GreenScreen® for Safer Chemicals

Practitioner Program 2016

GreenScreen®
Practitioner Program

Shari Franjevic, Clean Production Action
Michelle Turner, Clean Production Action
Eric Rosenblum, consulting to Clean Production Action
Teresa McGrath, Valspar
Cory Robertson, HP Inc.
February 25, 2016

Webinar Format

1. Introduction to GreenScreen
2. GreenScreen Practitioner Program
3. Authorized GreenScreen Practitioners
4. Questions and Answers

GreenScreen® Practitioner Program

CLEAN PRODUCTION ACTION

Speakers

Clean Production Action Practitioner Program Staff

Dr. Michelle Turner
GreenScreen Program Manager

Shari Franjevic
Education & Training Leader

Dr. Eric Rosenblum
Consulting Toxicologist/Lead Instructor

Guest Speakers

Teresa McGrath
Valspar

Cory Robertson
HP

PART I: INTRODUCTION TO GREENSCREEN FOR SAFER CHEMICALS

GreenScreen for Safer Chemicals

Chemical hazard assessment method developed by Clean Production Action

- Publicly transparent
- Systematic
- Comprehensive
- Scientifically robust

http://www.greenscreenchemicals.org/method/method-documents

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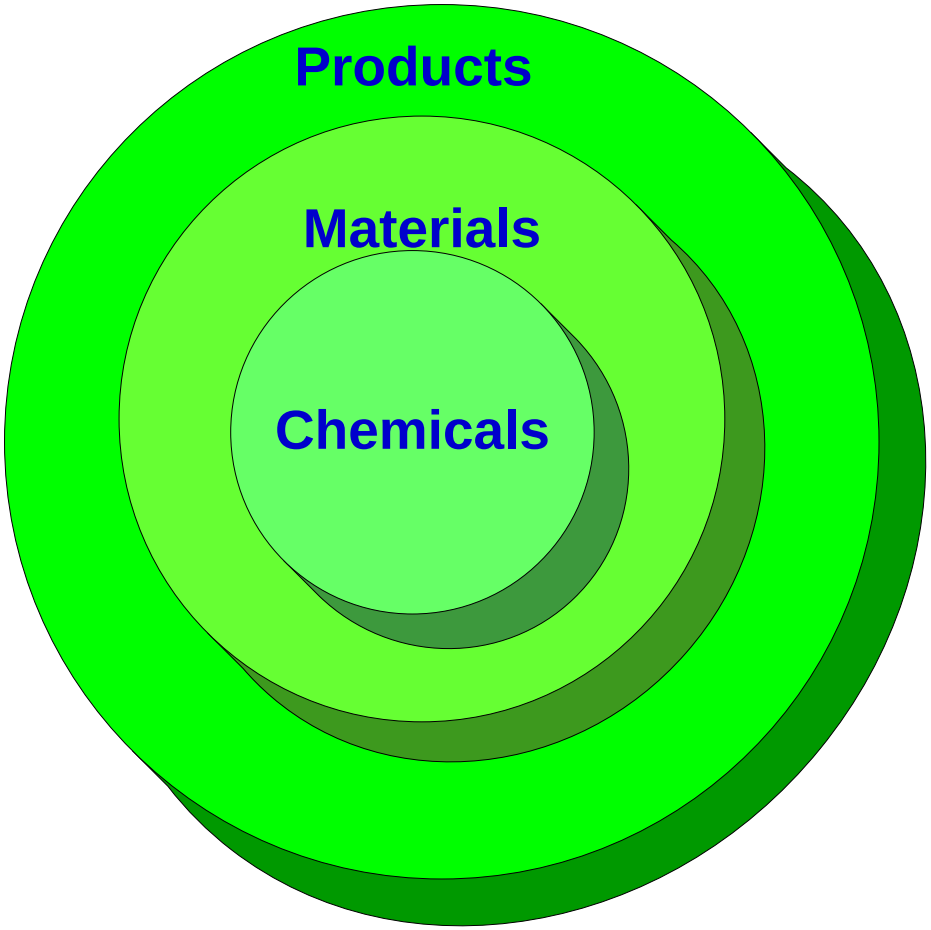
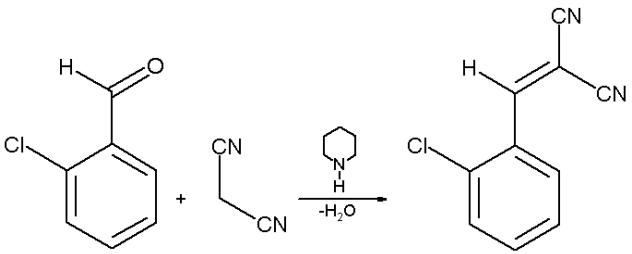
Chemicals are Building Blocks



