SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Preliminary Draft Staff Report

Proposed Amended Rule 1151 – Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

Rule 1151 – Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations was adopted in July 1988 to limit Volatile Organic Compound (VOC) emissions, toxic air contaminants, stratospheric ozone-depleting compounds, and global-warming compound emissions from automotive coating operations performed on motor vehicles, mobile equipment and associated parts or components for motor vehicles and mobile equipment. Rule 1151 includes 12 categories of automotive coatings with VOC limits and applies to any person who supplies, sells, offers for sale, markets, manufactures, blends, repackages, possesses or distributes any automotive coating or associated solvent for use within the South Coast Air Quality Management District (South Coast AQMD), as well as any person who uses, applies, or solicits the use or application of any automotive coating or associated solvent within the South Coast AQMD.

The current proposed rule amendments were initiated to address two exempt compounds that were determined to have toxic end points, including potential carcinogenicity, by the Office of Environmental Health Hazard Assessment (OEHHA): *tert*-Butyl Acetate (t-BAc), which is exempt from the definition of a VOC for certain categories of products in a few source specific rules including Rule 1151, and para-chlorobenzotrifluoride (pCBtF), which is considered exempt from the definition of a VOC for all uses within the South Coast AQMD, including Rule 1151 products. These exempt compounds are utilized by automotive coating manufacturers to formulate coatings and coating components that comply with Rule 1151 VOC content limits. The proposed prohibition of pCBtF and t-BAc is based on the Stationary Source Committee directive on April 21, 2017, to prioritize lowering the toxicity of coatings and solvents, even if it means increasing VOC levels. The current rule development has two primary goals: 1) to propose a phase-out timeline for pCBtF and t-BAc, and 2) to assess the feasibility of emission reductions through technology assessments and stakeholder engagement. To expedite the transition away from pCBtF and t-BAc, staff is proposing a temporary period of a few years to allow coatings formulated to meet the National U.S. Environmental Protection Agency (U.S. EPA) VOC content limits to be used in the South Coast AQMD provided the formulations do not include pCBtF or t-BAc. This temporary period provides time for those coatings to be reformulated to meet future lower VOC content limits without pCBtF or t-BAc.

During the Phase I period, which will span from the date of rule adoption to January 1, 2028, for most coating categories, coatings formulated to meet U.S. EPA VOC content limits will be allowed to be used. U.S. EPA VOC content limits are less stringent and therefore coating manufacturers do not utilize pCBtF or t-BAc in their formulations to comply with these limits. The transition away from pCBtF- and t-BAc-containing coatings will result in a temporary increase in VOC emissions during the Phase I period.

The Phase II period begins on January 1, 2028, for majority of coating categories. During this period facilities will begin to transition away from the higher-VOC coatings to reformulated, low-VOC coatings that do not contain pCBtF or t-BAc. This transition will result in a decrease in VOC emissions that resulted from the temporary emissions increase during the Phase I period.

There are approximately 3,000 automotive refinishing facilities in the South Coast AQMD subject to Rule 1151 including: autobody repair and paint shops; production autobody paint shops; new car dealer repair and paint shops; fleet operator repair and paint shops; custom-made car fabrication facilities, and truck body builders. This rule amendment will result in a temporary increase in VOC

emissions of 4.82 tons per day (tpd) and overall emission reductions of 0.11 tpd; however, it will result in permanently lowering the toxicity of the coatings and protecting public health.

The current rule amendment process began in September 2023. Staff conducted four working group meetings and multiple individual meetings with industry stakeholders and representatives. In addition, staff distributed a survey to the coating manufacturers requesting product data for each automotive coating category.

CHAPTER 1 : BACKGROUND

INTRODUCTION
REGULATORY HISTORY
AFFECTED INDUSTRIES
PUBLIC PROCESS
KEY CONCERNS

Introduction

Rule 1151 – Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations is a source-specific rule adopted on July 8, 1988, to reduce Volatile Organic Compound (VOC) emissions, toxic air contaminants, stratospheric ozone-depleting compounds, and global-warming compound emissions from automotive coating operations performed on motor vehicles, mobile equipment and associated parts or components for motor vehicles and mobile equipment. The rule applies to 12 categories of automotive coatings with VOC limits and applies to any person who supplies, sells, offers for sale, markets, manufactures, blends, repackages, possesses or distributes any automotive coating or associated solvent for use within the South Coast AQMD, as well as any person who uses, applies, or solicits the use or application of any automotive coating or associated solvent within the South Coast AQMD.

To reduce the VOC emissions from automotive coatings, many coatings manufacturers have relied on the use of solvents that are exempt from the definition of a VOC because they have low reactivity and therefore do not significantly contribute to the formation of ground-level ozone. In April 2017, the South Coast AQMD Stationary Source Committee recommended a precautionary approach when considering exempt compounds with a toxic endpoint and removing the exempt status for any compound that has an established toxic endpoint. The California Office of Environmental Health Hazard Assessment (OEHHA) has determined that two exempt compounds used in automotive coatings, pCBtF and t-BAc, have toxic endpoints. Therefore, the current rule development has two primary goals: 1) to propose a phase-out timeline for pCBtF and t-BAc, and 2) to assess the feasibility of emission reductions through technology assessments and stakeholder engagement. .

Regulatory History

Rule 1151 was adopted on July 8, 1988, and has been subsequently amended 13 times. The most recent amendment was on September 5, 2014, which sought to make administrative changes to the rule to enhance the understanding of current applicable rule requirements by removing obsolete rule language and making minor revisions and editorial corrections. The 2014 amendment also added new definitions to promote clarity and consistency, and further aligned the transfer efficiency equivalency section with the state Suggested Control Measure (SCM). This amendment was administrative in nature and did not affect current VOC limits or existing work practices and did not yield VOC reductions or increases.

Prior to the 2014 amendment, Rule 1151 was amended in December 2005 and included a partial exemption from the definition of a VOC for t-BAc for Automotive Coatings, except for color and clear coatings. Staff held a Toxics Symposium in October 2014 and developed the draft "t-BAc Assessment White Paper," which was released in April 2017. As a result of that work, the Stationary Source Committee recommended a precautionary approach—that compounds with a known or suspected toxic endpoint will not be exempted from the definition of VOC—and directed staff to prioritize toxicity over VOC emissions. In addition, the Stationary Source Committee further directed staff to request OEHHA to perform an assessment of pCBtF, a compound that is exempted for all uses in Rule 102 – Definition of Terms (Rule 102) as a Group I Exempt Solvent. In 2018, OEHHA finalized a draft Health Risk Assessment (HRA) of t-BAc, concluding that it poses a potential cancer risk to humans. In 2020, OEHHA finalized the assessment of pCBtF, and determined it to be a stronger carcinogen than t-BAc.

Affected Industries

Rule 1151 is applicable to Automotive Coatings and applies to any person who supplies, sells, offers for sale, markets, manufactures, blends, repackages, possesses or distributes any automotive coating or associated solvent for use within the South Coast AQMD, as well as any person who uses, applies, or solicits the use or application of any automotive coating or associated solvent within the South Coast AQMD. To determine how many facilities are affected by Rule 1151, staff researched the Clean Air Support System (CLASS) database using Standard Industrial Classification code (SIC) 7532 – Top, Body, and Upholstery Repair Shops and Paint Shops; North American Industry Classification System code (NAICS) 811121 – Automotive Body, Paint and Interior Repair and Maintenance; and South Coast AQMD Control Equipment Category (CCAT) codes 60 and 65 – Spray Booth, Paint and Solvent; and Automotive Refinishing Spray Booth as the search criteria. The CLASS database contains approximately 3,000 active Rule 1151 facilities. This database research identified required air permits that are for paint spray booths.

The 3,000 active facilities in the South Coast AQMD that apply automotive coatings to motor vehicles fall into six broad categories: 1) motor vehicle assembly lines; 2) autobody repair and paint shops; 3) production autobody paint shops; 4) new car dealer repair and paint shops; 5) fleet operator repair and paint shops; and 6) truck body-builders. These categories are further described as:

1. Motor Vehicle Assembly Lines

   Motor vehicle assembly line operations are where the original equipment manufacturer (OEM) builds new vehicles. VOC emissions from the application of coatings on motor vehicle assembly lines are subject to Rule 1115, not Rule 1151.

2. Autobody Repair and Paint Shops

   Autobody repair and paint shops are the largest component of the motor vehicle refinishing industry. They are usually small to medium-sized shops, owner operated, and specialize in collision repair work. They are found throughout the South Coast AQMD within business, commercial, and residential districts. These shops are subject to Rule 1151.

3. Production Paint Shops

   Production paint shops are high-volume retail auto paint shops where a large portion of the paint jobs are complete vehicles. These facilities are generally able to offer lower prices than small autobody shops and are subject to Rule 1151.

4. New Car Dealer Repair and Paint Shops

   Many new car dealers operate paint shops to touch-up new cars damaged during delivery, refurbish used cars before resale, and provide a full-service facility for customers. These shops are generally moderate in size and have operating characteristics between production paint shops and neighborhood autobody, repair, and paint shops, and are subject to Rule 1151.

5. Fleet Operator Repair and Paint Shops

Some companies maintain motor vehicle paint shops for maintenance of their fleet vehicles and equipment. These facilities are generally similar to new car dealer shops and are subject to Rule 1151.

6. Truck Body-Builders

Truck body-builders are facilities where old truck-bodies are modified or repainted. These facilities are subject to Rule 1151.

Process Description

Rule 1151 is applicable to all automotive and mobile equipment (such as trains, railcars, and truck trailers) refinishing operations that are not a part of a motor vehicle assembly line coating operation. Rule 1151 should not be confused with Rule 1115 – Motor Vehicle Assembly Line Coating Operations, which is applicable to assembly line coating operations conducted during the manufacturing of new motor vehicles.

Automotive refinishing products are used during the repair process to address damage during manufacture, transit, or the service life of the vehicle, and are also used in the restoration, color change, and customization of the vehicle. Automotive coatings are used in automotive refinishing operations to form a film that serves to beautify, preserve, repair, or protect the surface of a motor vehicle, mobile equipment, or associated parts and components.

Automotive coatings are typically grouped into two different classes, undercoats and topcoats. Undercoats primarily prepare the substrate for subsequent coatings. Undercoats include adhesion promoters for plastic parts, pretreatment coatings for bare metal surface etching, and primers, primer sealers, primer surfacers, and weld-through primers, which are used to undercoat the surface prior to application of the topcoat(s). Topcoats are typically applied onto prepared primed surfaces and include single-stage coatings and color and clear coat coating systems. Other coatings include:

- Uniform finish coatings, which are used for blending a spot repair into the surrounding areas for proper color match;
- Underbody coatings, which are used on the underside of the exterior body such as inner fender-well and chassis paint which is typically used on floor boards and frame rails; and
- Bed liner coatings, which are used to coat the beds of pick-up trucks.

