

# The Alternative

IRTA Newsletter

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## HSIA Asks EPA to Add n-Propyl Bromide to HAP List

The Halogenated Solvents Industry Alliance (HSIA) has petitioned EPA to add n-propyl bromide (nPB) to the list of Hazardous Air Pollutants (HAPs) in the Clean Air Act Amendments of 1990. No chemicals have been added to the HAP list since the original list was adopted but a few chemicals have been removed from the list.

nPB is a reproductive toxin which also causes nerve damage. Several years ago, the chemical was nominated for testing by the National Toxicology Program (NTP). The NTP report, which is currently undergoing peer review, concluded that there was evidence that nPB causes cancer in female rats and mice. The HSIA petition cites this study in the petition. The petition also indicates that nPB is largely unregulated and can be used without any controls. The petition can be accessed at HSIA's website at [www.hsia.org](http://www.hsia.org).

Based on the effects of the chemical, the California Occupational Safety and Health Administration (Cal/OSHA) adopted a worker exposure limit of 5 ppm for the chemical. The chemical is classified as a VOC but it is not regulated in California as a Toxic Air Contaminant (TAC). Several years ago, IRTA requested that the California Air Resources Board (CARB) add the chemical to the TAC list.

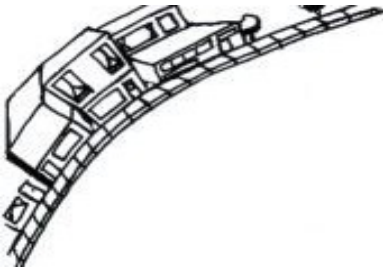
nPB is used in a variety of applications including dry cleaning and vapor degreasing. Several dry cleaners in California have adopted the solvent. nPB is unstable to hydrolysis which means it reacts to form acids when it comes in contact with water. Dry cleaning equipment in one California cleaning facility was destroyed when nPB "went acid." There is a lot of water present in the dry cleaning process and nPB should not be used by

that industry for technical reasons. Cleaners can not easily afford to replace equipment. nPB cannot be used in open top vapor degreasers in the jurisdiction of the South Coast Air Quality Management District (SCAQMD) because the District has limits on the VOC content of solvents for that application. The solvent is used, however, in other air districts in the state in open top vapor degreasers in a largely uncontrolled fashion.

nPB is also marketed as a spotting chemical used to remove spots before and after the main cleaning process in the dry cleaning industry. The Bay Area Air Quality Management District (BAAQMD) recently banned the use of halogenated spotting chemicals so it can no longer be used in the Bay Area. CARB also recently adopted a consumer product regulation (see article in this issue) that will prevent the use of nPB in spotting chemicals because it is a VOC.

The HSIA petition argues that alternative chemicals used in dry cleaning and vapor degreasing like perchloroethylene and trichloroethylene are heavily regulated. They are on the HAP list and they are also on California's TAC list. nPB, in contrast, is not regulated based on its toxicity. It is dangerous for workers and community members to be exposed to this very toxic chemical and CARB should add it to the TAC list as soon as possible.

For more information on nPB and its applications, call Katy Wolf at IRTA at (323)656-1121.



## Small Business Corner

### **California Air Resources Board Adopts Spotting Chemical Regulation**

On December 18, the California Air Resources Board (CARB) adopted regulations for 11 categories of consumer products. When the regulations are fully effective, they will reduce VOC emissions by about seven tons per day and they will also reduce the use of toxic substances.

One of the categories the Board regulated is spotting chemicals used by the dry cleaning industry to remove spots from garments. The major ingredient of spotting chemicals used by this industry is trichloroethylene (TCE). TCE is a VOC and it is also a carcinogen. Several years ago, the industry primarily used perchloroethylene (PERC) as the spotting agent of choice. This is also the major solvent used by dry cleaners in their dry cleaning equipment. PERC is not a VOC but, like TCE, it is a carcinogen. When PERC was more heavily regulated in the main dry cleaning process, suppliers of spotting chemicals decided to substitute TCE for PERC in most spotting chemicals. This was an unfortunate substitution and did not really result in a risk benefit to dry cleaning workers or people in businesses and communities surrounding dry cleaners. In the last few years, n-propyl bromide (nPB) has been marketed as a spotting agent. nPB is a reproductive toxin that also causes nerve damage.

