Proposed Amended Rule 1136: *Wood Products Coatings* (PAR 1136)

Working Group Meeting #4

September 16, 2025

Join Zoom Webinar

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Agenda

- Summary of Rule Development Process
- Exempt compound Background
- PAR 1136 Background and Need for Amendment
- Coating Manufacturer Survey Results
- Maximum Incremental Reactivity (MIR) VOC Limits
- Initial Rule Considerations
- Next Steps

Summary of Recent Rule Development Efforts

Due to staffing resources, PAR 1136 rule development was temporarily delayed

Summary of Working Group Meeting (WGM) #3 December 10, 2024

- Presented the initial findings from the Coating Manufacturer Survey data
- Explained considerations to phase out two exempt compounds with toxic endpoints:
  - *para*-Chlorobenzotrifluoride (pCBtF or Oxsol, CAS#: 98-56-6)
  - *tert*-Butyl Acetate (t-BAc, CAS #: 540-88-5)
- Encouraged manufacturers to submit survey responses if they had not already

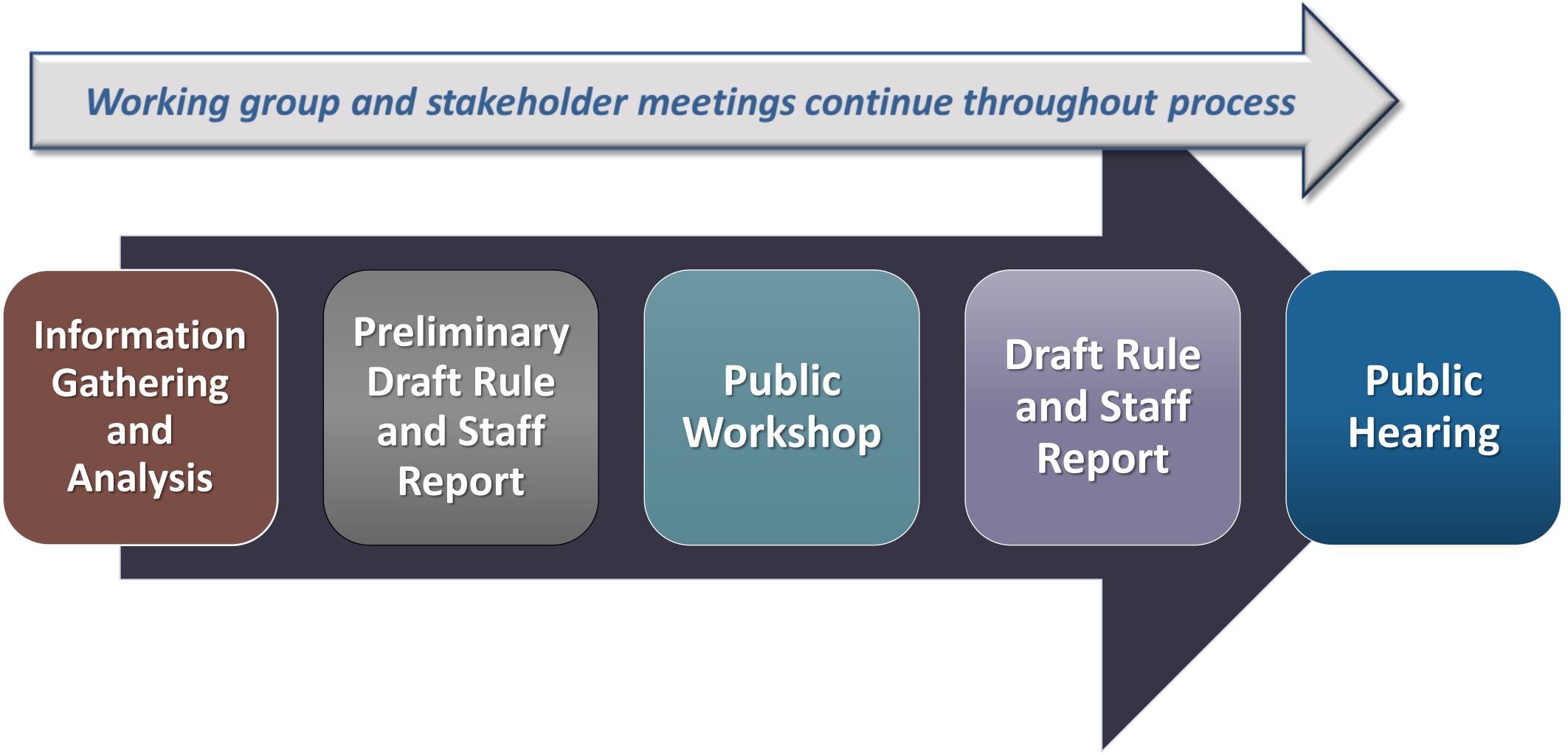
Rule Development Progress Since June 2025

- Received and analyzed coating manufacturer survey data
- Met with coatings manufacturers who responded to the survey

Background

- Rule 1136 was adopted in 1983 and last amended in 1996
- Purpose of the rule is to limit VOC emissions from wood coatings and strippers
- Applicable to wood products, including furniture, cabinets, shutters, frames and toys
  - Rule does not apply to residential non-commercial operations
- Establishes VOC content limits and coating application methods

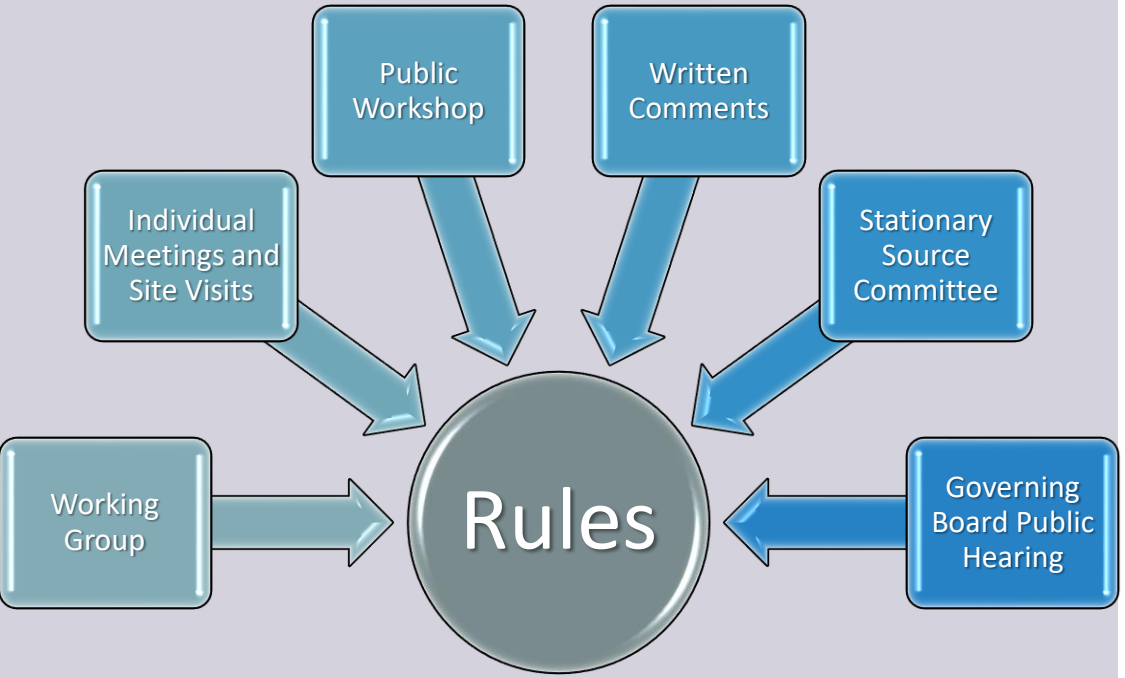
Overview of Rule Development Process



Information Gathering

- Staff gathers information from multiple sources:
  - Internet searches
  - Manufacturer meetings/surveys
  - Internal expertise and data
  - Permits issued to facilities
  - Inspection reports and compliance history
  - Previous rule files and other rule amendments
  - Product datasheets
  - Site visits
- Information includes types of products being used, volatile organic compound content, product cost, etc.
- Information used to inform staff recommendations

Public Input



- Stakeholders can provide input during Working Group Meetings and throughout the 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 to discuss individual issues

