

**APPENDIX – F: Acute Risk Evaluation**  
**Acute Noncancer Hazards**

**Table F1. Selection of COPCs for Acute Risk Evaluation: Comparison of the highest maximum concentration with chronic noncancer toxicity values.**

Compound	Maximum Concentration (µg/m <sup>3</sup> )					Chronic Toxicity Value (µg/m <sup>3</sup> )	Acute COPC Selected				
	2008	2009	2010	2011	2012		2008	2009	2010	2011	2012
Acetaldehyde	2.9	2.75	2.6	2.34	2.360	9.0	No	No	No	No	No
Acetone	6.7	7.29	5.2	10.93	5.345	30880.0	No	No	No	No	No
Benzene	13.6	10.12	4.2	6.87	3.056	9.6 <sup>a</sup>	<b>Yes</b>	<b>Yes</b>	No	No	No
1,3-Butadiene	0.49	3.15	0.98	0.53	0.570	2.0	No	<b>Yes</b>	No	No	No
Crotonaldehyde	0.52	0.55	0.44	0.40	0.53	NA	No	No	No	No	No
Cyclohexane	105.0	18.76	11.01	7.11	6.60	6000.0	No	No	No	No	No
Ethylbenzene	4.3	1.9	26.6	1.85	0.695	1000.0	No	No	No	No	No
Formaldehyde	4.8	10.21	3.17	3.39	3.11	9.8	No	<b>Yes</b>	No	No	No
n-Hexane	24.2	24.97	21.7	39.9	11.57	700.0	No	No	No	No	No
Isopropylbenzene	0.3	0.32	0.38	0.17	0.139	400.0	No	No	No	No	No
Methylcyclohexane	35.3	48.99	17.55	18.99	13.25	3010.0	No	No	No	No	No
Nonane	13.3	11.95	2.34	6.41	2.01	200.0	No	No	No	No	No
Pentane	150.5	53.71	45.6	42.37	20.600	1000.0	No	No	No	No	No
Propionaldehyde	0.37	0.44	0.34	0.28	0.268	8.0	No	No	No	No	No
Propylene	2.78	2.46	3.22	1.82	3.77	3000.0	No	No	No	No	No
Propylbenzene	1.09	0.69	0.97	0.71	0.546	1000.0	No	No	No	No	No
Styrene	3.44	0.22	0.42	2.69	13.15	1000.0	No	No	No	No	No
Toluene	118.4	24.8	7.59	93.67	19.60	5000.0	No	No	No	No	No
1,2,3-Trimethylbenzene	3.5	0.85	0.40	0.73	0.552	5.0	No	No	No	No	No
1,2,4-Trimethylbenzene	7.4	3.23	1.11	5.57	2.125	7.0	<b>Yes</b>	No	No	No	No
1,3,5-Trimethylbenzene	5.3	2.86	0.93	1.1	0.469	20.0	No	No	No	No	No
m-Xylene/p-Xylene	11.8	19.7	7.92	7.4	3.343	100.0	No	No	No	No	No
o-Xylene	3.6	3.17	1.66	2.42	0.890	100.0	No	No	No	No	No
Aliphatic hydrocarbons C5-C8	260.9	218.7	149.0	136.3	85.466	600.0	No	No	No	No	No
Aliphatic hydrocarbons C9-C18	444.8	46.9	12.93	14.55	8.857	100.0	<b>Yes</b>	No	No	No	No
Aromatic hydrocarbons C9-C16	16.26	6.43	2.57	5.54	5.922	100.0	No	No	No	No	No

Note: For sources of chronic toxicity values, see Table G1.

<sup>a</sup> ATSDR chronic MRL is used because it is the lowest chronic value. However EPA IRIS Reference Concentration of 30µg/m<sup>3</sup> was used for the estimation of chronic hazards per EPA and CDPHE guidelines for toxicity value hierarchy.