Public Process

The current rule amendment process began in September 2023. Staff conducted four working group meetings and multiple individual meetings with industry stakeholders and representatives. In addition, staff distributed a survey to the coating manufacturers requesting product data for each automotive coating category. The table below summarizes the key topics discussed at each of the Working Group Meetings, which ranged from one to three hours and included presentations that are posted on the South Coast AQMD's website.[1]

[1] http://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-1151

Table 1-1: Summary of Working Group Meetings

Meeting title	Date	Highlights
Working Group Meeting #1	November 7, 2023	• Rule background • Key amendment objectives • Exempt solvent background • Preliminary technology assessments • Coating manufacturer survey
Working Group Meeting #2	March 7, 2024	• Amendment progress update • Anticipated PAR 1401 impacts to 1151 facilities • Coating manufacturer survey update • Initial rule concepts
Working Group Meeting #3	May 21, 2024	• Amendment progress update • Coating manufacturer survey data analysis • BARCT Assessment progress • Initial rule concepts
Working Group Meeting #4	July 11, 2024	• Amendment progress update • Cost-Effectiveness and Incremental Cost-Effectiveness • Proposed Interim Limits • Initial Preliminary Draft Rule Language

Staff also met with industry stakeholders and their representatives throughout the rule development process. The table below summarizes stakeholder meetings during the rulemaking:

Table 1-2: Meetings with Stakeholders

Date	Stakeholder
January 2, 2024	SMC Global
January 2, 2024	PPG
January 10, 2024	Axalta
January 23, 2024	BASF
January 23, 2024	Cal OSHA
January 24, 2024	U.S. EPA
January 30, 2024	W.M. Barr
January 30, 2024	American Coatings Association (ACA)
January 31, 2024	Allnex
January 31, 2024	PPG
February 6, 2024	CARB
February 8, 2024	Transtar
February 20, 2024	Axalta
March 14, 2024	CAPCOA
March 21, 2024	W.M. Barr
March 28, 2024	AB617 SLA CSC
April 2, 2024	AkzoNobel
April 10, 2024	Axalta
June 5, 2024	AkzoNobel
June 13, 2024	Axalta
June 14, 2024	PPG
June 14, 2024	BASF
June 21, 2024	Covestro
June 26, 2024	California Autobody Association
July 12, 2024	U.S. EPA
July 17, 2024	AkzoNobel
July 24, 2024	W.M. Barr
July 30, 2024	PPG
August 1, 2024	CARB
August 2, 2024	Axalta
August 6, 2024	PPG
August 16, 2024	PPG

CHAPTER 2 : TECHNOLOGY ASSESSMENT

VOC Control Technology and Exempt Compounds

VOC emissions in automotive coatings can be controlled by modifying the chemistry of the coatings to reduce the VOC content, examples of different coating technologies are shown in the figure below. The most widely used method for controlling VOC emissions for automotive coatings is to transition to water-based systems or to formulate with exempt solvents. To meet the low VOC limits in Rule 1151, manufacturers relied heavily on pCBtF and, to a lesser extent, t-BAc.

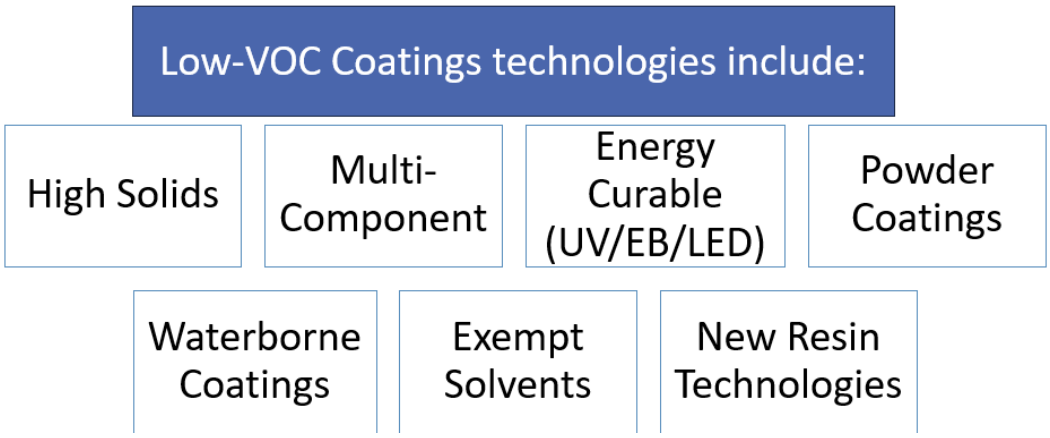

Figure 2-1: Coating Technologies

Ultraviolet, electron beam, light-emitting diode (UV/EB/LED) technologies have the potential to reduce VOC emissions from coatings, although these technologies are not widely implemented in automotive coatings at this time. Improvement in application methods to improve transfer efficiency can also reduce VOC emissions; however, Rule 1151 already requires facilities to use efficient high-volume, low-pressure (HVLP) spray guns for coating applications. The use of add-on controls, such as thermal oxidizers, is another method for VOC reduction that has been used in some surface coating applications.

Background on pCBtF and t-BAc

In 1994, the U.S. EPA exempted pCBtF from the definition of a VOC, and, in 2004, South Coast AQMD added pCBtF as an exempt VOC compound in Rule 102. The Rule 102 VOC exemption for pCBtF means it is not considered a VOC for any application within the South Coast AQMD.

In 2004, the U.S. EPA exempted t-BAc from the definition of a VOC, but due to toxicity concerns, the South Coast AQMD did not allow for an unlimited Rule 102 exemption but, instead, allowed for several limited exemptions in source specific rules, e.g., Rules 1113 and 1151. In 2013, the Rule 1113 amendment included a resolution that directed staff to review the exemption for t-BAc due to renewed toxicity concerns. The California Office of Environmental Health Hazard Assessment (OEHHA) finalized their t-BAc assessment in 2017, concluding that it had a higher cancer potency than previously estimated. In 2018, staff presented the preliminary t-BAc assessment and expressed concerns regarding pCBtF because OEHHA had yet to assess its toxicity. Based on staff recommendations, the Stationary Source Committee directed staff to: remove existing t-BAc exemption in Rules 1113 and 1151 when the rules are amended, and request that OEHHA review the potential toxicity of pCBtF and remove the exemption, as resources allow,

if pCBtF is deemed a potential carcinogen. In 2020, the pCBtF cancer inhalation unit risk factor document was adopted by OEHHA, which indicated pCBtF is a potential carcinogen.

Comparing pCBtF and t-BAc toxicity to Group II Compounds

Staff considered several approaches to address the toxicity concerns for pCBtF and t-BAc from removing the exempt status to a complete prohibition of use. To inform that decision, staff considered how other exempt compounds with potential toxic endpoints have historically been addressed. Rule 102 defines exempt compounds as being Group I or Group II compounds; Group II compounds are prohibited from use in some rules, including Rule 1151. Four Group II compounds have a Cancer Potency Factor, a Reference Exposure Level (REL), or both. Cancer Potency Factor is a measure used to estimate the risk of cancer associated with exposure to a carcinogenic substance and represents the increased cancer risk per unit of exposure over a lifetime. Reference Exposure Level (REL) is the maximum concentration level of a substance in the air that is not expected to have adverse health effects in humans over a specified exposure duration; RELs can be acute (short-term), 8-hour, or chronic (long-term).

Table 2-1: Cancer Potency Factor for Group II Compounds, pCBtF, and t-BAc

Compound	Cancer Potency Factor (Slope Factor)
perchloroethylene (perc)	0.021
DMC	0.0035
t-BAc	0.0047
pCBtF	0.03

For the four compounds shown in the table above, pCBtF has the highest Cancer Potency Factor of all Group II exempt compounds (almost 50 percent higher than perc).

The table below shows the available Acute RELs for Group II compounds. t-BAc has the lowest REL, meaning the highest risk among Group II compounds. Cancer Potency Factor for pCBtF is much higher than t-BAc, perc, and DMC, but it has no established Acute REL.

Table 2-2: Acute REL for Group II Compounds, pCBtF, and t-BAc

Compound	Acute REL
perc	20,000
DMC	14,000
t-BAc	10,000
pCBtF	N/A

Staff Recommendations on pCBtF and t-BAc

The preceding comparison of pCBtF and t-BAc to other toxic compounds that are prohibited from use in VOC rules, including Rule 1151, supports a future prohibition of pCBtF and t-BAc. OEHHA's assessment of pCBtF and t-BAc shows these compounds to be as toxic as many chemicals currently prohibited; therefore, staff recommends prohibiting the use of pCBtF and t-BAc.

Automotive Coating Manufacturer pCBtF and t-BAc Survey

To understand the extent of the use of pCBtF and t-BAc to comply with the VOC limits in Rule 1151, staff conducted a survey, in December 2023, of manufacturers who sell automotive coatings and products subject to Rule 1151. The main exempt compounds of interest of the survey were pCBtF and t-BAc. The results of the survey were used to help evaluate VOC content limits, VOC emissions, a potential prohibition timeline, and future effective VOC content limits. The table below shows the survey questions.

Table 2-3: pCBtF and t-BAc December 2023 Survey Questions

	Requested Information
1.	Company name, contact person, and an email address
2.	Do you sell automotive coatings into or within the South Coast AQMD?
3.	Do any of the automotive coatings sold into or within the South Coast AQMD contain para-chlorobenzotrifluoride (pCBtF), also known as Oxsol 100, or t-BAc?
4.	Information regarding each automotive coating categories that include pCBtF or t-BAc in formulation
5.	Information regarding reducers and solvent cleaning product that include pCBtF or t-BAc in formulation

Requested Information	
6.	The approximate weight percent of pCBtF or t-BAc in formulations
7.	The VOC content of each individual product
8.	Total annual volume sold or used in South Coast AQMD percent of California sales for each automotive coating category

In total, five of the seven major automotive coating manufacturers responded to the survey. Most reported that a large portion of the automotive coatings categories meet the current Rule 1151 VOC limits using pCBtF and t-BAc. The following summarizes the major findings of the survey:

- 62 percent of the reported automotive coatings contain pCBtF and less than one percent contain t-BAc;
- 71 percent of the reported automotive coatings are solvent-based and 29 percent are waterborne;
- Only two automotive categories reported using t-BAc: adhesion promoters and truck bedliners, and these two categories also reported using quantities of pCBtF ranging from 16 to 34 percent;
- Seven automotive coating categories reported only containing pCBtF in their formulation: clear coatings, color coatings, pretreatment coatings, primers, single-stage, uniform finish coatings, and underbody coatings;
- The remaining two categories: multi-color coatings and temporary protective coatings, were not reported in the survey.

Automotive Refinishing Products and Use of pCBtF and t-BAc

There are two main classes of automotive coatings: undercoats and topcoats. Undercoats, including pretreatment wash primers, primer surfacers, and primer sealers, prepare the exterior surfaces by providing corrosion resistance, adhesion, and a smooth foundation for subsequent topcoats. Pretreatment wash primers are applied directly to bare metal surfaces to provide corrosion resistance and adhesion. Pretreatment wash primers also contain a minimum of 0.5 percent acid by weight to provide surface etching and no more than 16 percent solids by weight. Similarly, primer surfacers are coatings applied to a substrate to facilitate bonding between subsequent topcoats and can be sanded to provide a smooth uniform finish. Primer sealers, on the other hand, have a lower solids content than surfacers and are intended to provide a smooth substrate surface for subsequent topcoat(s) and are not intended to be sanded. Topcoats are applied to provide color, gloss, and a protective finish. Topcoats can be classified into two main categories: (1) single-stage coatings, and (2) multi-stage systems.

Single-stage topcoats consist of only one final coating, which is applied over undercoats to provide color, gloss, and protection.

Multi-stage coatings, unlike the single-stage coatings, consist of two or more layers, each contributing separately to the final finish's characteristics. The initial layer, or basecoat layer,

contains the pigmentations and metallic flakes that provide the final color and color effects. The final coatings in multi-stage systems are non-pigmented clear coats that provide hardness and durability to the final glossy finish. One special form of clear coat that is typically found on high end vehicles is a low gloss or matted clear coat; these specialty clear coats contain flattening agents or additives that disperse light to give a flat matted finish. Multi-stage coatings include two-stage systems as well as three-stage systems. Three-stage coatings differ from the two stage-systems in that they include a mid-coat layer that provides additional color effects, such as a pearlized light effect resulting from mica flakes. The nature of both the coating systems requires that all coating components be used to refinish the vehicle to provide the required appearance and performance.

The main difference in the application of coatings in a manufacturing setting compared to a refinishing environment are the curing characteristics of the coatings. Automotive original equipment manufacturing (OEM) coatings are typically cured using baking ovens that operate at high temperatures. The types of coatings used in refinishing operations are typically air dried or by forced-air spray booths. Refinishing shops cannot use high-temperature ovens due to the potential damage to other automobile components made of plastic or other sensitive materials. Therefore, automotive coatings are formulated for faster drying times.

