

To: Naphthalene File (CAS # 91-20-3)
From: Gary Butterfield
Date: 10/19/04
Subject: Re-Evaluation of cancer unit risk value

The cancer unit risk value established by AQD in July 2001 has been updated due to the availability of new information. On September 10, 2004, EPA announced the release of an external peer groups report on naphthalene's carcinogenicity, which evaluated the draft June 2004 Toxicological Review of Naphthalene (document # NCEA-S-1707). California EPA has also recently (Aug 2, 2004) released a peer reviewed unit risk value for naphthalene. The unit risk values and ambient air concentrations associated with an increased cancer risk of 1×10^{-6} for each agency is presented below.

	EPA	Cal EPA	AQD (2001)
Unit Risk (ug/m3)-1	1×10^{-4}	3×10^{-5}	3×10^{-6}
Air conc. for 10 ⁻⁶ risk (ug/m3)	0.01	0.03	.3

The new 2004 AQD value was calculated from NTP 2000 study's male rat nasal epithelial adenoma incidence adjusting for rats that died before the first tumor appeared - incidence of 0/44, 6/42, 8/44 and 15/41 for the control, 10, 30 and 60 ppm groups.

The exposure doses were adjusted to lifetime doses of exposure by converting ppm to ug/m3 (using 5.24 mg/m3/ppm to obtain 0, 52.4, 157, or 314 mg/m3), and 6 of 24 hours exposure on 5 days per week to get the life time exposure levels of 0, 9360, 28100 or 56100 ug/m3. This is considered to be the lifetime exposure level for humans as well as rats, because for inhalation exposures the rat exposure is equivalent to the human exposure.

Running the above incidences and adjusted doses in the Linearized Multistage Model (Global 82) results in the 10⁻⁶ inhalation unit risk value of 1.17×10^{-5} (ug/m3)⁻¹ which rounds to two significant figures as 1.2×10^{-5} (ug/m3)⁻¹. This unit risk results in an IRSL of 0.08 ug/m3, and a SRS� of 0.8 ug/m3 with annual averaging.

The combined incidence of male rat nasal epithelial adenoma and male rat olfactory neuroblastomas incidence adjusting for rats that died before the first tumor appeared - incidence of 0/49, 6/48, 11/48 and 18/49 for the control, 10, 30 and 60 ppm groups.

The exposure doses were adjusted to lifetime doses of exposure by converting ppm to ug/m3 (using 5.24 mg/m3/ppm to obtain 0, 52.4, 157, or 314 mg/m3), and 6 of 24 hours exposure on 5 days per week to get the life time exposure levels of 0, 9360, 28100 or 56100 ug/m3. This is considered to be the lifetime exposure level for humans as well as rats, because for inhalation exposures the rat exposure is equivalent to the human exposure.

Running the above incidences and adjusted doses in the Linearized Multistage Model (Global 82) results in the 10⁻⁶ inhalation unit risk value of 1.22×10^{-5}

(ug/m3)-1 which rounds to two significant figures as 1.2×10^{-5} (ug/m3)-1. This unit risk results in an IRSL of 0.08 ug/m3, and a SRSL of 0.8 ug/m3 with annual averaging.

There is no difference between the unit risk values from the adenoma incidence or combined adenoma and neuroblastoms incidence, both have UR of 1.2×10^{-5} (ug/m3)-1.

	EPA	Cal EPA	AQD (2004)
Unit Risk (ug/m3)-1	1×10^{-4}	3×10^{-5}	1.2×10^{-5}
Air conc. for 10-6 risk (ug/m3)	0.01	0.03	0.08