

VI. ENVIRONMENTAL IMPACTS

Both the California Environmental Quality Act (CEQA) and ARB policy require the ARB to evaluate the potential adverse environmental impacts of proposed projects. The intent of the proposed SCM is to protect the public health by reducing the public's exposure to potentially harmful emissions of VOCs. An additional consideration is the impact that the proposed SCM may have on the environment. Based on available information, the ARB has determined that no significant adverse environmental impacts should occur as a result of districts adopting the proposed SCM. This chapter summarizes the potential impacts that the proposed SCM may have on wastewater treatment, air quality, and hazardous waste disposal.

A. ANALYSIS OF REASONABLY FORESEEABLE ENVIRONMENTAL IMPACTS OF THE METHODS OF COMPLIANCE

1. Potential Wastewater Impacts

Wastewater is regulated in California by the Water Resources Control Board. In California, wastewater containing hazardous substances is not allowed to be disposed of in the sewer system. Discharge of wastewater from automotive coatings facilities to a sanitary sewer can result in the solids portion of the coating accumulating in sewage treatment sludge, preventing its beneficial use. Some contaminants "pass through" and are discharged to lakes, rivers, bays, and oceans. Although the practice is illegal, facility operators may introduce hazardous substances to the sewer system by washing down areas containing over spray and allowing that water to enter the sewer system.

Most waste paint is a result of over spray and is collected primarily on the paint booth exhaust filter or in floor sweepings. Coating facilities may also generate paint-contaminated disposable rags, masking tape and paper, disposable mixing cups and sticks, and disposable paint strainers. The dry paint related wastes are typically landfilled. The reduction of VOC content will reduce the amount of VOCs landfilled.

The SCM is also not expected to adversely impact water quality. First, use of exempt solvents (solvents not considered to be VOCs, such as acetone and PCBTF) is expected to result in equivalent or fewer water quality impacts than currently used solvents (such as toluene, xylenes, mineral spirits, and methyl ethyl ketone), since the exempt solvents are less toxic. Second, because currently available compliant color coatings are already using water-based technology, no additional water quality impacts from future compliant water-based coatings are expected, although use of water-based coatings is expected to increase. The current manufacturing and clean-up practices associated with water-based coatings are not expected to change as a result of the SCM. Lastly, the SCM is not expected to promote the use of compliant coatings formulated with hazardous solvents that could create adverse water quality impacts.

Tertiary-Butyl acetate ($\text{CH}_3\text{COOC}(\text{CH}_3)_3$) is the common name for acetic acid, 1,1-dimethylethyl ester. Other names include *t*-butyl acetate, *tert*-butyl acetate, and informally, TBAC or TBACTM. It is an effective viscosity reducer with an intermediate flash point and vapor pressure. Industrially, it can be used in a variety of coatings. ARB staff has recommended that the districts consider exempting TBAC from their VOC definitions. It is anticipated that this exemption will be granted, by some if not all districts, allowing TBAC to be substituted for non-exempt VOCs of higher reactivity when reformulating automotive coatings and potentially cleaning solvents. In ARB's Draft Environmental Impact Assessment of *Tertiary-Butyl Acetate* (ARB, 2005), the staff determined that in automotive coating products, the compounds most likely to be replaced by TBAC are xylenes, toluene, and methyl ethyl ketone (MEK). (see <http://www.arb.ca.gov/research/reactivity/tbac1.pdf>)

ARB's assessment of TBAC also examined the potential impact on water of an increased use of TBAC. Based on information provided by the Lyondell Chemical Company and a literature search, the potential risk to surface waters of California is expected to be low, assuming the material is stored, used, and disposed of in accordance with hazardous materials regulations.

2. Air Quality Impacts

There are two basic kinds of air emissions from activities conducted at automotive refinishing facilities: VOCs and particulates (solids). Particulates make up the solid part of the paint that contains the binder, pigment, and other additives. To control particulates, painting should be performed inside a paint spray booth equipped with paint arrestors (filters) and a ventilation system sufficient to draw the air from the booth through the filters. Paint booth air emissions controls are limited to collection of paint particulates. Generally, no control of VOCs from the air exhausted from the paint booth is required or practiced.

The adoption and implementation of the proposed SCM on a statewide basis is expected to produce substantial, long-term, VOC emission reductions. VOCs are regulated because they contribute to the formation of both ozone and PM_{10} . Numerous VOCs have also been identified as toxic air contaminants and are regulated through the ARB's Toxic Air Contaminant (TAC) Control Program. If the proposed VOC content limits in the SCM were implemented statewide, emissions would be reduced by approximately 13 tons per day beginning in 2009, a net air quality benefit.

