

# The Alternative

**IRTA Newsletter**

**Volume XXIV Number 9**

**Summer 2014**

## **IRTA Graffiti Management Alternatives Report Available Soon**

Over the last few years, IRTA has conducted a project focused on identifying, developing and demonstrating graffiti management alternatives. The project is sponsored by EPA Region IX, the Bay Area Air Quality Management District (BAAQMD) and the San Francisco Department of the Environment (DE). The final report, summarizing the results of the research, will be available in August on IRTA's website at [www.irta.us](http://www.irta.us)

Controlling graffiti has become a major problem for public agencies and private companies across the country. Graffiti management is very expensive and extensive resources are required for mitigation. The tools used for graffiti control often pose health and environmental problems. Workers and community members are exposed to toxic components in many of the graffiti removers used today. The blasting systems used to remove graffiti from surfaces can pollute the land and stormwater. It is important to find safer alternatives that are more protective of health and the environment.

The purpose of IRTA's project was to find safer alternative graffiti management methods that are cost effective to use. Several public agencies participated in the project and IRTA worked with them to solve their biggest graffiti challenges. IRTA concentrated on three areas, including:

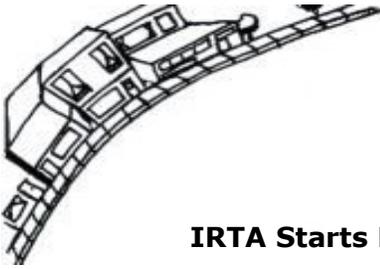
- Alternative blasting systems that would minimize the generation of waste
- Low-VOC, low toxicity graffiti removers
- Methods of protecting substrates like graffiti resistant coatings and films

Most agencies rely on high pressure water spray

systems combined with graffiti removers or sodium bicarbonate blasting (called soda blasting) systems to remove graffiti from surfaces like masonry walls, sidewalks and walkways. In most of California, storm water regulations have zero discharge restrictions which means that the spent effluent or media must be collected and properly disposed of. IRTA investigated two alternative blasting systems that generate less secondary waste. These include dry ice blasting and wet crushed recycled glass blasting. The dry ice system generates no secondary waste but is only suitable for removing light graffiti. The glass system is more aggressive than soda blasting and can remove graffiti more effectively and faster; it also generates less waste which is easier to collect since it is wet. IRTA demonstrated the two systems several times and some of the project participants are interested in them. IRTA's findings indicate that the cost of using soda blasting on the one hand and the cost of using the two alternative systems on the other hand comparable.



*(continued on page 3)*

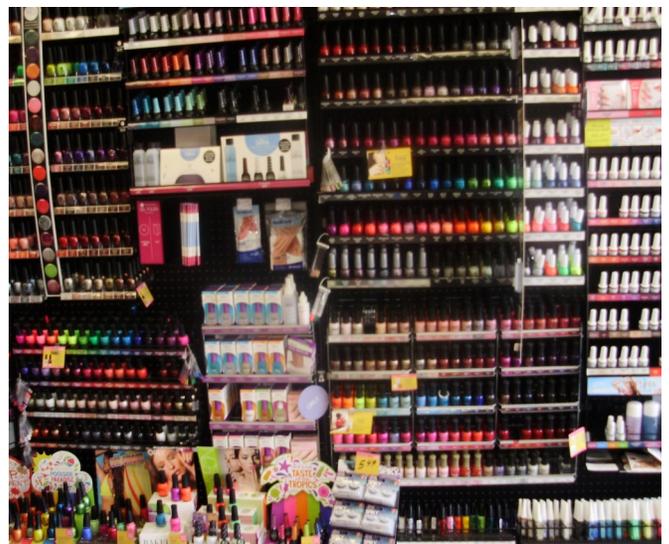


## Small Business Corner

### **IRTA Starts New Project to Develop Alternative Nail Polish Removers**

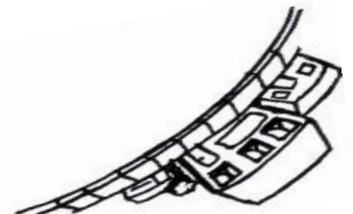
IRTA recently received a grant from the Paul H. Johanson Foundation to develop safer nail polish removers and thinners. The Bay Area Air Quality management District (BAAQMD) is also sponsoring the project.

