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Date out of EAB: OCT - 6 1987

To: Jim Roelofs
Product Manager
Registration Division (TS-767C)

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

Attached, please find the EAB review of...

Pack #: 38041 AND 38067

Chemical Name: Alachlor

Type Product: Herbicide

Product Name: Lasso

Company Name: Monsanto

Purpose: Submission of Final 1986 Surface Water Monitoring Results for Alachlor, Atrazine, Cyanazine, no file Metolachlor, and Simazine

Action Code: 870 EAB # (s): 70825 & 70839

Date Received: July 20, 1987 TAIS Code: _____

Date Completed: _____ Total Reviewing Time: _____

Monitoring study requested: _____

Monitoring study voluntarily: _____

Deferral to: _____ Ecological Effects Branch

_____ Residue Chemistry Branch

_____ Toxicology Branch

1. CHEMICAL:

Common name: Alachlor
Product name: Lasso

2. TEST MATERIAL:

Raw and finished surface water.

3. STUDY/ACTION TYPE:

Review of final 1986 surface water monitoring results.

4. STUDY IDENTIFICATION:

Titles: "Alachlor, Atrazine, Cyanazine, Metolachlor, and Simazine in Surface Water From 30 Community Water Systems Located in Regions of Lasso Use"
Authors: R. G. Smith, F. M. Triebe, S. R. Baszis
Laboratory Report No: MSL-6787 (Completed June 1987)
Author: Monsanto Agricultural Company, St. Louis, MO
Date: July 20, 1987

5. REVIEWED BY:

Linda L. Kutney
Chemist
Monitoring Section
Exposure Assessment Branch, HED (TS-769C) Date: 10/6/87

6. APPROVED BY:

Carolyn K. Offutt, Chief
Environmental Processes & Guidelines Section
Exposure Assessment Branch, HED (TS-769C) Date: 10/6/87

7. CONCLUSIONS:

Because Monsanto is claiming no confidentiality under FIFRA, the materials contained with this submission will not to be considered confidential business information by EAB. Monsanto should clarify whether this material is confidential.

Monsanto should clarify which GLP regulations they considered were not applicable to their monitoring study, for the record, and why not. This was not stated within this submission.

Monsanto should verify the final extract volume in their analytical method.

We reiterate our previous requests for a complete set of typical sample calculations along with a copy of the analytical method used. Although we already have the GC/MS method, it would be helpful to obtain another copy of it so that we may confirm the steps of extraction and concentration of the sample, as well as calculation steps. This is necessary so that we may determine whether the resultant calculations are correct as reported.

Because of the still outstanding quality assurance deficiencies summarized in this review, we are unable to approve the method used for the herbicide analyses.

We request that Monsanto identify the liquid-liquid analytical method which was used and furnish us a non-confidential copy. We can not comment further on the quality of the method without this information.

Monsanto should provide OPP and EAB complete, unedited, copies of the more sensitive analyses which they have stated to ODW are available for alachlor, which are not labelled "CBI" or confidential. Sample calculations and chromatograms should also be included.

Although the number of samples was too small to allow a statistical test, paired CWSs on the Iowa and Maumee River suggest by their overall agreement that sampling was performed in a consistent manner.

Control samples, i.e., also referred to as "blanks," appeared to be within acceptable limits, for alachlor, atrazine, metolachlor, and simazine. Controls for cyanazine approached 0.50 ppb, which is unacceptably far above the 0.20 ppb limit of detection.

Monsanto should confirm the new AMC values reported for Shipman, Illinois in the final 1986 survey.

Alachlor was rarely found in low use areas at levels above the limit of detection of the method (0.20 ppb).

High use alachlor areas were reported to have annualized mean concentrations (AMCs) of 0.20-0.98 ppb, with an average of 0.49 ppb. Low use alachlor areas were reported to have annualized mean concentrations of 0.20-0.29 ppb, with an average of 0.21 ppb.

Results following granular activated carbon (GAC) filtration at Creston, IA, suggest that over 40% of initial alachlor present prior to treatment is also present after the GAC filtration.