Based on ARB's 2002 Survey, xylenes, toluene, and MEK account for approximately 27.5 percent of the VOCs used in automotive coatings. As previously mentioned, ARB's Draft Environmental Impact Assessment of *Tertiary-Butyl Acetate* indicates that these compounds are the most likely VOCs to be replaced by the use of TBAC. Assuming a replacement of 25 to 50 percent of these three VOCs, TBAC substitution would result in a potential use of TBAC of 1.4 to 2.9 tpd. However, color coatings account for about 63 percent of the total VOC emissions and about 50 percent of the

xylenes, toluene, and MEK emissions from automotive coatings. If, as expected, coating manufacturers choose to meet the VOC limit for color coatings with water-borne coatings, the potential emissions of TBAC would be reduced to about 1.5 tpd (assuming 50 percent substitution for xylenes, toluene and MEK).

The California Department of Industrial Relations, Division of Occupational Safety and Health Administration (Cal/OSHA) regulates the concentration of many TACs in the workplace environment. To protect worker safety, Cal/OSHA has established a permissible exposure limit (PEL) for many of these compounds (the PEL is the maximum, 8-hour, time-weighted average concentration for occupational exposure). The current Cal/OSHA PEL for TBAC is 200 ppm for an 8 hour time-weighted average. If TBAC is substituted for xylenes, toluene, and MEK, the worker's TBAC exposure would not be expected to exceed the current workplace exposure standard.

Workers in the automotive coatings industry are exposed to isocyanates, found in polyurethane sealers and some primers. Paper masks offer no protection against isocyanate exposure, only the most protective respirators should be used for situations involving exposures to isocyanates that have poor warning properties, are potent sensitizers, or may be carcinogenic. These respirators include:

- any self-contained breathing apparatus with a full face piece operated in a pressure-demand or other positive-pressure mode, and
- any supplied-air respirator with a full face piece operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

A complete respiratory protection program should include:

- 1) regular training and medical evaluation of personnel,
- 2) fit testing,
- 3) periodic environmental monitoring,
- 4) periodic maintenance, inspection, and cleaning of equipment
- 5) proper storage of equipment, and
- 6) written standard operating procedures governing the selection and use of respirators. The program should be evaluated regularly.

Some manufacturers and districts have expressed a concern over the possible increased worker exposure to glycol ethers and TBAC upon reformulation to lower VOC automotive coatings and cleaning solvents. Because of the history of isocyanate

exposure in the automotive refinish industry, available personal protection systems are sufficient to protect against worker exposure to glycol ethers and TBAC.

In ARB's Draft Environmental Impact Assessment of *Tertiary-Butyl Acetate*, it is estimated that a large body shop uses 3,000 gallons of automotive coatings per year, and assumes that the average amount of toluene, xylenes and MEK present in automotive coatings is 50 percent of the total VOC content of the coating. Under this worst-case scenario, a large automotive refinishing facility would emit more than 6,500 pounds per year of TBAC if TBAC was substituted for toluene, xylenes, and MEK on a one-for-one basis. However, the SCAQMD has recently indicated that the largest automotive refinishing facility in their district uses no more than 1,100 gallons of coatings per year. Based on ARB's 2002 Automotive Survey, xylenes, toluene, and MEK account for approximately 27.5 percent of the VOCs used in automotive coatings. Under this scenario, which we believe most accurately defines the worst-case scenario for a large automotive refinishing facility, the amount of TBAC emitted annually would be approximately 1,350 pounds if TBAC was substituted on a one-for-one basis for toluene, xylenes and MEK.

The TBAC analysis also assesses the potential cancer risk from TBAC emissions from automotive refinishing facilities. The highest estimated cancer risk for a facility emitting 2,692 pounds per year of TBAC was 11 excess lifetime cancer cases per million. Based on the updated emission estimate for a large facility and the substitution assumption of 50 percent, we estimate the maximum potential risk to be 2.8 excess lifetime cancer cases per million. However, if the VOC limit for color coatings is met with water-borne coatings, the potential cancer risk would be reduced to about 1.4 in a million.

