Appendix B – Evaluation of Toxic Degradates of Concern

Methyl bromide degrades to the bromide ion and methanol in the soil, and the bromide ion in the atmsophere. The toxicologies of these degradates are compared to methyl bromide in order to identify the primary stressor as a result of pesticide application to soil and structures. Information for various methanol and the bromide ion toxicological endpoints are available from various open literature sources. **Table B-1** shows that the toxicities of methyl bromide exceed the toxicities to all aquatic and terrestrial organisms for both methanol and the bromide ion by wide margins in all cases. Methyl bromide possesses acute and chronic toxicity endpoint values that are between 1,393 – 20,000 more toxic than the bromide ion to aquatic species. For mammal species, the bromide ion is not expected to be of toxicological concern (memo from D. Ritter, Health Effects Division, to Jeff Kempster, Registration Division, dated 4/19/89). In addition, methanol possessed acute and chronic toxicity endpoints that indicated less toxicity by a magnitude of between 20 and 13,575 for aquatic organisms and 82 for acute terrestrial organisms (inhalation). The open literature citations for all of the toxicological endpoint values are listed under Table B-1.

Table B-1 Methyl bromide toxicity versus toxicity of degradates (Bromide Ion and Methanol).

Taxa	Endpoint	Methyl Bromide Toxicological Endpoint Value (ppm)	Degradate Toxicological Endpoint Values (ppm) and Magnitude Departures from Methyl Bromide Toxicological Endpoint	
			Bromide Ion	Methanol
Guppy	96-hr LC_{50} (Acute)	0.8 [a]	16,000 [b] (20,000)	10,860 [g] (13,575)
	1-month NOAEC (Chronic)	0.56 [b]	2,500 [b] (4,464)	11.5 [h] (20)
Medaka	96-hr LC_{50} (Acute)	0.7 [a]	24,000 [b] (34,286)	ND (NA)
	1-month NOAEC (Chronic)	0.56 [b]	780 [b] (1,393)	ND (NA)
Rainbow Trout	96-hr LC_{50} (Acute)	3.9 [c]	ND (NA)	19,000 (4,872) [i]
Daphnia	48-hr LC_{50} (Acute)	2.6 [d]	11,000 [b] (4,231)	19,500 (7,308) [j]
Green Algae	48-hr LC_{50}	2.2 [a]	7,800 [b] (3,545)	ND (NA)
Rat (Inhalation)	4-hr LC_{50} (Acute)	780 [e]	Not Toxic (NA) [f]	64,000 (82) [k]

[a]. From Canton et al., 1980
[b]. From Webster and Vos, 1984
[c] From MRID 42932901
[d] From MRID 43066701
[e] From Kato et al., 1986
[f] Memo from D. Ritter, Health Effects Division, to Jeff Kempster, Registration Division, dated 4/19/89
[g] Value from WHO, 1997 based on 7-day exposure duration.
[h] Value from ECB, 2000 based on 14-day exposure duration.
[i] Value from WHO, 1997
[j] Value from WHO, 1997 based on 18-hour exposure duration.

[k] Value from Lewis, R.J., 1996

[l] NA means not applicable

[m] ND means no data

[n] Magnitude departure from Methyl Bromide toxicological endpoint value =

$$\frac{\text{Degradate Toxicological Endpoint Value}}{\text{Methyl Bromide Toxicological Endpoint Value}}$$