8. RECOMMENDATIONS:

We recommend that Monsanto be informed of the deficiencies listed above under "Conclusions." Briefly, EAB has questions concerning confidentiality, Monsanto's quality assurance, the liquid-liquid extraction method used, the calculations used to derive the reported results, the more sensitive methods Monsanto has cited as available for alachlor, and the AMC values at Shipman, Illinois.

9. BACKGROUND:

The data included by Monsanto in this submission are the final results of the 1986 monitoring study for alachlor in surface water. Because the analytical method also detected atrazine, cyanazine, metolachlor, and simazine, Monsanto included those values, too. The protocol for the study, #86-35-R2 had been previously agreed to by the EPA in March 1986. See the 3/28/86 review by Linda Kutney of the Monsanto submission entitled, "Protocol for a Study to Determine Alachlor Concentrations in Drinking Water Derived from Surface Water Sources, 1986 Use Season" issued March 24, 1986 (p 472 of the current submission).

10. DISCUSSION:

Confidentiality Claims

Monsanto has included a "Statement of NO Confidentiality Claims" (p 2) for the information in the submission on the basis of its falling within the scope of FIFRA 10(d)(1)(A, B, or C). However, at the same time they have labelled many entries as trade secret. They also claim that they "do not waive any protection of rights involving this material that would have been claimed by the company if this material had not been submitted to the EPA." This set of conflicting claims for confidentiality classification is not clear. EAB assumes that if Monsanto is claiming no confidentiality under FIFRA that the materials contained with this submission are not to be considered confidential business information.

Good Laboratory Practices

Monsanto has also included a "GLP Compliance Statement" (p 3) which states that the material is not subject to the standards set down in the Good Laboratory Practices (GLP's) of the 40 CFR 160, included in the Federal Register, 48, 53946-69,

November 29, 1983. No explanation for this is included with this submission. Monsanto management did certify that "the technical conduct of this study, as well as the interpretation, analysis, documentation and reporting of the results...have been collected and reported in accordance with standards of good laboratory practices (p 5)." Apparently Monsanto means their own GLPs as opposed to those included in the 40 CFR 160. Monsanto also stated that "no significant deviation from applicable (?) GLP regulations...adversely affected the study quality or integrity" (p 6). Analysis of the available quality assurance data is included thoughout the remainder of this report. Monsanto should clarify which GLP regulations they do and do not consider applicable, for the record. This was not stated within this submission.

Analytical Method

The "Analytical Method for the Determination of Alachlor, Atrazine, Cyanazine, Metolachlor and Simazine in Raw and Finished Surface Water Samples by Gas Chromatography-Mass Spectrometry" was the method used by Monsanto for its analyses (Appendix C, p 346 of this submission). This method is not labelled "confidential," but is undated.

Finished and raw water samples were extracted using a octadecylsilyl (C 18) reverse-phase column with the "Baker"-10 SPE solid phase extraction device. Each 1.0 L sample was aspirated into a 75 ml resevoir on top of the column. Raw water samples required an additional filtration step in order to remove the particulate matter. For these samples, a pre-column filter consisting of a layer of glass wool, a layer of filter aid and another layer of glass wool, was placed in the resevoir.

The herbicides were eluted with 3 ml of 5:45:50 ethyl acetate-isooctane-methylene chloride; the eluate was then dried by passing through a filtration column containing 20-25 mm of anhydrous sodium sulfate. The volume of each solution was reduced under a dry stream of nitrogen or diluted, as necessary, to a final volume of 1.0 ml. The method summary (p 21), however, gives the final volume as 1.5 ml. We would assume that the summary of the method is probably incorrect, but we also note that such a difference would result in final concentrations which were reported to be 33% above the actual values, if the appropriate adjustment was not made in the calculations.

