

# The Alternative

IRTA Newsletter

Volume XVIII Number 4

Fall 2009

## SCAQMD Governing Board Declines to Exempt Dimethyl Carbonate

On February 20, 2009, EPA deemed dimethyl carbonate (DMC) exempt from VOC regulations based on its low potential to generate ozone in the troposphere. In California, local air districts and the California Air Resources Board (CARB) must explicitly exempt a chemical for an exemption to be effective in their jurisdiction.

Kowa American Corp. asked CARB to exempt DMC and the company planned to import it from three chemical manufacturers in China. Exxon Chemical performed an inhalation developmental toxicity study of DMC in mice in 1992. The results indicated that birth defects, including cleft palate, low set ears and multiple skull bone malformations, were observed in the mice. DMC apparently forms methanol as a metabolite and methanol may be responsible for the developmental toxicity observed in the Exxon study. CARB asked the Office of Environmental Health Hazard Assessment (OEHHA) to evaluate the toxicity of DMC.

The South Coast Air Quality Management District (SCAQMD) staff proposed an exemption from VOC regulations before OEHHA had completed their evaluation. The District anticipated using DMC as a paint, sealant and adhesive co-solvent and thought the solvent would be useful in cleaning applications and in paint and lacquer thinners as a replacement for VOC solvents and acetone. Acetone is exempt from VOC regulations and is lower in toxicity than virtually all other organic solvents. It does have a

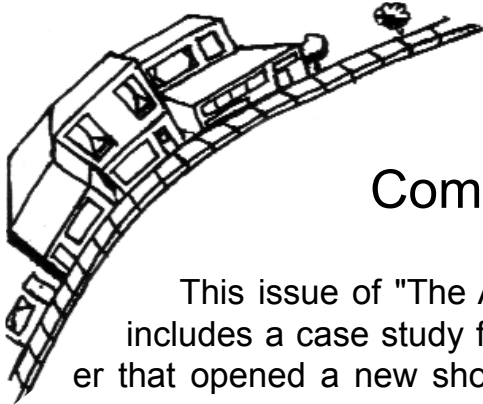
low flash point and the District preferred DMC because its flash point is somewhat higher.

In California, where there are very stringent VOC regulations, chemicals that are exempted from VOC regulations will be used widely. DMC has very good physical properties and would likely have immediate widespread use. There are no controls currently on DMC apart from the fact that it is a VOC.

IRTA opposed the exemption of DMC because it or its metabolite, methanol, is a developmental toxin. If it were exempted, it would replace other safer materials including water-based cleaners, soy based cleaners and acetone that are already used for cleaning and thinning. The District performed a risk assessment and concluded that, because the developmental risk was below a threshold value, the risk was acceptable. Since the other alternatives it would replace do not pose a developmental risk, it would not be good public policy to encourage the use of a developmental toxin.

The District did not take into account the risk to workers in their analysis. DMC currently has no worker exposure limit. The supplier indicates that 200 ppm, the worker exposure limit established for methanol, DMC's metabolite, would be protective. Dr. Julia Quint, an expert in toxicology and worker protection, analyzed the toxicological study results and sent a letter to the District. Her analysis indicated that the methanol 200

(see **DMC** page 3)



## Small Business Corner

# Textile Cleaning Industry Still Not Comfortable With Water-Based Cleaning

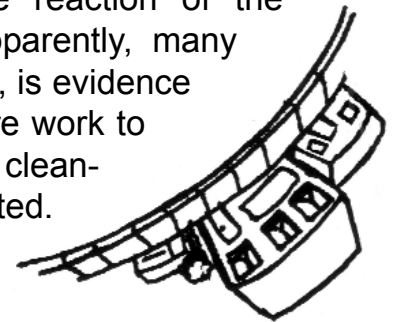
This issue of "The Alternative" includes a case study for a cleaner that opened a new shop in Chula Vista with a wet cleaning machine and a Green Jet machine. Both systems use water with a detergent. In the case of the Green Jet machine, the water/detergent mixture is sprayed onto the garments. Since they are not immersed, the finishing is easier and the finishing labor is lower than for traditional wet cleaning. This combination of equipment is very good and low cost wet cleaning washers and dryers are available and effective.

The California Air Resources Board developed a regulation that phases out the use of perchloroethylene (PERC) dry cleaning altogether by 2023 in the state. PERC is a carcinogen and it has polluted soil and groundwater throughout the country. Many landlords will not allow cleaners in their shopping centers to use PERC. This was the situation with the Chula Vista cleaner.

