Arkansas Water Resources Center

COMPLETION REPORT: ARKANSAS STATE PESTICIDES IN GROUND WATER MONITORING PROJECT PHASE IV: EASTERN ARKANSAS (PULASKI, LEE AND JACKSON COUNTIES)

Publication No. MSC-202

1995

T. Nichols[1], P. Vendrell[1,2,3], K. Steele[1,2],
H.D. Scott[3] and C. Armstrong[4]

[1] Arkansas Water Resources Center, 113 Ozark Hall, University of Arkansas, Fayetteville, Arkansas 72701
[2] Department of Geology, 118 Ozark Hall, University of Arkansas, Fayetteville, Arkansas 72701
[3] Department of Agronomy, 115 Plant Sciences University of Arkansas, Fayetteville, Arkansas 72701
[4] Arkansas State Plant Board, 1 Natural Resources Drive, Little Rock, Arkansas 72209

COMPLETION REPORT: ARKANSAS STATE PESTICIDES IN GROUND WATER MONITORING PROJECT PHASE IV: EASTERN ARKANSAS (PULASKI, LEE AND JACKSON COUNTIES)

T. Nichols, P. Vendrell, K. Steele[1], H. D. Scott[2], C. Armstrong[3]

I. Summary

In 1995, fifty-two water samples were drawn from 49 new wells and 2 wells that had been previously sampled during earlier phases. These included twenty samples from 19 wells in eastern Pulaski County, thirteen wells in Lee County, 16 wells in Jackson County, two wells in Lonoke County, one well in Crittenden County and resamples of two wells in Woodruff County. Figure 1 shows the locations of the 3 counties where the majority of the samples were taken and Figures 2-4 show the monitoring locations withing these counties. The wells were tested for nitrate and 13 pesticides listed in Table 3. The data and associated quality control information for all the wells tested are included in Section 2: Phase IV Quality Assurance Report.

Of the 51 wells tested, three showed trace levels of pesticides. These included resamples of two contaminated wells in Woodruff County. Woodruff #7 continued to have bentazon contamination, 38 ug/L, and Woodruff #9 was found to still have detectable levels of acifluorfen (4 ug/L)and bentazon (26 ug/L). These pesticides have persisted for 18 months. The new detections were from Pulaski County, well #14. It was found to be contaminated with trace levels of four pesticides, acifluorfen (27 ug/L), bentazon (135 ug/L), fluometuron (24 ug/L)and metribuzin (4 ug/L). The detections in this well were confirmed and verified.

Samples for nitrate analysis were taken from all 51 wells. Thirty-seven of the wells had nitrate levels less than 1 mg/L, NO_3-N Thirteen wells had concentrations between 1 and 10 mg/L. The maximum contaminant level (MCL) for drinking water is 10 mg/L. Only Jackson #7 exceeded the MCL with 17.7 mg/L.

II. Background

In 1990 the U. S. Environmental Protection Agency (EPA) released the first report on its National Pesticide Survey. The report made it clear that ground water contamination by pesticides is a wide-spread problem in the U. S. In response, the EPA initiated its "Pesticides in Ground-Water Strategy" which included the State Management Plan (SMP) concept (EPA,1991). Arkansas completed its generic SMP--The Arkansas Agricultural

[1]Arkansas Water Resources Center, University of Arkansas, [2]Department of Agronomy, University of Arkansas, [3]Arkansas State Plant Board.

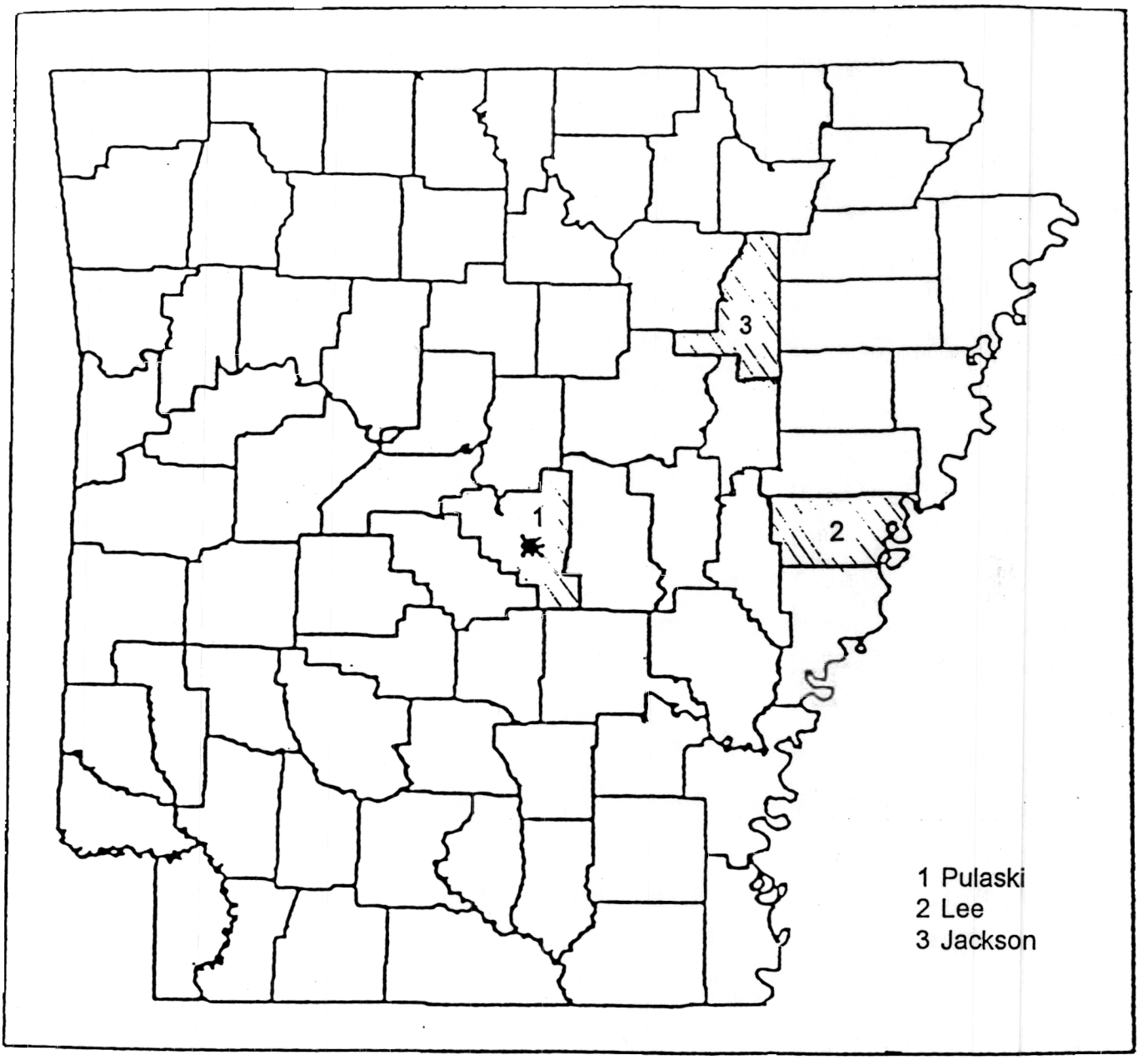

Figure 1 Counties Monitored During Phase IV. (Star indicates Little Rock)

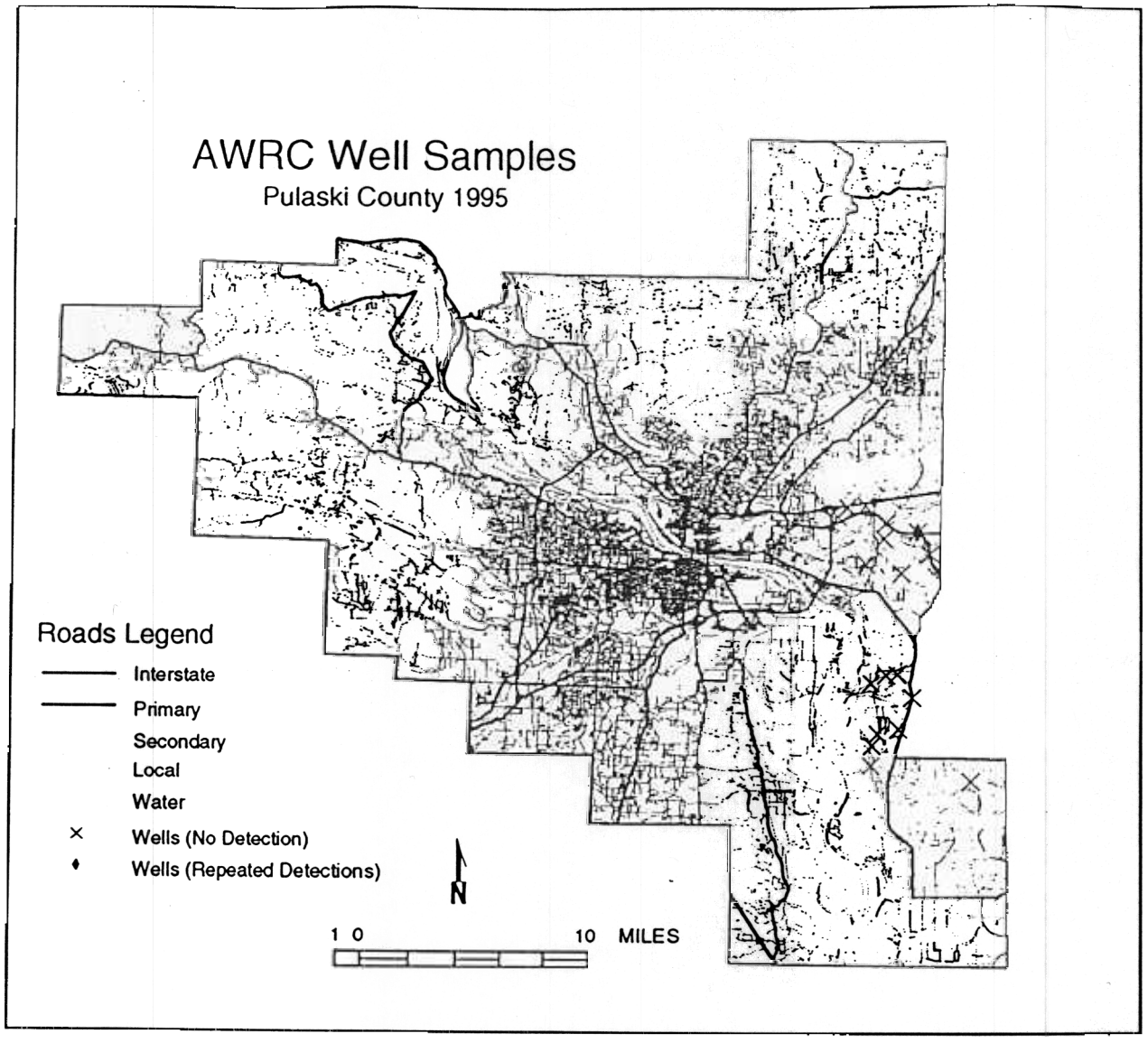

Figure 2. Monitoring Locations in Pulaski County.

