



# DIRTY

## secrets.

WHAT'S HIDING  
IN YOUR  
CLEANING PRODUCTS?



**WE**

Women's Voices For The Earth

A REPORT BY WOMEN'S VOICES FOR THE EARTH

## November 2011 By Alexandra Scranton

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## Executive Summary

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Cleaning product companies tell you that to keep your home clean and smelling fresh, you need to rely on an army of cleaning and air care products. Sprays, wipes, powders, liquids and more are sold with the promise of improving your home and your health by removing dirt and germs. More often than not, these products are also infused with fragrance to add a pleasant sensory experience to your everyday chores and to give your home that “clean” and “fresh” smell of lemon or pine forests.

**What companies are *not* telling you is that cleaning products can contain toxic chemicals that may harm your health.** Manufacturers often recommend frequent and repeated use of their products, but this also translates to frequent and repeated exposures to potentially harmful chemicals. You may inhale these chemicals by breathing indoor air and some of them can be absorbed through the skin. Long-term exposures to certain chemicals found in household cleaners have been linked to serious health problems like pregnancy complications, breast cancer, birth defects, asthma and allergic reactions.

In this report, Women's Voices for the Earth (WVE) commissioned an independent laboratory to test 20 popular cleaning products for hidden toxic chemicals from five top companies: Clorox, Procter & Gamble, Reckitt Benckiser, SC Johnson and Son, and Sunshine Makers (Simple Green). Products tested included all-purpose cleaners, laundry detergents, dryer sheets, air fresheners, disinfectant sprays, and furniture polish. While previous reports by WVE (*Household Hazards*, 2007 and *Disinfectant Overkill*, 2009) examined the hazards of harmful chemicals whose presence had been disclosed by manufacturers, this report exposes toxic chemicals that companies are keeping secret from consumers.

### What WVE Found:

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- Some products contained reproductive toxins such as toluene and phthalates, carcinogens such as 1,4-dioxane and chloroform, and a hormone disrupting synthetic musk.
- Several known allergens were also detected in these products, the highest levels of which appeared in fragranced air fresheners.
- Allergens were found in products marketed as fragrance-free.
- None of these chemicals were listed on the product's label.

This analysis represents a snapshot of the hidden chemicals found in popular cleaning products from five leading manufacturers. The results demonstrate that consumers do not have all of the ingredient information they need to select safe cleaning products. **Consumers deserve to know what chemicals they are being exposed to, so that they can easily avoid products that may cause allergic reactions or serious long-term health impacts like cancer, birth defects, or infertility.**

This report underscores the need for Congress to pass federal legislation that requires cleaning product manufacturers to disclose all the ingredients they use in their products directly on the product label.

# Test Results: Hidden Toxic Chemicals

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Women's Voices for the Earth commissioned an independent laboratory to test 20 popular household cleaning products to determine if they contain toxic chemicals that are not being disclosed by the manufacturer. The results show that cleaning products commonly contain hidden chemicals linked to cancer, birth defects, and infertility. **None of the chemicals detected were disclosed on product labels.**

Testing results detected the following chemicals in commonly used cleaning products:

## Phthalates (*hormone disruption and reproductive harm*)

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**Even at low doses, phthalate exposure during pregnancy can significantly affect reproductive and neurological development, especially in males.**

### PRODUCTS THEY'RE HIDING IN:

- ▣▣ Glade Tough Odor Solutions with Oust Air Sanitizer®
- ▣▣ Simple Green Naturals Multi-Surface Care®

**The Problem:** Phthalates detected include dibutyl phthalate (DBP), bis (2-ethylhexyl) phthalate (DEHP), butyl benzyl phthalate (BBP) and diethyl phthalate (DEP). These phthalates were found in products made by companies claiming to have removed this class of chemicals from their products: In 2009, SC Johnson (makers of Glade®) announced it would phase phthalates out of its products, and in 2010, Simple Green committed to reformulate products that contained phthalates. The levels of these chemicals found may indicate that this is a contamination issue, rather than the company's intentional use of phthalates in the product. Regardless, companies are responsible for quality control practices to ensure that phthalates at any level are not found. The presence of phthalates in these particular products also brings up a consumer trust issue: Companies may be claiming that their products don't contain certain chemicals, but without full disclosure, there is no way to hold companies accountable for those claims.

## Toluene (*reproductive harm*)

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**Toluene exposure has been linked to pregnancy complications, birth defects and developmental delays in children<sup>2</sup>.**

### PRODUCTS IT'S HIDING IN:

- ▣▣ Pine Sol Original Formula®
- ▣▣ Simple Green All-Purpose Cleaner®

**The Problem:** Women who are pregnant or are intending to get pregnant should avoid using products that contain toluene. However, toluene was not listed on the label of either of these two products, both of which are marketed to women, making it impossible to avoid. **Toluene poses an unnecessary risk and should not be present in household cleaning products at any level.**

## 1,4-dioxane (*carcinogen*)

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1,4-dioxane is a known cancer-causing substance and has been linked in animal studies to increased risk of breast cancer<sup>1</sup>.