**Table F 2. Evaluation of the 2008 noncancer acute risks based on a range of acute hazard quotients (HQs) derived using the average (the 95% UCL of the mean) and maximum detected air concentrations.**

Chemicals	Acute Toxicity Reference Value ( $\mu\text{g}/\text{m}^3$ )	BELL		BROCK		PARACHUTE		RIFLE	
		Average–Maximum	HQ	Average–Maximum	HQ	Average–Maximum	HQ	Average–Maximum	HQ
		Air Conc. ( $\mu\text{g}/\text{m}^3$ )		Air Conc. ( $\mu\text{g}/\text{m}^3$ )		Air Conc. ( $\mu\text{g}/\text{m}^3$ )		Air Conc. ( $\mu\text{g}/\text{m}^3$ )	
Benzene	28.8 ATSDR MRL Immunological effects (acute)	1.52–13.63	0.05–0.47	0.96–2.40	0.03–0.08	2.76–11.08	0.10–0.38	1.86–4.08	0.06–0.14
1,2,4-Trimethyl benzene	70.0 <sup>a</sup> EPA PPRTV Hematological effects (subchronic)	0.30–3.09	0.00 <sup>b</sup> (subchronic)	0.21–0.66	0.00 <sup>b</sup> (subchronic)	1.12–7.37	0.02 <sup>b</sup> (subchronic)	0.69–1.59	0.01 <sup>b</sup> (subchronic)
Aliphatic Hydrocarbons C9-C18	100.0 <sup>a</sup> EPA PPRTV Nasal lesions (subchronic)	49.3–460.2	0.49 <sup>b</sup> (subchronic)	3.10–10.44	0.03 <sup>b</sup> (subchronic)	70.14–444.8	0.70 <sup>b</sup> (subchronic)	3.67–12.73	0.04 <sup>b</sup> (subchronic)

**Note:** The cumulative acute noncancer hazards are not estimated by calculating an hazard index (HI) because 1,2,4-trimethylbenzene and aliphatic hydrocarbons C9-C18 are evaluated conservatively based on the subchronic toxicity value due to the unavailability of acute toxicity values.

<sup>a</sup> EPA's Subchronic Provisional Peer-Reviewed Toxicity Value (PPRTV) used for a qualitative evaluation.

<sup>b</sup> HQ is not derived based on the maximum detected concentration because the potential risks are estimated conservatively using the subchronic toxicity value.

**Table F 3. Evaluation of the 2009 noncancer acute risks based on a range of acute hazard quotients (HQs) derived using the average (the 95% UCL of the mean) and the maximum detected air concentrations.**

Chemicals	Acute Toxicity Reference Value ( $\mu\text{g}/\text{m}^3$ )	BELL		RULISON		PARACHUTE		RIFLE	
		Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
		Air Conc. ( $\mu\text{g}/\text{m}^3$ )	HQ	Air Conc. ( $\mu\text{g}/\text{m}^3$ )	HQ	Air Conc. ( $\mu\text{g}/\text{m}^3$ )	HQ	Air Conc. ( $\mu\text{g}/\text{m}^3$ )	HQ
Benzene	28.8	1.98–4.54	0.07–0.16	2.71–6.28	0.09–0.22	3.14–10.12	0.11–0.35	2.54–6.66	0.09–0.23
	ATSDR acute MRL Immunological effects								
1,3-Butadiene	660	0.05–0.15	0.0001–0.0003	0.05–0.18	0.0001–0.0003	0.23–3.15	0.0004–0.0005	0.14–0.40	0.0002–0.0006
	California EPA acute REL Developmental effects								
Formaldehyde	49.0	2.94–10.21	0.006–0.21	1.33–1.74	0.03–0.04	1.91–3.05	0.004–0.06	1.85–2.92	0.04–0.06
	ATSDR acute MRL cellular changes in nasal discharge								

**Note:** For benzene and formaldehyde, the highest HI is considered well below an acceptable level of one (HI = 0.4 at the Bell monitoring site).