Rule 1168 – Adhesive and Sealant Applications

Working Group Meeting #1

February 11, 2022, 1:00 PM (PST)

Join zoom meeting:
https://scaqmd.zoom.us/j/96627887514
Meeting ID: 966 27887514

Agenda

- Background
- Technology Assessments
- Categories Included in the Current Technology Assessment
- Other Areas of Consideration
- Next Steps
- Staff Contact Information

Background

Background on Rule 1168

- Applies to adhesives, adhesive primers, sealant, and sealant primers
- Rule adopted in 1989; last amended in 2017
- 2017 Rule Amended
  - Projected to achieve 1.4 tons per day (tpd) VOC reductions by 2023
  - Included lower VOC limits for 18 categories
  - Included technology assessments for the following categories:
    - Top and Trim Adhesives
    - Roofing products
    - Plastic Welding Cements
    - Foam Insulation and Sealants

Proposed VOC Limits

	Category	VOC Content Limit (g/L)			
		Current	Upon Rule Adoption	1/1/2019	1/1/2023
ADHESIVES	Building Envelope Membrane Adhesive	250			
	All Other Outdoor Floor Covering Adhesives	150		50	
	All Other Roof Adhesives	250			200*
	Single Ply Roof Membrane Adhesive	250			200*
	Wood Flooring Adhesive	100			20
	Edge Glue	250			
	ABS to PVC Transition Cement	510			425*
	CPVC Welding Cement	490			400*
	PVC Welding Cement	510			425*
	All Other Plastic Welding Cements	250		100	
	Rubber Vulcanization Adhesive	250	850		250
	Top and Trim Adhesive	250	540		250*
	Waterproof Resorcinol Glue	250		170	
	Substrate Specific Adhesive Applications				
	Reinforced Plastic Composite	250		200	
SEALANTS	Clear, Paintable, and Immediately Water Resistant	250	380		250
	Foam Sealant	250			50*
	Grout	250	65		
	Potable Water Sealant	250	100		
	All Other Roof Sealants	300			250*
	Single Ply Roof Membrane Sealant	450			250*
	All Other Architectural Sealants	250		50	
	All Other Sealants	420			250
	Adhesive Primers				
	Pressure Sensitive	200	785		
	Vehicle Glass	250	700		

* Includes a technology assessment prior to implementation date

Technology Assessments

Why South Coast AQMD conducts Technology Assessments?

- South Coast AQMD proposes lower VOC limits to reduce emissions to work toward achieving air quality goals
- Most VOC limits reflect new technology in the marketplace and are based on currently available products
- In some instances, the VOC limit is based on manufacturer feedback
  - Products may not be widely available
  - Staff recommends an extended implementation period and a technology assessment
    - The future effective VOC limit sets a target for industry to work towards
    - Technology assessment is conducted to check progress and report to Governing Board

How South Coast AQMD Conducts Technology Assessments?

- A South Coast AQMD technology assessment can take many forms:
  - Third-Party evaluation
  - Laboratory testing and evaluations
  - In-house evaluation
- Rule 1168 technology assessments likely will be conducted in-house and include:
  - Evaluation of the Quantity and Emissions Reports
  - Shelf surveys of available products
  - Consultations with the manufacturers
  - Working group meetings
- At the conclusion of the technology assessment, staff will present the finding to the Stationary Source Committee and recommend actions if necessary:
  - Actions can include a rule amendment or further studies

Data Sources for Technology Assessment

- Market penetration of low-VOC products is a useful indicator of technical feasibility
- Sales weighted average VOCs useful tool when assessing data
  - VOC weighting toward products with higher sales volumes
- For Adhesives and sealants, staff has two main sources of data:

2013 Survey	Quantity and Emissions Reports (QER)
• Staff conducted a survey of adhesives and sealants during the last rule amendment • Survey data represented 2013 sales and emissions • Data showed emissions were higher than previously estimated (4.1 tpd vs. 10.5 tpd)	• Rule 1168 requires manufactures to submit QERs • First set of QERs included 2017 and 2018 data • Data likely does not include recent product reformulations to meet future compliance deadlines • Next QER deadline is September 2022

Top and Trim

Technology Assessment

Top and Trim Adhesive - Background

2007

- VOC limit reduced from 540 to 250 g/L
- Technical challenges prevented reformulations
- End users continued to use high-VOC products as allowed under 55 gal/year exemption

2017

- Staff reinstate the 540 g/L limit until 2023
- Manufacturer feedback indicated there had been progress toward achieving the 250 g/L limits

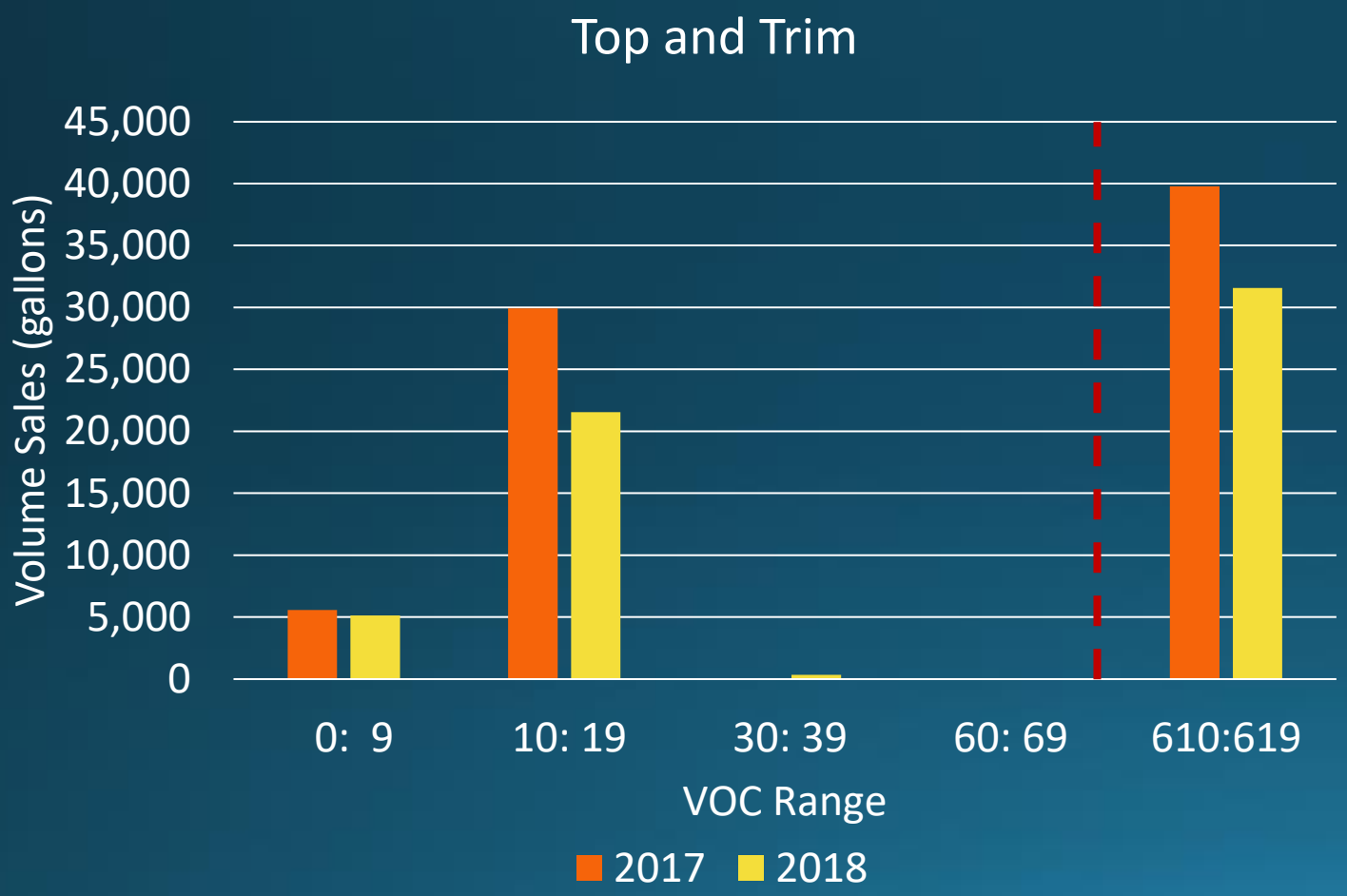
2019

- On January 1, 2019, 55-gal/year exemption expired for this category

2021

- Technology assessment required to ensure 250 g/L is feasible by 2023

Top and Trim Data



Top and Trim			
Current Limit 540 g/l			
Future Limit 250 g/l			
	2013	2017	2018
Sale Volume (gal)	PD*	75,000	60,000
Baseline (tpd)	0.35	0.28	0.23
# of Products	PD	19	19
SWA* VOC (g/L)	526	424	337

