

# Sacramento Rendering Company

## Health Risk Assessment

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The SMAQMD regulates emissions of toxic substances under Rule 402 and SMAQMD's guidance document, *Health Risk Management Programs for Existing, Modified and New Stationary Sources* (March 24, 2016).

The health risk action levels and results are summarized below:

<b>Health Risk Action Levels and Assessment Summary</b>				
Type of Health Risk	Permitting Thresholds <sup>(A)</sup>		Project HRA Results	
	T-BACT	Maximum	Residential <sup>(B)</sup>	Worker
Cancer Risk (Chances per Million)	≥ 1.0	10.0	0	0
Acute Non-Cancer (Hazard Index)	≥ 1.0	1.0	0.0001	0.0001
Chronic Non-Cancer (Hazard Index)	≥ 1.0	1.0	0.00003	0.00003

(A) In certain circumstances, the District may allow a health risk in excess of the levels specified here. For more information, see SMAQMD's guidance document, *Health Risk Management Programs for Existing, Modified and New Stationary Sources* (2016).

(B) The point of maximum impact was located at 652604.00 m E, 4265630.00 m N just north of the plant on open land. Though it is not a residential lot nor developed, the risks were calculated for both residential as well as nonresidential to represent a worst case analysis.

The following pollutants listed were found above detectable levels from the tests that were performed April 26<sup>th</sup> and May 3<sup>rd</sup> 2017. Those pollutants which have health values below have been identified by the Office of Environmental Health Hazard Assessment (OEHHA) as TACs and posing either cancer, non-cancer acute and/or non-cancer chronic health effects:

**OEHHA Health Effects:**

TAC	CAS	Cancer Potency Risk Factor (mg/kg-d) <sup>-1</sup>	Acute Inhalation REL (µg/m <sup>3</sup> )	Chronic Inhalation REL (µg/m <sup>3</sup> )
Propylene	115071	NA	NA	3000
Chloromethane	74873	NA	NA	NA
Methanol	67561	NA	28000	4000
Ethanol	64175	NA	NA	NA
Acetone	67641	NA	NA	NA

Carbon Disulfide	75150	NA	6200	800
2-Butanoine (MEK)	78933	NA	13000	NA
Hexane	110543	NA	NA	7000
Ethyl Acetate	141786	NA	NA	NA
Heptane	142825	NA	NA	NA
Toluene	108883	NA	37000	300

The following factors, formulas, and assumptions were taken into consideration in order to estimate the worst case excess cancer risk and the non-cancer health risks for the toxic pollutants emitted.

The project's emissions are modeled with the use of an EPA approved air dispersion model to determine the concentrations of toxic pollutants at residential and non-residential receptors surrounding the project. The model used for this analysis is Lakes Environmental's AERMOD View, Version 8.8.9.

The following parameters were used as inputs to the model:

Scrubber #1

Stack Height: 36.33 feet  
Stack Diameter: 5 feet  
Volumetric Flow Rate: 37,224 dscfm  
Stack Gas Temperature: 97.3 °F  
Nominal Emission Rate: 1.0 g/sec (see emission table)

Scrubber #2

Stack Height: 35 feet (estimated)  
Stack Diameter: 7 feet  
Volumetric Flow Rate: 57,257 dscfm  
Stack Gas Temperature: 69.7 °F  
Nominal Emission Rate: 1.0 g/sec (see emission table)

Scrubber #3

Stack Height: 35 feet (estimated)  
Stack Diameter: 5.83 feet  
Volumetric Flow Rate: 77,085 dscfm  
Stack Gas Temperature: 91.9 °F  
Nominal Emission Rate: 1.0 g/sec (see emission table)

Scrubber #4

Stack Height: 35 feet (estimated)  
Stack Diameter: 6.75 feet  
Volumetric Flow Rate: 59,666 dscfm (averaged over three runs)  
Stack Gas Temperature: 62.5 °F  
Nominal Emission Rate: 1.0 g/sec (see emission table)

Emission Table (A)								
TAC	Scrubber1		Scrubber2		Scrubber3		Scrubber4	
	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr
Propylene	1.2E-03	10.8	ND	ND	ND	ND	1.7E-03	14.6
Chloromethane	9.0E-04	7.9	1.2E-03	10.4	ND	ND	2.4E-03	20.7
Methanol	1.8E-02	161.6	9.0E-02	788.3	ND	ND	ND	ND
Ethanol	1.7E-01	1504	2.4E-01	2087	6.9E-02	601	3.3E-02	293
Acetone	4.4E-02	386.4	2.7E-02	234.5	2.5E-02	218.0	1.8E-02	153.4
Carbon Disulfide	1.9E-03	16.8	ND	ND	ND	ND	ND	ND
2-Butanoine (MEK)	8.1E-03	70.7	1.2E-02	105.9	6.9E-03	60.7	1.3E-02	110.7
Hexane	ND	ND	ND	ND	2.5E-03	21.6	1.7E-03	14.8
Ethyl Acetate	ND	ND	2.1E-03	18.0	ND	ND	2.1E-03	18.2
Heptane	ND	ND	ND	ND	3.6E-03	31.2	3.6E-03	31.8
Toluene	ND	ND	ND	ND	ND	ND	1.6E-03	14.1

(A) The hourly emissions were based on the concentrations of each pollutant that were found to be above the detection limit and the flow rate measured. The annual emissions assume the hourly emission rate multiplied by 8760 hours per year.