Table 2-4: General Automotive Coating Categories

Automotive Coating Type	
Undercoats	**Topcoats**
Pretreatment Wash Primer	Solid Color Coating
Primer Surfacer	Metallic Color Coating
Primer Sealer	Single-Stage Color Coating
Adhesion Promoter	Clear Coating/Matte-Clear Coating

During staff meetings with automotive coating industry stakeholders, the manufacturers indicated they primarily rely on pCBtF to meet the current Rule 1151 VOC limits and there is no suitable drop-in replacement. Based on the survey responses, color coatings, primers, and clear coatings account for approximately 80 percent of the automotive coating sales in California. pCBtF use is prevalent across these three categories, most significantly in primers and clear coats. Primers account for approximately 20 percent of the total California sales with 45 percent containing pCBtF. Clear coats account for approximately 38 percent of the total California sales with 60 percent of the products containing pCBtF. Color coatings account for approximately 22 percent of the total California sales and have a significant number of waterborne formulations available in the market. The figure below shows the percentage of automotive coatings sales in California.

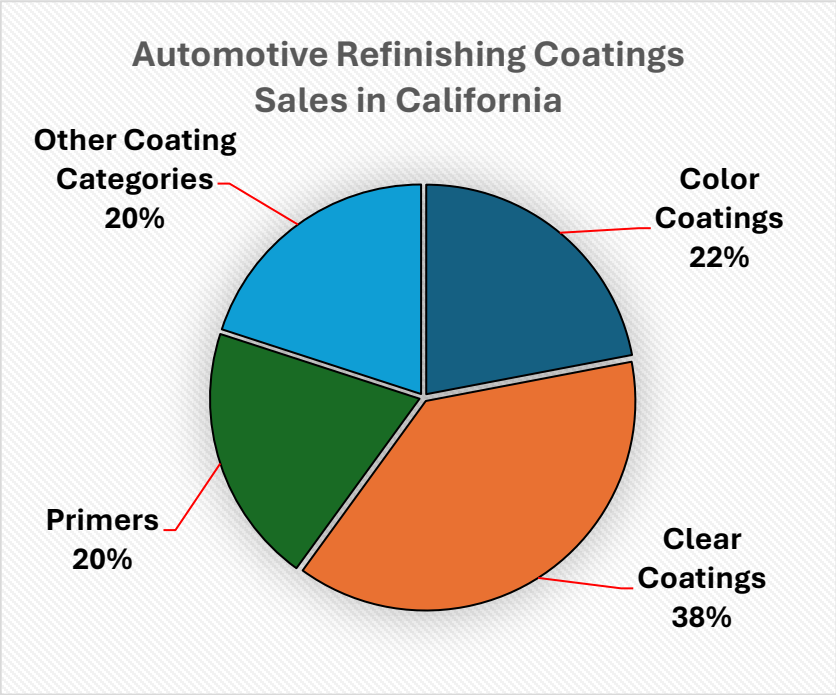

Figure 2-2: Automotive Coating Sales in California by Category.

The table below summarizes the weight percent usage of pCBtF in the automotive coatings sold within the South Coast AQMD according to the survey and range of pCBtF reported.

Table 2-5: pCBtF Weight Percent Survey Response by Category

Coating Category	pCBtF (wt %)	Average pCBtF (wt %)
Adhesion Promoter	Up to 88%	34%
Pretreatment Coating	Up to 71%	18%
Primer	Up to 68%	23%
Color Coating	Up to 60%	21%
Single Stage Coating	Up to 65%	36%
Clear Coating	Up to 65%	33%
Uniform Finishing Coasting	Up to 60%	32%
Truck Bed Liner Coating	Up to 25%	16%
Reducer	Up to 100%	55%

Based on the survey data that was submitted by the manufacturers, the use of pCBtF is prevalent in nearly all automotive coating categories, and t-BAc to a much lesser extent, to meet Rule 1151 limits. Due to the toxic risk associated with pCBtF and t-BAc, staff is proposing an expedited phase-out approach for the usage of pCBtF and t-BAc for automotive coatings by allowing higher VOC limits (Phase I limits) upon rule adoption and then transitioning to future effective lower limits (Phase II limits); this will provide sufficient time for coating manufacturers to develop suitable replacement products that will meet the lower future limits.

Automotive refinish coatings that are formulated to comply with the higher VOC limits in the National Rule or European limits do not utilize pCBtF and t-BAc in their formulation and are readily available outside of the South Coast AQMD. The table below compares current Rule 1151 VOC limits with the National Rule and European limits for automotive refinish coatings.

Table 2-6: National Rule and European Limits Compared to Rule 1151 Limits by Category

Coating Category	VOC Content Less Water and Exempts		
	Rule 1151 (g/L)	European Limits (g/L)	National Rule (g/L)
Adhesion Promoter	540	840	840
Color Coating	420	420	600
Clear Coating	250	420	600
Pretreatment Coating	660	780	780
Primer	250	540	550-580
Single-Stage Coating	340	420	600
Truck Bed Liner Coating	310	840	420
Uniform Finish Coating	540	840	840
Specialty Coating	--	840	840
Any Other Coating Type	250	--	840

Staff's analysis of the survey data and feedback from coating manufacturers indicate potential subcategories will be needed with higher VOC limits to avoid market disruptions. PAR 1151 includes the following new sub-categories: metallic color coats, matte clear coats, primer sealers, and primer surfacers.

- The color coating category will be subcategorized into color coats and metallic color coats;
- The clear coat category will be subcategorized into clear coats and matte clear coats; and
- The primer category will be subcategorized into primer sealers and primer surfacers.

The separation by primer type is consistent with the National Rule which differentiates between three types of primers: 1) pretreatment wash or "etch" primers, 2) primer sealers, and 3) primer

surfacers. The subcategories for each coating will be discussed as part of their respective categories in the BARCT assessment section.

Initially, staff proposed using the European limits as the Phase I limits since they are lower than the National Rule limits for several coating categories and the lower limits would minimize the temporary VOC emission increase in Phase I. However, transitioning to European coatings would delay the transition out of pCBtF and t-BAc due to potential supply chain challenges, product registration requirements for the raw material(s) used in the European formulation, and additional OEM testing and approvals. The delayed transition timeline does not align with staff's priority for an expedited transition out of pCBtF and t-BAc. PAR 1151 will instead rely on the National Rule limits as the basis for the Phase I limits, unless lower limits for the coating category are already being achieved. Use of the National Rule limits will allow for a rapid phase-out of pCBtF and t-BAc since most of the replacement products are currently available in nearby states and will also allow manufacturers to direct resources towards meeting the future effective lower Phase II limits.

According to the manufacturer survey and feedback received, clear coats are already below the National Rule limit with existing formulations at or below 520 g/L. Matte clear coats, however, will need a slightly higher VOC limit because of the flattening agent used to achieve the low-gloss matte appearance. Most color coats are also currently formulated at 420 g/L which is well below the National Rule limit of 600 g/L. The table below lists staff's proposed Phase I limits for each automotive coating category.

Table 2-7: Phase I Limits

Automotive Coating Categories	Phase I Limits (g/L)	U.S. EPA National Rule Limits (g/L)
Adhesion Promoter	840	840
Clear Coating	520	600
Matte-Clear Coating	550	600
Color Coating	420	600
Metallics Color Coating	420	600
Pretreatment Wash Primer	780	780
Primer Sealer	550	550
Primer Surfacer	580	580
Single-Stage Coatings	340	600
Temporary Protective Coating	60	N/A
Tinted Mid-Coat	750	750
Truck Bed Liner Coating	310	N/A
Underbody Coating	430	840
Uniform Finishing Coat	540	840
Any Other Coating Type	250	N/A

Three categories were either not reported in the survey or were reported as not containing any pCBtF or t-BAc in their formulation:

- Multi-color coatings were not reported, and no coatings could be identified that meet the definition of a multi-color coating; therefore, that category is proposed to be removed from PAR 1151;
- Temporary protective coatings were not reported, but were later identified and did not contain pCBtF or t-BAc; therefore, staff is proposing to maintain the VOC limit for that category;
- Underbody coatings were not reported as containing any pCBtF or t-BAc; therefore, staff is proposing to maintain the VOC limit for that category.

The BARCT assessment will focus on nine categories and subcategories that utilize an average of 16 percent or more pCBtF or t-BAc. The adhesion promoter and truck bed liner category were the only two categories that reported t-BAc use. The table below lists the categories the BARCT assessment will evaluate and the corresponding pCBtF weight percent by category.

Table 2-8: BARCT Assessment Categories and Corresponding pCBtF weight percent

Automotive Coating Category	pCBtF wt %	Average pCBtF wt %
Adhesion Promoter	Up to 88%	34 %
Pretreatment Coating	Up to 71%	18%
Primer	Up to 68%	23%
Color Coating	Up to 60%	21%
Single Stage Coating	Up to 65%	36%
Clear Coating	Up to 65%	33%
Uniform Finish Coating	Up to 60%	32%
Truck Bed Liner Coating	Up to 25%	16%
Reducer	Up to 100%	55%

BARCT Assessments

In the sections below, the data, feedback provided by stakeholders, and staff proposal for each category included in the technology assessment will be discussed. Most automotive coatings are multi-component products that may require a hardener, activator, or reducer for proper application and curing, thus VOC limits are as applied. The purpose of a BARCT assessment is to assess potential VOC control options to establish future effective emission limits for each automotive coating category. Under Health and Safety Code Section 40406, BARCT is defined as:

> "an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source."

The BARCT assessment follows a framework through the rule development process and includes public participation. The figure below shows the overall BARCT assessment approach.

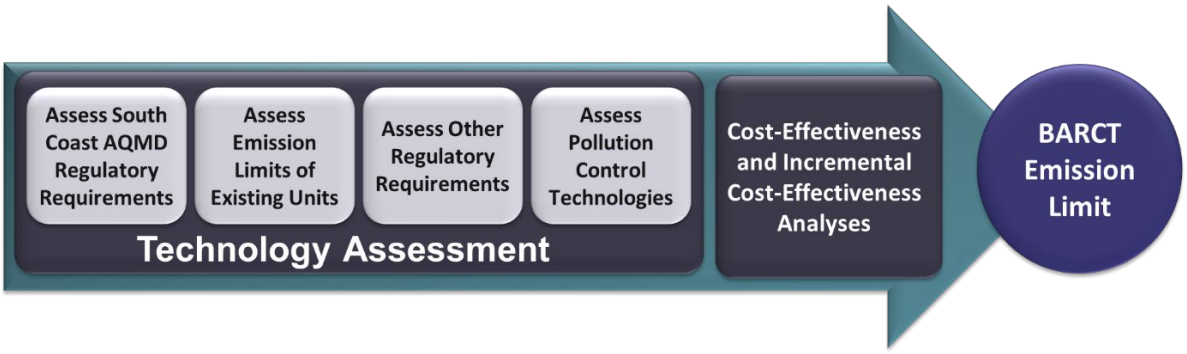

Figure 2-3: BARCT Assessment Approach

Technology Assessment

Staff conducted a technology assessment to evaluate VOC control technologies that will achieve the BARCT levels for Phase II VOC limits for automotive coating categories subject to PAR 1151. To quicky transition products out of pCBtF and t-BAc, staff is proposing to temporarily raise the VOC limits similar to those of the U.S. EPA National Rule limits for Phase I; except for categories that can currently meet lower limits. The technology assessment will focus on establishing a lower future effective Phase II limit at or near current VOC levels. There are 12 automotive coating categories subject to Rule 1151; the BARCT assessment focused on nine of the automotive categories and subcategories that utilize 16 to 55 percent pCBtF on average in their formulation and will have potential challenges in meeting Phase II VOC content limits without the use of pCBtF or t-BAc in their formulation. The remaining five categories were either not reported in the manufacturer survey or are not anticipated to encounter significant challenges to meet the current limits in Rule 1151. The technology assessment consists of four steps: the assessment of South Coast AQMD requirements, a complete assessment of emission limits of existing units, review of other regulatory requirements, and assessment of available VOC control technologies.