Everyone Selects Chemicals

Suppliers Select Chemicals

***e.g.*, Synthesis and processing chemicals**



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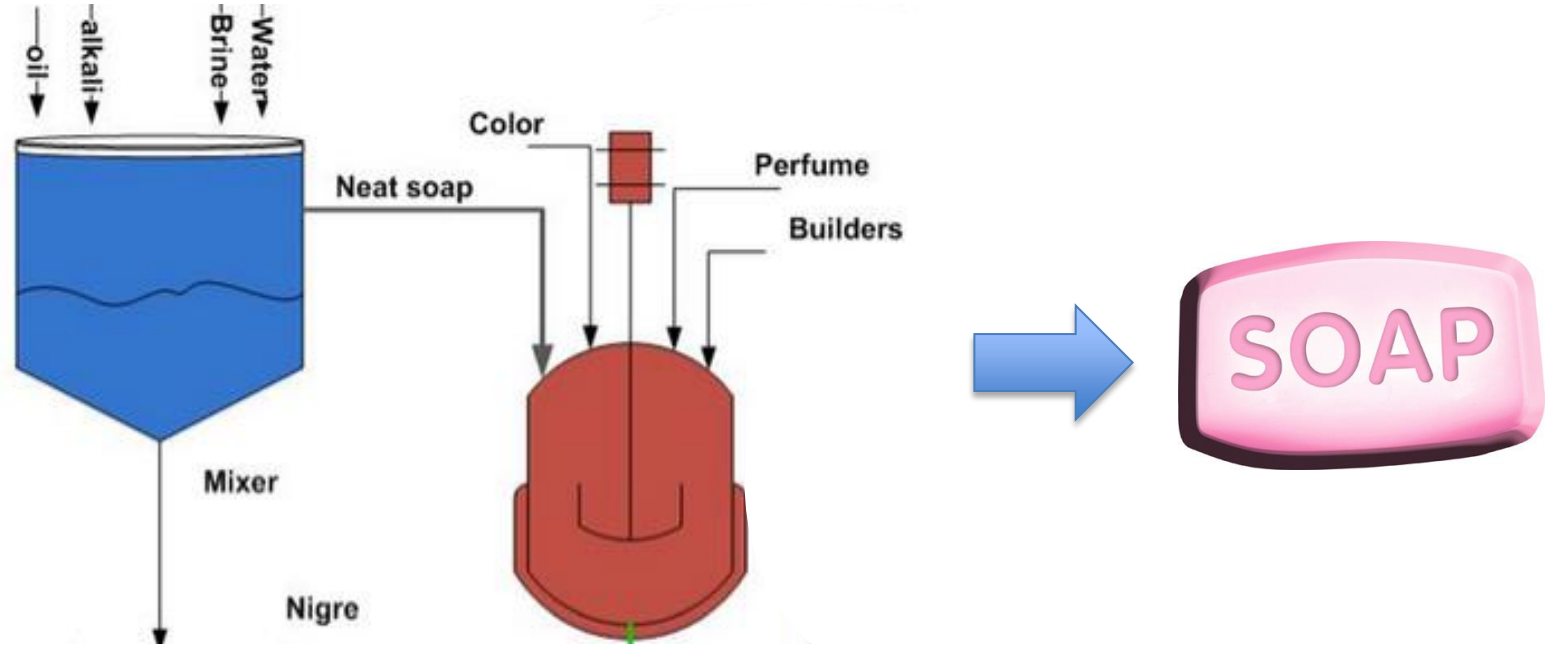
Manufacturers Select Chemicals

***e.g.,* Chemical ingredients in a product**



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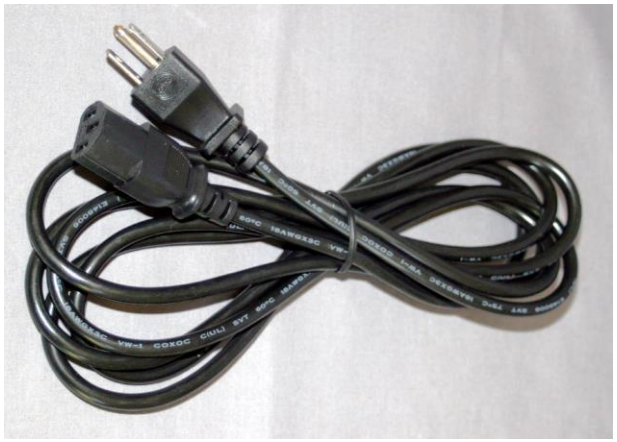
Designers Select Chemicals

***e.g.,* Materials for a complex products and articles**



Retailers Select Chemicals

***e.g.*, Products to put on the shelf**

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End Users Select Chemicals

- Large-scale purchasers
- Specifiers
- NGOs and Governments
- Individual consumers

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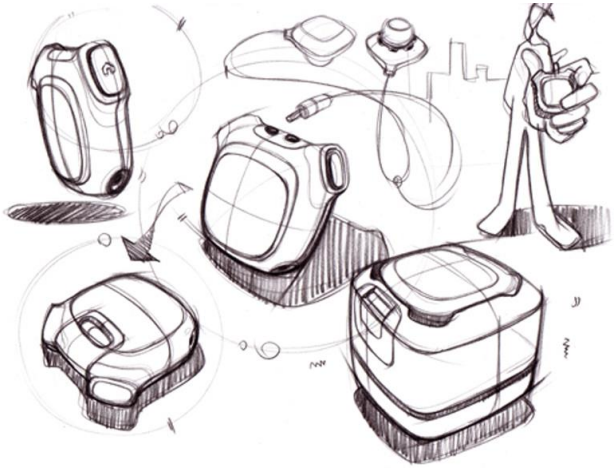
Chemical Selection Choice Points

1. Design



2. Substitution

3. Specification

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Get it Right the First Time

Save money $$

Get it Right the First Time

Avoid regrettable substitutions

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Get it Right the First Time

Avoid unintended consequences

Get it Right the First Time

Create Lasting Solutions

Chemical/Material Selection Parameters

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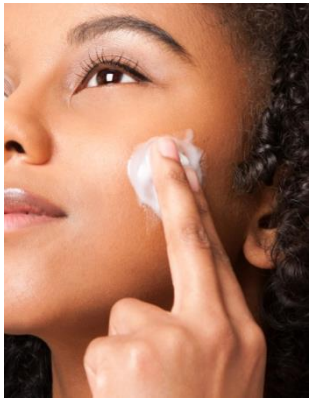
Chemical Hazard

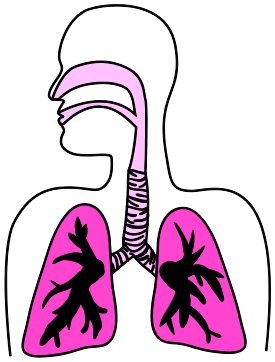
Hazard

- Human Health e.g. Carcinogen
- Environmental Health e.g. Aquatic Toxicity
- Physical e.g. Flammable

Routes of Exposure



Dermal (skin)



Inhalation (respiratory tract)

Ingestion (stomach or digestive tract)

Chemical Hazard Metric?