- Protected Data (PD) indicates the data is confidential with less than three manufacturers reported sales
- SWA: Sales Weighted Average

Top and Trim – Preliminary Assessment

Data shows a significant increase in sales of low-VOC top and trim adhesives

- 2013 survey showed all products exceeded 540 g/L VOC limit
- 2017 and 2018 QERs
  - High-VOC products phased out in 2019
  - Remaining volume of products are less than 20 g/L

Based on preliminary assessment, VOC limit of 250 g/L is feasible

- May propose a lower limit to reflect current VOC levels

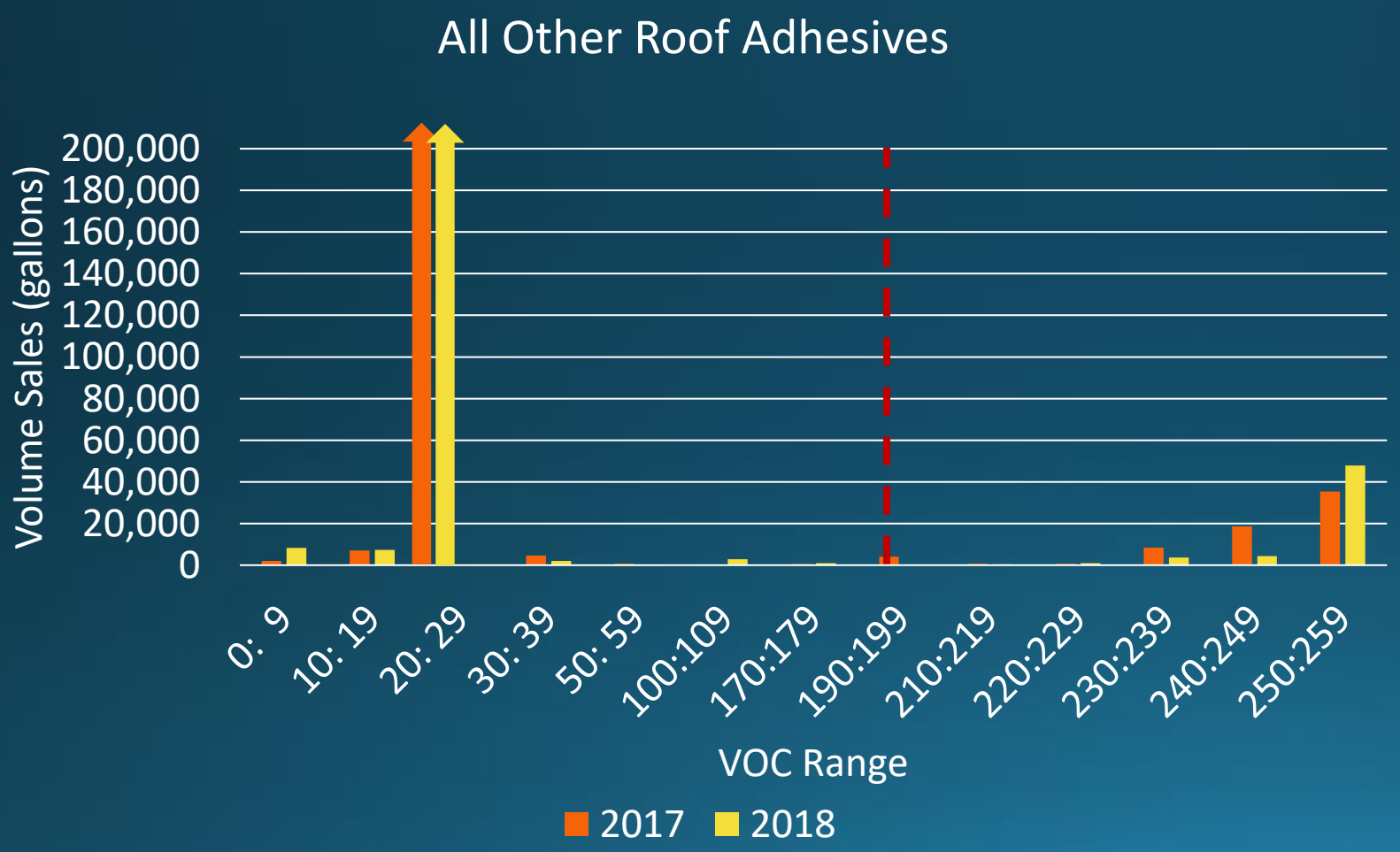
Roofing Adhesives and Sealants

Technology Assessments

All Other Roof Adhesives

- All Other Roof Adhesives consist of roofing products excluding Single-Ply Roof Membrane Adhesives
- The “All Other Roof Adhesives” category replaced the “nonmembrane roof adhesive” category
- VOC The proposed VOC limit for this category is 200 g/L
- Technology assessment was included to determine if subcategorization for this category is warranted

All Other Roof Adhesives Data



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

All Other Roof Adhesives – Preliminary Assessment

- Survey showed very large sales volume in the 20 – 29 g/L VOC range
  - Products are all asphalt adhesives
  - Majority (80%) are for Built Up Roofing Asphalt
- Staff's initial assessment is that a separate category for asphalt-based roofing adhesives may be warranted
  - Category could have a low VOC limit (~30 g/L)
- All Other Roof Adhesives category could be retained with the 200 g/L VOC limit
- Staff seeking input from stakeholders

