Date out of EAB JUL 2 1987

Shaughnessy No: 090501
080803
100101
035506
101101
108801
080807
036101
041405

To: David Giamporcaro
Product Manager
Registration Division (TS-767)

From: Carolyn K. Offutt, Chief
Environmental Processes and Guidelines Section
Exposure Assessment Branch
Hazard Evaluation Division (TS-769C)

Attached, please find the EAB review of...

Reg./File #: _____

Chemical Name: Alachlor & Alternatives: Atrazine, Cyanazine, Linuron, Metribuzin, Metolachlor, Simazine, Trifluralin, Butylate (ground water monitoring only)

Type Product: Herbicide

Product Name: Alachlor & alternatives

Company Name: Monsanto

Purpose: Review of 1985 Surface and Ground Water Screening Results for Selected Herbicides for PD4

Action Code: 870 EAB #(s): 70164 and 70240

Date Received: 1/5/87 & 2/5/87 TAIS Code: _____

Date Completed: 7/1/87 Total Reviewing Time: 7

Monitoring study requested: ____

Monitoring study voluntarily submitted: X

Deferrals to: ____ Ecological Effects Branch

____ Residue Chemistry Branch

__X__ Toxicology Branch

1. CHEMICALS:

		Shaughnessy No.
Common names:	Alachlor	090501
	Atrazine	080803
	Cyanazine	100101
	Linuron	035506
	Metribuzin	101101
	Metolachlor	108801
	Simazine	080807
	Trifluralin	036101
	Butylate (Ground Water Monitoring Only)	041405

2. TEST MATERIAL:

Surface and/or ground water

3. STUDY/ACTION TYPE:

Review of 1985 Surface and Ground Water Screening Results for chemicals, listed above, which are alternatives to Monsanto's herbicide product, alachlor. This study was voluntarily conducted by Monsanto and submitted in response to the May 7, 1986, request by EPA.

4. STUDY IDENTIFICATION:

Title:	"Analytical Results from Surface and Ground Water Monitoring for Selected Herbicides Conducted by Monsanto Company During 1985," Four Volumes, R.D. No. 691.
Author:	Compiled by S.R. Meunch
Submitted By:	Monsanto Company
Issue Date:	June 25, 1986
Pack No.:	19,770 and 19,982
Record No.:	187,391 and 189,067
Accession No.:	265,683 and 265,683
EAB No.:	70,164 and 70,240

5. REVIEWED BY:

Linda L. Kutney
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Environmental Processes and Guidelines Section, EAB 7/2/87

6. APPROVED BY:

Carolyn K. Offutt, Chief
Environmental Processes and Guidelines Section
Exposure Assessment Branch, HED (TS-769C) 7/2/87

7. CONCLUSIONS:

Quantitative conclusions concerning the amount of atrazine, cyanazine, linuron, metolachlor, metribuzin, simazine, trifluralin, and butylate in surface and ground water monitored by Monsanto are included in the attached tables. Data submitted are insufficient to allow validation. Exact sample locations must also be clarified for the reported data.

Although the monitoring data are inconclusive due to problems in quality control and proper confirmatory analyses, the following generalizations appear to be true:

a. Herbicides found in untreated, raw surface water also appear to be present in treated, tap water.

b. Concentrations of herbicides in tap water often are almost as high as concentrations in raw water.

c. Surface water concentrations (unconfirmed) of atrazine were, by far, the highest--up to 22.0 ppb maximum, with an annualized mean concentration (AMC) or estimated yearly average concentration of 5.98 ppb. Contamination due to cyanazine and metolachlor peaked at maximums of 8.8 ppb and 9.2 ppb with AMC's estimated at 2.3 ppb and 2.0 ppb, respectively. Simazine, linuron and metribuzin maximum concentrations were 1.2 ppb, 1.0 ppb and 0.7 ppb, respectively, and had estimated AMC's between 0.2-0.4 ppb. Only trifluralin was reported to be less than or equal to the detection limit (0.2 ppb) at all locations.

d. Ground water screening (unconfirmed) for July 1985 samples showed that maximum concentrations were atrazine, 6.5 ppb; cyanazine, 4.5 ppb; metolachlor, 0.4 ppb; and butylate, 0.4 ppb. No more than than 14 of 243 wells screened were positive for any of the four herbicides monitored (this is less than 6% of the total wells).

e. Maximum confirmed concentration of ground water sampled October 1985 showed metolachlor contamination in a well site in Hertford, NC was 48.0 ppb (this site had no detectable screening values reported in July 1985)! This amount is over 100x higher than the highest amount of metolachlor found in any well during previous July 1985 screening. Monsanto should clarify whether any sample was taken in Hertford, NC in July 1985. Maximum confirmed ground water contamination for atrazine was 2.0 ppb. Either no confirmation test was completed for cyanazine or butylate or neither pesticide was present in October 1985. Monsanto should clarify which is the

case in a revised submission. They should make clear also exactly how many samples were taken at any time, and how many of those were positive. This is not always clear from their tables.

The analytical methods used to detect the above eight herbicides in surface and well water were not reviewed because insufficient quality assurance information was provided.

8. RECOMMENDATIONS:

The monitoring data submitted for atrazine, cyanazine, linuron, metolachlor, metribuzin, simazine, trifluralin, and butylate should be considered unvalidated and preliminary.

Additional quality assurance information is necessary to validate the data, including information listing which positive samples were confirmed to be positive with the more reliable gas chromatography/mass spectrophotometry (GC/MS) method (if any) and which samples were unconfirmed positives (See Discussion section for details).

The specific city and state location for each sample should be clarified by Monsanto in a revised submission for the results to be meaningful.

If the quality assurance and location information is adequately furnished in a future submission from Monsanto, the data may be validated following their review.

The Agency may wish to consider omitting these data from the Alachlor PD4 due to the uncertainty of the data. If the data are included, appropriate language should describe the uncertainty of the reported values.