### PRODUCTS IT'S HIDING IN:

- ☐☐ Tide Liquid Laundry Detergent<sup>®</sup>
- ☐☐ Tide Free & Gentle Liquid Laundry Detergent<sup>®</sup>
- ☐☐ Simple Green Naturals Multi-Surface Care<sup>®</sup>

**The Problem:** 1,4-dioxane acts as a solvent, and is an expected contaminant from other commonly used ingredients like sodium laureth sulfate, PEG compounds and others. This chemical can actually be stripped out of products effectively; Procter & Gamble (makers of Tide<sup>®</sup>) reformulated its Herbal Essences<sup>®</sup> shampoo in 2009 to strip out 1,4-dioxane. Unfortunately, our test results show that the company has not chosen to make the same effort for its laundry detergent. It is especially concerning that 1,4-dioxane was detected in Tide Free & Gentle<sup>®</sup> and in Simple Green Naturals<sup>®</sup>, which are marketed to consumers looking for a healthier choice.

## Chloroform and Carbon Tetrachloride (*carcinogens*)

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Chloroform and carbon tetrachloride are cancer-causing chemicals. Carbon tetrachloride has specifically been shown to cause breast cancer in animal studies.<sup>5</sup> Exposure to chloroform can also cause nervous system effects such as dizziness, nausea and headaches.<sup>6</sup>

### PRODUCT THEY'RE HIDING IN:

- ☐☐ Clorox Clean Up with Bleach<sup>®</sup>

**The Problem:** Chloroform and carbon tetrachloride were found in a product intended to be used on hard surfaces in your home – especially those that you and your children come into contact with most often, such as countertops, sinks, appliances etc. This product is also marketed for frequent use throughout the day, increasing the risks from frequent exposures. Toxic chemicals like chloroform and carbon tetrachloride simply do not belong in products we use everyday.

## Galaxolide (*hormone disruption*)

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Galaxolide has been shown to disrupt levels of hormones<sup>3</sup> and has also been shown to decrease a cell's self-defense mechanism against other toxic chemicals<sup>4</sup>.

### PRODUCTS IT'S HIDING IN:

- ☐☐ Febreze Air Effects<sup>®</sup>
- ☐☐ Glade Tough Odor Solutions with Oust Air Sanitizer<sup>®</sup>

**The Problem:** Galaxolide is a synthetic musk, a common fragrance ingredient. It is persistent, meaning that it doesn't break down easily in the environment. It is especially concerning to have detected this chemical in two aerosol products; aerosols spray chemicals directly into the air of your home and can be inhaled directly, significantly increasing the potential for exposure to this hormone disrupting chemical.

## Allergens

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Impacts can range from mild skin rashes, eye, nose or throat irritation, or headaches to more debilitating outcomes such as chronic dermatitis, breathing difficulties and asthma. Allergens detected include: limonene, DL-Citronellol, linalool, eugenol and coumarin.

### PRODUCTS THEY'RE HIDING IN:

- Green Works Natural Glass & Surface Cleaner Original Scent®
- Green Works Natural Laundry Detergent Original Scent®
- Clorox Clean-Up Cleaner with Bleach®
- Original Pine-Sol®
- Tide Original Scent®
- Tide Free & Gentle®(fragrance free)
- Bounce with Febreze Fresh Scent Spring & Renewal®
- Bounce Free & Sensitive® (fragrance free)
- Febreze Air Effects Spring & Renewal®
- Lysol Disinfectant Spray Spring Waterfall®
- Lysol Neutra Air Fabric Mist Crisp Linen®
- Air Wick Scented Oil Lavender & Chamomile
- Air Wick Fresh Waters Air Freshener®
- Glade Plug In Scented Oil Hawaiian Breeze®
- Glade Tough Odor Solutions w/Oust Refreshing Citrus Air Sanitizer®
- Pledge Furniture Spray Dust & Allergen Outdoor Fresh®
- Windex Original®
- Simple Green All-Purpose Cleaner Non-Toxic Biodegradable®
- Simple Green Naturals Multi-Surface Care Lemon Verbena®

**The Problem:** Allergies and allergic-like reactions to fragranced products occur frequently in the general population. While only about 2-4% have been officially diagnosed with fragrance contact allergy, the percentage of people reporting sensitivities to fragrance is much higher, up to 30%.<sup>7</sup>

Allergens are frequently used in fragrances, so it's not surprising that they were found in most of the products tested. Some consumers do not experience adverse effects from allergens in fragrance. However, for those consumers who do have allergies or sensitivities, these chemicals need to be disclosed on the label so that they can be avoided. Full disclosure of fragrance ingredients will also allow consumers and their health care providers to better understand which chemicals result in allergic reactions. In the European Union, cleaning product labels must include a list of certain allergens present above a threshold percentage. Many of the companies examined in this report label allergens in their products in Europe, so clearly they can do the same for their customers in the United States. In this report, Women's Voices for the Earth specifically identified those allergens present in products that are required to be listed in the European Union.

