July 9, 2014 Submitted via email to SaferConsumerProducts@dtsc.ca.gov

COMMENTS FROM THE NATURAL RESOURCES DEFENSE COUNCIL ON THE DEPARTMENT OF TOXIC SUBSTANCES CONTROL (DTSC) PROPOSED INITIAL PRIORITY PRODUCTS

We appreciate this opportunity to submit comments on behalf of the Natural Resources Defense Council (NRDC), a non-profit organization with over 1.3 million members and activists, 250,000 of whom are Californians. NRDC has no financial interest in any of the chemicals or products that may be the subject of these comments.

We commend the Department on officially launching the Safer Consumer Products program with the release of the proposed list of initial priority products. This is an important first step in the implementation of the regulations and we appreciate the careful and comprehensive research that went into the development of the Priority Product Profiles.

We support the listing of all three priority products: Children's sleeping products containing TDCPP, Spray polyurethane foam systems containing unreacted diisocyantes, and Paint strippers containing methylene chloride. Our comments are summarized here and discussed in more detail below:

Children's Sleeping Products

1. **DTSC should expand the description of children's foam padded sleeping products to more comprehensively capture sources of harmful flame retardant exposures to children, including:** (a) TDCPP in components other than foam, (b) other types of children's products that contain TDCPP in the foam, and (c) other flame retardant candidate chemicals.
2. **DTSC should prepare an alternatives analysis guidance document with information on flammability standards and the option of flame retardant removal.** The Department and the Bureau of Electronics and Appliance Repair, Home Furnishings, and Thermal Insulation (BEAR-HFTI) should collaborate on a guidance document which compiles relevant information for manufacturers considering removing flame retardants from their product.

Spray Polyurethane Foam Systems

3. **DTSC should expand the product description of spray polyurethane foam** systems to include the flame retardant TCPP.
4. **DTSC should initiate a collaborative green chemistry research and development project** for alternatives to diisocyantes in spray polyurethane foam systems.

5. **DTSC should ensure that the regulation for spray polyurethane foam systems is based on the best available science.** We have provided some information and references which support the scientific basis for the Priority Product Profile.

Paint Strippers

6. **DTSC should clearly indicate in the alternatives analysis guidance document that N-methylpyrrolidone (NMP) is an unacceptable substitute for methylene chloride.**

DETAILED COMMENTS

1. Expand the product description for children's foam padded sleeping products containing TDCPP

(a) Clarify the Priority Product description to include any sleeping product that contains TDCPP

It is unclear from the current description whether a children's sleeping product that contained TDCPP in a component or part other than the polyurethane foam would be considered a Priority Product.

TDCPP added to any component or part of a children's sleeping product can result in exposure and possible adverse effects as detailed in DTSC's product profile. Thus, a children's sleeping product that contains TDCPP in any component or part should be considered a Priority Product.

Similarly, a children's sleeping product that does not contain polyurethane foam may still contain TDCPP. Though TDCPP is most commonly added to polyurethane foam, it can be added to other open-cell foams such as latex, and also to textiles. TDCPP was removed from the fabric of children's pajamas but there is no prohibition on its use in any other type of textile or fabric. A recent report from Washington Department of Ecology found TDCPP at high levels in textiles used to make tents[1]. Most studies to date that evaluated the presence of flame retardants in children's products focused on analysis of polyurethane foam and did not evaluate other materials. Therefore, although information on flame retardants in other components is lacking, this potential source of exposure to TDCPP should not be ignored.
The Children's Safe Products Act (CSPA) in Washington State requires reporting on the use of certain chemicals used in children's products. According to information in the CSPA database[2], other flame retardants are widely used in the textiles of children's products.

In order to account for the above factors and better protect children from the hazards of TDCPP, we suggest the following changes to the product description:

"This Priority Product includes the following sleeping products containing ~~polyurethane foam and~~ tris(1,3-dichloro-2-propyl) phosphate (TDCPP):
• Nap mats ~~with polyurethane foam~~
• Juvenile product pads in soft-sided portable cribs
• Infant travel beds ~~foam~~
• Portable infant sleepers ~~foam~~
• Playards ~~foam~~
• Play pens ~~foam~~

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[1] Van Bergen, Saskia, and Alex Stone. *Flame Retardants in General Consumer and Children's Products*. Olympia, Washington: Washington State Department of Ecology, June 2014.
[2] http://www.ecy.wa.gov/programs/swfa/cspa/search.html

- Bassinets ~~foam~~
- Nap cots ~~with foam pads~~
- Car bed~~s~~ ~~foam~~ pads
- ~~Foam~~ Sleep positioners”

(b) Expand the product description to include other types of children’s products

The Department should include the children’s products exempted by BEAR-HFTI from the TB117-2013 flammability standard which are not subject to other flammability standards.

