Proposed Amended Rule 1124 - *Aerospace Assembly and Component Manufacturing Operations* (PAR 1124)

Working Group Meeting #4
September 9, 2025

South Coast AQMD

Join Zoom Webinar

https://scaqmd.zoom.us/j/95678446098

Webinar ID: 956 7844 6098

Teleconference Dial-In: +1 669 900 6833

AGENDA

- Background
- PAR 1124 Progress Update
- Proposed Rule Concepts
- Next Steps

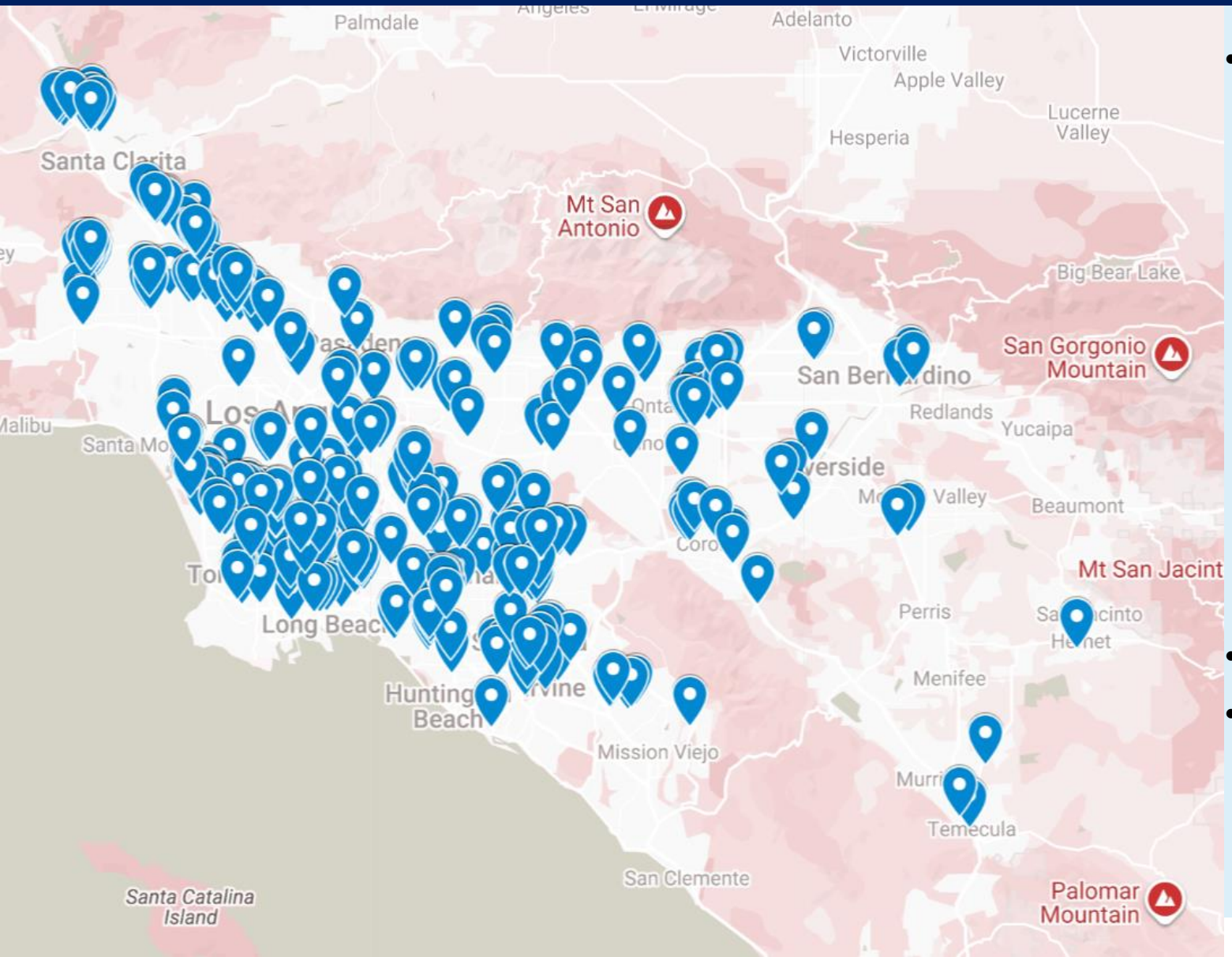
Background

- South Coast AQMD is amending VOC rules to address two exempt compounds determined to have high cancer potency factors
  - para-Chlorobenzotrifluoride (pCBtF or Oxsol) CAS #:98-56-6
  - tert-Butyl Acetate (t-BAc) CAS #: 540-88-5
- South Coast AQMD Stationary Source Committee directed staff to prioritize lowering toxicity over VOC emission reductions
- Aerospace coatings have been formulated with these exempt compounds to comply with Rule 1124
  - t-BAc used to a lesser extent, pCBtF used in broad range of materials
- Aerospace coatings are applied in local shops throughout our jurisdiction, potentially elevating the cancer exposure

pCBtF and t-BAc 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
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 regarding partial exemption of t-BAc as a VOC and presented findings to the South Coast AQMD Stationary Source Committee, who directed staff to prioritize toxicity over VOC emission reductions if confirmed as a carcinogen
2018	OEHHA finalized t-BAc Cancer Potency Factor, concluding t-BAc 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