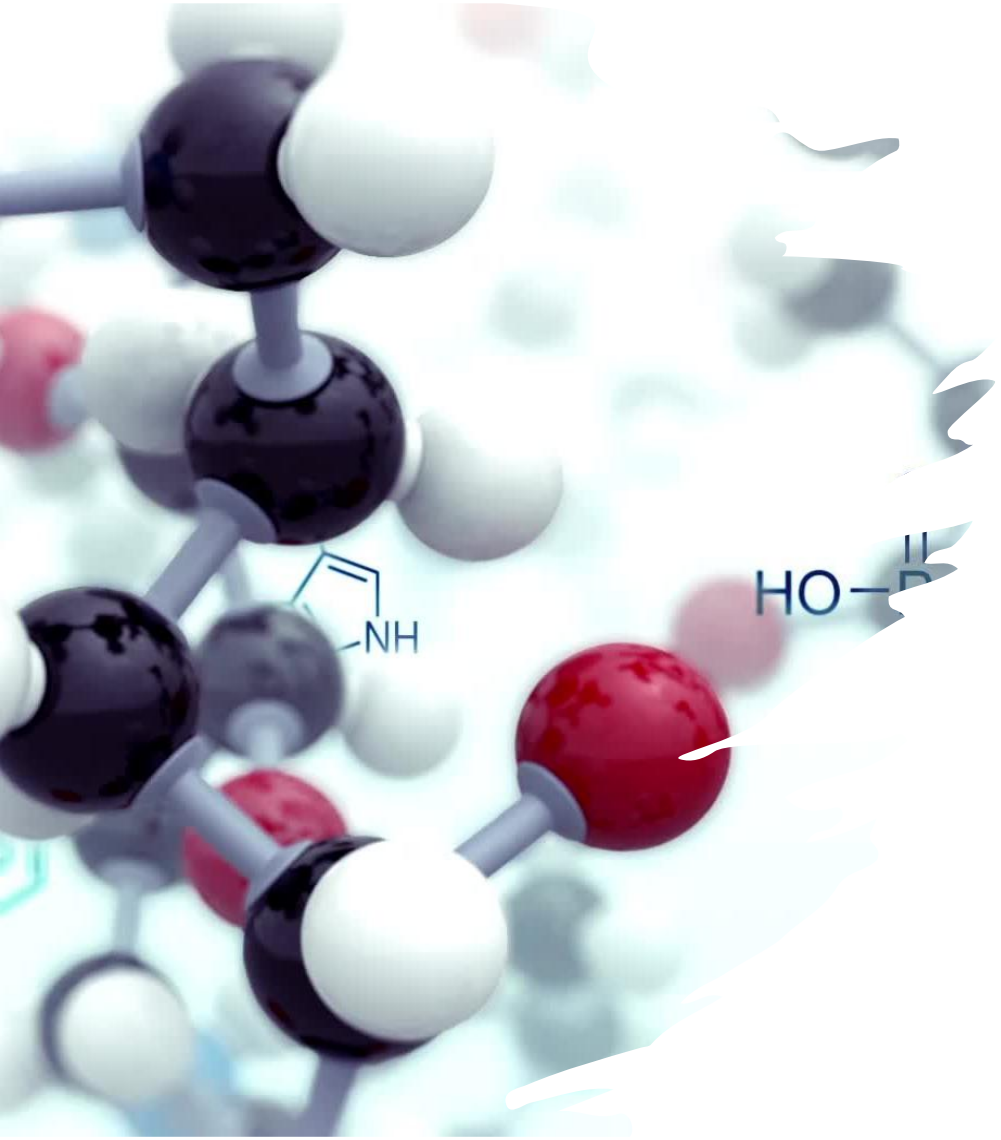
Exempt Compound Background

Volatile Organic Compounds (VOC)*

- VOCs are photochemically reactive chemicals and major contributor to Ozone formation (smog)
  - South Coast AQMD is classified as an extreme non-attainment area for the 2015 Ozone National Ambient Air Quality Standards (NAAQS)
- VOCs can be emitted from different sources including coatings
  - Common sources of VOCs are mobile sources, industrial processes, biogenic (e.g., wildfires), coatings, etc.
- Rule 1136 regulates VOCs that are emitted from coatings applied to wood surfaces

* Definition of VOC (per Rule 102): Carbon-based volatile compounds excluding: methane, CO, CO_2, carbonic acid, metallic carbides/carbonates, ammonium carbonate, and exempt compounds

Exempt Compounds



- U.S. EPA VOC Exemptions
  - Solvents with low photochemical reactivity (less than ethane)
  - Do not consider toxicity in exemptions
  - Key exempt compounds include: acetone, pCBtF, and t-BAc
- South Coast AQMD Approach
  - Considers U.S. EPA exemptions plus toxicity, ozone depletion, and environmental impact
  - Rule 102 Exempt Compound Groups:
    - Group I: Not expected to be restricted
    - Group II: Often prohibited in VOC rules
- Special Exemptions
  - t-BAc has limited use exemption in:
    - Rule 1113 (Architectural Coatings) and Rule 1151 (Motor Vehicle Coatings)

pCBtF and tBAc Background

1994	U.S. EPA exempted pCBtF as a VOC due to negligible photochemical reactivity
1995	South Coast AQMD exempted pCBtF as a VOC due to negligible photochemical reactivity
2004	U.S. EPA exempted t-BAc as a VOC due to negligible photochemical reactivity
2005 – 2006	South Coast AQMD included limited exemption for t-BAc in Rule 1151 and Rule 1113
2015	Office of Environmental Health Assessment (OEHHA) released draft Cancer Potency Factor for t-BAc, more toxic than previously believed
2017	South Coast AQMD staff drafted t-BAc white paper and presented findings to the Stationary Source Committee, who directed staff to prioritize toxicity over VOC emission reductions
2018	OEHHA finalized t-BAc Cancer Potency Factor, concluding poses potential cancer risk to humans, South Coast AQMD requested OEHHA evaluate toxicity of pCBtF
2020	OEHHA finalized pCBtF Inhalation Cancer Potency Factor, concluding pCBtF poses greater cancer risk to humans than t-BAc

Actions taken to address pCBtF and t-BAc

Three rules have been adopted with future effective phase outs

- **Rule 1168** – Adhesives and Sealants in 2022
- **Rule 1151** – Automotive Coating in 2024
- **Rule 1171** – Solvent Cleaning Operations in 2025

Rule amendment started in 2024 for three coating rules

- **Rule 1107** – Coating of Metal Parts and Products
- **Rule 1124** – Aerospace Operations
- **Rule 1136** – Wood Products Coatings

Other Ongoing Efforts

- Conducting a coating manufacturer survey for a series of VOC rules to assess the extent of pCBtF and t-BAc use

PAR 1136 Background and Need for Amendment

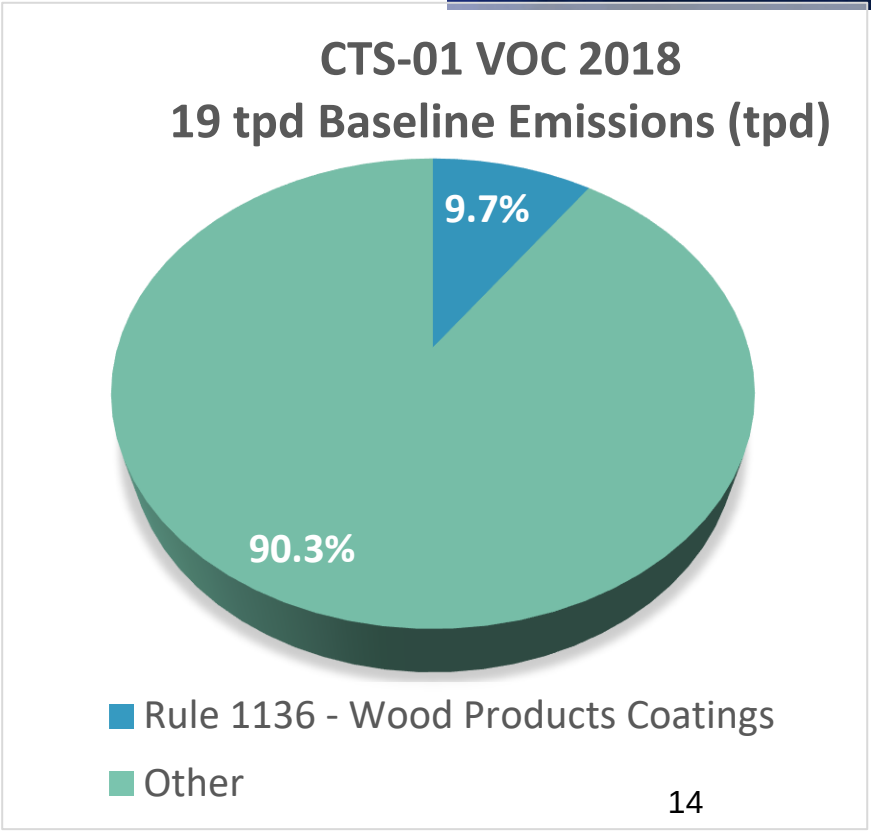
2022 Air Quality Management Plan

Blueprint to achieve federal air quality standards

- Control measures detail emission reductions needed to achieve 2015 ozone standards

CTS-01 *Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealant*

- Seeks to phase out of pCBtF and t-BAc while achieving emission reductions of 0.5 tpd