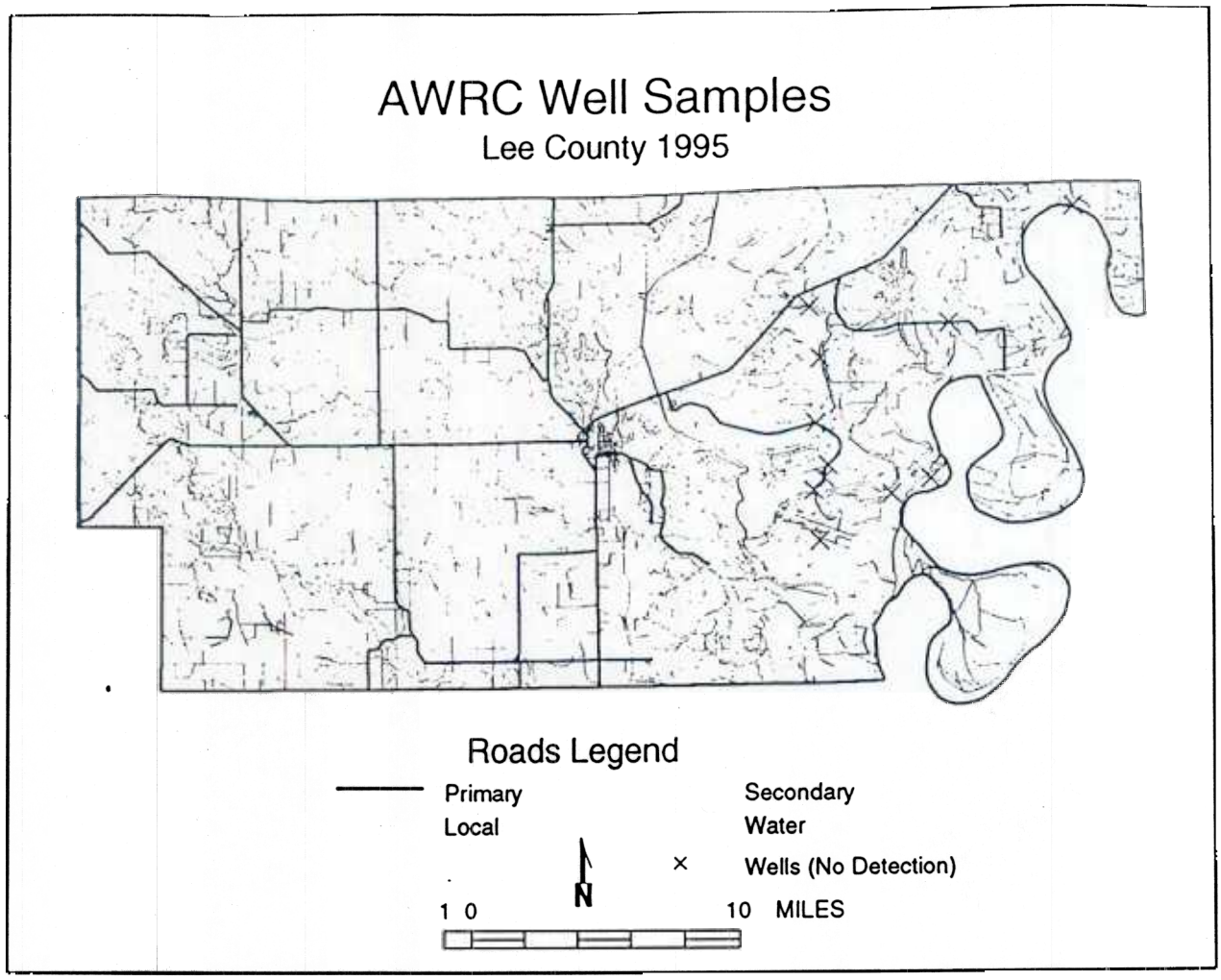

Figure 3. Monitoring Locations in Lee County.

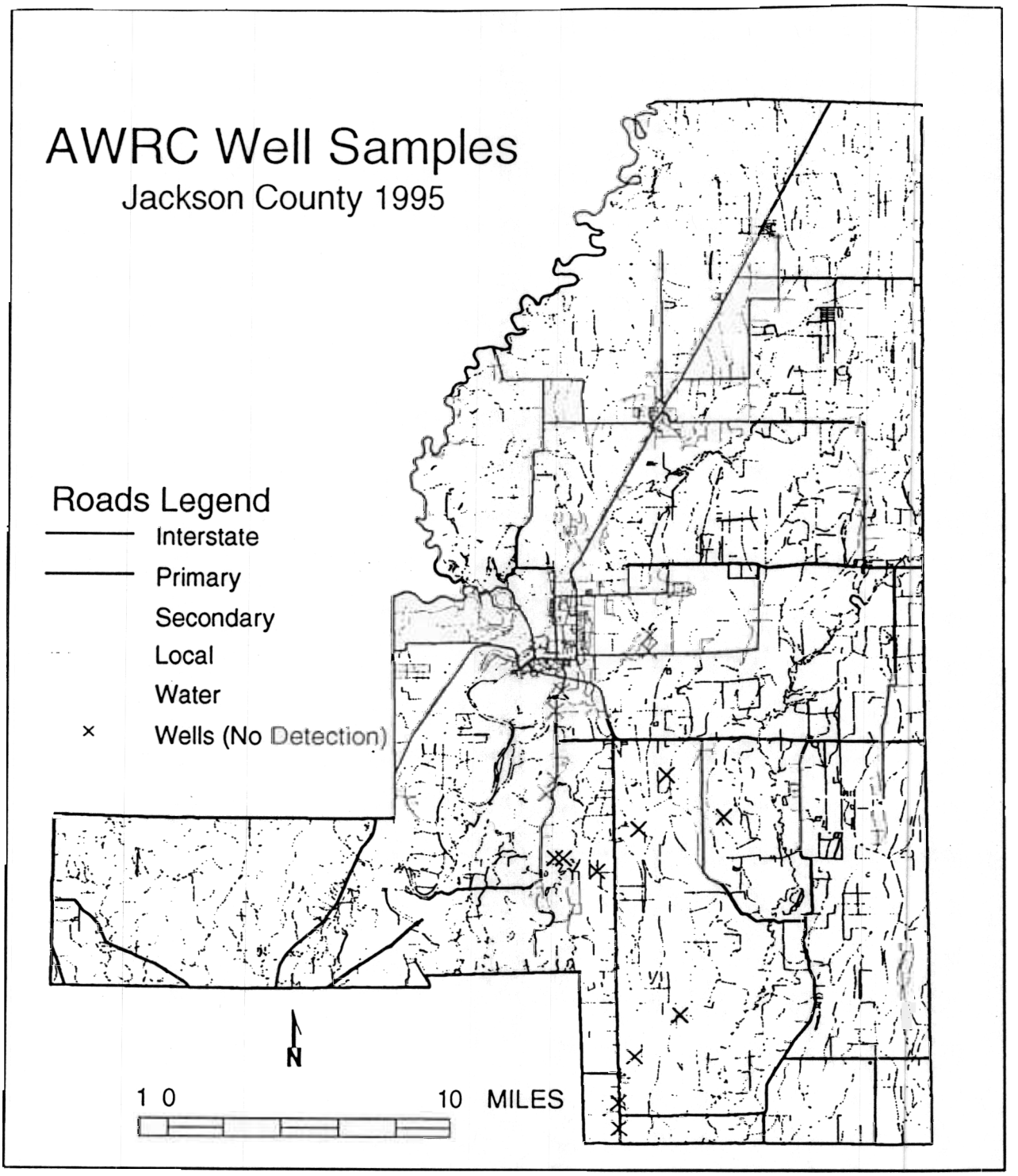

Figure 4. **Monitoring Locations in Jackson County.**

Chemical Ground-Water Management Plan--in 1992. This SMP called for monitoring of ground water for pesticides in those areas of the state thought to be most vulnerable.

With the Arkansas State Plant Board (ASPB) as lead agency, monitoring under the SMP began in September, 1992. Three phases of monitoring were carried out before this phase. Table 1 shows the counties and the number of wells tested during the first 3 phases of monitoring. With the completion of Phase IV, the number of wells tested has now risen to 169 with a total of 191 samples analyzed

Table 1. Areas Monitored During Phases I, II, and III.

County	Number of Wells	Number of Samples
Ashley	16	21
Chicot	6	6
Drew	1	2
Mississippi	15	16
Craighead	12	13
Poinsett	10	11
Woodruff	60	70
Total	120	139

Table 2 contains a summary of pesticide detections to date. Out of 120 wells sampled prior to Phase IV, 12 were contaminated, at least temporarily, with one or more pesticides. With the exception of three wells in Woodruff County, all the detections were small, less than 5 parts per billion. Bentazon (sold under the name 'Basagran') was the most frequently detected chemical and was found in the highest concentrations. It is used extensively for soybean production.

III. The Study Area

Phase IV of the monitoring program covered a broader area of the state than any of the previous phases. In the first three phases one county or an area consisting of parts of several counties was chosen for monitoring. Samples were then taken from both vulnerable and non-vulnerable parts of the designated area. In Phase IV a decision was made to concentrate on the most vulnerable areas of eastern Arkansas.

To identify areas where the ground water is vulnerable to pesticide contamination, a vulnerability map for the Arkansas Delta was developed using a combination of pesticide DRASTIC and pesticide use information. DRASTIC (Aller, et al., 1987) is a method for determining areas sensitive to ground-water contamination developed for EPA.

Table 2. Pesticide Detections during Phases I-IV.*

Well ID#	Date(s) Sampled	Chemical	Conc. (µg/L)
Drew #1	Apr. 22, 1993	Metolachlor	0.7
	May 20, 1993	no detection	
Miss #4	Nov. 2, 1993	Bentazon	2.5
Miss #5	Nov. 2, 1993	Bentazon	0.3
	Mar. 29, 1994	no detection	
CH #4	Nov. 22, 1993	Fluometuron	0.5
	Mar. 29, 1994	no detection	
Poin #1	Dec. 6, 1993	Bentazon	0.2
	Mar. 29, 1994	no detection	
Wood #7	May 23, 1994	Bentazon	55
	June 29, 1994	Bentazon	66
		Fluometuron	0.4
	July 27, 1994		
	inside	Bentazon	78
	outside	Bentazon	69
	May 15, 1995	Bentazon	21
	Oct. 12, 1995	**Bentazon**	**38**
Wood #9	May 24, 1994	Bentazon	25
		Acifluorfen	1.7
		Fluometuron	0.9
	June 29, 1994	Bentazon	88
		Acifluorfen	8.6
		Fluometuron	0.8
	15, 1995	**Bentazon**	**37**
		Acifluorfen	**6.8**
		Fluometuron	**0.4**
	12, 1995	Bentazon	26
		Acifluorfen	4
Wood #11	Jul. 26, 1994	Metolachlor	13
	Feb. 20, 1995	Metolachlor	11.5
Wood #25	Sep. 15, 1994	Bentazon	4.4
	Feb. 20, 1995	Bentazon	1.9
Wood #26	Sep. 15, 1994	Bentazon	1.5
	Feb. 20, 1995	Bentazon	0.9
Wood #29	Sep. 29, 1994	Metribuzin	0.4
	Feb. 20, 1995	Metribuzin	0.4
Wood #34(PB)	Feb. 20, 1995	Alachlor	1.5
	May 15, 1995	Bentazon	1.5
		Acifluorfen	0.5

Phase IV detections shown in bold face type.

Table 2. Pesticide Detections during Phases I-IV (continued).

Well ID#	Date(s) Sampled	Chemical	Conc. (µg/L)
Pulaski #14	Jun. 19, 1995	Acifluorfen	27
		Bentazon	135
		Fluometuron	24
		Metribuzin	4
	Sep. 28, 1995	**Acifluorfen**	**11**
		Bentazon	**57**
		Fluometuron	**19**
		Metribuzin	**2**

*Phase IV detections shown in bold face type

DRASTIC determines ground-water sensitivity to contamination based on seven factors:

Depth to Ground Water
net **R**echarge
Aquifer media
Soil media
Topography
Impact of the vadose zone, and
hydraulic **C**onductivity

The Arkansas Soil and Water Conservation Commission (ASWCC coordinated development of the vulnerability map for Arkansas (Fugitt, 1992). For this purpose estimates of pesticide use in the various counties was provided by the Arkansas Cooperative Extension Service (CES).

The vulnerability map of the Arkansas Delta indicates that the alluvial aquifers underlying the major river basins are highly vulnerable to contamination. These rivers wander in and out of various counties. For example, Woodruff County is bisected by the Cache River which then continues southward through Monroe County before joining the White River. North of Woodruff County the Cache runs through part of Jackson County where it parallels the Black River, another tributary of the White River. Based on the model, the alluvium underlying the Black and Cache Rivers is highly vulnerable.