9. BACKGROUND:

Surface and ground water screening of herbicides atrazine, cyanazine, linuron, metolachlor, metribuzin, simazine, trifluralin, and butylate was reported by Monsanto (competitor to the manufacturers of the alternative herbicides). This study was voluntarily conducted by Monsanto and submitted in duplicate, in response to a May 7, 1986, request by EPA, first on January 5, 1987, and then later on February 5, 1987. The Special Review Branch has requested that EAB complete this review for consideration in developing the Alachlor PD4. A preliminary summary of the data was submitted to David Giamporcaro, Product Manager, on January 22, 1987. In response to another request by EPA (June 26, 1987),

Monsanto sent a July 1, 1987, letter which waives any claims to confidentiality of the data in the subject report.

10. DISCUSSION:

A. Analytical Methodology

Review of the analytical methodology used for the eight herbicides monitored in this study will be considered if additional information is received in future submissions by Monsanto. Although the methods may be satisfactory, not enough quality assurance information is given for each of the eight herbicides monitored to comment on the validity of the data or the methodology.

Additional quality assurance data is needed as follows:

* Purity of all reference standards.

* The recovery percentages which were obtained for each of the eight herbicides at concentrations comparable to those found in the samples.

* Analytical results for "negative control" or blank samples.

* Analytical results for "positive control" or spiked samples.

* All duplicate results. Needed to determine repeatability of results (as opposed to a simple average, which was given).

* Plots of standard concentrations versus machine reading -- to determine level of skill and care of the analyst as well as method reliability for all herbicides.

* Plots of sample concentrations (including duplicate value) and machine reading to determine level of skill and care of the analyst as well as method reliability for all herbicides.

* Sample calculations for each herbicide.

* Storage stability data for each herbicide.

* Data concerning the amount of time between sampling and analysis for each herbicide.

* Presence or absence of confirmatory results such as GC/MS - to ensure that positive values are really positive and to determine the amount of error associated with their quantitative values.

* Data listing preliminary screening values and the corresponding values resulting from the confirmatory method for each herbicide to help detect any bias in the screening method which is not present in the longer, but more accurate, confirmatory method.

* Exact city and state for each location submitted. All the surface water results listed only the city name. In addition, the exact identity of ground water samples often appears as if it may be in error.

Because of the almost total lack of demonstrated quality assurance information given with this submission, this monitoring information should be considered only as a possible supplement to validated studies. Unless the petitioner submits additional quality assurance information, and confirms the reliability of the data, the data probably are not appropriate for the basis of regulatory decision by the Agency.

These data should be considered for exclusion in the PD4 for the reasons given below:

1) the questionable validity of the data,
2) the lack of proper quality assurance information,
3) the analytical methods are not validated, and
4) the lack of definite identity of samples.

B. Monitoring Results

Monsanto's monitoring of surface water herbicides should be considered preliminary due to lack of quality control information. The reported results are incomplete without additional clarification of the state associated with each city listed by "location." None of the surface water positive results were reported to be validated with a confirmatory method.

The identity of the locations listed for all the surface water monitoring were given by city only; no identity of state was mentioned anywhere in this review. It is very likely that the states associated with these cities correspond to those which were reported previously, in the PD 2/3, namely the following:

City Screened for Surface Water Herbicide Contamination	Most Likely State for the Reported City
BETHANY	MO
BLANCHESTER	OH
BREESE	IL
CHARLESTON	IL
CLARINDA	IA
COLUMBUS	OH
DAVENPORT	IA
DECATUR	IL
GREENVILLE	NC
KANKAKEE	IL
LEXINGTON	MO
MARION	IL
MI. CITY	IN
MONROE	MI
MOUNT VERNON	IN
MUNCIE	IN
PIQUA	OH
QUINCY	IL
RICHMOND	IN
ROANOKE RAPDS	NC
TOLEDO	OH
U OF IOWA	IA
WYACONDA	MO
YPSILANTI	MI

However, the exact location of these surface water monitoring samples should be explicitly reported in a revised submission from Monsanto.

Monsanto monitoring of ground water herbicides should also be considered preliminary due to quality control questions. Although both city and state are given for the ground water data, they should be verified if they are to have any meaning; e.g., is it really Decatur, IN, or IL; is it Tift, GA, or should it be Tifton, GA? Although ground water results for October 1985 were reportedly confirmed with GC/MS, the corresponding screening results were not given. No conclusion may be reached, therefore, by contrasting screening results with GC/MS results. Accuracy of all the screening results, including all the surface water results and all the July 1985 well water results, should be validated by confirmatory analyses and submission of QA/QC information. It is significant that only four out of twelve locations which screened positive in July of 1985 were confirmed to be positive in October of that same year, i.e., less than 34% were confirmed positive in the later month. Insufficient data is present to determine whether this is due to seasonal variance in ground water contamination or excessive positive samples reported by

the screening method. If the latter is the case, the number of positive herbicides reported may well be overestimated by the screening method at least by a factor of 3x higher than they should have been.

Review of the unvalidated screening of the selected herbicides in surface water shows that when herbicides are present in raw water, they are usually also present in finished (tap) water. Monsanto data suggests that the treatment of raw water usually reduces the maximum concentration of the herbicide only by 50% or less in the finished water. Details concerning the level of water treatment at each location were not given; however, it is likely that use of granualted activated carbon filters could reduce the herbicide concentration in finished water (This is an extremely expensive solution which is not practical in many locations).

