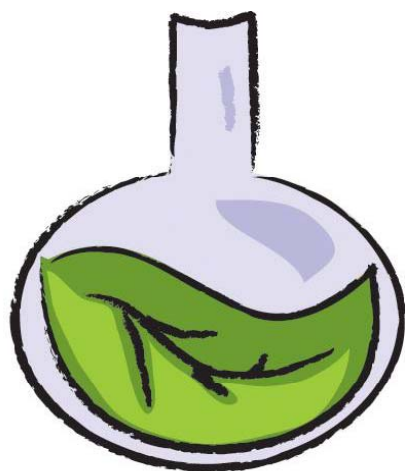




University/Business Partnership and Pilot Project



GC3 Roundtable
May 4, 2011

Greg Morose

GC³ Green Chemistry &
Commerce Council

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



University/Business Partnerships

The concept for developing partnerships between GC3 companies and academic institutions was discussed during the 2009 annual GC3 Innovators Roundtable. Initially to address chemicals of concerns in GC3 member products and supply chains.

Early thought leaders:

Roger McFadden, Staples

Barbara Hanley, HP

David Levine, American Sustainable Business Council





Project Team Formation (2009)

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, Kurt Bolz, Thorne Bartlett, Dow**
- **Meg Whittaker, Chris Schlosser, ToxServices**





Pilot Project Objectives (2009)

- 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.
- Provide valuable results for GC3 companies and supply chain partners for GC3 companies.
- 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.
- Demonstrate project success and to form a basis for the development of a model for continued university/business partnerships.





Pilot Project Approach (2009)

- Identify specific issue (chemical of concern) to investigate
- Determine resource needs for the pilot project
- Develop proposal and secure approval of resource contributors
- Execute, document, share



Chemical And Product Application Selection (2010)

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.