East of Crowley's Ridge, the St. Francis River basin is also underlain by highly vulnerable alluvial deposits. Phase II monitoring in Mississippi, Craighead and Poinsett Counties was mainly in the St. Francis basin. Another major river basin is the Arkansas River Basin. The alluvial deposits of the Arkansas

River stretch from eastern Pulaski County southeastward through Lonoke, Jefferson, Lincoln and Desha Counties.

Prior to beginning Phase IV, it was decided to evaluate the remainder of these basins as quickly as possible. Phase IV monitoring was conducted in Pulaski (Arkansas River Basin), Lee (lower St. Francis) and Jackson (Cache and Black Rivers) Counties.

The alluvium in the Arkansas River basin is highly vulnerable to pesticide contamination along much of its length, including eastern Pulaski County. Here the meandering of the river has created a wide, fertile valley, dotted with oxbow lakes and cypress swamps. Traditionally the area has been heavily farmed with soybeans, rice, wheat and truck gardens predominating. Some cotton is also grown. Now, however, urban sprawl from Little Rock is replacing some of the farmlands.

In eastern Pulaski County, depths to water in the alluvium range from 10 to 40 feet. Annual fluctuations around 10 feet are common, with the highest water levels occurring in the spring and lowest levels occurring in late summer or early fall. Much of this fluctuation is due to heavy pumping for irrigation (Hines, 1967). This is not an area where heavy pumping is permanently lowering ground water levels.

Monitoring in Lee County was conducted in a highly vulnerable section of the alluvium underlying the St. Francis River basin just north of the St. Francis National Forest where the river joins the Mississippi. Cotton, soybeans and winter wheat are the most common crops. Shallow ground water is available for irrigation in almost limitless supplies.

Jackson County is underlain by alluvial deposits from the interior highlands on the northwest to the Cache River on the southeast. The Black River cuts a diagonal across this area from northeast to southwest where it joins the White River at Newport. Water in the alluvial aquifer generally follows the ground surface and runs from north to south (Broom, 1981). Water levels average about 20 feet below the land surface and fluctuate about 10 feet. Fluctuations are due to changes in pumping and recharge as the seasons change (Albin, 1967). The principal crops are wheat, soybeans, cotton, grain sorghum and rice.

IV. Monitoring Results

The counties described were monitored for nitrate and 13 commonly used pesticides that have high potential to migrate to ground water. Table 3 gives a list of the pesticides analyzed in this study and the methods used. Estimated detection limits for each pesticide are also shown. These pesticides were chosen because of their extensive use in Eastern Arkansas, their high

leaching potential and their long half-life in soil. Solubility, half-life, adsorption coefficient (K_{oc}), and leaching potential were taken from the Arkansas State Plant Board (Nichols and Wilkes, 1992) which is based on data from CES.

Ten liters of water were collected from each well, providing enough water to have a sample and a field fortified sample for each of the three methods, as well as extra water for duplicate analysis or confirmation of hits.

Table 3. Phase IV Analytes.

Compound	Source/Method	Matrix	Units	EDL*
Metolachlor	EPA/507.1	groundwater	ug/L	0.75
Alachlor	EPA/507.1	groundwater	ug/L	0.38
Molinate	EPA/507.1	groundwater	ug/L	0.15
Atrazine	EPA/507.1	groundwater	ug/L	0.13
Metribuzin	EPA/507.1	groundwater	ug/L	0.15
Norflurazon	EPA/507.1	groundwater	ug/L	0.50
Linuron	NPS/4	groundwater	ug/L	0.25
Flumeturon	NPS/4	groundwater	ug/L	0.10
Cyanazine	NPS/4	groundwater	ug/L	0.58
Diuron	NPS/4	groundwater	ug/L	0.070
2,4-D	EPA/515.2	groundwater	ug/L	0.20
Bentazon	EPA/515.2	groundwater	ug/L	0.20
Acifluorfen	EPA/515.2	groundwater	ug/L	0.096

*Estimated Detection Limit (published with method.

Table 2 shows a listing of all the contaminated wells including those sampled during Phase IV. Two of the detections from Phase IV are from wells in Woodruff County. They were resampled during Phase IV because of the high concentrations previously detected. Woodruff #7 has been tested 5 times in 17 months. Initially fluometuron, 0.4 ug/L, was detected along with bentazon, 55 ug/L. In subsequent analyses fluometuron was never detected again but bentazon has persisted in the well. There is no steady trend in the data, but the current level, 38 ug/L, is about 50% of the highest concentration, 78 ug/L, reported in July, 1994.

Woodruff #9 again tested positive for bentazon, 26 ug/L, and aciflurofen, 4 ug/L. These concentrations are down since the well was last sampled in May, 1995. Aciflurofen which persisted in the well for a year has now disappeared completely

Of the new wells monitored during Phase IV, only one was contaminated with pesticides. However, this well, Pulaski #14, is contaminated with 4 pesticides (acifluorfen, 27 ug/L, bentazon, 135 ug/L, fluometuron, 24 ug/L, and metribuzin, 4 ug/L)

and the concentration of bentazon is the highest pesticide concentration found in Arkansas ground water to date. After the original detections were confirmed, the well was retested to verify that the contamination had not been a transitory phenomenon. The second analysis showed that all the pesticide concentrations had gone down but were still detectable. At the same time a second well, located less than 100 yards west of the contaminated well, was also tested. No pesticides were detected in the second well. The well is scheduled for retesting during Phase V of the monitoring. It is also a candidate for a pumping study to determine if a long period of pumping will significantly reduce pesticide concentrations in samples taken immediately thereafter.

Table 5. Nitrate Distribution.

Concentration (mg/L, NO_3-N)	**Number of Wells**
less than 0.01 (below detection limit)	13
0.1 to 0.99	22
1.0 to 4.99	8
5.0 to 9.99	5
10.0* or more	1
Total	49

The MCL for NO_3-N in drinking water is 10.0 mg/L.

Table 5 shows the distribution of nitrate in the 49 new wells tested. Thirteen had undetectable levels of nitrate. Twenty-two had detectable levels of nitrate-nitrogen below 1 mg/L. Eight were between 1 and 5 mg/L and five were between 5 and 10 mg/L. One of the wells was above the MCL for nitrate with a concentration of 17.7 mg/L. If a concentration greater than 1 is considered elevated then 14 of the 49 wells, or 29%, are contaminated. This is consistent with results from previous phases where 33% of the wells were above 1 mg/L.

V. Conclusions

During Phase IV monitoring 49 new wells were tested in 5 counties. There is no indication of wide-spread pesticide contamination of ground water in the areas studied. Only one well was found to be contaminated with pesticides. As another

well nearby was not contaminated, it is probable that this contamination incident is point-source. That is, no evidence of aquifer contamination was found.

In total, 13 of 169 wells, or 7.7%, have been found to be contaminated with detectable levels of one or more pesticides. One well could not be retested due to a broken pump. Four other wells were free of pesticides when resampled. In most of the other wells concentrations were declining when retested. There have not been any cases of multiple wells with pesticide contamination located together in a small geographical area. These results show no evidence pointing to aquifer-wide contamination.

However, Phase IV results and overall results both indicate about 30% of wells have levels of nitrate-nitrogen above 1 mg/L. Nitrate contamination is much more common than pesticide contamination. Though these data are not positive proof, it seems likely that this contamination is not the result of spills or other accidents at the wellheads. Rather, septic tanks and the normal use of commercial fertilizers are the most likely sources of this contamination. By chemical analysis, it is not possible to distinguish between these two sources and the locations of most of the shallow wells relative to septic tanks is unknown. Determining the relative contributions of each of these sources is beyond the scope of this project.

REFERENCES

Albin, D. R., M. S. Hines and J. W. Stephens. 1967. Water Resources of Jackson and Independence Counties, Arkansas. U. S. Geological Survey. Geological Survey Water-Supply Paper 1839-G.

Aller, L., T. Bennett, J. Lehr, and R. J. Petty. 1987. DRASTIC: A Standardized System for Evaluating Groundwater Pollution Potential Using Hydrogeologic Settings. Report No. EPA/600/2-87/035. U. S. Environmental Protection Agency.

Broom, M. E., and F. P. Lyford. 1981. Alluvial Aquifer of the Cache and St. Francis River Basins, Northeastern Arkansas. U. S. Geological Survey.

Fugitt, Todd. 1992. Development of Hydrogeologic Data for Eastern Arkansas and Ground-Water Vulnerability Identification in Woodruff County, Arkansas. Arkansas Soil and Water Conservation commission, Little, Rock, AR.

Nichols, T. and S. Wilkes (eds). 1992 Arkansas Agricultural Chemical Ground-Water Management Plan. Arkansas Water Resources Center, Univesity of Arkansas, Fayetteville, AR.

Plebuch, R. O. and M. S. Hines. 1967. Water Resources of Pulaski and Saline Counties, Arkansas. U. S. Geological Survey. Geological Survey Water-Supply Paper 1839-B.

U. S. Environmental Protection Agency. 1990. National Survey of Pesticides in Drinking Water Wells: Phase 1 Report. EPA-570/9-90-015. Washington D. C.

U. S. Environmental Protection Agency. 1991. Pesticides and Ground-Water Strategy. Washington D. C.

QUALITY ASSURANCE REPORT

ARKANSAS STATE

PESTICIDES IN GROUND WATER

MONITORING PROJECT

PHASE IV: EASTERN ARKANSAS

(PULASKI, LEE AND JACKSON COUNTIES)

QUALITY ASSURANCE REPORT: ARKANSAS STATE PESTICIDES IN GROUND WATER MONITORING PROJECT PHASE IV: EASTERN ARKANSAS (PULASKI, LEE AND JACKSON COUNTIES)

T. Nichols, P. Vendrell, K. Steele

I Introduction

In 1995, fifty-two water samples were drawn from fifty-one wells in various Arkansas counties. Twenty samples were drawn from 19 wells in eastern Pulaski County. Thirteen wells in Lee County and 16 wells in Jackson County were also tested. In addition, samples from two wells in Lonoke County, one well in Crittenden County and two in Woodruff County were analyzed. Ten liters of water were collected from each well, providing enough water to have a sample and a field fortified sample for each of the three methods, as well as extra water for duplicate analysis. Table 1 shows a list of the pesticides analyzed in these samples including the methods used and their estimated detection limits.

Table 1. Phase III Analytes.

Compound	Source/Method	Matrix	Units	EDL*
Metolachlor	EPA/507.1	groundwater	ug/L	0.75
Alachlor	EPA/507.1	groundwater	ug/L	0.38
Molinate	EPA/507.1	groundwater	ug/L	0.15
Atrazine	EPA/507.1	groundwater	ug/L	0.13
Metribuzin	EPA/507.1	groundwater	ug/L	0.15
Norflurazon	EPA/507.1	groundwater	ug/L	0.50
Linuron	NPS/4	groundwater	ug/L	0.25
Flumeturon	NPS/4	groundwater	ug/L	0.10
Cyanazine	NPS/4	groundwater	ug/L	0.58
Diuron	NPS/4	groundwater	ug/L	0.070
2,4-D	EPA/515.2	groundwater	ug/L	0.20
Bentazon	EPA/515.2	groundwater	ug/L	0.20
Acifluorfen	EPA/515.2	groundwater	ug/L	0.096

*Estimated Detection Limit

Of the 51 wells tested, three showed trace levels of pesticides. These included resamples of two wells from Woodruff County known to be contaminated and a well in Pulaski County which was sampled twice. Table 2 shows a listing of the contaminated wells including the concentrations detected in samples taken at different times.

[1]Arkansas Water Resources Center, University of Arkansas.

Table 2. Wells Contaminated with Pesticides.

Well ID	Date Sampled	Chemical	Conc. (µg/L)
PULASKI#14	JUNE 19	ACIFLUORFEN	27
		BENTAZON	135
		FLUOMETURON	24
		METRIBUZIN	4
	SEPTEMBER 28	ACIFLUORFEN	11
		BENTAZON	57
		FLUOMETURON	19
		METRIBUZIN	2
WOODRUFF#7R4	OCTOBER 12	BENTAZON	38
WOODRUFF#9R3	OCTOBER 12	ACIFLUORFEN	4
		BENTAZON	26

II. Interpretation of QC data.

During the project, six trips were made to collect water. The samples collected on each trip were extracted and analyzed as a batch, with each batch being subdivided into the three methods of analysis indicated in Table 1. The tabulated quality control data follow this format. Thus, for each sampling trip the reported analysis results are accompanied by three QC reports, one for each method. The following paragraphs are intended as an aid in interpreting the QC data.