Single-Ply Roof Membrane Adhesive

VOC

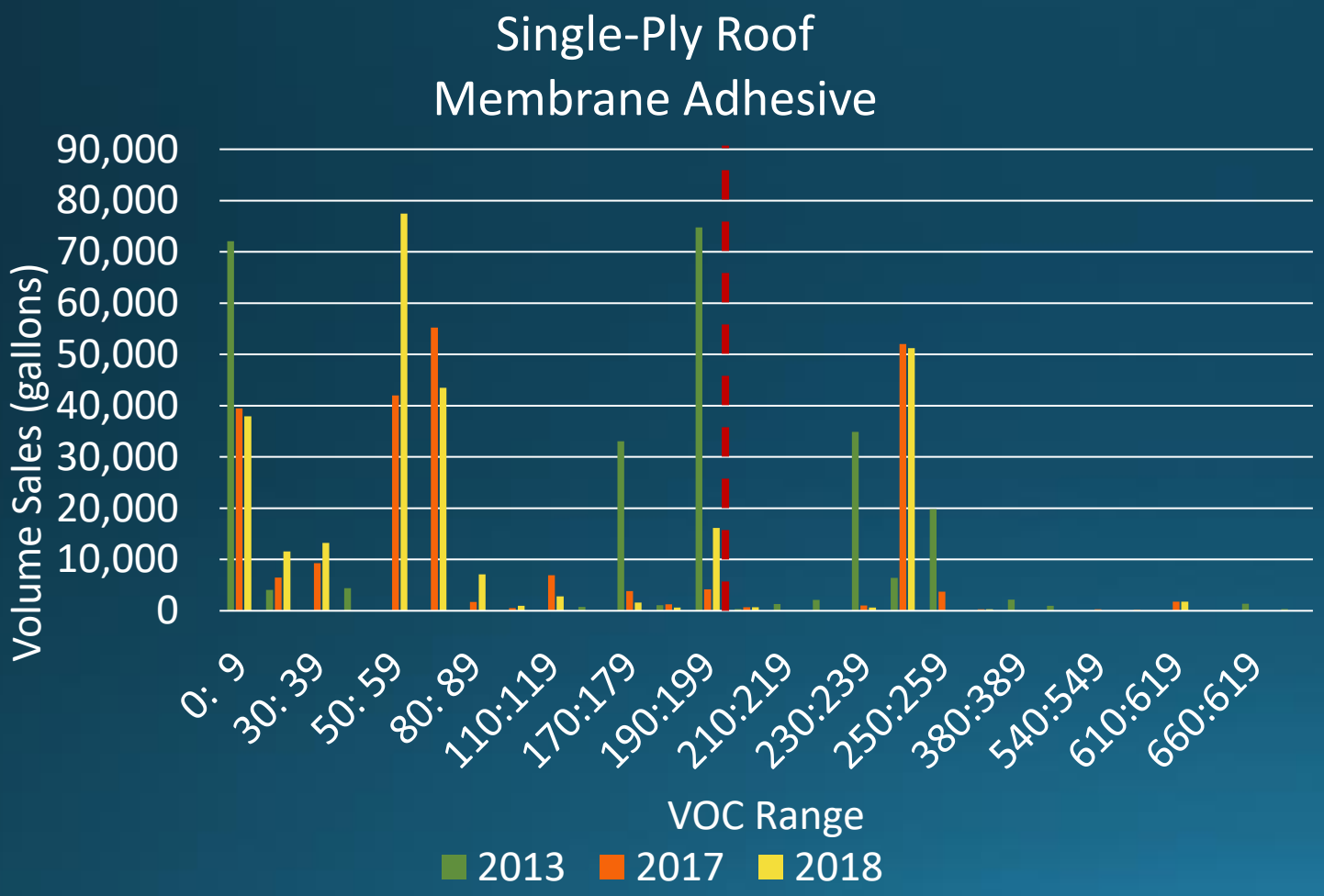
The proposed VOC limit for this category is 200 g/L

Products are primarily water-based or reactive systems

During 2017 rule development, concerns were raised regarding the use of water-based adhesives in cool weather

- Staff report stated 50 percent of market share were waterborne
- Based on the 2018 survey, only ~ 10 percent of the market share was waterborne showing solvent-based products are being reformulated to meet 200 g/L limits

Single-Ply Roof Membrane Adhesive Data



Single-Ply Roof Membrane Adhesive			
Current Limit 250 g/l			
Future Limit 200 g/l			
	2013	2017	2018
Sale Volume (gal)	260,000	230,000	270,000
Baseline (tpd)	0.45	0.36	0.38
# of Products	52	61	60
SWA VOC (g/L)	147	120	125

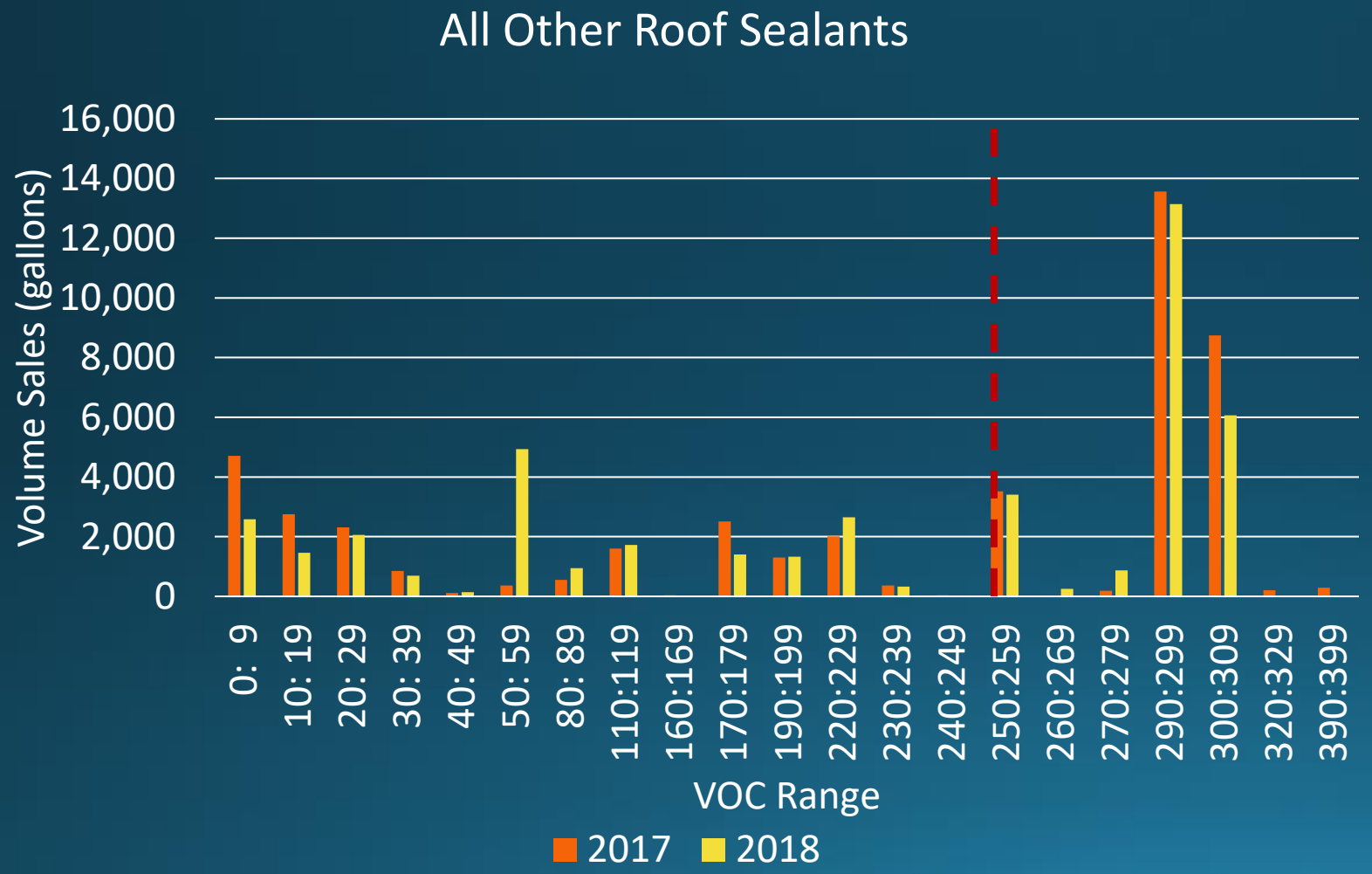
Single-Ply Roof Membrane Adhesive – Preliminary Assessment

- Sizable market share already meeting the 200 g/L VOC limits based on 2017 and 2018 data
  - Survey data show decreasing SWA VOC from 2013 to 2017/2018 survey
- Cluster of products formulated at 250 g/L, staff will further review to see if they are unique products or if they can be replaced with the 200 g/L products
- Technology assessment for this category was also to determine if subcategorization for this category are warranted
  - Single-ply roof membrane roofing comes in several different types of materials: TPO, PVC, EPDM
  - Staff seeking feedback if further subcategorization is needed

All Other Roof Sealants

- This category includes all roof sealants except Single-Ply Roof Membrane Sealants
  - Most products are either asphalt or polyurethane-based
  - The low-VOC products are reactive or elastomeric products that require the surface to be moisture free
- High-VOC solvent-based products are formulated for application in wet environments, e.g., leak repair during rainfall
- Proposed limit for this category is 250 g/L

All Other Roof Sealants



All Other Roof Sealants	
Current Limit: 300 g/l	
Future Limit: 250 g/l	
	2017 (same as 2018)
Sale Volume (gal)	45,000
Baseline (tpd)	0.025
# of Products	60
SWA VOC (g/L)	198

