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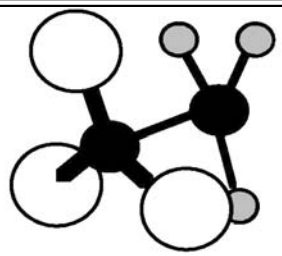


The Alternative

IRTA Newsletter Volume XV Number 4 Fall 2006

IRTA Initiates New EPA Project for Difficult Cleaning Process

IRTA recently started a new project, sponsored by EPA, that involves energized electrical equipment cleaning. IRTA plans to identify, test, develop and demonstrate alternative low-VOC, low toxicity alternatives for cleaning energized electrical equipment.

Historically, 1,1,1-trichloroethane (TCA) and CFC-113 were used as contact cleaners. Contact cleaning involves cleaning various types of equipment including motors, transformers and generators. Some contact cleaning is performed on equipment that is energized (has electricity running through it while it is being cleaned) and some is performed on equipment that is not energized. TCA and CFC-113, sometimes with additives like alcohols, were used in aerosol contact cleaners and in bulk form for cleaning at large firms that have their own generators and transformers and at electric and gas utilities. Often the equipment is cleaned in the field and sometimes it is necessary to clean in confined spaces.

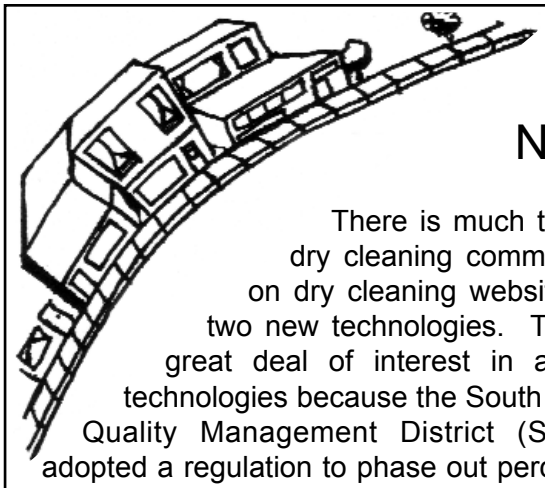
TCA and CFC-113 contribute to stratospheric ozone depletion and their production was banned in 1996. At that stage, the suppliers began formulating contact cleaners with HCFC-141b. This HCFC also contributes to ozone depletion and its production was banned in 2003. There is a stockpile of HCFC-141b that is still being used to formulate contact cleaners but it will eventually be exhausted.

Alternatives to HCFC-141b for contact cleaning of electrical equipment that is not energized are widely available. If the equipment is not energized, water-based cleaners and other alternatives with flash points like mineral spirits or terpenes can be used for the cleaning.

The alternatives to HCFC-141b that are now being marketed for contact cleaning of energized electrical equipment must not have flash points and must not be conductive. This eliminates most water-based cleaners because they are conductive and virtually all non-halogenated materials because they all have flash points. The suppliers are marketing a variety of halogenated solvent alternatives including perchloroethylene (PERC), trichloroethylene (TCE), n-propyl bromide (NPB), HCFC-225, HFEs and HFC-4310. PERC and TCE are carcinogens, are on EPA's Hazardous Air Pollutant list, on California's Toxic Air Contaminant list and Proposition 65. NPB is a reproductive toxin and is undergoing testing for carcinogenicity; it is listed on Proposition 65. HCFC-225 causes ozone depletion and is scheduled to be banned in 2015. The HFEs and HFC-4310 are global warming gases.

In the new EPA project, IRTA plans to work with a large electric utility to test alternatives for energized electrical equipment cleaning. Because halogenated solvents all have toxicity or environmental problems, IRTA will not test these. Instead, IRTA plans to test alternatives like carbon diox-

*(see **New EPA Project** page 6)*



Small Business Corner

New Dry Cleaning Processes Unveiled

There is much talk in the dry cleaning community and on dry cleaning websites about two new technologies. There is a great deal of interest in alternative technologies because the South Coast Air Quality Management District (SCAQMD) adopted a regulation to phase out perchloroethylene (PERC) some years ago and the California Air Resources Board (CARB) is proposing a similar regulation that would phase out PERC in 2023 (see article in this issue of The Alternative).