GreenScreen for Safer Chemicals

Simple:

- Integer Score: 1 to 4

Comprehensive:

- Transparent, detailed documentation

Green Screen Assessments of Similar Function Chemical		
Common Name	**CAS #**	**Full Name**
Preferred		
Design	none	Design material out, dematerialize
Substance 0	#####-##-#	Chemical name
Use but still opportunity for improvement		
Substance 1	#####-##-#	Chemical name
Substance 2	#####-##-#	Chemical name
Use but search for alternatives		
Substance 3	#####-##-#	Chemical name
Substance 4	#####-##-#	Chemical name
Substance 5	#####-##-#	Chemical name
Substance 6	#####-##-#	Chemical name
DO NOT USE		
Substance 7	#####-##-#	Chemical name
Substance 8	#####-##-#	Chemical name
Substance 9	#####-##-#	Chemical name
Substance 10	#####-##-#	Chemical name
Substance 11	#####-##-#	Chemical name
Substance 12	#####-##-#	Chemical name

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GreenScreen Tools
for Chemical Hazard Assessment

1. **GreenScreen for Safer Chemicals (GreenScreen)**
   - Designed to identify problematic chemicals *and* inherently safer chemicals
   - Comprehensive evaluation of a chemical

2. **GreenScreen List Translator (List Translator)**
   - Designed to identify problematic chemicals
   - Streamlined evaluation of a chemical

GreenScreen Tools

for Chemical Hazard Assessment

Attribute	GreenScreen	GreenScreen List Translator
*Score	GreenScreen Benchmark	List Translator
Expertise	Significant	Minimal
Time	Significant	Minimal
Identifies	Safer Hazardous Poorly understood	Hazardous
Analysis	Measured Data Estimated Data Lists	Lists
Transformation Products	Yes	No
Data gaps	Yes	No

***A Benchmark score always trumps a List Translator score.**

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GreenScreen Assessment Procedure

1. Assess and classify hazards

2. Assign a Benchmark score

3. Make informed decisions

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GreenScreen Hazard Endpoints

Human Health Group I	Human Health Group II and II*	Environmental Toxicity & Fate	Physical Hazards
Carcinogenicity	Acute Toxicity	Acute Aquatic Toxicity	Reactivity
Mutagenicity & Genotoxicity	Systemic Toxicity & Organ Effects	Chronic Aquatic Toxicity	Flammability
Reproductive Toxicity	Neurotoxicity	*Other Ecotoxicity studies when available*	
Developmental Toxicity	Skin Sensitization	Persistence	
	Respiratory Sensitization		
Endocrine Activity	Skin Irritation	Bioaccumulation	
	Eye Irritation		

GreenScreen Hazard Criteria

Example - Carcinogenicity (C)

Information type	Information Source	List Type	High (H)	Moderate (M)	Low (L)
Data	GHS Category & Guidance	N/A	1A (Known) or 1B (Presumed) for any route of exposure	2 (Suspected) for any route of exposure or limited or marginal evidence of carcinogenicity in animals	Adequate data available, and negative studies, no structural alerts, and GHS not classified.
List (Sample included here)	EPA-C (1986)	Authoritative	Group A, B1 or B2	Group C	Group E
	IARC	Authoritative	Group 1 or 2A	Group 2B	Group 4
	Prop 65	Authoritative	Known to the state to cause cancer		

See GreenScreen Hazard Criteria for a complete set of hazard criteria for all hazard endpoints.

http://www.greenscreenchemicals.org/method/method-documents

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Hazard Summary Table

GreenScreen Hazard Summary Table																			
Group I Human					**Group II and II* Human**										**Ecotox**		**Fate**		**Physical**	
Carcinogenicity	**Mutagenicity**	**Reproductive Toxicity**	**Developmental Toxicity**	**Endocrine Activity**	**Acute Toxicity**	**Systemic Toxicity**		**Neurotoxicity**		**Skin Sensitization***	**Respiratory Sensitization***	**Skin Irritation**	**Eye Irritation**		**Acute Aquatic Toxicity**	**Chronic Aquatic Toxicity**	**Persistence**	**Bioaccumulation**	**Reactivity**	**Flammability**
						single	repeated *	single	repeated *	*	*									
L	**L**	**L**	**M**	*M*	**L**	**L**	**L**	**vH**	*H*	**L**	**DG**	**L**	**L**		**H**	**H**	**vL**	**L**	**M**	*L*

1. **Hazard Classification**
   - **vH** = very High
   - **H** = High
   - **M** = Moderate
   - **L** = Low
   - **vL** = very Low
   - DG = Data Gap

2. **Level of Confidence**:
   - **Bold = High confidence**
   - *Italics = Low confidence*

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Data & References

Hazard Classification Summary Section:

Group I Human Health Effects (Group I Human)

Carcinogenicity (C) Score (H, M, or L): L

Propylene glycol was assigned a score of Low for carcinogenicity based on negative data. GreenScreen® criteria classify chemicals as a Low hazard for carcinogenicity when adequate data are available and negative, there are no structural alerts, and they are not classifiable under GHS (CPA 2012a).

- Authoritative and Screening Lists
  - Not on any authoritative or screening lists
- UNEP 2001
  - *Oral:* A non-GLP compliant 2 year chronic toxicity/carcinogenicity study (method not reported) was conducted using male and female CD rats (number not reported). Rats were administered doses of up to 2,100 mg/kg of the propylene glycol (purity not reported) daily for 2 years. No evidence of any treatment related tumors were reported under the test conditions. Limited details were available for this study.
  - *Oral:* A non-GLP compliant 2 year chronic toxicity/carcinogenicity study (method not reported) was conducted using male and female Beagle dogs (number not reported). Dogs were administered doses of up to 5,000 mg/kg of propylene glycol daily for 2 years. Tumor incidences were unchanged in male and female dogs when compared to the controls. No further details were provided for this study.
  - *Dermal:* In a skin painting study, propylene glycol was administered to female mice at 2, 10 or 21 mg/day over the life time. No increase in dermal tumors was observed.
  - *Dermal:* When used as a vehicle (dose not specified) in an ear painting study in rats, propylene glycol did not induce tumors after 10 – 14 months treatment.