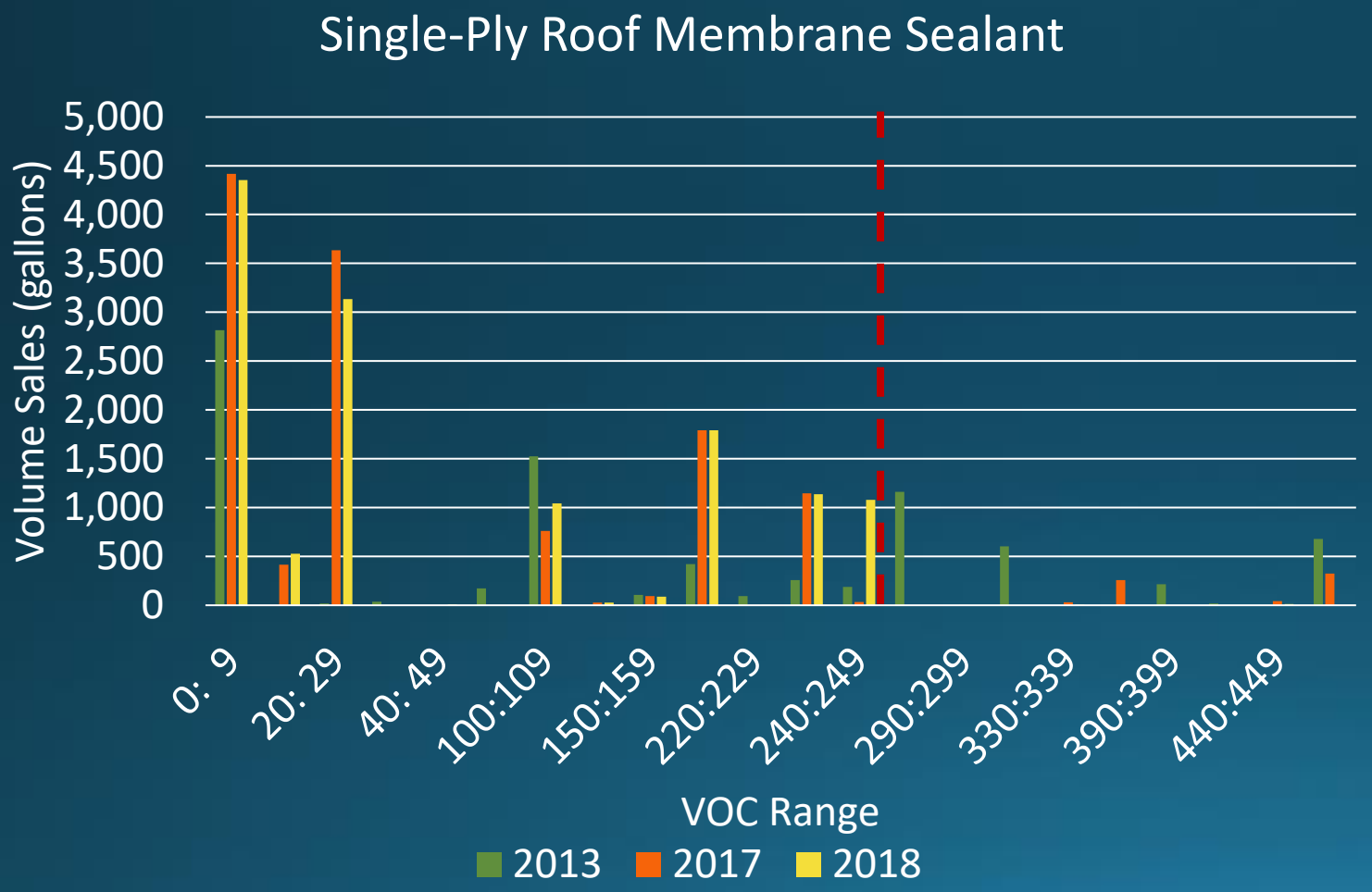
All Other Roof Sealants – Preliminary Assessment

- Small category with a low baseline
- Based on current survey data, there is a considerable market share reformulated to meet the future effective limits
  - SWA VOC is below the future compliant limit
  - Survey data does not reflect most recent re-formulations
    - Rule amendment October 2017
    - Survey data is from 2017 and 2018
    - Next set of reports not due until September 2022

Single-Ply Roof Membrane Sealant

- Single-Ply Roof Membrane Sealants technologies include:
  - Low-VOC water-based sealants
  - 100 percent solids sealants
  - Solvent-based sealants
    - Includes sealants formulated with exempt solvents
- The overall volume is much lower than All Other Roofing Sealants
- The proposed limit for this category is 250 g/L

Single-Ply Roof Membrane Sealant



Single-Ply Roof Membrane Sealants			
Current Limit 450 g/l			
Future Limit 250 g/l			
	2013	2017	2018
Sale Volume (gal)	8,300	13,000	13,000
Baseline (tpd)	0.027	0.012	0.012
# of Products	33	36	33
SWA VOC (g/L)	96	81	82

Single-Ply Roof Membrane Sealant – Preliminary Assessment

- Sales volume and emissions are very low
- Based on survey data, vast majority of products are meeting the future effective limits
- Staff recommends keeping further effective limit of 250 g/L
  - Potentially include lower limit for this category to reflect existing products

Plastic Welding Cements

Technology Assessments

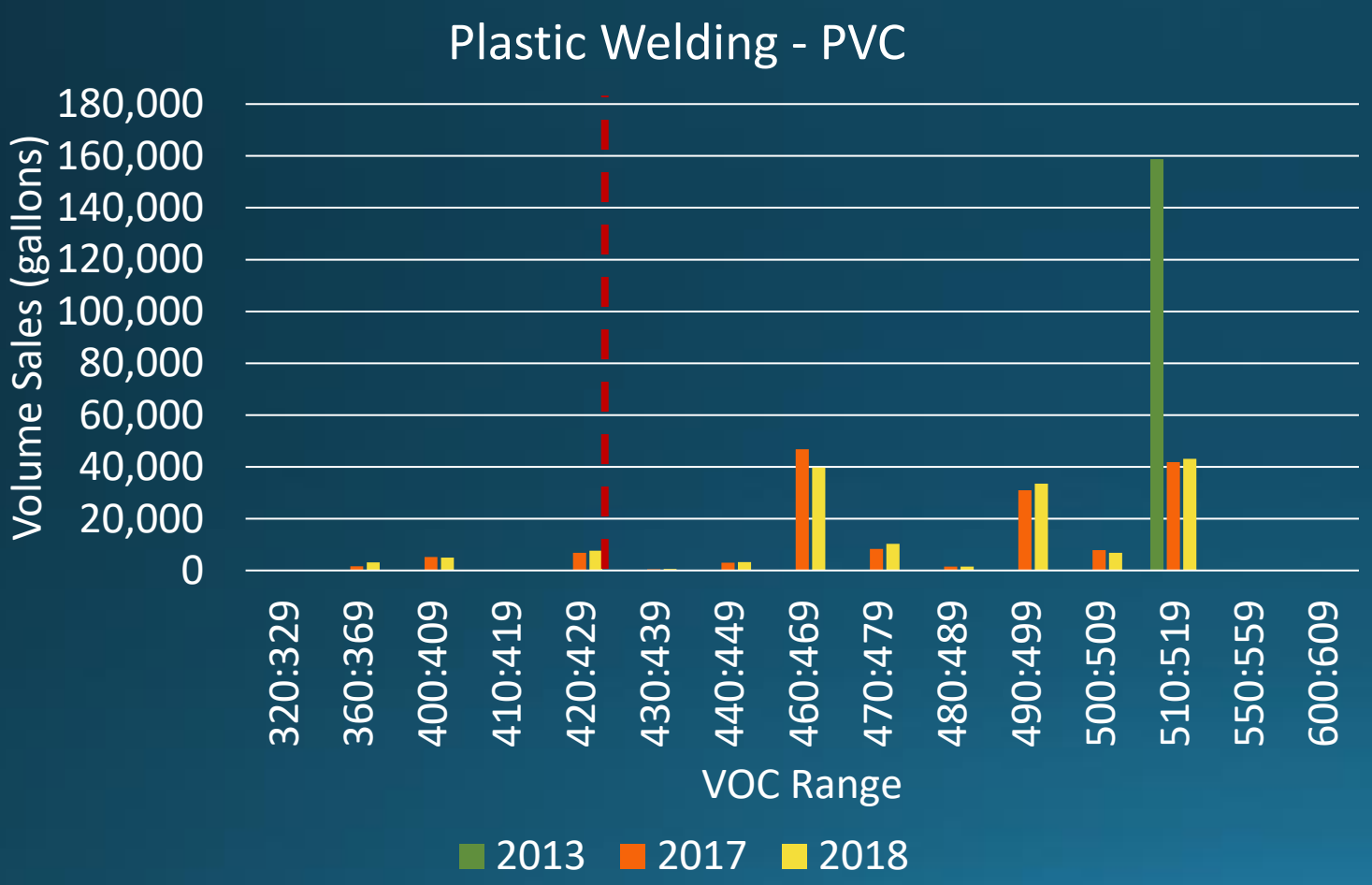
Plastic Welding Cement Background

- 2017 rule amendment lowered VOC limits for PVC welding cements from 510 g/L to 425 g/L
  - Products were already available below 425 g/L
  - Leaders in the industry expressed support for the lower VOC limits in 5 years
- Technical assessment was included to check-in on product development