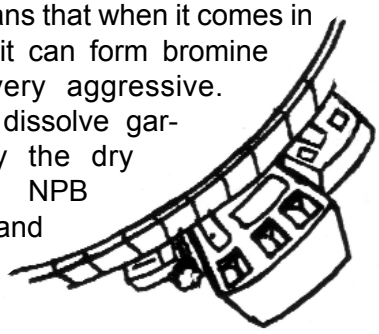
Some information on one of the technologies, called Solvair, was provided at the August dry cleaning show and exhibition in Long Beach, California. This technology is marketed by R.R. Street & Co. The process relies on a solvent combined with proprietary additives. R.R. Street will not reveal the identity of the solvent the process uses but it is widely speculated that it is a glycol ether perhaps combined with a hydrocarbon. The garments are cleaned in the solvent and dried in pressurized liquid carbon dioxide. The carbon dioxide solubilizes the cleaning solvent, the pressure in the wheel is reduced and the carbon dioxide becomes a gas. The equipment includes filters and a still. The company indicates that it will only provide a Material Safety Data Sheet (MSDS) to dry cleaners who actually purchase the technology.

One of Street's machines using the new process has been operating in Chicago. Dry cleaners interested in the process can visit Chicago and the company will demonstrate the process. Some cleaners are considering adopting the process but this would not be a smart move unless they can determine the identity of the solvent. If the solvent is, in fact, a glycol ether, it is classified as a VOC. This means that CARB cannot provide a grant to cleaners wanting to use the technology because AB 998, the legislation that established the grant program, specifically forbids CARB from giving grants for processes using VOCs. Some glycol ethers are toxic and it is important to know about the toxicity of the solvent before it is used. The equipment is likely to be very expensive, in the range of $120,000 because of the carbon dioxide drying process. In effect, the process is similar to the plain carbon dioxide process and it probably cleans more aggressively but it is not as "green."

A company called Dry Cleaning Technologies is also offering a new process for dry cleaners. The company's website calls the solvent used for cleaning DrySolv which is a chemical called n-propyl bromide (NPB) or 1-bromopropane. The website indicates the chemical can be used in an existing PERC machine.

NPB has been used for metal and precision cleaning for several years. It is classified as a VOC and has recently been listed on Proposition 65 in California because it is a reproductive toxin. The California Department of Health Services Hazard Evaluation System & Information Service (HESIS) has issued a Health Hazard Alert for the chemical. According to the alert, NPB can harm the reproductive system and the nervous system. It causes sterility in both female and male test animals and it harms the developing fetus when tested in pregnant animals. It is undergoing testing in laboratory animals to see if it causes cancer as many similar chemicals do. The effects on human health have not been well studied but there are a few human case study reports that suggest it can harm the nervous system. HESIS recommends a workplace exposure level for the chemical of 1 ppm and a skin notation to require protection against skin contact exposure. Cleaners can access the HESIS website to see a copy of the Health Hazard Alert at www.dhs.ca.gov/ohb.

NPB may pose problems for dry cleaners. The 1 ppm exposure level recommended by HESIS cannot be met with an existing PERC machine. The chemical is also very unstable to hydrolysis. This means that when it comes in contact with water, it can form bromine acids which are very aggressive. These acids could dissolve garments and destroy the dry cleaning equipment. NPB contains stabilizers and



*(see **New Dry Cleaning Process** page 3)*

Illustration by Todd Schmid

IRTA Starts New Project With Autobody Shops

IRTA recently initiated a new project, sponsored by Cal/EPA's Department of Toxic Substances Control (DTSC), that involves working on alternatives with autobody shops. IRTA plans to test low-VOC, low toxicity alternatives for cleanup of the currently used coatings and cleanup of the new waterborne coatings the industry plans to adopt. IRTA also plans to test alternative thinning materials for the currently used coatings and the new waterborne coatings. Finally, IRTA plans to work with the autobody shops participating in the project to test alternative low-VOC and waterborne coatings that will be adopted over the next few years.