The major QA/QC concern of this study is to demonstrate an ongoing ability to detect small amounts of pesticides in various ground waters. Primary to this purpose are the three (one for each method) field fortified samples collected from each well--except Lonoke#1 where the spikes were inadvertently omitted--and spiked with low levels of the appropriate pesticides. Table 3 shows the concentrations of these pesticides in the "field spikes." Extraction and analysis of these field spikes were done for every well and for every method, far exceeding EPA's recommendation that water from one source in every ten be field fortified. Consistent recoveries of the pesticides spiked into the various ground waters indicate that sample extraction and analysis are acceptable; nothing in the ground waters is preventing the detection of pesticides in the non-fortified samples and sample handling procedures are adequate to avoid pesticide degradation.

As a further check that small amounts of pesticide will not go unnoticed, 2X standards (containing pesticide concentrations at about two times the estimated detection limit for the

Table 3. Spiking Levels.

METHOD	PESTICIDE	CONCENTRATION (ug/L)	
		FIELD SPIKE	2X STANDARD
507	Molinate	2.00	0.40
	Atrazine	2.06	0.41
	Metribuzin	2.10	0.42
	Alachlor	4.08	0.81
	Metolachlor	13.72	2.74
	Norflurazon	5.90	1.18
515.2	2,4-D	3.00	0.60
	Bentazon	7.21	1.44
	Aciflurofen	3.15	0.63
NPS4	Cyanazine	6.42	1.28
	Fluometuron	1.10	0.22
	Diuron	0.99	0.20
	Linuron	3.03	0.60

pesticide) were analyzed with most batches. Concentrations for the 2X standards are also included in Table 3. In most of the QC reports, peak areas for a 2X standard are reported to demonstrate instrument capability to detect very small amounts of pesticides. EPA holding times for samples and extracts were met without exception and samples and extracts were held at or below 4°C at all times.

Recovery of a spiked pesticide from any field spike should be within the normal range of recovery for the laboratory doing the work. This laboratory has a history of successful analyses from which to determine a "normal" range of recovery for each analyte. Table 4 shows the mean recoveries and associated standard deviations for the pesticides in this study. These were derived from field spikes collected previously in studies of ground water in six Arkansas counties.

The acceptable range of recovery is defined as the mean plus/minus 3 standard deviations. For example the mean recovery for molinate, for 132 spikes analyzed, was 88.2% with a standard deviation of 114.1% yielding an acceptable range of 45.9 - 130.5%. If the recovery of a particular analyte from a field spike is outside the acceptable range then the result for that analyte for that well is reported as suspect. In addition, surrogate recovery for the non-fortified samples must also fall in the normal range of surrogate recoveries which are defined in the same way. A surrogate is a pure compound not expected to be in the sample. A known amount of surrogate is added to the sample water before extraction as a check on the sample preparation and

Table 4. Summary of Spike Recoveries for EPA Methods 507, 515 and National Pesticide Survey Method 4 - Mean, Standard Deviation and Range.

Chemical	N	Mean (M) %	Std. Dev. (s) %	Acceptable Range (M±3s) %
EPA METHOD 507				
Molinate	132	88.2	14.1	45.9 - 130.5
Atrazine	137	94.9	14.7	50.8 - 138.9
Metribuzin	137	93.9	15.2	48.3 - 139.4
Alachlor	137	93.7	14.6	49.9 - 137.5
Metolachlor	137	97.5	12.9	58.7 - 136.3
Norflurazon	137	98.6	16.0	50.6 - 146.6
EPA507 surrogate	345	91.0	18.7	34.9 - 147.1
NPS METHOD 4				
Cyanazine	136	88.8	14.9	44.1 - 133.5
Fluometuron	136	85.2	13.8	43.8 - 126.5
Diuron	135	88.1	11.6	53.2 - 123.0
Linuron	136	83.0	10.8	50.7 - 115.4
NPS4 surrogate	337	83.9	14.8	39.6 - 128.2
EPA METHOD 515				
2,4-D	106	84.1	18.4	28.9 - 139.4
Bentazon	100	82.2	16.9	31.4 - 133.1
Aciflurofen	106	81.7	18.5	26.3 - 137.1
EPA515 surrogate	242	89.6	20.6	27.8 - 151.3

extraction procedures. The normal ranges for surrogate recoveries are also given in Table 4.

Results are reported as suspect due to matrix effects if the spike recovery or the surrogate recovery was not in the specified range. In actuality, none of the recoveries in this study was so low as to cause suspicion of false negatives.

Nitrate-nitrogen was also analyzed and reported for Phase IV. QC data were collected on one sample from each sampling trip. For this, a duplicate analysis was performed with a percent relative standard deviation (%RSD) less than 10% being satisfactory. A spike was also analyzed with a percent recovery from 90 to 110% required to pass.

III.QA/QC Summary.

Sampling procedures set out in the QAPP for this project were followed on all sample collection trips. Samples were iced immediately and kept iced until delivered to the lab. Sample custody forms were maintained through sample delivery and are on file with the records of this project. EPA holding times for samples and extracts were met without exception and samples and extracts were held in the lab at 4°C, or below, at all times. No detectable levels of pesticide were in any of the laboratory "blanks."

Appendix A contains analysis results and spike recovery information for six sampling trips during Phase IV. (QC data related to additional Phase IV sampling done in Woodruff County were reported previously in the Woodruff County QC report.) For the fifty-two samples there were a total of 676 data points (52 times 13 pesticides) of which 12, or 1.8%, have been reported as suspect. Suspect results have been highlighted with grey shading on the analysis reports.

An exception to the above mentioned practice should be noted. Two spike recoveries for the 14th well sampled in Pulaski County were out of range, but the corresponding results were not reported as suspect. These were spike recoveries associated with pesticide detections. In both cases the detections were confirmed by ASPB and the concentrations assigned by the ASPB laboratory were close to those determined in our laboratory.

Being able to recover the minimum acceptable amount, or more, of the pesticides in all but one of the field spikes assures the researchers that no significant amounts of pesticide have gone undetected. The authors feel the QC data for these analysis results are adequate for the stated purposes of the study.

All the QC data for nitrate-nitrogen were satisfactory. However, there was no %RSD calculated for the duplicate analysis from both trips to Pulaski County and trip #2 to Lee County as at least one of the duplicate measurements was below the detection limit making computation of this statistic impossible.

APPENDIX A

ANALYSIS RESULTS

AND

SPIKE RECOVERY DATA

RESULTS OF PESTICIDE MONITORING : TRIP #1 TO PULASKI COUNTY-JUNE, 1995. Page 1.

(unk = unknown, NC = not collected, ND = not detected) ([redacted] = suspect, see text)

	1	2	3	4	5
WELL ID:	PUL#01	PUL#02	PUL#03	PUL#04	PUL#05
DATE SAMPLED:	5-Jun-95	5-Jun-95	5-Jun-95	5-Jun-95	5-Jun-95
LATITUDE:	34° 37' 49"	34° 40' 32"	34° 38' 26"	34° 37' 04"	34° 40' 12"
LONGITUDE:	92° 07' 48"	92° 06' 36"	92° 06' 34"	92° 07' 55"	92° 07' 49"
DEPTH OF WELL, ft:	<20	50	85	70	shallow
pH, standard units:	7.1	6.9	7.2	6.8	6.7
CONDUCTIVITY AT 25° C , umhos/cm:	575	1023	384	414	864
TEMPERATURE, ° C :	19	19	20	19	18.5
NITRATE, mg/L:	<0.01	0.02	<0.01	0.01	<0.01
ACIFLUORFEN, ug/L	ND	ND	ND	ND	ND
ALACHLOR, ug/L:	ND	ND	ND	ND	ND
ATRAZINE,ug/L:	ND	ND	ND	ND	ND
BENTAZON, ug/L	ND	ND	ND	ND	ND
CYANAZINE, ug/L:	ND	ND	ND	ND	ND
DIURON, ug/L:	ND	ND	ND	ND	ND
FLUOMETURON, ug/L:	ND	ND	ND	ND	ND
LINURON, ug/L:	ND	ND	ND	ND	ND
METOLACHLOR, ug/L:	ND	ND	ND	ND	ND
METRIBUZIN, ug/L:	ND	ND	ND	ND	ND
MOLINATE, ug/L:	ND	ND	ND	ND	ND
NORFLURAZON, ug/L	ND	ND	ND	ND	ND
2,4-D, ug/L	ND	ND	ND	ND	ND

RESULTS OF PESTICIDE MONITORING : TRIP #1 TO PULASKI COUNTY-JUNE, 1995. Page 2

(unk = unknown, NC = not collected, ND = not detected) (▒▒▒▒▒▒▒▒ = suspect, see text)

	6	7	8	9	10
WELL ID:	PUL#06	PUL#07	PUL#08	PUL#09	LON#01
DATE SAMPLED:	5-Jun-95	6-Jun-95	6-Jun-95	6-Jun-95	6-Jun-95
LATITUDE:	34° 38' 16"	34° 40' 30"	34° 39' 38"	34° 36' 26"	34° 40' 38"
LONGITUDE:	92° 07' 32"	92° 07' 07"	92° 05' 55"	92° 03' 25"	92° 04' 51"
DEPTH OF WELL, ft:	30	50-60	<60	37	shallow
pH, standard units:	7	6.8	6.7	6	6.7
CONDUCTIVITY AT 25° C , umhos/cm:	437	501	357	281	603
TEMPERATURE, ° C :	18	18	19	20	19
NITRATE, mg/L:	0.01	0.68	0.02	5.94	0.02
ACIFLUORFEN, ug/L	ND	ND	ND	ND	ND
ALACHLOR, ug/L:	ND	ND	ND	ND	ND
ATRAZINE,ug/L:	ND	ND	ND	ND	ND
BENTAZON, ug/L	ND	ND	ND	ND	ND
CYANAZINE, ug/L:	ND	ND	ND	ND	ND
DIURON, ug/L:	ND	ND	ND	ND	ND
FLUOMETURON, ug/L:	ND	ND	ND	ND	ND
LINURON, ug/L:	ND	ND	ND	ND	ND
METOLACHLOR, ug/L:	ND	ND	ND	ND	ND
METRIBUZIN, ug/L:	ND	ND	ND	ND	ND
MOLINATE, ug/L:	ND	ND	ND	ND	ND
NORFLURAZON, ug/L	ND	ND	ND	ND	ND
2,4-D, ug/L	ND	ND	ND	ND	ND

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO PULASKI COUNTY - JUNE. 1995.

EPA METHOD 507 - PAGE 1

PERCENT RECOVERIES

	SURROGATE	MOLINATE	ATRAZINE	METRIBUZIN	ALACHLOR	METOLACHLOR	NORFLURAZON	INT. STD.
FIELD FORTIFIED SAMPLES								
PUL#01	58	75	88	100	92	89	98	90
PUL#02	58	74	87	101	87	89	96	88
PUL#03	81	86	98	114	97	98	115	79
PUL#04	73	84	95	114	97	94	105	89
PUL#05	38	59	84	98	85	84	96	79
PUL#06	62	85	102	116	106	100	116	80
PUL#07	69	85	95	113	94	99	131	81
PUL#08	64	79	92	100	96	95	109	74
PUL#09	75	88	99	97	95	100	108	81
NON-FORTIFIED SAMPLES								
PUL#01	69							75
PUL#02	75							70
PUL#03	60							71
PUL#04	66							69
PUL#05	66							67
PUL#06	78							69
PUL#07	73							66
PUL#08	63							68
PUL#09	64							69
LON#01	74							69

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO PULASKI COUNTY - JUNE. 1995.