Above: Excerpt from a Certified GreenScreen Assessment of Propylene Glycol CAS # 57-55-6 conducted by ToxServices in December, 2014

GreenScreen Assessment Procedure

1. Assess and classify hazards

2. **Assign a Benchmark score**

3. Make informed decisions

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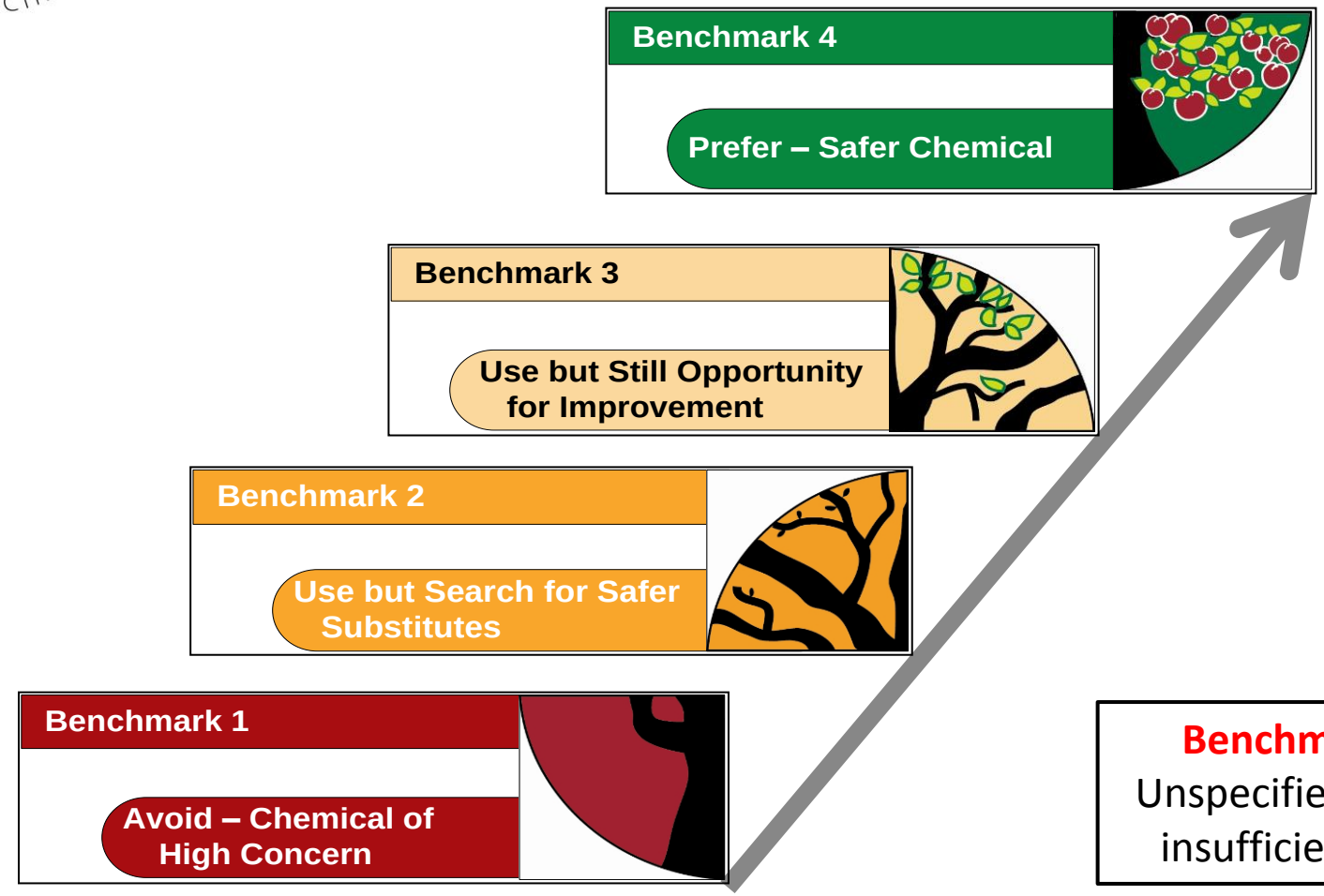
GreenScreen Benchmarks™



Benchmark U
Unspecified due to insufficient data

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GreenScreen Benchmark Criteria

BENCHMARK 1

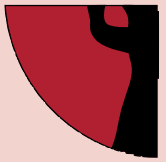
a. PBT = High P + High B + [very High T (Ecotoxicity or Group II Human) or High T (Group I or II* Human)]

b. vPvB = very High P + very High B

c. vPT = very High P + [very High T (Ecotoxicity or Group II Human) or High T (Group I or II* Human)]

d. vBT = very High B + [very High T (Ecotoxicity or Group II Human) or High T (Group I or II* Human)]

e. High T (Group I Human)



Avoid—Chemical of High Concern

ABBREVIATIONS

P Persistence

B Bioaccumulation

T Human Toxicity and Ecotoxicity

See GreenScreen Benchmark Criteria and GreenScreen Guidance for a complete set of Benchmark Criteria and how to apply them. http://www.greenscreenchemicals.org/method/method-documents

Benchmark Score

GreenScreen® Summary Rating for Propylene Glycol[4]: Propylene glycol was assigned a GreenScreen® Benchmark Score of 2 ("Use but Search for Safer Substitutes") as it has Moderate Group I Human Toxicity (reproductive toxicity (R) and developmental toxicity (D)). This corresponds to GreenScreen® benchmark classification 2e in CPA 2011, 2012a. Data gaps (DG) exist for endocrine activity (E), neurotoxicity repeated dose (Nr*) and respiratory sensitization (SnR*). As outlined in CPA (2013) Section 12.2 (Step 8 – Conduct a Data Gap Analysis to assign a final Benchmark score), propylene glycol meets requirements for a GreenScreen® Benchmark Score of 2 despite the hazard data gaps. In a worst-case scenario, if propylene glycol were assigned a High score for the data gap E, it would be categorized as a Benchmark 1 Chemical.