Because companies are keeping these chemicals a secret, the only option that has been available to those with allergies is to choose fragrance-free products. However, our tests detected allergens in two fragrance-free products (Tide Free & Gentle Liquid Laundry Detergent® and Bounce Free & Sensitive Dryer Sheets®). Allergens were even detected in one product marketed specifically to people with allergies (Pledge Furniture Spray Dust & Allergen®), which should not be present in a product marketed to this population. **Disclosure of allergens on the label is a simple and easy solution to protect consumers' health.**

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## Toxic Chemicals & Women's Health

*Research shows that women are disproportionately impacted by toxic chemicals in cleaners. Although gender roles have changed over time, studies show that women continue to do more than 70% of the housework in the average home, meaning that they are much more frequently exposed to chemicals in cleaning products<sup>8</sup>. Women who spend more of their time at home may also have higher exposure to these chemicals. Studies also show that women are more likely to suffer from fragrance allergy than men<sup>9</sup>.*

*In addition, women carry the health impacts of toxic chemicals in a unique way. Many chemicals accumulate in fat, and women have a higher percentage of fat tissue than men. Toxic chemicals can be stored in body fat over a lifetime, so that even small exposures add*

*up. Women are also the first environment for the next generation, and the chemicals stored in a woman's body are passed onto her child during pregnancy and later through breast feeding. This last point is particularly concerning, as these chemicals are being detected in our blood,<sup>10</sup> breast milk,<sup>11</sup> and even newborns.<sup>12</sup> Certain hormone disrupting chemicals found in cleaning products can have significant lifelong effects on reproductive health and development. This is why it's particularly important that women who are pregnant or are trying to get pregnant have the information they need to avoid certain chemicals in cleaners that may impact the health of their developing child.*

# The Need for Mandatory Ingredient Disclosure

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When WVE launched our Safe Cleaning Products Initiative in 2007, no companies were disclosing ingredients in their cleaners. Since then, consumers have been increasingly demanding to know what is in the products they use to clean their homes. As a result, the landscape around ingredient disclosure in cleaning products has changed dramatically.

In 2010, the cleaning product industry launched its Consumer Product Ingredient Communication Initiative, which led to most major companies making some product ingredients available through a website or a toll-free phone line.<sup>13</sup> While the Initiative is certainly a step forward, it is insufficient to meet the needs of consumers looking to protect their health. The Initiative places the burden on the consumer to research products online before even setting foot in the store. But even the most informed consumer can't avoid certain toxic chemicals if they wish to—online disclosure is limited in its usefulness and this report shows that companies are still keeping some of their chemicals secret. **We need mandatory, consistent ingredient disclosure that is standardized across the industry in order to protect consumers from exposure to hidden toxic chemicals and ensure that consumers have the information they need at the point of purchase to make safe choices.**

*See Appendix B: “Progress Made and Remaining Steps” for a snapshot of current ingredient disclosure practices and toxic chemical policies among the five top cleaning product companies examined in this report.*

## WHY VOLUNTARY DISCLOSURE FALLS SHORT

### The voluntary initiative allows companies to keep fragrance ingredients a secret.

Most of the products we tested contained hidden toxic fragrance chemicals. The industry's voluntary initiative doesn't require companies to disclose fragrance chemicals, so most simply list “fragrance.” Fragrances can be composed of dozens to hundreds of chemicals, and all of these ingredients are kept secret from consumers.

The fragrance industry argues that the list of ingredients in a particular fragrance is confidential business information.<sup>14</sup> These ingredients are such closely held secrets that even federal regulators do not have access to them, and thus cannot assure their safety. Instead, the International Fragrance Association (IFRA), an industry trade group, sets standards for fragrance manufacturers and facilitates safety reviews of fragrance ingredients. In 2008, for the first time, IFRA released a master list of over 3,100 chemicals that make up the palette of ingredients used by most fragrance houses.<sup>15</sup> Among the chemicals on the list are carcinogens like p-dichlorobenzene and styrene oxide; endocrine disruptors like galaxolide and tonalide (both synthetic musks); reproductive toxicants like diethyl phthalate (DEP) and di-isononyl phthalate (DINP), and problematic disinfectants like Triclosan and ammonium quaternary compounds. Not surprisingly, numerous allergens are also listed. Unfortunately, IFRA provided no data on how commonly these chemicals are used, by amount or even by type of fragranced product, and consumers are not provided any product-specific information that would allow them to avoid products containing these chemicals of concern.

