FORM

Results of Polyhalogenated Dibenzo-*p*-dioxin/Dibenzofuran Testing and Reporting Under the Toxic Substances Control Act (TSCA)

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INTRODUCTION

The United States Environmental Protection Agency (USEPA) recognizes the potential public health and environmental significance of a variety of polyhalogenated dibenzo-*p*-dioxins (PHDDs) and dibenzofurans (PHDFs).

As a result, the USEPA has undertaken activities to assess and, as appropriate, control the risks posed by PHDDs and PHDFs. A fundamental requirement for the risk assessment is the determination of PHDD and PHDF levels in certain existing chemicals as well as chemicals that are likely to be produced in the future.

In 1987, the USEPA, under the authority granted by Sections 4 and 8 of the Toxic Substances Control Act (TSCA), promulgated a testing and reporting Rule (40 *CFR* 766) for selected chlorinated or brominated chemicals that are structurally related to dioxins and furans (Table 1). Manufacturers or importers of these chemicals are required to submit analytical testing protocols for approval by USEPA and to carry out testing to determine whether the chemicals contain 2,3,7,8-substituted halogenated dioxins and furans at levels above limits of quantitation (LOQ) set forth in the Rule (Table 2).

Twenty-two other organic chemicals, not known to be currently manufactured or imported commercially in the United States, will also require testing if their manufacture or import should be initiated.

FORM

Table 1: Chemicals Undergoing Testing

Chemical Name	CAS No.
2,4-Dichlorophenol	120-83-2
2,3,5,6-Tetrachloro-2,5-cyclohexadiene-1,4-dione	118-75-2
Decabromodiphenyl oxide	1163-19-5
Octabromodiphenyl oxide	32536-52-0
Pentabromodiphenyl oxide	32534-81-9
Tetrabromobisphenol-A	79-94-7
2,4,6-Tribromophenol	118-79-6
Tetrabromobisphenol-A-bisethoxylate	4162-45-2
Allyl ether of tetrabromobisphenol-A	25327-89-3
1,2-Bis(tribromophenoxy)ethane	37853-59-1

Table 2: Limits of Quantitation (LOQs) Required by the Rule

Isomer	LOQ (ppb)
Tetra-PHDD	0.1
Penta-PHDD	0.5
Hexa-PHDD	2.5
Hepta-PHDD	100
Tetra-PHDF	1.0
Penta-PHDF	5.0
Hexa-PHDF	25
Hepta-PHDF	1,000

STATUS OF TEST RULE ACTIVITIES

The USEPA approved the sampling plan and analytical protocol for one submission received for 2,4-dichlorophenol. Analytical testing data for 2,4-dichlorophenol have been received and approved by the USEPA as meeting the data quality requirements of the Rule. No PHDDs or PHDFs were found in this chemical at levels above the LOQs required by the Rule.

The USEPA also has received data from four of the five submitters for 2,3,5,6-tetrachloro-2,5-cyclohexadiene-1,4-dione (chloranil). Although it did not meet all of the QA/QC criteria, the data submitted indicate that the chloranil manufactured or imported by these four submitters is contaminated by PHDDs and PHDFs. As a result of these analyses, the USEPA has initiated an investigation into the potential for PHDD and PHDF contamination in chloranil-derived products, including C.I. Pigment Violet 23. Preliminary analyses conducted by the USEPA demonstrated that an off-the-shelf sample of C.I. Pigment Violet 23 was contaminated with PHDDs and PHDFs.[1] The USEPA currently is evaluating the risks associated with exposure to chloranil and C.I. Pigment Violet 23. Industry is moving quickly to implement process changes that appear to dramatically reduce

the PHDD and PHDF levels in chloranil. Protocols for analysis of "low dioxin" chloranil are currently under development.

Sixteen testing submissions (sampling and analytical protocols) and testing data for the eight brominated chemicals shown in Table 3 have been received by USEPA. The status of these submissions is shown in the table. In some cases, further information has been requested before the USEPA can determine if the data are acceptable. Resampling and retesting will be required in some cases where the samples collected were not representative of more than one lot of production.

Table 3. Status of Submissions for Brominated Chemicals as of May 1993

Chemical	Submitter	Status
Decabromodiphenyl oxide	Great Lakes	Data acceptable
Decabromodiphenyl oxide	Ethyl	Data acceptable
Decabromodiphenyl oxide	Ameribrom	Data unacceptable; must retest
Octabromodiphenyl oxide	Great Lakes	Information requested
Octabromodiphenyl oxide	Ethyl	Data acceptable
Octabromodiphenyl oxide	Ameribrom	Information requested
Pentabromodiphenyl oxide	Great Lakes	Data in review
Pentabromodiphenyl oxide	Ameribrom	Data in review
Pentabromodiphenyl oxide	Akzo	Protocol revisions required
Tetrabromobisphenol-A	Great Lakes	Data acceptable
Tetrabromobisphenol-A	Ethyl	Information requested
Tetrabromobisphenol-A	Ameribrom	Data unacceptable; must retest
1,2-Bis(tribromophenoxy)-ethane	Great Lakes	Data in review
Tetrabromobisphenol-A-bis-ethoxylate	Great Lakes	Data in review
Allyl ether of tetrabromobisphenol-A	Great Lakes	Information requested
2,4,6-Tribromophenol	Great Lakes	Information requested

FORM

Table 4 summarizes the results of the commercial product analyses where the data was found to be acceptable. Some PHDD/PHDF isomers were detected above the test rule LOQs in octabromodiphenyl oxide. All other products did not contain PHDD/PHDF levels above the test rule LOQs but did contain detectable amounts of selected isomers.

Table 4: PBDD and PBDF Concentrations in Selected Commercial Products Isomer Concentration (ng/g)

	Decabromo-diphenyl oxide		Octabromo-diphenyl oxide	Tetrabromo-bisphenol-A
Isomer	Great Lakes	Ethyl	Ethyl	Great Lakes
2,3,7,8-TBDD	ND[a]	ND	ND-0.71	ND
1,2,3,7,8-PeBDD	ND-0.1	ND	ND	ND
1,2,3,4,7,8/ 1,2,3,6,7,8-HxBDD	ND	ND	ND	ND
1,2,3,7,8,9-HxBDD	ND	ND-0.76	ND	ND
1,2,3,4,6,7,8-HpBDD	ND	ND	ND	ND
2,3,7,8-TBDF	ND-0.1	ND	ND-12.6	ND
1,2,3,7,8-PeBDF	ND	ND-0.07	ND-6.3	ND
2,3,4,7,8-PeBDF	ND-0.5	ND	ND-83.1	ND
1,2,3,4,7,8/ 1,2,3,6,7,8-HxBDF	ND-2.5	ND-0.38	3.5-67.8	ND
2,3,4,6,7,8-HxBDF	ND	ND	ND	ND
1,2,3,7,8,9-HxBDF	ND	ND	1.7-56.0	ND
1,2,3,4,6,7,8-HpBDF	160-302	80.5-186	125-Sat[b]	ND
1,2,3,4,7,8,9-HpBDF	ND	ND	ND	ND

[a] Not detected.
[b] Saturated responses in some replicates.

1. Remmers J, Dupuy A, McDaniel D, Harless R, Steele D. *Polychlorinated Dibenzo-p-dioxin and Dibenzofuran Contamination in Chloranil and Carbazole Violet*, Chemosphere 1992; 25(7-10):1505-8.