Monsanto did not submit a sample calculation, as was previously requested (reviews of Linda Kutney, dated July 2, 1987, of "1985 Surface and Ground Water Screening Results for Selected Herbicides for the PD4," EAB #'s 70164 and 70240; AND "Responses to the June 18, 1986 DCI..." EAB #'S 70001 AND 70002, dated July 2, 1987, by Kutney). Monsanto should verify the final volume of the extract used in their GC/MS method. We reiterate our previous requests for a complete set of typical sample calculations along with the analytical method so we may determine whether the results are correct as reported. Because of these quality assurance deficiencies we are unable to draw a definite conclusion as to the acceptability of the method used for the herbicide analyses.

The five herbicides were separated and quantified by capillary gas chromatography/mass specrometry. The method was validated from 0.20 to 25.0 ug/L (PPB) for raw and finished water.

The SPE Method

Monsanto included results for the solid phase extraction, SPE, method (the method used for the 1986 monitoring) and a "liquid-liquid extraction" method using the conventional methylene chloride partitioning for several samples (See p 28 of the submission). Although the values obtained for the two different methods correlate very well (R= 0.96 - 0.99) the title of the liquidliquid extraction method is not specifically identified (See Table 14, p 51 of the submission). We request that Monsanto identify the liquid-liquid method which was used and furnish us a non-confidential copy. We must delay any further review concerning the quality of the method without this information.

Improved Methods

We also request that Monsanto furnish copies of the methods which they stated to ODW were available for the determination of alachlor (See review by L. Kutney, dated 8/21/87, EAB #70819, "Review of Comments Received on July 20, 1987 concerning the Office of Drinking Water's 3/31/87 Health Advisory for Alachlor"). We also request that these methods not include the label "CBI" or trade secret/confidential.

Fortification/Recovery Results

Table 10 of the submission (p 40-43) presents data for recoveries of laboratory-fortified weekly-composite samples. High background levels were a major problem in some of the SPE analyses. The recovery values which were reported for fortification samples were corrected for background errors. However, many fortification results were not reported when background levels exceeded 50% of the fortification level. This background was described by Monsanto as being "unacceptably high." Background was unacceptably high for alachlor in 1 out of 11 (9%) of the samples at the 0.50 PPB level of fortification. As many as 45% of the atrazine, cyanazine, metolachlor, and simazine samples were unquantifiable because of high background (See Table IV of the Appendix for further details concerning background levels for alachlor and the other herbicides monitored). Such high percentages of unquantifiable samples render the methods impractical for the herbicides for which this was a problem. It would be very helpful for Monsanto to explain the cause for this method problem.

Recovery values for alachlor at the 0.20 PPB, fortification level, the detection limit of the SPE method, ranged from 54% to 107%, with an overall mean of 91%. At higher fortifications of 0.50 - 25.0 PPB, recoveries were between 88% and 126% of the fortification level. (See Table IV of the Appendix to this review for further details concerning recovery values and background levels for alachlor and the other herbicides monitored).

Table 17 on page 56 of this submission lists recoveries of field-fortified samples of 2 and 5 ppB as being 81-114% for alachlor, 70-117% for atrazine, 59-110% for cyanazine, 91-114% for metolachlor, and 49-111% for simazine. Background levels for field-fortified samples were often reported to be too high to allow quantification.

Storage Stabilities

The storage stability for the five herbicides tested was checked after 0, 4, and 8 weeks of storage and is reported in Table II of the Appendix (from Table 16 of the submission). Stabilities appear to be acceptable within the 8-week framework.

Maximum Weekly Concentrations

Table I of the Appendix (compiled from Tables 2 and 6 in the submission) presents maximum weekly concentrations (MWCs) and annualized mean concentrations (AMCs) for the alachlor, atrazine, cyanazine, metolachlor, and simazine for the community water supplies tested.

Replicates of Weekly Composites

Weekly composite replicates of finished and raw surface water analyses of all the herbicides tested (See Table 11, p 43-45 of this submission) were very good (R=0.98 to 0.99); replicates for simazine were slightly less reliable (R=0.84). (See Table V of the Appendix for further details).