Above: Excerpt from a Certified GreenScreen Assessment of Propylene Glycol CAS # 57-55-6 conducted by ToxServices in December, 2014

Benchmark: Benchmark 2

Rationale: **M** **Group I Human** **Reproductive Toxicity (R) & Developmental Toxicity (D)**

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GreenScreen Assessment Procedure

1. Assess and classify hazards

2. Assign a Benchmark score

3. Make informed decisions

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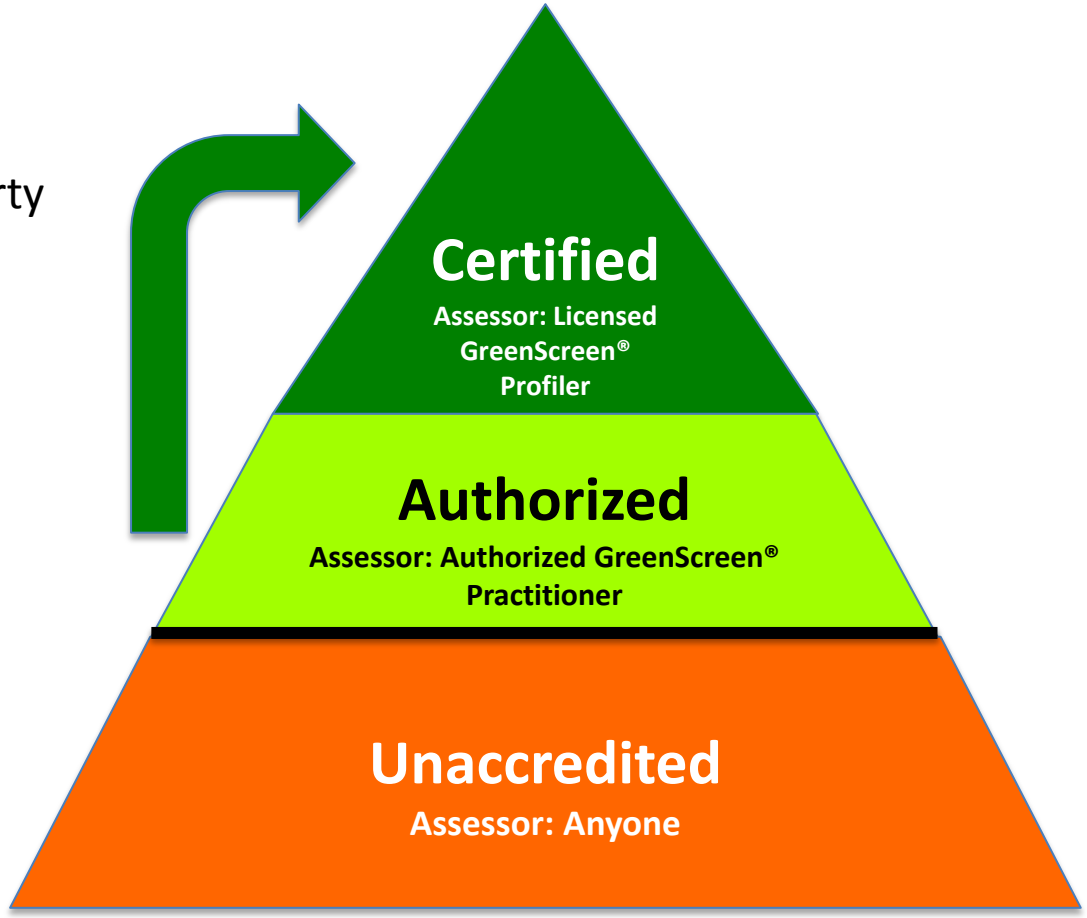
GreenScreen Assessments

Third-party review

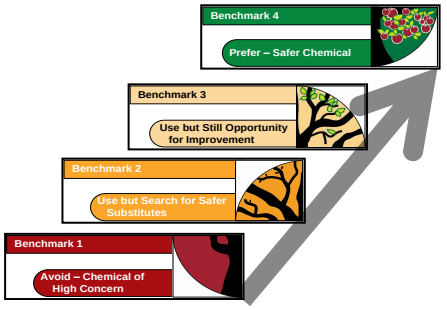


Note: GreenScreen List Translator assessments are another type of assessment, are significantly less comprehensive than a full GreenScreen assessment, and are not depicted here.

GreenScreen Results

Three Levels of Results

1. Benchmark Score



2. Hazard Summary Table

Figure 1: GreenScreen® Hazard Ratings for Propylene Glycol

Group I Human					Group II and II* Human									Ecotox		Fate		Physical	
C	M	R	D	E	AT	ST		N		SnS*	SnR*	IrS	IrE	AA	CA	P	B	Rx	F
						single	repeated*	single	repeated*										
L	L	M	M	DG	L	DG	M	M	DG	L	DG	L	L	L	L	vL	vL	L	L

3. Data & References

Hazard Classification Summary Section:

Group I Human Health Effects (Group I Human)

Carcinogenicity (C) Score (H, M, or L): L
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GreenScreen Uses

1. Alternatives Assessment

2. State Regulations & Policy Support

3. Corporate Policy

4. Materials Procurement

5. Product Development

6. Standards, Scorecards, and Ecolabels

7. Software Tools

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GreenScreen®
Practitioner Program

PART II:

GREENSCREEN PRACTITIONER PROGRAM

GreenScreen® Practitioner Program

Description

- Most advanced training offered
- Designed for individuals
- Leads to becoming Authorized GreenScreen Practitioner

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GreenScreen® Practitioner Program

Prerequisites

- Completion of the GreenScreen Standard Introductory Course*
- Ability to perform a literature search to find relevant data on a chemical of interest
- Familiarity with toxicological test methods
- Familiarity with reviewing toxicological studies
- Ability to assign hazard classifications to appropriate hazard endpoints
- Ability to perform Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

*Individuals who meet all the remaining requirements and have not yet completed the GreenScreen Standard Introductory Course will be able to do so through an online version of this training. Once accepted into the program, Clean Production Action will ensure you obtain access to the online course in order to meet the prerequisite.

