

US EPA ARCHIVE DOCUMENT

File

Shaugh. No. 090501 1985

EAB Log Out Date: MAR 1 1985

Init.: Chu

To: Bob Taylor  
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Attached, please find the environmental fate review of:

Reg./File No.: 524-316

Chemical: Alachlor

Type Product: Herbicide

Product Name: Lasso

Company Name: Monsanto

Submission Purposes: Review of STORET data of alachlor  
in surface water

ZBB Code: \_\_\_\_\_

Action Code: 400

Date In: 11/19/84

EFB#: 5095

Date Completed: 3/1/85

TAIS (Level II) Days

02                      5

Deferrals To:

- Ecological Effects Branch
- Residue Chemistry Branch
- Toxicology Branch

TITLE: Summary of STORET Alachlor Surface Water Data

## 1.0 Background

As part of the ongoing review of alachlor, Monsanto has submitted a summary of STORET data (Accession No. 255613). The STORET data base is maintained by EPA and contains a variety of monitoring data, predominantly surface water and sediment data. Both the alachlor reregistration guidance package (Registration Standard) and the alachlor special review (Position Document) address the issue of possible surface and ground water contamination from alachlor use.

This review is an evaluation of the Monsanto summary of STORET data and a comparison to the results of an inhouse retrieval of STORET data on alachlor.

## 2.0 Discussion

The STORET data on alachlor is summarized on Tables 1 and 2. This data summary is only for surface water concentrations, and not for sediment or mud samples. Table 1 summarizes the entire data set for each state and Table 2 summarizes the monthly variations of alachlor data for each state.

Several trends are apparent upon examination of Table 1. Arkansas had the most samples, over 2000, and yet had only a small percentage of positives, and all of them were low in magnitude; the mean was only 0.18 ug/l. Iowa had the most positive findings of any state, and had the highest mean concentration, 4.58 ug/l, and the highest single finding, 101.0 ug/l. Ohio was second to Iowa in terms of total positives found, mean concentration and maximum finding. However, the median for Ohio, 1.67 ug/l, is significantly higher than the median for Iowa, 0.29 ug/l, which indicates that Iowa's mean was pulled up by a few high findings. Still, of the 196 positive values above the median in Iowa, over 100 were over 2.00 ug/l. In contrast, of the 78 positive values above the median in Ohio, 54 were above 2.00 ug/l. Since Iowa and Ohio are large producers of corn and, hence, large users of alachlor, it is reasonable that these two states had the highest alachlor findings. Significant findings were also in Kansas, Michigan, and Pennsylvania. Wisconsin (1 sample only) and Oklahoma (50 samples) found no positives in their state.

Several trends were also apparent upon examination of the monthly summaries in Table 2. Over 90% of all positive findings (693 out of 755) occurred during the spring and summer months of April to September. Nearly one out of every three samples

taken during these months were found to contain measurable quantities of alachlor. In contrast, only 4% of all samples taken during the fall and winter months of October to March were positive. This trend is to be expected since alachlor is a spring-applied herbicide and its appearance in surface waters is most likely the result of spring and summer runoff. What is interesting, however, is that approximately 40% of all samples were taken during the winter months when it would be unlikely for alachlor to appear in the surface waters. Arkansas' sampling program was uniformly spread out during the year, with 49% of total sampling taking place during the winter. On the other hand, Ohio's sampling program collected 96% of the samples during the summer months. Iowa also sampled during the summer months, with 76% of their samples taken during that time.