Key Objectives of Rule Amendment

Implement CTS-01 the 2022 Air Quality Management Plan

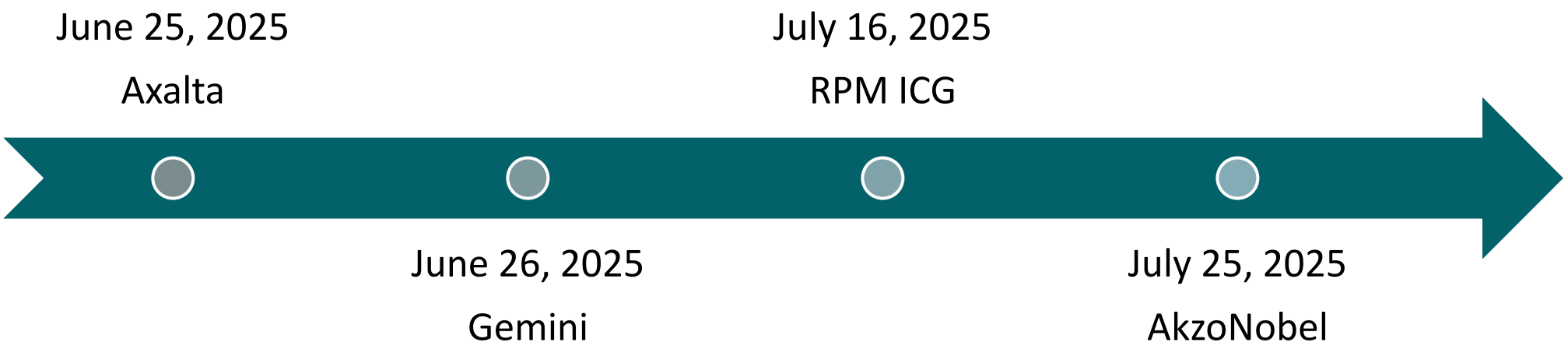
Evaluate VOC content limits and usage of pCBtF and tBAc

Consider best approach to phase out the use of pCBtF and t-BAc as quickly as practical

Rule 1136 Universe

- Staff identified 516 facilities with active permits
- 21 facilities with a high potential to emit, i.e., Title V facilities
  - ~ 10 facilities have high VOC emissions from applying wood coatings
- Facilities are spread throughout the South Coast AQMD region
- Some facilities are located near sensitive receptors (e.g., schools, residential areas, etc.)

Meeting with Coating Manufacturers



Points of Discussion

- Clarification on coating manufacturer survey data
- Extent of pCBtF and t-BAc usage within a specific industry
- Challenges with prohibition of pCBtF and t-BAc
- Alternative compliance methods and reformulations
  - e.g., waterbased coating technologies, reactivity-based VOC limits

PAR 1136 Site Visits

- Staff conducted site visits at three wood coating operations:
  - One facility complying with the rule with pollution control equipment
- Staff conducted another site visit after resumed rule development process in third quarter 2025

Business Sector	Applicable Rule
Amusement and Recreation Services	1136
Musical Instruments	1136
Motion Picture Production	1136
Coating Manufacturer	1136/1113

PAR 1136 Survey Results

Coating Manufacturer Survey Status

- The survey was distributed on August 7, 2024
- Responses were requested by October 22, 2024
- Assess extent of pCBtF and t-BAc use and propose a feasible prohibition timeline
- Assess potential VOC reductions

- Staff received responses from four manufacturers
- Staff encourages any remaining manufacturers to provide survey responses as soon as possible so staff has time to properly evaluate new data

Rule 1136 Coating Categories Reported

Rule 1136 Coating Categories
Clear Sealers
Clear Topcoat
Pigmented Primers, Sealers & Undercoats
Pigmented Topcoats
Barrier Coat - Plastic Components
Composite Wood Edge Filler
Extreme Performance Coatings
Fillers
High-Solid Stains
Inks
Mold-Seal Coatings
Multi-Colored Coatings
Low-Solids Barrier Coat - Plastic Components
Low Solid Stains, Toners, and Washcoats

Seven coating categories were reported to be sold in the manufacturer surveys:

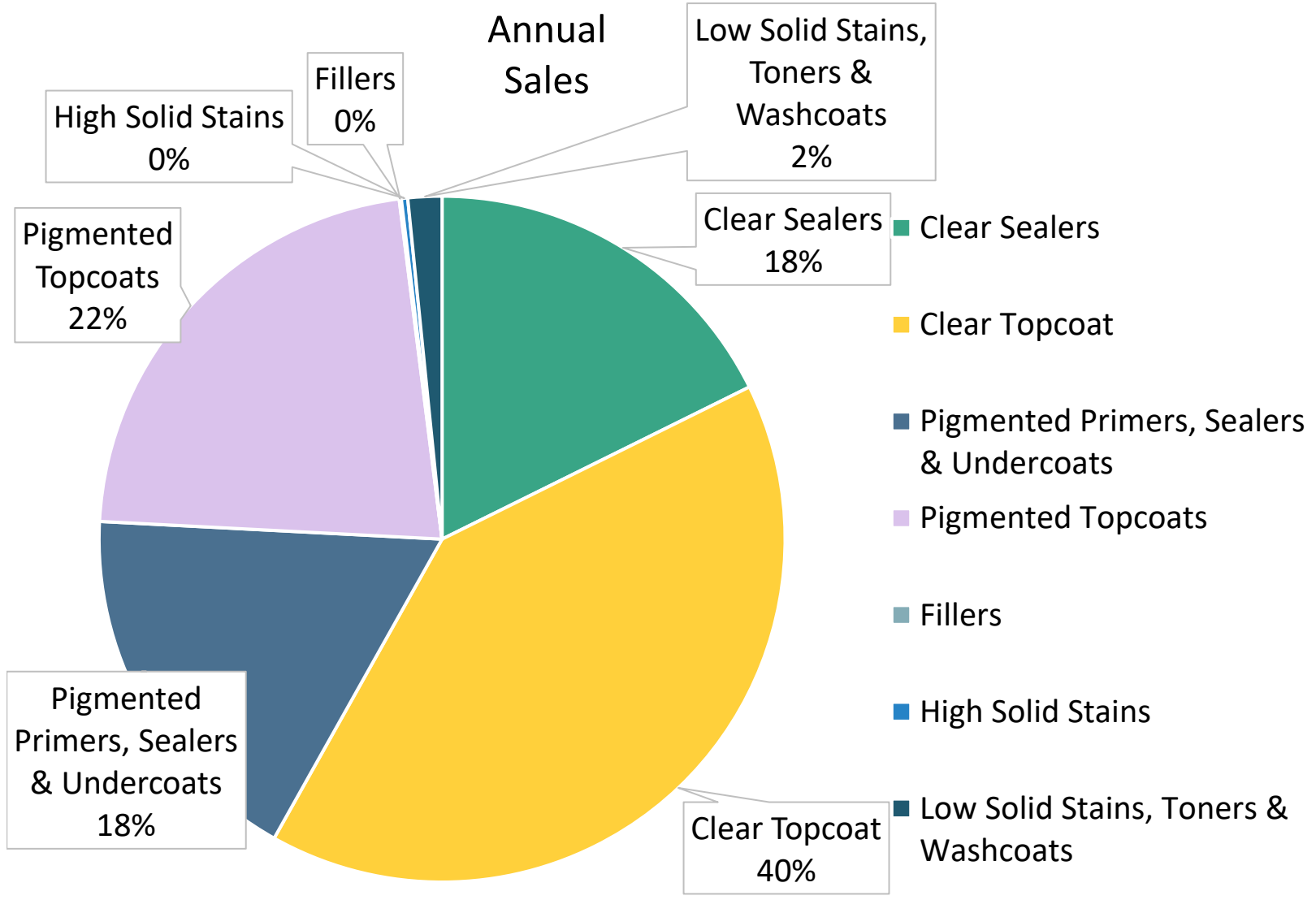
- Surveys identified seven coating categories, six of which reported the presence of pCBtF

No use of t-BAc reported

No sales reported for seven of the Rule 1136 coating categories, consider need for those categories

If no further data submitted, staff will assume pCBtF and t-BAc can be phased out of these categories

Overview of PAR 1136 Manufacturer Survey Data – Annual Sales



Summary of Survey Data	
Number of Products reported	517
Percent Solvent-based	79%
# of Products Containing pCBtF	41%
Sales of Products Containing pCBtF	85%
Range of pCBtF Content	8 to 90%
Number of Products with t-BAc	0