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GreenScreen® Practitioner Program

Course Structure

1. Advanced Topics Course*
   - Four 3-hour live, web-based classes
2. Practicum
   - Two comprehensive GreenScreen assessments

** May be taken without the Practicum*

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GreenScreen® Practitioner Program

Advanced Topics Course

Class	Class Name	Topics
1	Advanced Hazard Assessment I	• GreenScreen Online Resources • Assessing & Classifying Hazard • Hazard Assessment Tips – Group I Human Health • Hazard Assessment Resources
2	Advanced Hazard Assessment II	• Hazard Assessment Tips – Group II Human Health

GreenScreen® Practitioner Program

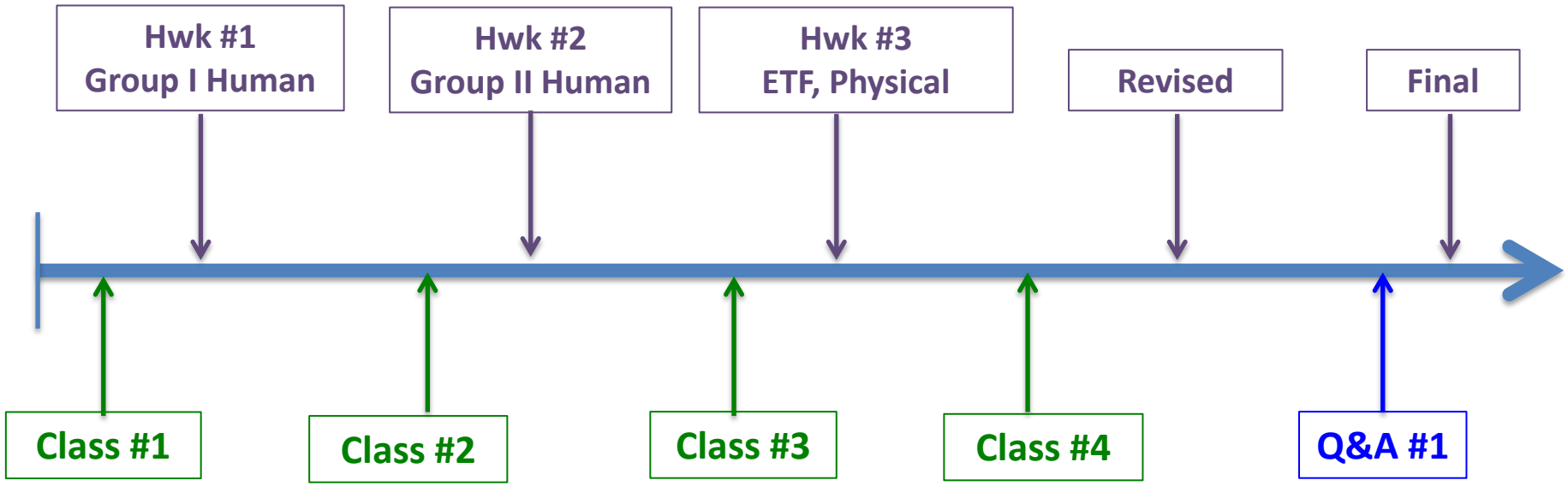
Advanced Topics Course

Class	Class Name	Topics
3	Advanced Hazard Assessment III	• Hazard Assessment Tips – Environmental Toxicity, Fate and Physical Hazards • Estimation
4	Advanced Benchmarking	• Hazard Assessment Special Cases: Inorganic chemicals, polymers • Advanced Benchmarking: Data Gaps, Transformation Products, Inorganic Chemicals, Mixtures

GreenScreen® Practitioner Program

Practicum Process

Assessment #1



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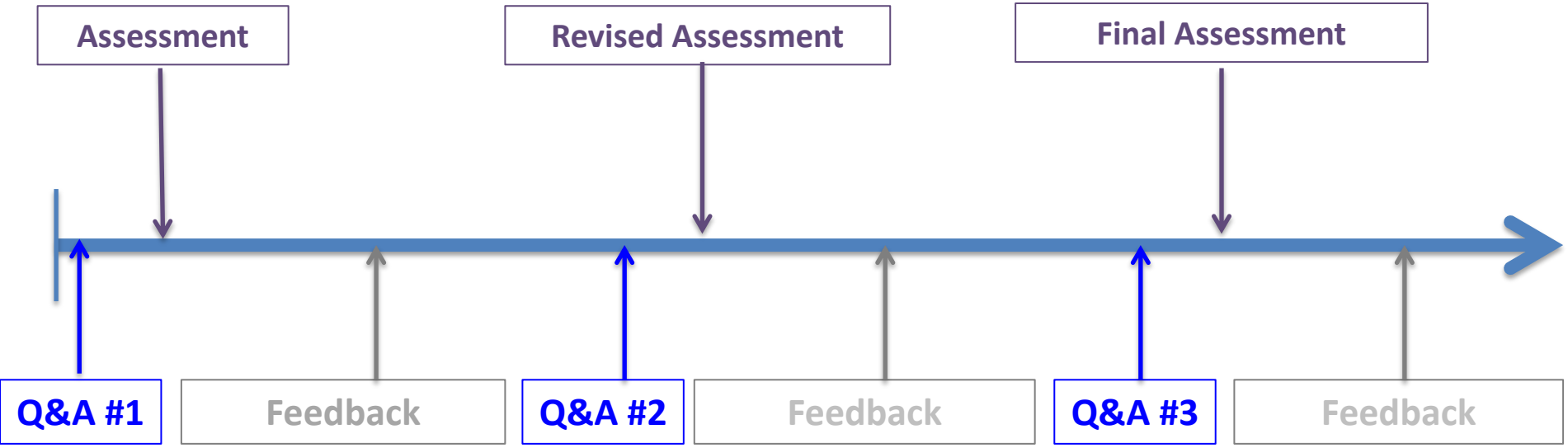
GreenScreen® Practitioner Program

