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# US EPA & Federal Partners Efforts to Understand & Promote the Safe Use of Polyurethane Products & EPA's Proposed Regulatory Actions under the Toxic Substances Control Act (TSCA) for Diisocyanates

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# EPA's Concerns for Isocyanates and Polyurethane Products

- Many polyurethane products are mixed, applied, and/or manufactured on-site in a home, school, or other buildings.
- Isocyanates are recognized as leading attributable cause of occupational asthma.
- Diisocyanates in vapors, aerosols, and dust can cause:
  - Asthma, respiratory & breathing problems, and in severe cases fatal reactions have been reported (see NIOSH ALERTS),
  - Skin, eye, and dermal irritation,
  - Sensitization (potent inhalation & dermal sensitizers), and
  - Can trigger severe asthma attacks in sensitized persons, even at very low levels.
- Amine catalysts, flame retardants, blowing agents and other ingredients or reaction products, such as aldehydes, may also cause health and environmental effects.



# Partnerships

- Federal Partnership:

- US Environmental Protection Agency
- Occupational Safety and Health Administration
- National Institute for Occupational Safety and Health
- The Consumer Product Safety Commission (CPSC)
- The Agency for Toxic Substances and Disease Registry (ATSDR)



- Engagement with Industry Representatives:

- American Chemistry Council (ACC)
- ACC's Center For Polyurethanes Industry (CPI)
- Spray Polyurethane Foam Alliance (SPFA), representing applicators
- Individual Chemical and Polyurethane Product Manufacturers





## Stewardship Goals

- Avoidance of misleading and/or deceptive marketing claims.
- Accurate & comprehensive communication of hazards, as well as benefits of polyurethane products.
- Develop & adopt practices to prevent harmful exposures:
  - Ensure workers are trained on hazards, processing and equipment, curing rates, performance, as well as communicating with others.
  - Ensure worksite isolated and restricted to workers wearing appropriate personal protective equipment (PPE).
  - Provide guidance on safe re-occupancy times/ventilation.
- Address research needs and data gaps on different types of polyurethane product formulations and applications.



## Challenge – Misleading and/or Deceptive Marketing Claims

- “No off--gassing”, “non—toxic”, “green“, “environmentally friendly”, “plant-based”, “made from soy beans”, etc.
- Little is revealed about chemical ingredients and potential hazards/risks.
- DIY programs showing improper protection.
- On-line videos showing untrained/unprotected application of products.
- Lack of balance between potential performance benefits and hazards.



# Progress in Addressing Misleading Marketing Claims

- US Federal Trade Commission (FTC) Green Guides, see <http://www.ftc.gov/os/2012/10/greenguides.pdf>
  - As part of the its Green Guides compliance program, FTC recently took action against companies for making false environmental marketing claims. The proposed consent orders prohibit the companies from making claims unless the representations are true and supported by competent and reliable scientific evidence.
- Enhanced Energy Star Residential Insulation Partnership Requirements (see separate slide).
- Industry guidance - see <http://www.spraypolyurethane.org/GreenMarketingClaims> ; and, <http://spraypolyurethane.org/Guidance-for-Videos-or-Images-Showing-SPF-Application>



# Challenge – Deficiencies in Hazard Communication

- Hazard and exposure control information varies widely.
- Availability of Safety Data Sheets (SDSs) – some on-line, others made available only after request by federal Agency.
- Recommendations on respiratory protection vary, while only a few mention the possible need for protection for “adjacent workers.”
- Indicate that adequate ventilation is needed but provide little guidance what constitutes adequate ventilation and methods.
- Few SDSs mention that skin contact may cause an allergic reaction and sensitization.
- Several SDSs mention that dust can be generated during cutting or abrasive processes, however, hazards are identified as “mechanical irritation.”