Some companies are now providing a palette of fragrance ingredients used in their products. This allows consumers to better understand some of the ingredients used by a manufacturer, but without associating ingredients with specific products, a palette does not allow consumers to avoid those

# What Else is Hiding in Fragrance?

The International Fragrance Association's (IFRA) master list of chemicals used in fragrance includes:

- *Carcinogens like p-dichlorobenzene and styrene oxide; endocrine disruptors like galaxolide and tonalide (both synthetic musks)*
- *Reproductive toxicants like diethyl phthalate (DEP) and di-isononyl phthalate (DINP)*
- *Problematic disinfectants like Triclosan and ammonium quaternary compounds*
- *Numerous allergens*

Unfortunately, IFRA's list won't tell you-which companies are using these toxic chemicals, which products they're in, how commonly they're used, or amounts they're used in.

**You deserve to know if carcinogens and reproductive toxins are hiding in your cleaning products.**

products that contain chemicals of concern. While these efforts towards transparency and safety are a step in the right direction, there remains an inherent conflict of interest when a trade group, funded by industry, holds the responsibility for regulating itself. The potential for undue corporate influence into safety mechanisms is simply a reality. Self-regulation of the fragrance industry and secrecy with respect to ingredients, especially toxic ones, is not working in favor of public health. This is why WVE is calling for mandatory disclosure of all ingredients, including those used in fragrance.

## **The voluntary initiative does not require disclosure of known or expected contaminants.**

Several of the chemicals we detected in products may be present as a result of contamination, including 1,4-dioxane and phthalates. Products can be contaminated as a result of chemical reactions that can happen during the manufacturing process or over time in the product container. Contaminants in a product can also result from the use of ingredients that are themselves contaminated. Yet these chemicals, even in small amounts, can pose health problems, especially over repeated or long-term use. Toxic chemicals at any level pose unnecessary risks to health that can be avoided (often easily) by better quality control processes. Companies are responsible for the quality of the products they produce, yet often they do not perform the routine testing necessary to detect contaminants in their products. If a company is aware of contaminants in its product but is unwilling to take steps to remove them, these chemicals should be clearly disclosed on the label of the package so that consumers can make informed purchasing decisions.

## **The voluntary initiative does not establish a standard format for disclosure of ingredients.**

There is currently little consistency in how companies communicate their ingredients to consumers. Some companies offer ingredients by phone, while most have opted to disclose on a website. Unfortunately, no company website is the same as another, resulting in inconsistency and widely varying degrees of user-friendliness. Very few manufacturers have opted to provide ingredient information on the product label where it would be accessible to all consumers at both the point of purchase and the point of use. As a result, the burden often lies on the consumer to locate the ingredient pages, which are not always easy to find, and the different terminology and formats used by manufacturers makes it difficult for consumers to compare products.

**BOTTOM LINE: consumers need greater consistency in the presentation of ingredient listings, full ingredient information including fragrance components and expected or known contaminants, and access to this information on the product label.**

# Conclusion and Solutions

The product testing results presented in this report reveal that common household cleaning and air care products marketed today routinely contain hidden chemicals of concern. In addition to the need to disclose these ingredients, many of the chemicals detected—linked to cancer, hormone disruption, and reproductive problems—simply do not belong in products women use in their home at any level.

**Full disclosure of chemicals in cleaning products is the simplest way to protect our health.** Consumers need to have information available to make informed purchasing choices and avoid chemicals of concern. Keeping toxic chemicals hidden is an unacceptable industry practice that must be remedied through legislation.

**The solution: WVE is calling on Congress to pass new federal legislation that requires cleaning product manufacturers to disclose all the ingredients they use in their products directly on the product label.**

## WHAT GOVERNMENT CAN DO:

- **The Cleaning Product Right to Know Act** has been introduced in Congress and will require household cleaning products to bear a label including a full list of product ingredients.
- Go to [www.womensvoices.org](http://www.womensvoices.org) to find out how to ask your legislators to support the Cleaning Product Right to Know Act!

## WHAT CLEANING PRODUCT COMPANIES CAN DO:

- Companies should disclose all ingredients, including allergens, fragrance components and expected or detected contaminants, directly on the product label, where it helps you the most.
- Companies should reformulate their products to eliminate chemicals of concern, such as phthalates and synthetic musks, and replace them with safer alternatives.
- Companies should ensure that their “fragrance-free” products are truly free of fragrance compounds.
- Companies should improve the quality control of their ingredient supply to ensure that harmful contaminants are not present in their products, and take steps to remove contaminants that are present.