Details concerning reported values are summarized in the tables. Briefly, in finished surface water, maximum values of herbicides and annualized mean concentrations (AMCs) were as follows:

	Finished Surface Water	
Herbicide	Maximum Weekly Concentration (ppb)	Annualized Mean Concentration (ppb)
Atrazine	22.20 (in Blanchester)	5.98
Cyanazine	8.78 (in Blanchester)	2.28
Linuron	0.96 (in Picqua)	0.22
Metolachlor	9.15 (in Columbus)	2.05
Metribuzin	0.72 (in Mt. Vernon)	0.21
Simazine	1.24 (in Richmond)	0.37
Trifluralin	$\leq$ Detection limit at all locations (<0.20 ppb)	$\leq$ Detection limit at all locations (<0.20 ppb)
Alachlor*	10.9* (in Columbus, OH)	1.4*

*from "Alachlor Special Review Technical Support Document" (Table E)

In ground water, the following results were reported (See attached table for more details):

Herbicide	Ground Water Maximum Concentration (ppb) 7/85 Screening	Maximum Concentration Confirmed 10/85 (ppb)
Atrazine	6.5 (in Decatur, IN) Only 14 of 243 wells were positive	2.0 (in Decatur, IN)
Butylate	0.38 (in Miller, GA) Only 1 of 243 wells was positive	---
Cyanazine	4.5 (in Iroquois, IL) Only 3 of 243 wells were positive	---
Metolachlor	0.37 (in Pulaski, IN) Only 12 of 243 wells were positive	48.0 (in Hartford, NC)
Alachlor*	1.33* (in Hertford, NC)	21.8*(in Pulaski, IN)

*from "Review of Ground Water Monitoring Study," completed 4/17/87, by Matthew Lorber, EAB #6871-2

The "Analytical Results from Surface and Ground Water Monitoring for Selected Herbicides Conducted by Monsanto During 1985," submitted JUNE 25, 1986 (4 Volumes), is summarized in the attached tables. They contain monitoring information for the following chemicals in surface and ground water:

ATRAZINE
CYANAZINE
LINURON
METOLACHLOR
METRIBUZIN
SIMAZINE
TRIFLURALIN
BUTYLATE (GROUND WATER ONLY)

11. COMPLETION OF ONE-LINER:

Not applicable.

12. CBI APPENDIX:

Not applicable.

TABLE 1 - ATRAZINE IN CWS

FINISHED WATER

LOCATION	DATE OF MAX	RANGE OF CONC(PPB)	ANNUALIZED MEAN CONC*
BETHANY	7/17/85	0.48-0.88	0.55-0.57
BLANCHESTER	7/10/85	<0.20-22.20	5.96-5.98
BREESE	6/6/85	<0.20-19.07	2.00-2.02
CHARLESTON	7/3+10/85	<0.20-0.35	0.22-0.26
CLARINDA	7/3/85	<0.20-2.15	0.61-0.67
COLUMBUS	5/8/85	0.57-17.97	4.11-4.13
DAVENPORT	5/14/85	<0.20-0.56	0.09-0.22
DECATUR	7/16/85	<0.20-1.20	0.52-0.58
GREENVILLE	4/24/85	<0.20-0.37	0.02-0.20
KANKAKEE	6/4/85	<0.20-1.64	0.37-0.44
LEXINGTON	5/29/85	<0.20-3.11	0.59-0.63
MARION	8/21/85	<0.20-1.59	0.48-0.55
MI. CITY	none	<0.20	0.00-0.20
MONROE	12/25/85	<0.20-0.26	0.00-0.20
MOUNT VERNON	5/10	<0.20-4.62	0.60-0.68
MUNCIE	5/2	<0.20-7.31	0.68-0.78
PIQUA	5/8	<0.20-1.73	0.38-0.44
QUINCY	6/10	<0.20-1.24	0.41-0.45
RICHMOND	5/8	-10.29	2.04-2.09
ROANOKE RAPDS	none	<0.20	0.00-0.20
TOLEDO	11/27	-0.24	0.01-0.20
U OF IOWA	5/29	<0.20-2.95	0.57-0.61
WYACONDA	4/12	0.32-1.13	0.60-0.63
YPSILANTI	none	<0.20	0.00-0.20

RAW WATER

LOCATION	DATE OF MAX	RANGE OF CONC(PPB)	ANNUALIZED MEAN CONC*
BETHANY	5/2/85	0.48-1.13	0.63-0.66
BLANCHESTER	7/10/85	0.30-22.77	6.38-6.40
BREESE	6/6/85	<0.20-18.84	1.97-2.00
CHARLESTON	6/12/85	<0.20-0.60	0.29-0.32
CLARINDA	6/26/85	<0.20-3.86	0.65-0.71
COLUMBUS	5/8/85	0.99-24.31	4.67-4.69
DAVENPORT	5/14/85	<0.20-1.20	0.28-0.33
DECATUR	7/16/85	<0.20-1.52	0.56-0.61
GREENVILLE	4/17/85	<0.20-0.59	0.06-0.21
KANKAKEE	6/4/85	<0.20-1.42	0.40-0.45
LEXINGTON	5/29/85	0.23-5.43	0.96-1.00
MARION	7/10/85	<0.20-1.31	0.58-0.62
MI. CITY	none	<0.20	0.00-0.20
MONROE	7/31+8/7	<0.20-0.58	0.18-0.27
MOUNT VERNON	5/10	<0.20-4.80	0.74-0.79
MUNCIE	5/2	<0.20-4.52	0.60-0.65
PIQUA	5/8	0.21-2.42	0.60-0.62
QUINCY	4/29	<0.20-1.33	0.40-0.45
RICHMOND	5/8	-9.07	2.23-2.27
ROANOKE RAPDS	9/23	0.26	0.00-0.20
TOLEDO	11/18	-0.35	0.10-0.22
U OF IOWA	5/29	<0.20-2.76	0.60-0.65
WYACONDA	5/14	0.35-1.85	0.86-0.90
YPSILANTI	7/16	<0.20-0.31	0.06-0.21

*LOW AMC VALUE USED NONDETECT=0.00 PPB; HIGH VALUE USED NONDETECT=0.20 PPB; THE LIMITS OF DETECTION WERE REPORTED AS 0.20 PPB