"Paired" Community Water Supplies

A very limited amount of information was available for "paired" CWS's (from Table 8, p 38 of the submission), those in close proximity of one another on the same river. The results AMCs of alachlor are summarized below:

ALACHLOR AMCs FOR 'PAIRED' CWSs

Source	CWS	RANGE OF AMC	AVG AMC
Iowa R	Iowa City	0.42-0.56	0.49
	U of Iowa	0.48-0.62	0.55
Maumee R	Bowling Green	0.52-0.66	0.59
	Waterville	0.42-0.57	0.49

Results for atrazine, cyanazine, metolachlor, and simazine are also included (Table 8, p 38 of the submission), but will not be summarized here. The average AMCs for those herbicides at the two paired CWSs on the Iowa River and Maumee River, as listed above, also agreed well with each other--within 0.3 ppb of each other. Although the number of samples was too small to allow a statistical test, paired CWSs on the Iowa and Maumee River suggest by their overall agreement that sampling was performed in a consistent manner.

Blank Results

Apparent alachlor residues in unfortified, blank quality control samples were reported in Monsanto's Table 12, (p 46-47) of this submission. For alachlor, the highest value for the "blank" was 0.08 or approximately 0.1 ppb. The average blank, of 39 reported, was 0.02 ppb. This indicates that samples tested may be overestimated up to 0.1 ppb. The submisssion does not state whether or not the final reported sample values were corrected for high blank samples. Values for the blanks seem acceptable for the alachlor assay when compared to the reported limit of detection of 0.20 ppb. Values for blanks of atrazine, metolachlor, and simazine also appeared to be generally less that the limit of detection of 0.20 ppb. However, for 65 cyanazine blanks, the reported range in the submission was from -0.13 to 0.46 ppb, with an average of 0.08 ppb. This data suggests that the cyanazine analysis is less reliable than that for the other herbicides tested.

Shipman, Iowa--"New" Data

The data summary, Table VI of the Appendix of this review (Monsanto's Table 2) for the 1986 monitoring of surface water for alachlor is slightly different from those submitted in the preliminary report submitted to the Agency, labelled "interim," which were dated December 16, 1986. Values for Shipman, Iowa, originally were reported as having an AMC of 0.63 and 0.76 ppb (for calculations where ND=0.00 and ND=0.20 ppb) in December 1986. The final 1986 monitoring report, dated 7/20/87, lists AMC values for Shipman as 0.89 and 0.91 ppb (for calculations where ND=0.00 and ND=0.20 ppb, respectively). No explanation for the cause for this change is offered, and the change is not even mentioned in the current submission. Monsanto should clarify the reasons for the changes in these values (See Table VI of this report "Annualized Mean and Maximum Concentrations of Alachlor in Raw and/or Finished Surface Water for the 1986 Growing Season" which was submitted by Monsanto as Table 2 on page 14 of their final submission).

Unlike other locations, alachlor was detected year-round at Shipman. A Monsanto usage questionaire (See p 488 of the submission) determined that alachlor had not been agriculturally used in the Shipman watershed for the past five years. Monsanto has suggested that one or more point sources of contamination may be involved.

Alachlor Concentrations in High Use Vs. Low Use Areas

Alachlor AMCs for finished or raw surface water in high or low use areas are summarized in the following table (from table 7 of the submission):

Alachlor AMCs-High Use Areas

RANGE(PPB)	MEAN(PPB)	STD DEV	%STD DEV
0.20-0.98	0.49	0.28	57

Alachlor AMCs-Low Use Areas

RANGE(PPB)	MEAN(PPB)	STD DEV	%STD DEV
0.20-0.29	0.21	0.03	14

The mean AMC for the high use areas was 0.49 ppb; as opposed to 0.21 ppb for the low use areas. The mean AMC for the high use areas is slightly over two times the amount found for the low use ares. The value of 0.21 ppb is very close to the limit of detection of the method (0.20 ppb), leading to the conclusion that alachlor was rarely detected in the 1986 monitoring study of surface water, except in high use areas. At low ranges of AMC, the standard deviation (STD DEV) is smaller between samples, as expected. The % STD DEV is a commonly reported index of variation equal to the STD DEV/MEAN.

