PAR 1168 Working Group Meeting

Tertiary Butyl Acetate and Dimethyl Carbonate in Roofing Products Health Risk Analysis Based on Air Sampling in the 2010 Bridgestone Report

May 20, 2014

Purpose

- Sensitivity analysis of various exposure scenarios
- Toxic air contaminant (TAC) comparison

Occupational (On-site) Carcinogenic Health Risk Scenarios

1. Baseline (Existing setting)
2. Future - Regulatory default exposure values (i.e., hr/dy, dy/wk, wk/yr, and lifetime)
3. Future - Dan Pourreau's worst-case exposure values
4. Future - Working group input exposure values

Occupational (On-site) Assumptions

1. Assumed tertiary butyl acetate concentration of 6.5 ppm based on 10 gallons applied one hour from 2010 Bridgestone Report (provided by Lyondell) for all averaging periods (1-hr, 8-hr and annual)
2. Developed unitized concentration/rate to be used for other TACs (i.e., all other TAC concentrations are normalized to TBAC).
3. Baseline with highest TACs found

Occupational Assumptions (Concluded)

4. Rule 212/1401 health risk values
5. OEHHA interim health risk values for tertiary butyl acetate and dimethyl carbonate
6. OEHHA occupational methodology for carcinogenic health risk with cancer potency factors and worker breathing rate (149 L/kg-day)

Carcinogenic Exposure Parameters

Description	Op Time, hour/day	Op Time, day/week	Op Time, week/year	Op Time, year/life
Regulatory Default	8	5	49	40
Dan Pourreau's Worst-case	4	3	45	30
Working Group Input	8	5	42*	30

* On average 36 days per year have 0.01 inches of precipitation or more between 1906 and 2012 in Los Angeles. There are approximately 16 Santa Ana wind days per year.

Single-Ply Adhesive Occupational Concentrations

Baseline – 0.5% Ethylbenzene and 10% Toluene, 10% Hexane or 5% Methyl Ethyl Ketone

Toxic Air Contaminant	Conc., ppm	OSHA PEL, ppm
Toluene Ethylbenzene	0.2 0.01	200 100
Methyl ethyl ketone	0.1	200
Hexane	0.2	500

Future – 50% Tertiary Butyl Acetate

Toxic Air Contaminant	Conc., ppm	OSHA PEL, ppm
Tertiary butyl acetate	6.5	200

Single-Ply Adhesive Occupational Carcinogenic Risk*

Baseline – 0.5% Ethylbenzene

Description	Health Risk in One Million	Health Risk in One Thousand
Regulatory	21	0.02
Dan Pourreau	4.3	0.004
Working Group Input	13	0.01

Future – 50% Tertiary Butyl Acetate

Description	Health Risk in One Million	Health Risk in One Thousand
Regulatory	2,473	2.5
Dan Pourreau	511	0.5
Working Group Input	1,589	1.6

* For comparison purposes only

Single-Ply Adhesive Occupational Non-Carcinogenic Risk*

Baseline – 0.5% Ethylbenzene and 10% Toluene**

Toxic Air Contaminant	Chronic Hazard Index	Acute Hazard Index
Toluene	2.8	0.02
Ethylbenzene	0.02	N/A
	2.8	0.02

Future – 50% Tertiary Butyl Acetate

Toxic Air Contaminant	Chronic Hazard Index	Acute Hazard Index
Tertiary butyl acetate	N/A	3.1

* For comparison purposes only

** Baseline also includes products with 10% hexane and 5% methyl ethyl ketone; however, these TACs generated the same or lower hazard indices

Other Roofing Adhesive Occupational 8-Hour Concentrations

Baseline – 1.3% Naphthalene and 0.1% Ethylbenzene

Toxic Air Contaminant	Conc., ppm	OSHA PEL, ppm
Naphthalene	0.021	10
Ethylbenzene	0.002	100

Future – 35% DMC

Toxic Air Contaminant	Conc., ppm	OSHA PEL,* ppm
Dimethyl carbonate	0.9	None

* The OSHA PEL for methanol is 200 ppm

Other Roofing Adhesive Occupational Carcinogenic Risk

Baseline – 1.3% Naphthalene and 0.1% Ethylbenzene

- Known carcinogens

Future – 35% Dimethyl Carbonate

- None

Other Roofing Adhesive Occupational Non-Carcinogenic Risk*

Baseline – 1.3% Naphthalene and 0.1% Ethylbenzene

Toxic Air Contaminant	Chronic Hazard Index	Acute Hazard Index
Naphthalene	12	N/A
Ethylbenzene	0.004	N/A

Future – 35% DMC

Toxic Air Contaminant	Chronic Hazard Index	Acute Hazard Index
Dimethyl carbonate	0.8	0.2

* For comparison purposes only

Off-site Health Risk Assumptions

1. Off-site receptors would only be exposed to acute affects, because roofing is infrequent
2. Baseline with highest TACs found
3. Concentrations estimated by air dispersion modeling with EPA's AERMOD with Redlands meteorological data
4. 500 gal/day (62.5 gal/hr), 10,000 square foot area source (1,250 sq ft) elevated 35 feet
5. Default 25 meter source to receptor distance used

Single-Ply Adhesive
Off-Site Non-Carcinogenic Risk

Baseline – 0.5% Ethylbenzene and 10% Toluene, 10% Hexane and 5% Methyl Ethyl Ketone*

Toxic Air Contaminant	Acute Hazard Index
Methyl ethyl ketone	0.9

Future – 50% Tertiary Butyl Acetate

Toxic Air Contaminant	Acute Hazard Index
Tertiary butyl acetate	17

* Baseline also includes products with 0.5% ethylbenzene and 10% toluene or 10% hexane; however, these TACs generated the same or lower hazard indices

Other Roofing Adhesive
Off-Site Non-Carcinogenic Risk

Baseline – 1.3% Naphthalene and 0.1% Ethylbenzene

Toxic Air Contaminant	Acute Hazard Index
Naphthalene	N/A
Ethylbenzene	N/A

Future – 35% DMC

Toxic Air Contaminant	Acute Hazard Index
Dimethyl carbonate	5.8

Discussion

- Input on assumptions
- Input on exposure parameters