Potential Priority Chemicals

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Presentation to Scientific Guidance Panel
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Purpose of agenda item

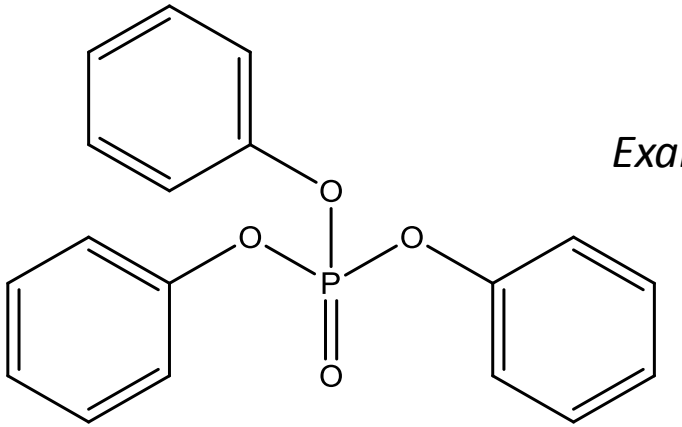
- Panel consideration of selected classes of chemicals as potential priority chemicals
  - Non-halogenated aromatic phosphates
  - *p,p'*-Bisphenols
  - Diglycidyl ethers of *p,p'*-bisphenols

- Panel input on future candidates for consideration as potential priority chemicals

Criteria for recommending priority chemicals (SB 1379)

- The degree of potential ***exposure*** to the public or specific subgroups
- The ***likelihood of a chemical being a carcinogen or toxicant*** based on peer-reviewed health data, the chemical structure, or the toxicology of chemically related compounds
- The ***limits of laboratory detection*** for the chemical, including the ability to detect the chemical at low enough levels that could be expected in the general population
- ***Other criteria*** that the panel may agree to

Background on non-halogenated aromatic phosphates



Example structure: Triphenyl phosphate

- **March 2011**
  - Screening of non-halogenated phosphates
- **March 2012**
  - Panel recommended adding “non-halogenated aromatic phosphates” to the designated chemicals list

March 2012 document on non-halogenated aromatic phosphates

- Document included information on:
  - Potential for exposure
  - Known or suspected health effects
  - Potential to biomonitor, including analytical considerations
- Available at: http://www.oehha.ca.gov/multimedia/biomon/pdf/031612NhArPvers3.pdf

Non-halogenated aromatic phosphates

Example potential priority chemical(s)	Flame retardants and plasticizers Example uses	Detected in humans	Biomonitoring California analytical methods
Bisphenol A bis(diphenyl phosphate)	Electronic equipment	--*	*Method development currently under consideration*
t-Butylphenyl diphenyl phosphate	PVC, textile coatings, and hydraulic fluids	--	
2-Ethylhexyl diphenyl phosphate	Food-packaging plastics	breast milk	
Isodecyl diphenyl phosphate	Commercial resins and PVC	--	
Isopropylated triphenyl phosphate	PVC, paints, polyurethane foam, electronics and hydraulic fluid	--	
Resorcinol bis(diphenyl phosphate)	Electronic equipment	--	
Tricresyl phosphate	PVC, textile coatings, industrial lubricants	breast milk	
Triphenyl phosphate	Polyurethane foam and electronic equipment	urine, plasma, breast milk	

* Double dash means OEHHA did not locate biomonitoring findings

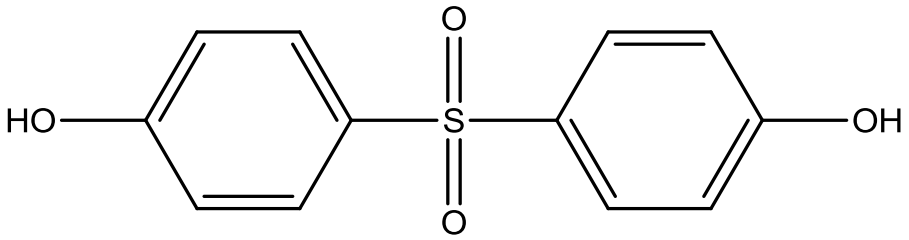
New findings since March 2012 on non-halogenated aromatic phosphates

- Dodson *et al.* (2012) sampled dust from 16 California homes in 2006 and 2011
  - Three non-halogenated aromatic phosphates:
    - 2-Ethylhexyl diphenyl phosphate
    - Tricresyl phosphate
    - Triphenyl phosphate
  - All three were found in 100% of samples in both years
  - Median levels of **triphenyl phosphate** were among the highest of all flame retardants measured in the study
    - For 2011: median, 2.8 µg/g; range 0.79-36 µg/g

Questions?