BEAR-HFTI found that the following products do not pose any fire hazard and thus there is no need for manufacturers to add flame retardants: Bassinets, booster seats, changing pads, floor play mats, highchairs, highchair pads, infant bouncers, infant carriers, infant seats, infant swings, infant walkers, nursing pads, nursing pillows, playpen side pads, playards, portable hook-on chairs, and strollers.

The Department should also include children’s furniture. TDCPP used in children’s furniture presents the same exposure concerns as use in sleeping products: namely, that TDCPP is used additively, is easily released from the product and results in exposure via inhalation, dermal contact, and contact with contaminated dust.

Multiple studies have documented TDCPP use in, and exposure concerns from, other types of children’s products:

1. TDCPP is also used in changing pads, nursing pillows, carriers, high chairs, and walkers as found by Stapleton, et al (2011)[3].
2. A recent report from Washington Ecology found TDCPP in a booster seat, children’s furniture, and changing pads[4].
3. The Center for Environmental Health also found TDCPP in children’s furniture[5].
4. Infants often sleep in carriers as well, so these products present the same exposure concerns as the other listed sleeping products.
5. CPSC’s exposure modeling found unsafe exposures to children from furniture foam, not just sleeping products[6].

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[3] Stapleton, Heather M, Susan Klosterhaus, Alex Keller, P Lee Ferguson, Saskia van Bergen, Ellen Cooper, Thomas F Webster, and Arlene Blum. “Identification of Flame Retardants in Polyurethane Foam Collected from Baby Products.” *Environmental Science & Technology* 45, no. 12 (June 2011): 5323–31.

[4] Van Bergen, Saskia, and Alex Stone. *Flame Retardants in General Consumer and Children’s Products*. Olympia, Washington: Washington State Department of Ecology, June 2014.

[5] Cox, Caroline, and Judy Levin. *Playing on Poisons: Harmful Flame Retardants in Children’s Furniture*. Center for Environmental Health, November 2013. http://www.ceh.org/wp-content/uploads/2013/11/Kids-Furniture-Report-Press.pdf.

[6] Babich, Michael A. *CPSC Staff Preliminary Risk Assessment of Flame Retardant (FR) Chemicals in Upholstered Furniture Foam*. Bethesda, MD: US Consumer Product Safety Commission, 2006. www.cpsc.gov/library/foia/foia07/brief/ufurn2.pdf.

(c) *Identify other additive flame retardant chemicals as chemicals of concern because they are used in children's products and present the same exposure concerns as TDCPP.*

TCEP (CAS RN 115-96-8) and TBBPA (CAS RN 79-94-7) are on DTSC's initial candidate chemicals list and are also used in children's products. Both these chemicals are used as additive flame retardants and would present the same exposure concerns as TDCPP. As described below, these chemicals are found in children's products and identified as posing a hazard to children:

1. TCEP is used in changing pads, sleep positioners, portable mattresses, nursing pillows, and carriers as found by Stapleton, et al (2011)[7].
2. A recent report from Washington Ecology found TCEP in a booster seat, children's furniture and carriers[4].
3. The Children's Safe Products Act (CSPA) in Washington State requires reporting on the use of certain chemicals used in children's products. According to information in the CSPA database[8], TBBPA is used in carriers, playpens, booster seats, and swings.
4. TCEP is closely related to TDCPP; it is also listed as a carcinogen on California's Proposition 65 list[9].
5. TBBPA is on several of the Safer Consumer Products candidate chemicals source lists due to persistence, bioaccumulation, toxicity and endocrine disruption hazards.

2. Guidance document for children's product manufacturers with information on flammability standards and flame retardant removal

Looking ahead to the next steps in the Safer Consumer Products process, responsible entities will need to conduct an analysis of the alternatives to TDCPP use in their product. Section 69505 of the regulations provide for the Department to issue guidance materials to assist persons in performing an alternatives analysis. It is unclear why flame retardant chemicals are currently added to the identified children's sleeping products as there are no applicable regulatory requirements. We strongly support the removal of flame retardants from all components or parts of children's sleeping products as the best alternative option. The Department should signal the availability of this option to the market in their guidance document.

