GC3 University/Business Partnership and Pilot Project

GC3 Green Chemistry & Commerce Council

U.S. EPA Phthalate Kick-off Meeting
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Greg Morose

A project of the Lowell Center for Sustainable Production, University of Massachusetts Lowell

Pilot Project Working Group

Team Formation to Start a Pilot Project

- **Melissa Coffin, LCSP**
- **David Levine, American Sustainable Business Council**
- **Roger McFadden, Staples**
- **Barbara Hanley, HP**

- **Greg Morose, Project Manager, TURI**
- **Helen Holder, Cory Robertson, HP**
- **Jeff Leblanc, Mike Arsenault, Deb Fragoza, EMC**
- **Shari Franjevic, Alex McPherson, Clean Production Action**
- **Ghosh Dastider, Thorne Bartlett, Dow**
- **Meg Whittaker, Chris Schlosser, ToxServices**
- **Pat Harmon, BASF, Topher Buck, GreenBlue**
- **Chuck Hoover, Teknor Apex, Albert Tsang, Dell**

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Next Steps/Future Directions

- Conduct Green Screens for additional plasticizer candidates (e.g.DIDP, DINP, Flexol 380, DPHP, Ecolibrium, DOS)
- Conduct performance testing for promising plasticizer candidates
- Alignment with other plasticizer initiatives (iNEMI, U.S. EPA Dfe Program)
- Implement a second pilot project for another chemical of concern
- If no viable alternatives, develop new chemicals with Warner Babcock Inst.
- Fundraising: Direct funding and in-kind contributions

Pilot Project Objectives

- Provide valuable results for GC3 companies and supply chain partners for GC3 companies.
- Develop a repeatable research methodology for chemicals of concern to identify possible chemical alternatives, evaluate their toxicity, assess their technical performance, and evaluate the economic implications of selecting one alternative over another.
- Demonstrate project success and to form a basis for the development of a model for continued university/business partnerships.
- Share pilot project results with the public in an effort to lead to more rapid adoption of the safer chemicals and materials in relevant supply chains.

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Chemical And Product Application Selection

Based upon the feedback from GC3 members, the working group chose to focus on phthalates used in products because it was a challenge faced by many companies in many industry sectors. Phthalates are used in a variety of products such as flooring, wire and cables, footwear, adhesives, toys, etc.

The working group sent a survey to the GC3 members during 2010 to determine the product application of most interest to GC3 members. Based on GC3 member input, the working group decided to focus on wire and cable applications for the electronics sector.

Based on a review of available literature, an inventory was developed listing more than 100 commercially available plasticizers that could potentially be used for wire and cable applications.

Candidate Screening Process

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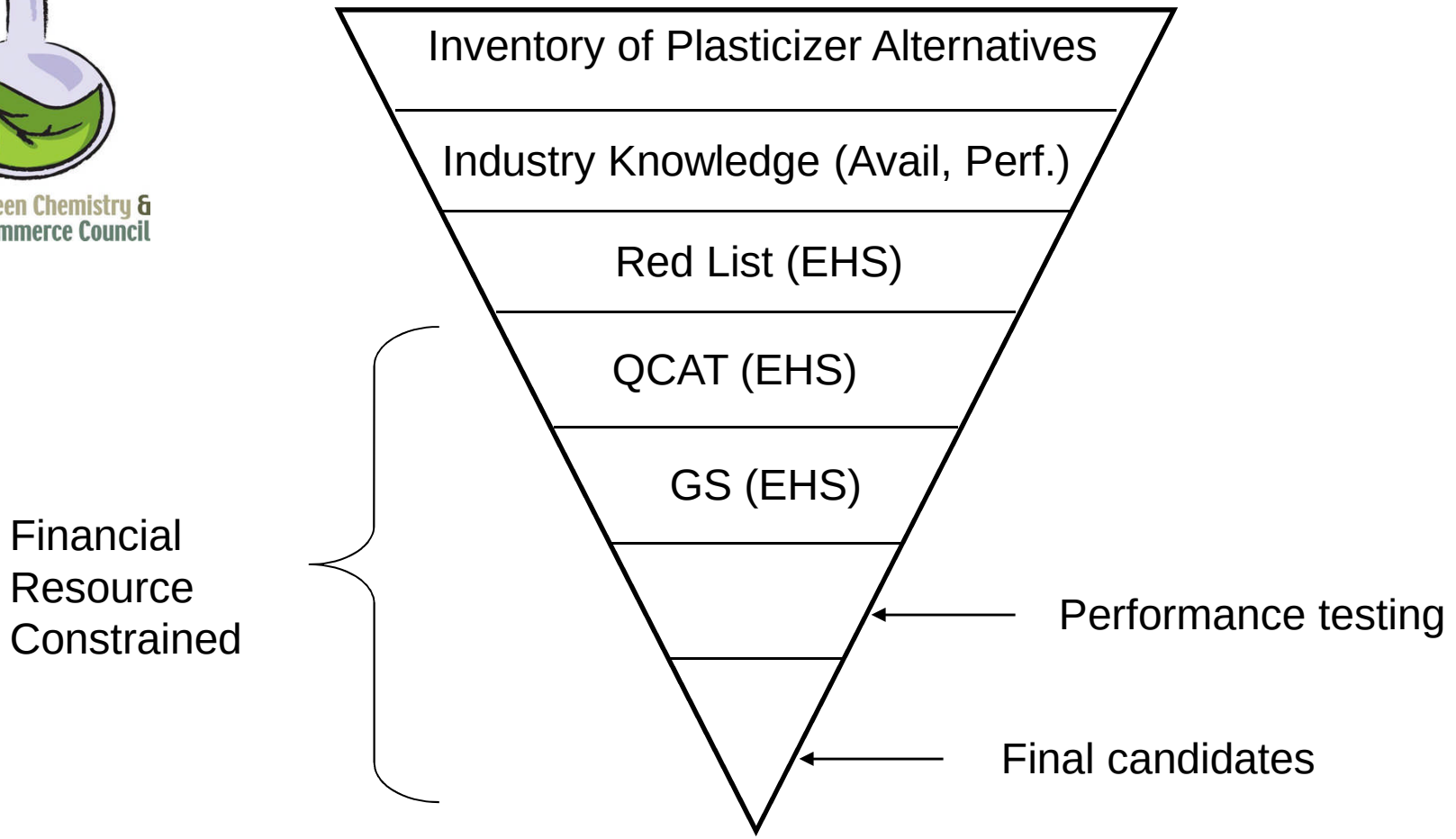

