

The Alternative

IRTA Newsletter

Volume XVI Number 1

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IRTA Revising Mailing List for "The Alternative"

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IRTA Completes Project on Five Emerging Solvents

IRTA recently completed a project which was sponsored by the California Department of Health Services Hazard Evaluation System & Information Service (HESIS) and U.S. EPA. The purpose of the project was to identify and evaluate alternatives to five solvents that have or may have toxicity problems. The five candidate solvents include:

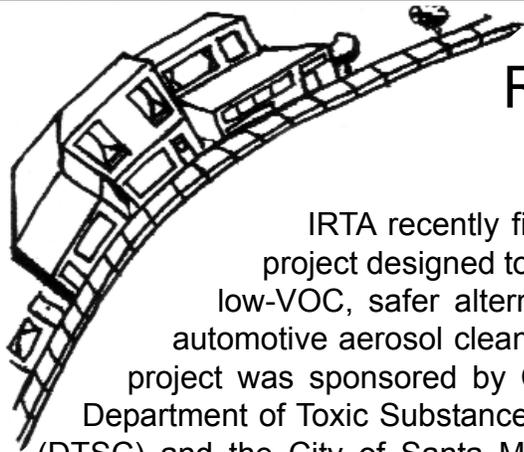
- Decamethylcyclopentasiloxane (D5)
- Parachlorobenzotrifluoride (PCBTF)
- n-Propyl Bromide (NPB)
- 1,2-trans-Dichloroethylene (DCE)
- N-Methyl Pyrrolidone (NMP)

There are thousands of chemicals in commerce and more than 7,000 new chemicals enter commerce each year. Emerging chemicals are an increasing problem. Virtually all new chemicals enter the market without adequate toxicity tests that could be used to verify their safety. The new chemicals are marketed aggressively by their suppliers in a variety of applications and thousands of con-

sumers, workers and community members are exposed to them. Even if evidence of high toxicity becomes available, it is very difficult to prevent or control the use of the chemicals. Any effort to restrict their use, even when they are clearly toxic, is controversial.

The project conducted by IRTA and HESIS was designed to focus on five emerging solvents to highlight the problems with this issue. The project approach can be used to gain and provide more information on emerging chemicals in general and the final report identifies and describes alternatives to the emerging solvents that were investigated. The information should be useful to government agencies involved in regulation and outreach and to users of the solvents who wish to identify and implement safer alternatives.

D5 is a volatile methyl siloxane and these chemicals were first marketed in the 1990s as alternatives to ozone depleting solvents (see **Five Emerging Solvents** page 3)



IRTA recently finalized a project designed to focus on low-VOC, safer alternatives to automotive aerosol cleaners. The project was sponsored by Cal/EPA's Department of Toxic Substances Control (DTSC) and the City of Santa Monica. It involved identifying, developing, testing and demonstrating alternative aerosol cleaners and non-aerosol automotive cleaning methods with 10 auto repair facilities.

The current California Air Resources Board (CARB) VOC limit for brake cleaners, general purpose degreasers and carburetor and fuel injection system cleaners is 45%. The limit for engine degreasers is 35%. CARB estimates VOC emissions from these cleaning activities at about 10 tons per day. During this project, IRTA tested alternative aerosol and non-aerosol products for three of the cleaning categories: brake cleaning, general purpose degreasing and carburetor and fuel injection system cleaning. In two earlier projects, sponsored by CARB and the Department of Health Services Hazard Evaluation System & Information Service (HESIS), IRTA successfully tested a variety of water-based engine degreasers with a VOC content of 10% with detailers, car washes and consumers.

The facilities that participated in the project included one city yard, two service stations that perform repairs, two small general automotive repair facilities and five large dealerships. The alternatives that were tested included:

- two acetone based aerosol cleaners for brake cleaning and general purpose degreasing developed for this project;
- one water-based aerosol cleaner for brake cleaning and general purpose degreasing developed in the earlier CARB and HESIS projects;

Illustration by Todd Schmid

Small Business Corner

Report Available on Alternatives for Auto Aerosol Cleaning

- one soy/acetone aerosol cleaner for carburetor and fuel injection system cleaning developed in the earlier CARB and HESIS projects;
- an acetone based cannister system;
- water-based brake cleaning systems;
- spray bottles using water-based cleaners.