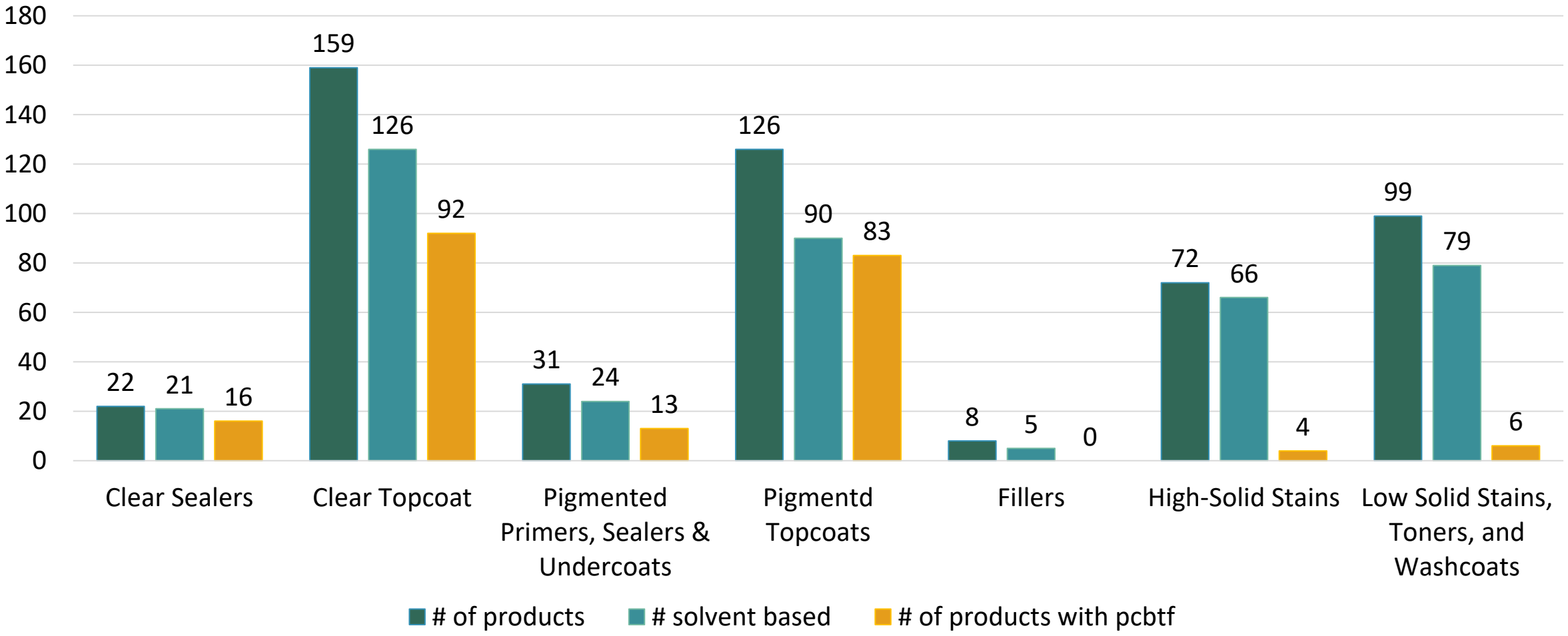
Overview of PAR 1136 Manufacturer Survey Data – Category and Total Sales

Manufacturers reported a total of 517 products sold in South Coast AQMD

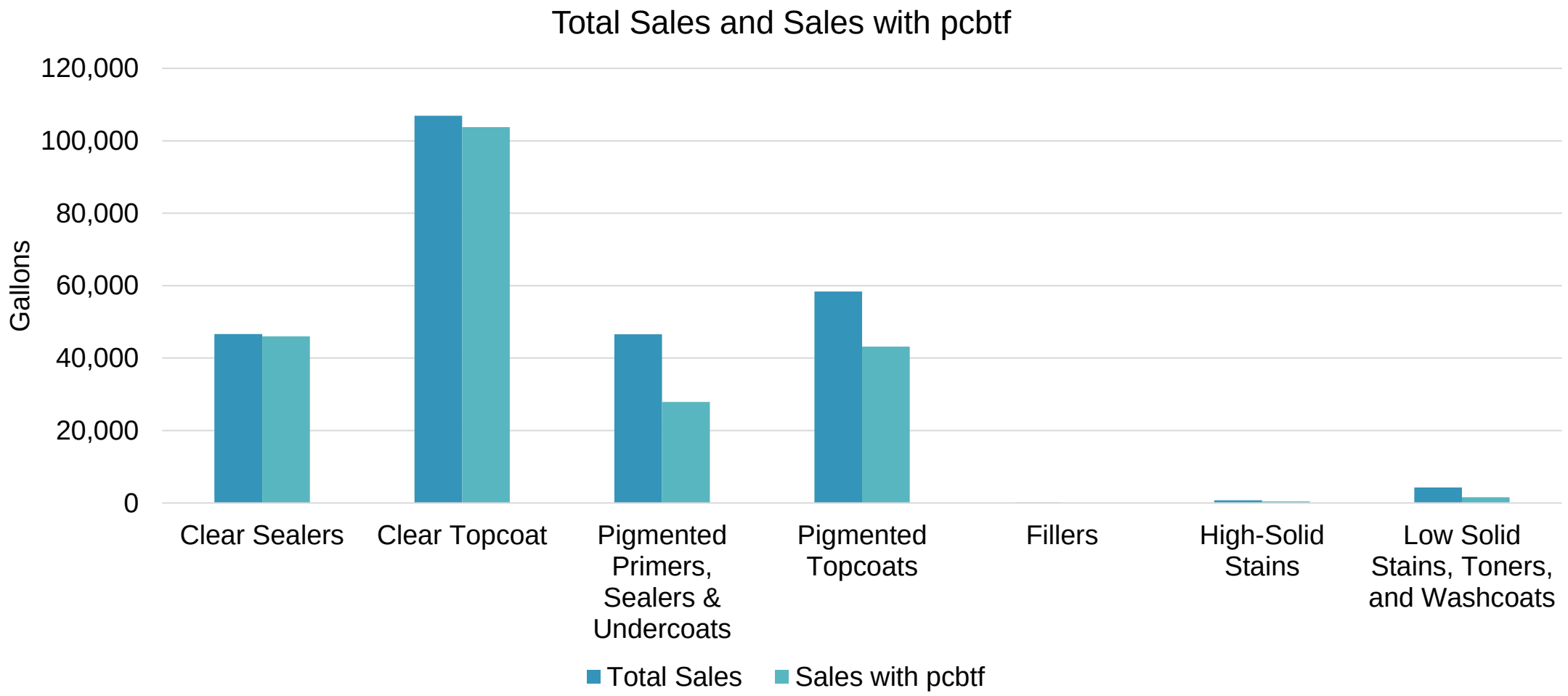
Reported products were in seven of the 14 categories

Category	# of Reported Products	Gallons Products Sold
Clear Sealers	22	46,600
Clear Topcoats	159	106,900
Pigmented Primers, Sealers & Undercoats	31	46,600
Pigmented Topcoats	126	58,400
Fillers	8	Protected Data
High-Solid Stains	72	Protected Data
Low Solid Stains, Toners, and Washcoats	99	4,300
Total	517	263,660

Survey Data – # of reported products, # solvent based and # of products with pCBtF



Survey Data – Total Sales and Sales with pCBtF



Current Rule 1136 emission limits and Sales Weighted Average VOC

Category	SWA VOC g/L	Category Limit g/L	Max pCBtF	Avg pCBtF
Clear Sealers	269	275	18%	9%
Clear Topcoat	265	275	44%	13%
Pigmented Primers, Sealers & Undercoats	260	275	13%	4%
Pigmented Topcoats	250	275	32%	10%
Barrier Coat - Plastic Components	N/A	275	N/A	N/A
Composite Wood Edge Filler	N/A	275	N/A	N/A
Extreme Performance Coatings	N/A	275	N/A	N/A
Fillers	88	275	0%	0
High-Solid Stains	435*	350	16%	1%
Inks	N/A	500	N/A	N/A
Mold-Seal Coatings	N/A	750	N/A	N/A
Multi-Colored Coatings	N/A	275	N/A	N/A
Low-Solids Barrier Coat - Plastic Components	N/A	120	N/A	N/A
Low Solid Stains, Toners, and Washcoats	118	120	90%	32%

* Waiting for further information from manufacturer on high-solid stains VOC contents.

Survey Data – Clear and Pigmented Primers, Sealers, & Undercoats

- Clear Sealer
  - Coating containing binders, but not opaque pigments, which seals the wood product prior to application of the subsequent coatings
- Pigmented Primers, Sealers & Undercoats
  - Opaque coatings which contain binders and colored pigments formulated to hide the wood surface, that are applied prior to the topcoat to provide a firm bond, level the wood product surface, or seal the wood product surface
- 36% of total sales from these two categories

	Clear Sealer	Pigmented Primers, Sealers & Undercoats
# of Reported Products	22	31
% Category Sales	18%	18%
% Solvent-Based	79%	77%
% Water-Based	21%	23%
% Sales Containing pCBtF	99%	60%
% Products Containing pCBtF	73%	42%
# of Products Containing pCBtF	16	13

Survey Data – Clear Topcoat & Pigmented Topcoat

- Clear Topcoat
  - Final coating which contains binders, but not opaque pigments, and is specifically formulated to form a transparent or translucent solid protective film
- Pigmented Topcoats
  - Final opaque coating which contains binders and colored pigments, and is specifically formulated to hide the wood surface and form a solid protective film
- 62% of total sales from these two categories

	Clear Topcoat	Pigmented Topcoats
# of Reported Products	159	126
% Category Sales	40%	22%
% Solvent-Based	100%	71%
% Water-Based	0%	29%
% Sales Containing pCBtF	97%	74%
% Products Containing pCBtF	58%	66%
# of Products Containing pCBtF	92	83

Survey Data – Fillers, High-Solid Stains, Low Solid Stains, Toners, and Washcoats