BARCT Assessment

Assessment of South Coast AQMD Regulatory Requirements

Staff reviewed existing South Coast AQMD VOC coating regulations for similar categories and to assess potential technology transfer. Most of the limits in existing South Coast AQMD rules were at similar VOC levels as Rule 1151, which may be an indication that the low VOC limits are likely achieved using exempt solvents. The following table summarizes the current South Coast AQMD VOC coatings rules that staff evaluated as part of the BARCT technology assessment.

Table 2-9: South Coast AQMD Regulatory Requirements

Regulation/ Rule Title	Relevant Unit/ Equipment	VOC Emission Limits for Similar Coating Categories
Regulation XI – Source Specific Standards / Rule 1107 – Coatings of Metal Parts and Products	All metal coating operations except: aerospace assembly, magnet wire, marine craft, motor vehicle, metal container, and coil coating operations	• General One-Component: 275 g/L • General Multi-Component: 340 g/L • Etching Filler: 420 g/L • Metallic: 420 g/L • Pretreatment Coatings: 420 g/L • Touch Up: 420 g/L • Extreme High Gloss: 340 g/L • High Performance Architectural: 420 g/L
Regulation XI – Source Specific Standards / Rule 1106 – Marine and Pleasure Craft Coatings	Applies to marine or pleasure craft coatings and any associated solvent	**Pleasure Craft** • Finish Primer/Surfacer: 420 g/L • High Build Primer Surfacer:340 g/L • Marine Deck Sealant Primer: 760 g/L • Pretreatment Wash Primer: 780 g/L • Teak Primer: 775 g/L • Extreme High Gloss Coating: 490 g/L • High Gloss Coating: 420 g/L • Pretreatment Wash Primer: 780 g/L **Marine Coating** • Extreme High Gloss: 420 g/L (baked); 490 g/L (air dried) • High Gloss: 275 g/L (baked); 340 g/L (air dried) • Pretreatment Wash Primer: 420 g/L (baked);
Regulation XI – Source Specific Standards / Rule 1113 – Architectural Coatings	Applies to coatings applied to stationary sources, fields, or lawns	• Industrial Maintenance (IM) Coatings: 100 g/L • Color Indicating Safety Coating: 480 g/L • High Temp IM Coating: 420 g/L • Non-Sacrificial Anti-Graffiti Coatings: 100 g/L • Metallic Pigmented Coatings: 150 g/L • Multi-Color Coatings: 250 g/L • Non-flat Coatings: 50 g/L • Pretreatment Wash Primers: 420 g/L

Assess VOC Limits of Existing Coatings

Assess VOC Limits of Existing Coatings

The manufacturers' submitted survey data was used to evaluate existing VOC levels for each coating category. Based on the survey, most coatings use either pCBtF or t-BAc in their formulation to comply with existing limits. Adhesion promoters and truck bed liners were the only two categories that utilize t-BAc along with pCBtF in their formulation; these two categories only account for one percent of the total automotive coating sales. The table below shows the average VOC content per category.

Table 2-10: VOC Limits of Existing Coatings and Exempt Compounds

Automotive Coating Category	Average VOC as applied (g/L)	pCBtF in Formulation	t-BAc in formulation
Adhesion Promoter	528	Yes	Yes
Color Coating	340	No	Yes
Multi-Color Coating	Not Reported	Not Reported	Not Reported
Clear Coating	246	No	Yes
Pretreatment Coating	657	No	Yes
Primer	232	No	Yes
Single-Stage Coating	334	No	Yes
Truck Bedliner Coating	249	Yes	Yes
Underbody Coating	382	No	Yes
Uniform Finish Coating	467	No	Yes
Temporary Protective Coating	Not Reported	Not Reported	Not Reported
Any Other Coating Type	Not Reported	Not Reported	Not Reported

Other Regulatory Requirements

This step of the BARCT assessment identifies and compares other regulatory requirements for the same source type or category. The evaluation ensures that the proposed requirements are consistent with, conform to, or are more stringent than existing standards. The assessment evaluated most California Air Districts that have similar automotive coatings rules, the Federal Regulation 40 CFR Part 9 and 59 – National Volatile Organic Compound Emission Standards for Automotive Refinish Coating (U.S. National Rule), and the European Regulation for Paints, Varnishes, Vehicle Refinish Products, and Activities. Most Air Districts throughout California have similar VOC limits since most Air Districts rely on the limits in the CARB SCM. Furthermore, most automotive refinishing products sold and used in California rely on pCBtF and t-BAc to meet the low limits specified in the CARB SCM. The U.S. National Rule limits and European limits are higher than those of California air districts and manufacturers do not use pCBtF or t-BAc in their product formulation. The tables below compare limits between large California Air Districts, National Rule, and European Rule.

Table 2-11: Other Air District Limits

Category	Antelope Valley – Rule 1151 (g/L)	Bay Area AQMD – Rule 45 (g/L)	Eastern Kern APCD – Rule 410.4A (g/L)	Feather River AQMD – Rule 3.19 (g/L)	San Diego County APCD – Rule 67.20 (g/L)	Santa Barbara APCD – Rule 339 (g/L)
Adhesion Promoter	540	540	540	540	540	540
Color Coating	420	420	420	420	420	420
Clear Coating	250	250	250	250	250	250
Pretreatment Coating	660	660	660	660	660	660
Primer	250	250	250	250	250	250
Single-Stage Coating	340	420	340	340	340	340
Truck Bed Liner Coating	310	310	200	310	310	310
Uniform Finish Coating	540	540	650	540	540	540
Any Other Coating Type	250	250	250	250	250	250

Table 2-12: South Coast AQMD, U.S. National Rule, Limits

Category	South Coast AQMD Limits (g/L)	European Limits (g/L)	National Rule Limits (g/L)
Adhesion Promoter	540	--	840
Color Coating	420	420	420
Clear Coating	250	420	250
Pretreatment Coating	660	780	660
Primer	250	540	250
Single-Stage Coating	340	420	340
Truck Bed Liner Coating	310	840	200
Uniform Finish Coating	540	--	650
Specialty Coating	--	840	840
Any Other Coating Type	250	--	840

Assess Low-VOC Technologies

The next step is to research the commercially available low VOC control technologies and seek information on any emerging VOC control technology. As part of this assessment, staff met with several of the major automotive coating manufacturers to discuss the status and development of low VOC products. Most of the manufacturers agree that phasing out the toxic compounds as quickly as possible is the best approach, but the lack of a suitable drop-in exempt solvents is a challenge. Manufacturers have indicated they have been working on reformulations to meet existing limits without pCBtF or t-BAc and are confident they will have a product to bring to the market. In addition, staff met with coating resin raw material suppliers to discuss emerging technologies; the resin suppliers stated that they are currently in the process of developing resin systems that meet the current limits of Rule 1151 without the use of exempt solvents; they are developing two component primer systems that meet current limits. There are a few products available that demonstrate feasibility to meet the current VOC limits without pCBtF or t-BAc but may only be specific to certain substrates or do not meet certain performance requirements. UV/EB/LED curable primer is a technology that can be utilized for repairing areas of one square-foot or less and allows for fast cure times. Staff has identified a UV/EB/LED curable primer formulated at approximately 210 g/L, which is below the current 250 g/L limit for primers. The table below lists some of the coating products that are currently available on the market that meet the current limits.

Table 2-13: Low VOC Coatings Currently Available without pCBtF or t-BAc

Automotive Coating Type	Category	VOC As Applied (g/L)
Waterborne 1K Primer - Gray	Primer	86
Waterborne 1K Primer Surfacer - Gray	Primer	86
Waterborne High-Build 1K Primer	Primer	160
Waterborne Flexible 1K Primer Surfacer	Primer	158
UV Cured Primer Filler Surfacer	Primer	210
Waterborne Acrylic Urethane Clearcoat	Clearcoat	126

Another form of effective VOC control is the use of add-on control technology that captures and directs VOC-laden air from process areas or emissions points to air pollution control equipment. The effectiveness of an add-on control system is based on the capture efficiency and the VOC destruction capability of the emissions control device, which is typically around 95 percent destruction efficiency. Capture efficiency refers to the ability of a ventilation system to capture and transfer VOCs released from process areas or emission points to the pollution control device. If the process areas or emission points meet the criteria set forth in U.S. EPA Method 204, the area or emission point may be considered a permanent total enclosure (PTE) and the capture efficiency is assumed to be 100 percent. If the criteria of U.S. EPA Method 204 are not met, then the capture efficiency of the system can only be determined through source testing.

The options for control devices are numerous, each having different cost and control efficiencies. The particular selection is dependent upon the needs and operation of the specific automotive refinish facility. Although there are many types of control devices that work on different principles such as adsorption or destruction of VOC emissions, the most typical type of control equipment for VOC emissions is the use of thermal destruction equipment such as a thermal oxidizer or a regenerative catalytic oxidizer.

Rule 1151 allows for the use of add-on control equipment as an option for achieving compliance. Although this method of control may be cost-effective for some operators, it could be prohibitively expensive for others, particularly those that are small businesses or have low production throughputs. Staff's evaluation of add-on control using a thermal oxidizer determined that it was not cost-effective at $230,000 per ton of VOC reduced. Therefore, the use of add-on controls is offered as an option rather than a mandated requirement. The evaluation can be found in Chapter 4 under the incremental cost-effectiveness analysis. The primary form of control is to rely on low-VOC coating formulations.

Proposed Initial Phase II VOC Emission Limits

Based on the BARCT assessment and discussion with manufacturers, staff has developed the following proposed initial Phase II VOC limits. The next step is to determine if it is cost effective to reformulate from the Phase I VOC limits to the Phase II VOC limits.

Table 2-14: Initial Proposed Phase II Limits

Automotive Coating Categories	Initial Proposed Phase II Limit (g/L)
Adhesion Promoter	720
Clear Coating	250
Matte-Clear Coating	520
Color Coating	250
Metallics Color Coating	250
Pretreatment Wash Primer	720
Primer Sealer	150
Primer Surfacer	150
Single-Stage Coatings	340
Tinted Mid-Coat	250
Temporary Protective Coating	60
Truck Bed Liner Coating	310
Underbody Coating	430
Uniform Finishing Coat	540
Any Other Coating Type	250

For the coating categories outlined in red, staff did not identify any pCBtF or t-BAc in those coatings; therefore, staff is not proposing to change those VOC limits since it is feasible for them to meet current VOC limits without exempt compounds.

Cost-Effectiveness and Incremental Cost Effectiveness Analysis

The South Coast AQMD routinely conducts cost-effectiveness analyses regarding proposed rules and regulations that result in the reduction of criteria pollutants (NOx, SOx, VOC, PM, and CO). The analysis is used as a measure of relative effectiveness of a proposal. It is generally used to compare and rank rules, control measures, or alternative means of emissions control relating to the cost of purchasing, installing, and operating control equipment to achieve the projected emission reductions. The major components of the cost-effectiveness analysis are the annualized nonrecurring costs, recurring cost, emission reductions, discount rate, present value factor, and equipment life.

- Annualized Nonrecurring Cost: The cost difference of the transition from the higher Phase I limits to the lower Phase II limits. Staff anticipates that coating manufacturers will have to reformulate or develop new products with lower VOC content; the cost difference between the new product for Phase II and Phase I products is the annualized nonrecurring cost. Staff estimates the cost of Phase II compliance products to be 10 percent more than Phase I products; this is based on manufacturer feedback. For color coating category, waterborne low VOC products are currently available, so the cost difference between Phase I and Phase II is based on actual costs.
- Recurring Cost: Annual cost that is recurring over the course of the technology considered. Operation and maintenance are examples of recuring costs. However, there will be zero recurring cost associated with the transition from Phase I to Phase II since the evaluation is only based on the cost difference during the transition from the higher VOC Phase I products to the low VOC Phase II products. Accordingly, there are no operation and maintenance costs associated with the transition.
- Present Value Factor: Formula, as described below, is based on timeframe evaluated and discount rate used. For this evaluation, cost is evaluated over one year for Phase I and Phase II cost difference; thus, the present worth value is equal to one.
- Discount rate: The discount rate used for the cost-effectiveness calculation is four percent and used in calculating the present value factor.
- Emission Reduction: The VOC reduction from the higher Phase I interim limits to the lower Phase II limit over one year timeframe.
- Equipment life: The timeframe at which the cost difference between Phase I and Phase II and emission reductions are evaluated. The timeframe used is one year.