## WHAT YOU CAN DO:

- Make your own cleaning products! Until you know what’s in the products you buy off the shelf, you can mix your own with safe ingredients like vinegar and baking soda. Visit [www.womensvoices.org](http://www.womensvoices.org) for recipes and tips.
- If you are concerned about a cleaning product that you currently use (and like), call the company’s toll-free number and inquire about the problem ingredients discussed in this report. Ask the manufacturer to disclose all of their fragrance ingredients and any contaminants, and ask them to remove any phthalates, musks and toxic contaminants from their products.
- Support the work of Women’s Voices for the Earth! Sign up for the WVE Action Network at [www.womensvoices.org](http://www.womensvoices.org) to learn more about how you can support policies that protect us from toxic chemical exposure.

## Appendix A: Testing Results by Product

Brand	Product Name	Chemical Detected	Level detected *mg/kg (ppm)	Health Concern**
<b>Clorox</b>				
Green Works	Clorox Green Works Natural Glass & Surface Cleaner	Limonene	15-37	Allergies
Green Works	Original Scent Green Works Natural Laundry Detergent Original Scent	Limonene DL-Citronellol	410-540 3.4 - 64	Allergies Allergies
Clorox	Clorox Clean-Up Cleaner with Bleach	Chloroform Carbon tetrachloride Limonene	4.00 4.60 9.2	Cancer Cancer Allergies
Pine-Sol	Original Pine-Sol	Toluene Limonene	0.31 1900- 5600	Pregnancy complications Allergies
<b>Procter &amp; Gamble</b>				
Tide	Tide Original Scent	1,4-dioxane Limonene	63.00 58-230	Cancer Allergies
Tide	Tide Free & Gentle (fragrance free)	1,4-dioxane Limonene	89.00 0.8	Cancer Allergies
Bounce	Bounce with Febreze Fresh Scent Spring & Renewal	Limonene DL-Citronellol Linalool	48 -88 1.9 - 200 18 - 210	Allergies Allergies Allergies
Bounce	Bounce Free & Sensitive (fragrance free)	Limonene Linalool 1,4-dioxane Galaxolide	0.17 0.44 0.32 0.62	Allergies Allergies Cancer Hormone disruption
Febreze	Febreze Air Effects Spring & Renewal	Limonene Linalool	89 - 99 220-300	Allergies Allergies
<b>Reckitt Benckiser</b>				
Lysol	Lysol Disinfectant Spray Spring Waterfall	Limonene DL-Citronellol Eugenol	24 16 5.1	Allergies Allergies Allergies
Lysol	Lysol Neutra Air Fabric Mist Crisp Linen	Limonene Linalool Limonene	1.9 5.2 - 20 11000	Allergies Allergies Allergies
AirWick	Air Wick Scented Oil Lavender & Chamomile	Linalool Eugenol Coumarin	11000 - 24000 440 1800	Allergies Allergies Allergies
AirWick	Air Wick Fresh Waters Air Freshener	Limonene Linalool	13-72 78	Allergies Allergies

Brand	Product Name	Chemical Detected	Level detected *mg/kg (ppm)	Health Concern**
<b>SC Johnson &amp; Son</b>				
Glade	Glade Plug In Scented Oil Hawaiian Breeze	Limonene	13000-81000	Allergies Allergies Allergies
		Linalool	5900-15000	
		Eugenol	550	
Glade	Glade Tough Odor Solutions w/Oust Refreshing Citrus Air Sanitizer	Dibutyl phthalate (DBP)	0.55	Reproductive harm, hormone disruption, neurodevelopment problems Reproductive harm, hormone disruption, neurodevelopment problems Reproductive harm, hormone disruption Reproductive harm, hormone disruption Hormone disruption Allergies Allergies
		Bis (2-ethylhexyl) phthalate (DEHP)	19.00	
		Diethyl phthalate (DEP)	7.80	
		Butyl benzyl phthalate (BBP)	2.80	
		Galaxolide	88.00	
		Limonene	11 - 39	
		Linalool	10 - 33	
Pledge	Pledge Furniture Spray Dust & Allergen Outdoor Fresh	Limonene	40 - 290	Allergies Allergies
		DL-Citronellol	35	
Pledge	Pledge Multi-Surface Everyday Cleaner Fragrance Free Hypoallergenic	None	N/A	N/A
Windex	Windex Original	Limonene	3.2	Allergies Allergies
		Linalool	1.5	
<b>Sunshine Makers</b>				
Simple Green	Simple Green All-Purpose Cleaner Non-Toxic Biodegradable	Toluene	0.68	Pregnancy complications Allergies
		Limonene	26 - 99	
Simple Green Naturals	Simple Green Naturals Multi-Surface Care Lemon Verbena	Bis (2-ethylhexyl) phthalate (DEHP)	0.58	Reproductive harm, hormone disruption, neurodevelopment problems Cancer Allergies Allergies
		1,4-dioxane	0.45	
		Limonene	27 - 93	
		Linalool	0.59 - 1.8	