*Illustration by Todd Schmid*

The case study does not identify the name of the shop owners or the name of the shop itself. The cleaner did not want to be identified because he was concerned that his customers would read the case study and realize that he uses water-based cleaners. He indicated to IRTA that his customers stress that they want their garments dry cleaned and would be displeased if they knew he used water-based systems. He did not believe that telling the customers that he uses a "green" technology would ameliorate their concern over his use of water on the garments.

There is still a long way to go in this industry to persuade cleaners that water-based cleaning is a viable alternative to PERC. The reaction of the cleaner and, apparently, many of his customers, is evidence that there is more work to do before water cleaning will be accepted.



Need help finding an alternative?  
IRTA assists firms in converting to suitable alternatives in cleaning, paint stripping, coating, thinning, dry cleaning and other applications.


# Chula Vista Cleaner Adopts Green Jet Technology

This Chula Vista cleaner is located in an up-scale shopping center in Southern California. The owners, a couple, opened the new store in October, 2008. Since then, they have been building the business.

The owners decided to purchase water-based cleaning equipment so they could start up as a "green" store. They purchased two water-based systems, a Milner machine and a Green Jet machine. The Milner machine is used to wet clean about three-fourths of the garments. The Green Jet, a more gentle cleaning method, is designed to spray water and detergent through the garments rather than immersing them; it is used to process about one-fourth of the garments received by the cleaner. The owners also installed finishing equipment including tensioning systems.

The shop operates the equipment six days a week. An average of 45 pieces per day are processed in the Green Jet which amounts to two loads. All kinds of dry-clean only garments, including wool structured jackets, wool pants and delicate silks, are cleaned in the Green Jet machine. The

advantage of the Green Jet machine is that the garments are more easily finished than wet cleaned garments because they are not immersed in the water. According to the owner "the garments from the Green Jet are not wrinkled and I can finish each one very quickly. It takes longer to finish the garments that are wet cleaned."

The store is currently cleaning about 56,000 pounds of garments per year. "We are growing the business and hope to increase our volume over the next year or so," says the owner. "The Green Jet machine helps us to process more garments because the finishing time is so low." 

	Green Jet
Annualized Capital Cost	\$1,525
Detergent Cost	\$277
Electricity Cost	\$600
Spotting Labor Cost	\$2,600
Finishing Labor Cost	\$2,600
Maintenance Cost	\$10
Total Cost	\$7,612


## DMC (Continued from front Page)

ppm worker exposure limit was not established to prevent developmental toxicity but, rather, was set to prevent headaches and visual disturbances. Her calculations showed that the worker exposure limit for DMC would have to be 10 ppm to be protective based on the developmental toxicity study results. This low limit could not be physically met for a volatile solvent like DMC.

Methanol is classified as a Hazardous Air Pollutant (HAP) by EPA and as a Toxic Air

Contaminant (TAC) in California. It is also being considered by OEHHA for addition to California's Proposition 65 list. Since DMC is virtually 100 percent metabolized to methanol, it does not seem reasonable to promote the use of a known toxic chemical.

At the public hearing held on September 11, the District's Governing Board voted unanimously to reject the staff's proposal to exempt DMC from VOC regulations.

For more information on DMC, call Katy Wolf at IRTA at (818) 244-0300. 

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



## You Are Invited...

to attend a free seminar, **Laser Paint Stripping**, at SCE's Customer Technology Application Center (CTAC) on October 21.  
(Event and Registration details below)

### **The Results of an Innovative Clean Air Technologies (ICAT) Demonstration of a Portable Hand-Held Laser Stripping Technology**

A two-year project that focused on applications using a hand-held portable laser for paint stripping was recently completed. The project was sponsored by the California Air Resources Board (CARB) and was conducted by the Institute for Research and Technical Assistance (IRTA) in partnership with Southern California Edison and Laser Strip, the technology developer.

This conference will present the results of four demonstrations that involved using a prototype portable hand-held laser to strip portions of:

- a water storage tank
- aircraft parts
- ground vehicle parts
- ship parts and boat hull paint panels

Paint stripping is currently performed with methylene chloride, a carcinogen, with VOC solvents which contribute to smog and with blasting operations that lead to the formation of particulate matter (PM 2.5 and PM 10). Laser technologies have been investigated for many years because they hold promise for eliminating the use of the technologies that cause air and water pollution, generate large quantities of hazardous waste and worker exposure. Lasers use light as the stripping medium and eliminate or minimize the pollution from currently used stripping methods.

This conference will bring together participants from the navy, air force, army, marines, private companies and government agencies to discuss the applications of this emerging technology. The prototype device used for the testing is a small portable laser. Laser Strip is currently developing a higher-powered portable laser and a much higher powered fixed laser system.