The cost-effectiveness for PAR 1151 was completed using the discounted cash flow method, as explained below:

Discounted Cash Flow (DCF)

The DCF method converts all costs, including initial capital investments and costs expected in the present and all future years of equipment life, to present value. Conceptually, it is as if calculating the number of funds that would be needed at the beginning of the initial year to finance the initial capital investments and to set aside to pay off the annual costs as they occur in the future. The fund that is set aside is assumed to be invested and generates a rate of return at the discount rate chosen. The final cost-effective measure is derived by dividing the present value of total costs by the total emissions reduced over the equipment life. The equation below is used for calculating cost-

effectiveness with DCF. The equation was presented in the 2016 AQMP Socioeconomic Report Appendix 2-B (p. 2-B-3):

$$Cost - effectiveness = \frac{Initial\ Capital\ Investments\ +\ (Annual\ O\&M\ Costs\ \times\ PVF)}{Annual\ Emission\ Reductions\ \times\ Years\ of\ Equipment\ Life}$$

Where:

$$PVF = \frac{(1+r)^N - 1}{r * (1+r)^N}$$

Where r = real interest rate (discount rate); and N = years of equipment life.

Finally, Health and Safety Code Section 40920.6(a)(3) states that an incremental cost-effectiveness assessment should be performed on one or more identified potential control options that meet emission reduction objectives. To determine the incremental cost-effectiveness under this paragraph, South Coast AQMD calculates the difference in the dollar costs divided by the difference in the emission reduction potentials between each progressively more stringent potential control option as compared to the next less expensive control option. Once the BARCT assessment is complete and VOC limits are established, staff considers incrementally more stringent options to demonstrate that the VOC limit represents the "maximum degree of reduction achievable by each class or category." The equation for incremental cost-effectiveness is below:

$$\text{I} - CE\left(\$/_{tons\ VOC\ reduced}\right) = \frac{Incremental\ Difference\ in\ Cost\ (Present\ Worth\ Value)}{Incremental\ Difference\ in\ Emission\ Reductions\ (Lifetime\ Reductions)}$$

Summary of Cost-Effectiveness Analysis and Incremental Cost-Effectiveness Analysis

To determine cost-effectiveness for the proposed Phase II BARCT limits, cost information and estimates for existing coatings were obtained. Staff met with multiple coating manufacturers, vendors, distributors, and stakeholders to gather cost data and estimates for various types of coatings. Based on manufacturer feedback, coatings meeting the current limits are approximately 10 percent more expensive than those meeting the U.S. National Rule limits and, as a result, staff assumed the products meeting the proposed Phase II limits will be similar in cost to the coatings meeting current Rule 1151 limits. The cost difference between the Phase I and Phase II products will be used in the cost-effectiveness analysis. The South Coast AQMD Governing Board established a cost screening threshold of $40,168 per ton of VOC removed.

Automotive Coating Categories

As previously mentioned, one of the first steps in the BARCT assessment is to establish the class and category of automotive coating products. Staff collaborated with the stakeholders to better understand the challenges and establish several subcategories of the specific coating categories. Based on the BARCT technology assessment and manufacturer feedback, staff updated the existing categories and established subcategories of coatings for color coats, clear coats, and primers since each coating had specific challenges and/or requirements. The following sections explain the cost-effectiveness of reducing the VOC limits from the Phase I to Phase II VOC limit for each applicable subcategory of automotive coating.

Adhesion Promoter

Adhesion promoters are coatings applied directly to uncoated plastic and other synthetic surfaces, excluding metals, to facilitate bonding of subsequent coatings. All adhesion promoters reported in the automotive coating manufacturer survey are solvent-based coatings and utilize exempt compounds to comply with the current VOC content limit of 540 g/L. The two primary exempt solvents used in this category are pCBtF and t-BAc. Total estimated annual usage for this category is approximately 12,900 gallons per year which represents approximately 0.7 percent of the automotive coatings used in South Coast AQMD.

The proposed Phase I VOC content limit of 840 g/L is identical to the limit for adhesion promoters in the U.S. National Rule. Upon discussion with coating manufacturers, and after reviewing the coating data evaluation, staff determined that a lower Phase I limit for adhesion promoters was not feasible given the VOC contents of the commercially available adhesion promoters that do not contain pCBtF or t-BAc.

The proposed Phase II VOC content limit of 720 g/L is technologically feasible and cost-effective by the January 1, 2028, effective date based on discussions with coating manufacturers. The cost-effectiveness for the category is approximately $30,000 per ton of VOC reduced.

Clear Coating

Clear coatings are coatings that are formulated with materials that do no impart color and are applied over a color coating or clear coating. Ninety-nine percent of the clear coatings reported in the automotive coating manufacturer survey are solvent-borne and about 60 percent contain pCBtF. Forty one percent of the total automotive coatings used in South Coast are clear coats. The clear coating category can be further divided into two subcategories: high gloss clear coats or matte clear coats. High gloss clear coats annual usage is approximately 801,000 gallons.

The proposed Phase I VOC content limit for the category is 520 g/L. The proposed Phase II VOC content limit of 250 g/L is technologically feasible based on a future effective date of January 1, 2030. The VOC limit is cost-effectiveness for the category at $39,000 per ton of VOC removed.

Matte Clear Coating

Staff is proposing to carve out a subcategory of clear coatings for matte clear coatings. Matte clear coatings are coatings that are formulated with materials that do no impart color and are applied over a color coating or a subsequent layer of a matte clear coating, which register a gloss of less than forty units on a sixty-degree meter, according to ASTM Test Method 523. Matte clear coatings contain a flattening agent which is a substance that gives the clear coat a lusterless or matte appearance. According to manufacturers, a higher VOC limit is necessary due to the flattening agent used in these coatings. Based on coating manufacturer feedback, matte clear coatings are a small, niche category of coatings and make up approximately 0.4 percent of the clear coating category used in South Coast AQMD.

Staff evaluated the cost-effectiveness of a lower Phase II VOC content limit of 520 g/L for matte clear coatings. Due to the relatively low volume of these coatings sold and subsequently low emission reductions from the lower limit, it was determined to not be cost-effective at $600,000 per ton of VOC removed. Accordingly, staff is proposing to maintain the 550 g/L for matte clear instead of lowering the Phase II VOC content limit.

Color Coating

Color coatings are pigmented automotive coatings, excluding adhesion promoters and primers, that require a subsequent clear coating to be applied. Color coatings are generally applied over a primer or adhesion promoter but can also be applied over another color coating. Based on survey data and product data sheet analysis, staff confirmed that use of pCBtF is prevalent in solvent-borne color coatings. Approximately 30 percent of color coatings reported in the survey are water based while 70 percent reported are solvent based. Based on the survey data, color coatings can typically be divided into two subcategories: solid colors coats and metallic color coatings. Metallic color coatings need to have a higher VOC content in their formulation to achieve their metallic appearance; solid color coatings can be formulated at lower VOC levels. The figure below shows the average VOC content for each subcategory.

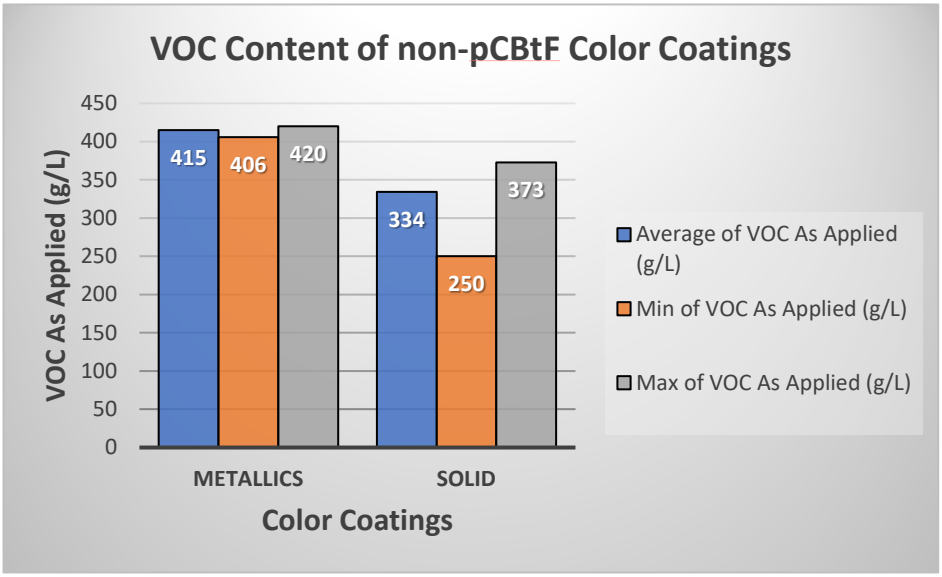

Figure 2-4: Metallics and Solid Color VOC Content

Lower-VOC waterborne color coatings are widely used by most facilities and make up most of the volume of color coatings sold for use in South Coast AQMD. Approximately 240,000 gallons are used annually in the South Coast. Waterborne color coatings do not contain pCBtF or t-BAc.

Because there are non-pCBtF-containing color coatings currently commercially available and in use that meet the existing VOC content limit for color coatings, staff is not proposing to raise the VOC Content limit of 420 g/L during the Phase I period. There are smaller shops that rely on the higher VOC solvent-based color coatings so the rule will allow higher VOC coatings to be sold in small containers, which is detailed in Chapter three of this staff report.

The proposed Phase II VOC Content limit of 250 g/L is based on reported automotive coating manufacturer survey data and discussions with coating manufacturers. It is cost-effective for the color coatings category at $24,000 per ton of VOC reduced.

Metallic Color Coating

Staff is proposing to carve out a subcategory of color coatings for metallic color coatings. Metallic color coatings are color coatings that contain more than 0.042 g/L of metal flakes, as applied, where such particles are visible in the dried film.

There are non-pCBtF-containing metallic color coatings currently commercially available and in use that meet the existing VOC content limit for color coatings; therefore, staff is not proposing to raise the VOC Content limit of 420 g/L during the Phase I period. Approximately 293,000 gallons of metallic color coatings are used annually.

Coating manufacturers voiced concerns regarding the higher VOC contents of metallic color coatings compared to traditional, solid color coatings and the need for a separate, higher limit. Staff reviewed metallic color coating data sheets and confirmed the need for a subcategory carve-out. However, based on follow up meetings with a major automotive coating manufacturer, a 250 g/L is technically feasible at a date later than staff's original proposal of January 1, 2030; additional time is necessary for development, formulation, and testing. Therefore, staff is also proposing a future effective date of January 1, 2032, for both the color and metallic color coating category; this will ensure manufacturers have adequate time to address technical and color matching challenges associated with reformulation. Staff is proposing a lower Phase II VOC content limit 250 g/L for the metallic color coating category which is cost-effectiveness at $18,000 per ton of VOC reduced.

Tinted Mid-Coat

Tinted mid-coats are transparent color coatings used as part of a three-stage metallic or pearlescent system. The mid-coat is traditionally used to add a depth effect to paints and color match three-stage coatings during the repair process. Mid-coats are similar to basecoats since they can be tinted or adjusted to get a different color and provide the metallic finish desired. Approximate mid-coat usage is 2,000 gallons per year for the category.

Mid-coats utilize pCBtF in formulation to meet the current 420 g/L VOC limit. Since no suitable replacement is currently available, staff is proposing a Phase I limit of 750 g/L which is similar to the National Rule limit. Based on manufacturer feedback and staff evaluation of the mid-coat category, a Phase II VOC limit of 250 g/L is feasible and also cost-effective at $8,000 per ton of VOC reduced. Therefore, staff is proposing a Phase II limit of 250 g/L for the category with a future effective date of January 1, 2032.