The participating facilities tested the alternatives for extended periods of time. The technicians had personal preferences and IRTA provided them with the cleaning alternatives they preferred for the longer-term testing period.

All of the alternatives that were tested had a VOC content no higher than 10%. CARB recently adopted a new regulation that limits the VOC content of the aerosol cleaners to 10% (see article in this issue of The Alternative). The CARB regulation will result in a VOC emissions reduction of about seven tons per day in California.

IRTA conducted cost analysis and comparison for the currently used high VOC aerosols and the alternative aerosol and non-aerosol cleaning products. The results indicate that the use of the alternatives is comparable or lower in cost than the cost of using the current aerosol cleaners.

The project findings show that the alternative aerosol and non-aerosol technologies are acceptable as alternatives to the high VOC aerosol cleaners used today. The participating facilities were able to operate productively with these alternatives for an extended period of time. This suggests that the automotive industry will be able to comply with the new CARB VOC limit.

IRTA's final report will be on the IRTA website at www.irta.us in January, 2007. If there are questions on the project or the alternatives, please call Katy Wolf at (818) 244-0300. 



Five Emerging Chemicals

(Continued from Front Page)

vents. In 1993, EPA required the D5 producers to submit information on 56 siloxanes and a Memorandum of Understanding to conduct additional toxicity testing on six of the siloxanes including D5 was signed in 1996. The preliminary results of a two year chronic toxicity test were released in 2003; the results showed an increase in a malignant tumor. The final report on the chronic toxicity study was made available in 2006 and EPA and the Office of Environmental Health Hazard Assessment (OEHHA) in California are evaluating the results.

D5 was deemed exempt from VOC regulations by EPA. Over the last several years, the solvent has been used increasingly in several applications where worker, community and consumer exposure is high. IRTA and HESIS decided to focus on and evaluated alternatives in three applications. These include: dry cleaning where D5 is marketed as a safer alternative to perchloroethylene (PERC); repair and maintenance cleaning where D5 is offered as an alternative to mineral spirits and water-based cleaners; and consumer products like antiperspirants and deodorants, hair products, beauty creams, sunscreens and personal lubricants.

PCBTF was originally used as an intermediate in the production of other chemicals. The producer began marketing it as an alternative to the ozone depleting solvents. Like D5, EPA deemed PCBTF exempt from VOC regulations so it became attractive for uses in places like California where VOC regulations are stringent. PCBTF has not been tested for chronic toxicity but its structure, a benzene ring with a chlorine substituent, suggests it could have high toxicity.

IRTA and HESIS focused on six applications of PCBTF and evaluated the alternatives. The applications included autobody coating formulations, thinners used in autobody coatings, autobody coating application equipment cleaning, repair and maintenance cleaning, cosmetic stain removers and aerosol rust inhibitors.

NPB was first marketed as an alternative to ozone depleting solvents. It is a repro-

ductive and developmental toxin. It causes sterility in both male and female test animals, harms the developing fetus and can cause nerve damage. HESIS issued a Health Hazard Alert for NPB in July 2003 and recommends that the workplace exposure to the chemical be set at about 1 ppm to protect against the reproductive and nerve toxicity.

IRTA and HESIS focused on alternatives to NPB in three applications. These include industrial and precision cleaning, adhesives used in the foam fabrication industry and aerosol cleaning formulations.

DCE is a chlorinated solvent that has never been tested for chronic toxicity. It is, however, structurally similar to other chemicals that are carcinogens. It is used primarily in high technology cleaning applications where it is combined with other solvents. IRTA and HESIS focused on two DCE applications including precision vapor degreasing and aerosol cleaning.

The suppliers of NMP began marketing the chemical as an alternative to ozone depleting solvents and methylene chloride. It is a developmental and reproductive toxicant in animals. IRTA and HESIS evaluated alternatives to NMP in six applications including consumer product paint strippers, furniture stripping, general stripping, precision cleaning, pharmaceutical formulations for penetration enhancement and children's shampoo and bath concentrate.