Table 12: Regulated Product Proposed VOC Content Limit

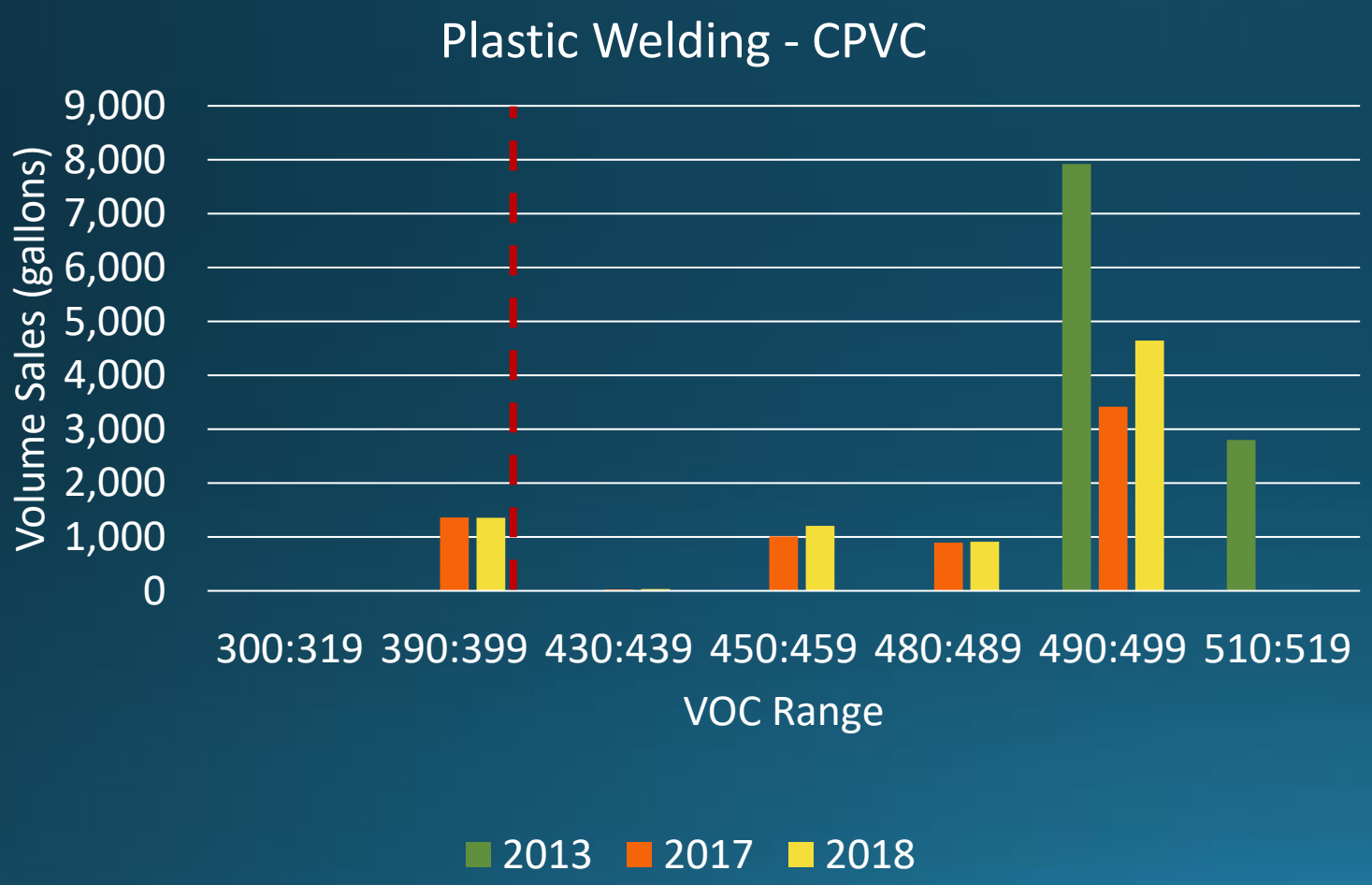
Category	VOC Content Limit (g/L)			
	Current	Upon Rule Adoption	1/1/2019	1/1/2023
Adhesives				
Architectural Applications				
Building Envelope Membrane Adhesive	250			
Roofing				
Single-Ply Roof Membrane Adhesive	250			200*
All Other Roof Adhesives	250			200*
Wood Flooring Adhesive	100			20
All Other Outdoor Floor Covering Adhesive	150		50	
Edge Glue Adhesive	250			
Plastic Welding Cement				
ABS to PVC Transition Cement	510			325*
CPVC Welding Cement	490			400*
PVC Welding Cement	510			425*
All Other Plastic Welding Cements	250		100	
Rubber Vulcanization Adhesive	250	850		250
Top and Trim Adhesive	250	540		250
Waterproof Resorcinol Glue	250		170	
Substrate Specific Adhesive Applications				
Reinforced Plastic Composite	250		200	
**Sealants **				
Architectural				
Clear, Paintable, Immediately Water Resistant Sealant	250	380		250
Foam Sealant	250			50*
Grout	250	65		
Insulating Foam Sealant	250	50		
Non-Staining Plumbing Putty	580	150		50
Potable Water Sealant	250	100		