**Notes:**

\* These measurements represent levels detected in laboratory testing and may not represent actual exposure levels experienced with use of the product in the home, as ventilation and usage patterns can vary widely. For several chemicals, the values represent a range of concentrations measured by two different test methods.

\*\* Health concerns listed are those which have been determined in the scientific literature through exposure to the chemical listed, by at least one route of exposure: inhalation, ingestion or skin absorption.

\*\*\* In most cases, research has never been conducted to determine if exposure to the chemical through use of the cleaning product is associated with the health outcome.

# Appendix B: Progress Made and Remaining Steps

## A Snapshot of the Companies Examined in This Report

Company	Clorox	Reckitt Benckiser	Procter & Gamble	SC Johnson	Simple Green
<b>Ingredients Disclosed</b>	<p>Online:</p> <ul style="list-style-type: none"> <li>Some ingredients</li> <li>Dyes</li> <li>Preservatives</li> <li>Master list of fragrance ingredients</li> </ul> <p>Labels:</p> <ul style="list-style-type: none"> <li>Green Works® labels</li> </ul>	<p>Online:</p> <ul style="list-style-type: none"> <li>Some ingredients</li> <li>Dyes</li> <li>Preservatives</li> </ul>	<p>Online:</p> <ul style="list-style-type: none"> <li>Some ingredients</li> <li>Dyes</li> <li>Preservatives</li> </ul>	<p>Online:</p> <ul style="list-style-type: none"> <li>Some ingredients</li> <li>Dyes</li> </ul>	<p>Online:</p> <ul style="list-style-type: none"> <li>Some ingredients</li> </ul>
<b>Ingredients Kept Secret</b>	<ul style="list-style-type: none"> <li>Product-specific fragrance ingredients</li> <li>Allergens</li> </ul>	<ul style="list-style-type: none"> <li>Fragrance ingredients*</li> <li>Allergens</li> </ul>	<ul style="list-style-type: none"> <li>Fragrance ingredients*</li> <li>Allergens</li> </ul>	<ul style="list-style-type: none"> <li>Preservatives*</li> <li>Fragrance ingredients*</li> <li>Allergens</li> </ul>	<ul style="list-style-type: none"> <li>Dyes</li> <li>Preservatives</li> <li>Fragrance ingredients</li> <li>Allergens</li> </ul>
<b>Products DO NOT Contain*</b>	<ul style="list-style-type: none"> <li>2-butoxyethanol</li> <li>APEs</li> <li>Phthalates</li> <li>Triclosan</li> <li>Synthetic musks</li> </ul>	<ul style="list-style-type: none"> <li>2-butoxyethanol</li> <li>APEs</li> <li>Phthalates</li> <li>Triclosan</li> <li>Synthetic musks</li> </ul>	<ul style="list-style-type: none"> <li>2-butoxyethanol</li> <li>APEs</li> </ul>	<ul style="list-style-type: none"> <li>2-butoxyethanol</li> <li>APEs</li> <li>Triclosan</li> </ul>	<ul style="list-style-type: none"> <li>APEs</li> <li>Monoethanolamine</li> <li>Ammonium quaternary compounds</li> <li>Triclosan</li> <li>Synthetic musks</li> </ul>
<b>Toxic Chemicals Still in Products</b>	<ul style="list-style-type: none"> <li>Monoethanolamine</li> <li>Ammonium quaternary compounds</li> <li>Testing results show chloroform, carbon tetrachloride and toluene</li> </ul>	<ul style="list-style-type: none"> <li>Monoethanolamine</li> <li>Ammonium quaternary compounds</li> </ul>	<ul style="list-style-type: none"> <li>Monoethanolamine</li> <li>Ammonium quaternary compounds</li> <li>Phthalates</li> <li>Synthetic musks</li> <li>Triclosan</li> <li>Testing results show 1,4-dioxane</li> </ul>	<ul style="list-style-type: none"> <li>Monoethanolamine</li> <li>Ammonium quaternary compounds</li> <li>Synthetic musks</li> <li>Testing results show phthalates**</li> </ul> <p><i>*SC Johnson has committed to disclose preservatives and a master list of fragrance chemicals in 2012, and to list ingredients on product labels over the next 2-3 years</i></p> <p><i>**SC Johnson announced the removal of phthalates in 2009--product testing results show phthalate.</i></p>	<ul style="list-style-type: none"> <li>2-butoxyethanol</li> <li>Testing results show 1,4-dioxane, toluene, and phthalates*</li> </ul> <p><i>*Simple Green committed to reformulate its products to remove phthalates in 2010—product testing results show phthalates.</i></p>
<p>* “Products DO NOT Contain” list refers to chemicals which the company has claimed to have eliminated from their product lines, and which were not detected in our testing.</p>		<p><i>*Reckitt Benckiser has committed to release a master list of fragrance ingredients before the end of 2011.</i></p>	<p><i>*Procter &amp; Gamble has committed to release a master list of fragrance ingredients in 2012.</i></p>		