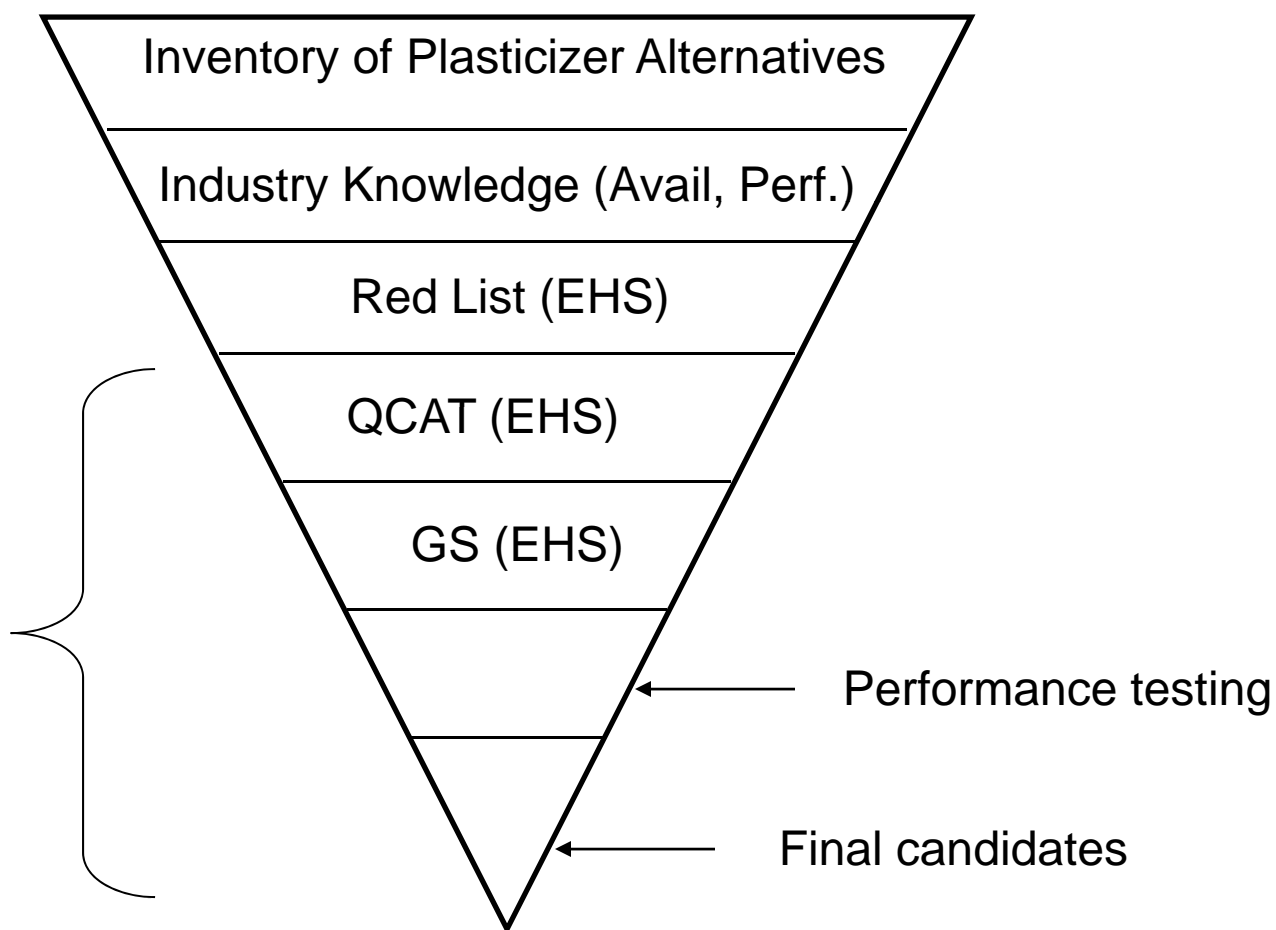


Candidate Screening Process



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Financial
Resource
Constrained





Industry Knowledge (2011)

Commercial 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, whether the plasticizers were used for PVC and/or non-PVC materials, and reasons for selecting or deselecting the plasticizer. 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 (2011)

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, 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 the following 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