TABLE 2 - CYANAZINE IN CWS

FINISHED WATER

LOCATION	DATE OF MAX	RANGE OF CONC(PPB)	ANNUALIZED MEAN CONC*
BETHANY	7/17/85	0.53-1.02	0.65-0.67
BLANCHESTER	6/26/85	<0.20- 8.78	2.22-2.28
BREESE	4/26/85	<0.20- 2.68	0.35-0.46
CHARLESTON	6/19/85	<0.20-0.23	0.00-0.20
CLARINDA	7/3/85	<0.20-1.30	0.33-0.43
COLUMBUS	5/15/85	<0.20- 4.04	0.58-0.67
DAVENPORT	7/23/85	<0.20-0.25	0.03-0.20
DECATUR	6/26/85	<0.20-0.33	0.10-0.22
GREENVILLE	7/03/85	<0.20-0.21	0.00-0.20
KANKAKEE	7/9/85	<0.20-0.33	0.06-0.21
LEXINGTON	5/22/85	<0.20-0.59	0.07-0.22
MARION	7/17/85	<0.20-0.29	0.01-0.20
MI. CITY	none	<0.20	0.00-0.20
MONROE	none	<0.20	0.00-0.20
MOUNT VERNON	5/10	<0.20-0.91	0.13-0.27
MUNCIE	5/2	<0.20-1.36	0.05-0.23
PIQUA	5/1	<0.20-0.44	0.09-0.23
QUINCY	4/29	<0.20-0.45	0.10-0.24
RICHMOND	5/8	<0.20- 3.67	0.65-0.73
ROANOKE RAPDS	none	<0.20	0.00-0.20
TOLEDO	none	<0.20	0.00-0.20
U OF IOWA	5/21	<0.20-1.54	0.21-0.32
WYACONDA	8/19	<0.20-0.28	0.01-0.20
YPSILANTI	none	<0.20	0.00-0.20

RAW WATER

LOCATION	DATE OF MAX	RANGE OF CONC(PPB)	ANNUALIZED MEAN CONC*
BETHANY	4/25/85	0.76-1.66	0.85-0.89
BLANCHESTER	7/17/85	<0.20-12.44	2.97-3.02
BREESE	4/26/85	<0.20- 2.76	0.30-0.40
CHARLESTON	none	<0.20	0.00-0.20
CLARINDA	6/26/85	<0.20-2.60	0.45-0.52
COLUMBUS	5/8/85	<0.20- 6.40	0.80-0.89
DAVENPORT	5/14/85	<0.20-0.49	0.06-0.21
DECATUR	7/23/85	<0.20-0.38	0.09-0.23
GREENVILLE	none	<0.20	0.00-0.20
KANKAKEE	5/28/85	<0.20-0.45	0.04-0.21
LEXINGTON	5/15/85	<0.20-1.32	0.13-0.28
MARION	none	<0.20	0.00-0.20
MI. CITY	none	<0.20	0.00-0.20
MONROE	none	<0.20	0.00-0.20
MOUNT VERNON	5/10	<0.20-1.55	0.15-0.30
MUNCIE	5/2	<0.20-1.35	0.08-0.24
PIQUA	5/8	<0.20-0.85	0.16-0.28
QUINCY	4/29	<0.20-0.76	0.09-0.24
RICHMOND	5/8	<0.20-4.41	0.91-0.99
ROANOKE RAPDS	none	<0.20	0.00-0.20
TOLEDO	none	<0.20	0.00-0.20
U OF IOWA	5/21	<0.20-1.51	0.23-0.34
WYACONDA	none	<0.20	0.00-0.20
YPSILANTI	none	<0.20	0.00-0.20

*LOW AMC VALUE USED NONDETECT=0.00 PPB; HIGH VALUE USED NONDETECT=0.20 PPB; THE LIMITS OF DETECTION WERE REPORTED AS 0.20 PPB

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TABLE 3 - LINURON IN CWS

FINISHED WATER

LOCATION	DATE OF MAX	RANGE OF CONC(PPB)	ANNUALIZED MEAN CONC*
BETHANY	none	<0.20	0.00-0.20
BLANCHESTER	6/19/85	<0.20- 0.22	0.00-0.20
BREESE	6/06/85	<0.20- 0.30	0.01-0.20
CHARLESTON	none	<0.20	0.00-0.20
CLARINDA	none	<0.20	0.00-0.20
COLUMBUS	6/19/85	<0.20- 0.87	0.04-0.22
DAVENPORT	none	<0.20	0.00-0.20
DECATUR	none	<0.20	0.00-0.20
GREENVILLE	none	<0.20	0.00-0.20
KANKAKEE	none	<0.20	0.00-0.20
LEXINGTON	none	<0.20	0.00-0.20
MARION	none	<0.20	0.00-0.20
MI. CITY	none	<0.20	0.00-0.20
MONROE	none	<0.20	0.00-0.20
MOUNT VERNON	none	<0.20	0.00-0.20
MUNCIE	none	<0.20	0.00-0.20
PIQUA	6/12	<0.20-0.96	0.03-0.22
QUINCY	none	<0.20	0.00-0.20
RICHMOND	7/3	<0.20- 0.20	0.01-0.20
ROANOKE RAPDS	none	<0.20	0.00-0.20
TOLEDO	none	<0.20	0.00-0.20
U OF IOWA	5/1	<0.20-0.23	0.00-0.20
WYACONDA	none	<0.20	0.00-0.20
YPSILANTI	none	<0.20	0.00-0.20