Aerospace Operations in the Community



- Staff identified ~390 facilities that apply aerospace related coatings
  - 23 facilities are considered major sources of emission, i.e., Title V facilities
    - Facilities that emit, or have the potential to emit,10 tons per year or more of certain criteria pollutants such as VOCs or nitrogen oxides
    - Some pollutants have higher thresholds (e.g., 100 tons per year of sulfur oxides)
- Facilities located throughout region
- Local shops contract with aerospace companies to apply coatings to parts
  - Some located in communities or residential areas

Key Objectives of Rule Amendment

Prohibit or reduce exposure from the use of pCBtF and t-BAc

Find feasible solutions for coating manufacturers and end users

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

Ongoing rule amendment efforts 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 other VOC rules to assess the extent of pCBtF and t-BAc use

Addressing Toxic Exempt Compounds

- Staff has considered each rule and category case-by-case in collaboration with regulated industry and community
- Approaches to address toxics taken so far:

Future Prohibition

Allow time for reformulation with future phase out date

Rules 1168 and 1171, PAR 1107

Temporary VOC Increase

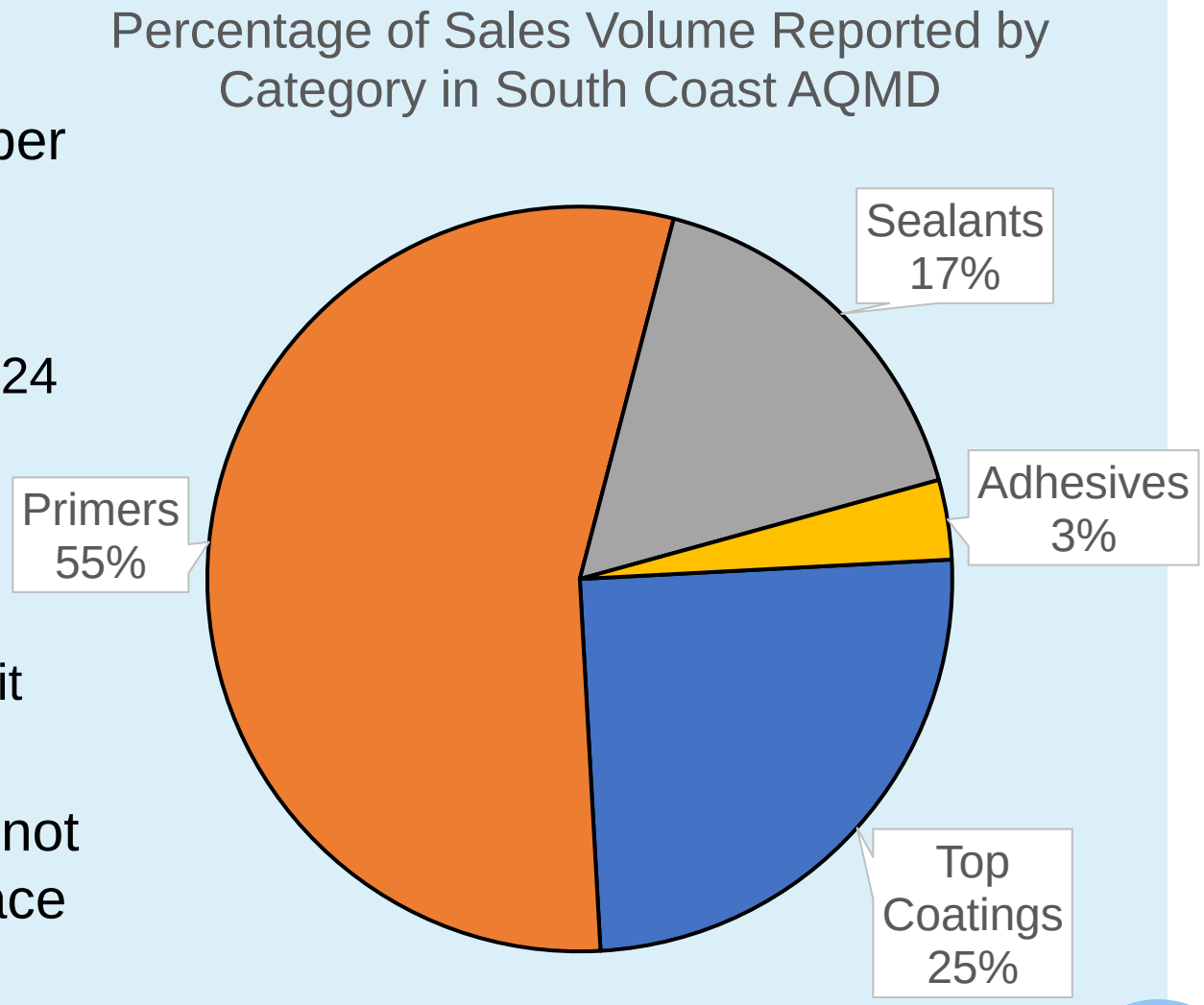
When non-pCBtF/t-BAc, higher-VOC coatings are readily available, temporarily raise limits and quickly prohibit pCBtF and t-BAc

Rule 1151

- Rule 1124 has unique challenges, discussion of staff considerations in later slides