IRTA examined and evaluated alternatives to the five solvents in the applications of focus. IRTA compared the performance and, in some cases, the cost of the five solvents and their alternatives. For several applications, case studies of companies using alternatives or companies that converted to alternatives are presented.

The project findings indicate that safer alternatives to the five candidate solvents are available. The cost of using most of the alternatives is lower than the cost of using the solvents.

For more information, call Katy Wolf at IRTA at (818) 244-0300. The final project report is on IRTA's website at www.irta.us.



IRTA Finalizes Spotting Alternatives Project

IRTA recently completed a project sponsored by U.S. EPA and Cal/EPA's Department of Toxic Substances Control (DTSC). The project involved identifying, developing, testing and demonstrating alternative safer spotting chemicals for the textile cleaning industry.

So-called POG (Paint, Oil and Grease) spotting agents are used by the textile cleaning industry to remove spots from garments before and after they are cleaned. The POG spotting agent used most widely today is trichloroethylene (TCE). The chemical is a carcinogen. It is classified by EPA as a Hazardous Air Pollutant, by the California Air Resources Board (CARB) as a Toxic Air Contaminant, it is a VOC, it is listed on Proposition 65 and it is a listed hazardous waste in the Resource Conservation and Recovery Act (RCRA). Some POG spotting agents also contain perchloroethylene (PERC) which is also a carcinogen.

The dry cleaning industry has relied on PERC for cleaning for several years. More recently, the industry is converting to alternatives to PERC dry cleaning. The South Coast Air Quality Management District (SCAQMD) has adopted a regulation that will phase out PERC dry cleaning by 2020. The California Air Resources Board is currently proposing a regulation that will phase out

PERC dry cleaning a few years later. Landlords are not allowing cleaners to renew their leases if they use PERC. All of these factors are contributing to a switch to the alternatives.

The waste streams from PERC dry cleaning are classified as hazardous waste because they contain PERC which is a listed waste under RCRA. In earlier studies, sponsored by U.S. EPA, CARB and DTSC, IRTA found that some of the waste and effluent streams from the alternative textile cleaning processes contained PERC and TCE. The likely origin of the TCE and one of the likely origins of the PERC was spotting chemicals. In some cases, the waste and effluent streams from the alternative processes would not be classified as hazardous waste and could be disposed of at a lower cost. The presence of PERC and TCE in the waste and effluent streams, however, indicated that they would be classified as hazardous waste.

The purpose of the alternative spotting chemical project was to investigate whether there were alternatives to TCE and PERC POG spotting agents that could be used with the alternative textile cleaning processes. IRTA tested a variety of alternatives with several cleaners using the alternative processes. The alternatives were tested for hydrocarbon, Green Earth, carbon dioxide, wet cleaning,

Green Jet and icy water cleaning.

One of the alternatives spotting agents that was tested was a commercial spotting agent. Another alternative was a product used for cleaning ink. These two spotting agents are water-based cleaners. Another alternative was a soy based material used for cleaning in other industries. A glycol ether was also tested. Finally, three blends containing soy, acetone or the glycol ether were tested. IRTA performed initial testing to ensure that the spotting agents would not leave a ring with any of the alternative cleaning processes. All of the alternatives are either water soluble or water rinseable. If the spotting process is performed properly, the spotting agent is rinsed with steam and dried with compressed air. None of the alternatives left a ring when spotting was performed properly.

IRTA performed initial testing with the spotters or facility owners. IRTA provided larger quantities of the alternatives that performed best for longer term testing. The spotters who tested the alternatives had certain personal preferences. Every spotter liked at least one of the alternative spotting agents. IRTA conducted a cost analysis to compare the cost of using TCE spotting agents with the cost of using the alternatives. The results indicated that the cost of using the alternatives is

(See **Spotting Alternatives** Continued on Page5)

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alternative?

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more about
IRTA?

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

or contact us at:

818-244-0300

IRTA Finds Alternatives to VOC Emitting Metal Working Fluids

IRTA recently completed a project, sponsored by U.S. EPA and the South Coast Air Quality Management District (SCAQMD), that involved identifying, testing and demonstrating low-VOC alternatives to vanishing oils and rust inhibitors. IRTA completed an earlier project sponsored by U.S. EPA that focused on testing and demonstrating low-VOC, low toxicity alternatives to VOC emitting lubricants and chlorinated paraffin lubricants.