Plastic Welding Cement - PVC



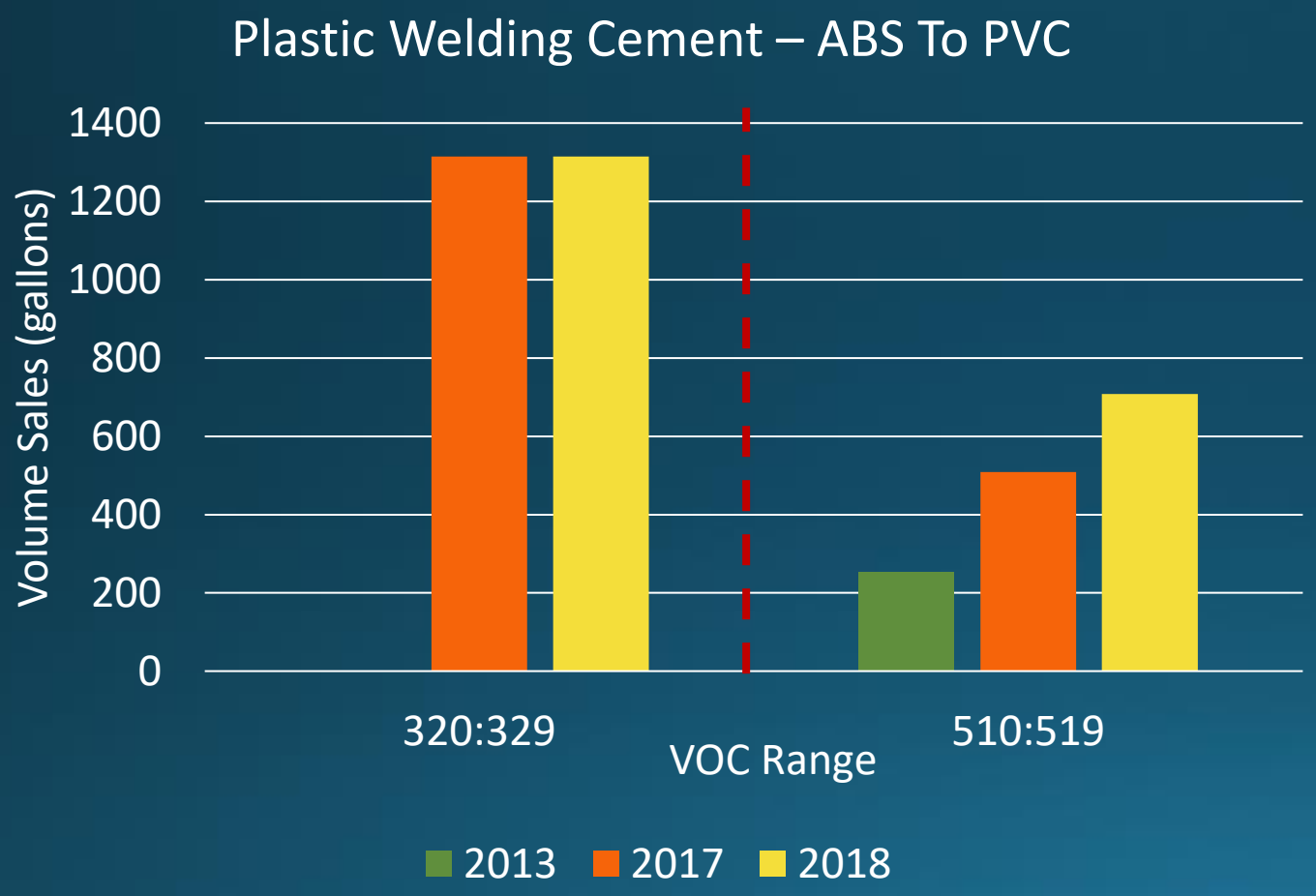
Plastic Welding Cement			
Current Limit 510 g/l			
Future Limit 425 g/l			
	2013	2017	2018
Sale Volume (gal)	159,000	155,000	155,000
Baseline (tpd)	0.92	0.85	0.85
# of Products	164	336	335
SWA VOC (g/L)	522	480	480

Plastic Welding Cement - CPVC



CPVC			
Current Limit 490 g/l			
Future Limit 400 g/l			
	2013	2017	2018
Sale Volume (gal)	10,700	6,700	8,200
Baseline (tpd)	0.06	0.035	0.04
# of Products	37	58	58
SWA VOC (g/L)	651	383	469

Plastic Welding Cement – ABS To PVC



Plastic Welding Cement – ABS To PVC			
Current Limit 510 g/l			
Future Limit 425 g/l			
	2013	2017	2018
Sale Volume (gal)	254	1,800	2,000
Baseline (tpd)	0.001	0.007	0.008
# of Products	PD	PD	PD
SWA VOC (g/L)	510	377	390

* Protected Data (PD) indicates the data is confidential with less than three manufacturers reported sales

Plastic Welding Cement - Manufacturer Feedback

- Meetings with Plastic Welding Cement Manufacturers
  - November 12, 2021: Meeting with Plastic Pipe and Fittings Association (PPFA)
  - November 18, 2021: Meeting with Oatey
  - November 19. 2021: Meeting with E-Z Weld
  - January 28, 2022: Meeting with Weld-On/IPS
  - February 4, 2022: Meeting with Oatey
- Initial feedback:
  - Some manufacturers have reformulated products to meet most future limits
  - Others still working on future compliant formulation
  - Most concerned with CPVC, life saving systems (e.g., fire sprinkler system) and large diameter pipe
    - Need more time to reformulate and test
    - Products must undergo extensive testing once a new product formulation is developed

Plastic Welding Cement – Preliminary Assessment

- Survey data does not show a significant number of products meeting the future limits, but trends show VOC levels decreasing
- Survey data does not reflect any recent re-formulations
  - Rule amendment October 2017
  - Survey data is from 2017 and 2018
  - Next set of reports not due until September 2022
- Staff will conduct shelf surveys in the coming months to assess availability of future compliant products
- Considering the need for:
  - Additional time for further effective VOC limits
  - A subcategory under CPVC for “life saving systems” with a higher VOC limit

Foam Insulation and Sealants

Technology Assessments

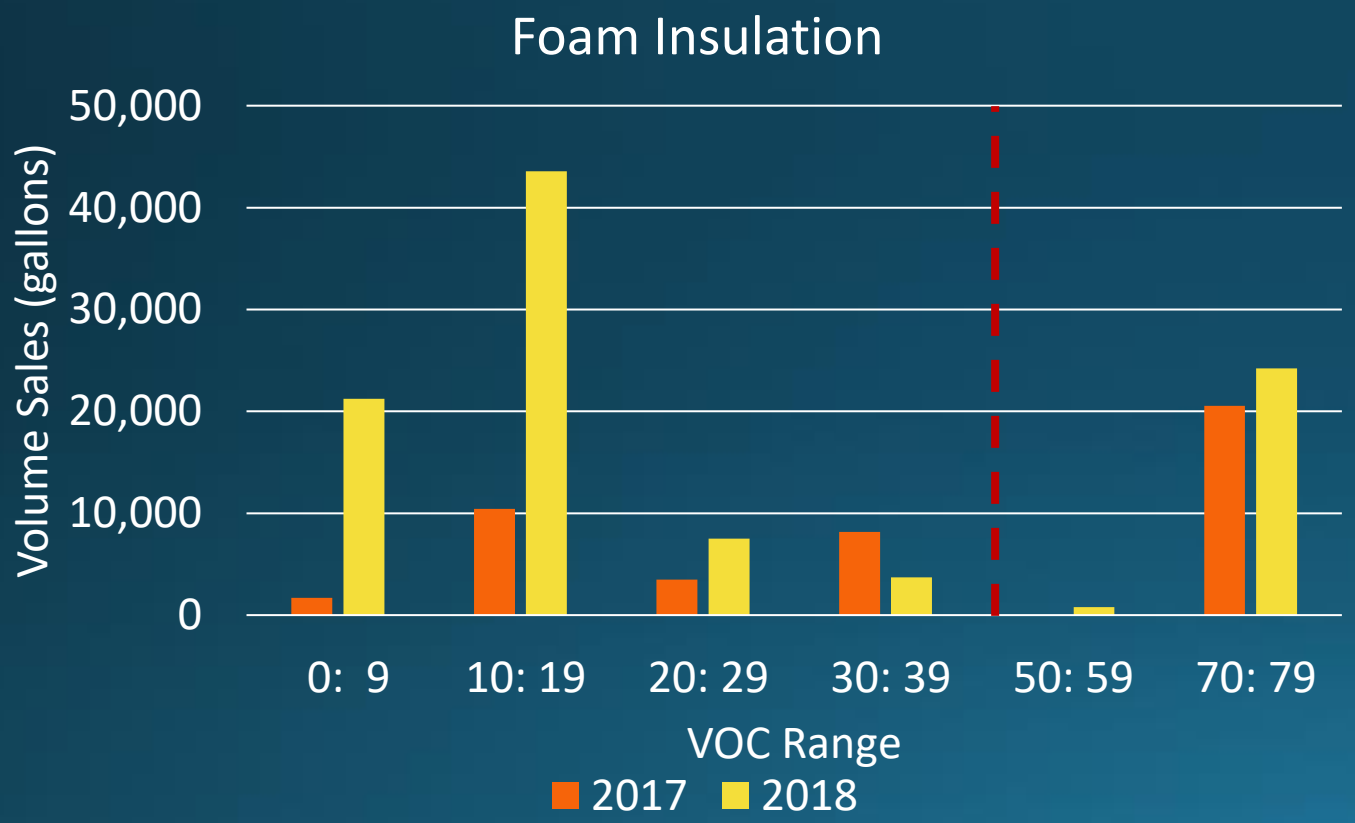
Foam Products - Background

- The 2017 amendment included two new categories of foam products: foam insulation and foam sealants
  - Prior to 2017, these products were not explicitly regulated by Rule 1168
- The foam itself is typically a one-component or two-component polyurethane that contains little or no VOC
  - Propellants used in some of the aerosol products contribute to the VOC content
- Based on preliminary analysis, most of the products and sales volume reported are aerosol products