PAR 1124 Aerospace Coating Survey Results

- Staff distributed survey on August 7, 2024
- Response submission requested by October 22, 2024
- Four manufacturers responded
  - Three manufacturers responded for PAR 1124
- pCBtF reported in 3 out of 5 primary categories
  - Primers, top coatings, and sealants
  - Maskants also use pCBtF, but did not submit survey (manufacturers reached out directly)
- t-BAc reported only in top coatings and is not considered an exempt solvent for aerospace coatings



PAR 1124 Progress Update

Summary of Recent Rule Development Efforts

Summary of Working Group Meeting (WGM) #3

WGM #3 focused on results of coating manufacturer survey including:

- Categories reported in the survey
- Initial conclusions and takeaways

Rule Development Progress Since WGM #3

- Staff conducted additional site visits
- Met with Aerospace Materials manufacturers including coatings and maskants manufacturers
- Met with emissions control manufacturers

Site Visits and Manufacturer Meetings

Manufacturer Takeaways

- Aerospace coatings are formulated for nationwide use, no readily available alternative without exempt compounds
  - pCBtF present in many military specifications (mil-spec) and Original Equipment Manufacturer (OEM) approved coatings
  - Domestic aerospace coatings rely less on pCBtF than military or aerospace coatings
- Reformulation, testing, and certification to meet mil-spec challenging, time intensive, and costly
- Can take decades to get a new coating approved (up to 25 years)

End User Takeaways

- Most end users depend on pre-approved coatings with little substitution flexibility
- Limited influence on coating or solvent selection
- Some aerospace coatings need to be approved for specific aircraft, further limiting potential substitutions

Proposed Options

Current Challenges

- pCBtF-containing defense coatings are mil-spec and OEM approved with no readily available substitutes
- Reformulation requires timely testing, re-certification, and approvals
- Aerospace materials containing pCBtF are used nationwide
- Certifications are time consuming, challenging, and costly
- Shops and smaller facilities rely on mil-spec and OEM-approved materials

Addressing Challenges

Considering three potential compliance pathway options

Three Proposed Compliance Pathways

1. Install Air Pollution Control System

- Allows continued usage of pCBtF or t-BAc containing products if spray booth is vented to an approved air pollution control system

2. Transition Away From Products Containing pCBtf or t-BAc

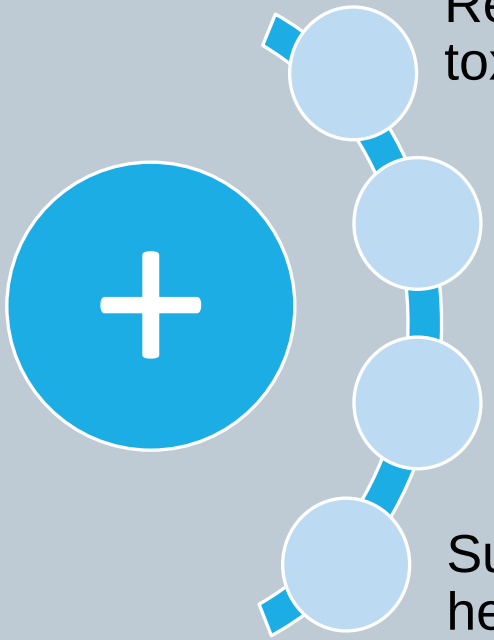
- Apply products free of pCBtF or t-BAc without requiring an air pollution control system

3. Low-Use Exemption

- Allow shops to apply limited volume of pCBtF and t-BAc containing coatings if health protective low-use threshold can be established

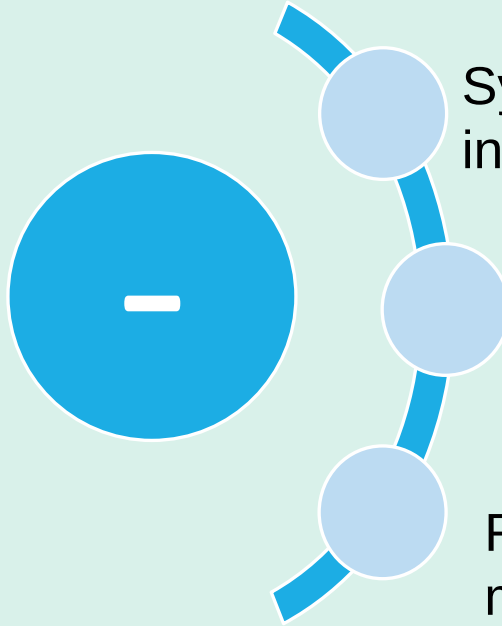
Option 1: Install Air Pollution Control System

PROS



- Reduces community exposure to toxics
- Provides flexibility where reformulation not feasible
- Allow continued use of pCBtF and t-BAc while toxics are captured
- Supports compliance through health-protective engineering controls

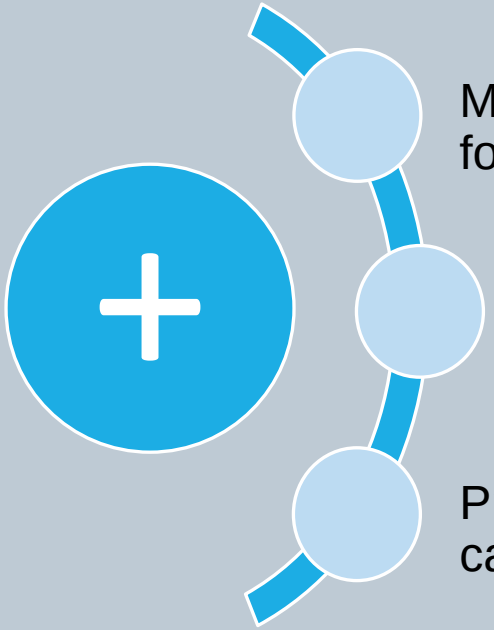
CONS



- Systems can be costly to install
- Cost prohibitive for small shops
- Requires permit modifications