A summary of STORET data on alachlor was submitted by Monsanto. Their information was largely the same as our retrieval with a few differences. They included in their summaries findings of alachlor in sediment or mud samples. As well, four significant findings of theirs did not show up on our search. The highest concentration of alachlor identified by Monsanto as being in STORET, 213 ug/l, showed up in Arizona as a "mud dry" sample from a station identified by a Monsanto representative as "Motorola NP38 single-point monitoring well". As well, there were three surface water samples of 5.5, 9.0, and 16.0 ug/l from three different Wisconsin USGS monitoring stations which did not show up in our search. There are two possible explanations for these discrepancies: 1) these stations could be prioritized and could not be accessed by our general search, or 2) these findings were extracted or altered in STORET between the time of their search and ours. Another discrepancy between our search and theirs pertained to duplicate entries of alachlor in Iowa. Monsanto was able to spot duplicate alachlor entries which were entered under two different alachlor STORET categories (out of three possible entries: "Alachlor WHL Sample", "Alachlor (Lasso)", and "Alachlor Total"). We were able to identify 8 of the 14 claimed duplicate entries. Monsanto informed the Iowa agencies responsible for these entries of the duplications. Iowa agencies, in turn, informed Monsanto that they would clean up the duplicates. It is possible that they had begun their clean-up between the time Monsanto did their search and we did ours (there was a little over a month's difference between their search and ours).

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Table 1

Nationwide Summary

	Total samples in STORET	Total samples with K&U comments*	Total Positives	mean**	median ug/l	maximum
Arkansas	2072	1987	85	0.18	0.08	2.13
Illinois	6	3	3	.68	0.71	0.76
Iowa	503	110	393	4.58	0.29	101.0
Kansas	651	601	50	0.94	0.55	4.2
Louisiana	76	72	4	0.08	0.02	0.16
Maryland	9	1	8	0.68	0.18	2.70
Michigan	23	2	21	2.04	0.96	8.16
Minnesota	3	3	0	-	-	-
Missouri	63	58	5	0.72	0.70	1.10
Nebrasks	32	31	1	0.21	0.21	0.21
Oklahoma	50	50	0	-	-	-
Ohio	177	20	157	4.26	1.67	69.60
Pennsylvania	75	50	25	1.48	0.57	11.00
Virginia	3	0	3	1.64	0.90	3.40
Wisconsin	1	1	0	-	-	-

\* K qualifier: actual value is known to be greater than value given  
 U qualifier: indicates material was analyzed for but not detected  
 (also in this column are values listed as "0.00" without K or  
 U qualifier)

\*\* mean: arithmetic mean of positives only  
 median: median of positives  
 maximum: maximum listed value of positives

Table 2  
Monthly Summary By State

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
<b>Arkansas</b>												
LTD*	146	208	110	81	64	164	214	229	226	215	185	145
Pos	0	0	0	1	4	54	16	8	0	2	0	0
Mean	-	-	-	0.03	0.17	0.19	0.14	0.11	-	0.67	-	-
Max	-	-	-	0.03	0.60	2.13	0.84	0.54	-	1.22	-	-
<b>Illinois</b>												
LTD	0	0	0	0	0	3	0	0	0	0	0	0
Pos	0	0	0	0	0	3	0	0	0	0	0	0
Mean	-	-	-	-	-	0.68	-	-	-	-	-	-
Max	-	-	-	-	-	0.76	-	-	-	-	-	-
<b>Iowa</b>												
LTD	15	10	11	21	10	3	0	1	5	18	11	5
Pos	1	1	1	7	70	127	65	31	41	13	22	14
Mean	9.5	6.7	2.2	0.29	3.63	10.68	2.47	0.08	0.08	0.06	0.03	0.03
Max	9.5	6.7	2.2	0.90	76.00	101.00	1.00	0.81	0.40	0.40	0.05	0.30
<b>Kansas</b>												
LTD	21	23	74	55	55	84	59	61	55	35	43	36
Pos	0	0	0	0	8	19	12	6	4	0	1	0
Mean	-	-	-	-	0.97	0.94	1.33	0.50	0.58	-	0.34	-
Max	-	-	-	-	3.40	3.20	4.20	0.81	0.87	-	0.34	-
<b>Louisiana</b>												
LTD	3	6	8	3	3	2	7	13	9	12	4	2
Pos	0	0	0	0	3	1	0	0	0	0	0	0
Mean	-	-	-	-	0.10	0.01	-	-	-	-	-	-
Max	-	-	-	-	0.16	0.01	-	-	-	-	-	-