Practicum Process

Assessment #2



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GreenScreen® Practitioner Program

Course Commitment

- Total time commitment = ~120 hours
  - Practicum: ~20-60 hours per chemical
  - Class: 17 hours
  - Class homework: ~ 4 hours
- Time involved is highly dependent on participants' prior experience and expertise.

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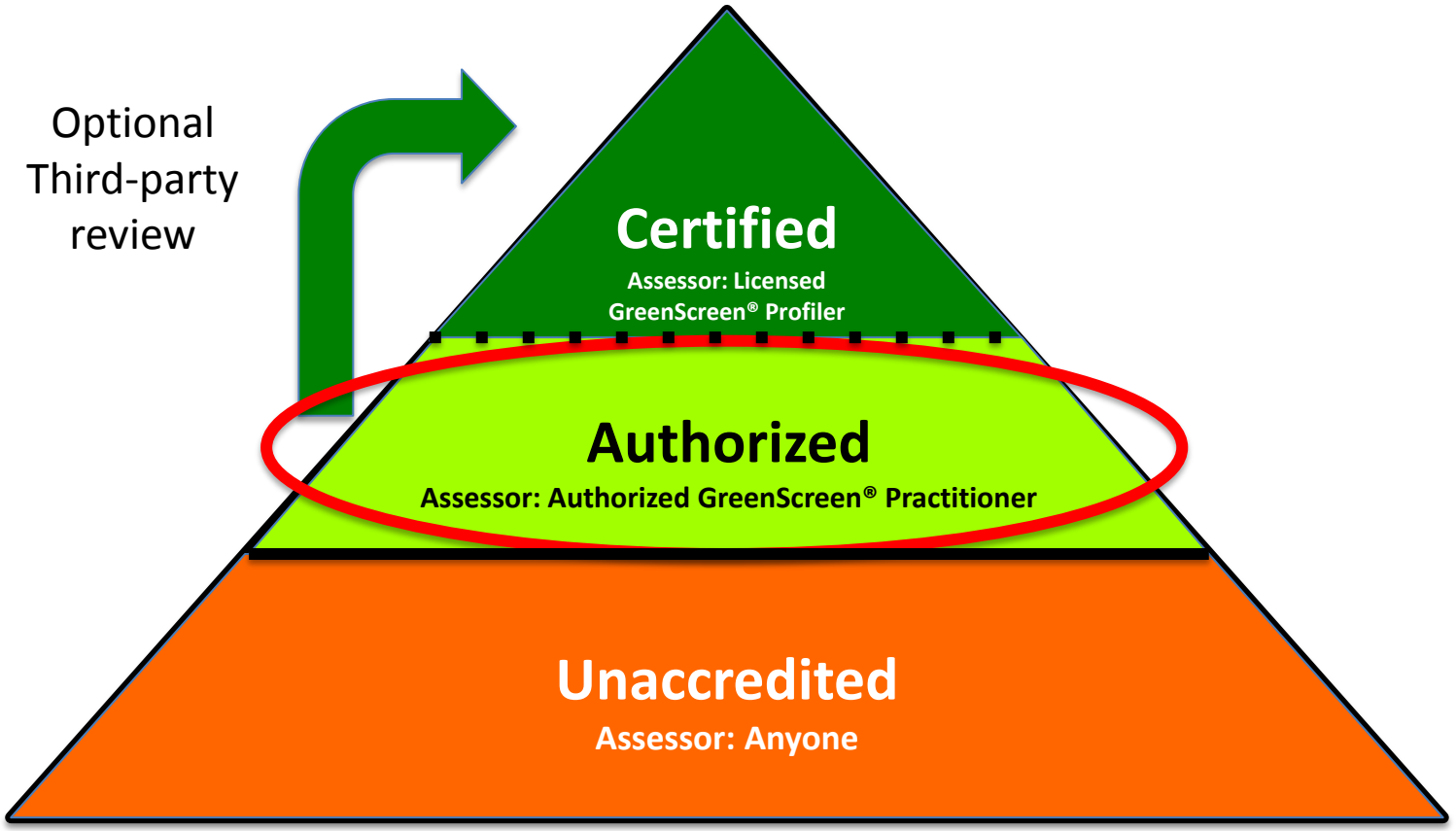
PART III:

AUTHORIZED GREENSCREEN PRACTITIONERS

AUTHORIZED GreenScreen® PRACTITIONER

Assessments



Note: GreenScreen List Translator assessments are another type of assessment, are significantly less comprehensive than a full GreenScreen assessment, and are not depicted here.

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Description

A professional with the scientific expertise and training to perform high quality GreenScreen assessments for his or her registered organization.

- Licensed to author assessments for his/her registered organization, and
- Licensed to submit authorized assessments for third party review resulting in certified assessments.