Option 2: Transition Away From pCBtf or t-BAc Products

PROS



Most health-protective pathway for public health

Encourage transition to safer, non-toxic formulations and reformulate

Provides an option for shops that cannot afford control systems

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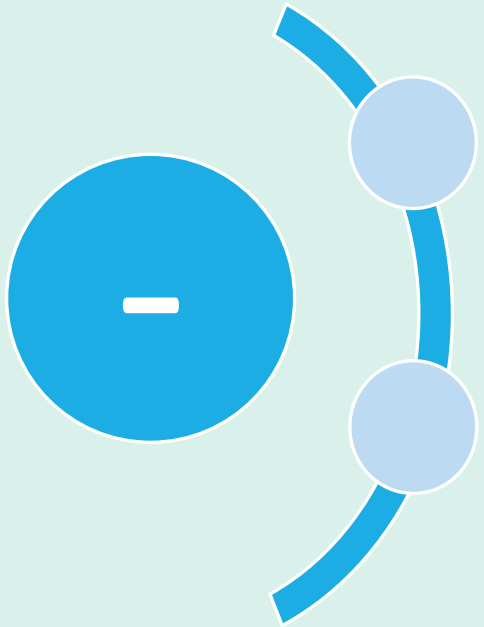

Requires shops to seek alternative coatings or jobs that is free of pCBtF/t-BAc

Could drive pCBtF and t-BAc operation to larger shops with controls

Option 3: Low-Use Exemption

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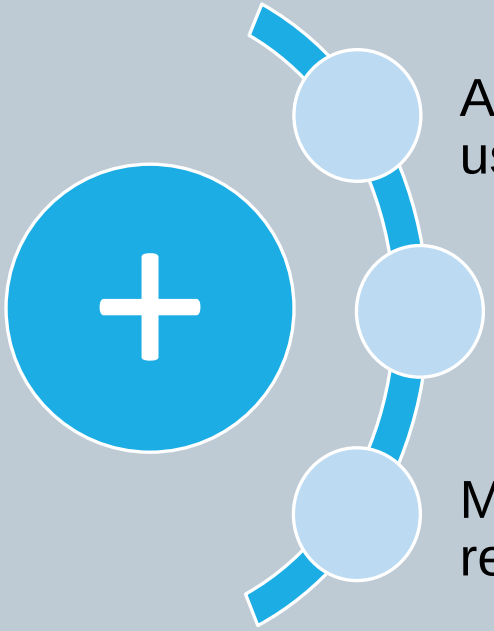

- Allows limited pCBtF/t-BAc use below a defined volume
- Eases burden on low-usage facilities
- Maintains flexibility where reformulation not feasible

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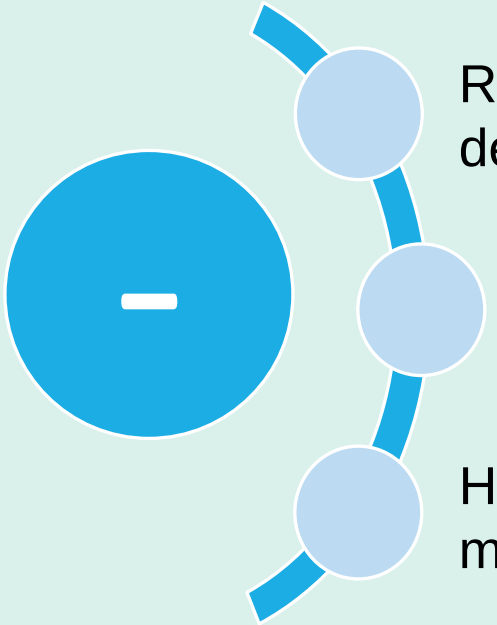


- Requires recordkeeping to demonstrate compliance
- Low allowable volume
- High risk limiting usage may make this option infeasible

Proposed Rule Concepts

OPTION 1

Install Air Pollution Control System

Control Technology

- Air pollution controls already used for some aerospace materials
  - Dry filters already required for spray booths
- Dry filters are not effective to control pCBtF or t-BAc but other controls are
- Coatings applied in a paint spray booth
  - Booth could be vented through air pollution control systems to protect nearby residents

Air Pollution Control Technology Overview

- Reduce emissions of toxic components in aerospace materials
- Allows continued use of high-performance materials
- Protect Public Health