\*Key: LTD: Number of alachlor water concentrations entered into Storet with qualifiers K ("actual value is known to be greater than value given") and U ("indicates material was analyzed for but not detected") and entered as "0.00" without any qualifiers

Pos: Number of positive alachlor entries

Mean: Arithmetic mean of alachlor water concentrations, positives only, ug/l

Max: Maximum value listed, ug/l

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Monthly summary (cont'd)

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
<b>Maryland</b>												
LTD	0	0	0	0	0	0	0	0	1	0	0	0
Pos	0	0	0	0	0	2	3	2	1	0	0	0
Mean	-	-	-	-	-	1.41	0.69	0.21	0.10	-	-	-
Max	-	-	-	-	-	2.70	1.70	0.34	0.10	-	-	-
<b>Michigan</b>												
LTD	0	0	0	2	0	0	0	0	0	0	0	0
Pos	0	0	0	0	5	9	5	2	0	0	0	0
Mean	-	-	-	-	5.62	1.30	0.54	0.12	-	-	-	-
Max	-	-	-	-	8.16	4.18	1.25	0.15	-	-	-	-
<b>Minnesota</b>												
LTD	0	0	0	0	0	3	0	0	0	0	0	0
Pos	0	0	0	0	0	0	0	0	0	0	0	0
Mean	-	-	-	-	-	-	-	-	-	-	-	-
Max	-	-	-	-	-	-	-	-	-	-	-	-
<b>Missouri</b>												
LTD	5	4	6	3	6	7	7	4	3	2	5	6
Pos	0	0	0	0	0	0	4	0	1	0	0	0
Mean	-	-	-	-	-	-	0.84	-	0.25	-	-	-
Max	-	-	-	-	-	-	1.10	-	0.25	-	-	-
<b>Nebraska</b>												
LTD	3	1	3	3	1	8	1	1	3	2	1	4
Pos	0	0	0	0	1	0	0	0	0	0	0	0
Mean	-	-	-	-	0.21	-	-	-	-	-	-	-
Max	-	-	-	-	0.21	-	-	-	-	-	-	-
<b>Oklahoma</b>												
LTD	5	3	4	3	4	2	3	6	2	1	11	6
Pos	0	0	0	0	0	0	0	0	0	0	0	0
Mean	-	-	-	-	-	-	-	-	-	-	-	-
Max	-	-	-	-	-	-	-	-	-	-	-	-

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Monthly summary (cont'd)

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
<b>Ohio</b>												
LTD	0	0	0	12	7	0	1	0	0	0	0	0
Pos	0	0	0	0	44	46	44	16	0	0	0	7
Mean	-	-	-	-	11.69	2.56	0.72	0.19	-	-	-	0.25
Max	-	-	-	-	69.60	9.96	2.34	0.88	-	-	-	0.57
<b>Pennsylvania</b>												
LTD	0	0	0	0	0	8	10	15	17	0	0	0
Pos	0	0	0	0	0	12	7	4	2	0	0	0
Mean	-	-	-	-	-	1.84	1.36	0.69	1.29	-	-	-
Max	-	-	-	-	-	11.00	3.80	1.40	2.00	-	-	-
<b>Virginia</b>												
LTD	0	0	0	0	0	0	0	0	0	0	0	0
Pos	0	0	0	0	3	0	0	0	0	0	0	0
Mean	-	-	-	-	1.64	-	-	-	-	-	-	-
Max	-	-	-	-	3.40	-	-	-	-	-	-	-
<b>Wisconsin</b>												
LTD	0	0	0	0	1	0	0	0	0	0	0	0
Pos	0	0	0	0	0	0	0	0	0	0	0	0
Mean	-	-	-	-	-	-	-	-	-	-	-	-
Max	-	-	-	-	-	-	-	-	-	-	-	-