EPA METHOD 507 - PAGE 2

PERCENT RECOVERIES

LAB BLANKS

	SURROGATE	MOLINATE	ATRAZINE	METRIBUZIN	ALACHLOR	METOLACHLOR	NORFLURAZON	INT. STD.
2186bl	84							72
2188bl	65							66

CONCENTRATIONS FOR LAB BLANKS

2186bl	0	0	0	0	0	0	
2188bl	0	0	0	0	0	0	

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

P2203	P2205	%RSD
116366	119021	2.26

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

1ST RUN	2ND RUN	%RSD
139103	148196	6.33

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO PULASKI COUNTY - JUNE. 1995.

PERCENT RECOVERIES

	SURROGATE	2,4-D	INT. STD	BENTAZON	ACIFLUROFEN
FIELD FORTIFIED SAMPLES					
PUL#01	84	51	105	57	53
PUL#02	69	69	104	69	72
PUL#03	188	55	104	57	56
PUL#04	88	73	103	74	73
PUL#05	84	59	112	66	63
PUL#06	129	74	111	80	78
PUL#07	82	75	102	73	72
PUL#08	57	67	116	70	67
PUL#09	71	67	113	71	68
NON-FORTIFIED SAMPLES					
PUL#01	75		114		
PUL#02	74		113		
PUL#03	109		110		
PUL#04	73		107		
PUL#05	140		108		
PUL#06	96		108		
PUL#07	74		109		
PUL#08	149		107		
PUL#09	59		105		
LON#01	288		112		

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO PULASKI COUNTY - JUNE. 1995.

PERCENT RECOVERIES

	SURROGATE	2,4-D	INT. STD.	BENTAZON	ACIFLUROFEN
LAB BLANKS					
2192BL	76		112		
2194BL	65		113		

CONCENTRATIONS FOR LAB BLANKS

2192BL	0	0	0
2194BL	0	0	0

PEAK AREAS FOR A 2X* STANDARD

	2,4-D	BENTAZON	ACIFLUROFEN
2X STANDARD	82811	166975	473708

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

		%RSD
2259	2250	
467833	491005	4.83

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO PULASKI COUNTY - JUNE. 1995.

PERCENT RECOVERIES

	CYANAZINE	FLUOMETURON	DIURON	LINURON	SURROGATE	INT. STD.
FIELD FORTIFIED SAMPLES						
PUL#01	92	89	90	90	93	114
PUL#02	92	95	94	95	99	113
PUL#04	90	84	90	81	84	114
PUL#05	80	79	80	77	82	117
PUL#06	94	90	94	90	90	113
PUL#07	94	90	93	77	94	109
PUL#08	90	87	93	75	96	108
PUL#09	91	76	89	64 ✓	78	111
NON-FORTIFIED SAMPLES						
PUL#01					85	116
PUL#02					94	105
PUL#03					87	115
PUL#04					85	113
PUL#05					94	115
PUL#06					90	117
PUL#07					89	116
PUL#08					95	122
PUL#09					91	115
LON#01					95	119

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO PULASKI COUNTY - JUNE. 1995.

PERCENT RECOVERIES

LAB BLANKS

	CYANAZINE	FLUOMETURON	DIURON	LINURON	SURROGATE	INT. STD.
2189bl					92	116
2191bl					91	121

CONCENTRATIONS FOR LAB BLANKS

2189bl	0	0	0	0
2191bl	0	0	0	0

PEAK AREAS FOR A 2X* STANDARD

CYANAZINE	FLUOMETURON	DIURON	LINURON
2759	844	2905	7527

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

P2214	P2215	%RSD
150422	165956	9.82

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

1ST RUN	2ND RUN	%RSD
158922	161229	1.44

*ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO PULASKI COUNTY - JUNE. 1995.

NITRATE

SPIKE RECOVERY

WELL NUMBER	% RECOVERY
PUL #2	96%

DUPLICATE ANALYSIS

1ST MEASUREMENT	2ND MEASUREMENT	% RSD
<0.01 mg/L	0.01 mg/l	NC

RESULTS OF PESTICIDE MONITORING : TRIP #2 TO PULASKI COUNTY-JUNE, 1995. Page 1.

(unk = unknown, NC = not collected, ND = not detected) (▒▒▒▒▒▒▒▒ = suspect, see text)

	1	2	3	4	5
WELL ID:	PUL#10	PUL#11	PUL#12	PUL#13	PUL#14
DATE SAMPLED:	19-Jun-95	19-Jun-95	19-Jun-95	19-Jun-95	19-Jun-95
LATITUDE:	34° 45' 41"	34° 46' 56"	34° 46' 52"	34° 46' 18"	34° 45' 56"
LONGITUDE:	92° 07' 14"	92° 08' 06"	92° 08' 59"	92° 07' 07"	92° 05' 42"
DEPTH OF WELL, ft:	95	shallow	18	18	20-30
pH, standard units:	6.8	6.1	6.1	6.6	6.9
CONDUCTIVITY AT 25° C , umhos/cm:	257	243	349	471	455
TEMPERATURE, ° C :	18	18	18	18	21
NITRATE, mg/L:	<0.01	6.4	0.95	1.73	3.62
ACIFLUORFEN, ug/L	ND	ND	ND	ND	27
ALACHLOR, ug/L:	ND	ND	ND	ND	ND
ATRAZINE,ug/L:	ND	ND	ND	ND	ND
BENTAZON, ug/L	ND	ND	ND	ND	135
CYANAZINE, ug/L:	ND	ND	ND	ND	ND
DIURON, ug/L:	ND	ND	ND	ND	ND
FLUOMETURON, ug/L:	ND	ND	ND	ND	24
LINURON, ug/L:	ND	ND	ND	ND	ND
METOLACHLOR, ug/L:	ND	ND	ND	ND	ND
METRIBUZIN, ug/L:	ND	ND	ND	ND	4
MOLINATE, ug/L:	ND	ND	ND	ND	ND
NORFLURAZON, ug/L	ND	ND	ND	ND	ND
2,4-D, ug/L	ND	ND	ND	ND	ND

RESULTS OF PESTICIDE MONITORING : TRIP #2 TO PULASKI COUNTY-JUNE, 1995. Page 2

(unk = unknown, NC = not collected, ND = not detected) (▒▒▒▒▒▒▒▒ = suspect, see text)

	6	7	8	9	10
WELL ID:	LON #2	PUL #15	PUL #16	PUL #17	PUL #18
DATE SAMPLED:	19-Jun-95	19-Jun-95	19-Jun-95	19-Jun-95	19-Jun-95
LATITUDE:	34° 45' 49"	34° 46' 32"	34° 45' 05"	34° 44' 43"	34° 44' 22"
LONGITUDE:	92° 03' 58"	92° 09' 27"	92° 05' 09"	92° 08' 05"	92° 06' 27"
DEPTH OF WELL, ft:	65	shallow	52	28	32
pH, standard units:	7	6.8	7.3	6.8	6.8
CONDUCTIVITY AT 25° C , umhos/cm:	442	927	560	250	209
TEMPERATURE, ° C :	21	18	20	20.5	19
NITRATE, mg/L:	0.01	0.01	0.01	2.77	2.48
ACIFLUORFEN, ug/L	ND	ND	ND	ND	ND
ALACHLOR, ug/L:	ND	ND	ND	ND	ND
ATRAZINE,ug/L:	ND	ND	ND	ND	ND
BENTAZON, ug/L	ND	ND	ND	ND	ND
CYANAZINE, ug/L:	ND	ND	ND	ND	ND
DIURON, ug/L:	ND	ND	ND	ND	ND
FLUOMETURON, ug/L:	ND	ND	ND	ND	ND
LINURON, ug/L:	ND	ND	ND	ND	ND
METOLACHLOR, ug/L:	ND	ND	ND	ND	ND
METRIBUZIN, ug/L:	ND	ND	ND	ND	ND
MOLINATE, ug/L:	ND	ND	ND	ND	ND
NORFLURAZON, ug/L	ND	ND	ND	ND	ND
2,4-D, ug/L	ND	ND	ND	ND	ND

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO PULASKI COUNTY - JUNE. 1995.

EPA METHOD 507 - PAGE 1

PERCENT RECOVERIES

	SURROGATE	MOLINATE	ATRAZINE	METRIBUZIN	ALACHLOR	METOLACHLOR	NORFLURAZON	INT. STD.
FIELD FORTIFIED SAMPLES								
PUL#10	83	90	104	104	97	99	77	91
PUL#11	79	90	98	95	107	95	116	102
PUL#12	69	77	94	86	85	88	107	95
PUL#13	73	86	101	95	105	97	114	99
PUL#14	77	82	91	80	94	91	106	92
LON #2	93	94	102	96	102	96	114	96
PUL #15	77	93	112	108	102	101	118	101
PUL #16	94	109	118	114	121	114	135	102
PUL #17	106	107	114	112	109	110	127	97
PUL #18	84	94	104	100	96	98	121	93
NON-FORTIFIED SAMPLES								
PUL#01	66							100
PUL#02	66							102
PUL#03	74							106
PUL#04	68							103
PUL#05	81							100
PUL#06	98							102
PUL#07	69							106
PUL#08	67							103
PUL#09	87							113
LON#01	96							108

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO PULASKI COUNTY - JUNE. 1995.

EPA METHOD 507 - PAGE 2

LAB BLANKS

	SURROGATE	MOLINATE	ATRAZINE	METRIBUZIN	ALACHLOR	METOLACHLOR	NORFLURAZON	INT. STD.
2410	87							88
2412	89							99

CONCENTRATIONS FOR LAB BLANKS

2410	0	0	0	0	0	0
2412	0	0	0	0	0	0

PEAK AREAS FOR A 2X* STANDARD

	MOLINATE	ATRAZINE	METRIBUZIN	ALACHLOR	METOLACHLOR	NORFLURAZON
2X STANDARD	21162	18957	12239	6262	25550	65546

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

2313	2315	%RSD
86602	112157	25.71

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

1ST RUN	2ND RUN	%RSD
136156	115424	16.48

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO PULASKI COUNTY - JUNE. 1995.

PERCENT RECOVERIES

	SURROGATE	2,4-D	INT. STD	BENTAZON	ACIFLUROFEN
FIELD FORTIFIED SAMPLES					
PUL#10	98	97	121	109	99
PUL#11	75	71	103	80	69
PUL#12	77	72	106	77	73
PUL#13	109	100	96	111	105
PUL#14	76	59	133	29	61
LON #2	91	79	98	102	78
PUL #15	62	62	111	53	92
PUL #16	65	60	81	58	102
PUL #17	100	85	102	85	83
PUL #18	84	85	95	86	83
NON-FORTIFIED SAMPLES					
PUL#10	103		102		
PUL#11	124		103		
PUL#12	98		95		
PUL#13	85		118		
PUL#14	82		140		
LON #2	119		103		
PUL #15	92		110		
PUL #16	108		109		
PUL #17	99		122		
PUL #18	53		96		

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO PULASKI COUNTY - JUNE. 1995.

LAB BLANKS

	SURROGATE	2,4-D	INT. STD.	BENTAZON	ACIFLUROFEN
2416bl	95		none		
2418bl	82		90		

CONCENTRATIONS FOR LAB BLANKS

2416bl	0	0	0
2418bl	0	0	0

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

2349	2340	%RSD
18018	19396	7.37

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO PULASKI COUNTY - JUNE. 1995.

PERCENT RECOVERIES

	CYANAZINE	FLUOMETURON	DIURON	LINURON	SURROGATE	INT. STD.
FIELD FORTIFIED SAMPLES						
PUL#10	81	72	82	70	73	107
PUL#11	88	88	86	84	94	109
PUL#12	83	84	90	84	95	107
PUL#13	87	93	83	85	97	109
PUL#14	84	(247) hit	98	95	105	95
LON #2	87	92	87	83	92	106
PUL #15	97	106	96	77	91	103
PUL #16	94	103	95	92	97	100
PUL #17	94	101	94	92	102	104
PUL #18	99	91	97	95	102	105
NON-FORTIFIED SAMPLES						
PUL#10					87	108
PUL#11					76	107
PUL#12					85	102
PUL#13					97	107
PUL#14					89	107
LON #2					91	101
PUL #15					73	103
PUL #16					89	103
PUL #17					83	104
PUL #18					97	104

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO PULASKI COUNTY - JUNE. 1995.