Foam Products – Background *cont.*

- Measuring the VOC content of foam products presents a significant challenge
  - South Coast AQMD is conducting test method development
    - Presentation from July 2020 posted on website
  - Development has been delayed due to COVID restrictions
  - Currently, VOC content must be determined through formulation data
    - U.S. EPA Method 24 cannot be used to measure the VOC content for foam products

Foam Insulation



Foam Insulation			
Current Limit 250 g/l			
Future Limit 50 g/l			
	2013	2017	2018
Sale Volume (gal)	N/A	45,000	100,000
Baseline (tpd)	N/A	0.020	0.022
# of Products	N/A	42	48
SWA VOC (g/L)	N/A	20	28

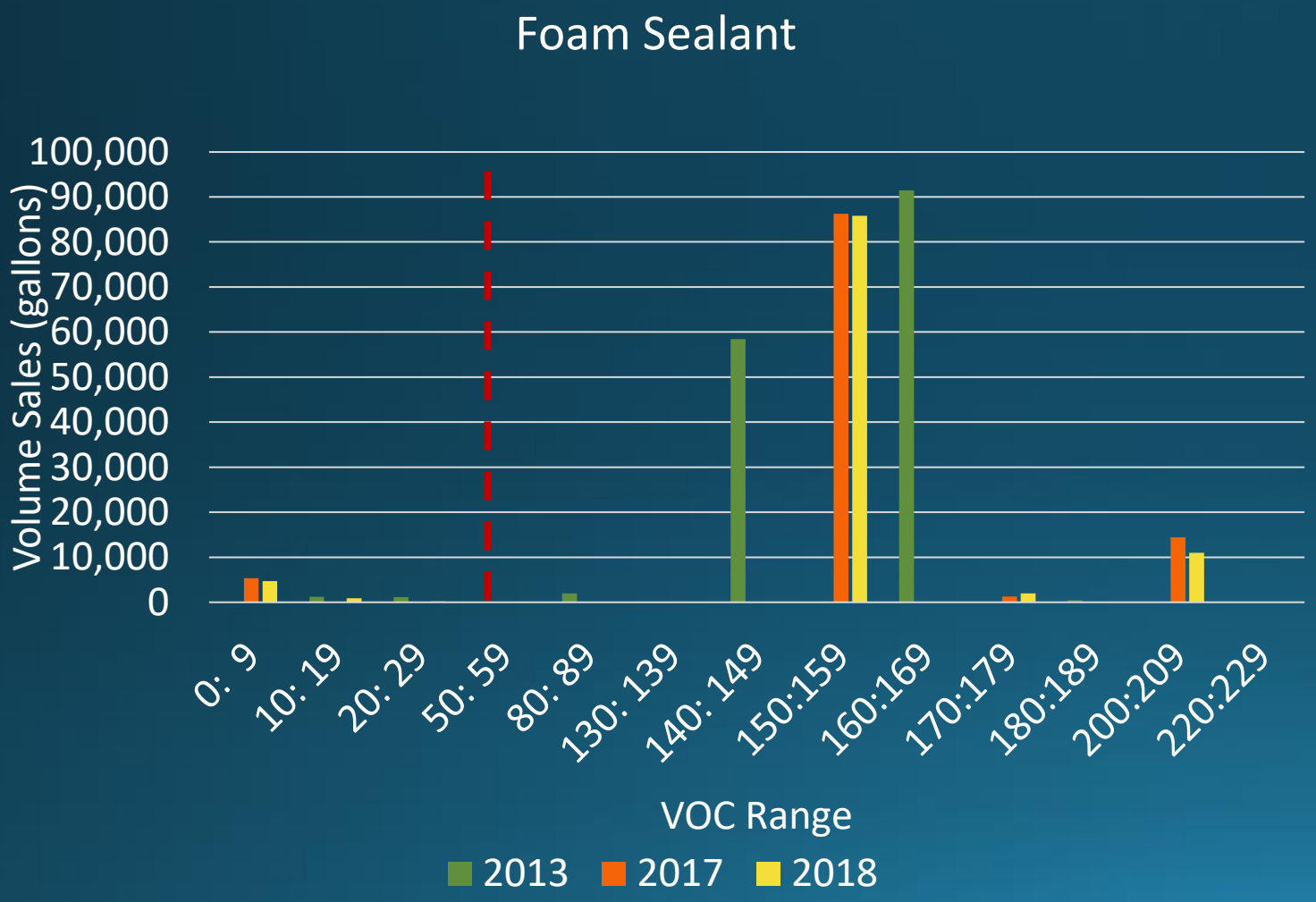
Foam Insulation – Preliminary Assessment

- Significant sales volume already meeting the future effective VOC level of 50 g/L
  - Significant number of future compliant products at time of rule adoption
- Preliminary data suggests the future VOC limit has been achieved with significant market penetration
- Staff seeking further input from foam insulation manufacturers

Foam Sealants - Background

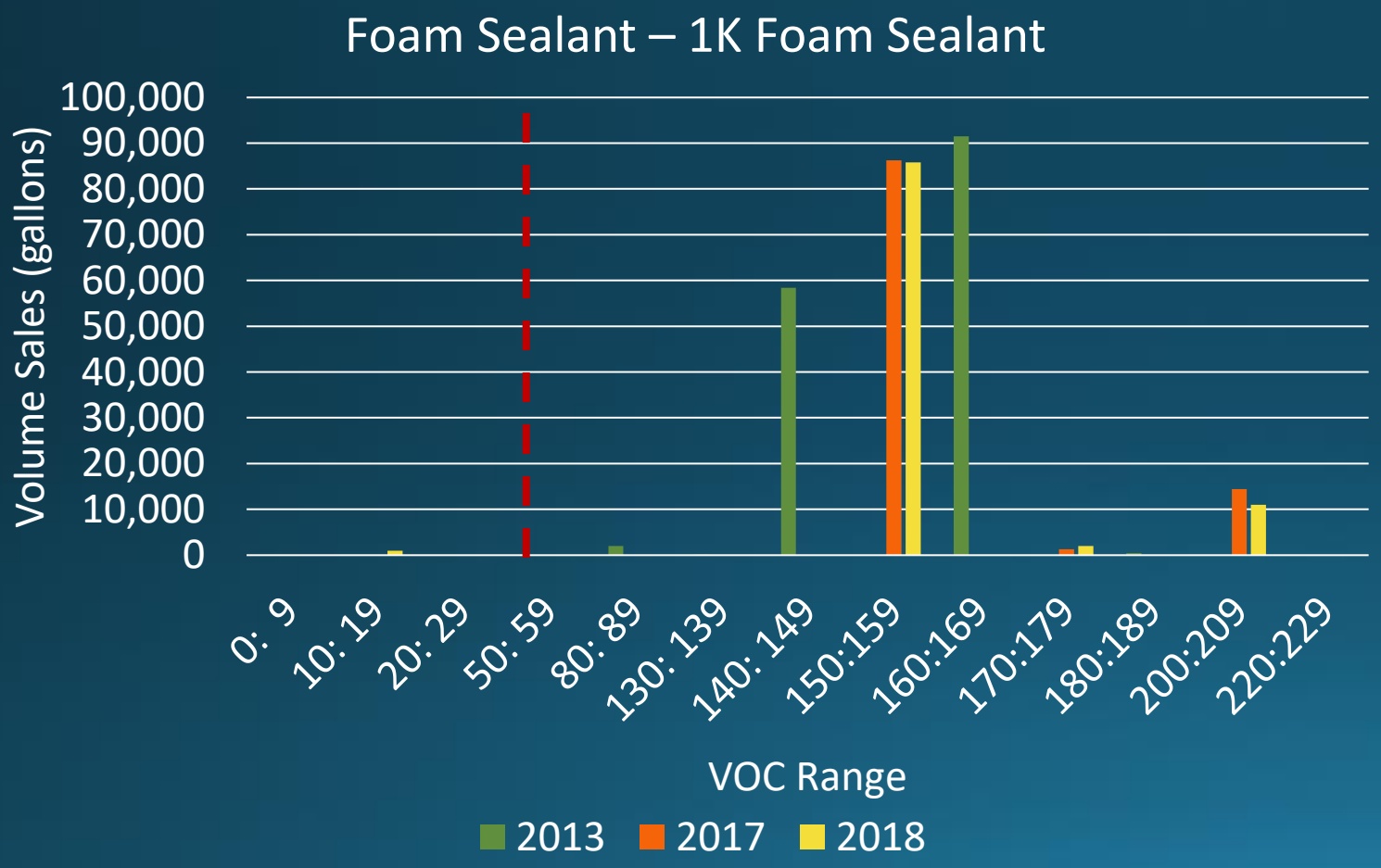
- The Adhesives and Sealants Council (ASC) has been in discussions with South Coast AQMD staff since 2021
  - Presented concerns to staff on February 18, 2021
  - Formal letter submitted on April 12, 2021
  - Meeting on December 2, 2021
- One of their main concerns is the categorization of foam sealants
  - Requested one-component (1K) and two-component (2K) foam sealant subcategories
- The following slides summarize the current foam sealant category followed by a breakdown of 1K and 2K foam sealants
  - Staff worked with the manufactures to refine the categories or relied on internet searches to separate the categories