Staff also analyzed the potential for other air quality impacts. During past regulatory efforts affecting coatings, industry representatives have alleged that the use of low VOC coatings may create certain significant adverse air quality impacts. While similar concerns have not been raised during the development of this SCM, we examined the following issues in order to determine if any of these concerns were applicable to automotive coatings:

➤ *Will the use of lower VOC automotive coatings result in a thicker film coating?*

No. In previous rulemakings on coatings, some industry representatives contended that lower VOC coatings are formulated with high solids contents and were therefore difficult to handle during application, tending to produce a thick film when applied. A thicker film supposedly indicates that a smaller surface area is covered with a given amount of material, thereby increasing VOC emissions per unit area covered as compared to higher VOC coatings. Although high solids, low VOC coatings are being used, the recommended film thickness for these coatings is similar to that for higher VOC coatings. Thus, a lower VOC coating would cover the same or larger surface area than a higher VOC coating.

- *Will the use of lower VOC automotive coatings result in illegal thinning of the product?*

Excessive thinning is not expected to be a problem because many of the coatings already comply with the SCM limits. Additionally, the VOC limit for color coatings is expected to be met with the use of water-borne formulations. Even if some thinning occurs, thinning would likely be done with water or exempt solvents. As a result, the potential for excessive thinning is minor and concerns about significant adverse air quality impacts are unfounded.

- *Will the use of lower VOC automotive coatings require additional priming for proper adhesion to the substrate?*

No. Automotive coatings primers are currently solvent-borne coatings, and many already meet the VOC limits in the proposed SCM. Manufacturers' data show that substrate preparation for low VOC color coatings is similar to substrate preparation for higher VOC color coatings. No instances of poor adhesion between primers and low VOC color coatings are expected.

- *Will the use of lower VOC automotive coatings require the use of more topcoats?*

In previous rulemakings on coatings, some industry representatives have claimed that the proposed lower VOC limits would yield products that provide inferior coverage, resulting in the use of more coatings to provide the same coverage as their higher VOC counterparts. This is not the case with automotive coatings. In fact, some low VOC water-borne automotive coatings currently sold and used in the United States provide greater coverage than solvent-borne automotive coatings. Manufacturers and current users of water-borne automotive coatings have indicated that coverage is superior to that of solvent-borne coatings, and therefore do not require the application of additional coats to achieve the necessary coverage.

- *Will the use of lower VOC automotive coatings require more frequent recoating?*

No. Water-borne automotive coatings have been used successfully by the majority of the automobile manufacturers for several years; they are also used in manufacturer's vehicle processing centers, where cars are touched up prior to distribution in the United States. Data from the automotive coatings sector do not support the claim that lower VOC automotive coatings require more frequent recoating.

- Will the use of lower VOC automotive coatings result in product substitution by the end-users?

There are currently available low VOC automotive coatings with performance characteristics comparable to higher VOC automotive coatings, therefore it is not anticipated that spray technicians will substitute a product from a higher VOC category. Typically, manufacturers market coatings as a system and will not warranty the products' performance if the user deviates from the recommended usage. Additionally, the products within each automotive coatings category are specific to certain applications, and do not lend themselves to use in another coating category.

- Will the use of lower VOC automotive coatings result in coatings with higher reactivity?

Using the Maximum Incremental Reactivity (MIR) scale as the basis for comparing reactivities of VOCs it is true that, on a per gram basis, some VOCs used in water-borne coatings are more reactive than some VOCs used in solvent-borne coatings (Carter, 1999). For example, using the MIR scale as a basis, a typical VOC used in water-borne coatings, such as propylene glycol, is two to three times more reactive than a typical mineral spirits. However, less reactive solvents such as mineral spirits are not extensively used in automotive coatings. Automotive coatings tend to have solvents with higher reactivity such as xylenes and toluene. The reactivity of propylene glycol is approximately one-third the reactivity, on a gram for gram basis, of xylenes and toluene. Additionally, it is anticipated that manufacturers will incorporate the use of water and exempt solvents when formulating to meet the lower VOC limits of the proposed SCM. We have concluded, based on this information, that the total reactivity of the lower VOC automotive coatings will be less than the reactivity of the higher VOC automotive coatings.

3. Potential Hazardous Waste Impacts

The Department of Toxic Substances Control (DTSC) is the lead agency in California for hazardous waste management. DTSC enforces the California's Hazardous Waste Control laws, issues permits to hazardous waste facilities, and mitigates contaminated hazardous waste sites. In California, all hazardous waste must be disposed of at a facility that is registered with DTSC. Under these programs, automotive coatings may be classified as hazardous waste if they contain substances listed as toxic or if they meet other hazard criteria.