LAB BLANKS

	CYANAZINE	FLUOMETURON	DIURON	LINURON	SURROGATE	INT. STD.
2407					103	105
2409					91	95

CONCENTRATIONS FOR LAB BLANKS

0	0	0	0
0	0	0	0

PEAK AREAS FOR A 2X* STANDARD

CYANAZINE	FLUOMETURON	DIURON	LINURON
2268	810	3055	7564

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

2304	2305	%RSD
155029	169391	8.85

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

1ST RUN	2ND RUN	%RSD
168093	168609	0.31

*ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO PULASKI COUNTY - JUNE. 1995.

NITRATE

SPIKE RECOVERY

WELL NUMBER	% RECOVERY
PUL #11	95%

DUPLICATE ANALYSIS

1ST MEASUREMENT	2ND MEASUREMENT	% RSD
<0.01 mg/L	<0.01 mg/L	NC

RESULTS OF PESTICIDE MONITORING : TRIP #1 TO LEE COUNTY-SEPTEMBER, 1995. Page 1.

(unk = unknown, NC = not collected, ND = not detected) ([redacted] = suspect, see text)

	1	2	3	4
WELL ID:	LEE # 01	LEE # 02	LEE # 03	LEE # 04
DATE SAMPLED:	27-Sep-95	27-Sep-95	27-Sep-95	27-Sep-95
LATITUDE:	34° 45' 28"	34°45'04"	34°44'41"	34°43'04"
LONGITUDE:	90° 36' 55"	90°37'04 "	90°37'30 "	90°37'19"
DEPTH OF WELL, ft:	50-60	60	60	110
pH, standard units:	7.4	7.2	7	7.1
CONDUCTIVITY AT 25° C , umhos/cm:	589	654	642	765
TEMPERATURE, ° C :	20	19	18	17
NITRATE, mg/L:	1.44	3.17	0.02	0.01
ACIFLUORFEN, ug/L	ND	ND	[redacted] ND	ND
ALACHLOR, ug/L:	ND	ND	ND	ND
ATRAZINE,ug/L:	ND	ND	ND	ND
BENTAZON, ug/L	ND	ND	[redacted] ND	ND
CYANAZINE, ug/L:	ND	ND	ND	ND
DIURON, ug/L:	ND	ND	ND	ND
FLUOMETURON, ug/L:	ND	ND	ND	ND
LINURON, ug/L:	ND	ND	ND	ND
METOLACHLOR, ug/L:	ND	ND	ND	ND
METRIBUZIN, ug/L:	ND	ND	ND	ND
MOLINATE, ug/L:	ND	ND	ND	ND
NORFLURAZON, ug/L	ND	ND	ND	ND
2,4-D, ug/L	ND	ND	[redacted] ND	ND

RESULTS OF PESTICIDE MONITORING : TRIP #1 TO LEE COUNTY-SEPTEMBER, 1995. Page 2

(unk = unknown, NC = not collected, ND = not detected) (= suspect, see text)

	5	6	7	8
WELL ID:	LEE # 05	CRIT #01	PUL #14R	PUL # 19
DATE SAMPLED:	27-Sep-95	28-Sep-95	28-Sep-95	28-Sep-95
LATITUDE:	34°46'50"	34°52'37"	34° 45' 56"	34° 45' 56"
LONGITUDE:	90°37'22"	90°21'30"	92° 05' 42"	92° 05' 42"
DEPTH OF WELL, ft:	UNK	100	20-30	SHALLOW
pH, standard units:	7.1	7.4	6.9	6.9
CONDUCTIVITY AT 25° C , umhos/cm:	602	668	640	655
TEMPERATURE, ° C :	18	18	20	18
NITRATE, mg/L:	1.44	<0.01	3.05	0.01
ACIFLUORFEN, ug/L	ND	ND	11	ND
ALACHLOR, ug/L:	ND	ND	ND	ND
ATRAZINE,ug/L:	ND	ND	ND	ND
BENTAZON, ug/L	ND	ND	57	ND
CYANAZINE, ug/L:	ND	ND	ND	ND
DIURON, ug/L:	ND	ND	ND	ND
FLUOMETURON, ug/L:	ND	ND	19	ND
LINURON, ug/L:	ND	ND	ND	ND
METOLACHLOR, ug/L:	ND	ND	ND	ND
METRIBUZIN, ug/L:	ND	ND	2	ND
MOLINATE, ug/L:	ND	ND	ND	ND
NORFLURAZON, ug/L	ND	ND	ND	ND
2,4-D, ug/L	ND	ND	ND	ND

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO LEE COUNTY - SEPTEMBER. 1995.

EPA METHOD 507 - PAGE 1

PERCENT RECOVERIES

	SURROGATE	MOLINATE	ATRAZINE	METRIBUZIN	ALACHLOR	METOLACHLOR	NORFLURAZON	INT. STD.
FIELD FORTIFIED SAMPLES								
LEE # 01	omitted	62	88	83	80	90	108	112
LEE # 02	omitted	76	91	85	91	102	85	106
LEE # 03	omitted	62	64	60	56	90	76	103
LEE # 04	omitted	66	76	60	73	91	77	115
LEE # 05	65	64	83	81	90	90	72	105
CRIT #01	76	70	53	61	33	81	89	114
PUL #14R	88	76	102	88	87	100	85	112
PUL # 19	69	69	91	84	88	99	108	100

NON-FORTIFIED SAMPLES-SURROGATE AND INTERNAL STANDARD RECOVERIES

LEE # 01	105	110
LEE # 02	83	103
LEE # 03	59	107
LEE # 04	60	102
LEE # 05	75	103
CRIT #01	78	100
PUL #14R	70	98
PUL # 19	98	95

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO LEE COUNTY - SEPTEMBER. 1995.

EPA METHOD 507 - PAGE 2

LAB BLANKS

	SURROGATE	MOLINATE	ATRAZINE	METRIBUZIN	ALACHLOR	METOLACHLOR	NORFLURAZON	INT. STD.
2587BL	55							111
2588BL	45							102

CONCENTRATIONS FOR LAB BLANKS

	MOLINATE	ATRAZINE	METRIBUZIN	ALACHLOR	METOLACHLOR	NORFLURAZON
2587BL	0	0	0	0	0	0
2588BL	0	0	0	0	0	0

PEAK AREAS FOR A 2X* STANDARD

	MOLINATE	ATRAZINE	METRIBUZIN	ALACHLOR	METOLACHLOR	NORFLURAZON
2X STANDARD	22433	20515	11807	8602	22839	67788

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

P2503	P2504	%RSD
200144	121455	48.94

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

1ST RUN	2ND RUN	%RSD
omitted	omitted	#VALUE!

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO LEE COUNTY - SEPTEMBER. 1995.

PERCENT RECOVERIES

	SURROGATE	2,4-D	INT. STD	BENTAZON	ACIFLUROFEN
FIELD FORTIFIED SAMPLES					
LEE # 01	110	125	89	130	125
LEE # 02	104	120	100	120	118
LEE # 03	142	139	101	142	141
LEE # 04	63	74	91	54	73
LEE # 05	101	114	102	119	138
CRIT #01	91	99	97	97	95
PUL #14R	72	95	122	57	96
PUL # 19	109	121	94	121	123

NON-FORTIFIED SAMPLES-SURROGATE AND INTERNAL STANDARD RECOVERIES

LEE # 01	118	92
LEE # 02	121	96
LEE # 03	113	93
LEE # 04	111	94
LEE # 05	omitted	96
CRIT #01	62	95
PUL #14R	94	116
PUL # 19	100	101

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO LEE COUNTY - SEPTEMBER. 1995.

LAB BLANKS

	SURROGATE	2,4-D	INT. STD.	BENTAZON	ACIFLUROFEN
2582bl	103		101		

CONCENTRATIONS FOR LAB BLANKS

2582bl		0	0	0

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

2508	2509	%RSD
188736	206901	9.18

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

1ST RUN	2ND RUN	%RSD
194627	192368	1.17

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO LEE COUNTY - SEPTEMBER. 1995.

PERCENT RECOVERIES

	CYANAZINE	FLUOMETURON	DIURON	LINURON	SURROGATE	INT. STD.
FIELD FORTIFIED SAMPLES						
LEE # 01	88	69	83	79	67	109
LEE # 02	86	83	85	90	85	108
LEE # 03	77	73	76	78	77	107
LEE # 04	91	58	80	93	90	99
LEE # 05	92	99	89	82	71	94
CRIT #01	78	63	80	74	75	101
PUL #14R	93	117	77	83	77	106
PUL # 19	96	75	88	83	75	98

NON-FORTIFIED SAMPLES-SURROGATE AND INTERNAL STANDARD RECOVERIES

LEE # 01	78	98
LEE # 02	88	96
LEE # 03	87	105
LEE # 04	75	105
LEE # 05	88	99
CRIT #01	89	106
PUL #14R	82	108
PUL # 19	60	113

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO LEE COUNTY - SEPTEMBER. 1995.

LAB BLANKS

	CYANAZINE	FLUOMETURON	DIURON	LINURON	SURROGATE	INT. STD.
					106	81
2587BL					89	109
2588BL					77	113
2590BL						

CONCENTRATIONS FOR LAB BLANKS

2587BL	0	0	0	0
2588BL	0	0	0	0
2590BL	0	0	0	0

PEAK AREAS FOR A 2X* STANDARD

CYANAZINE	FLUOMETURON	DIURON	LINURON
2977	1011	2918	7129

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

P2514	P2515	%RSD
147232	138884	5.84

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

1ST RUN	2ND RUN	%RSD
158922	161229	1.44

*ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO LEE COUNTY - SEPTEMBER. 1995.

NITRATE

SPIKE RECOVERY

WELL NUMBER	% RECOVERY
LEE #2	94%

DUPLICATE ANALYSIS

1ST MEASUREMENT	2ND MEASUREMENT	% RSD
1.44 mg/L	1.45 mg/L	0.50%

RESULTS OF PESTICIDE MONITORING : TRIP #2 TO LEE COUNTY-OCTOBER, 1995. Page 1.

(unk = unknown, NC = not collected, ND = not detected) (▒▒▒▒▒▒▒▒ = suspect, see text)

	1	2	3	4
WELL ID:	WOOD #7R4	WOOD #9R3	LEE # 06	LEE # 07
DATE SAMPLED:	10/12/95	10/12/95	12-Oct-95	12-Oct-95
LATITUDE:	35° 19' 27"	35° 17' 09"	34° 44' 56"	34° 44' 30"
LONGITUDE:	91° 18' 20"	91° 18' 29"	90° 32' 54"	90° 34' 28"
DEPTH OF WELL, ft:	UNK	60	50-100	SHALLOW
pH, standard units:	6.5	6.5	6.7	6.6
CONDUCTIVITY AT 25° C , umhos/cm:	193	286	714	1071
TEMPERATURE, ° C :	17	17	20	22
NITRATE, mg/L:	<0.01	0.2	<0.01	0.01
ACIFLUORFEN, ug/L	ND	4	ND	ND
ALACHLOR, ug/L:	ND	ND	ND	ND
ATRAZINE,ug/L:	ND	ND	ND	ND
BENTAZON, ug/L	38	26	ND	ND
CYANAZINE, ug/L:	ND	ND	ND	ND
DIURON, ug/L:	ND	ND	ND	ND
FLUOMETURON, ug/L:	ND	ND	ND	ND
LINURON, ug/L:	ND	ND	ND	ND
METOLACHLOR, ug/L:	ND	ND	ND	ND
METRIBUZIN, ug/L:	ND	ND	ND	ND
MOLINATE, ug/L:	ND	ND	ND	ND
NORFLURAZON, ug/L	ND	ND	ND	ND
2,4-D, ug/L	ND	ND	ND	ND

RESULTS OF PESTICIDE MONITORING : TRIP #2 TO LEE COUNTY-OCTOBER, 1995. Page 2

(unk = unknown, NC = not collected, ND = not detected) (= suspect, see text)

	5	6	7	8
WELL ID:	LEE # 08	LEE # 09	LEE # 10	LEE # 11
DATE SAMPLED:	12-Oct-95	12-Oct-95	13-Oct-95	13-Oct-95
LATITUDE:	34° 49' 53"	34° 53' 30"	34° 50' 33"	34° 48' 54"
LONGITUDE:	90° 32' 01"	90° 27' 09"	90° 37' 29"	90° 37' 06"
DEPTH OF WELL, ft:	UNK	25	60	75
pH, standard units:	6.7	6.7	6.7	6.7
CONDUCTIVITY AT 25° C , umhos/cm:	1367	719	775	699
TEMPERATURE, ° C :	18	18	19	18
NITRATE, mg/L:	0.02	0.02	0.05	<0.01
ACIFLUORFEN, ug/L	ND	ND	ND	ND
ALACHLOR, ug/L:	ND	ND	ND	ND
ATRAZINE,ug/L:	ND	ND	ND	ND
BENTAZON, ug/L	ND	ND	ND	ND
CYANAZINE, ug/L:	ND	ND	ND	ND
DIURON, ug/L:	ND	ND	ND	ND
FLUOMETURON, ug/L:	ND	ND	ND	ND
LINURON, ug/L:	ND	ND	ND	ND
METOLACHLOR, ug/L:	ND	ND	ND	ND
METRIBUZIN, ug/L:	ND	ND	ND	ND
MOLINATE, ug/L:	ND	ND	ND	ND
NORFLURAZON, ug/L	ND	ND	ND	ND
2,4-D, ug/L	ND	ND	ND	ND

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO LEE COUNTY - OCTOBER. 1995.