Foam Sealant



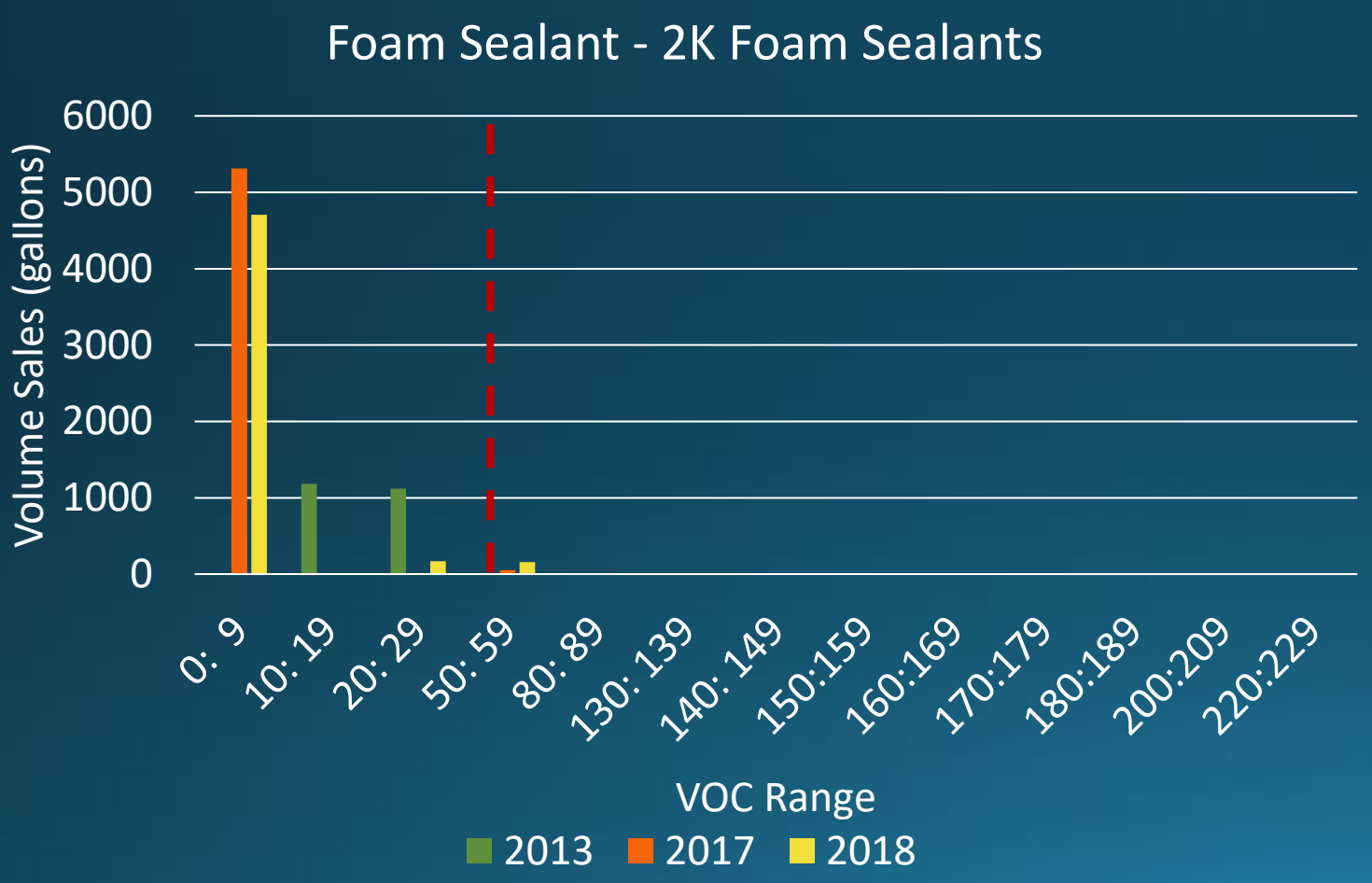
Foam Sealant			
Current Limit 250 g/l			
Future Limit 50 g/l			
	2013	2017	2018
Sale Volume (gal)	155,000	107,000	105,000
Baseline (tpd)	0.27	0.18	0.18
# of Products	16	37	45
SWA VOC (g/L)	153	154	148

Foam Sealants – 1K Foam Sealant



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 Sealants – 2K Foam Sealants



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

* Protected Data (PD) indicates the data is confidential with less than three manufacturers reported sales

Foam Sealants - Considerations

- Staff considering breaking up the foam sealant category
  - One component foam sealants
  - Two component low-pressure sealants
  - Possibly include further subcategories
- Laboratory staff is continuing work on the test method development
- Staff considering a change to the metric for regulating the foam products using a weight percent instead of gram per liter less exempts and water
  - Metric will simplify the testing and reporting of VOC content
- Considering including new exempt compound(s) that has shown promise for aerosol sealants

Foam Sealants – Preliminary Assessment

- Some foam sealant products need more time to reformulate to meet future VOC limits
  - 2K foam sealants already meet 50 g/L limits
- Majority of 1K foam sealants reported sold in 2017 and 2018 meet 150 g/L
- Staff may amend rule:
  - Include an interim limit of 150 g/L
  - Allow more time to reformulate to 50 g/L
  - Must assess the technical feasibility and cost-effectiveness

Preliminary Conclusions for Rule 1168 Technical Assessments

- Staff concludes Rule 1168 will require an amendment prior to implementation of January 1, 2023 VOC limits
  - Implementation dates may be delayed
  - VOC limits may be revised
  - Some categories may need to be broken into sub-categories
- Targeting a public hearing in the fourth quarter of 2022 to allow time for further research

Preliminary Conclusions for Rule 1168 Technical Assessments

The following categories appear to be on track to meet the future limits:

- Top and Trim
- Single-Ply Roof Membrane Sealants
- ABS to PVC
- Foam Insulation

The following categories need further evaluation:

- All Other Roof Adhesives
- Single-Ply Roof Membrane Adhesives
- All Other Roof Sealants
- PVC and CPVC
- Foam Sealant

Other Areas of Discussion for Next Working Group Meeting

Exempt Solvents

- Considering a limited VOC exemption for two HFO blowing agents
- Will evaluate the extent that para-Chlorobenzotrifluoride (pCBtF) is used to formulate compliant adhesives and sealants

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

Initiate Rule Amendment

Report on initial findings and continue discussions

Questions

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