Pretreatment Wash Primer

The primer category can be divided into pretreatment wash primers, primer sealers, and primer surfacers. Pretreatment wash primers are automotive coatings that contain a minimum of 0.5 percent acid by weight and not more than the 16 percent solids by weight necessary to provide surface etching. Staff confirmed the use of pCBtF is prevalent in pretreatment wash primers as reported in the automotive coating manufacturer survey. Approximately 25,300 gallons are used annually in South Coast AQMD.

The proposed Phase I VOC content limit is 780 g/L. Staff evaluated the cost-effectiveness of a lower Phase II VOC content limit of 720 g/L for pretreatment wash primers. Due to the relatively low volume of these coatings sold and subsequent low emission reductions from the lower limit, staff confirmed the lower limit is not cost-effective at $104,000 per ton of VOC removed. Accordingly, staff is maintaining the 780 g/L limit and not proposing a lower Phase II VOC content limit.

Primer Sealer

Primer sealers are automotive coatings that are applied prior to the application of a topcoat for the purpose of color uniformity, or to promote the ability of an underlying coating to resist penetration by the topcoat. Most primers reported in the automotive coating manufacturer survey are solvent

based, with only a very small percentage being waterborne. Staff found the use of pCBtF to be prevalent among primers to meet the current VOC content limit. Approximately 13,600 gallons of primer sealers are used annually.

The proposed Phase I VOC content limit is 550 g/L. The proposed Phase II VOC content limit is 150 g/L and is technologically feasible based on a future effective date of January 1, 2028. The proposed limit is cost-effective for the category at $21,000 per ton of VOC reduced.

Primer Surfacer

Primer surfacers are automotive coatings that are applied for the purpose of corrosion resistance or adhesion and promote a uniform surface by filling in surface imperfections. Most primers reported in the automotive coating manufacturer survey are solvent based, with only a very small percentage being waterborne. Staff found the use of pCBtF to be prevalent among primers to meet the current VOC content limit. Approximately 287,000 gallons are used annually for this category.

Staff identified a commercially available UV/EB/LED curable product being used at a local refinishing facility as a potential technology to justify lowering the VOC limit of the primer surfacer category. The UV/EB/LED curable primer technology is currently only recommended for panel repairs of one square-foot or less but can potentially be scaled up to larger panels. The UV/EB/LED curable primer has a VOC content of 206 g/L, which is slightly higher than the proposed Phase II VOC limit of 150 g/L.

The proposed Phase I VOC content limit is 580 g/L. The proposed Phase II limit is 150 g/L is technologically feasible based on a future effective date of January 1, 2028. The proposed limit is cost-effective for the category at $22,000 per ton of VOC reduced.

Single-Stage coating

Single-stage coatings are pigmented automotive coatings, excluding adhesion promoters and primers, labeled and formulated for application without a subsequent clear coating and are applied over an adhesion promoter, a primer, or a color coating. Staff confirmed that no waterborne single-stage coatings were reported in the automotive coating manufacturer survey and that single-stage coatings comprise about two percent of automotive coatings used in South Coast AQMD with an annual usage of approximately 35,000 gallons.

The proposed Phase I VOC content limit is 600 g/L. The proposed Phase II VOC content limit is 340 g/L and is technologically feasible based on a future effective date of January 1, 2028. The proposed limit is cost-effective for the category at $19,000 per ton of VOC reduced.

Table 2-15: Cost-effectiveness by Category

Automotive Coating Category	Proposed Phase II VOC Content Limits (g/L)	Cost-Effectiveness
Adhesion Promoter	720	$30,000
Clear Coating	250	$39,000
Matte-Clear Coating	520	$600,000
Color Coating	250	$24,000
Metallics Color Coating	250	$18,000
Pretreatment Wash Primer	720	$104,000
Primer Sealer	150	$21,000
Primer Surfacer	150	$22,000
Single-Stage Costings	340	$19,000
Temporary Protective Coating	60	N/A
Tinted Mid-Coat	250	$8,000
Truck Bedliner Coating	310	N/A
Underbody Coating	430	N/A
Uniform Finish Coating	540	N/A
Any Other Coating Type	250	N/A

CHAPTER 3 : SUMMARY OF PROPOSALS

Introduction

The main objective of the proposed amendments to Rule 1151 is to phase out the use of pCBtF and t-BAc as solvents in automotive coatings, as directed by the South Coast AQMD's Stationary Source Committee, due to toxicity concerns.

Staff is proposing the following amendments to Rule 1151. The proposed amendments are primarily on the revised VOC limits for several product categories or new subcategories and the prohibition of pCBtF and t-BAc use in the regulated products. Some other amendments are for new labeling and reporting requirements, and for rule clarification or streamlining. The proposed revised rule structure and key provisions are discussed below.

Proposed Amended Rule Structure

(a) Purpose
(b) Applicability
(c) Definitions
(d) Requirements
(e) Alternative Compliance Options
(f) Prohibition of Possession, Specification, Sale or Use
(g) Recordkeeping Requirements
(h) Administrative and Reporting Requirements for Automotive Coating Manufacturers
(i) Test Methods
(j) Rule 442 Applicability
(k) Exemptions

Proposed Amended Rule 1151

Purpose [Subdivision (a)]

The purpose of this rule is to reduce VOC emissions, toxic air contaminants, stratospheric ozone-depleting compounds, and global-warming compound emissions from automotive coating applications performed on motor vehicles, mobile equipment, and associated parts and components.

No significant revisions were made to this subdivision. Staff capitalized defined terms to indicate that definitions for the associated terms can be found in the Definitions subdivision.

Applicability [Subdivision (b)]

PAR-1151 applies to any person that supplies, sells, offers for sale, markets, manufactures, blends, packages, repackages, possesses, or distributes any automotive coating, automotive coating component, or associated solvent for use within the South Coast AQMD, as well as any person who uses, applies, or solicits the use or application of any automotive coating or associated solvent within the South Coast AQMD.

No significant revisions were made to this subdivision. Staff capitalized defined terms to indicate that definitions for the associated terms can be found in the definition's subdivision.

Definitions [Subdivision (c)]

To provide clarity, definitions are used in the proposed amended rule as a proper noun to better distinguish defined terms from common terms. Refer to PAR-1151 for a complete list of definitions.

The following are new definitions for Proposed Amended Rule 1151, including some that distinguish the new automotive coating categories necessary for the transition away from pCBtF and t-BAc. Staff proposes to establish new categories and VOC content limits to reflect the results of the technology assessment. For all definitions, refer to the preliminary draft of PAR 1151 released with the Staff Report. Accordingly, the following definitions for those new categories will be added:

ADHESION PROMOTER in paragraph (c)(1), which means:

> *"any Automotive Coating, specifically labeled and formulated to be applied to uncoated plastic and other synthetic surfaces, excluding metals, to facilitate bonding of a subsequent automotive coating, for the purpose of applying a subsequent Automotive Coating."*

MATTE-CLEAR COATING in paragraph (c)(18), which means:

> *"any Automotive Coating that is formulated with materials that do not impart color and is specifically labeled and formulated for application over a Color Coating or a previous layer of a Matte-Clear Coating, which register a gloss of less than 40 units on a 60-degree meter, according to ASTM Test Method D523.*

MAXIMUM INCREMENTAL REACTIVITY (MIR) in paragraph (c)(20), which means:

> *"the measure of the photochemical reactivity of a VOC, which estimates the weight of ozone produced from a weight of a VOC expressed as gram of ozone per gram of VOC (g O_3/g VOC). MIR values for individual VOCs are specified in sections 94700 and 94701, Title 17, California Code of Regulations."*

METALLIC COLOR COATING in paragraph (c)(19), which means:

> *"any Automotive Coating that contains more than 0.042 pounds per gallon (5 grams per liter) of metal as applied, where such particles are visible in the dried film."*

PRIMER in paragraph (c)(24), which means:

> *"any Automotive Coating that is specifically labeled and formulated for application to a substrate to provide 1) a bond between the substrate and subsequent coats, 2) corrosion resistance, 3) a smooth substrate surface, or 4) resistance to penetration of subsequent coats, and for the purpose of applying a subsequent automotive coating. Primers may be pigmented and include Weld-through Primers, Primer Sealers, and Primer Surfacers."*

PRIMER SEALER in paragraph (c)(25), which means:

"any Coating applied prior to the application of a topcoat for the purpose of color uniformity, or to promote the ability of an underlying Coating to resist penetration by the topcoat."

PRIMER SURFACER in paragraph (c)(26), which means:

"any Coating applied for the purpose of corrosion resistance or adhesion, and which promotes a uniform surface by filling in surface imperfections."

PRIVATE LABELER in paragraph (c)(27), which means:

"is the person, company, firm, or establishment (other than the toll manufacturer) identified on the label of a Regulated Product."

PRODUCT-WEIGHTED MIR (PW-MIR) in paragraph (c)(28), which means:

"the sum of all weighted-MIR for all ingredients in a Reducer or Thinner. The PW-MIR is the total product reactivity expressed to hundredths of a gram of ozone formed per gram of product (excluding container and packaging) and calculated according to the following equations:

Weighted MIR (Wtd-MIR) ingredient = MIR x Weight fraction ingredient,)and,

$$\text{Product-Weighted MIR} = (\text{Wtd-MIR})_1 + (\text{Wtd-MIR})_2 + \ldots + (\text{WtdMIR})_n$$

where,

MIR	=	ingredient MIR
1,2,3,...,n	=	each ingredient in the product up to the total n ingredients in the product.*"*

READY-TO-SPRAY AUTOMOTIVE COATINGS in paragraph (c)(29), which means:

"the Automotive Coatings, mixed with all Automotive Coating Components, based on the manufacturers' stated mix ratio."

REDUCER OR THINNER in paragraph (c)(30), which means:

"any solvents used for reducing the viscosity of Automotive Coatings, including, but not limited to, products that prominently display the term "Paint Thinner," "Lacquer Thinner," "Thinner," or "Reducer" on its packaging."

REGULATED PRODUCT in paragraph (c)(31), which means:

"any Automotive Coating, Automotive Coating Component, and any product with reference to automotive refinishing or Automotive Coating on the container or in product

literature and with a recommendation for use in motor vehicle, Mobile Equipment, and Associated Parts and Components refinishing."

SOUTH COAST AQMD TEST METHOD in paragraph (c)(34), which means:

"the test method included in the manual of "Laboratory Methods of Analysis for Enforcement Samples" which can be found on the South Coast AQMD website."

TINTED MID-COAT in paragraph (c)(37), which means:

"a transparent color coating specifically labeled and formulated for use as part of a three-stage metallic or pearlescent coating system to add depth and color-match a three-stage coating system."

Requirements [Subdivision (d)]

This subdivision contains the provisions for any person that applies any automotive coating to a motor vehicle, mobile equipment, or associated parts or components of a motor vehicle or mobile equipment.

Paragraph (d)(1) - PAR 1151 VOC Content Limits

PAR 1151 establishes Phase I and Phase II VOC content limits and effective dates for automotive coatings by category, as summarized in PAR 1151 Table 1 – Table of Standards. Please see the table below for a summary of the proposed VOC content limits and effective dates. Coatings complying with Phase I and Phase II VOC limits are not allowed to contain pCBtF or t-BAc. Subdivision (d) also establishes a product-weighted maximum incremental reactivity limit for reducers and thinners, as summarized in PAR 1151 Table 3-2.