The conference will present the results of the emerging technology demonstration and serve as a forum for interactive discussion of the needs for stripping in various applications.

**Agenda for “Laser Paint Stripping  
The Results of an Innovative Clean Air Technologies (ICAT)  
Demonstration of a Portable Hand-Held Laser Stripping Technology”**

Wednesday, October 21, 2009

Southern California Edison’s Customer Technology Application Center (CTAC)  
Irwindale, California

- 8:00 AM** Continental Breakfast
- 9:00 AM** Welcome  
Russ Krinker, Southern California Edison
- 9:15 AM** Overview of CARB Project Results and Conference  
Dr. Katy Wolf, Institute for Research and Technical Assistance
- 10:00 AM** Aircraft Stripping Requirements  
Mike Allen, Aero Pro
- 10:45 AM** Ground Vehicle Stripping Requirements  
Brad Hart, Barstow Marine Base
- 11:30 AM** Description of Laser Technology and Demonstration  
Joe Ermalovich, LaserStrip
- 11:45 AM** Questions/Discussion
- 12:15 PM** Lunch
- 1:30 PM** Adjourn

Sponsors: Southern California Edison, California Air Resources Board,  
Institute for Research and Technical Assistance, LaserStrip

## Event Details

**Event Name:** Laser Paint Stripping

**Event Number:** 23703

**Event Date:** Wednesday, October 21, 2009

**Event Time:** 9:00 a.m. - 2:00 p.m. with lunch

**Registration & Continental Breakfast:** 8:30 a.m.

**Event Location:** SCE's Customer Technology Application Center (CTAC)  
6090 N. Irwindale Ave  
Irwindale, CA 91702

Reservations can be made by calling (626) 812-7537 or (800) 336-2822 or by  
registering online at [www.sce.com/energycenters](http://www.sce.com/energycenters).

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# IRTA Completes Project on Energized Electrical Equipment Cleaning

IRTA recently completed a project, sponsored by EPA Region IX, that involved identifying, developing, testing and demonstrating safer alternative cleaning methods for energized electrical equipment. Energized equipment is equipment which has current running through it. For many years, halogenated solvents have been used for so-called contact cleaning of energized and non-energized electrical equipment. These cleaners were sold in aerosol form or in larger quantities which are applied with a spray bottle, a wipe cloth or a high pressure spray device. Halogenated solvents were attractive for these cleaning applications because they have low conductivity and do not have flash points.

All of the halogenated solvents used for electrical equipment cleaning pose health and/or environmental problems. For years, 1,1,1-trichloroethane (TCA) and CFC-113 were used for these purposes. Production of the two chemicals was banned in 1996 because they contribute to stratospheric ozone depletion. The industry largely converted to HCFC-141b but production of this chemical was banned a few years ago for the same reason. Until recently, there have been stocks of HCFC-141b remaining but the HCFC-141b will be depleted in the near future.

There are a variety of other halogenated solvents used for these cleaning applications. These include trichloroethylene (TCE) and perchloroethylene (PERC), both carcinogens; n-propyl bromide (nPB), a reproductive toxin which also causes nerve damage; HCFC-225, which is scheduled to be phased out in 2015 because it causes ozone depletion; and various HFCs and HFEs which contribute to global warming. None of these materials is a good alternative because of their health and environmental problems and

some are very poor cleaners.

For the alternatives analysis and testing, IRTA focused on finding low-VOC alternatives that also are low in toxicity. IRTA conducted testing with several Southern California Edison facilities and a few private companies to determine the effectiveness of the alternatives. The Edison personnel at various substations were especially helpful during the project.

For non-energized electrical equipment, any process or non-halogenated material can be used for cleaning since low conductivity and no flash point are not required. Alternatives that were tested and found to be effective in these applications included water-based cleaners, soy based cleaners and acetone cleaners. Acetone is low in toxicity and is exempt from VOC regulations.

For cleaning mechanism cabinets with a small residual current, water-based and acetone cleaners can be used as long as workers clean carefully. For cleaning mechanism cabinets and energized control panels with only dust contamination, a carbon dioxide Sno-Gun was effective. For cleaning insulators, a variety of alternatives can be used. These include deionized water, media blasting operations that rely on corn cobs or limestone and carbon dioxide blasting operations. The carbon dioxide blasting method is especially attractive since it generates no secondary waste and no particulate emissions. All of these options are better, from an overall health and environmental standpoint, than halogenated solvents.

The final project report entitled "Alternatives to Toxic, VOC, Ozone Depleting and Global Warming Energized Electrical Equipment Cleaners" can be accessed on IRTA's website at [www.irta.us](http://www.irta.us). For more information on the alternatives, call Katy Wolf at IRTA at (818) 244-0300.