Industry Knowledge

Availability and Technical Performance Screening

A survey was created and distributed to GC3 members and to other interested companies, asking respondents to identify which of the plasticizers were of most interest. The survey also requested the level of priority for each plasticizer, and whether the plasticizers were used for PVC and/or non-PVC materials. Respondents were also prompted to tell the GC3 about any additional plasticizers they were interested in having evaluated. In total, surveys were received from ten companies and one trade association.

Red List Screen

The “Red List” created by Clean Production Action is designed to identify chemicals that would be screened out because they are known or suspected carcinogens, mutagens, reproductive toxins (CMRs), persistent, bioaccumulative or an aquatic toxin (PBT), etc. It is essentially a compilation of chemical hazard lists, some 2,500 substances designated for restriction by agencies and governments.

LCSP staff compared the plasticizer inventory with the Red List. Any chemicals on the chemical inventory appearing on the Red List were removed from consideration for further investigation.

Quick Chemical Assessment Tool (QCAT)

Developed by Washington State Department of Ecology – Alex Stone

The primary goal of the QCAT is to assign an appropriate grade for a chemical and its degradation products using both: 1) a refined group of high priority hazard endpoints identified in the Green Screen, and 2) fewer data sources than used in the Green Screen. QCAT assessments examine 8 hazard endpoints.

1. Acute mammalian toxicity
2. Carcinogenicity
3. Reproductive/Developmental/Neuro-developmental toxicity
4. Genotoxicity/Mutagenicity
5. Endocrine disruption,
6. Persistence,
7. Bioaccumulation
8. Acute aquatic toxicity

QCAT Scoring Process

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Grade A	Few concerns, i.e. safer chemical	**Preferable**
Grade B	Slight concern	**Improvement possible**
Grade C	Moderate concern	**Use but search for safer**
Grade D	High concern	**Avoid**
Grade F	Toxic chemical	**DO NOT USE**

QCAT Results

Chemical	Initial Grade	Data Gap Grade
DEHP	F	F
DIDP	F	F
Bis-2-ethylhexyl isophthalate (Flexol 380)	*B**	F
Tri(2-ethylhexyl)-trimellitate (TEHTM)	D	F
Acetylated monoglycerides of fully hydrogenated castor oil (COMGHA)	*C**	F
LPLAs 1100 series (Ecolibrium brand proprietary chemistry)	N/A	N/A
Diisononyl cyclohexane-1,2-dicarboxylate (DINCH)	*B**	*F**
Di(2-ethylhexyl) azelate (DOZ)	A	C
Dipropylene glycol bibenzoate (DGZ)	*D**	F
2,2,4-Trimethyl-1,3pentanediol diisobutyrate (TXIB)	D	D

Green Screen

Developed by Clean Production Action

Green Screen assesses 16 human and environmental health endpoints

Green Screen Results

Chemical	Green Screen™ Rating[1]
Chemical A	Benchmark 2: “Use-But Search for Safer Substitutes”
Chemical B	Benchmark 3: “Use But Still Opportunity for Improvement”
Chemical C	Benchmark 4: “Prefer-Safer Chemical”

Thank you!

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