RAW WATER

LOCATION	DATE OF MAX	RANGE OF CONC(PPB)	ANNUALIZED MEAN CONC*
BETHANY	1/08/86	<0.20-0.24	0.02-0.20
BLANCHESTER	6/05/85	<0.20- 0.33	0.08-0.22
BREESE	6/06/85	<0.20- 1.46	0.28-0.39
CHARLESTON	none	<0.20	0.00-0.20
CLARINDA	none	<0.20	0.00-0.20
COLUMBUS	6/19/85	<0.20- 1.70	0.45-0.53
DAVENPORT	12/16/85	<0.20-1.03	0.02-0.21
DECATUR	5/13/85	<0.20-0.95	0.17-0.27
GREENVILLE	6/26/85	<0.20-0.62	0.08-0.24
KANKAKEE	6/18/85	<0.20-0.31	0.03-0.20
LEXINGTON	12/04/85	<0.20-0.27	0.01-0.20
MARION	none	<0.20	0.00-0.20
MI. CITY	none	<0.20	0.00-0.20
MONROE	8/21/85	<0.20-0.21	0.01-0.20
MOUNT VERNON	9/04	<0.20-0.47	0.13-0.25
MUNCIE	6/6	<0.20-0.44	0.04-0.22
PIQUA	none	<0.20	0.00-0.20
QUINCY	none	<0.20	0.00-0.20
RICHMOND	6/12	<0.20-0.78	0.10-0.26
ROANOKE RAPDS	none	<0.20	0.00-0.20
TOLEDO	12/16	<0.20-2.66	0.05-0.24
U OF IOWA	8/7	<0.20-0.20	0.00-0.20
WYACONDA	none	<0.20	0.00-0.20
YPSILANTI	5/2	<0.20-0.57	0.03-0.21

*LOW AMC VALUE USED NONDETECT=0.00 PPB; HIGH VALUE USED NONDETECT=0.20 PPB; THE LIMITS OF DETECTION WERE REPORTED AS 0.20 PPB

TABLE 4 - METOLACHLOR IN CWS

FINISHED WATER

LOCATION	DATE OF MAX	RANGE OF CONC(PPB)	ANNUALIZED MEAN CONC*
BETHANY	none	<0.20	0.00-0.20
BLANCHESTER	7/03/85	<0.20- 0.52	0.08-0.23
BREESE	6/06/85	<0.20- 2.72	0.22-0.34
CHARLESTON	none	<0.20	0.00-0.20
CLARINDA	6/12	<0.20-0.82	0.11-0.26
COLUMBUS	6/19/85	<0.20- 9.15	2.03-2.05
DAVENPORT	5/14	<0.20-0.23	0.00-0.20
DECATUR	5/13	<0.20-0.74	0.26-0.33
GREENVILLE	none	<0.20	0.00-0.20
KANKAKEE	7/2	<0.20-0.59	0.12-0.26
LEXINGTON	5/1	<0.20-0.25	0.02-0.20
MARION	6/20	<0.20-0.43	0.11-0.24
MI. CITY	none	<0.20	0.00-0.20
MONROE	none	<0.20	0.00-0.20
MOUNT VERNON	5/10	<0.20-1.15	0.10-0.25
MUNCIE	05/2	<0.20-1.12	0.21-0.34
PIQUA	8/28	<0.20-0.34	0.01-0.20
QUINCY	06/10	<0.20-0.31	0.02-0.20
RICHMOND	5/8	<0.20- 1.25	0.26-0.38
ROANOKE RAPDS	none	<0.20	0.00-0.20
TOLEDO	none	<0.20	0.00-0.20
U OF IOWA	5/21	<0.20-0.87	0.09-0.25
WYACONDA	none	<0.20	0.00-0.20
YPSILANTI	none	<0.20	0.00-0.20

RAW WATER

LOCATION	DATE OF MAX	RANGE OF CONC(PPB)	ANNUALIZED MEAN CONC*
BETHANY	none	<0.20	0.00-0.20
BLANCHESTER	6/05-12	<0.20- 0.62	0.11-0.26
BREESE	6/06/85	<0.20- 2.95	0.27-0.39
CHARLESTON	6/12	<0.20-0.22	0.00-0.20
CLARINDA	6/12	<0.20-0.68	0.09-0.25
COLUMBUS	5/08/85	<0.20- 9.74	2.40-2.43
DAVENPORT	05/14/85	<0.20-0.55	0.01-0.20
DECATUR	7/09/85	<0.20-0.82	0.34-0.40
GREENVILLE	6/19/85	<0.20-0.23	0.01-0.20
KANKAKEE	10/22/85	<0.20-0.71	0.13-0.26
LEXINGTON	05/29/85	<0.20-1.23	0.14-0.28
MARION	06/20	<0.20-0.48	0.11-0.24
MI. CITY	none	<0.20	0.00-0.20
MONROE	none	<0.20	0.00-0.20
MOUNT VERNON	9/04	<0.20-0.47	0.13-0.25
MUNCIE	5/30	<0.20-1.94	0.26-0.38
PIQUA	08/28	<0.20-0.41	0.02-0.20
QUINCY	05/20	<0.20-0.35	0.02-0.20
RICHMOND	6/12	<0.20-1.92	0.34-0.46
ROANOKE RAPDS	none	<0.20	0.00-0.20
TOLEDO	none	<0.20	0.05-0.20
U OF IOWA	5/9	<0.20-1.80	0.18-0.31
WYACONDA	none	<0.20	0.00-0.20
YPSILANTI	none	<0.20	0.00-0.20

*LOW AMC VALUE USED NONDETECT=0.00 PPB; HIGH VALUE USED NONDETECT=0.20 PPB; THE LIMITS OF DETECTION WERE REPORTED AS 0.20 PPB