Table 3-1: Summary of the Revisions to the VOC Content Limits and Effective Dates Compared with the Current Requirements

Coating Categories	Current Limits		Phase I Limits		Phase II Limits		
	g/L	lb/gal	g/L	lb/gal	g/L	lb/gal	Effective Date
Adhesion Promoter	540	4.5	840	7.0	720	6.0	1/1/2028
Clear Coating	250	2.1	520	4.3	250	2.1	1/1/2030
Matte-Clear Coating	250	2.1	550	4.6			
Color Coating	420	3.5			250	2.1	1/1/2032
Metallic Color Coating	420	3.5			250	2.1	1/1/2032
Pretreatment Wash Primer	660	5.5	780	6.5			
Primer Sealer	250	2.1	550	4.8	150	1.25	1/1/2028
Primer Surfacer	250	2.1	580	4.6	150	1.25	1/1/2028
Single-Stage Coating	340	2.8	600	5.0	340	2.8	1/1/2028
Temporary Protective Coating	60	0.5					
Tinted Mid-Coat	420	3.5	750	6.3	250	2.1	1/1/2032
Truck Bed Liner Coating	310	2.6					
Underbody Coating	430	3.6					
Uniform Finishing Coating	540	4.5					
Any Other Coating Type	250	2.1					

Table 3-2: Table of Standards
Product Weighted MIR VOC Content Limit for Reducers and Thinners and Effective Dates

	PW-MIR VOC limit (g O_3/g VOC)	Effective Date
Reducers and Thinners	**1.0**	**1/1/2028**

Paragraph (d)(3) – Alternative VOC Content Limits

In paragraph (d)(3), staff is proposing an alternative VOC content limit of 720 g/L for color coatings and metallic color coatings that are supplied in half-pint containers, provided that the coating does not contain more than 0.01 percent by weight of either pCBtF or t-BAc. This is intended to address smaller autobody shops that are still using solvent-based color coatings and will provide additional time to transition to waterborne alternatives.

Paragraph (d)(4) – Phase II Sell-Through and Use-Through Allowances

Paragraph (d)(4) includes the sell-through and use-through allowances for coating categories where there is a *decrease* in the allowed VOC limit. This paragraph clarifies that coatings manufactured to comply with the higher, Phase I VOC limit and prior to the Phase II effective date, can be sold for up to 18 months and used for up to 24 months after the VOC limit is decreased upon the Phase II effective date. Paragraph (d)(4) does not apply to the sell-through and use-through periods associated with the transition away from pCBtF and t-BAc-containing coatings to U.S. EPA National Rule coatings. These sell-through and use-through periods will be subject to the provisions in subparagraph (f)(8)(D), discussed later in the staff report.

Alternative Compliance Options [Subdivision (e)]

This subdivision contains the provisions for any person that chooses to comply with the provisions of paragraph (d)(1) by using an approved emission control system or an alternative emission control plan.

Subdivision (e) was previously a paragraph in the preceding subdivision and is now its own stand-alone subdivision. Staff moved this language for better readability and consistency. No changes were made to this language other than being moved to its own subdivision.

Prohibition of Possession, Specification, Sale or Use [Subdivision (f)]

This subdivision contains the provisions for any person that applies, possesses, solicits the use or application of, supplies, sells, offers for sale, markets, blends, packages, repackages or distributes automotive coatings for use within the South Coast AQMD.

Paragraph (f)(7) – Carcinogenic Materials

Paragraph (f)(7) was moved from Subdivision (d) to Subdivision (f) to streamline the rule and group all provisions that include prohibitions together in the same subdivision. Paragraph (f)(7) prohibits the manufacturing of regulated products for use in South Coast AQMD in which cadmium or hexavalent chromium was introduced as a pigment or as an agent to impart any

property or characteristic to the automotive coatings during manufacturing, distribution, or use of the applicable automotive coatings. No changes were made to this language other than being moved to its own subdivision.

Paragraph (f)(8) – Exempt Compounds

Paragraph (f)(8) was moved from Subdivision (d) to Subdivision (f) to streamline the rule and group all provisions that include prohibitions together in the same subdivision. Currently, the rule prohibits the manufacture, sale, offer for sale, or distribution for use of any automotive coatings that contain any Group II exempt compounds within the South Coast AQMD. PAR 1151 extends the prohibition to include pCBtF and t-BAc with a one-year sell-through period, during which automotive coatings and automotive coating components containing pCBtF or t-BAc may continue to be sold. PAR 1151 also provides for a three-year use-through provision, during which automotive coatings and automotive coating components containing pCBtF or t-BAc may continue to be used, so long as they were manufactured prior to the effective date of the pCBtF and t-BAc prohibition. Please see the table below for a summary of the proposal.

Table 3-3: pCBtF and t-BAc Prohibition Timeline

Prohibition Effective Date	Sell-through End Date	Use-through End Date
May 1, 2025	May 1, 2026	July 1, 2027

Recordkeeping Requirements [Subdivision (g)]

Subdivision (g) outlines the recordkeeping requirements including maintaining records for VOC emissions pursuant to Rule 109 – Recordkeeping for Volatile Organic Compound Emissions, emission control systems, and for any person who supplies, sells, offers for sale, markets, blends, packages, repackages or distributes any automotive coatings for use within South Coast AQMD that do not meet the applicable VOC limits but are intended for use at a facility that utilizes an approved emission control system; a facility that operates in accordance with an approved alternative emissions control plan; or are exempt under subdivision (k).

This subdivision was restructured to streamline and better organize the rule provisions. Most of the changes are minor, defined terms were capitalized and the existing Rule 1151 recordkeeping clause (e)(3)(A)(iv) was moved to paragraph (g)(3).

Administrative and Reporting Requirements for Automotive Coating Manufacturers [Subdivision (h)]

This subdivision outlines the reporting requirements, and compliance statement and labeling requirements for automotive coating manufacturers.

Staff is proposing to add date of manufacture labeling to requirements for coating manufacturers and to require coating manufacturers to submit a General Quantity and Emission Report (QER) to South Coast AQMD according to the proposed schedule. Please see the table below for a summary of the proposal.

Subparagraph (h)(2)(C) – Labeling Requirements

Subparagraph (h)(2)(C) requires any automotive coatings and automotive coatings components to display the date of manufacture or a code indicating the date of manufacture. If the manufacturer uses a code that does not clearly indicate the date of manufacture, they must file an explanation of the date code with the Executive Officer. This requirement will be effective a year after rule adoption.

Paragraph (h)(4) and (h)(5) – General Quantity and Emission Report (QER)

Paragraphs (h)(4) and (h)(5) specify the information required to be submitted by automotive coating manufacturers and/or private labelers of regulated products sold into or within the South Coast AQMD, and the reporting timeline. Some key parameters required to be reported include the product manufacturer, name and code, applicable Rule 1151 category, VOC content, whether the coating is solvent-based or waterborne, and volumes sold into or within South Coast AQMD. See the table below for a summary of the reporting deadlines.

Table 3-4: Reporting Timeline

Reporting Deadlines	**Reported Years**
Manufacturers & Private Labelers	
September 1, 2030	2028, 2029
September 1, 2035	2033, 2034
September 1, 2040	2038, 2039

For a coating that falls under multiple categories, the category with the most restrictive VOC content pursuant to paragraph (d)(2) shall be listed in the general quantity and emissions report. In addition, any automotive coating that contains water or uses water as a carrier shall be considered water-based or waterborne in the general quantity and emissions report.

Test Methods [Subdivision (i)]

This provision specifies the approved test methods for determining the VOC content of automotive coatings, to quantify amounts of exempt perfluorocarbon compounds in automotive coatings, metal content of automotive coatings, acid content of pretreatment wash primers, gloss determination of automotive coatings, transfer efficiency of alternative automotive coatings application methods, and efficiency of emission control systems.

Rule 442 Applicability [Subdivision (j)]

This provision clarifies that any automotive coating, automotive coating operation or facility that is exempt pursuant to subdivision (k) from all or a portion of the VOC limits of subdivision (d), shall comply with Rule 442 – Usage of Solvents. This subdivision was not changed other than to capitalize defined terms and amend a reference that changed.

Exemptions [Subdivision (k)]

This provision provides conditional exemptions to various subdivisions of this rule. Staff is not proposing any removals from this subdivision.

Subparagraph (k)(2(B) – Automotive Coating Training Center

Subparagraph (k)(2)(B) outlines the period during which automotive coatings applied for educational purposes at automotive coating training centers that are owned and operated by automotive coating manufacturers shall conditionally be exempt from the prohibition of pCBtF and t-BAc in paragraph (f)(8).

Staff is proposing this amendment to address automotive coating training centers that are located in South Coast AQMD that train auto body employees employed at auto body shops located in Air Districts outside of South Coast AQMD that have not prohibited the use of pCBtF and t-BAc in their jurisdiction. Staff is proposing a period of ten years from the date of rule adoption that coatings containing pCBtF and t-BAc may continue to be conditionally used at these facilities.

CHAPTER 4 : IMPACT ASSESSMENT

Emission Inventory

The emission inventory for the proposed rule was determined by using the 2002 CARB Automotive Refinishing Survey, California population growth data from the U.S. Census, VOC content and sales data from the South Coast AQMD Coating Manufacturer Survey. According to the 2002 CARB Automotive Refinishing Survey, the total volume of automotive coatings from all categories was 3,685,636 gallons with a population of approximately 33.8 million people in the state of California based on the April 1, 2000, U.S. census data. The April 1, 2020, U.S. census data reported that the population of California grew by approximately 15 percent to approximately 39.5 million people and, as a result, staff estimated that automotive coatings usage also increased by approximately 15 percent to a total volume of 4,574,991 gallons in 2021 in California. Since South Coast AQMD accounts for nearly 46 percent of the California population, the total volume used was also estimated to be approximately 46 percent of the total volume at approximately 2.1 million gallons. Manufacturers also reported percent sales by category in the South Coast AQMD survey which was applied to the total usage volume estimated in the South Coast AQMD. For the emissions calculations, the VOC of material or actual VOC was used; the VOC actual was estimated based on the survey data provided by the automotive coating manufacturers.

Based on staff's proposal, the baseline emission for the PAR 1151 can be separated into current Limits (2021), Phase I Limits, and Phase II Limits. The baseline emissions are 2.47, 7.31, and 2.53 respectively. The table below list the associated emissions by category for the respective phases.

Table 4-1: Estimated VOC Emission Inventory by Category for Each Phase

Emission Category	2021 Emissions (tpd)	Phase I Emissions (tpd)	Phase II Emissions (tpd)
Adhesion Promoter	0.04	0.12	0.10
Clear Coating	1.09	3.92	0.10
Matte-Clear Coating	0.006	0.02	0.02
Color Coating	0.33	0.33	0.19
Metallics Color Coating	0.40	0.40	0.40
Pretreatment Wash Primer	0.08	0.21	0.21
Primer Sealer	0.01	0.09	0.01
Primer Surfacer	0.23	1.8	0.23
Single-Stage Costings	0.08	0.2	0.08
Temporary Protective Coating	0	0	0
Tinted Mid-Coat	0.003	0.01	0.003
Truck Bedliner Coating	0.13	0.13	0.13
Underbody Coating	0.004	0.004	0.004
Uniform Finish Coating	0.07	0.07	0.07
Any Other Coating Type	0	0	0
Total PAR 1151	**2.47**	**7.31**	**2.53**

Control Technology

Compliance with PAR 1151 is expected to be met through manufacturers reformulating regulated products by substituting certain chemicals with other chemicals that contain less VOCs, less or no toxics, and no stratospheric ozone-depleting compounds. The manufacturers will have flexibility to use any compliant alternative reformulation to meet the VOC limits in PAR 1151. For certain categories, there are existing products that meet the proposed lower VOC content limits; therefore,

product reformulation is technically feasible. Some end-users may comply with the rule using alternative options such as control devices (e.g., emission collection systems or thermal oxidizer). The latter options may be cost prohibitive for most refinishing facilities, so it is anticipated that most will comply using lower VOC products in the future.

Emission Reductions

Based on the technology assessment, which includes staff discussions with stakeholders and analyzing the South Coast AQMD automotive coating manufacturer survey data as well as product data sheets, staff is proposing updated VOC content limits for six existing automotive coating categories and four proposed new automotive coating categories. Staff is proposing an effective date of January 1, 2028, for all automotive coating categories, with the exception of clear coatings which will have an effective date of January 1, 2030, to provide the necessary additional time to reformulate these coatings to meet the proposed Phase II VOC content limit.