Several years ago, CARB adopted a regulation that will phase out PERC for dry cleaning statewide by 2023. Several cleaners have already converted to alternatives and as many as one-third of cleaners now use alternative processes. These include hydrocarbon, wet cleaning and carbon dioxide cleaning. Use of TCE, PERC or nPB as spotting chemicals will contaminate the waste stream for hydrocarbon and carbon dioxide and will result in a discharge of the brominated or chlorinated solvents to the sewer system in the wet cleaning process.

TCE, PERC and nPB based spotting chemical are referred to as POG (Paint, Oil and Grease) spotting chemicals. The POG materials are used before and after the main dry cleaning process to

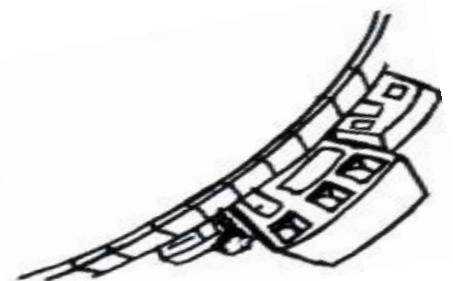
remove spots of various types. In the spotting process, the spotter generally uses a squeeze bottle containing the spotting agent. The agent is applied to the spot and it rubbed in with a small tool to work it into the fabric. The spotting agent is allowed to act, it is flushed with steam on the spotting board and it is dried with compressed air, also on the spotting board.

In two projects, one sponsored by Cal/EPA's Department of Toxic Substances Control (DTSC) and EPA and the other sponsored by the Bay Area Air Quality Management District (BAAQMD), IRTA tested and evaluated alternative spotting agents with a number of cleaners using PERC alternatives in the main dry cleaning process. Since the majority of spots on garments are water soluble, IRTA tested water-based cleaners that also contain surfactants capable of removing oil based contaminants. Some of these cleaners are used in the auto repair industry for removing oil and grease from parts. IRTA also tested a few soy based cleaners which have proven effective in removing ink, oil and grease.

IRTA tested a variety of alternatives with the facilities. When a facility liked a particular cleaner after using it for a week or two, IRTA provided larger quantities of the cleaner to be tested over the longer term. All of the facilities that participated in the testing found at least one alternative that performed as well as the POG spotting agent the spotters used currently.

IRTA identified sources that could provide the water-based and soy based cleaners to cleaning facilities. IRTA also evaluated their cost for this industry and found that all of the alternatives are less costly than the TCE spotting chemical used most widely today.

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The CARB regulation establishes a very low VOC content for the category Spot Remover (Dry Clean-Only). For aerosol spot removers, the VOC limit is 15 percent by weight and for nonaerosol spot removers, the limit is three percent by weight. The limit is higher for aerosol products to accommodate the possible need to use a VOC based propellant in the aerosols. The regulation also prohibits the use of toxic chlorinated solvents which includes TCE and PERC. Since nPB is a VOC, it could only be used in very small percentages in spotting chemicals. The regulation becomes effective on December 31, 2012.

The BAAQMD recently adopted a regulation on spotting chemicals based on IRTA's work on alternatives. This regulation prohibits the use of halogenated spotting chemicals. It effectively bans the use of TCE, PERC and nPB spotting agents.

For more information on the testing and the alternatives, final reports for the two projects are available on IRTA's website at [www.irta.us](http://www.irta.us). For more information, call Katy Wolf at IRTA at (323) 656-1121.

### **Procter & Gamble Tackles Dry Cleaning**

Procter & Gamble (P & G) is entering the dry cleaning business by way of Tide Dry Cleaners. The company plans to establish cleaners all over the country and offer drive-through service and 24 hour pickup. According the New York Times, P & G is counting on the name Tide to draw in customers to the franchise stores. They will offer superior service and "environmentally benign cleaning methods." Tide owns Green Earth and P & G will use the solvent in their franchise stores for dry cleaning.

Green Earth is a silicon based solvent called D5. The chemical has caused cancer in laboratory animals so it is not reasonable for anyone to refer to it as an "environmentally benign cleaning method." D5 is marketed as a safer cleaning alternative than perchloroethylene (PERC), the major dry cleaning agent used today. The California Air Resources Board (CARB) is phasing out PERC use in dry cleaning by 2023. About two-thirds of the cleaning facilities in California are still using PERC which, like D5, is a carcinogen.