BEAR-HFTI exemptions for juvenile products are based on the agency finding that these items do not pose any fire hazard and do not need to meet a flammability standard[10], which was

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[7] Stapleton, Heather M, Susan Klosterhaus, Alex Keller, P Lee Ferguson, Saskia van Bergen, Ellen Cooper, Thomas F Webster, and Arlene Blum. "Identification of Flame Retardants in Polyurethane Foam Collected from Baby Products." *Environmental Science & Technology* 45, no. 12 (June 2011): 5323–31.

[8] http://www.ecy.wa.gov/programs/swfa/cspa/search.html

[9] http://oehha.ca.gov/prop65/prop65_list/Newlist.html

[10] BEARHFTI. *Exemption of Juvenile Products from Requirements of Technical Bulletin 117: Initial Statement of Reasons*. Sacramento, CA: California Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation, 2010.

reiterated in 2013[11]. We encourage the Department to collaborate with BEAR-HFTI in releasing a guidance document on flammability standards and exempted children's products for manufacturers interested in removing the chemical of concern from their product. Such a document would be useful because it would present BEAR-HFTI's findings on lack of fire hazard, specific exempted products, and the Department's findings on flame retardant risks together in one resource.

3. Expand the product description for spray polyurethane foam systems

In addition to the diisocyantes contained in SPF, these products also contain the additive flame retardant Tris(1-chloro-2-propyl)phosphate (TCPP, CAS RN 13674-84-5)[12]. The California Environmental Contaminant Biomonitoring Program lists TCPP as a Priority Chemical based on carcinogenicity hazard, as it is structurally similar to three known carcingogens[13, 14]. TCPP does not readily break down in the environment and is persistent[14]. It is found:

- Across the entire globe in wastewater, coastal and marine waters, surface water, drinking water, groundwater, sediment, sewage, soil, landfill leachate, mussels, fish, birds, and at the Arctic and Antarctic[15, 16, 17, 18, 19]
- At high levels in the air and dust of California homes and schools[20, 21]

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[11] BEARHFTI. 2013. *New Flammability Standards for Upholstered Furniture and Articles Exempt from Flammability Standards: Initial Statement of Reasons*. Sacramento, CA: California Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation.

[12] Babrauskas, Vytenis, Donald Lucas, David Eisenberg, Veena Singla, Michel Dedeo, and Arlene Blum. "Flame Retardants in Building Insulation: A Case for Re-Evaluating Building Codes." *Building Research & Information* 40, no. 6 (December 2012): 738–55. doi:10.1080/09613218.2012.744533.

[13] OEHHA. *Brominated and Chlorinated Organic Compounds Used as Flame Retardants: Additional Information on Four Flame Retardants*. Sacramento, CA: California Office of Environmental Health Hazard Assesment, 2009.

[14] EC. *European Union Risk Assessment Report: Tris (2-Chloro-1-Methylethyl) Phosphate TCPP*. Luxembourg: European Commission, Ireland Chemicals Policy and Services, 2008.

[15] Van der Veen, Ike, and Jacob de Boer. "Phosphorus Flame Retardants: Properties, Production, Environmental Occurrence, Toxicity and Analysis." *Chemosphere* 88, no. 10 (August 2012): 1119–53.

[16] Möller, Axel, Renate Sturm, Zhiyong Xie, Minghong Cai, Jianfeng He, and Ralf Ebinghaus. 2012. "Organophosphorus Flame Retardants and Plasticizers in Airborne Particles over the Northern Pacific and Indian Ocean toward the Polar Regions: Evidence for Global Occurrence." *Environmental Science & Technology* 46 (6): 3127–34.

[17] Eggen, Trine, Monika Moeder, and Augustine Arukwe. 2010. "Municipal Landfill Leachates: A Significant Source for New and Emerging Pollutants." *The Science of the Total Environment* 408 (21): 5147–57.

[18] Fries, Elke, and Ivana Mihajlović. 2011. "Pollution of Soils with Organophosphorus Flame Retardants and Plasticizers." *Journal of Environmental Monitoring : JEM* 13 (10): 2692–94.