Purpose & Benefits

- Potential Systems include:
  - Carbon Adsorber systems
  - Thermal Oxidizers

Technology

Carbon Adsorption System

What they do

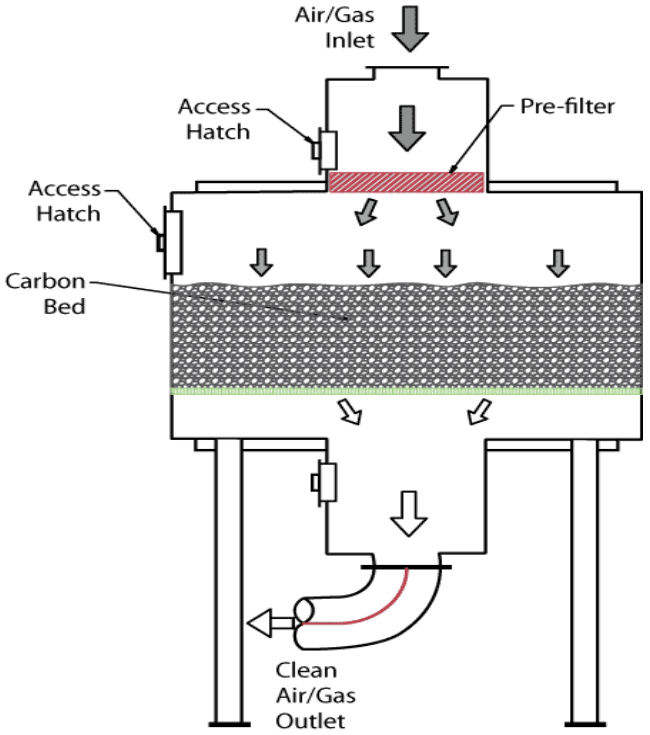
- Control emissions of volatile organic compounds and toxic air contaminants
- Capture gas-phase pollutants through adsorption onto activated carbon

Features

- High removal efficiency between 95-99%+
- Requires monitoring and routine maintenance to prevent breakthrough
- Key design factors include flowrate, compound concentrations, humidity, and temperature

Use

- Successfully used in South Coast AQMD to control toxic air contaminants such as perchloroethylene (perc)
- Vendors confirm it is a feasible control option for pCBtF and t-BAc coatings sprayed in a paint booth



Existing Facilities with Carbon Adsorption System

Staff visited local facility operating carbon adsorption systems

- Aerospace coating facility
- Maskant applied in 16,666-gallon dip tank
- Total enclosure, exhaust sent to large carbon adsorption system
- Been in operation for over 25 years

Staff identified a military coating facility in Bay Area with a spray booth equipped with a carbon adsorption system

Thermal Oxidizers

What they do

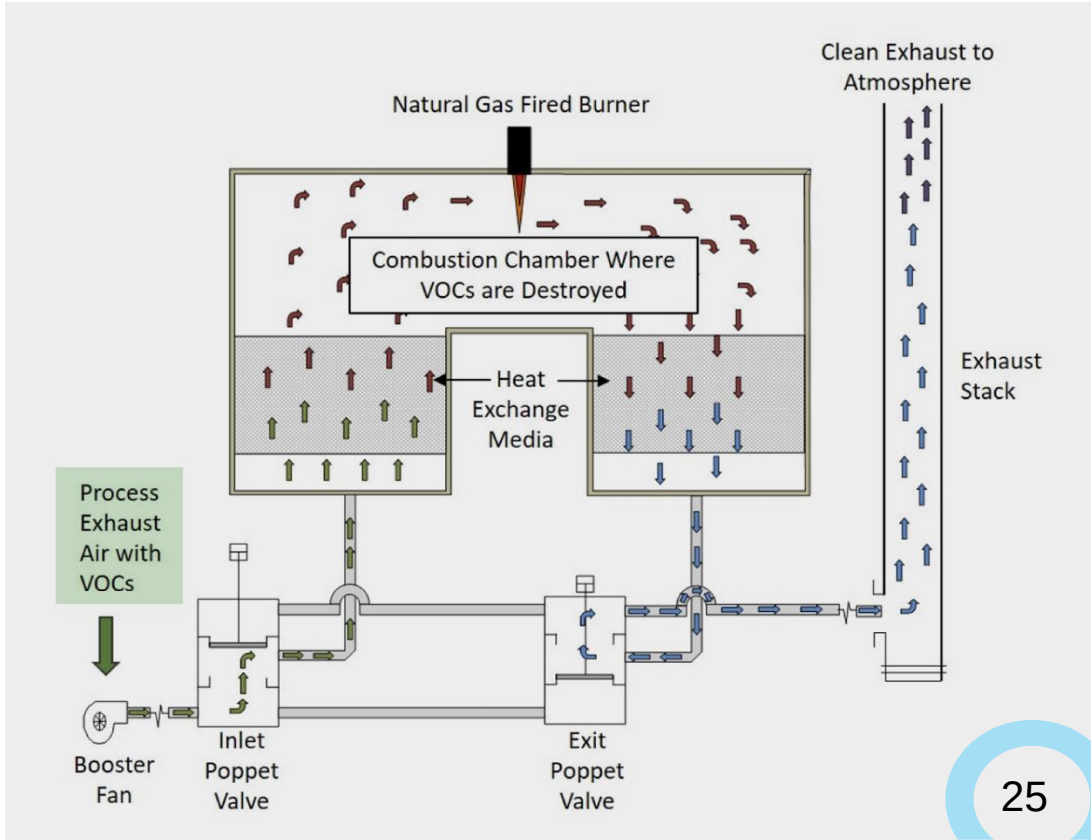
- Destroy volatile organic compounds and toxic air contaminants through high-temperature combustion
- Oxidize pollutants into carbon dioxide and water