- Filler
  - Material which is applied to a wood product, and whose primary function is to build up, or fill the voids and imperfections in the wood product to be coated, not including composite wood edge filler
- High-Solid Stain
  - Stains containing more than one pound of solids per gallon of material, and include wiping stains, glazes, and opaque stains
- Low Solid Stains, Toners and Washcoat
  - Coatings containing one pound, or less, of solids per gallon of material
- ~ 2% of sales from these three categories

	Filler	High-Solid Stain	Low Solid Stains, Toners & Washcoat
# of Reported Products	8	72	99
% Category Sales	0.1%	0.3%	1.6%
% Solvent-Based	63%	92%	80%
% Water-Based	37%	8%	20%
% Sales Containing pCBtF	0%	56%	36%
% Products Containing pCBtF	0%	6%	6%
# of Products Containing pCBtF	0	4	6

PAR 1136 Initial Take-Aways From Survey

- t-BAc not widely used in wood coatings sold in the South Coast AQMD
  - Early prohibition date feasible for all categories
- Staff will assume pCBtF is not needed to comply with VOC limits for following categories, may eliminate some categories:
  - Barrier Coat - Plastic Components, Composite Wood Edge Filler, Extreme Performance Coatings, Inks, Mold-Seal Coatings, Multi-Colored Coatings, and Low-Solids Barrier Coat - Plastic Components
    - Not reported in survey
  - Fillers
    - Products reported do not contain pCBtF or t-BAc in formulations
    - Early prohibition date feasible
- pCBtF found in other six coating categories, all major categories

PAR 1136 Initial Take-Aways From Survey (cont.)

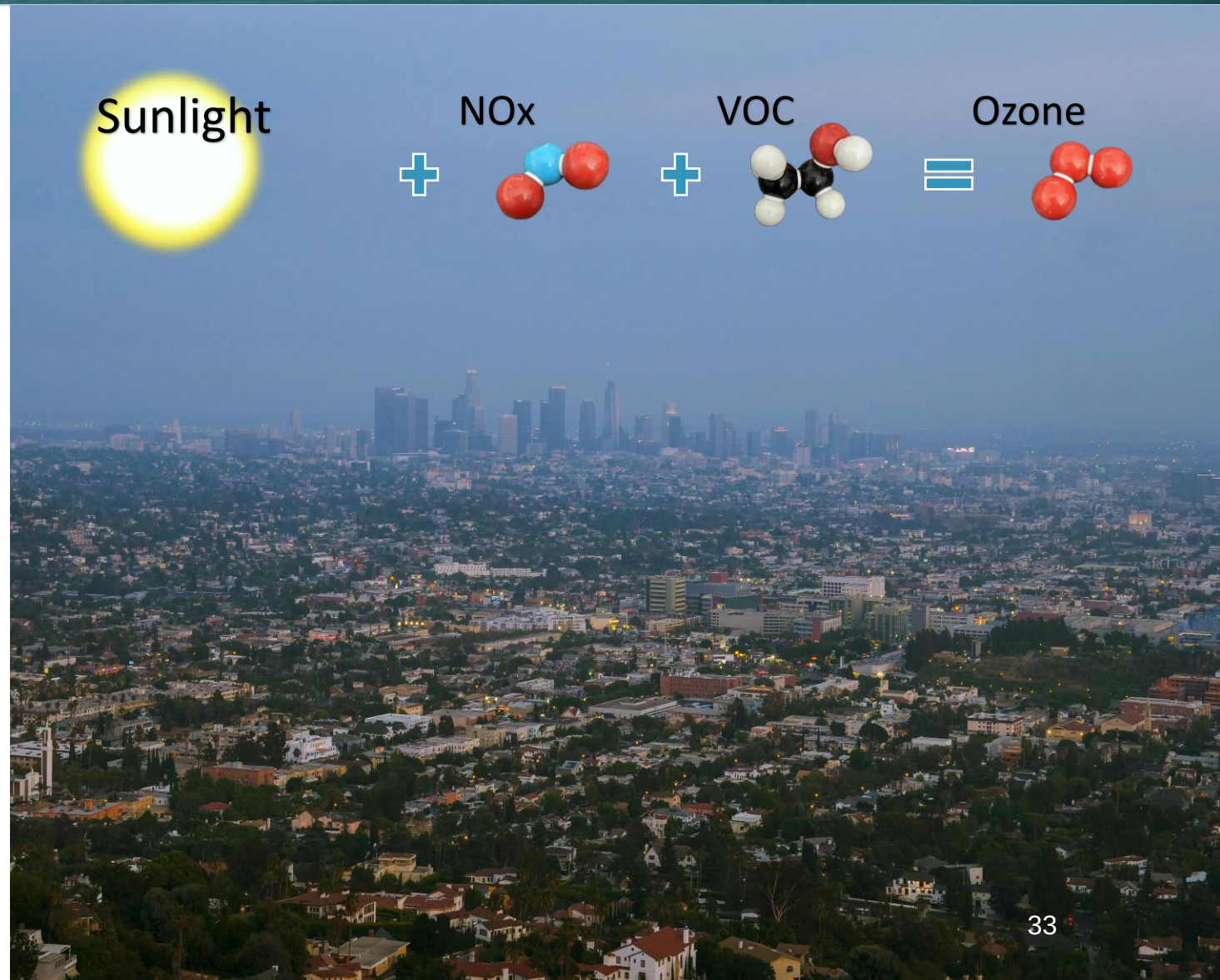
Staff will continue working with stakeholders to

- Identify availability of potential alternatives or replacements
- Evaluate feasible path to reduce or eliminate toxic emissions
- Evaluate appropriate phase out/prohibition timelines along with sell-through and use-through timelines

Maximum Incremental Reactivity (MIR) VOC Limits

VOCs, Reactivity, and Ozone Formation

- VOCs are the solvents in coatings that evaporate when coatings dry
  - VOCs are one of the main ozone precursors
- Ozone at ground level can make it harder to breathe, especially for kids, elderly, or people with asthma
- Not all VOCs have equal ozone-formation potential
  - Some VOCs are more reactive, i.e., they create more ozone than others



MIR: Measuring Ozone Formation

MIR is a score that tells us how much ozone a chemical can generate expressed as the grams of ozone a gram of VOC generates (g O_3/g VOC)

- High MIR solvents contribute to higher ozone formation
- Low MIR solvents contribute less to ozone formation

Wood coatings contain various VOCs with different ozone-formation potentials

- Acetone and pCBtF are considered exempt compounds due to their low MIR, 0.36 and 0.11 g O_3/g VOC respectively
  - Acetone and pCBtF generate 0.36 and 0.11 grams of ozone for each gram released into the air
- Other compounds such as Toluene have higher MIR, 4.0 g O_3/g VOC
  - Toluene generates 4 grams of ozone for each gram released into the air

The ozone-formation potential of a coating can be determined by calculating the product weighted average MIR of all solvents in the coating “Product Weighted-MIR” or PW-MIR

MIR Limits vs. Mass-Based VOC Limits

- Most rules limit VOCs by mass (e.g., 275 grams of VOC per liter of coating), considers solvents as either:
  - Zero-VOC (e.g., exempt compounds)
  - 100% VOC
- Ozone forming potential not reflected in mass-based limits
- Reactivity-based limits focus on ozone creation, not just mass:
  - Reactivity-based limits would provide manufacturers an alternative option to choose solvents with lower MIR
  - Could allow formulators more flexibility
  - CARB uses reactivity-based limits for aerosol coatings as shown in the table

Table of Reactivity Limits
Product-Weighted MIR in Grams Ozone per Gram Product
(g O_3 / g product)

Aerosol Coating Category

General Coatings	**06/01/2002**	**01/01/2017**
Clear Coating	1.50	0.85
Flat Coating	1.20	0.80
Fluorescent Coating	1.75	1.30
Metallic Coating	1.90	1.25
Nonflat Coating	1.40	0.95
Primer	1.20	0.70
Specialty Coatings (A)	**01/01/2003**	**01/01/2017**
Auto Body Primer	1.55	0.95
Electrical/Electronic/Conformal Coating		2.00
Exact Match Finish:		
Automotive	1.50	0.95
Engine	1.70	0.95
Industrial	2.05	1.20
Flexible Coating		1.60
Ground Traffic/Marking Coating	1.20	0.85
Mold Release Coating		1.10
Two Component Coating		1.20
Uniform Finish Coating		1.30

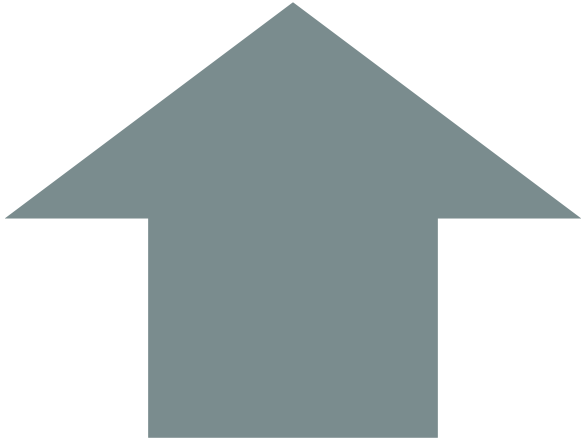
Impact of Reactivity

- Examples of solvent selection for a coating
- Second example will produce almost four times more ozone than the first example

