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**Item ID Number** 05231



**Not Scanned**

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**Report/Article Title** Summary: EPA Monitoring Systems - A Case History on Dioxin

**Journal/Book Title**

**Year** 1978

**Month/Day** February 21 & 22

**Color**

**Number of Images** 0

**Description Notes**

## Summary

### EPA MONITORING STUDIES - A CASE HISTORY ON DIOXIN

Carolyn K. Offutt  
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Office of Special Pesticide Reviews (WH-566)  
US Environmental Protection Agency  
Washington, D.C.

USDA/EPA Symposium  
on the Use of Herbicides in Forestry  
February 21 and 22, 1978

Several herbicides used in forestry management have been referred to EPA as candidates for a special review of the risks and benefits of the continued use of the herbicides. These include 2,4,5-T, Silvex, and some related compounds which are chemically derived from chlorinated phenols. One of the concerns is the potential for some phenoxy herbicides to be contaminated with dioxin compounds, particularly with 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). Dioxins may be produced as a manufacturing contaminant during the production of the pesticide raw materials. TCDD is recognized to be a very toxic compound.

The concern on the part of the Federal Agencies, the producers, the users, and the public for TCDD contamination of phenoxy herbicides has resulted in a reduction of TCDD in the technical products by three orders of magnitude. The older, 2,4,5-T, for example, had as much as 80 ppm of TCDD. The current working level for TCDD is less than 0.1 ppm.

The Dioxin Implementation Plan was developed as a collaborative effort of EPA, USDA, Dow Chemical USA, and the Environmental Defense Fund and was finalized in February 1975. The plan was designed to develop the analytical methodology for detecting TCDD in the low parts per trillion (ppt) range, to conduct monitoring for detectable amounts of TCDD in environmental samples, and to support research on the toxicological effects of TCDD.

Under Phase I of the Plan, a promising analytical methodology has been identified for analyzing dioxin at levels around 10 parts per trillion (ppt).

The goal of Phase II is to determine actual dioxin levels in environmental samples. Therefore, Phase II is emphasizing further corroboration of this methodology by several laboratories and the possibility of lowering the detection limit to 1 ppt or less. This analytical method is being applied to the monitoring studies under Phase II of the Plan.

#### Dioxin Implementation Plan

*B. J. Wald*

##### Phase I

##### • Analytical Studies

- Acid-base extraction and column chromatography clean-up
- Analysis by gas chromatography interfaced with high resolution mass spectrometry

method not in method  
by hazard to donor,  
100% lower, analyzed

8.9 leaf samples  
1 sample 60 ppt  
2- 2-0 ppt  
3- 10 ppt  
No lower standard proposed

-Method not valid below 10 ppt

- Monitoring Studies
  - Forestry samples
  - Beef fat and beef liver study - 132 samples - 7/10/75.
- Toxicological studies
  - Long term chronic studies undertaken
- Phase I Status Report being written

Phase II

- Analytical Studies
  - Corroborative evaluation of Phase I analytical method
  - Evaluation of alternate extraction and cleanup procedures
  - Evaluation of alternate analytical instrumentation
  - Goal to reduce detection limit to 1 ppt or less
- Monitoring Studies
  - Human milk studies
  - Other human studies
  - Analysis of technical products
  - Other environmental studies - beef, small mammals, soil water, etc.
- Toxicological Studies
  - Dioxin monitoring data will be considered in pre-RPAR review of those phenoxy herbicides potentially contaminated with TCDD

Conclusion

The Dioxin Implementation Plan is now three years old. Much progress has been made on the development of analytical methodology for very low levels of TCDD. I believe it is time to conclude some portions of the Dioxin Implementation Plan, yet some aspects of the monitoring program are continuing to provide useful information on the presence of the TCDD in the environment.