Many of the nail polish removers used today contain toxic solvents and some of them are also VOCs. Acetone, a solvent with relatively low toxicity and not classified as a VOC, is used in many nail polish removers but it can damage the nails because of its high evaporation rate. A new process, called gel nails, is being used increasingly. This process relies on nail polish that is cured by ultraviolet (UV) light. UV cured coatings are very durable and the UV gel nail polishes apparently last longer than traditional nail polish which is their attraction to customers. Since the gel polishes are so durable, they are very difficult to remove. So-called acetone wraps, where acetone is placed under foil wrapped around fingers for 15 minutes, must be used to remove the polish. Solvents like acetone are absorbed through the skin and can cause central nervous system effects.



Eighty percent of the cosmetologists and manicurists are Vietnamese immigrants and 50 percent are of reproductive age. The nail salon technicians often work in close quarters and are exposed to high concentrations of numerous chemicals in nail products. Several years ago, the Healthy Nail Salon Collaborative brought this issue to the forefront and fostered a program called "Three Free." The three chemicals this program referred to are dibutyl phthalate, formaldehyde and toluene which are widely used in nail products. These materials are toxic in various ways. Some suppliers began to offer three free products and the awareness of the high exposure of salon workers increased. It became an environmental justice issue of significant concern.

*(continued on page 7)*



(continued from page 1)

The San Francisco DE lists several graffiti removers on their website. Based on the material safety data sheets (MSDS), IRTA evaluated these removers and many of those currently used by the agencies participating in the project. Some graffiti removers used by participants contained methylene chloride, a carcinogen, and N-methyl pyrrolidone (NMP), a reproductive and developmental toxin. Many of the graffiti removers also did not comply with California's VOC regulations. Another concern is that the MSDSs for many graffiti removers list very few of the ingredients so it is not clear whether they may contain other toxic compounds. As part of the project, IRTA developed five graffiti removers for specific applications that were of interest to the project participants. Three of these were general graffiti removers, one was designed for sensitive surfaces and the other was specifically targeted for sticker removal. Four of them had zero VOC content.

IRTA conducted comparative testing of eight of the San Francisco DE listed graffiti removers and four of IRTA's graffiti removers on concrete, fiberglass, metal and street signs which are sensitive surfaces. The graffiti on the surfaces included spray paint, marker and, in some cases, stickers. The commercial graffiti removers worked most effectively on light spray paint and performed well on fiberglass and metal surfaces. IRTA's graffiti removers were designed to be more aggressive and they were able to remove heavy spray paint and stickers.



IRTA also investigated and tested films for protecting street signs, glass and plexiglass. A film made by 3M was effective for street signs. Most of the spray paint and marker on the film could be removed with packaging tape and only a small amount of residual graffiti needed to be removed with a graffiti remover. Stickers could be pulled up from the film readily.

Many of the graffiti resistant coatings that are available do not meet the VOC content limits established by air districts in California. After screening out high VOC content products, IRTA tested six different graffiti resistant coatings on various surfaces. Three of the coatings seemed to perform well on concrete and granite without discoloring the surface. One of the coatings can be used on street signs without dampening the reflectivity; most of these coatings do not maintain the reflectivity which is dangerous. Another coating seemed to perform well on glass. For some substrates, like fiberglass, the findings indicate there is no reason to use a graffiti resistant coating; removal with a graffiti remover is a better option.



For more information on the methods of graffiti control, call Katy Wolf at IRTA at (323) 656-1121.

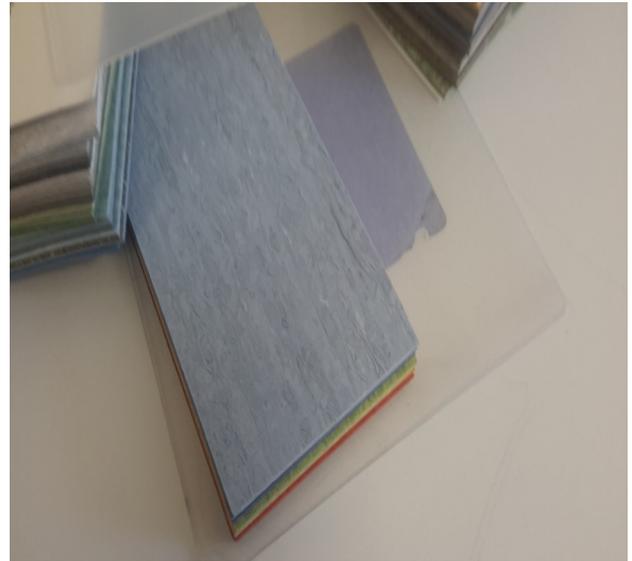
### IRTA Plans Test of Alternative Flooring