TABLE 5 - METRIBUZIN IN CWS

FINISHED WATER

LOCATION	DATE OF MAX	RANGE OF CONC(PPB)	ANNUALIZED MEAN CONC*
BETHANY	none	<0.20	0.00-0.20
BLANCHESTER	none	<0.20	0.00-0.20
BREESE	none	<0.20	0.00-0.20
CHARLESTON	none	<0.20	0.00-0.20
CLARINDA	none	<0.20	0.00-0.20
COLUMBUS	5/22/85	<0.20- 0.24	0.01-0.20
DAVENPORT	none	<0.20	0.00-0.20
DECATUR	none	<0.20	0.00-0.20
GREENVILLE	none	<0.20	0.00-0.20
KANKAKEE	none	<0.20	0.00-0.20
LEXINGTON	none	<0.20	0.00-0.20
MARION	none	<0.20	0.00-0.20
MI. CITY	none	<0.20	0.00-0.20
MONROE	none	<0.20	0.00-0.20
MOUNT VERNON	5/10	<0.20-0.72	0.01-0.21
MUNCIE	none	<0.20	0.00-0.20
PIQUA	none	<0.20	0.00-0.20
QUINCY	none	<0.20	0.00-0.20
RICHMOND	5/22+29	<0.20- 0.24	0.01-0.20
ROANOKE RAPDS	none	<0.20	0.00-0.20
TOLEDO	6/19	<0.20-0.27	0.01-0.20
U OF IOWA	none	<0.20	0.00-0.20
WYACONDA	none	<0.20	0.00-0.20
YPSILANTI	none	<0.20	0.00-0.20

RAW WATER

LOCATION	DATE OF MAX	RANGE OF CONC(PPB)	ANNUALIZED MEAN CONC*
BETHANY	none	<0.20	0.00-0.20
BLANCHESTER	none	<0.20	0.00-0.20
BREESE	6/06/85	<0.20- 1.81	0.09-0.25
CHARLESTON	none	<0.20	0.00-0.20
CLARINDA	none	<0.20	0.00-0.20
COLUMBUS	6/19/85	<0.20- 1.91	0.27-0.35
DAVENPORT	none	<0.20	0.00-0.20
DECATUR	5/06/85	<0.20-0.31	0.01-0.20
GREENVILLE	none	<0.20	0.00-0.20
KANKAKEE	none	<0.20	0.00-0.20
LEXINGTON	05/29/85	<0.20-0.40	0.01-0.20
MARION	none	<0.20	0.00-0.20
MI. CITY	none	<0.20	0.00-0.20
MONROE	none	<0.20	0.00-0.20
MOUNT VERNON	none	<0.20	0.00-0.20
MUNCIE	6/13	<0.20-0.68	0.02-0.21
PIQUA	none	<0.20	0.00-0.20
QUINCY	none	<0.20	0.00-0.20
RICHMOND	5/01	<0.20-1.12	0.08-0.23
ROANOKE RAPDS	none	<0.20	0.00-0.20
TOLEDO	12/16	<0.20-2.66	0.05-0.24
U OF IOWA	7/10	<0.20-0.28	0.01-0.20
WYACONDA	none	<0.20	0.00-0.20
YPSILANTI	none	<0.20	0.00-0.20

*LOW AMC VALUE USED NONDETECT=0.00 PPB; HIGH VALUE USED NONDETECT=0.20 PPB; THE LIMITS OF DETECTION WERE REPORTED AS 0.20 PPB

TABLE 6 - SIMAZINE IN CWS

FINISHED WATER

LOCATION	DATE OF MAX	RANGE OF CONC(PPB)	ANNUALIZED MEAN CONC*
BETHANY	none	<0.20	0.00-0.20
BLANCHESTER	8/21	<0.20-0.71	0.06-0.21
BREESE	7/11	<0.20-0.50	0.06-0.22
CHARLESTON	none	<0.20	0.00-0.20
CLARINDA	none	<0.20	0.00-0.20
COLUMBUS	6/05/85	<0.20- 0.77	0.15-0.27
DAVENPORT	none	<0.20	0.00-0.20
DECATUR	9/17	<0.20-0.59	0.02-0.20
GREENVILLE	none	<0.20	0.00-0.20
KANKAKEE	none	<0.20	0.00-0.20
LEXINGTON	none	<0.20	0.00-0.20
MARION	8/21	<0.20-0.38	0.10-0.23
MI. CITY	none	<0.20	0.00-0.20
MONROE	none	<0.20	0.00-0.20
MOUNT VERNON	7/04	<0.20-0.41	0.10-0.23
MUNCIE	8/01	<0.20-0.54	0.05-0.21
PIQUA	8/7+14	<0.20-0.23	0.01-0.20
QUINCY	none	<0.20	0.00-0.20
RICHMOND	6/19	<0.20- 1.24	0.29-0.37
ROANOKE RAPDS	none	<0.20	0.00-0.20
TOLEDO	none	<0.20	0.00-0.20
U OF IOWA	none	<0.20	0.00-0.20
WYACONDA	none	<0.20	0.00-0.20
YPSILANTI	none	<0.20	0.00-0.20

RAW WATER

LOCATION	DATE OF MAX	RANGE OF CONC(PPB)	ANNUALIZED MEAN CONC*
BETHANY	9/25	<0.20-0.41	0.01-0.20
BLANCHESTER	7/24	<0.20-0.64	0.10-0.24
BREESE	6/14/85	<0.20- 0.37	0.04-0.20
CHARLESTON	none	<0.20	0.00-0.20
CLARINDA	10/25	<0.20-0.27	0.01-0.20
COLUMBUS	6/12/85	<0.20- 0.90	0.27-0.36
DAVENPORT	none	<0.20	0.00-0.20
DECATUR	5/06/85	<0.20-0.29	0.01-0.20
GREENVILLE	none	<0.20	0.00-0.20
KANKAKEE	none	<0.20	0.00-0.20
LEXINGTON	05/01/85	<0.20-0.86	0.02-0.21
MARION	7/10	<0.20-0.35	0.12-0.24
MI. CITY	none	<0.20	0.00-0.20
MONROE	none	<0.20	0.00-0.20
MOUNT VERNON	5/10	<0.20-0.62	0.10-0.23
MUNCIE	7/25	<0.20-1.62	0.11-0.26
PIQUA	7/24+31	<0.20-0.23	0.01-0.20
QUINCY	none	<0.20	0.00-0.20
RICHMOND	6/19	<0.20-1.76	0.38-0.47
ROANOKE RAPDS	none	<0.20	0.00-0.20
TOLEDO	none	<0.20	0.00-0.20
U OF IOWA	7/10	<0.20-0.28	0.01-0.20
WYACONDA	none	<0.20	0.00-0.20
YPSILANTI	6/12	<0.20-0.33	0.02-0.20