D5 is not classified as a VOC and is therefore exempt from VOC regulations. Some California air districts do not require dry cleaners using the solvent to have a permit. The use of D5 in dry cleaning in these cases is completely uncontrolled and cleaners can use as much of the solvent as they want. D5 has not been regulated by the Occupational Safety & Health Administration (OSHA) so no worker exposure levels

have been established. Facilities using the chemical can expose their workers to high concentrations of the chemical and will have no legal responsibilities.

The most widely used alternative to PERC in dry cleaning is hydrocarbon. Although hydrocarbon is classified as a VOC, it does not pose the serious toxicity problem that D5 does. D5's use is currently fairly limited but P&G is planning to market it aggressively. The company has already opened four Tide Dry Cleaners and plans to open many more over the next few years. P & G's website indicates the company's commitment to "sustainability." Promoting use of a chemical that has caused cancer in laboratory animals is not good environmental stewardship.

Cleaners should not use D5 because the chemical may eventually be more heavily regulated. The toxicity problems should be sufficient to discourage its use. In spite of its name, D5 is not a "green" solvent.

For more information on PERC and D5 alternatives in garment cleaning, call Katy Wolf at IRTA at (323) 656-1121.

## **IRTA Plans To Test Three Alternative Boat Hull Paints**

For the last six months or so, IRTA has been working on a project sponsored by Cal/EPA's Department of Toxic Substances Control (DTSC) and EPA. The project involves investigating methods of reducing the cost and complexity of using alternative non-biocide paints for boat hulls. Copper based paints have been used for many years to protect boat hulls from marine organism attachment. The copper acts as a biocide and it leaches out of the paint, keeping the hull relatively free of fouling. Fouling attachment can cause hull damage and it adds weight to the boat.

Before copper paints were used to protect boat hulls, paints based on tributyl tin (TBT) were widely used. The TBT had a devastating effect on marine life and paints containing it were phased out internationally. The boating industry then adopted copper paints and they have been used almost exclusively since. The copper in the paints has built up in the water column to dangerous levels in many of the basins and marinas in California. The regional water quality control boards are beginning to set standards for reducing the copper loading.

For the last three years, IRTA has partnered with the Port of San Diego on an EPA sponsored project to identify, test, demonstrate and evaluate alternatives to copper antifouling paints. The project will be finalized shortly (see companion article in this issue of *The Alternative*). As part of the project, a range of different types of alternative paints were investigated. These included alternative biocide paints based on zinc pyrithione and/or Ecomea, zinc oxide only paints and non-biocide paints. The project findings indicate that some of the alternative non-biocide paints perform well on boats and using them over the life of the paint is lower in cost than using a copper paint.

Paint suppliers are marketing the alternative biocide paints as copper paint replacements. In many other applications and industries, users have adopted alternatives that themselves have problems. This is not a good strategy since it substitutes one problem for another that may prove serious in the future. The zinc biocide paints and the zinc oxide only paints contain zinc which could also build up over time in the water to critical levels and they, too, might need to be controlled. Ecomea, an new organic biocide, contains a variety of halogens including chlorine, bromine and fluorine. Organic halogen substances are known to cause a range of health and environmental problems. Substituting zinc or Ecomea for copper may result in the same shell game of substituting copper for TBT. The best strategy for boaters is to adopt the non-biocide alternative paints.

In the DTSC/EPA project, IRTA is conducting panel tests on new and emerging non-biocide paint alternatives. The panel tests were initiated in August and are scheduled to be completed next August. Several of the alternatives are performing well and are candidates for boat testing. Over the next month, in conjunction with the suppliers, IRTA plans to apply two of the paints to boats. IRTA also plans to apply one of the paints from an earlier set of panel tests to a third boat over the next month.

In the DTSC/EPA project, IRTA is investigating methods of making the non-biocide alternative paints less costly to use and methods of simplifying the application procedures. The non-biocide alternatives require a stripped hull whereas the copper paints can simply be applied over themselves. The non-biocide paints also generally require spraying whereas the copper paints can be rolled on. Stripping is very expensive, as much as \$2,000 or \$3,000 for a 30 foot boat. Spraying is also expensive and could add \$1,000 to the cost of a paint job for a 30 foot boat.