# CARB Adopts Regulation on Consumer Paint Thinners and Multi-Purpose Solvents

On March 6, the South Coast Air Quality Management District (SCAQMD) adopted Rule 1143 "Consumer Paint Thinners and Multi-Purpose Solvents." This regulation applies to suppliers in the SCAQMD jurisdiction including Los Angeles, Orange, San Bernardino and Riverside Counties. It sets a VOC limit of 300 grams per liter on January 1, 2010 and a lower limit, 25 grams per liter, on January 1, 2011 for consumer paint thinners and multi-purpose solvents. These products are sold widely in home improvement and hardware stores. This regulation will result in a VOC reduction in the South Coast Basin of 9.75 tons per day.

The California Air Resources Board (CARB) adopted a state regulation for the same products on September 24. The VOC limits for the CARB regulation are the same as the VOC limits for the SCAQMD regulation but they will become effective at later dates. The CARB regulation establishes a VOC limit of 30 percent by December 31, 2010 which is about a year later than the 300 gram per liter VOC limit in the SCAQMD regulation. The CARB regulation also establishes a VOC limit of three percent on December 31, 2013, about three years later than the SCAQMD VOC limit of 25 grams per liter. CARB estimates that the emission reduction from their regulation on the effective dates, excluding the SCAQMD jurisdiction, is 12.3 tons per day. Statewide, the combined reduction is more than 22 tons per day.

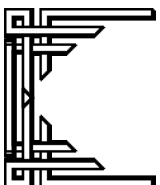
The CARB regulation also has additional requirements. It limits the use of global warming compounds that have a global warming potential (GWP) of 150 or greater. It prohibits the use of certain chlorinated sol-

vents including methylene chloride, trichloroethylene and perchloroethylene in paint thinners and multi-purpose solvent products. The regulation also includes a limit on the use of aromatic compounds in these categories to one percent by weight. Aromatic compounds often have higher reactivity than currently used VOC solvents. They are also generally more toxic than some of the currently used VOC solvents so this should reduce the reactivity and toxicity of the alternatives.

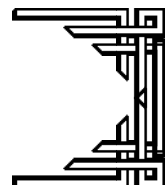
The CARB regulation also requires labeling for the alternatives. The label must include the VOC content of the product. Since some of the alternatives may have lower flash points than some currently used products, suppliers must provide a label that indicates the product can be flammable or extremely flammable.

IRTA completed a project, sponsored by Cal/EPA's Department of Toxic Substances Control (DTSC) a few years ago. It focused on identifying, developing, testing and demonstrating low-VOC, low toxicity alternatives for consumer product paint thinners and cleanup materials. Alternatives that proved effective included water-based cleaners, soy based materials and acetone based formulations. IRTA conducted testing with several small facilities in industries likely to purchase paint and lacquer thinner from hardware and home improvement stores. The report summarizing the results of the project is available on IRTA's website at [www.irta.us](http://www.irta.us).

For more information on safer alternatives or the regulations, contact Katy Wolf at IRTA at (818) 244-0300.



**Dont Forget!! Register for the Laser Paint Stripping Conference!**  
[www.sce.com/energycenters](http://www.sce.com/energycenters) or call (800) 336-2822



# CALENDAR

## October 8-9

"Balancing Environmental Needs and Economic Realities, Annual Statewide Environmental Summit," Catamaran Resort Hotel, San Diego, CA. For Information, call John Ulrich at (916) 989-9692

## October 21

"The Results of an Innovative Clean Air Technologies (ICAT) Demonstration of a Portable Hand-Held Laser Stripping Technology," Southern California Edison's CTAC Facility, 6090 N. Irwindale Ave., Irwindale, CA. For Reservations, call (800) 336-2822 or access [www.sce.com/energycenters](http://www.sce.com/energycenters)

## October 28-29

2009 Western Sustainability & Pollution Prevention Network Conference, Bahia Resort Hotel, San Diego, CA. For information, access [www.wsppn.org](http://www.wsppn.org)

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**In This Issue**

SCAQM Governing Board Declines to Exempt Dimethyl Carbonate.....1

*Small Business Corner:*

Textile Cleaning Industry Still Not Comfortable with Water-Based Cleaning.....2

Chula Vista Cleaner Adopts Green Jet Technology.....3

Laser Stripping Seminar Information.....4

Laser Stripping Seminar Agenda.....5

IRTA Completes Project on Energized Electrical Equipment Cleaning.....6

CARB Adopts Regulation on Consumer Paint Thinners and Multi-Purpose Solvents.....7

Calendar.....8

**Institute for Research and Technical Assistance**