Features

- High destruction efficiency up to 99%+
- Fuel consumption increases operating costs, generates NOx emissions
- Key design factors include temperature, residence time, and turbulence

Use

- Common in industrial processes with high VOC emissions



☑ Carbon Adsorption Systems

Pros

- High removal efficiency for gas-phase pollutants
- Energy efficient
- No combustion byproducts, e.g., no NOx emissions

Cons

- Carbon bed saturation requires frequent replacement
- Performance sensitive to humidity and temperature
- Does not destroy contaminants, only adsorbs them
- High costs of hazard waste disposal

☒ Thermal Oxidizers

Pros

- High destruction efficiency
- Ideal for high concentration pollutants
- Thermal energy can be recovered

Cons

- Generate corrosive byproducts, hydrochloric acid for chlorinated solvents and hydrofluoric acid for fluorinated solvents
- Secondary treatment, i.e., scrubber, to remove acids
- Might **not** be most effective to reduce pCBtF emissions

Initial Conclusion for Option 1 – Air Pollution Controls

Feasible Compliance Path

- Add-on air pollution control systems are a viable option for aerospace coating operations
- Carbon adsorption systems could reduce pCBtF emissions by 95 percent or greater

Cost Estimates

- Estimated installation costs ~ $100,000 for a smaller shop
- Up to $1,000,000 for large coating operation

Better fit for larger shops

- Suitable for shops whose main operations are for military aircraft or high production

Rule Concept for Option 1 – Air Pollution Controls

Permit Application

- Submit permit application to install carbon adsorber system meet a control efficiency

Installation

- Install approved carbon adsorption system once permit to construct is issued

Full Compliance

- Must operate controls to ensure toxic emissions are effectively reduced

OPTION 2

Transition Away From Products containing pCBtf and t-BAc

Alternatives to pCBtF and t-BAc

- Small and large aerospace coating facilities were identified using products that do not contain pCBtF or t-BAc
- Ongoing research and reformulation to find viable alternatives to pCBtF underway for certain coating categories
- pCBtF used mainly in military coatings and maskants
  - Alternative to pCBtF-based maskants are readily available
- Facilities will need time to transition away from pCBtF-based coatings

Option 2 – Proposed Transition Pathway

Transition Period

Facilities may continue to use existing pCBtF and t-BAc containing products during the transition period

Prohibition of Possession

After transition period, products containing pCBtF or t-BAc may not be used or stored by a facility, unless the facility submitted a permit to install an air pollution control system (Option 1)

OPTION 3

Low-Use Exemption

Determining Low-Usage Limits

- Staff will assess if a low-use threshold can be established that would be health protective based on conservative assumptions
- Usage limits or threshold can be determined using Health Risk Assessment (HRA) methodology similar to those used in permit evaluation
  - Analysis estimates potential cancer and non-cancer health risks from exposure to toxic air contaminants
  - Maximum Individual Cancer Risk (MICR) below one in a million deemed low risk
- Results help quantify relationship between product use and health risk