Some of the alternative non-biocide paints can be rolled on instead of sprayed and IRTA is investigating this option. IRTA is also evaluating and testing alternative stripping methods. The methods used today either rely on chemical strippers like methylene chloride, a carcinogen, or involve hand sanding which exposes workers to toxic particulate matter emissions. IRTA is testing various media blasting methods and will analyze the cost of using them and compare it to the methods used today.

IRTA is recruiting boaters to participate in the DTSC/EPA project. Although the cost of the paint job for the alternative non-biocide paints is higher, the boaters may not have to repaint the boat for five to ten years. The typical life of a copper paint is about two years. In addition, once the boat hull has been stripped and the non-biocide paint applied, the paint can be applied over itself for subsequent paint jobs and the paint jobs will be less costly.

Commercial boats in particular can gain an advantage by using the non-biocide paints. These paints are designed to present a smooth surface so fouling will have a more difficult time attaching to the hull. Some commercial boats have applied these paints and have experienced substantial fuel savings, as much as six percent in certain cases.

Boaters interested in participating in the project should contact Katy Wolf at IRTA at (323) 656-1121.

## **SCAQMD Amends Paint and Lacquer Thinner Rule**

On December 8, the South Coast Air Quality Management District (SCAQMD) amended their Rule 1143 "Consumer Product Paint Thinners & Multipurpose Solvents." The rule was originally adopted on March 6, 2009.

The amendments to the rule include an exemption from the VOC limits for artist solvents and thinners that are labeled properly and sold in containers that are one liter in volume or less. The District estimates that these solvents and thinners contribute about 114 pounds or 18.5 gallons per day to VOC emissions in the South Coast Basin. These solvents and thinners are designed to be used specifically with solventborne oil based artist paints. To ensure the exemption applies only to this narrow category, the rule requires recordkeeping and reporting for the exempt materials.

SCAQMD and the California Air Resources Board (CARB) both have regulations that address paint thinners and multipurpose solvents. The CARB regulation also provides an exemption for "Artist's Solvent/Thinner" in their statewide consumer products regulations.

The SCAQMD rule specifies an interim and final VOC limit for the thinners and solvents. The interim VOC limit of 300 grams per liter went into effect on January 1, 2010. The final VOC limit of 25 grams per liter becomes effective on January 1, 2011. The regulation also includes a sell-through provision. It allows suppliers to sell products manufactured before the effective date for up to one year after the effective date of the rule. Consumer paint thinners that were manufactured before July 9, 2010 and labeled for more than one use can be sold, supplied, offered for sale or used until April 1, 2011.

The CARB regulation has VOC limits similar to those of the SCAQMD rule but the implementation dates for the limits are later. CARB established a VOC limit for consumer paint thinners and multipurpose solvents of 30 percent and it is effective on January 1, 2011. A VOC limit of three percent becomes effective on January 1, 2014. The CARB regulation also includes a lim-

itation on the aromatic content of the materials.

In SCAQMD's earlier rule development, the District found that almost all of the consumer product paint thinners and multipurpose solvents that are sold are used for cleanup rather than thinning paints. This follows from the fact that there are very few solventborne paints that are used today and most of them do not require thinning. Alternative cleanup materials have been demonstrated to be effective. These include low VOC materials like acetone and soy and water-based cleaners. Acetone is lower in toxicity than nearly all other organic solvents.

IRTA conducted a project, sponsored by Cal/EPA's Department of Toxic Substances Control (DTSC), that involved identifying, developing, testing and demonstrating alternative low-VOC, low toxicity alternatives to paint and lacquer thinners. IRTA worked with small companies using solventborne paints that are likely to purchase consumer product paint and lacquer thinners from home improvement and hardware stores. These included autobody shops, contractors, wood refinishers, companies that paint metal substrates and companies that apply architectural paints. IRTA tested alternative thinners with several companies and found suitable and effective alternatives. The alternatives that were effective included acetone, acetone blends, soy and water-based materials.

Paint thinners and multipurpose cleanup solvents often contain toxic components that are high in VOC content. These include solvents like toluene and some mineral spirits formulations. When the 25 gram per liter limit goes into effect, suppliers will not be able to use these chemicals any longer except in very small quantities. Thus, in addition to regulating the VOC content, the SCAQMD and CARB regulations will also substantially reduce the toxicity of the materials.

For more information on alternatives, call Katy Wolf at (323) 656-1121 or access IRTA's website at [www.irta.us](http://www.irta.us).