Thousands of facilities use VOC emitting metal working fluids as lubricants, vanishing oils and rust inhibitors in their metal working operations. Examples of process that use these fluids are cutting, forming, stamping, honing, cold heading, tube bending and deep drawing. Some of the fluids are based on petroleum products that result in VOC emissions. In many cases, the suppliers or users dilute the petroleum products further with mineral spirits or kerosene. Some facilities use synthetic and semi-synthetic materials which are vegetable based and water-based. These metal working fluids generally have low or no VOC emissions.

IRTA worked with five facilities in the earlier EPA project to demonstrate low-VOC alternatives in operations where lubricants were used. IRTA worked with eight facilities in the current EPA/SCAQMD project to demonstrate low-VOC alternatives in operations where vanishing oils and rust inhibitors were used. The alternatives that proved effective were vegetable based or water-based materials. Five of the facilities participating in the two projects decided to convert to the low-VOC alternatives.

IRTA analyzed and compared the cost of using the original and alternative metal working fluids. The results indicated that five of the 15 candidate operations would increase their costs through a conversion to the alternative materials and the remaining operations would have a lower cost.

SCAQMD is developing an inventory of the VOC emissions for the industry and is considering regulating the emissions in the future. The SCAQMD laboratory is conducting an analysis of the VOC content of various different types of metal working fluids so the VOC content of the petroleum, vegetable based and water-based fluids can be used in developing the regulation.

For more information on alternative metal working fluids, contact Katy Wolf IRTA at (818) 244-0300. The final project report can be accessed at IRTA's website at www.irta.us in January, 2007.

Spotting Alternatives

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lower than the cost of using TCE.

The VOC emissions from use of TCE in spotting were estimated by IRTA to be about one ton per day in California. The findings indicate that cleaners could adopt alternatives that are safer and have low VOC content.

The final report on spotting chemical alternatives will be on the IRTA website at www.irta.us in January, 2007. For more information on the alternatives, call Katy Wolf at (818) 244-0300.



CARB Board Adopts Regulation for Auto Aerosol Products

The California Air Resources Board (CARB) held a meeting of their board on November 17. The board adopted a regulation to reduce the VOC content of automotive aerosol cleaners used by auto repair facilities, car washes, detailers and consumers. The categories that are covered by the regulation are brake cleaning, general purpose degreasing, carburetor and fuel injection system cleaning and engine degreasing. Under the current consumer product regulation, the VOC content of engine degreasers is set at 35% and the VOC content of the cleaners for the other three categories is set at 45%.

A few years ago, IRTA competed two projects that focused on identifying, developing and demonstrating low-VOC, low toxicity alternative automotive aerosol cleaners. The two projects were sponsored by CARB and the California Department of Health Services Hazard Evaluation System & Information Service (HESIS). During the projects, IRTA worked with several water-based cleaner suppliers to develop aerosol water-based cleaners for brake cleaning, general purpose degreasing and engine degreasing. IRTA tested several different water-based cleaners for engine degreasing and all of them performed well. IRTA also

tested a number of non-foaming or low foaming water-based cleaners for brake cleaning and general purpose degreasing. Two of the cleaners, in particular, performed acceptably. IRTA also developed three soy/acetone based cleaner for carburetor and fuel injection system cleaning which generally involves cleaning throttle body valves and two of these cleaners performed well. The cleaners that were tested had a 10% VOC content or less.

IRTA extended the results of the earlier projects during a project sponsored by Cal/EPA's Department of Toxic Substances Control (DTSC) and the City of Santa Monica that was completed recently (see article in this issue of The Alternative). The project involved converting 10 auto repair facilities to low-VOC, safer alternatives for a period. For this project, IRTA tested one of the water-based aerosol cleaners developed in the earlier projects and one of the soy/acetone aerosol cleaners that performed well for throttle body valve cleaning. IRTA also developed two new acetone based aerosol cleaners for brake cleaning and general purpose degreasing. Non-aerosol methods of cleaning were also tested and these included water-based brake cleaning systems, spray bottles containing water-based cleaners and acetone based

cannister systems. The facilities used the alternatives for extended periods.