Solvent	Weight Percent	MIR	Weighted Average
Toluene	10%	4.0	0.400
MEK	40%	1.48	0.592
Acetone	10%	0.36	0.036
IPA	30%	0.61	0.183
Methyl acetate	10%	0.07	0.007
	100%		1.218

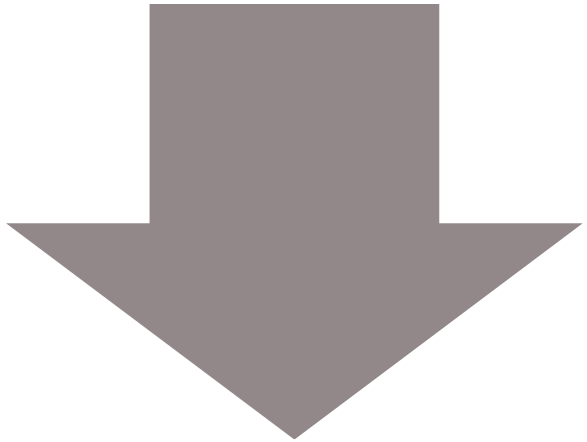
Solvent	Weight Percent	MIR	Weighted Average
Xylene	40%	7.74	3.096
Toluene	20%	4.00	0.800
Butanol	25%	2.88	0.720
MEK	15%	1.48	0.222
	100%		4.838

Pros and Cons



Reduce ozone

- Formulation flexibility
- Provide another tool to improve air quality



Might not be adopted widely

- Different metric just for South Coast AQMD
- More complicated than mass-based limits
- Need to add MIR VOC content to label, safety datasheets, product datasheets

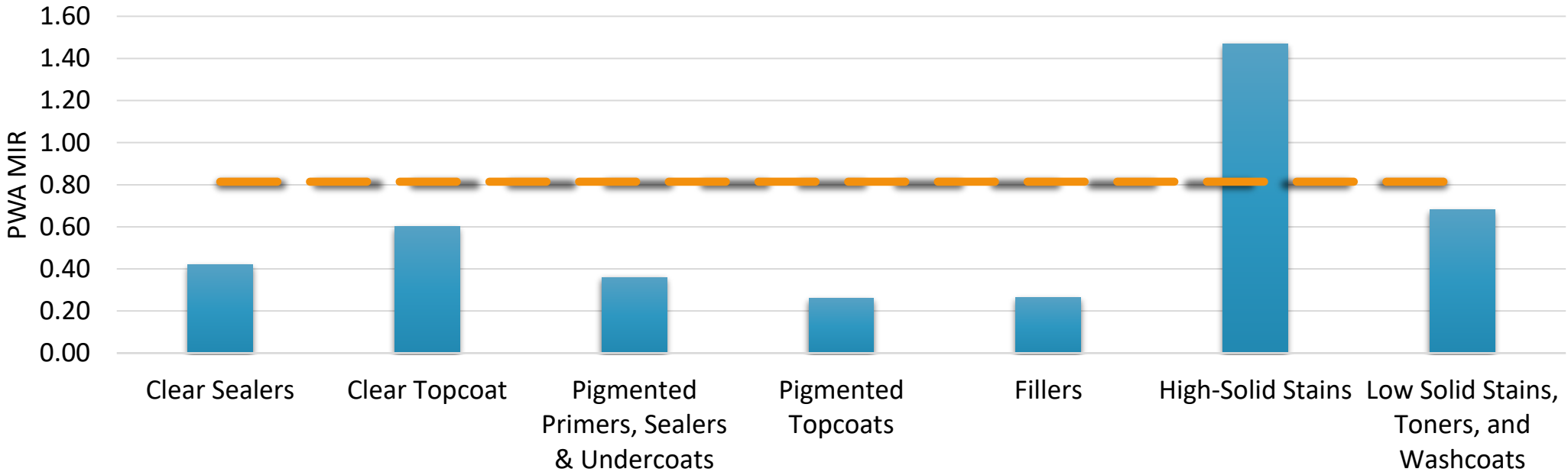
Example PW-MIR Values for 275 g/L Coatings

Clear Topcoat Example				
Ingredients	MIR	Percent Range	Percent Average (%)	Weighted MIR
Acetone	0.36	45 – 70	57.5	0.207
pCBtF	0.11	13 – 30	13.8	0.015
2-Heptanone	2.36	1 – 5	3	0.071
isopropyl alcohol	0.61	1 – 5	3	0.018
n-Butyl Alcohol	2.88	1 – 5	3	0.086
n-propyl acetate	0.87	1 – 5	3	0.003
Nitrocellulose	0	5 – 10	7.5	0
Urea	0	1 – 5	3	0
PW-MIR				0.400

Clear Sealer Example				
Ingredients	MIR	Percent Range	Percent Average (%)	Weighted MIR
Acetone	0.36	55 – 75	65	0.234
pCBtF	0.11	0	0	0
isopropyl alcohol	0.61	2.5 – 10	6.25	0.038
n-Butyl Alcohol	2.88	2.5 – 10	6.25	0.18
N-butyl Acetate	0.83	2.5 – 10	6.25	0.052
ethyl benzene	3.04	0.1 – 1	0.55	0.017
Nitrocellulose	0	2.5 – 10	6.25	0
PW-MIR				0.521

Estimated MIR Values for PAR 1136 Coatings Categories from Survey

- Staff evaluated MIR values for different categories for three out of four submitted surveys
  - MIR value provided by two manufacturers for their reported products
  - MIRs estimated based on safety data sheet for one manufacturer's survey
  - MIRs pending for one survey, as staff were unable to locate the product safety data sheets
- Chart shows the average MIR across all products in that category (Product Weighted Average-MIR or PWA-MIR)
- High PWA-MIRs due to aromatic hydrocarbons with MIRs up to 8 g O_3/g VOC



Summary of Each Category MIR

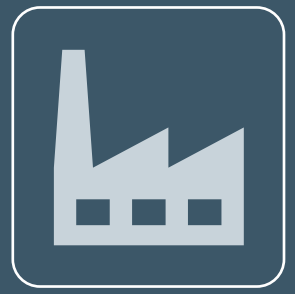
- Clear Topcoats tend to have higher PW-MIR values compared to pigmented topcoats
  - Likely due to higher solids content
- High- and Low-Solid Stains show elevated PW-MIR levels driven by aromatics

Product Category	PWA MIR (g O_3/ g Product)	Category VOC Limit (g/L)
Clear Sealers	0.42	275
Pigmented Primers, Sealers & Undercoats	0.36	275
Clear Topcoats	0.60	275
Pigmented Topcoats	0.26	275
Fillers	0.26	275
High-Solid Stains	1.47	350
Low-Solid Stains, Toners & Washcoats	0.68	120

Initial Rule Considerations

Initial Rule Considerations

Stationary Source Committee directed staff to reduce toxicity as soon as practicable



Coatings formulated to higher VOC limits sold outside of South Coast AQMD

Considering alternative approaches to reduce ozone formation impact of wood coatings

Prioritize Reducing Toxicity

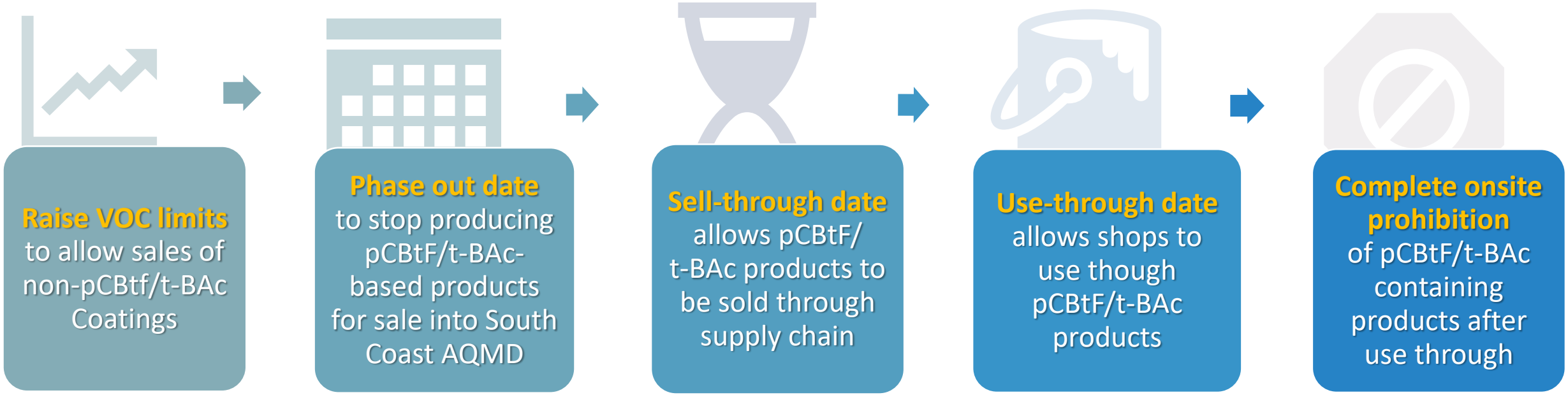
Key Elements:

- Temporarily raise mass-based VOC limits to allow higher VOC, non-pCBtF coatings, sold outside California (e.g., 275 → 550 g/L)
- Enable earlier prohibition of pCBtF and t-BAc
- After ~three years, reduce VOC levels down to current mass-based limits and introduce alternative MIR-based limits to provide formulation flexibility
- Aligns with the Governing Board's direction to prioritize toxicity reduction over VOC reductions

Accelerates removal of toxics with short-term emission increases

Phase I: Prohibition Approach

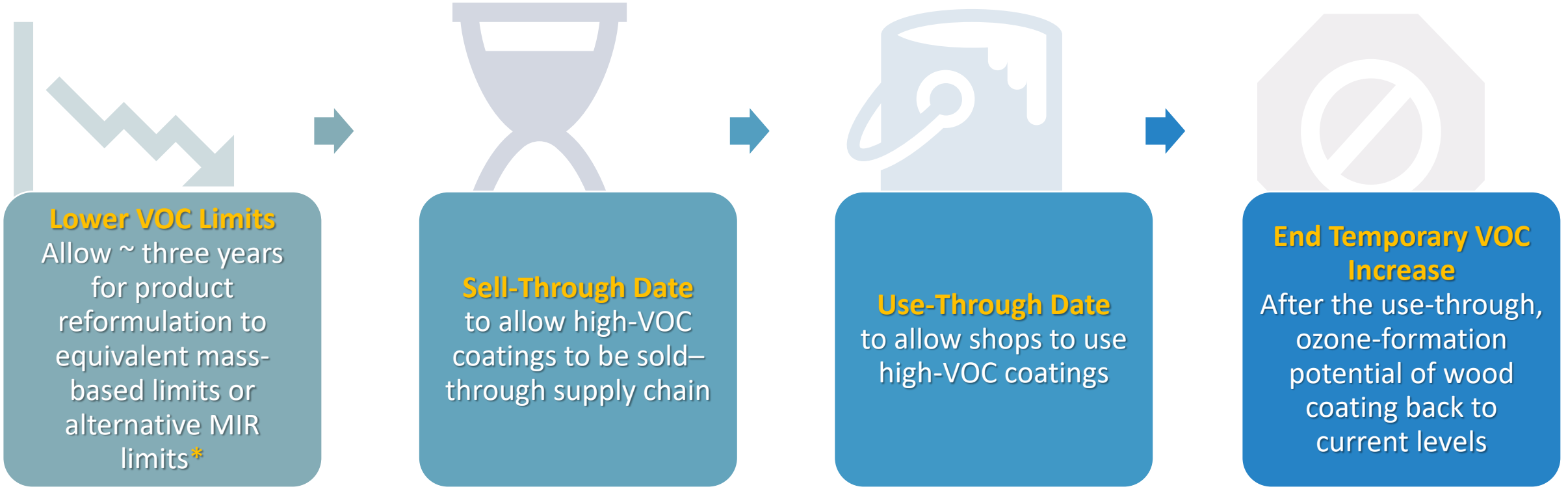
- Staff is considering step by step phase out with multiple dates



- Proposed approach includes provisions to address the time needed to use existing inventory
  - Addresses coating manufacturers, distributers, and end users

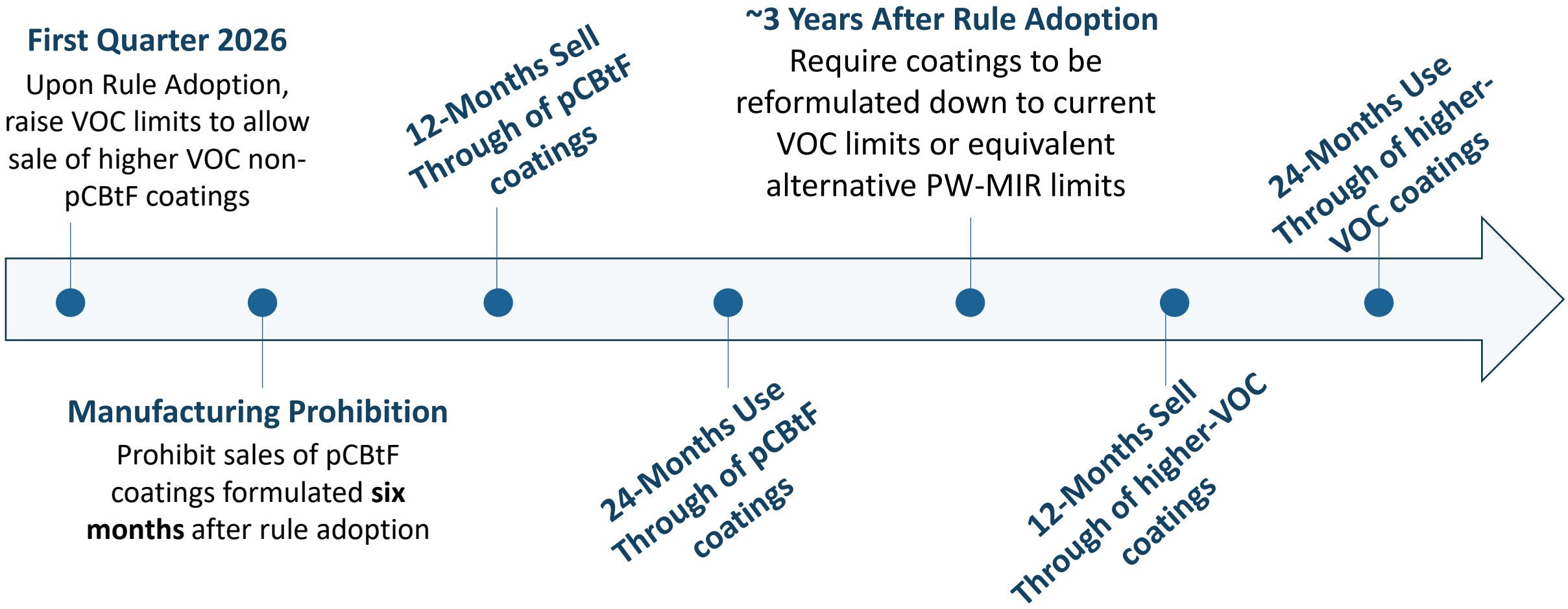
Phase II: Product Reformulation

- Allow time for manufacturers to reformulate to lower VOC limits



* Timeframe to be discussed with stakeholders

Initial Timeline Transition to Products*



*For discussion purposes only, *subject to change*

Initial Considerations

Seeking stakeholder feedback on:

- Feasibility and timelines for pCBtF and t-BAc phase out
- Availability of high-VOC non-pCBtF/t-BAc coatings
  - Timeline and challenges to transitioning
- Reformulation timelines
  - Feasibility of lower mass-based or PW-MIR VOC limits

Staff available to continue one-on-one manufacturer meetings

Other Considerations

Wood Coating Categories

Currently fourteen categories of Wood Coatings in PAR 1136, many with the same VOC limit and similar definitions

- Manufacturers only reported sales for seven of the categories

During the last amendment in 1996 four new categories added and one category removed

- New categories including Pigmented Primers, Sealers & Undercoats, Barrier Coat - Plastic Components, Composite Wood Edge Filler, Low-Solids Barrier Coat - Plastic Components
- Removed category; Fiberboard and Particleboard Coating

Two categories changed their name and definition for clarifications

- Sealers to Clear Sealers
- Pigmented Coatings to Pigmented topcoats

Streamlining Coating Categories

Considering combining similar categories with same VOC limit

- Combine extreme Performance Coatings and Multi-Colored Coatings into either pigmented or clear topcoats
- Combine “Low-Solids Barrier Coat - Plastic Components” and “Low Solid Stains, Toners, and Washcoats” to a new category: “Low-Solids Coatings”
- Combine “Composite Wood Edge Filler” into the “Fillers” Category
- Create a new category of “Other Coatings” which includes Barrier Coat - Plastic Components and other undefined coatings

Category	VOC (g/L)
Clear Sealers	275
Clear Topcoat	275
Pigmented Primers, Sealers & Undercoats	275
Pigmented Topcoats	275
Barrier Coat - Plastic Components	275
Composite Wood Edge Filler	275
Extreme Performance Coatings	275
Fillers	275
Multi-Colored Coatings	275
Low-Solids Barrier Coat - Plastic Components	120
Low Solid Stains, Toners, and Washcoats	120

Initial Rule Considerations – Wood Coating Categories

Category	VOC (g/L)
Primers, Sealers, and Undercoats (PSU)	
Clear PSU	275
Pigmented PSU	275
Topcoats (includes extreme performance and multi-colored coatings)	
Clear Topcoat	275
Pigmented Topcoats	275
Other Categories	
High-Solid Stains	350
Inks	500
Mold-Seal Coatings	750