IRTA is working with the Riverside Unified School District and a flooring distributor called KYA to devise a plan to test and compare five different types of flooring. This effort is part of a project, sponsored by EPA Region IX and the Bay Area Air Quality Management District, to find safer alternative floor wax strippers and methods of reducing or eliminating the use of floor wax stripping.

IRTA is working with several school districts and public buildings in Northern and Southern California. Virtually all schools and public buildings have vinyl composition tile (VCT) flooring. It is a low cost flooring so it is the preferred option. The problem is that VCT flooring must be waxed and stripped on a routine basis. The life cycle cost of using the flooring is likely to be high because of the purchases of the flooring products and the labor involved in the waxing and stripping.

The project involves testing low-VOC, low toxicity floor wax strippers (see article in this issue) but it also involves looking at other options. One of these options is to replace the VCT with other types of flooring that do not require waxing or stripping. Even though the cost of the alternative flooring is higher, the cost of using the flooring over its life may be lower because of the reduced maintenance costs.

In August, KYA and IRTA plan to install four different types of flooring in a Riverside school hallway that has heavy use. The school has already installed a fifth type of alternative flooring in some locations so the performance and cost of that flooring can also be evaluated. The five types of alternative flooring will be monitored for the school year to evaluate their performance. IRTA plans to conduct a cost analysis and comparison of VCT and the five alternative types of flooring over the life cycle.



Most users who installed VCT cannot replace the flooring until its useful life is ended which can be many years. Another option IRTA is investigating is whether coatings that do not require waxing or stripping can be used over the VCT. IRTA plans to test four different types of coatings over the VCT in the same hallway at the Riverside school.

For more information on the floor wax stripping project, contact Katy Wolf at IRTA at (323) 656-1121.

## IRTA Tests Experimental Floor Wax Stripper with Rochester Midland

IRTA is working on a project, sponsored by EPA Region IX and the Bay Area Air Quality Management District (BAAQMD), to find alternative floor wax strippers. As part of the project, IRTA has recruited several school districts and public buildings in Northern and Southern California to test alternative floor care methods. Nearly all schools and public buildings have vinyl composition tile (VCT) as their flooring and it must be routinely waxed and stripped to have a good appearance.

The South Coast Air Quality Management District (SCAQMD) has developed a certification program for janitorial products. The District has found products that comply with the very low VOC limits of their program in all types of products except floor wax stripper. IRTA is working with a few suppliers to identify, develop and test low-VOC, low toxicity strippers. IRTA is also planning to test alternative types of flooring (see article in this issue) that don't require waxing or stripping, coatings that can be applied to VCT that don't require waxing or stripping and abrasive methods for removing the wax that need no or minimal stripper.

The California Air Resources Board regulates the VOC content of strippers. The current requirement is that strippers must have a VOC content of no more than 3% to 12%, depending on the wax buildup. The SCAQMD certification program establishes a much lower VOC content limit of 10 grams per liter (about 1%) for products that qualify. Virtually all floor wax strippers sold today contain higher levels of VOC, generally from the solvents they contain. Most floor wax strippers also contain monoethanolamine which can cause asthma. IRTA is trying to find, develop and test alternative floor wax strippers that meet the SCAQMD criteria and contain no monoethanolamine.

Rochester Midland, a floor care company, has developed a new experimental floor wax stripper that contains no solvent or monoethanolamine. It is formulated with a surfactant that is completely new to the market. IRTA worked with Rochester Midland to test the new stripper at the City Hall in San Francisco and this was the first field test of the new ma-

terial. It worked well in the test but the company is working on the formulation to minimize the foaming. IRTA plans to test the stripper with the San Francisco school system and Riverside Unified School System over the next few months.