In the DTSC/City of Santa Monica sponsored project, IRTA worked with several dealerships because they are subject to a South Coast Air Quality Management District (SCAQMD) regulation. This regulation specifies that companies can use 160 fluid ounces of high VOC aerosol cleaners per day (about 10 cans). If the facility uses more than the limit, the aerosol cleaners must meet a 25 gram per liter (about 2.5%) limit. Several dealership in the South Coast Basin have completely adopted the 2.5% aerosols for their cleaning.

In the CARB consumer products regulation, the CARB staff originally proposed to reduce the VOC content of the aerosol cleaners in the four cleaning categories to 10% by the end of 2008. The 10% limit was based on IRTA's findings in the projects conducted for CARB and HESIS. The staff reached a compromise with industry during the rule-making. The staff/industry compromise proposed that the VOC content of engine degreasers be reduced from 35% to 10% by 2010. Foaming water-based cleaners can be used easily in this application. The staff/industry compromise also proposed that the VOC content of the cleaners used in the other

(See **Auto Aerosol Regulation** Continued on Page 7)

Auto Aerosol Regulation

(Continued from Page 6)

three categories be reduced from 45% to 20% by 2008 and to 10% by 2012.

The CARB board considered testimony from industry and the industry made it clear that they wanted CARB staff to relax the limits if they decided they couldn't be achieved. The SCAQMD and others argued that the 10% limit was already being reached in the South Coast Basin. The board adopted a compromise position in which the VOC content of cleaners in the three categories would be set at 20% by 2008 and 10% by 2010. The regulation would involve a staff review to determine whether the limits are feasible in 2009.

For information on safer alternatives, call Katy Wolf at (818) 244-0300.



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SCAQMD Board Adopts Modifications to Rule 1171

On July 7, the South Coast Air Quality Management District (SCAQMD) Governing Board adopted changes to Rule 1171 "Solvent Cleaning Operations." The changes involved the VOC limits for lithographic printing cleanup solvents.

The current VOC limit for cleanup solvents used in lithographic and screen printing is 500 grams per liter. The rule delays the compliance date for the use of cleanup solvents with a VOC content of 100 gram per liter from July 1, 2006 to January 1, 2008. For lithographic printing on newsprint, the 100 gram per liter VOC limit became effective on July 1, 2007. The Los Angeles Times raised an issue at the board meeting and indicated that the lower limit for newsprint should not be required until January 1, 2008 in concert with the other lithographic printing applications. The board asked the staff to investigate the issue and the staff presented additional information confirming that the lower limit could be met immediately at the October 6 board meeting.

On July 7, the board also adopted a higher VOC limit of 650 grams per liter for cleaners used in automatic roller and blanket cleanup systems in lithographic printing until the January 1, 2008 limit of 100 grams per liter goes into effect. The additional time is needed so the industry can conduct further testing and transition to the lower VOC content cleaners.

The District also held workgroup meetings on September 21 for lithographic and screen printing. The meetings involved extensive discussion of the progress on the development and use of alternative cleanup solvents that meet the 500 and 100 gram per liter VOC limits. At the meeting, IRTA presented the results of the testing in four projects sponsored by U.S. EPA, Cal/EPA's Department of Toxic Substances Control and SCAQMD. In these projects, IRTA developed, tested and demonstrated alternative cleanup solvents for both industries that meet the 100 gram per liter VOC limits.

IRTA's reports for screen or lithographic printing cleanup alternatives are on IRTA's website at www.irta.us. For information on alternatives, call Katy Wolf at (818) 244-0300.



CALENDAR

January 25-26

California Air Resources Board Meeting to Consider Phaseout of Perchloroethylene in dry cleaning. For information, contact Mei Fong at 916-324-2570

March 22-23

California Air Resources Board Meeting to consider further regulation of consumer product categories. For information, call David Mallory at 916-445-8316

Week of February 26 - March 2

Conference on Safer Alternatives to Toxic Cleanup Solvents in Lithographic Printing. For information contact Patrice Sutton at 415-407-0259 or psutton@phi.org

March 26-29

WESTEC 2007 Exposition & Conference, Los Angeles Convention Center, Los Angeles, CA. For Information, call 800-733-4763.

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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