Filtration & Herbicides In Finished Water

At Creston, Iowa, herbicide concentrations in raw and finished water were monitored in 1986 before and after filtration through granular activated carbon (GAC) filters. Calculations show up to 42% of alachlor and up to 40-52% of the other herbicides tested remained despite the GAC filter. (See Table III of the Appendix which was calculated primarily from information given on p. 23 and 220-258 of the submission). Table III of the Appendix included analysis of Creston, Iowa, before and after GAC treatment, because only Creston had detectable residues of alachlor before treatment. Ft. Wayne was chosen for comparison because it was the only study location where conventional water treatment was used which had detectable alachlor residues, and analyses for raw and finished water.

It appears that the presence of such an expensive GAC filter is no guarantee that concentrations of herbicides, specifically alachlor, will be substantially removed after filtration. Although data are not available to explain the failure of the GAC to eliminate organic contaminants such as alachlor, it <u>may</u> be due to any of the following causes:

* Poor condition of the GAC filter, i.e., poor maintenance.

* Failure of even a fresh GAC filter to remove the herbicides.

* Poor sampling or sampling error.

* Contamination of the sample.

* Analytical or calculational error.

* Time lag between sample peak and treatment-a sampling error, e.g., it may take over a day for treatment of raw water.

11. COMPLETION OF ONE-LINER:

NOT APPLICABLE

12. CBI APPENDIX:

NOT APPLICABLE

13. APPENDIX:

ATTACHED

APPENDIX
TABLE I
MAXIMUM HERBICIDE CONCENTRATIONS IN FINISHED SURFACE WATER COMPOSITES: MONSANTO 1986 FINAL RESULTS**

CWS LOCATION	ALACHLOR MAX CONC (PPB)	DATE	ATRAZINE MAX CONC (PPB)	DATE	CYANAZINE MAX CONC (PPB)	DATE	METOLOCHLOR MAX CONC (PPB)	DATE	SIMAZINE MAX CONC (PPB)	DATE
APPLETON, WI	<0.20		0.34	8/27/86	<0.20		<0.20		0.23	8/12/86
BOWLING GREEN, OH	5.21	6/11/86	9.37	5/28/86	4.11	5/21/86	5.91	6/11/86	0.88	6/25/86
CALDONIA, OH	9.48	5/14/86	12.33	5/14/86	2.75	5/14/86	17.83	5/14/86	0.73	6/18/86
CARLINVILLE, IL	<0.20		1.97	6/4/86	0.44	6/25/86	0.25	6/4/86	<0.20	
COLUMBUS, OH	3.06	6/11/86	10.47	7/2/86	4.20	6/11/86	5.45	6/11/86	1.52	6/4/86
CRESTON, IA	<0.20	6/4/86	1.22	7/16/86	0.66	6/4/86	0.34	6/4/86	0.50	7/16/86