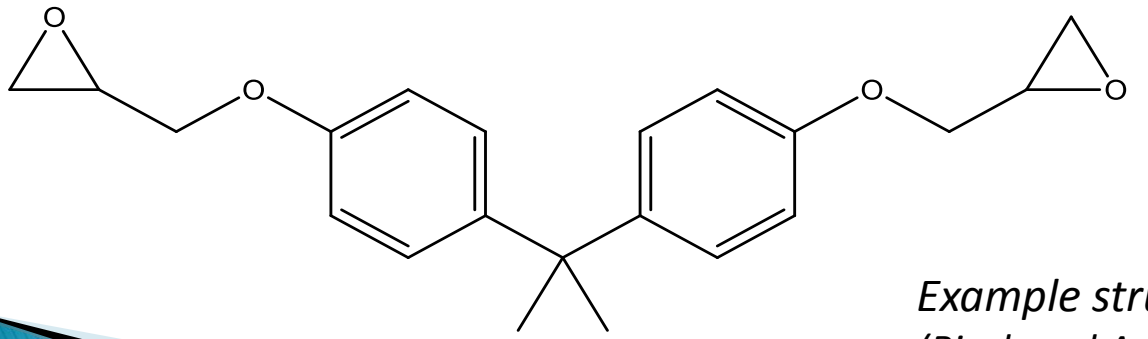
p,p′-Bisphenols and diglycidyl ethers of *p,p′*-bisphenols

p,p′-Bisphenols



Example structure – BPS (Bisphenol S)

Diglycidyl ethers of *p,p′*-Bisphenols



Example structure – BADGE
(Bisphenol A diglycidyl ether)

Background on *p,p'*-bisphenols and diglycidyl ethers of *p,p'*-bisphenols

- **March 2012**
  - Preliminary screening table on bisphenol A (BPA) substitutes and structurally related compounds
- **July 2012**
  - Interim update on additional screening of BPA substitutes and structurally related compounds
- **November 2012**
  - Panel recommended adding "*p,p'*-bisphenols and diglycidyl ethers of *p,p'*-bisphenols" to the designated chemicals list

November 2012 document on *p,p′*-bisphenols and diglycidyl ethers of *p,p′*-bisphenols

- Document included information on:
  - Potential for exposure
  - Known or suspected health effects
  - Potential to biomonitor, including analytical considerations
- Available at:
  http://www.oehha.ca.gov/multimedia/biomon/pdf/110812Bisphenols.pdf

p,p'-Bisphenols

Example potential priority chemicals	Example uses	Detected in humans	Biomonitoring California analytical methods
Bisphenol AF	Synthetic rubber in food processing equipment	--	*Method under development to measure BPAF, BPB, BPF, and BPS in urine.* *Method could be expanded to include more compounds.*
Bisphenol B	Epoxy resins - can linings	Urine, serum	
Bisphenol F	Epoxy resins - can linings	--	
Bisphenol S	Thermal paper - cash register receipts Epoxy resins - can linings & plastics	Urine	
TGSA (4,4'-Sulfonylbis[2-(2-propene-1-yl)phenol])	Thermal paper - cash register receipts	--	

Diglycidyl ethers of *p,p'*-bisphenols

Example potential priority chemicals	Example uses	Detected in humans	Biomonitoring California analytical methods
BADGE (Bisphenol A diglycidyl ether)	Epoxy resins - can linings and dental restorative materials	Urine	*Method under development to measure BADGE* in urine.* *Method could be expanded to include more compounds.*
BFDGE (Bisphenol F diglycidyl ether)	Epoxy resins - can linings	--	

*Included in method with p,p'-bisphenols

New findings on BADGE in late 2012

- Wang *et al*. (2012a,b) measured BADGEs* in dust and urine.
- BADGEs were found in 100% of indoor dust and urine samples.

Population	Geometric mean in urine (μg/L)
New York (n =31 adults)	BADGEs = 3.0
China (n = 26 adults)	BADGEs = 1.3
U.S. NHANES (age ≥20 years, 2009-2010)	BPA = 1.8

* BADGEs include BADGE and three derivatives, BADGE·H_2O, BADGE·H_2O·HCl, BADGE·$2H_2O$

Questions?

Potential priority chemicals for consideration today

Three chemical classes:

- Non-halogenated aromatic phosphates
- *p,p′*-Bisphenols
- Diglycidyl ethers of *p,p′*-bisphenols

Panel input on future potential priority chemical candidates

Based on your review of the February 2013 updated designated list:

- Are there additional designated chemicals the Panel would like to consider in the future as potential priority chemicals?