Last year, the California Air Resources Board (CARB) finalized a Suggested Control Measure (SCM) for the autobody industry. This SCM is not a regulation but is rather a template that can be used by air districts in California for regulating the industry. In December, 2005, the South Coast Air Quality Management District (SCAQMD) adopted a new regulation for the autobody industry similar to the CARB SCM. The VOC limits in CARB's SCM and the District's regulation are based on the VOC content of waterborne coatings that have been adopted in Europe.

The autobody coating suppliers are currently developing the waterborne and low-VOC coatings designed to meet the lower VOC limits established in the SCAQMD regulation. Material Safety Data Sheets (MSDSs) for the new coatings are not yet available so it is not clear which coatings will be based on the waterborne technology and which will be based on the use of chemicals that are exempt from VOC regulations.

IRTA is recruiting seven autobody facilities to participate in the project. IRTA plans to be involved in the tests of the alternative coatings at the participating facilities when they are available. IRTA will work with the shops to estimate the cost of the new coatings and compare the cost to the coatings that are used currently. The cost and performance analysis should be useful to other autobody shops that plan to convert to the new coatings at a later date.

In an earlier project sponsored by EPA and SCAQMD, IRTA tested alternative cleanup materials for coating and adhesive application equipment. IRTA worked with two autobody shops and found that acetone and a combination of acetone and methyl acetate were effective cleaners for the coating application equipment. The results of preliminary testing with autobody shops in the DTSC project indicate that plain acetone is an effective cleaner for the application equipment. When the companies convert to the alternative coatings, a new cleanup process will have to be devised.

For more information on the project, contact IRTA at (818) 244-0300.

New Dry Cleaning Process *(Continued from Page 2)*

inhibitors that are designed to prevent acid formation. In the metal cleaning industry, however, there have been instances where the NPB "goes acid" and caused worker and equipment problems.

Many years ago, a supplier developed a new process based on 1,1,1-trichloroethane (TCA). TCA contributes to stratospheric ozone depletion and its production was banned in 1996. TCA, like NPB, is unstable to hydrolysis and TCA formulations contained stabilizers and inhibitors. When it was marketed for dry cleaning, the suppliers had to build special stainless steel machines and, even with that precaution, there were some instances where the moisture caused the TCA to "go acid."

NPB is even more unstable to hydrolysis than TCA. Water is always present in the dry cleaning process. It forms when the solvent is condensed, it comes in on the garments and water is often added to the solvent to clean water soluble stains. Because of the stability problem and the clear toxicity of NPB, cleaners should be very cautious about using the new process.

For more information, call IRTA at (818) 244-0300.

CARB Develops New Proposal for PERC Dry Cleaning

The California Air Resources Board (CARB) has issued a proposed regulation for perchloroethylene (PERC) dry cleaning. The CARB staff had proposed a regulation to the Board earlier on May 25, 2006 that would tighten up the equipment dry cleaners use but would not phase out PERC. Testimony presented at the hearing persuaded the Board that CARB should phase out PERC in dry cleaning. The Board directed the staff to develop a new proposal in six to eight months.

CARB held several workgroup meetings between May 25 and September. CARB also held a workshop on September 19. The new proposal calls for a phaseout of PERC dry cleaning by January 1, 2023. It also specifies that no PERC dry cleaning machines can be sold for use in California by January 1, 2008. No new PERC dry cleaning facilities would be allowed after January 1, 2008 but existing facilities can relocate their PERC dry cleaning equipment from one location to another within an air district if the air district approves. In 2002, the South Coast Air Quality Management District (SCAQMD) called for a phaseout of PERC in dry cleaning by 2020. Since about half the cleaners in the state are in the purview of the SCAQMD, they would have to stop using PERC earlier than the proposed CARB date of 2023.

Although all PERC machines must cease operation by January 1, 2023, most cleaners using PERC machines will have to stop using them much sooner. The proposed regulation states that beginning on July 1, 2010, existing PERC facilities must remove their PERC machines when they are 15 years old. Some cleaners will have to remove their PERC equipment sooner. By July 1, 2010, cleaners that operate PERC machines at co-residential locations must remove their PERC machines. Most of the cleaners that will be affected by this provision are located in the Bay Area.