# Progress in Addressing Hazard Communications

- Federal – US EPA Spray Polyurethane Foam website, OSHA's Green Jobs site and National Emphasis Program, NIOSH ALERTS, numerous resources and information pages across federal Agency websites on isocyanates and other chemical hazards (see resources).
- Industry - Product stewardship activities:
  - Fact sheets, technical bulletins, websites & portals, see <http://spraypolyurethane.org/default.aspx>
  - Other - *Spray Foam* Magazines, industry newsletters, blogs, Green Building webinars, technical panels at conferences, goals in product sustainability standards.





# Why Best Practices are Important

- Airborne contaminants may be generated during application processes, including
  - Vapors, aerosols, and mists generated during spraying.
  - Dusts/particulates during trimming/cutting/grinding.
  - Vapors also emitted during curing process.
- Workers and others in the area can breath harmful airborne contaminants or get them on the skin/eyes.
- Best Practices can help reduce exposures to contaminants.



# EPA's Approach to Best Practices

- Identify established practices for engineering or process efficiencies & control technologies to reduce exposures and environmental releases,
- Review existing worker training materials & practices addressing the use of PPE and control technologies, and
- Solicit recommendations for innovative practices from industry and field experts, capturing the following:
  - Identify job related tasks.
  - Safe work practice(s).
  - Exposure reduction/prevention potential of the safe work practice.
  - Other relevant information (i.e., pros and cons) associated with the safe work practice.



## EPA Guidance

- Checklists for installers and communicating with homeowners.
- Ventilation Guidance for SPF Applications/Automotive Shops.
- Self-evaluation tool for contractors of practices and strategies to protect workers and promote the safe use of polyurethane products.
  - Periodic assessment tool of their current practices and identify areas for improvement.
  - Includes the following:
    - Over 175 Activities (safer workplace practices).
    - Potential for exposure & impact on worker exposure.
    - Four key-operation phases: on-going, pre-application, application, and post-application.



## Challenge - Training

- Ensure that all workers receive comprehensive training on hazards, curing rate, performance, equipment and processing, as well as communicating with others, including homeowners.
- Ensure premises are restricted to workers wearing appropriate personal protective equipment (PPE).
  - Innovative solutions to prevent chemical migration should continue to be developed and shared to ensure industry-wide practice.
- Ensure homeowners, teachers and students, and the general public are not exposed to hazardous chemicals during and after polyurethane product applications.



## Progress in Training

- Industry – ACC's on-line H&S training & testing courses:
  - Low Pressure SPF Chemical Health and Safety Training
  - High Pressure SPF Chemical Health and Safety Training
    - See <http://spraypolyurethane.org/SPF-Chemical-Health-and-Safety-Training>
- SPFA certification and accreditation program:
  - SPF Professional Certification Program (PCP) for assistants, installers, master installers, program managers, and field examiner, see [http://www.sprayfoam.org/index.php?page\\_id=4557](http://www.sprayfoam.org/index.php?page_id=4557)
- Training courses at conferences/conventions
- Chemical or Product Manufacturer-Contractor training



# Challenge - Assessing Exposures

- Data are needed to accurately assess the potential for exposures with variable applications & product formulations:
  - Measuring total isocyanates exposure during application
  - Measuring indoor air emissions/off-gassing of isocyanates and other polyurethane product ingredients (amines, SVOCs, flame retardants, etc.) and reactants.
- Answering the questions:
  - When can other trade workers, building occupants, residents, and school children safely re-enter the premises after product application or installation?
  - What are post-occupancy ventilation (H-VAC needs)?