Many counties in California operate a Small Business Waste Program, providing low-cost programs for small businesses that qualify as Conditionally Exempt Small Quantity Generators (CESQG). In order to qualify as a CESQG, as defined in the California Health and Safety Code, section 25218.1, and the Code of Federal Regulations (40

CFR 261.5), the business must generate no more than 100 kilograms (220 pounds or approximately 27 gallons) of hazardous waste, or one kilogram (2.2 pounds) of extremely hazardous waste. The small business considered a CESQG must also store less than 2,200 pounds of all kinds of hazardous waste at any time. In order to encourage businesses to participate in their programs, many cities help subsidize disposal costs. Often times the disposal costs are tax deductible and the long-term liability of the materials is taken over by the county or city agency.

It is difficult to determine the amount of liquid waste paint generated from automotive coatings since the waste paint is usually mixed with waste paint thinner. Waste paint thinner is usually generated when paint guns and other paint equipment are cleaned. The waste paint thinner is usually collected in a 55 gallon drum and is mixed with waste paint. In almost all cases, waste coatings in liquid form must be managed as hazardous waste. The reduction of solvents in automotive coatings is not expected to result in non-hazardous liquid waste coatings. Solvent-based automotive coatings waste will still be classified as hazardous due to ignitability characteristics.

It is anticipated that resin manufacturers and coatings formulators will continue the trend of using less hazardous solvents such as Oxsol 100, and propylene glycol in their compliant coatings. It is expected that future compliant coatings will contain less hazardous materials, or nonhazardous materials, as compared to conventional coatings, resulting in a net benefit. Therefore, hazard impacts associated with the proposed SCM will be negligible.

Coating facilities that have filter-type paint booths also generate paint booth exhaust filters. Paint booth exhaust filters are changed every few weeks to few months depending on the amount of painting being done. Waste paint filters need to be tested for ignitability and toxicity characteristics. The *"Toxicity Characteristic Leaching Procedure"* (TCLP) is used to determine if the filters contain toxic materials. It is rare that a paint booth filter will meet the definition of hazardous waste assuming that only typical automotive coatings have been used. Waste filters are typically thrown into the trash for disposal at the sanitary landfill. It is not anticipated that the proposed SCM will impact the quantity or toxicity of the paint booth exhaust filters currently being landfilled.

4. Reasonably Foreseeable Feasible Mitigation Measures

ARB is required to do an analysis of reasonably foreseeable mitigation measures. We have concluded that no significant adverse environmental impacts should occur from implementation of the proposed SCM. As a result, no mitigation measures would be necessary.

5. Alternatives to the Proposed SCM

As alternatives to the proposed SCM, ARB staff evaluated taking no action and delaying the effective date. ARB staff determined that neither of these alternatives would be as effective at reducing VOC emissions from automotive coatings activities as the proposed SCM. The no action alternative was rejected because it would not achieve emission reductions necessary to attain the State and federal ambient air quality standards. The delayed effective date alternative was rejected because compliant coatings are currently available or will be available before the proposed effective date of January 1, 2009.

B. COMMUNITY HEALTH AND ENVIRONMENTAL JUSTICE

The ARB is committed to evaluating community impacts of proposed regulations, including environmental justice concerns. ARB's goal is to reduce or eliminate any disproportionate impacts of air pollution on low-income and minority populations so that all individuals in California can live, work, and play in a healthful environment. The proposed SCM is not expected to result in significant negative impacts in any community. The result of the proposed SCM will be reduced exposure to VOCs and toxic air contaminants (e.g., xylenes, toluene, and MEK) for California communities, including those with large populations of low-income and minority residents.

As part of our Community Health and Environmental Justice Programs, we assess and reduce the localized impacts of pollution from multiple sources. The cumulative, multi-pollutant focus of this important program compels us to take a more comprehensive, integrated approach to defining the ARB's overall control strategy.

Many communities in California are composed of a mix of residential, commercial, and industrial sites. During and after World War II, these areas experienced tremendous development due to rapid population growth and capital investment in military and industrial complexes. This rapid growth and development did not allow for proper residential planning, therefore, residential areas and industrial zones may be integrated. As a result, parts of these communities exhibit an unhealthy mixture of homes, schools, and environmentally hazardous facilities. Homes within these neighborhoods may be in close proximity to multiple sources of air pollution, such as businesses, industries, storage facilities, and freeways.

Automotive refinishing facilities, whose operations produce VOCs, are often among those types of small businesses located in low-income, minority communities. The higher than average incidence of asthma and other respiratory illnesses in children living in these communities may be related to poor air quality (U.S. EPA, 2000).

REFERENCES

Air Resources Board, Staff Report. Draft Environmental Impact Assessment of Tertiary-Butyl Acetate. June, 2005 (ARB, 2005)

United States Environmental Protection Agency Region 9. *Fact Sheet: Barrio Logan Environmental Justice Project* News Release 11/13/2000. (U.S. EPA 2000)