SMAQMD utilizes the California Air Resources Board's Hotspots Analysis and Reporting Program (HARP2), Version 16088 model which incorporates the health risk assessment methodologies from the "Risk Assessment Guidelines - Guidance Manual for Preparation of Health Risk Assessments" (February 2015).

#### **CANCER RISK ASSESSMENT:**

From equation 5.4.1.1 and 8.2.4 A:

$$\text{Riskair} = \text{Cair} * (\text{BR}/\text{BW}) * A * \text{EF} * \text{CPF} * \text{ED}/\text{AT} * (1\text{E}-06) * (\text{GLC}) * \text{ASF} * \text{FAH}$$

Where:

Riskair = Cancer risk from inhalation exposure  
 Cair = Concentration ( $\mu\text{g}/\text{m}^3$ ) per 1.0 g/s emission rate  
 (BR/BW) = Breathing Rate/Body Weight  
 = 361 (L/kg-day) 95%, 3<sup>rd</sup> Trimester  
 = 1090 (L/kg-day) 95%, 0<2 years  
 = 572 (L/kg-day) 80%, 2<16 years  
 = 261 (L/kg-day) 80%, 16<30 years  
 = 230 (L/kg-day) 8 hour worker rate

A	= Inhalation Absorption Factor (default = 1)
EF	= Exposure Frequency = 0.96 (350/365 days) for Res = 0.68 (245/365 days) for Non-Res
CPF	= Cancer Potency Factor (kg-day/mg)
ED	= Exposure Duration, 30 years Res, 25 years Non-Res
AT	= Averaging Time, 70 years
ASF	= Age sensitivity factor for a specified age group = 10, 3 <sup>rd</sup> Trimester = 10, 0<2 years = 3, 2<16 years = 1, 16<30 years
FAH	= Fraction of time spent at home (use 1 for children under 16 when a school is within a 1 in a million cancer risk isopleth) = 0.85, 3 <sup>rd</sup> Trimester = 0.85, 0<2 years = 0.72, 2<16 years = 0.73, 16<30 years
(1E-06)	= (mg/1000 ug)*(m <sup>3</sup> /1000 L)
GLC	= Ground Level Adjustment Factor = 1.0 for resident = 1.0 (7/5 x 24/8) for worker that is exposed to annual average continuous facility operation of 24/365

**NON-CANCER RISK ASSESSMENT:** The chronic non-cancer health risk is determined for a given pollutant by dividing the pollutant's annual average ambient air concentration (ug/m<sup>3</sup>) by the chronic reference exposure level of that pollutant in order to obtain the chronic hazard index (HI). The acute non-cancer health risk is determined by dividing the pollutant's maximum hourly ambient air concentration (ug/m<sup>3</sup>) by the acute reference exposure level in order to obtain the acute hazard index (HI). In addition, each contaminant can affect different organs of the body and several compounds may affect common organs. Therefore, when there are multiple toxic compounds involved, the effects are additive for the common organs.

A list of chronic or acutely hazardous air contaminants may be found at the OEHHA website [www.oehha.ca.gov](http://www.oehha.ca.gov). The method of calculating the HI numbers (Risk Assessment Guidelines) is also found at this website.

The hazard index for the organs affected are shown below:

Toxic Air Pollutant	Target Organ Affects – Acute (Residential or Nonresidential)											
	Cardiovascular	Nervous	Immune	Kidney	Alimentary	Reproductive	Respiratory	Skin	Eye	Bone	Endocrine	Hematologic
Methanol	X	1.29E-04	X	X	X	X	X	X	X	X	X	X
CS2	X	7.14E-06	X	X	X	7.14E-06	X	X	X	X	X	X
MEK	X	X	X	X	X	X	8.41E-05	X	8.41E-05	X	X	X
Toluene	X	1.43E-06	X	X	X	1.43E-06	1.43E-06	X	1.43E-06	X	X	X
<b>Total</b>	<b>X</b>	<b>1.37E-04</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>8.57E-06</b>	<b>8.55E-05</b>	<b>X</b>	<b>8.55E-05</b>	<b>X</b>	<b>X</b>	<b>X</b>

Toxic Air Pollutant	Target Organ Affects – Chronic (Residential or Nonresidential)											
	Cardiovascular	Nervous	Immune	Kidney	Alimentary	Reproductive	Respiratory	Skin	Eye	Bone	Endocrine	Hematologic
Propylene	X	X	X	X	X	X	9.54E-07	X	X	X	X	X
Methanol	X	X	X	X	X	2.60E-05	X	X	X	X	X	X
CS2	X	2.63E-06	X	X	X	2.63E-06	X	X	X	X	X	X
Hexane	X	3.15E-07	X	X	X	X	X	X	X	X	X	X
Toluene	X	4.84E-06	X	X	X	4.84E-06	4.84E-06	X	X	X	X	X
<b>Total</b>	<b>X</b>	<b>7.79E-06</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>3.35E-05</b>	<b>5.80E-06</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>

**HRA CONCLUSION:** The health risk for this project is considered acceptable to the SMAQMD because:

- The evaluated cancer risk for a maximum exposed individual resident or nonresident is **0** in one million (no carcinogens found above the detection level), which poses no significant risk.
- The evaluated noncancer Acute Hazard Index is less than one for all cases.
- The evaluated noncancer Chronic Hazard Index is less than one for all cases.