*LOW AMC VALUE USED NONDETECT=0.00 PPB; HIGH VALUE USED NONDETECT=0.20 PPB; THE LIMITS OF DETECTION WERE REPORTED AS 0.20 PPB

TABLE 7 - TRIFLURALIN IN CWS

FINISHED WATER

LOCATION	DATE OF MAX	RANGE OF CONC(PPB)	ANNUALIZED MEAN CONC*
BETHANY	none	<0.20	0.00-0.20
BLANCHESTER	none	<0.20	0.00-0.20
BREESE	none	<0.20	0.00-0.20
CHARLESTON	none	<0.20	0.00-0.20
CLARINDA	none	<0.20	0.00-0.20
COLUMBUS	none	<0.20	0.00-0.20
DAVENPORT	none	<0.20	0.00-0.20
DECATUR	none	<0.20	0.00-0.20
GREENVILLE	none	<0.20	0.00-0.20
KANKAKEE	none	<0.20	0.00-0.20
LEXINGTON	none	<0.20	0.00-0.20
MARION	none	<0.20	0.00-0.20
MI. CITY	none	<0.20	0.00-0.20
MONROE	none	<0.20	0.00-0.20
MOUNT VERNON	none	<0.20	0.00-0.20
MUNCIE	none	<0.20	0.00-0.20
PIQUA	none	<0.20	0.00-0.20
QUINCY	none	<0.20	0.00-0.20
RICHMOND	none	<0.20	0.00-0.20
ROANOKE RAPDS	none	<0.20	0.00-0.20
TOLEDO	none	<0.20	0.00-0.20
U OF IOWA	none	<0.20	0.00-0.20
WYACONDA	none	<0.20	0.00-0.20
YPSILANTI	none	<0.20	0.00-0.20

RAW WATER

LOCATION	DATE OF MAX	RANGE OF CONC(PPB)	ANNUALIZED MEAN CONC*
BETHANY	none	<0.20	0.00-0.20
BLANCHESTER	none	<0.20	0.00-0.20
BREESE	none	<0.20	0.00-0.20
CHARLESTON	none	<0.20	0.00-0.20
CLARINDA	none	<0.20	0.00-0.20
COLUMBUS	none	<0.20	0.00-0.20
DAVENPORT	none	<0.20	0.00-0.20
DECATUR	8/13/85	<0.20-0.20	0.00-0.20
GREENVILLE	none	<0.20	0.00-0.20
KANKAKEE	6/18/85	<0.20-0.32	0.01-0.20
LEXINGTON	none	<0.20	0.00-0.20
MARION	none	<0.20	0.00-0.20
MI. CITY	none	<0.20	0.00-0.20
MONROE	none	<0.20	0.00-0.20
MOUNT VERNON	12/10/85	<0.20-0.21	0.00-0.20
MUNCIE	none	<0.20	0.00-0.20
PIQUA	none	<0.20	0.00-0.20
QUINCY	none	<0.20	0.00-0.20
RICHMOND	none	<0.20	0.00-0.20
ROANOKE RAPDS	none	<0.20	0.00-0.20
TOLEDO	none	<0.20	0.00-0.20
U OF IOWA	none	<0.20	0.00-0.20
WYACONDA	none	<0.20	0.00-0.20
YPSILANTI	none	<0.20	0.00-0.20

*LOW AMC VALUE USED NONDETECT=0.00 PPB; HIGH VALUE USED NONDETECT=0.20 PPB; THE LIMITS OF DETECTION WERE REPORTED AS 0.20 PPB

TABLE 8
MONSANTO 1985 GROUNDWATER MONITORING PROGRAM
OF SELECTED WELLS - SUMMARY OF POSITIVE SAMPLES

LOCATION	RANGE OF POSITIVE RESULTS FROM 243 WELLS SAMPLED JULY 1985 (PPB)	RANGE OF POSITIVE RESULTS FROM 246 WELLS SAMPLED OCT. 1985 (PPB)	TOTAL NUMBER OF POSITIVE WELLS AT SAMPLING LOCATION
	ATRAZINE		
Fayette, IA	<0.22 - 1.4	0.80	4
Decatur, IN**	0.39 - 6.5**	2.0**	2
Crisp, GA	0.34	-	1
Dane, WI	0.34 - 1.1	0.34 - 1.7	7
	BUTYLATE		
Miller, GA	0.38	-	1
	CYANAZINE		
Iroquois, IL**	4.5**	-	1
Tift, GA	0.27	-	1
Turner, GA	<0.23	-	1
	METOLACHLOR		
Houston, AL	0.35	0.55	1
Kossuth, IA	0.22 - 0.28	-	6
Knox, IN	0.28 - 0.30	-	2
Pulaski, IN**	0.37**	-	1
Turner, GA	-	3.2	1
Hertford, NC**	-	48.0**	1

*NOTE: "**" Indicates Areas of High Concentration.
Results expressed as the Average of Duplicate Determinationa.
Limit of Detection was 0.20 ppb.
Results obtained with GC/ECD; not confirmed with GC/MS for July 1985 samples, but confirmed with GC/MS for Oct 1985 samples.