CREWE, VA	<0.20		<0.20		<0.20		<0.20		0.37	7/9/86
DEARBORN, MO	1.19	5/14/86	2.98	5/14/86	0.24	5/7/86	0.28	7/2/86	0.37	7/2/86
DELTA, OH	<0.20		0.34	4/23/86	0.23	5/21/86	<0.20		0.31	7/16/86
ESKRIDGE, KS	<0.20		<0.20		0.27	7/16/86	<0.20		<0.20	
FORT WAYNE, IN	5.16	5/21/86	13.19	5/21/86	3.48	5/21/86	7.58	6/11/86	1.19	6/4/86
HETTICK, IL	<0.20		1.45	7/2/86	0.24	6/18/86	<0.20		0.49	7/2/86
IOWA CITY, IA	5.07	5/21/86	7.31	5/21/86	6.14	5/21/86	3.85	5/21/86	<0.20	
JACKSONVILLE, IL*	6.15	5/7/86	22.55	5/7/86	3.53	5/7/86	20.76	5/21/86	0.33	5/21/86
JARRATT	<0.20		0.96	5/29/86	1.76	7/3/86	<0.20		3.33	7/3/86
JEFFERSON	0.29	5/29/86	4.23	9/4/86	0.22	5/15/86	1.02	5/29/86	0.30	7/10/86
MACOMB, IL	1.42	6/11/86	3.74	6/18/86	1.94	6/18/86	1.53	6/11/86	1.58	7/16/86
MAYSVILLE, OH	<0.20		0.34	7/16/86	<0.20		<0.20		0.56	7/16/86
OLATHE, KS	0.51	5/21/86	2.82	8/27/86	0.41	9/3/86	0.48	5/21/86	<0.20	
OTTAWA, KS	<0.20		3.60	7/16/86	<0.20		0.28	8/6/86	<0.20	
PLATTSBURG, MO	<0.20		1.91	8/13/86	0.26	8/27/86	0.35	8/13/86	<0.20	
POMONA LAKE, KS	<0.45	6/11/86	10.75	6/18/86	<0.20		1.68	7/16/86	0.29	6/25/86
SABETHA, KS	<0.91	7/10/86	9.95	7/10/86	0.59	6/18/86	3.16	7/10/86	<0.20	
SHELBINA, MO	<0.31	6/19/86	3.19	7/3/86	0.65	5/29/86	0.50	6/19/86	<0.20	
SHIPMAN, IL	7.43	6/11/86	16.33	6/11/86	1.96	6/11/86	9.32	6/11/86	0.57	7/16/86
SWANTON, OH	0.33	6/25/86	1.07	7/16/86	0.28	7/16/86	0.27	6/25/86	0.23	7/2/86
U.OF I, IA	2.93	4/30/86	6.04	6/11/86	3.60	6/4/86	3.22	6/4/86	<0.20	
WATERVILLE, OH	5.16	5/11/86	8.73	6/11/86	3.73	5/21/86	6.25	6/11/86	0.80	6/11/86
WESTERVILLE, OH	1.25	6/4/86	5.43	6/4/86	1.47	6/4/86	1.86	6/4/86	2.54	6/4/86
WHITE HOUSE, TN	<0.20		0.52	7/16/86	0.45	7/23/86	<0.20		0.32	7/16/86
AVERAGE	1.96		5.45		1.49		3.13		0.63	

NOTE THAT SAMPLES FROM JACKSONVILLE, IL WERE RAW WATER

NOTE THAT 0.20 PPB WAS THE METHOD LIMIT OF DETECTION, ENTRY OF <0.20 PPB INDICATES NO POSITIVE SAMPLES DETECTED AT CWS

**TABLE I WAS CALCULATED USING DATA FROM TABLES 2 AND 6 FROM THE MONSANTO SUBMISSION

APPENDIX
TABLE II

STORAGE AND STABILITY DATA FOR HERBICIDE SAMPLES*
% RECOVERY OF HERBICIDES

RANGE OF RECOVERY VALUES (%)
AND
MEAN RECOVERY VALUES (%)

WEEKS STORED	HERBICIDES				
	ALACHLOR	ATRAZINE	CYANAZINE	METOLACHLOR	SIMAZINE
0	96-114 105	92-104 99	89-116 101	95-103 100	92-108 98
4	88-116 105	91-105 98	74-116 101	95-108 102	83-108 100
8	78-116 101	82-117 100	76-123 101	95-113 100	91-111 103