Rule Concept for Option 3 – Low-Use Exemption

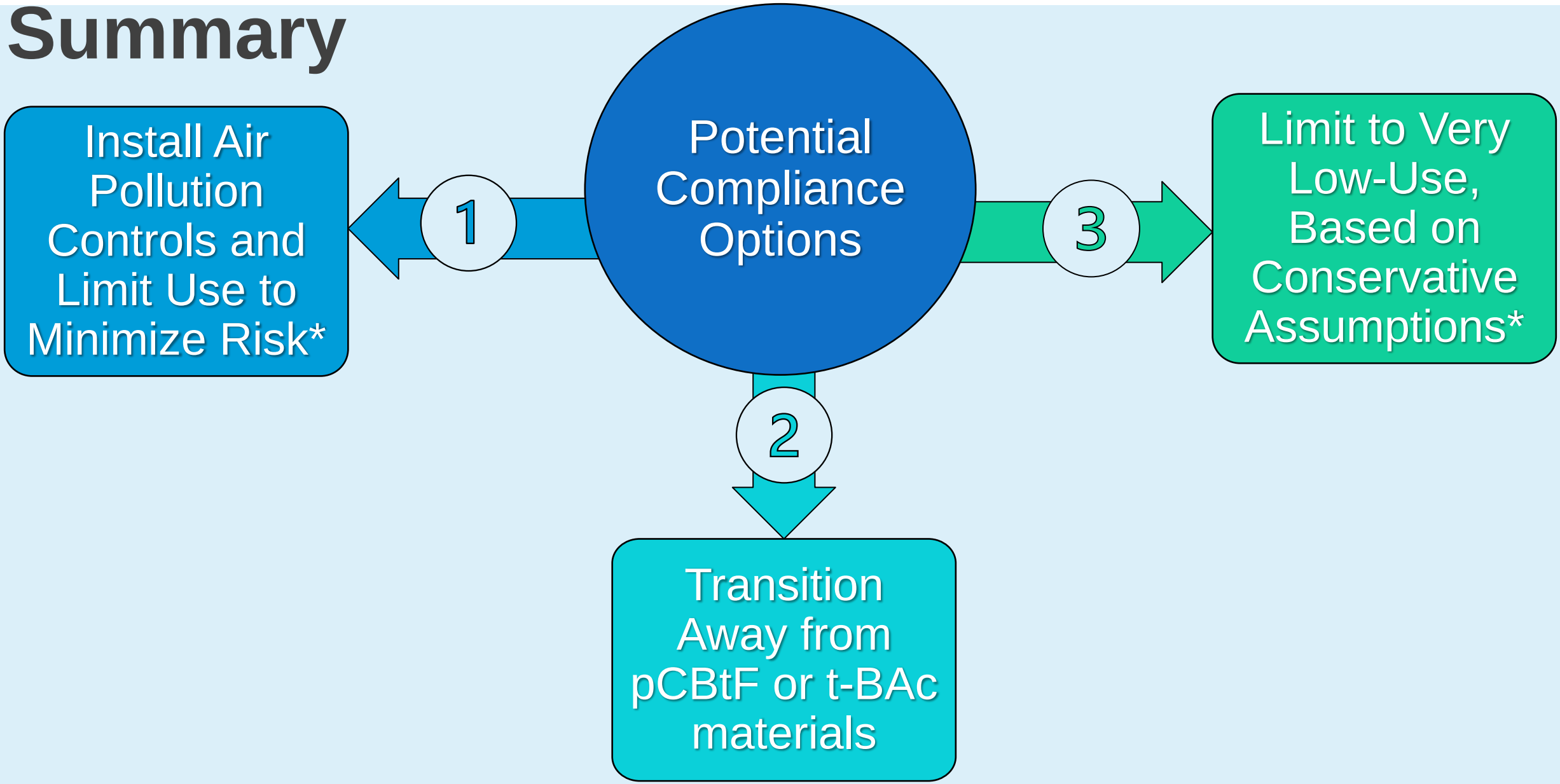
Applicability

- Could be an option for facilities with minimal or infrequent use
- Usage limits would apply across all combined materials used at facility

Considerations

- Consider mass-based limit or annual usage limit
- Usage records must be documented and records retained for compliance verification
- Staff will model scenarios to determine a potential health protective threshold for discussion in next working group meeting

Summary

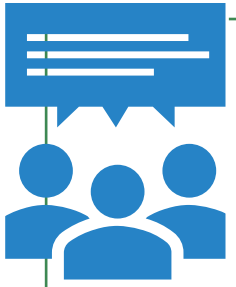


* Staff will model several scenarios to consider what volume limits will maintain a MICR below 1 in a million

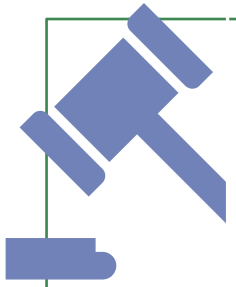
Next Steps

Continue Working Group Meetings

Release initial preliminary draft rule language



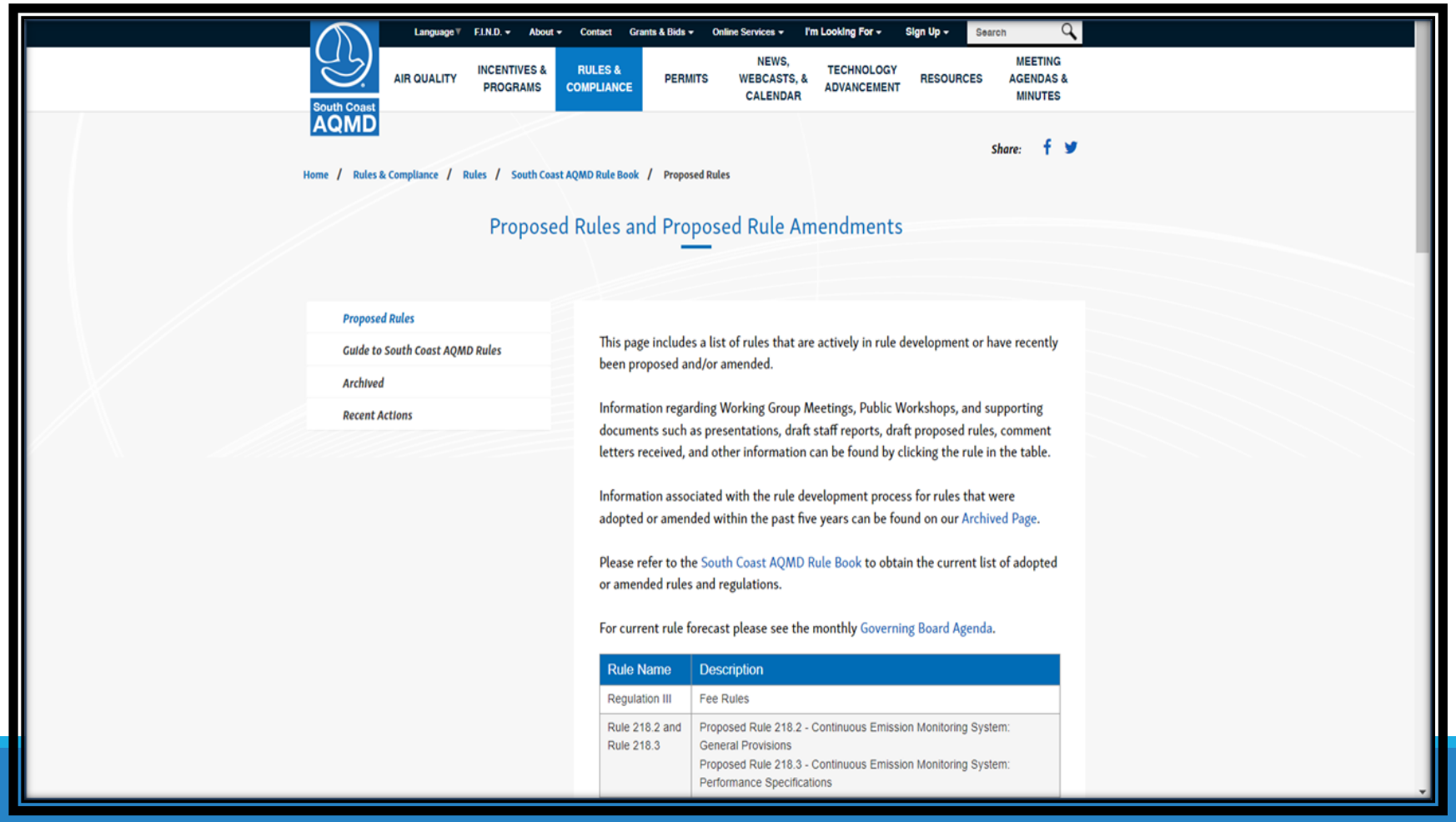
Continue meeting with individual stakeholders



