Appendix E

Review of Dioxin Contamination

Dioxin Contaminant

Table 8-32 presents a summary of results obtained by EPA for CDDs/CDFs in eight technical 2,4-D herbicides; these data were extracted from program files in OPP. Because some of these files contained CBI, the data in this table were reviewed by OPP staff to ensure that no CBI was being disclosed (memorandum dated May 28, 1996, from S. Funk, U.S. EPA, to W. Hazel, U.S. EPA). Figure 8-5 presents a congener profile for 2,4-D based on the average congener concentrations reported in Table 8-32.

An estimated 28,100 metric tons of 2,4-D were used in the United States in 2000, making it one of the top 10 pesticides in terms of quantity used (EPA proprietary data). The pesticide 2,4-D is the only product judged to have the potential for environmental release through its agricultural use. However, no estimate of environmental release can be made for 2000. Since 1995, the chemical manufacturers of 2,4-D have been undertaking voluntary actions to significantly reduce the dioxin content of the product. No information is available on the level of dioxin contamination, if any, that may have been present in 2,4-D in 2000. An estimated 26,300 and 30,400 metric tons were used during 1995 and 1987, respectively (U.S. EPA, 1997e, 1988d). On the basis of the average CDD/CDF congener concentrations in 2,4-D presented in Table 8-33 (not including OCDD and OCDF), the corresponding TEQ_{DF}-WHO_{98} concentration is 1.1 µg/kg (0.7 µg I-TEQ_{DF}/kg). Combining this TEQ concentration with the activity level estimates for 1995 and 1987 indicates that 28.9g TEQ_{DF}-WHO_{98} (18.4 g I-TEQ_{DF}) were released in 1995 and 33.4 g TEQ_{DF}-WHO_{98} (21.3 g $ITEQ_{DF}$) in 1987. The release estimates for 1987 and 1995 are assigned a high confidence rating, indicating high confidence in both the production and the emission factor estimates. Because no estimate can be made for 2000, it is rated as Category E (no estimate of environmental release of CDDs/CDFs can be made because of the poor quality of existing information).

Table 8-32. Summary of results for CDDs/CDFs in technical 2,4-D and 2,4-D ester herbicides

Congener	EPA LOQ[a] (µg/kg)	Total no. of technicals	Number of technicals greater than LOQ	Observed maximum conc. (µg/kg)	Average conc.[b] (µg/kg)
2,3,7,8-TCDD	0.1	8	2	0.13	0.06
1,2,3,7,8-PeCDD	0.5	8	3	2.6	0.78
1,2,3,4,7,8-HxCDD	2.5	8	0	0.81	0.31
1,2,3,6,7,8-HxCDD	2.5	8	0	0.77	0.39
1,2,3,7,8,9-HxCDD	2.5	8	0	0.68	0.24
1,2,3,4,6,7,8-HpCDD	100.0	8	0	1.5	0.21
OCDD	-	-	-	-	-
2,3,7,8-TCDF	1	8	0	0.27	0.07
1,2,3,7,8-PeCDF	5	8	0	0.62	0.38
2,3,4,7,8-PeCDF	5	7	0	0.73	0.07
1,2,3,4,7,8-HxCDF	25	8	0	1.6	0.36
1,2,3,6,7,8-HxCDF	25	8	0	1.2	0.11
1,2,3,7,8,9-HxCDF	25	8	0	1.4	0.16
2,3,4,6,7,8-HxCDF	25	8	0	1.1	0.14
1,2,3,4,6,7,8-HpCDF	1,000	8	0	8.3	2.17
1,2,3,4,7,8,9-HpCDF	1,000	8	0	1.2	0.18
OCDF	-	-	-	-	
TOTAL[c]					5.6
I-TEQ$_{DF}$					0.7
TEQ$_{DF}$-WHO$_{98}$					1.1

[a] LOQ required by EPA in the data call-in.

[b] Average of the mean results for multiple analyses of four technical 2,4-D and/or 2,4-D ester products for which detectable CDD/CDF congener concentrations less than the LOQs were quantified; nondetect values were assumed to be zero.

[c] Total equals the sum of the individual congener averages. LOQ = Limit of quantitation -- = Analyses not performed

Source: U.S. EPA Office of Pesticide Programs file.

Figure 8-5. Congener profile for 2,4-D (salts and esters) (based on mean concentrations reported in Table 8-34).