The Green Screen for Safer Chemicals

Diseases of our modern age are increasingly linked to toxic chemicals in the environment. We are routinely exposed to known carcinogens in the air we breathe and in the water we drink, so it's no surprise that one in three people in North America now contracts cancer. Breast cancer affects 1 in 8 women, yet we continue to be exposed to hormone-disrupting chemicals in our environment and in the products we buy. Children, adults, and wildlife are carrying hundreds of synthetic hazardous chemicals in their bodies. More and more individuals and companies are looking to move away from the use of these chemicals of high concern and are asking, "Where can I find safer alternatives"?

Clean Production Action developed the Green Screen for Safer Chemicals to help move our society, quickly and effectively, toward the use of greener and safer chemicals. The Green Screen is the first open source tool to identify substances that are inherently less hazardous for humans and the environment. Specifically, the Green Screen is a method that:

- Defines a path to greener, safer chemicals.
- Is free, publicly available and transparent.
- Supports decision-making by governments and businesses (HP, Wal-Mart, and the states of Maine and Washington have all used the Green Screen to either identify chemicals of high concern or inherently safer substances).
- Promotes continuous improvement toward greener chemicals.
- Facilitates informed substitution by providing a rigorous comparative hazard assessment framework to compare chemicals of similar functional use.

How It Works

The Green Screen sets out four benchmarks on the path to safer chemicals, with each benchmark defining progressively safer chemicals (see Figure 1). It builds on the 12 Principles of Green Chemistry and the US EPA's Design for the Environment (DfE) alternatives assessment method, which consolidates the available data on a chemical's inherent characteristics—including human health effects, environmental fate and toxicity, and safety—into a table of hazard endpoints ranked as high, moderate or low. From there, the hazard evaluations are further consolidated into a single benchmark that provides an easy means for assessing whether a chemical is safer than another. The Green Screen also addresses the hazards posed by a chemical when it breaks down in the environment or in an organism into more toxic chemical byproducts. By using the Green Screen assessment method, companies can rank chemicals and understand why some alternatives are more or less environmentally preferable.

Identifying Chemicals of High Concern (Benchmark 1)

An important value of the Green Screen is that Benchmark 1 clearly defines the criteria for chemicals of high concern to human health and the environment. Chemicals of high concern include:

- carcinogens,
- reproductive or developmental toxicants,
- mutagens,
- persistent, bioaccumulative and toxic chemicals (PBTs),
- very persistent and very bioaccumulative chemicals (vPvBs),
- endocrine disruptors, and
- neurotoxicants.

Businesses are using the Green Screen to assess whether any of the chemicals they manufacture, purchase or use, contain chemicals of high concern. Once identified, these chemicals can be prioritized for substitution.

Screening Chemicals at Wal-Mart

Wal-Mart is adopting a chemical screening approach to support their sustainability initiative. In the fall of 2007, Clean Production Action (CPA) introduced the Green Screen to Wal-Mart as a way to guide their movement toward an inventory of safer chemical products. CPA is working with Wal-Mart and a group of stakeholders to finalize a comprehensive list of chemicals of concern—including endocrine disrupting compounds—as part of a new software screening tool. We believe this could have a major ripple effect of promoting safer chemicals use within global supply chains.

Identifying Safer Alternatives

Many states in the U.S. are actively searching for safer alternatives to chemicals of high concern. Maine, Washington and Illinois, for example, have all assessed (or are in the process of assessing) whether safer alternatives exist to the hazardous flame retardant, decabromodiphenyl ether (decaBDE). These states have either used the Green Screen itself, or were informed by the Green Screen approach, to evaluate whether the chemical substitutes to decaBDE are safer. The Green Screen is an effective tool because it takes a complex set of hazard endpoints and creates a clear protocol for evaluating the data and ranking a chemical.

The first application of the Green Screen assessed decaBDE and its alternatives for use in television enclosures. CPA identified decaBDE—as well as one of its alternatives, BAPP—as a "Benchmark 1, Avoid—Chemical of High Concern," based on their byproducts. DecaBDE breaks down into more problematic polybrominated diphenyl ether (PBDE) compounds and BAPP breaks down into bisphenol A. The analysis also showed that there is one chemical, RDP, that is less hazardous than decaBDE and BAPP. To learn more about the Green Screen and to download our case study, please visit: *www.cleanproduction.org*.

GREEN SCREEN FOR SAFER CHEMICALS

This chemical passes all of the criteria.

BENCHMARK 4

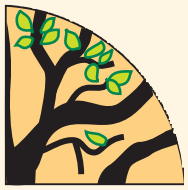
ready biodegradability (low P) + low B + low Human Toxicity + low Ecotoxicity (+ additional ecotoxicity endprints when available)

Prefer—Safer Chemical

BENCHMARK 3

a. moderate P or moderate B
b. moderate Ecotoxicity
c. moderate Human Toxicity
d. moderate Flammability or moderate Explosivenesness

Use but Still Opportunity for Improvement



If this chemical and its breakdown products pass all of these criteria, then move on to Benchmark 4

BENCHMARK 2

a. moderate P + moderate B + moderate T (moderate Human Toxicity or moderate Ecotoxicity)
b. high P + high B
c. (high P + moderate T) or (high B + moderate T)
d. moderate Human Toxicity for any priority effect or high Human Toxicity
e. high Flammability or high Explosiveness

Use but Search for Safer Substitutes

If this chemical and its breakdown products pass all of these criteria, then move on to Benchmark 3

BENCHMARK 1

a. PBT: high P + high B + high T[1] (high Human Toxicity[2] or high Ecotoxicity)
b. vPvB: very high P + very high B
c. vPT (vP + high T) or vBT (vB + high T)
d. high Human Toxicity for any priority effect[3]

Avoid—Chemical of High Concern

If this chemical and its breakdown products pass all of these criteria, then move on to Benchmark 2

ABBREVIATIONS:
B = bioaccumulation **P**=persistence
T=human toxicity and ecotoxicity
vB=very bioaccumulative **vP**=very persistent

FOOTNOTES:
1 Toxicity – "T" = human toxicity and ecotoxicity
2 Human Toxicity = priority effects (see below) or acute toxicity, immune system or organ effects, sensitization, skin corrosion, or eye damage
3 Priority Effects = carcinogenicity, mutagenicity, reproductive or developmental toxicity, endocrine disruption, or neurotoxicity