[19] Salamova, Amina, Mark H. Hermanson, and Ronald A. Hites. 2014. "Organophosphate and Halogenated Flame Retardants in Atmospheric Particles from a European Arctic Site." *Environmental Science & Technology* 48 (11): 6133–40. doi:10.1021/es500911d.

[20] Dodson, Robin E, Laura J Perovich, Adrian Covaci, Nele Van den Eede, Alin C Ionas, Alin C Dirtu, Julia Green Brody, and Ruthann A Rudel. "After the PBDE Phase-Out: A Broad Suite of Flame Retardants in Repeat House Dust Samples from California." *Environmental Science & Technology*, November 2012. doi:10.1021/es303879n.

[21] Bradman, Asa, Fraser Gaspar, Rosemary Castorina, Elodie Tong-Lin, and Thomas E McKone. *Environmental Exposures in Early Childhood Education Environments*. Berkeley, CA: Center for Environmental Research and Children's Health, University of California Berkeley for the California Air Resources Board, 2012.

- In human breast milk and its metabolite is found in urine[22]

TCPP is a potential carcinogen, accumulates in the liver and kidneys, and may affect the developing nervous system of infants and children based on cellular and animal studies[15]. Though TCPP is not on the Initial Candidate Chemicals list, we recommend that the Department evaluate also naming TCPP as a chemical of concern for SPF.

4. Initiate a green chemistry research project as part of the spray polyurethane foam (SPF) regulatory response

Looking forward to the next steps of the Safer Consumer Products process there are a variety of regulatory responses available to DTSC, and Section 69506 of the regulations describes the selection principles for these responses. According to these principles, the Department shall give preference to responses that avoid adverse impacts by redesigning the chemicals in a product, rather than those that simply reduce exposure to the existing chemical of concern. These principles prefer a redesign to reduce the hazard of chemical components because this method provides the greatest level of inherent protection, in contrast to administrative, engineering or other controls that affect exposure.

While there are many alternative materials other than SPF that can accomplish the same function, there appear to be very limited options for diisocyanates in SPF. A letter from the American Chemistry Council[23] states:

> “There is currently no known substitute for isocyanates to produce rigid SPF insulation and roofing that provides the qualities required for these applications.” (pg. 2)

Isocyanates in SPF systems are thus an ideal candidate for a green chemistry research project that would aim to develop a new formulation of SPF that does not present health or environmental hazards, providing inherent protection to users. The risks of diisiocyanates have been recognized for decades and users continue to suffer from the impacts of diisocyanate exposures despite the exposure controls currently in place. Additional similar regulations would do little to shift the paradigm of using inherently hazardous chemicals.

We strongly encourage the Department to consider an “Advancement of Green Chemistry and Green Engineering” regulatory response for SPF, described in Section 69506.8. Such a project

[22] Covaci, Adrian, Tinne Geens, Laurence Roosens, Nadeem Ali, Nele Van den Eede, Alin C. Ionas, Govindan Malarvannan, and Alin C. Dirtu. 2012. “Emerging Organic Contaminants and Human Health.” In *The Handbook of Environmental Chemistry, Vol. 20*, edited by Damià Barceló, 20:243–305. The Handbook of Environmental Chemistry. Berlin, Heidelberg: Springer Berlin Heidelberg. http://www.springerlink.com/content/20458u17n72816x0/.

[23] “Comments on the DTSC Priority Product Profile for ‘Spray Polyurethane Foam Systems Containing Unreacted Diisocyanates,’ March 2014” Accessed July 3, 2014 from http://dii.americanchemistry.com/Standalone-Content/Technical-Comments-on-SPF-Priority-Product-Profile.pdf

would ideally include a collaboration between industry, a government agency, and an academic laboratory specializing in green chemistry.

5. Ensure the best science is utilized to inform regulation development for SPF

Statements have been made in response to the identification of SPF with diisocyanates as a priority product that are not supported by evidence from the literature. To this end, we are providing for the Department's reference further information that supports DTSC's actions to address the health threats from SPF systems and refutes claims made in the American Chemistry Council letter[24].