EPA METHOD 507 - PAGE 1

PERCENT RECOVERIES

	SURROGATE	MOLINATE	ATRAZINE	METRIBUZIN	ALACHLOR	METOLACHLOR	NORFLURAZON	INT. STD.
FIELD FORTIFIED SAMPLES								
WOOD #7R4	68	67	81	80	78	97	83	97
WOOD #9R3	80	71	88	84	88	100	140	98
LEE # 06	62	68	88	83	82	100	103	98
LEE # 07	67	70	88	83	76	95	102	110
LEE # 08	59	67	93	89	80	102	100	101
LEE # 09	65	67	102	90	74	96	127	101
LEE # 10	78	75	96	96	85	105	119	102
LEE # 11	70	70	94	93	83	103	127	108

NON-FORTIFIED SAMPLES-SURROGATE AND INTERNAL STANDARD RECOVERIES

WOOD #7R4	78	103
WOOD #9R3	57	99
LEE # 06	55	97
LEE # 07	72	105
LEE # 08	83	108
LEE # 09	83	110
LEE # 10	64	107
LEE # 11	70	105

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO LEE COUNTY - OCTOBER. 1995.

EPA METHOD 507 - PAGE 2

LAB BLANKS

	SURROGATE	MOLINATE	ATRAZINE	METRIBUZIN	ALACHLOR	METOLACHLOR	NORFLURAZON	INT. STD.
2591BL	59							103
2592BL	64							102

CONCENTRATIONS FOR LAB BLANKS

2591BL	0	0	0	0	0	0
2592BL	0	0	0	0	0	0

PEAK AREAS FOR A 2X* STANDARD

	MOLINATE	ATRAZINE	METRIBUZIN	ALACHLOR	METOLACHLOR	NORFLURAZON
2X STANDARD	27775	38507	27714	9927	30801	24202

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

P2613	P2615	%RSD
100282	145874	37.04

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

1ST RUN	2ND RUN	%RSD
131893	135871	2.97

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO LEE COUNTY - OCTOBER. 1995.

PERCENT RECOVERIES

	SURROGATE	2,4-D	INT. STD	BENTAZON	ACIFLUROFEN
FIELD FORTIFIED SAMPLES					
WOOD #7R4	105	111	68	98	117
WOOD #9R3	94	96	72	88	76
LEE # 06	109	108	98	135	121
LEE # 07	115	113	97	111	127
LEE # 08	111	111	101	118	123
LEE # 09	87	93	116	97	103
LEE # 10	103	100	119	114	120
LEE # 11	103	97	124	109	113

NON-FORTIFIED SAMPLES-SURROGATE AND INTERNAL STANDARD RECOVERIES

WOOD #7R4	103	123
WOOD #9R3	101	123
LEE # 06	103	116
LEE # 07	109	113
LEE # 08	111	114
LEE # 09	108	107
LEE # 10	112	109
LEE # 11	56	112

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO LEE COUNTY - OCTOBER. 1995.

LAB BLANKS

	SURROGATE	2,4-D	INT. STD.	BENTAZON	ACIFLUROFEN
2680BL	129		93		
2682BL	111		111		

CONCENTRATIONS FOR LAB BLANKS

2680BL	0	0	0
2682BL	0	0	0

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

2619	2610	%RSD
193908	192629	0.66

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

1ST RUN	2ND RUN	%RSD
98188	96223	2.02

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO LEE COUNTY - OCTOBER. 1995.

PERCENT RECOVERIES

	CYANAZINE	FLUOMETURON	DIURON	LINURON	SURROGATE	INT. STD.
FIELD FORTIFIED SAMPLES						
WOOD #7R4	94	65	88	92	94	108
WOOD #9R3	77	78	74	68	73	117
LEE # 06	80	80	82	110	73	109
LEE # 07	89	87	86	86	86	113
LEE # 08	92	91	93	92	92	101
LEE # 09	92	87	91	88	90	101
LEE # 10	84	72	82	105	73	102
LEE # 11	88	81	85	81	84	106

NON-FORTIFIED SAMPLES-SURROGATE AND INTERNAL STANDARD RECOVERIES

WOOD #7R4	106	106
WOOD #9R3	93	100
LEE # 06	86	105
LEE # 07	97	96
LEE # 08	87	100
LEE # 09	79	108
LEE # 10	88	107
LEE # 11	89	99

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO LEE COUNTY - OCTOBER. 1995.

LAB BLANKS

	CYANAZINE	FLUOMETURON	DIURON	LINURON	SURROGATE	INT. STD.
2595BL					92	105
2597BL					73	105
2598BL					84	104

CONCENTRATIONS FOR LAB BLANKS

2595BL	0	0	0	0
2597BL	0	0	0	0
2598BL	0	0	0	0

PEAK AREAS FOR A 2X* STANDARD

CYANAZINE	FLUOMETURON	DIURON	LINURON	SURROGATE	INT.STD.

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

P2604	P2605	%RSD
150359	157654	4.74

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

1ST RUN	2ND RUN	%RSD
129409	124070	4.21

*ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO LEE COUNTY - OCTOBER. 1995.

NITRATE

SPIKE RECOVERY

WELL NUMBER	% RECOVERY
WOOD 9	98%

DUPLICATE ANALYSIS

1ST MEASUREMENT	2ND MEASUREMENT	% RSD
<0.01 mg/L	<0.01 mg/L	NC

RESULTS OF PESTICIDE MONITORING : TRIP #1 TO JACKSON COUNTY-NOVEMBER, 1995. Page1

(unk = unknown, NC = not collected, ND = not detected) ([redacted] = suspect, see text)

	1	2	3	4
WELL ID:	JACK #1	JACK #2	JACK #3	JACK #4
DATE SAMPLED:	11/8/95	11/8/95	11/8/95	11/8/95
LATITUDE:	35° 34' 46"	35° 32' 43"	35° 30' 16"	35° 29' 50"
LONGITUDE:	91° 15' 55"	91° 15' 57"	91° 16' 00"	91° 14' 29"
DEPTH OF WELL, ft:	38	90	shallow	unk
pH, standard units:	5.4	5.6	6.3	5.8
CONDUCTIVITY AT 25° C , umhos/cm:	169	177	372	280
TEMPERATURE, ° C :	16	16	17.5	15.5
NITRATE, mg/L:	6.04	0.02	<.01	2.65
ACIFLUORFEN, ug/L	ND	ND	ND	ND
ALACHLOR, ug/L:	ND	ND	ND	ND
ATRAZINE,ug/L:	ND	ND	ND	ND
BENTAZON, ug/L	ND	ND	ND	[redacted]
CYANAZINE, ug/L:	ND	ND	ND	ND
DIURON, ug/L:	ND	ND	ND	ND
FLUOMETURON, ug/L:	ND	ND	ND	ND
LINURON, ug/L:	ND	ND	ND	ND
METOLACHLOR, ug/L:	ND	ND	ND	ND
METRIBUZIN, ug/L:	ND	ND	ND	ND
MOLINATE, ug/L:	ND	ND	ND	ND
NORFLURAZON, ug/L	ND	ND	ND	ND
2,4-D, ug/L	ND	ND	ND	ND

RESULTS OF PESTICIDE MONITORING : TRIP #1 TO JACKSON COUNTY-NOVEMBER, 1995. Page 2

(unk = unknown, NC = not collected, ND = not detected) ([redacted] = suspect, see text)

	5	6	7	8
WELL ID:	JACK #5	JACK #6	JACK #7	JACK #8
DATE SAMPLED:	11/8/95	11/8/95	11/9/95	11/9/95
LATITUDE:	35° 24'07"	35° 30' 15"	35° 35' 22"	35° 31' 26"
LONGITUDE:	91° 13' 15"	91° 15' 41"	91° 15' 41"	91° 09' 48"
DEPTH OF WELL, ft:	shallow	35	unk	50
pH, standard units:	5.5	6.3	5.2	6.6
CONDUCTIVITY AT 25° C , umhos/cm:	361	316	437	924
TEMPERATURE, ° C :	17	17	17	16
NITRATE, mg/L:	5.13	<.01	17.7	0.01
ACIFLUORFEN, ug/L	ND	ND	ND	ND
ALACHLOR, ug/L:	ND	ND	ND	ND
ATRAZINE,ug/L:	ND	ND	ND	ND
BENTAZON, ug/L	ND	ND	ND	ND
CYANAZINE, ug/L:	ND	ND	ND	[redacted] ND
DIURON, ug/L:	ND	ND	ND	[redacted] ND
FLUOMETURON, ug/L:	ND	ND	ND	[redacted] ND
LINURON, ug/L:	ND	ND	ND	[redacted] ND
METOLACHLOR, ug/L:	ND	ND	ND	ND
METRIBUZIN, ug/L:	ND	ND	ND	ND
MOLINATE, ug/L:	ND	ND	ND	ND
NORFLURAZON, ug/L	ND	ND	ND	ND
2,4-D, ug/L	ND	ND	ND	ND

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO JACKSONCOUNTY - NOVEMBER, 1995.

EPA METHOD 507 - PAGE 1

PERCENT RECOVERIES

	SURROGATE	MOLINATE	ATRAZINE	METRIBUZIN	ALACHLOR	METOLACHLOR	NORFLURAZON	INT. STD.
FIELD FORTIFIED SAMPLES								
JACK #1	74	80	92	99	74	86	113	100
JACK #2	91	94	106	109	82	94	109	104
JACK #3	101	98	108	109	81	92	96	101
JACK #4	75	84	97	104	76	88	92	103
JACK #5	72	77	91	60	71	82	87	101
JACK #6	73	78	92	98	73	85	88	102
JACK #7	63	74	89	94	69	82	84	101
JACK #8	64	76	91	97	71	83	85	104

NON-FORTIFIED SAMPLES-SURROGATE AND INTERNAL STANDARD

JACK #1	108	103
JACK #2	83	103
JACK #3	74	105
JACK #4	70	100
JACK #5	67	99
JACK #6	50	101
JACK #7	94	101
JACK #8	70	99

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO JACKSONCOUNTY - NOVEMBER, 1995.

EPA METHOD 507 - PAGE 2

LAB BLANKS

SURROGATE AND INTERNAL STANDARD RECOVERIES

	SURROGATE	MOLINATE	ATRAZINE	METRIBUZIN	ALACHLOR	METOLACHLOR	NORFLURAZON	INT. STD.
2693BL	70							101
2695BL	67							102

CONCENTRATIONS FOR LAB BLANKS

2186bl		0	0	0	0	0	0
2188bl		0	0	0	0	0	0

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

2703	2705	%RSD
195532	126702	42.72

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

1ST RUN	2ND RUN	%RSD
112550	107302	4.77

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO JACKSONCOUNTY - NOVEMBER, 1995.