*TABLE II WAS CALCULATED FROM TABLE 16 OF THE MONSANTO SUBMISSION

APPENDIX
TABLE III

HERBICIDE REMOVAL FOR GRANULAR ACTIVATED CARBON (GAC) AND CONVENTIONAL (CONV) TREATMENT 1986

HERBICIDE & TREATMENT	AVERAGE MWC** CONC BEFORE TREATMENT (PPB)	AVERAGE MWC** CONC AFTER TREATMENT (PPB)	% HERBICIDE REMOVED
ALACHLOR			
CRESTON, IA GAC	0.48	<0.20	58
FORT WAYNE, IN CONV	6.40	5.02	22
ATRAZINE			
CRESTON, IA GAC	2.21	<0.90	59
FORT WAYNE, IN CONV	12.00	10.75	15
CYANAZINE			
CRESTON, IA GAC	1.37	0.66	52
FORT WAYNE, IN CONV	3.69	3.46	6
METOLACHLOR			
CRESTON, IA GAC	0.56	0.23	58
FORT WAYNE, IN CONV	6.02	4.93	31
SIMAZINE			
CRESTON, IA GAC	0.54	<0.20	64
FORT WAYNE, IN CONV	0.57	0.44	22

**MWC-MAXIMIM WEEKLY CONCENTRATION AS INCLUDED IN THIS SUBMISSION (DATA FROM P. 23, 220-258 OF THE MONSANTO SUBMISSION)

APPENDIX
TABLE IV

PESTICIDE RECOVERIES FOR FORTIFIED WEEKLY COMPOSITE SAMPLES**

HERBICIDE TESTED

RANGE OF RECOVERY VALUES (%)
MEAN RECOVERY VALUES (%)

AMOUNT ADDED (PPB)	ALACHLOR	ATRAZINE	CYANAZINE	METOLACHLOR	SIMAZINE
0.20	54-107 91	82-118 99 *A	0-140 77 *B	58-114 98 *C	20-95 78 *D
0.50	92-111 99 *E	93-109 97 *F	1-104 71	96-110 101 *G	82-105 92
1.0	94-112 101	90-106 97 *H	55-114 91 *I	94-106 98	76-109 93 *J
5.0	88-121 102	82-105 95 *K	32-116 97	89-106 98	55-107 93
10.0	95-117 103	94-99 97 *L	76-116 97	76-104 96	92-112 100
25.0	90-126 100	92-104 98 *M	82-129 101	92-101 97 *N	96-125 103

* Recoveries not calculated when background levels > 50% of spiking level.
Letter Reported in the Footnote = # of samples not calculated due to high background levels / total number of samples.

A=3/9	B=4/9	C=1/9	D=2/9	E=1/11
F=4/11	G=2/11	H=4/10	I=2/10	J=1/10
K=4/10	L=4/9	M=1/8	N=1/8	

**TABLE IV WAS CALCULATED USING TABLE 10 OF THE MONSANTO SUBMISSION

APPENDIX
TABLE V

REPLICATE SUMMARY OF WEEKLY COMPOSITE REPRODUCABILITY*

HERBICIDE TESTED

	ALACHLOR	ATRAZINE	CYANAZINE	METOLACHLOR	SIMAZINE
AVG OF 1ST SMPLS	1.07	4.10	0.86	2.06	0.33
STD DEV'N OF 1ST SMPLS	1.57	4.49	1.16	3.45	0.57
AVG OF 2ND SMPLS	1.09	4.09	0.81	2.09	0.28
STD DEV'N OF 2ND SMPLS	1.57	4.49	1.10	1.45	0.19
COEF OF CORREL'N FOR 1ST AND 2ND SMPLS (R)	0.996	0.999	0.977	0.997	0.842

*TABLE V WAS CALCULATED USING DATA FROM TABLE 11 OF THE MONSANTO SUBMISSION

Simazine RIN: 16446-93

Page 17 is not included in this copy.

Pages _____ through _____ are not included.

The material not included contains the following type of information:

____ Identity of product inert ingredients.

____ Identity of product impurities.

____ Description of the product manufacturing process.

____ Description of quality control procedures.

____ Identity of the source of product ingredients.

____ Sales or other commercial/financial information.

____ A draft product label.

____ The product confidential statement of formula.

____ Information about a pending registration action.

✓ FIFRA registration data.

____ The document is a duplicate of page(s) _____.

____ The document is not responsive to the request.

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.