The proposed regulation also includes a requirement for good operating practices. Each PERC cleaning facility must have a trained operator. The operator must complete an environmental training program and refresher courses every three years. This trained operator must maintain an operation and maintenance checklist and must inspect the PERC machine for leaks on a regular basis. PERC facilities must also keep records detailing the PERC purchases and the pounds of clothing cleaned per load for five years. The proposed regulation also includes reporting requirements for PERC cleaners.

A new provision that will affect PERC distributors and manufacturers has been added to the proposed regulation. Distributors and manufacturers must keep monthly sales and purchase records for PERC sold in California. They must also keep a list of cleaners that purchased PERC from them and how much PERC they purchased. The distributors must report the amount of PERC sold to California cleaners to CARB annually.

AB 998 requires CARB to levy a fee on PERC used in dry cleaning. The fee is to increase by $1 per gallon every year until 2013. The distributors have been paying this fee but deciding how much they pay has been determined by them, not by CARB. The new provision in the proposed regulation will allow CARB to determine how much each distributor must pay and will require that payment by law. A violation of the regulation can result in a penalty of up to $10,000 per day.

The requirement that the distributors keep records of the cleaners they sell PERC to will ensure that cleaners do not purchase PERC from more than one supplier to avoid complying with their permit limit. The SCAQMD plans to provide all cleaners still using PERC with a specific PERC emissions limit based on District risk calculations. The Districts will have access to the distributor records to verify that cleaners meet their permit limit.

*(see **Dry Cleaning Proposal** page 5)*

Climate Change Bill Passed by California Assembly

The California Assembly passed landmark climate change legislation that focuses on making reductions in emissions of greenhouse gases. The legislation, AB 32, was approved by the Senate on August 30 and the Governor has indicated he will sign the bill.

AB 32 imposes caps on greenhouse gas emissions from major industrial facilities, mandates greenhouse gas reporting by these facilities beginning in 2008 and requires that the state reduce the emissions to 1990 levels by 2020. The California Air Resources Board (CARB) was given the authority to develop the regulations and incentives necessary to implement the bill.

Industry strongly opposed the legislation for two reasons. First, industry wanted the legislation to include market-based mechanisms like emission credit trading, banking, offsets and auctions as a mandatory provision. Instead, AB 32 specifies that CARB "may" include the market mechanisms in their regulatory strategy. Second, industry believes that the legislation gives CARB too much "command and control" over future regulations.

The most familiar greenhouse gas is carbon dioxide which is emitted by power plants and chemical manufacturing plants. Other greenhouse gases are used in refrigeration and air conditioning, foam manufacture, cleaning agents, fire extinguishing agents and various other applications. These other greenhouse gases have much higher global warming potential than does carbon dioxide on a pound-for-pound basis.

The U.S. is a signatory to the Montreal Protocol and regulations were adopted by EPA to phase out production of the strongest ozone depleting substances many years ago. Production of the chlorofluorocarbons or CFCs and 1,1,1-trichloroethane (TCA) was halted in 1996. Use of these substances generally continued until the stockpiles were exhausted. The industries that used CFCs and TCA converted to alternatives and some of the alternatives that are being used widely today contribute to ozone depletion and global warming. In automotive air conditioning, for example, CFC-12 was used historically. Since the product ban on CFC-12 went into place, a hydrofluorocarbon (HFC) called HFC-134a has been used in automotive air conditioners and it contributes to global warming. The same HFC is used in home refrigerators. Various hydrochlorofluorocarbons (HCFCs) and/or HFCs are used in chillers that are used to cool commercial buildings and retail food refrigeration units in grocery stores and restaurants. An HFC, various hydrofluoroethers (HFEs) and two HCFCs are used in cleaning applications. These alternatives are all greenhouse gases.

To achieve the reduction in greenhouse gas emissions mandated by AB 32, alternatives and/or emissions prevention methods in all of these applications will likely have to be implemented. In many cases, banks of CFC, HCFC and HFC greenhouse gases are in place and new policies for recovering the greenhouse gases may be necessary.

Dry Cleaning Proposal *(Continued from Page 4)*

Cleaners should convert to PERC dry cleaning alternatives as soon as possible. The regulation adopted by SCAQMD and the proposed CARB regulation will impose stringent requirements on PERC dry cleaners. Landlords are also refusing to allow the continued use of PERC so cleaners that need to renew leases will have to switch to alternatives. About one-third of the cleaners in the state have already made the switch and many of them are happy with the alternatives.