Anticipated Public Hearing First Quarter 2026 (*subject to change*)

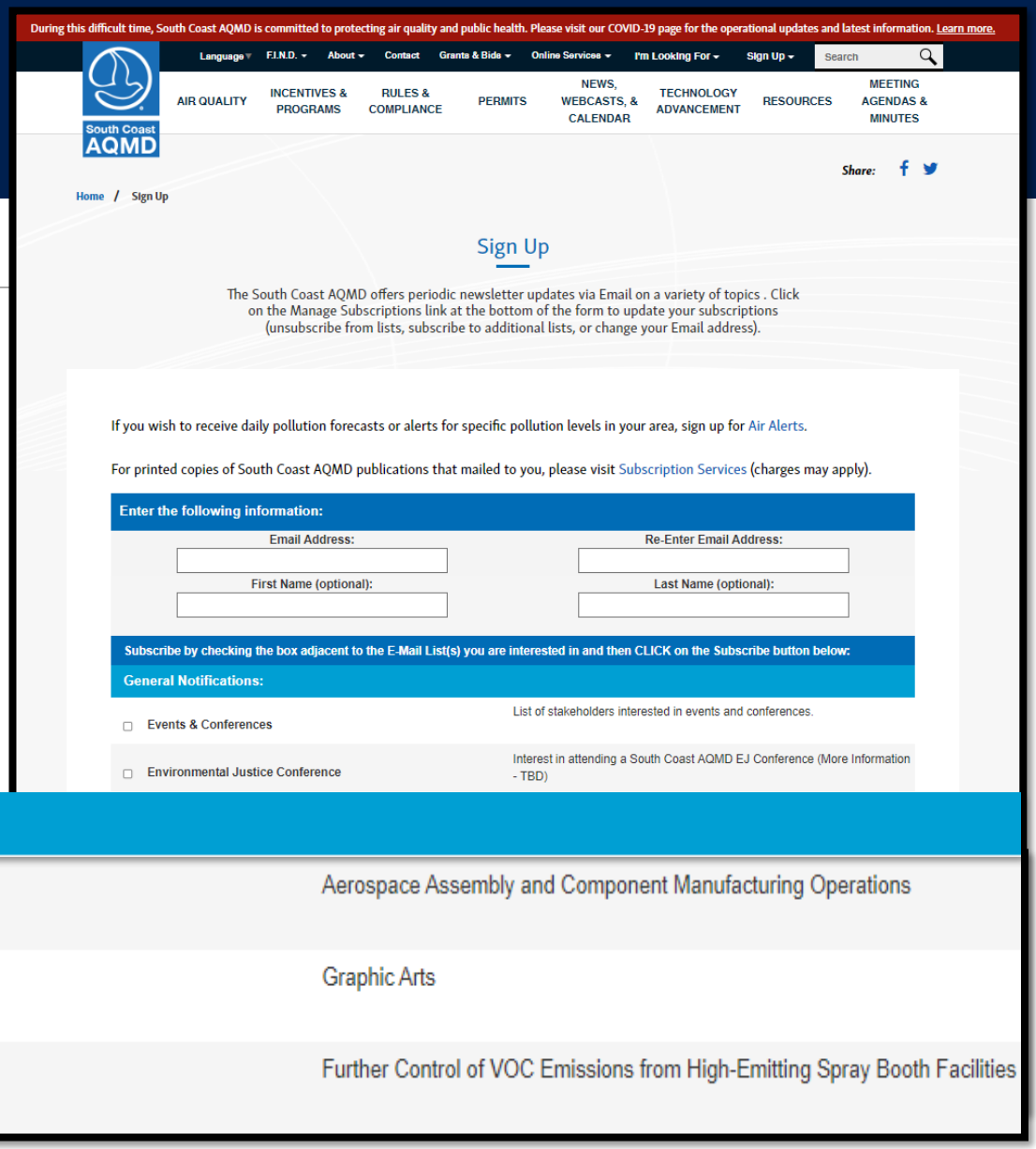
Working Group Materials

- 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 Rule 1124 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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