For three categories: matte clear coatings, pretreatment wash primers, and metallic color coatings, staff is proposing to maintain the higher interim Phase I limit in Phase II to accommodate specific challenges and requirements for the category. Metallic color coatings will not result in a net increase in emissions since the current limit is being maintained. The VOC limits are presented in the Table 4-2 below; the delayed and foregone emissions, and emission reductions are presented in Table 4-3 below.

Table 4-2: Proposed Phase I and Phase II VOC Limits by Category

Automotive Coating Category	Current Limits	Phase I Limits	Phase II Limits	Phase II Effective Date
Adhesion Promoter	540	840	720	1/1/2028
Clear Coating	250	520	250	1/1/2030
Matte-Clear Coating	250	550		
Color Coating	420	420	250	1/1/2032
Metallics Color Coating	420	420	250	1/1/2032
Pretreatment Wash Primer	660	780	780	1/1/2028
Primer Sealer	250	550	250	1/1/2028
Primer Surfacer	250	580	250	1/1/2028
Single-Stage Costings	340	600	340	1/1/2028
Temporary Protective Coating	60	60	60	-
Tinted Mid-Coat	420	750	250	1/1/2032
Truck Bedliner Coating	310	310	310	-
Underbody Coating	430	430	430	-
Uniform Finish Coating	540	540	540	-
Any Other Coating Type	250	250	250	-

Table 4-3: Delayed and Foregone Emissions by Category

Automotive Coating Category	Current Emissions	Phase I Emissions	Phase II Emissions	Phase II Effective Date	Forgone Emission Reductions (tpd)
Adhesion Promoter	0.04	0.12	0.10	1/1/2028	0.02
Clear Coating	1.09	3.92	1.09	1/1/2030	0
Matte-Clear Coating	0.006	0.02	0.02		0.014
Color Coating	0.33	0.33	0.19	1/1/2032	(0.14)
Metallics Color Coating	0.40	0.40	0.27	1/1/2032	(0.13)
Pretreatment Wash Primer	0.08	0.21	0.21	1/1/2028	0.13
Primer Sealer	0.01	0.09	0.01	1/1/2028	0
Primer Surfacer	0.23	1.8	0.23	1/1/2028	0
Single-Stage Costings	0.08	0.2	0.08	1/1/2028	0
Temporary Protective Coating	0	0	0	-	0
Tinted Mid-Coat	0.003	0.01	0.003	1/1/2028	0
Truck Bedliner Coating	0.13	0.13	0.13	-	0
Underbody Coating	0.004	0.004	0.004	-	0
Uniform Finish Coating	0.07	0.07	0.07	-	0
Any Other Coating Type	0	0	0	-	0
Total Emissions (tpd)	2.47	7.31	2.39		-
PAR 1151 Emissions Change (tpd)	**0**	**4.83**	**(4.92)**		**(0.11)**

The temporary forgone emissions from current limits to Phase I is approximately 4.83 tpd and emission reductions from Phase I to Phase II emissions will be approximately 4.92 tpd; at full implementation the total overall emission reduction will be 0.11 tpd for the proposed rule amendments. The temporary increase from the current VOC limits to the Phase I limits is being proposed to phase out pCBtF and t-BAc as quickly as possible to protect public health, which aligns with the South Coast AQMD Stationary Source Committee's directive to prioritize toxicity over VOC reductions.

Staff is continuing to work with stakeholders on the proposed Phase II VOC limits and assessing if equivalent emission reductions could be achieved by lowering the VOC limit of the primer categories to allow for increased VOC limits for some of the more challenging categories, such as the clear coating and color coating categories.

Cost-Effectiveness and Incremental Cost-Effectiveness

Cost-Effectiveness

The cost and cost-effectiveness analysis are based on the cost difference between the estimated cost of coatings formulated to meet the Phase II VOC limits and coatings formulated to meet the Phase I VOC limits. The cost of the Phase II compliant coatings is assumed to be ten percent more than Phase I complaint coatings. The cost effectiveness analysis was conducted for each coating category using the estimated emission reduction from Phase I to Phase II VOC limits. Staff did not include the cost savings associated with the transition from the current pCBtF and t-Bac-containing lower-VOC coatings to coatings that meet the Phase I VOC limits. Cost savings will occur from the transition to the higher VOC coatings meeting the Phase I limit due to the high cost of pCBtF.

The current proposed amendment is that the Phase I limits for all categories will be adjusted back to current or near-current levels in Phase II. However, there are five coating categories where the VOC limits will not change and thus a cost-effective and incremental cost-effectiveness analysis was not conducted. The five categories are: temporary protective coatings, truck bed liner coatings, underbody coatings, uniform finish coatings, and "any other" coating type. Staff also proposed to maintain the Phase I interim limit for the metallic color coating category since a higher VOC limit is needed to achieve a metallic appearance, so a cost-effectiveness analysis was not conducted for this category.

Staff gathered costs from various sources which included the manufacturers, online research, and vendor quotes. Certain coating categories such as color coats currently have waterborne low-VOC options; in this case, staff relied on actual cost data since it is already available. For categories where costs are not available, staff assumed a ten percent increase in cost. This difference in cost is used in the cost-effectiveness analysis.

Table 4-4: Cost-Effectiveness for Each Automotive Coating Category

Automotive Coating Category	Cost-Effectiveness
Adhesion Promoter	$30,000
Clear Coating	$39,000
Matte-Clear Coating	$600,000
Color Coating	$24,000
Metallics Color Coating	$18,000
Pretreatment Wash Primer	$104,000
Primer Sealer	$21,000
Primer Surfacer	$22,000
Single-Stage Costings	$19,000
Temporary Protective Coating	$0
Tinted Mid-Coat	$8,000
Truck Bedliner Coating	$0
Underbody Coating	$0
Uniform Finish Coating	$0
Any Other Coating Type	$0

Consistent with the South Coast AQMD cost-effectiveness methodology, the discount cash flow method of analysis is used to calculate the cost-effectiveness for PAR 1151 for Phase I to Phase II emission limits. The cost-effectiveness for the proposed amendments is calculated by the following equation using clearcoat category as an example.

CE = [Capital Cost + (1.0 x Annual O& M)]/(Annual Emission Reductions x 1)

Where,

Capital Cost	=	Product cost difference between Phase II and I
1.0	=	Present value factor for 1 year at 4% interest
1	=	Assumed Productive Life of the Equipment in years

The cost-effectiveness for clear coat category is:

CE = [($39,906,099) + ($0* 1.0)]/(398*1)

CE = ($39,906,099)/398 tons
CE = $38,656 per ton of VOC Reduced

Incremental Cost-Effectiveness

There is no established cost threshold for incremental cost-effectiveness; however, under Health and Safety Code Section 40920.6, South Coast AQMD is required to perform an incremental cost analysis when adopting a Best Available Retrofit Control Technology (BARCT) rule or feasible measure required by the California Clean Air Act. To perform this analysis, South Coast AQMD must (1) identify one or more control options achieving the emission reduction objectives for the proposed amended rule, (2) determine the cost effectiveness for each option, and (3) calculate the incremental cost effectiveness for each option. To determine incremental costs, South Coast AQMD must, pursuant to H&SC 40920.6(a)(3), "calculate the difference in the dollar costs divided by the difference in the emission reduction potentials between each progressively more stringent potential control option as compared to the next less expensive control option." Staff conducted a cost-effectiveness assessment for each automotive coating category and determined that it was cost-effective for most categories to achieve the lower Phase II limits. Staff's evaluation also concluded that a thermal oxidizer with low-NOx burner is the next stringent level of control. This add-on VOC control option controls emissions at the facility level and can achieve up to 95 percent destruction efficiency, yielding additional VOC reductions; this type of control is considered Best Available Control Technology (BACT). Cost of add-on control will vary based on facility size and the size of the unit needed. Staff assumed an average spray booth size of 30'W x 15'W x 13'H, flow rate of 15,000 scfm, and operation of 12 hours a day for 5 days per week. The rated heat input necessary is approximately 1.25 MMBtu/hr with an annual operating cost of approximately $91,000 per year with an equipment life of 25 years. Based on vendor quotes and compiled costs, the capital and installation costs are estimated to be approximately $275,000. There are approximately 3,000 refinishing facilities operating spray booths within the South Coast AQMD. Therefore, the cost to equip all spray booths with add-on control is estimated to be $825 million. The additional emission reductions are assuming a 95 percent capture efficiency and a 95 percent destruction efficiency across the control device. The more stringent add-on control option yields an additional emission reduction of 2.4 tons per day or 876 tons per year.

Using the discounted cash-flow method the annual cost of this add-on control option, assuming 25 years life for the equipment, is calculated using the following equation:

Annual Cost of Control Option = [Capital Cost + (15.62 x Annual O& M)]/(876 x 25)

Where,

15.62 = Present value factor at 25 years and 4% interest

Capital Cost for this control option= $825,000,000

Annual O & M (calculated based on 1.25 MMBtu/hr and fuel usage using SoCal Gas June 2024 rates) = $272,160,000

Annual Cost of Control Option = [$825,000,000 + (15.622) x 272,160,000)]/(876 x25)

= $230,000 per ton of additional VOC reduced

Socioeconomic Impact Assessment

A socioeconomic impact assessment will be conducted and released for public review and comment at least 30 days prior to the South Coast AQMD Governing Board Hearing on PAR 1151, which is scheduled for November 1, 2024 (subject to change).

California Environmental Quality Act (CEQA)

Pursuant to the California Environmental Quality Act (CEQA) and South Coast AQMD's certified regulatory program (Public Resources Code Section 21080.5, CEQA Guidelines Section 15251(l) and South Coast AQMD Rule 110), the South Coast AQMD, as lead agency, is reviewing the proposed project (PAR 1151) to determine if it will result in any potential adverse environmental impacts. Appropriate CEQA documentation will be prepared based on the analysis.

Draft Findings Under The Health and Safety Code

Health and Safety Code Section 40727 requires that prior to adopting, amending, or repealing a rule or regulation, the South Coast AQMD Governing Board shall make findings of necessity, authority, clarity, consistency, nonduplication, and reference, as defined in that section, based on relevant information presented at the hearing, this written analysis, and the rulemaking record. The draft findings are as follows:

Necessity – A need exists based on the Stationary Source Committee's direction to address the toxic risk of currently exempt compounds pCBtF and t-BAc.

Authority - The South Coast AQMD Governing Board obtains its authority to adopt, amend, or repeal rules and regulations from Health and Safety Code Sections 39002, 40000, 40001, 40440, 40702 and 41508.

Clarity - Proposed Amended Rule 1151 – Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations, is written and displayed so that the meaning can be easily understood by persons directly affected by it.

Consistency - Proposed Amended Rule 1151 – Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations, is in harmony with, and not in conflict with or contradictory to, existing statutes, court decisions, or federal and state regulations.

Nonduplication - Proposed Amended Rule 1151 – Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations, does not impose the same requirement as any existing state or federal regulation, and the proposed amendments are necessary and proper to execute the powers and duties granted to, and imposed upon, the South Coast AQMD.

Reference - In amending this rule, the South Coast AQMD Governing Board references the following statutes which the South Coast AQMD hereby implements, interprets, or makes specific: Health and Safety Code Sections 40001, 40440, and 40702.

Comparative Analysis

Under Health and Safety Code Section 40727.2, the South Coast AQMD is required to perform a comparative analysis when adopting, amending, or repealing a rule or regulation. The comparative analysis is relative to existing federal requirements, existing or proposed South Coast AQMD rules and air pollution control requirements and guidelines which are applicable to VOC regulations for automotive coatings. A comparative analysis will be prepared and released at least 30 days prior to the South Coast AQMD Governing Board Hearing on PAR 1151, which is anticipated to be heard on November 1, 2024.