For more information on cleaning alternatives, contact IRTA at (818) 244-0300.

Results of IRTA Project Show Alternatives are Available in Multipurpose Cleaning

IRTA is currently conducting a project sponsored by Cal/EPA's Department of Toxic Substances Control (DTSC). The project involves identifying, testing, developing and demonstrating alternative low-VOC, low toxicity alternatives in certain applications. These applications are multipurpose cleaning applications in the consumer products arena and they include cleaners sold for thinning coatings and for cleanup of coating application equipment. The California Air Resources Board has one category of consumer products called "Lacquer Thinner" which has VOC emissions of 13 tons per day. There are other categories that fall into the classification of multipurpose cleaning that have high emissions as well.

CARB regulations affect the solvents used for cleanup and thinning by contractors that apply architectural coatings and consumers that apply architectural coatings, autobody coatings, metal coatings and wood coatings. To test low-VOC, low toxicity alternatives, IRTA worked with contractors that apply architectural coatings, autobody shops that are meant to represent consumer use of autobody coatings, a metal product manufacturer meant to represent consumer use of metal coatings and two companies that do wood coating meant to represent consumer use of wood coatings. IRTA also coated metal panels with autobody coatings purchased in a home improvement store.

Many coating suppliers indicate that industrial firms no longer have to use thinners because the coatings are designed to not be thinned. IRTA found, during this project, however, that all industrial firms that use coatings use thinner on a routine basis. The products are variously called thinner, retarder or reducer. These industrial facilities generally purchase the thinners from suppliers but some of them also purchase them at paint supply stores or home improvement stores. The thinners purchased in paint supply and home improvement stores are classified as consumer products.

*(see **Multipurpose Alternatives** page 7)*

New EPA Project

(Continued from front page)

ide pellet blasting and/or snow, deionized water which does not conduct, very high flash point materials like soy and a new hand-held portable laser cleaning system.

The results of the tests will be analyzed and compared with the other energized electrical equipment cleaners in terms of performance and cost. IRTA will prepare a final report that summarizes the advantages and disadvantages of the alternatives.

Need an alternative?

Want to learn more about IRTA?

Visit us on the web at: www.irta.us

or contact us at:

818-244-0300

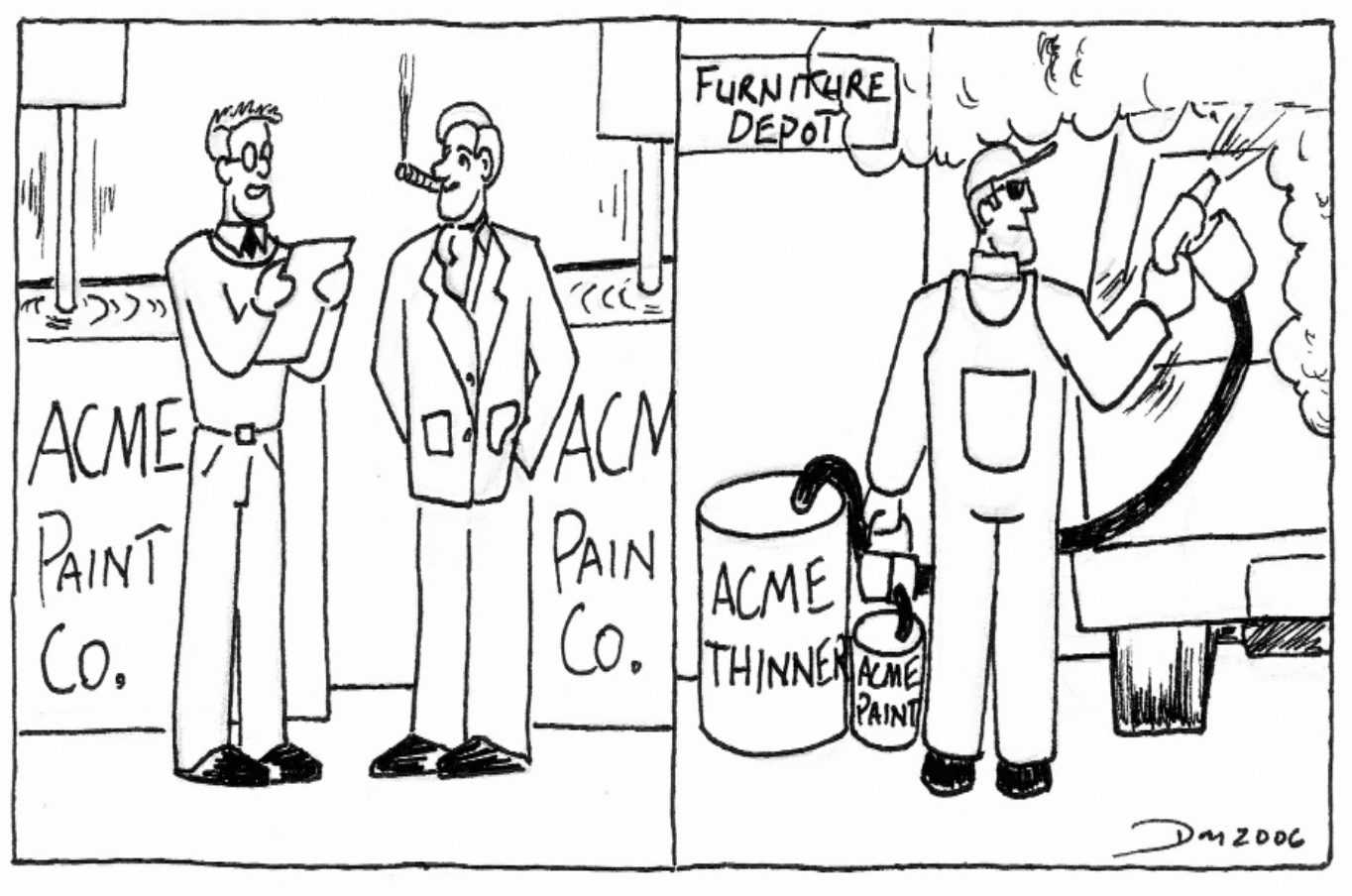
Multipurpose Alternatives *(Continued from Page 6)*

IRTA tested alternatives for high VOC solvents used to clean coating application equipment (spray guns, rollers and brushes) for solvent-borne wood, metal, architectural and autobody coatings. IRTA tested acetone which is exempt from VOC regulations and lower in toxicity than most other organic solvents. IRTA also tested methyl acetate for cleanup of autobody coatings. The findings indicate that plain acetone worked well in all cleanup applications where it was tested.

IRTA tested alternative thinners with the businesses. The alternatives that were tested were based on acetone; some blends of acetone with small quantities of soy and a glycol ether were also tested. With the exception of a few coatings tested in the autobody shops, these alternatives worked effectively and provided a good finish. The consumer product autobody coatings are not the same as the coatings purchased from suppliers for coating vehicles. To accomodate this difference, IRTA purchased consumer product autobody coatings and the alternative thinners performed acceptably in the testing.

The results of the project indicate that low-VOC, low toxicity alternatives are available and effective for consumer products used for cleanup of application equipment and thinning. IRTA is performing the cost analysis for the project and expects to finalize the report early next year.

For more information on cleanup materials or thinners, contact IRTA at (818) 244-0300.



Regulator: "Your coatings that don't require thinners have really reduced VOC emissions over the last several years..."

Painter: "Hey Joe, bring me more of that thinner, I'm running out!"

CALENDAR

October 6
South Coast Air Quality Management District Governing Board Meeting, Rule 1171 hearing. For information, call Lou Yuhas 909-396-2475

October 10-12
Western Regional Pollution Prevention Network Annual Conference, Double Tree Hotel, San Diego, CA. For Information, Call Ed Gonzalez at (702)866-2390.

October 12
18th Annual Clean Air Awards, Biltmore Millennium, 506 S. Grand, Los Angeles, CA. For information, call G. Bowen at (909)396-2778

November 16-17
California Air Resources Board Hearing, Consumer Products Regulation Amendments, Sacramento, CA. For Information, call David Mallory at (916)445-8316

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 , and foundations to accomplish this goal. We appreciate your comments and contributions!

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