For more information on the floor wax stripping project, contact Katy Wolf at IRTA at (323) 656-1121.

## Exempt Chemicals Policies and Toxicity

Recent issues of The Alternative have included articles about the South coast Air Quality Management District's (SCAQMD's) proposal to exempt tert-butyl acetate (TBAC) and dimethyl carbonate (DMC) from VOC regulations for roofing products regulated in SCAQMD Rule 1168, "Adhesive and Sealant Applications." TBAC forms a metabolite that is a carcinogen and DMC is a developmental toxin and forms a metabolite that is also a developmental toxin.

Part of the District's mission is to regulate VOC emissions from stationary sources. In this light, the District is involved in encouraging the development and adoption of low-VOC alternatives that can replace VOCs used today. In the case of the roofing products, VOC solvents are used as carriers for the resins that are deposited on the surface and they are emitted during the application process.

In the last several years, SCAQMD has proposed to exempt TBAC and DMC in a number of different rules. In a few cases, rules exempting TBAC have been adopted. The proposed exemption of the two chemicals in Rule 1168 has become controversial because of the high risk posed by the chemicals to workers applying the roofing products and the surrounding community members. IRTA has argued that chemicals with toxic endpoints should not be exempted because such an exemption promotes their use. Another part of the District's mission is to protect people from toxic air emissions and exempting toxic chemicals does not do this.

If the District does not exempt chemicals that are toxic, are there other options that can be used to reduce VOC emissions? Can the District still carry out the VOC part of its missions through other means? In IRTA's view, the answer is yes.

IRTA has conducted many safer alternatives projects over the last few decades. Almost all of these have focused on finding low-VOC, low toxicity alternatives that are reasonably cost effective. There are many examples of alternatives IRTA has found, developed and demonstrated that are not based on toxic exempt chemicals.

Some of these are illustrated in a project IRTA recently completed for EPA Region IX and SCAQMD that examined alternative release agents and cleanup materials for industrial parts molding, concrete stamping and asphalt manufacture and application. A few companies that use release agents in fiberglass parts molding rely on high VOC content wax based materials. Many companies have converted to high VOC liquid products which are much more cost effective to use. The companies using the wax release agents are using styrene, a VOC and a carcinogen, for cleaning the molds. When companies use the liquid release products, they no longer have to clean their molds. The best option for eliminating the use of styrene is to convert to liquid release agents. IRTA also tested water-based liquid release agents and that is the best option for eliminating the use of the high VOC content liquid release agents used today. The companies molding fiberglass parts can convert to low-VOC, low toxicity alternatives that do not rely on toxic exempt chemicals.

For concrete stamping, high VOC content release agents are used so the curing concrete will not stick to the mats that are used to stamp the pattern in the concrete. IRTA tested a variety of alternatives and the best option was a low vapor pressure lubricant material that has extremely low VOC content. This option, like the one for fiberglass parts molding, does not rely on toxic exempt chemicals to reduce the VOC emissions. In fact, several solvents IRTA tested as potential alternatives tend to bleach the color from the concrete. Since most stamped concrete is colored, this is not a viable option. Solvents like TBAC and DMC would probably remove and/or change the color of the concrete so they would not be suitable alternatives.

In asphalt production and when workers are applying asphalt to roads, diesel, a VOC, is used as a release agent to prevent the asphalt from sticking to equipment. The best alternative IRTA found and tested was recycled vegetable oil that is discarded from restaurants. This material has very low VOC content and is a cost effective alternative. No toxic exempt chemicals are needed for this application.

*(continued on page 7)*

*(continued from page 6)*

IRTA has worked on many other projects where the best solution is to adopt a non-solvent low-VOC alternative. Several of these projects have involved using water-based cleaners in place of solvent cleaners. In a project that focused on alternatives to automotive aerosol cleaners, water-based brake cleaning systems are a good option. Another option is to use water-based cleaners in a spray bottle instead of an aerosol can to eliminate the need for a VOC propellant. In other projects that involved finding alternatives for high VOC content solvents used in screen printing and lithographic printing cleanup, IRTA tested soy based materials which are very low in VOC content.