The

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

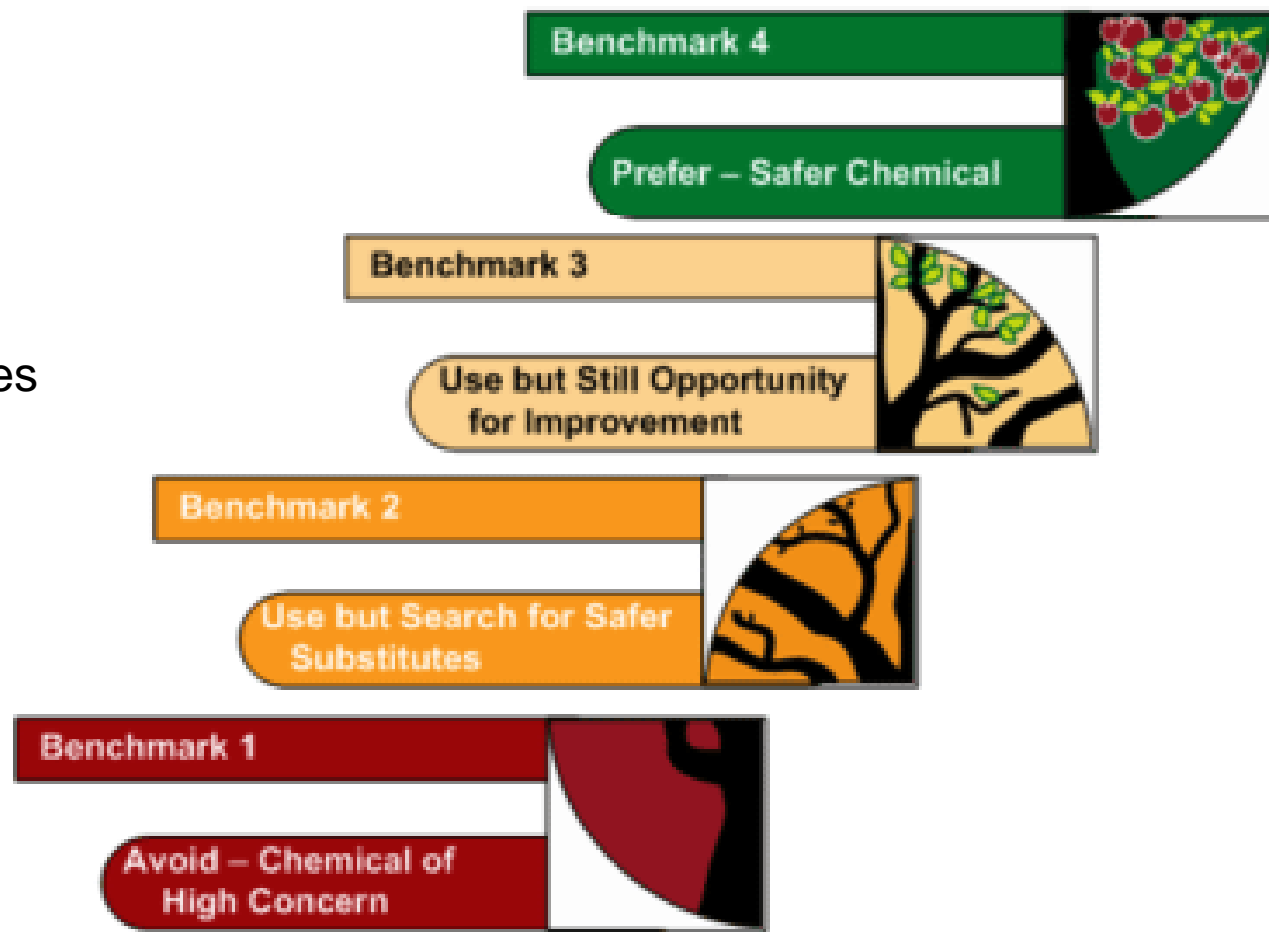
Chemical	Initial Grade	Data Gap Grade
DEHP	F	F
DIDP	F	F
Bis-2-ethylhexyl isophthalate (Flexol 380)	<i>B*</i>	F
Tri(2-ethylhexyl)-trimellitate (TEHTM)	D	F
Acetylated monoglycerides of fully hydrogenated castor oil (COMGHA)	<i>C*</i>	F
LPLAs 1100 series (Ecolibrium brand proprietary chemistry)	N/A	N/A
Diisononyl cyclohexane-1,2-dicarboxylate (DINCH)	<i>B*</i>	<i>F*</i>
Di(2-ethylhexyl) azelate (DOZ)	A	C
Dipropylene glycol dibenzoate (DGZ)	<i>D*</i>	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
TEHTM	Benchmark 2: “Use-But Search for Safer Substitutes”
DINCH	Benchmark 3: “Use But Still Opportunity for Improvement”
DOZ	Benchmark 4: “Prefer-Safer Chemical”



Funding

In total, \$13,000 was collected from GC3 member companies in support of the first phase of this pilot project. That money was allocated as follows:

Staffing Resources

Melissa Coffin @ .25 FTE Contributed In-Kind
Greg Morose: @ .25 FTE Contributed In-Kind

Total Contract with ToxServices (10 QCATs and 3 GS).....\$12,500

Remaining Funding Balance\$500





Next Steps/Future Directions

- Breakout session at GC3 2011 (8:30 AM – 10:00 AM, Thursday)
- Conduct QCATs and Green Screens for additional plasticizer candidates
- Conduct performance testing for promising plasticizer candidates
- Alignment with other plasticizer initiatives (iNEMI, U.S. EPA Dfe Program)
- If no viable alternatives, develop new chemicals with Warner Babcock Inst.
- Fundraising: Direct funding and in-kind contributions
- Implement a second pilot project for another chemical of concern



Thank you!

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