## Appendix C: Testing Methodology

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Women's Voices for the Earth commissioned tests of 20 brand-name cleaning and air care products targeting a range of chemicals, including volatile and semi-volatile organic compounds.

All 20 products were purchased in Missoula, MT at retail stores including Wal-Mart, ACE Hardware, Albertsons and Lowe's. Unopened products were sent to Analytical Sciences, an independent laboratory in Petaluma, California, for analysis. The testing methodology is described below.

### **VOLATILE ANALYSIS PROTOCOL**

An accurately weighed amount of the sample was placed into a Teflon sealed purge vial. Five milliliters of water free of organic compounds was added to the vial. The vial was sealed and placed into the autosampler of the instrument. The autosampler then takes each sample vial, adds additional water, internal standard compounds and begin a helium purge of the sample for approximately 10 minutes. The helium flow rate was 20 milliliters per minute. Organic compounds are swept out of the solution with the helium flow and transported to a specifically designed solid phase trap used to capture organic compounds by adsorption. During purging the trap is maintained at 38 degrees centigrade. After the purging step is completed the temperature of the trap is rapidly elevated to 280 degrees centigrade with a steady helium flow passing through the trap. The elevated temperature desorbs compounds from the trap and the helium flow moves them to the injection port of the gas chromatograph. The chromatographic column in the chromatograph collects all the organic compounds coming into the injection port of the instrument. Once the desorption step is complete the chromatograph executes a temperature ramp program to allow the chromatographic column to separate the organic compounds as they flow through the column with helium flow. The individual compounds emerge from the column at different times over the course of the 30 minute temperature ramp program and are detected using the attached mass spectrometer. The instrument is calibrated and specifically targets over 60 compounds known to be environmental hazards by the United States Environmental Protection Agency. If chromatographic peaks appear that are not on the specific target list the laboratory chemist can ask the computerized mass spectral software (National Bureau of Standards Mass Spectral database) to identify the peak observed. When a satisfactory identification is made in this manner the chemist can ask the instrument to quantify the identified peak using the nearest internal standard. In this way both specifically targeted hazardous volatile chemicals and non-targeted potentially problematic volatile compounds can be assessed with a single gas chromatographic analytical analysis.

### **SEMI-VOLATILE ANALYSIS PROTOCOL**

An accurately weighed amount of the sample was placed into a Teflon sealed extraction vessel to which a known volume of methylene chloride was added. The vessel was sealed and mixed using a vortexer and then exposed to vigorous sonication for 30 minutes in a sonication bath. Methylene chloride extracted sample vessels were removed from the sonicator and allowed to cool. Three

hundred microliters of methylene chloride was withdrawn from each sample extract and placed into an autosampler vial. Six internal standard compounds were added at specific concentrations as well. The contents of the autosampler vial were well mixed and the vial sealed. Sealed autosampler vials were placed in the autosampler of the gas chromatograph with a mass spectrometer detector (GC/MS). A specific amount of each sample extract was injected into the GC/MS instrument for analysis. The instrument, using a temperature ramp program, separates the compounds in the sample extract as they pass through the column in the gas chromatograph. The instrument mass spectrometer detects each compound as it emerges from the column. The GC/MS method was calibrated for approximately 70 compounds known to be potentially hazardous by the United States Environmental Protection Agency. Compounds detected but not on the calibrated target list were identified using the computerized National Bureau of Standards Mass Spectral Database. Once satisfied with the identity of the peak, the chemist can ask the computer to quantify the peak using the nearest internal standard. Both targeted semi-volatile peaks and non-targeted semi-volatile peaks can be identified and quantified in this manner.