A few chemicals that are already exempt from VOC regulations are low in toxicity and they can also be used in alternatives to reduce VOC emissions. These include chemicals like acetone and propylene carbonate. In the automotive aerosol cleaning application, IRTA developed some aerosol cleaners that relied on ac-

tone and used carbon dioxide as a propellant. No toxic exempt chemicals were needed in that application either.

Many formulators just want a new chemical to drop in that can replace a VOC solvent that is used currently. This is the major reason they favor using toxic exempt chemicals. The District should require these formulators to be more creative and find solutions that do not involve exempting chemicals with toxic endpoints. IRTA has demonstrated in many instances that other solutions are viable and cost effective. VOC reductions can still be achieved. In cases where no low-VOC alternative can be found, it is better to compromise and allow the use of a higher VOC content materials instead of exposing workers and community members to a toxic risk.

For more information on the exempt chemical issue, call Katy Wolf at IRTA at (323) 656-1121.

*(continued from page 2)*

Not only salon workers are exposed to the toxic chemicals in nail products. Customers in nail salons, consumers who buy and use nail products and residents and workers surrounding nail salons are also exposed to the toxic materials. Gel nail products are now sold in beauty supply and drug stores so the process of holding the solvent longer on the fingers is becoming widespread.

Safer alternatives to the products used today need to be identified and developed. IRTA plans to focus on developing a few alternative nail polish removers and thinners that will have low VOC content and be low in toxicity. IRTA plans to work with several nail salons in Northern and Southern California to make sure the alternatives perform well and do not damage the nails. IRTA also plans to test the safer alternatives with a few consumers who routinely do their own nails.

For more information on the project, call Katy Wolf at IRTA at (310) 656-1121.

**Visit our website: [www.irta.us](http://www.irta.us) Read back issues of The Alternative and recently completed reports.**

# Calendar

## July 24

South Coast Air Quality Management District workgroup meeting for Rule 1168 "Adhesive and Sealant Applications," 9:00 AM at SCAQMD headquarters, Diamond Bar, CA. For information, call Mike Morris at SCAQMD at (909) 396-3282.

## July 25

Stationary Source Committee meeting of the South Coast Air Quality Management District Governing Board, 10:30 AM at SCAQMD headquarters, Diamond Bar, CA. One agenda item will focus on exemption of tert-butyl acetate and dimethyl carbonate for Rule 1168 "Adhesive and Sealant Applications." For information, call Mike Morris at SCAQMD at (909) 396-3282.

## July 29-30

Expert Public Workshop on Alternatives and Risk Reduction Approaches to Trichloroethylene (TCE) Use as a Degreaser. Access: [www.epa.gov/oppt/existingchemicals/](http://www.epa.gov/oppt/existingchemicals/)

## September 9

Webinar on low-VOC, low toxicity alternative release agents for industrial parts molding, concrete stamping and asphalt manufacture and application. Speaker is Dr. Katy Wolf from IRTA. Sponsored by WSPPN. For information, call Donna Walden at WSPPN at (775) 834-3675.

## September 15-19

Pollution Prevention Week.

**IRTA** is working together with industry and government towards a common goal, implementing sensible environmental policies which allow businesses to remain competitive while protecting and improving our environment. IRTA depends on grants and donations from individuals, companies, organizations ,



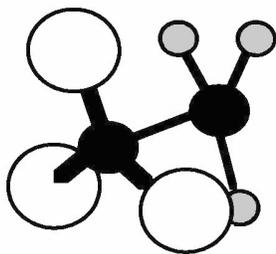
Printed on recycled paper

- Yes! I would like to support the efforts and goals of IRTA.  
Enclosed is my tax-deductible contribution of: \$\_\_\_\_\_
- I would like to receive more information about IRTA.  
Please send me a brochure.
- Please note the following name/address change below.

Name/Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_



## IRTA Institute for Research and Technical Assistance

8579 Skyline Drive  
Los Angeles, CA 90046  
website: [www.irta.us](http://www.irta.us)

### *In This Issue*

IRTA Graffiti Management Alternatives Report Available Soon.....1-3

*Small Business Corner:*  
IRTA Starts New Project to Develop Alternative Nail Polish Removers.....2-7

IRTA Plans Test of Alternative Flooring.....4

IRTA Tests Experimental Floor Wax Stripper with Rochester Midland.....5

Exempt Chemicals Policies and Toxicity.....6-7

Calendar .....8