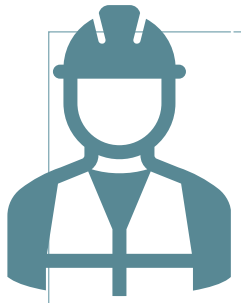
Current Category	Proposed Category	VOC (g/L)
Composite Wood Edge Filler	Fillers	275
Filler		
Low-Solids Barrier Coat - Plastic Components	Low-Solids Coatings	120
Low-Solid Stains, Toners, and Washcoats		
Barrier Coat - Plastic Components	Other or Default Coatings	275

Initial Conclusions

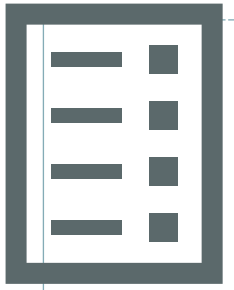
Combining categories might simplify rule compliance

Open to further discussion on coating categories/subcategories

Next Steps

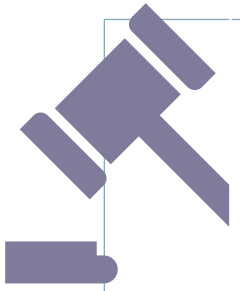


Continue data analysis and develop rule concepts



Release draft rule language

Continue meeting with individual stakeholders and conduct additional Working Group meetings

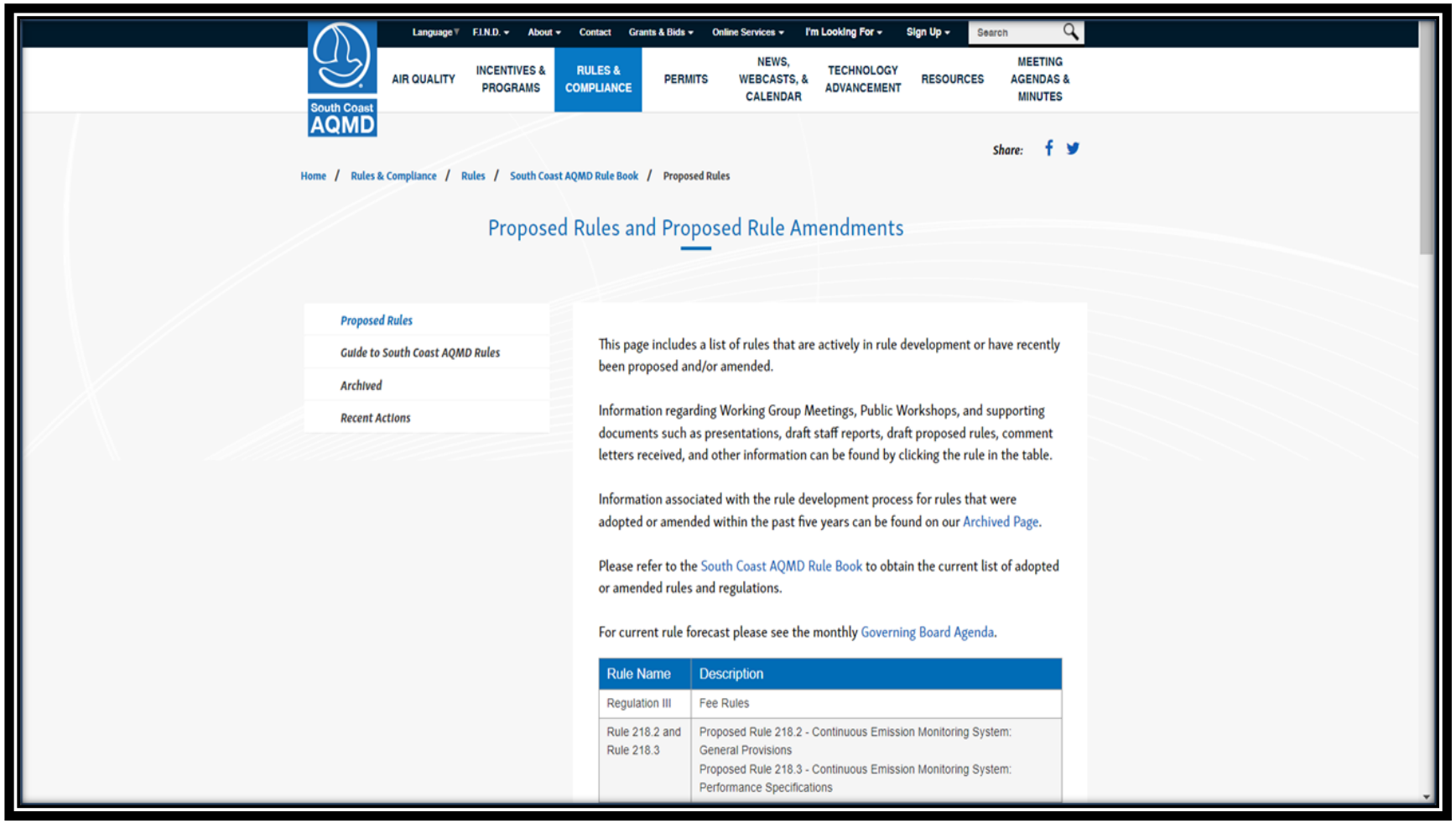


Anticipated Public Hearing in 2026

Working Group Materials

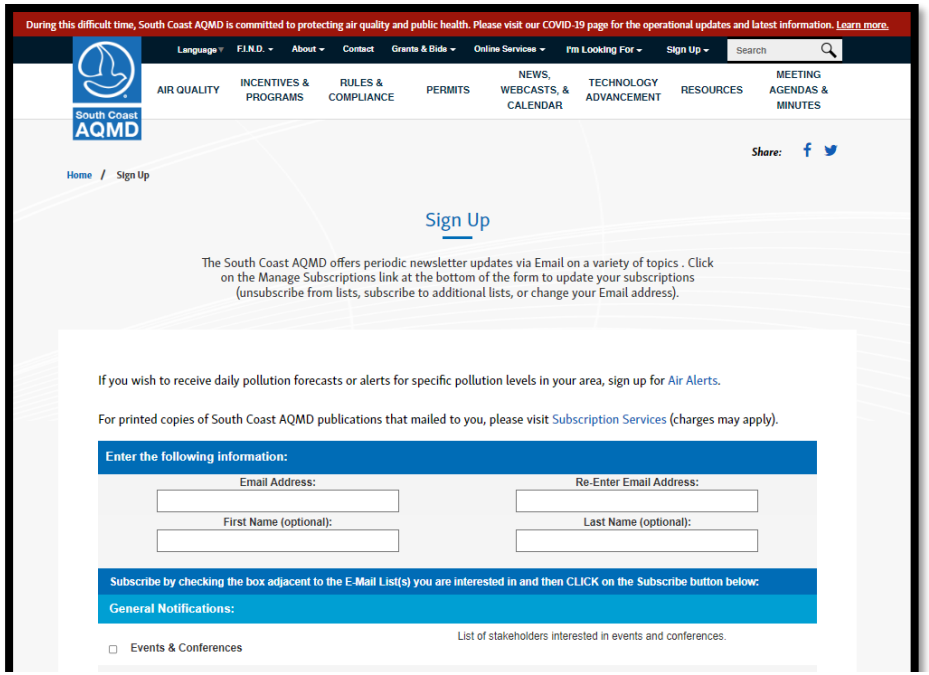
- Working Group materials for each Working Group meeting will be made available:

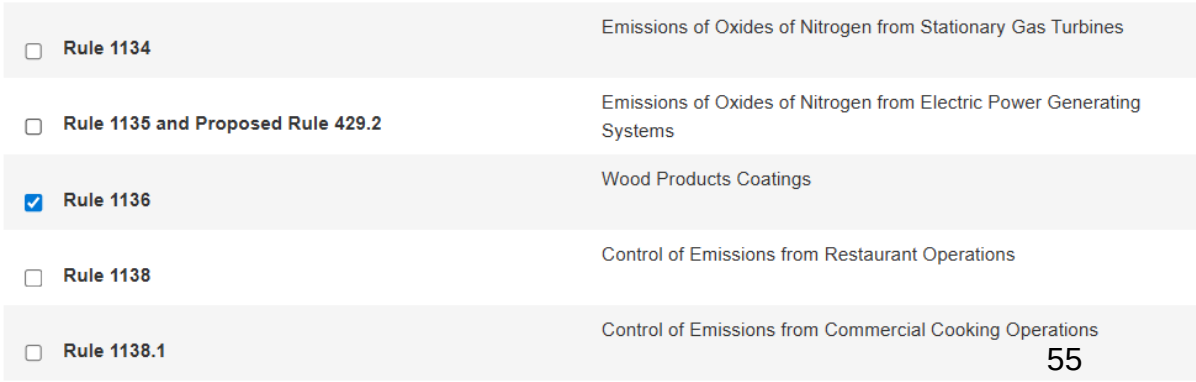
https://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules



Receiving Rulemaking Updates

- To receive email updates, sign up at South Coast AQMD sign up page *http://www.aqmd.gov/sign-up*
  - Enter email address and name
  - Subscribe by scrolling down to “Rule Updates” and check the box for Rule1136 and click on the subscribe button at bottom of page
  - An email will be sent to confirm
  - Future meeting notices, links to documents, and any updates will be sent via email





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