## **PHTHALATES ANALYSIS PROTOCOL**

An accurately weighed amount of the sample was placed into a glass extraction vessel to which 5 milliliters of methylene chloride was added. The sample extraction vial was sealed, mixed using a vortexer and sonicated for 30 minutes. Once cool a 300 microliter portion of the methylene chloride was removed and placed into an autosampler vial. Internal standards were added, mixed in the extraction vial and the vial was sealed. The methylene chloride extracts were placed into an autosampler connected to a gas chromatograph with a mass spectrometer detector. Each sample extract was injected into the gas chromatograph and the phthalates were separated on the chromatographic column. The mass spectrometer detected compounds as they emerged from the gas chromatographic column. The instrument was calibrated with 16 specific phthalates which the instrument looked for in each of the samples. If a target phthalate was found by the mass spectrometer at the expected retention time it was quantified and reported.

## **FORMALDEHYDE ANALYSIS PROTOCOL**

Formaldehyde is extracted from a weighed amount of sample using an acetic acid buffer at a pH equal to 5.0. The formaldehyde extracted into the acetic acid extraction buffer is then derivatized with the chemical diphenylhydrazine. The derivatized product is then extracted from the aqueous buffer solution using a separatory funnel and multiple methylene chloride extractions. The methylene chloride extract of approximately 80 milliliters is concentrated using a rotoevaporator to approximately 5 milliliters. The 5 milliliters of methylene chloride is placed into a small vial and 2 milliliters of acetonitrile are added. Heat is applied with gentle swirling until the primary solvent is acetonitrile and the volume is measured to be two milliliters. The derivatized formaldehyde in the acetonitrile solvent is then injected into a high pressure liquid chromatograph (HPLC) optimized to analyze for the derivatized formaldehyde. The derivatized formaldehyde is detected with an ultraviolet spectrometer operating at 365 nanometers. Standards of formaldehyde are derivatized and extracted as well. The extracted formaldehyde standards are used to calibrate the HPLC instrument.

## 1,4-DIOXANE ANALYSIS PROTOCOL

An accurately weighed amount of the sample was placed into an extraction vial. Exactly five milliliters of methylene chloride was added. The sample was sealed in the extraction vial, mixed well and sonicated for 30 minutes. Once cooled a specific amount of the methylene chloride sample extract was removed and placed into an injection vial. A specific amount of an internal standard (1,4-dioxane-d8) was added to the injection vial. Injection vials were sealed and placed into an autosampler connected to a gas chromatograph with a very sensitive mass spectrometer attached. The instrumental method utilizes very specific mass spectral ions unique to 1,4-Dioxane and 1,4-Dioxane-d8 to identify and quantify 1,4-Dioxane. This mode of instrument operation is commonly referred to as “Selective Ion Monitoring” or “SIMS”. This is the most sensitive means to look at a target compound with mass spectroscopy because only chemicals having one specific ion are detected and the mass spectrometer is 100% focused on that one ion. The use of the SIMS mode typically increases the sensitivity of the instrument 100 fold or more for the targeted compound. Results for detected 1,4-Dioxane are quantified using 1,4-Dioxane standards run using the same gas chromatogram program.

### Chemicals Detected and Laboratory Reporting Detection Limits

CHEMICAL	DETECTION LIMIT RANGE IN PPM
Chloroform	0.1 - 0.8
Carbon tetrachloride	0.1 - 0.8
Toluene	0.1 - 0.8
Diethyl phthalate (DEP)	0.1 - 1.0
Dibutyl phthalate (DBP)	0.1 - 1.0
Butyl benzyl phthalate (BBP)	0.1 - 1.0
Bis (2-ethylhexyl) phthalate (DEHP)	0.1 - 1.0
1,4-dioxane	250
Galaxolide	0.25 - 2.8

**Note:** Detection limits varied by sample and matrix. The levels represent the range of limits across most samples. The scented oil air fresheners and liquid laundry detergents had detection limits several orders of magnitude higher for most compounds. Chemical levels in these products may be underestimated.

# End Notes

<sup>1</sup> Rudel RA. et. al. (2007) Chemicals causing mammary gland tumors in animals signal new directions for epidemiology, chemicals testing, and risk assessment for breast cancer prevention. *Cancer (Supplement)* Vol. 109. No. 12. June 15, 2007.

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<sup>5</sup> Rudel RA. et. al. (2007) Chemicals causing mammary gland tumors in animals signal new directions for epidemiology, chemicals testing, and risk assessment for breast cancer prevention. *Cancer (Supplement)* Vol. 109. No. 12. June 15, 2007.

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<sup>14</sup> International Fragrance Association (IFRA) (2011) International Fragrance Association: Ingredients. Available at: [www.ifraorg.org/en-us/Ingredients\\_2](http://www.ifraorg.org/en-us/Ingredients_2)

<sup>15</sup> International Fragrance Association (IFRA) (2011) International Fragrance Association: Ingredients. Available at: [/www.ifraorg.org/en-us/Ingredients\\_2](http://www.ifraorg.org/en-us/Ingredients_2)



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