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**Read back issues of The Alternative**  
**and recently completed reports.**

## Draft Final Report on Alternatives to Copper Antifouling Paints Released

For the last three years, IRTA has been conducting an EPA sponsored project in partnership with the Port of San Diego. The project team has issued a draft final report to the stakeholders. The report will be revised based on comments from the stakeholders and it will be submitted to EPA at the end of January.

Copper antifouling paints have been used for many years to protect boat hulls from marine organism attachment. Heavy fouling on the boat bottoms can lead to boat damage and can add weight and increase fuel costs. The paints are designed to leach copper to the surface and the biocidal action keeps the hulls relatively clean. The paints are applied about every two years by boatyards and the hulls are generally maintained by divers who use various tools to clean the boat bottoms on a regular basis.

Over the years, the copper from the bottom paints has built up in the Shelter Island Yacht Basin in San Diego. The copper loading must be reduced significantly over the next several years. Other basins and marinas in the state also have high concentrations of copper and they are likely to require action to reduce the copper loading over the next few years.

Four years ago, IRTA partnered with the Port of San Diego to write a proposal to EPA to test and evaluate alternatives to copper antifouling paints. EPA funded the grant and the project was initiated three years ago. Although some earlier work had been done on alternative paints, there were other paints emerging and they needed to be investigated. The project involved testing 46 alternative paints on panels for a four month period during the highest fouling season. Twenty-one of the paints performed well in the panel testing. Several of the best performing alternative paints were selected for boat testing. The boats were inspected and maintained for a 20 month period. IRTA conducted a cost analysis of the different paints and compared the results to the cost of using copper paint.

The alternative paints that have emerged over the last several years are of six types. They include:

- zinc biocide paints
- organic biocide paints
- zinc/organic biocide combination paints
- zinc oxide only paints
- non-biocide “soft” paints
- non-biocide “hard” paints

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At least one paint of each type was tested on the boats during the project. Zinc biocide paints are generally based on zinc pyrithione. Organic biocide paints often contain a new biocide called Ecomea. Combination paints may include zinc pyrithione and an organic biocide, most frequently Ecomea. Zinc oxide is not considered a biocide so the paints containing zinc oxide only are non-biocide paints but they behave more like biocide paints. Soft non-biocide paints generally contain silicon materials and/or fluoropolymers. Hard non-biocide paints are based on ceramic and/or epoxy.

The alternative biocide paints and the zinc oxide only paints generally have shorter lives than the copper paints used today. The non-biocide paint alternatives generally have much longer lives than copper paints. The alternative non-biocide paints are higher cost and more expensive to apply than the copper paints. The alternative biocide paints and the zinc oxide paints should be cleaned by the divers on the same schedule as the copper paints. The soft non-biocide paints can also be cleaned on the same schedule as copper. The hard non-biocide paints require more frequent cleaning.

The cost analysis was performed over the life of the paint. It indicated that it is more costly to use the alternative biocide and zinc oxide only paints than it is to use the copper paints, primarily because of the shorter paint lives. The results also indicated that the cost of using the hard non-biocide paints is lower than or comparable to the cost of using copper paints for paints with long lives. It may be more costly to use hard non-biocide paints with shorter lives than it is to use copper paints. Even though the lives of the hard non-biocide paints are longer, it does not always off-set the higher cost of cleaning the paint. The results showed that the cost of using the soft non-biocide paint is lower than or comparable to the cost of using the copper paints.

Several of the alternative paints performed well in the testing. The results of the research will be finalized and available at the end of January. Contact Katy Wolf at IRTA at (323) 656-1121 for more information.



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

# Calendar

## January 20th

South Coast Air Quality Management District Rule 1107 "Coating of Metal Parts and Products" Working Group Meeting, SCAQMD Headquarters, Diamond Bar, CA. For information call Mike Morris at 909-396-3282.

## January 31st

Report on Safer Alternatives to Copper-Based Anti-Fouling Paints submitted to EPA by Port of San Diego and IRTA and publically available. For more information, call Katy Wolf at IRTA at 323-656-1121.

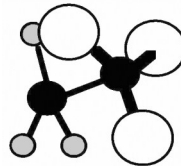
IRTA is working together with industry and government towards a common goal, implementing sensible environmental policies which allow businesses to remain competitive while protecting and improving our environment. IRTA depends on grants and donations from individuals, companies, organizations, and foundations to accomplish this goal. We appreciate your comments and contributions!

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