For Benefits to Individuals and Organizations, see:

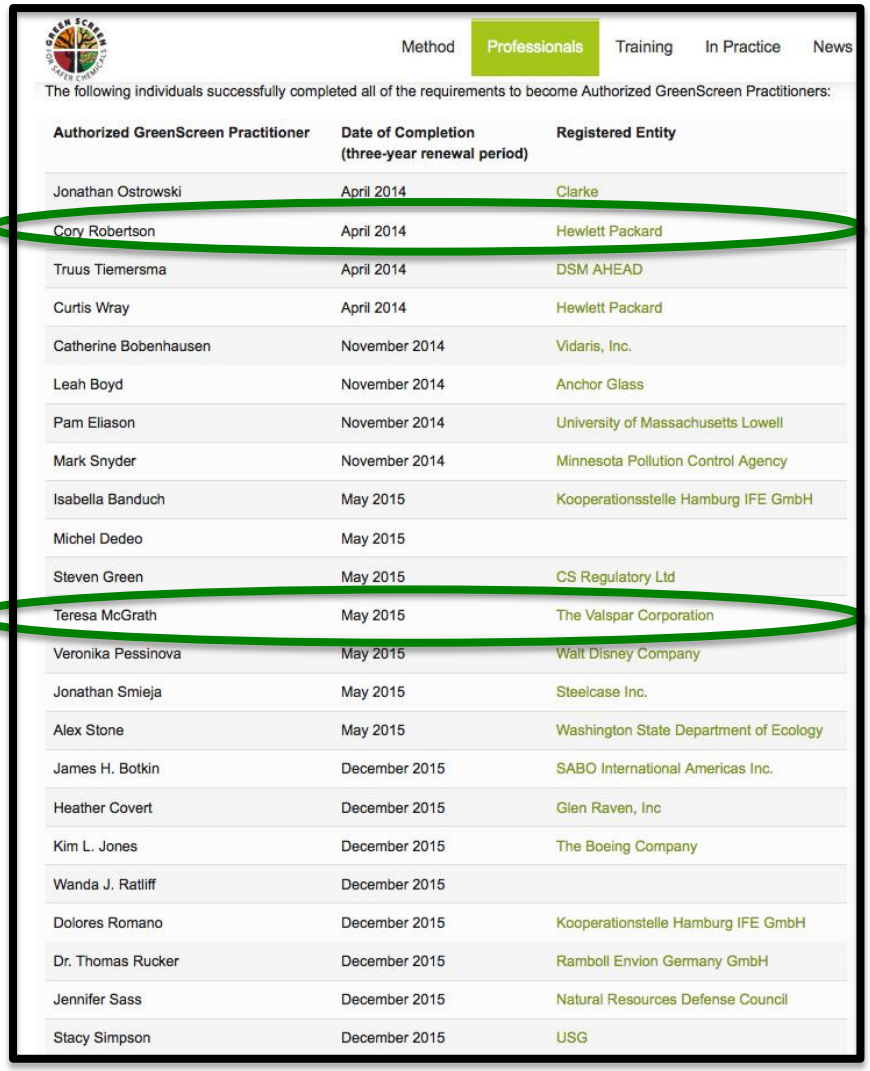
http://www.greenscreenchemicals.org/training/certified-practitioner-program

AUTHORIZED
GreenScreen®
PRACTITIONER

Current Licensees

23 Authorized GreenScreen Practitioners to date

Posted on Clean Production Action website:
http://www.greenscreenchemicals.org/professionals/certified-practitioners



Method | Professionals | Training | In Practice | News

The following individuals successfully completed all of the requirements to become Authorized GreenScreen Practitioners:

Authorized GreenScreen Practitioner	Date of Completion (three-year renewal period)	Registered Entity
Jonathan Ostrowski	April 2014	Clarke
Cory Robertson	April 2014	Hewlett Packard
Truus Tiemersma	April 2014	DSM AHEAD
Curtis Wray	April 2014	Hewlett Packard
Catherine Bobenhausen	November 2014	Vidaris, Inc.
Leah Boyd	November 2014	Anchor Glass
Pam Eliason	November 2014	University of Massachusetts Lowell
Mark Snyder	November 2014	Minnesota Pollution Control Agency
Isabella Banduch	May 2015	Kooperationsstelle Hamburg IFE GmbH
Michel Dedeo	May 2015	
Steven Green	May 2015	CS Regulatory Ltd
Teresa McGrath	May 2015	The Valspar Corporation
Veronika Pessinova	May 2015	Walt Disney Company
Jonathan Smieja	May 2015	Steelcase Inc.
Alex Stone	May 2015	Washington State Department of Ecology
James H. Botkin	December 2015	SABO International Americas Inc.
Heather Covert	December 2015	Glen Raven, Inc
Kim L. Jones	December 2015	The Boeing Company
Wanda J. Ratliff	December 2015	
Dolores Romano	December 2015	Kooperationstelle Hamburg IFE GmbH
Dr. Thomas Rucker	December 2015	Ramboll Envion Germany GmbH
Jennifer Sass	December 2015	Natural Resources Defense Council
Stacy Simpson	December 2015	USG

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Cory Robertson

Authorized GreenScreen Practitioner

- Registered Organization: HP Inc.
- Date of completion: April 2014

Teresa McGrath

Authorized GreenScreen Practitioner

- Registered Organization: Valspar
- Date of completion: May 2015

PART IV:
QUESTIONS AND ANSWERS

Available to respond to questions:

- Michelle Turner: GreenScreen Program Manager
- Shari Franjevic: Education & Training Leader
- Cory Robertson: Authorized GreenScreen Practitioner, HP
- Teresa McGrath: Authorized GreenScreen Practitioner, Valspar
- Eric Rosenblum: Toxicologist/ Lead Instructor

GreenScreen® Practitioner Program

THANK YOU!

Applications due: April 15, 2016

URL: http://www.greenscreenchemicals.org/training/certified-practitioner-program

Contact:

Shari Franjevic
Education and Training Leader
Clean Production Action
Email: shari@cleanproduction.org
Phone: 781-391-6743x117

Webinar Speakers:

Shari Franjevic, Clean Production Action
Michelle Turner, Clean Production Action
Eric Rosenblum, consulting to Clean Production Action
Teresa McGrath, Valspar
Cory Robertson, HP Inc.

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