# Progress in Addressing Exposure Assessment Needs & Data Gaps

- Comparative study to validate total reactive isocyanate groups (TRIG) monitoring method.
- Developing ASTM Methods (D22.05) for measuring chemical emissions from Spray Polyurethane Foam (see next slide).
- Evaluating the impact of incremental changes in ventilation rates on the concentration of Spray Polyurethane Foam vapor & particulates emitted. Included the development of a generic formula for evaluating Spray Polyurethane Foam emissions.
- Evaluating dust from trimming operations.
- International Research Conference (Isocyanates & Health: Past, Present, & Future, convened in April 2013, at the Bolger Center in Potomac, MD), see <http://www.isocyanates2012.org/content/home.cfm>
- Curing letter data submissions – see separate slide



# MDI and TDI Action Plans

- Diisocyanates:
  - Recognized as dermal and inhalation sensitizers
  - May cause asthma, lung damage, and in severe cases, fatal reactions
- EPA is concerned about potential exposures to consumers and/or those commercial workers not covered under OSHA regulations, and the general population that could result from the use of products containing unreacted MDI, TDI, and related compounds.
  - e.g., application of spray-applied sealants and coatings when such products are used in or around buildings such as homes or schools







## MDI Action Plan

- Based on EPA's screening-level review of hazard and exposure information EPA will consider the following actions:
  - Initiate TSCA section 8(d) reporting for unpublished health and safety studies for uncured MDI.
  - Consider initiating a TSCA section 4 test rule to require exposure monitoring studies in representative locations where commercial products are installed, including on-site application of insulation, sealants, coatings, and adhesives, and, exposure monitoring studies representatives of polyurethane products installed in the home (i.e., insulation) or used by the consumer (i.e., foam mattresses).





## TDI Action Plan

- Based on EPA's screening-level review of hazard and exposure information EPA will consider the following actions:
  - Initiate rulemaking under TSCA section 5(a)(2) for a Significant New Use Rule (SNUR) designating certain uses of TDI in a consumer product as a new use requiring prior notice to the Agency.
  - Initiate a TSCA section 8(d) rule for reporting of unpublished health and safety studies.
  - If information indicates further actions are warranted, EPA would then consider initiating a TSCA section 4 test rule to require exposure monitoring studies in representative locations where commercial products would be used.





## Other Potential Regulatory Actions

- Consider issuing a data call-in under TSCA section 8(c) Allegations of Adverse Effects
- Consider TSCA section 6 action that gives EPA the authority to protect against unreasonable risk of injury to health or the environment -
  - If EPA finds that there is a reasonable basis to conclude that the chemical's manufacture, processing, distribution, use or disposal presents an unreasonable risk.
  - Actions could include but are not limited to: prohibiting or limiting manufacture, processing, or distribution in commerce of a chemical; requiring warnings and instructions with respect to use, distribution, or disposal; and/or, recordkeeping requirements.





# Information Request Authority

- For the purposes of carrying out TSCA, EPA requested companies voluntarily provide certain information to the Agency -
  - EPA specifically requested information on the curing time required to chemically react all diisocyanate functional groups, and
  - The amount of time required to safely re-occupy or use an area where diisocyanates have been reacted
- The Agency is reviewing the information to determine what it tells us about consumer and worker exposure to polyurethane products.



# Types of Information or Data Received from the Information Request

- EPA received the following types of data as a result of our request including:
  - Formulation Data
  - Safety Data Sheets
  - Industrial Hygiene Studies
  - Curing information



# Challenge – Development of Test Methods to Measure Emissions

- Need methods and data that paint the picture of “source-to-exposure”, over the life-cycle of the polyurethane product.
- Recognize as complex undertaking and its important to keep that in mind as develop specific test systems and protocols to address aspects of the larger goal.
- Need multiple approaches to characterize stage-specific emissions for the product(s).
- Need to develop/demonstrate methods that capture the “normal” cure phase emissions because that is a benchmark for evaluating emissions and off-spec conditions, wherein –
  - A methodology is a tool that industry uniformly uses to evaluate product formulations, and
  - Federal and/or state Agencies have access to data to better assess the potential for exposures, including modeling exposures under different scenarios.



# Progress - Test Methods Development

- EPA's Office of Research and Development is developing test methods and protocols to generate reliable data to fill knowledge gaps related to polyurethane products, including
  - What is emitted and for how long?
  - What factors impact emissions?
- This work supports the ASTM Committee D 22.05 Spray Polyurethane Foam Insulation (SPFI) emissions test method development task, which is a component of a broader strategy to develop test methods specific to SPFI, as well as tool and models to relate product emissions to potential exposures.
- Test method development could be used in exposure monitoring studies for uncured diisocyanates to allow for better understanding of potential exposures in uncontrolled settings.