On page 4, the letter claims that because there has been a reduction over time in diisocyante-related asthma cases, diisocyantes are no longer one of the leading attributable causes of asthma in the workplace.
We agree that it is good news that diisocyanate-related asthma cases have been declining. However, prevalence statistics of one disease alone are not sufficient to make rankings without comparisons to other causes of occupational asthma. The work-related asthma data from NIOSH[25] linked to in the letter in fact support that diisocyanates remain one of the leading attributable causes of occupational asthma, as the vast majority of cases in the first 7 categories are not attributable to specific causes (ie, categorized as "chemicals, n.o.s., not otherwise specified) in the underlying data[26].

Statements on pages 5 and 7 attempt to demonstrate that there is no risk of MDI exposure by citing studies which monitor MDI concentrations after installation.
We commend the industry for improvements in safety practices. However, the fact remains that those installing SPF systems continue to experience risk of diisocyanate exposure. All of the references provided in the letter for 2-component systems relate to measurements taken after SPF installation (30 min, 1 hr, etc, after installation). None of the references are relevant to the exposures that installers experience.

On page 9, the letter implies that isocyanates do not produce toxic by-products upon thermal degradation.
It is well documented that diisocyanates contribute to the formation of hydrogen cyanide in the thermal degradation of polyurethane[27]. Hydrogen cyanide is formed when nitrogen-containing

[24] "Comments on the DTSC Priority Product Profile for 'Spray Polyurethane Foam Systems Containing Unreacted Diisocyanates,' March 2014" Accessed July 3, 2014 from http://dii.americanchemistry.com/Standalone-Content/Technical-Comments-on-SPF-Priority-Product-Profile.pdf

[25] NIOSH Work-Related Asthma: http://www2a.cdc.gov/drds/WorldReportData/FigureTableDetails.asp?FigureTableID=2607&GroupRefNumber=F09-01

[26] http://www2a.cdc.gov/drds/WorldReportData/FigureTableDetails.asp?FigureTableID=2610&GroupRefNumber=T09-05

[27] Stec, Anna A., and T. Richard Hull. 2011. "Assessment of the Fire Toxicity of Building Insulation Materials." Energy and Buildings 43 (2-3): 498–506. doi:10.1016/j.enbuild.2010.10.015.

compounds undergo thermal degradation[28]. The source of nitrogen in polyurethane is the diisocyanate (the polyol component does not contain nitrogen). The statement by DTSC that diisocyanates are known to undergo thermal degradation and release toxic chemicals is well supported by other evidence.

Page 14 of the letter implies that isocyanates are not released during the thermal degradation of polyurethane insulation, as the study originally referenced by DTSC did not identify the source of isocyanates or quantify their release.
However, other studies do document and quantify the release of isocyanates during the thermal degradation of polyurethane insulation materials[29, 30]. Furthermore, these studies and other analyses indicate that the isocyanate component of thermal degradation effluents contribute significantly to toxicity[29-31].

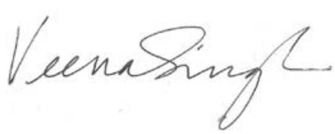
6. NMP is an unacceptable substitute for methylene chloride.

As mentioned previously, responsible entities will need to conduct an analysis of the alternatives to methylene chloride use in their product, and Section 69505 of the regulations provide for the Department to issue guidance materials. The Department should clearly and strongly reiterate the message that NMP is not a safer substitute for methylene chloride due to its numerous identified hazards and presence on the Candidate Chemical list.

CONCLUSION

Thank you for your consideration of these comments and we hope the Department will find them useful. Please feel free to contact me with any questions.

Respectfully,



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[28] Stec, Anna, and T. Richard Hull. 2010. *Fire Toxicity*. Boca Raton; Oxford: CRC Press ; Woodhead Pub.
[29] Hertzberg, Tommy, Per Blomqvist, Marianne Dalene, and Gunnar Skarping. 2003. *Particles and Isocyanates from Fires*. Brandforsk project 324-021. Boras, Sweden: SP Swedish National Testing and Research Institute.
[30] Blomqvist, Per, Tommy Hertzberg, Marianne Dalene, and Gunnar Skarping. 2003. "Isocyanates, Aminoisocyanates and Amines from Fires—a Screening of Common Materials Found in Buildings." *Fire and Materials* 27 (6): 275–94.
[31] Stec, Anna A., and T. Richard Hull. 2011. "Assessment of the Fire Toxicity of Building Insulation Materials." Energy and Buildings 43 (2-3): 498–506. doi:10.1016/j.enbuild.2010.10.015.