(HED PROVIDE) CASWELL NO.:

REGISTRATION DIVISION DATA REVIEW RECORD
—TO BE USED FOR REVIEW OF STUDIES PPA ONLY—

Confidential Business Information—
Does Not Contain National Security Info. (E.O. 12065)

(HED PROVIDE) PACK No.: 19982

2/5/87

CHEMICAL NAME: ALACHLOR

(RD PROVIDE) SHAUGNESSY NO. 090501

Identifying Number	Action Code	Reference Number	Record Number	Study Guideline or Narrative Description	Reg. Std. Review Submission Criteria (SEE BELOW)	Accession Number	(HED/BUD/TSS Complete) Study found to be Acceptable (A)/ Unacceptable(U) for review or reviewer comment
090501	870	184767		1985 Surface and Ground Water Screening Results for Selected Herbicides	RCB # 1842	265683	

PRODUCT MANAGER (PM) or REVIEW MANAGER (RM) AND NUMBER: DAVID GIAMPORCARO RM 79

PM/RM TEAM MEMBER AND NUMBER:

DATE RECEIVED (EPA): 10/6/86

RD BRANCH CHIEF INITIALS:

CHECK APPLICABLE BOX:

- ☐ Adverse 6(a)(2) Data (405,406)
- ☐ Product Specific Data (Reregistration) (655,656)
- ☐ Suspect Data (415,416)
- ☐ Generic Data (Reregistration) (660,661)
- ☐ IBT Data (485,486)
- ☑ Special Review Data (870,871)

NUMBER OF INDIVIDUAL STUDIES SUBMITTED: 1 (4 VOLUMES)

HAVE ANY OF THE ABOVE STUDIES (in whole or in part) BEEN PREVIOUSLY SUBMITTED FOR REVIEW? (circle: yes or no) If yes, please identify the study(ies): No

RELATED ACTIONS: SPECIAL REVIEW

INSTRUCTIONS: Please review for PD 4. Refer to Carolyn Offutt; Linda Kutney

TO BE COMPLETED BY RSERB

DATE SENT TO HED/BUD/TSS: 2-5-87

PRIORITY NUMBER:

PROJECTED RETURN DATE: 5-5-87

DATE RETURNED TO RD (HED/BUD/TSS PROVIDE):

REVIEWS SENT TO:

HED: ☐ SIS ☐ TB ☐ RCB ☒ EAB ☐ EEB RD: ☐ TSS BUD: ☐ EAB ☐ SSB

TO:	TYPE OF REVIEW	NUMBER OF ACTIONS: Reregistration	Special Review	Other
	Toxicology			
	Ecological Effects			
	Residue Chemistry			
X	Exposure Assessment			
	Product Chemistry			
	Efficacy			
	Precautionary Labeling/Acute Tox.			
	Science Support			
	Economic Analysis			

FOR DATA SUBMITTED UNDER A REGISTRATION STANDARD: Review Submission Criteria

Policy Note #31

1 = data which meet 6(a)(2) or meet 3(c)(2)(B) flagging criteria

2 = data of particular concern

3 = data necessary to determine tiered testing requirements

NOTE TO TSS: Return 1 Copy To RSERB

INCLUDE AN ORIGINAL AND FOUR (4) COPIES OF THIS COMPLETED FORM FOR EACH BRANCH CHECKED FOR REVIEW.

(HED PROVIDE) CASWELL NO.:

REGISTRATION DIVISION DATA REVIEW RECORD
—TO BE USED FOR REVIEW OF STUDIES PPA ONLY—

Confidential Business Information—
Does Not Contain National Security Info. (E.O. 12065)

(HED PROVIDE) PACK No.: 19776 T
1/5/87 HED

CHEMICAL NAME: ALACHLOR

(RD PROVIDE) SHAUGNESSY NO. 090501

Identifying Number	Action Code	Reference Number	Record Number	Study Guideline or Narrative Description	Reg. Std. Review Submission Criteria (SEE BELOW)	Accession Number	(HED/BUD/TSS Complete) Study found to be Acceptable (A)/ Unacceptable(U) for review or reviewer comment
090501	870		187391	1985 Surface and Groundwater Screening Results for Selected Herbicides		265673	

PRODUCT MANAGER (PM) or REVIEW MANAGER (RM) AND NUMBER: DAVID CAMPORCARO RM 79

PM/RM TEAM MEMBER AND NUMBER:

DATE RECEIVED (EPA): 10/6/86

RD BRANCH CHIEF INITIALS: JCE

CHECK APPLICABLE BOX:

- ☐ Adverse 6(a)(2) Data (405,406)
- ☐ Suspect Data (415,416)
- ☐ IBT Data (485,486)
- ☐ Product Specific Data (Reregistration) (655,656)
- ☐ Generic Data (Reregistration) (660,661)
- ☑ Special Review Data (870,871)

NUMBER OF INDIVIDUAL STUDIES SUBMITTED: 1 (4 Volumes)

HAVE ANY OF THE ABOVE STUDIES (in whole or in part) BEEN PREVIOUSLY SUBMITTED FOR REVIEW? (circle: yes or no) If yes, please identify the study(ies): No

RELATED ACTIONS:

INSTRUCTIONS: Please review for incorporation in PD 4

TO BE COMPLETED BY RSERB

DATE SENT TO HED/BUD/TSS: 1-5-87

PRIORITY NUMBER:

PROJECTED RETURN DATE: 4-5-87

DATE RETURNED TO RD (HED/BUD/TSS PROVIDE):

REVIEWS SENT TO:

HED: ☐ SIS ☐ TB ☐ RCB ☑ EAB ☐ EEB RD: ☐ TSS BUD: ☐ EAB ☐ SSB

TO:	TYPE OF REVIEW	NUMBER OF ACTIONS: Reregistration	Special Review	Other
	Toxicology			
	Ecological Effects			
	Residue Chemistry			
✓	Exposure Assessment			
	Product Chemistry			
	Efficacy			
	Precautionary Labeling/Acute Tox.			
	Science Support			
	Economic Analysis			

FOR DATA SUBMITTED UNDER A REGISTRATION STANDARD: Review Submission Criteria

Policy Note #31

1 = data which meet 6(a)(2) or meet 3(c)(2)(B) flagging criteria

2 = data of particular concern

3 = data necessary to determine tiered testing requirements

NOTE TO TSS: Return 1 Copy To RSERB

INCLUDE AN ORIGINAL AND FOUR (4) COPIES OF THIS COMPLETED FORM FOR EACH BRANCH CHECKED FOR REVIEW.