# Significant New Use Rules (SNURs)

- TSCA section 5(a) authorizes EPA to determine that a use of a chemical substance is a “significant new use.” EPA must make this determination by rule after considering all relevant factors, including those listed in TSCA section 5(a)(2), i.e.,
  - The projected volume of manufacturing and processing of a chemical substance.
  - The extent to which a use changes the type or form of exposure of human beings or the environment to a chemical substance
  - The extent to which a use increases the magnitude and duration of exposure of human beings or the environment to a chemical substance
  - The reasonably anticipated manner and methods of manufacturing, processing, distribution in commerce, and disposal of a chemical substance
- A SNUR requires that manufacturers and processors of the chemical subject to the SNUR notify EPA at least 90 days before beginning any activity that EPA has designated as a “significant new use”





## Proposed SNUR for TDI and Related Compounds

- The Action Plan covered toluene diisocyanates (TDI) and TDI-related compounds, and stated that EPA would initiate a rulemaking under TSCA section 5(a)(2) for a Significant New Use Rule (SNUR) designating certain uses of TDI in consumer products as a new use requiring prior notice to the Agency.
- EPA plans to issue a proposed SNUR for TDI and related compounds in 2014.



# Federal Agency Coordination

- Since 2009, these federal agencies have pursued actions related to workers and consumers:
  - On June 25, 2013, US OSHA announced a three year National Emphasis Program on isocyanates that will focus outreach efforts and inspections on specific hazards for workplaces, construction, and maritime industries. OSHA is also revisiting isocyanate PELs.
  - On June 24, 2013, NIOSH published a request for information on TDI and other TDI-based isocyanate products to develop a Criteria Document to establish an updated Recommended Exposure Limit (REL) for TDI.
  - On April 23, 2013, CPSC announced new guidance to clarify the definition of “strong sensitizer” under the Federal Hazardous Substances Act (FHSA), which would require cautionary labeling.



## Summary

- The CASE industry needs to ensure:
  - There is comprehensive and clear hazard communication for all CASE users – applicators, assistance, other trades, do-it-yourselfers, consumers, and other decision-makers (i.e., building managers, etc.).
  - Consumers need clear hazard and use warnings, such as through product labeling and communications with commercial contractors.
  - The work site is restricted to only those wearing appropriate personal protective equipment.
  - Quality control - avoid installation of off-spec, poor performance polyurethane materials. (see [saferproducts.gov](http://saferproducts.gov) for complaints of off-gas persistence).
  - Guidance is provided on re-occupancy time & long-term ventilation (H-VAC) needs.
  - Marketing claims are accurate and balanced.



## Where to Get More Information?

- EPA's DfE SPF website at [http://www.epa.gov/dfe/pubs/projects/spf/spray\\_polyurethane\\_foam.html](http://www.epa.gov/dfe/pubs/projects/spf/spray_polyurethane_foam.html)
- NIOSH Alert on Spray-on Truck Bed Lining Operations at <http://www.cdc.gov/niosh/docs/2006-149/default.html>
- OSHA's isocyanates website at <http://www.osha.gov/SLTC/isocyanates/index.html>
- OSHA's Green Jobs Hazards website at <http://www.osha.gov/dep/greenjobs/index.html>
- EPA's Action Plan website for MDI: <http://www.epa.gov/opptintr/existingchemicals/pubs/actionplans/mdi.pdf>
- Docket MDI <http://www.regulations.gov/#!docketDetail;rpp=10;po=0;D=EPA-HQ-OPPT-2011-0182>
- American Chemistry Council—Center for the Polyurethanes Industry website at <http://www.spraypolyurethane.org/>
- Spray Polyurethane Foam Alliance's website at <http://www.sprayfoam.org/>
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