PERCENT RECOVERIES

	SURROGATE	2,4-D	INT. STD	BENTAZON	ACIFLUROFEN
FIELD FORTIFIED SAMPLES					
JACK #1	86	91	NOT USED	93	86
JACK #2	98	107	NOT USED	109	106
JACK #3	108	99	NOT USED	97	96
JACK #4	140	124	NOT USED	134	121
JACK #5	114	123	NOT USED	121	122
JACK #6	97	112	NOT USED	110	106
JACK #7	110	125	NOT USED	122	120
JACK #8	119	122	NOT USED	121	116

NON-FORTIFIED SAMPLES-SURROGATE AND INTERNAL STANDARD		
JACK #1	139	75
JACK #2	68	112
JACK #3	89	102
JACK #4	91	102
JACK #5	91	106
JACK #6	82	99
JACK #7	93	102
JACK #8	76	98

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO JACKSONCOUNTY - NOVEMBER, 1995.

LAB BLANKS

SURROGATE AND INTERNAL STANDARD RECOVERIES

	SURROGATE	2,4-D	INT. STD.	BENTAZON	ACIFLUROFEN
2690BL	97		NOT USED		

CONCENTRATIONS FOR LAB BLANKS

2690BL		0	0	0

PEAK AREAS FOR A 2X* STANDARD

SURROGATE	2,4-D	INT. STD.	BENTAZON	ACIFLUROFEN
186092	110511	NOT USED	549557	691762

DUPLICATE ANALYSIS

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

1ST RUN	2ND RUN	%RSD
196020	197947	0.98

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO JACKSONCOUNTY - NOVEMBER, 1995.

PERCENT RECOVERIES

	CYANAZINE	FLUOMETURON	DIURON	LINURON	SURROGATE	INT. STD.
FIELD FORTIFIED SAMPLES						
JACK #1	78	79	79	52	83	110
JACK #2	75	82	78	53	85	107
JACK #3	75	80	80	79	82	115
JACK #4	78	84	83	82	86	105
JACK #5	85	90	98	89	91	101
JACK #6	90	90	88	87	105	96
JACK #7	88	99	89	90	96	99
JACK #8	83	88	91	88	92	105
NON-FORTIFIED SAMPLES-SURROGATE AND INTERNAL STANDARD						
JACK #1					94	102
JACK #2					82	111
JACK #3					84	106
JACK #4					86	106
JACK #5					75	109
JACK #6					89	105
JACK #7					84	108
JACK #8					78	108

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO JACKSONCOUNTY - NOVEMBER, 1995.

LAB BLANKS

SURROGATE AND INTERNAL STANDARD RECOVERIES

	CYANAZINE	FLUOMETURON	DIURON	LINURON	SURROGATE	INT. STD.
2696BL					91	102
2697BL					84	107

CONCENTRATIONS FOR LAB BLANKS

2696BL	0	0	0	0
2697BL	0	0	0	0

PEAK AREAS FOR A 2X* STANDARD

CYANAZINE	FLUOMETURON	DIURON	LINURON	SURROGATE	INT.STD.
1252	614	2491	5077	129557	11002

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

P2714	P2715	%RSD
155072	147907	4.73

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

1ST RUN	2ND RUN	%RSD
150242	150240	0.00

*ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO JACKSONCOUNTY - NOVEMBER, 1995.

NITRATE

SPIKE RECOVERY

WELL NUMBER	% RECOVERY
JACK 2	105%

DUPLICATE ANALYSIS

1ST MEASUREMENT	2ND MEASUREMENT	% RSD
6.04 mg/L	6.00mg/L	0.71%

RESULTS OF PESTICIDE MONITORING : TRIP #2 TO JACKSON COUNTY-DECEMBER, 1995. Page1

(unk = unknown, NC = not collected, ND = not detected) ([redacted] = suspect, see text)

	1	2	3	4
WELL ID:	JACK #9	JACK #10	JACK #11	JACK #12
DATE SAMPLED:	12/4/95	12/4/95	12/4/95	12/4/95
LATITUDE:	35° 32' 16"	35° 25' 22"	35° 21' 55"	35° 22' 42"
LONGITUDE:	91° 16' 17"	91° 11' 33"	91° 13' 51"	91° 13' 51"
DEPTH OF WELL, ft:	50	40	100	unk
pH, standard units:	6	6.6	6.7	6.8
CONDUCTIVITY AT 25° C , umhos/cm:	165	415	513	432
TEMPERATURE, ° C :	15	14	16	16
NITRATE, mg/L:	5.15	0.01	<0.01	<0.01
ACIFLUORFEN, ug/L	ND	ND	ND	ND
ALACHLOR, ug/L:	ND	ND	ND	ND
ATRAZINE,ug/L:	ND	ND	ND	ND
BENTAZON, ug/L	ND	ND	ND	ND
CYANAZINE, ug/L:	ND	ND	ND	ND
DIURON, ug/L:	ND	ND	ND	ND
FLUOMETURON, ug/L:	ND	ND	ND	ND
LINURON, ug/L:	ND	ND	ND	ND
METOLACHLOR, ug/L:	ND	ND	ND	ND
METRIBUZIN, ug/L:	ND	ND	ND	ND
MOLINATE, ug/L:	ND	ND	ND	ND
NORFLURAZON, ug/L	ND	ND	ND	ND
2,4-D, ug/L	ND	ND	ND	ND

RESULTS OF PESTICIDE MONITORING : TRIP #2 TO JACKSON COUNTY-DECEMBER, 1995. Page 2

(unk = unknown, NC = not collected, ND = not detected) (▒▒▒▒▒▒▒▒ = suspect, see text)

	5	6	7	8
WELL ID:	JACK #13	JACK #14	JACK #15	JACK #16
DATE SAMPLED:	12/4/95	12/4/95	12/5/95	12/5/95
LATITUDE:	35° 31'07"	35° 32' 44"	35° 36' 34"	35° 37' 03"
LONGITUDE:	91° 12' 58"	91° 11' 54"	91° 12' 31"	91° 12' 27"
DEPTH OF WELL, ft:	25	60	40	unk
pH, standard units:	6.9	6.8	6.9	6.9
CONDUCTIVITY AT 25° C , umhos/cm:	399	622	480	352
TEMPERATURE, ° C :	18	15.5	15	16
NITRATE, mg/L:	<0.01	0.02	0.73	<0.01
ACIFLUORFEN, ug/L	ND	ND	ND	ND
ALACHLOR, ug/L:	ND	ND	ND	ND
ATRAZINE,ug/L:	ND	ND	ND	ND
BENTAZON, ug/L	ND	ND	ND	ND
CYANAZINE, ug/L:	ND	ND	ND	ND
DIURON, ug/L:	ND	ND	ND	ND
FLUOMETURON, ug/L:	ND	ND	ND	ND
LINURON, ug/L:	ND	ND	ND	ND
METOLACHLOR, ug/L:	ND	▒▒ND▒▒	ND	ND
METRIBUZIN, ug/L:	ND	ND	ND	ND
MOLINATE, ug/L:	ND	ND	ND	ND
NORFLURAZON, ug/L	ND	ND	ND	ND
2,4-D, ug/L	ND	ND	ND	ND

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO JACKSON COUNTY - DECEMBER, 1995.

EPA METHOD 507 - PAGE 1

PERCENT RECOVERIES

	SURROGATE	MOLINATE	ATRAZINE	METRIBUZIN	ALACHLOR	METOLACHLOR	NORFLURAZON	INT. STD.
FIELD FORTIFIED SAMPLES								
JACK #9	92	107	135	122	102	120	125	108
JACK #10	96	100	121	110	92	107	110	117
JACK #11	98	103	122	111	92	107	110	110
JACK #12	109	112	133	60	101	118	121	103
JACK #13	93	97	121	112	92	108	117	106
JACK #14	101	104	125	123	98	154	118	98
JACK #15	88	95	117	107	89	105	112	107
JACK #16	68	92	114	105	86	102	105	109

NON-FORTIFIED SAMPLES-SURROGAT AND INTERNAL STANDARD RECOVERIES

JACK #9	61	102
JACK #10	70	106
JACK #11	75	101
JACK #12	94	106
JACK #13	85	105
JACK #14	81	95
JACK #15	79	106
JACK #16	83	105

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO JACKSON COUNTY - DECEMBER, 1995.

EPA METHOD 507 - PAGE 2

LAB BLANKS

	SURROGATE	MOLINATE	ATRAZINE	METRIBUZIN	ALACHLOR	METOLACHLOR	NORFLURAZON	INT. STD.
2888BL	97							101
2894BL	84							101

CONCENTRATIONS FOR LAB BLANKS

2888BL	0	0	0	0	0	0
2894BL	0	0	0	0	0	0

PEAK AREAS FOR A 2X* STANDARD

	MOLINATE	ATRAZINE	METRIBUZIN	ALACHLOR	METOLACHLOR	NORFLURAZON
2X STANDARD	25102	34983	20589	10128	30543	32772

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

2813	2815	%RSD
128113	129620	1.17

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

1ST RUN	2ND RUN	%RSD
171926	157069	9.03

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO JACKSON COUNTY - DECEMBER, 1995.

PERCENT RECOVERIES

	SURROGATE	2,4-D	INT. STD	BENTAZON	ACIFLUROFEN
FIELD FORTIFIED SAMPLES					
JACK #9	96	111	97	111	106
JACK #10	85	104	100	101	108
JACK #11	92	104	100	102	110
JACK #12	79	102	103	105	103
JACK #13	78	107	100	111	117
JACK #14	84	111	91	112	123
JACK #15	90	125	95	121	128
JACK #16	83	104	102	105	117

NON-FORTIFIED SAMPLES-SURROGAT AND INTERNAL STANDARD RECOVERIES

JACK #9	99	110
JACK #10	90	98
JACK #11	81	98
JACK #12	80	104
JACK #13	81	97
JACK #14	68	100
JACK #15	80	99
JACK #16	66	102

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO JACKSON COUNTY - DECEMBER, 1995.

LAB BLANKS

	SURROGATE	2,4-D	INT. STD.	BENTAZON	ACIFLUROFEN
2880BL	100		101		
2886BL	101		94		

CONCENTRATIONS FOR LAB BLANKS

2880BL	0	0	0
2886BL	0	0	0

PEAK AREAS FOR A 2X* STANDARD

2,4-D	BENTAZON	ACIFLUROFEN
37000	215375	83173

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

P2859	P2850	%RSD
41845	38912	7.26

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

1ST RUN	2ND RUN	%RSD
51799	52540	1.42

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO JACKSON COUNTY - DECEMBER, 1995.

PERCENT RECOVERIES

	CYANAZINE	FLUOMETURON	DIURON	LINURON	SURROGATE	INT. STD.
FIELD FORTIFIED SAMPLES						
JACK #9	91	90	88	91	92	99
JACK #10	93	91	88	93	94	97
JACK #11	97	89	92	94	93	95
JACK #12	96	84	93	98	98	97
JACK #13	95	93	90	93	91	104
JACK #14	105	103	110	72	105	90
JACK #15	94	94	91	97	92	105
JACK #16	95	94	93	94	93	98

NON-FORTIFIED SAMPLES-SURROGAT AND INTERNAL STANDARD RECOVERIES

JACK #9	99	97
JACK #10	94	97
JACK #11	98	98
JACK #12	94	101
JACK #13	51	195
JACK #14	86	108
JACK #15	98	98
JACK #16	102	100

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO JACKSON COUNTY - DECEMBER, 1995.

LAB BLANKS

SURROGATE AND INTERNAL STANDARD RECOVERIES

	CYANAZINE	FLUOMETURON	DIURON	LINURON	SURROGATE	INT. STD.
2887BL					97	103
2889BL					90	104
2893BL					109	93

CONCENTRATIONS FOR LAB BLANKS

2887BL	0	0	0	0
2889BL	0	0	0	0
2893BL	0	0	0	0

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

P2804	P2805	%RSD
159253	150702	5.52

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

1ST RUN	2ND RUN	%RSD
158037	157497	0.34

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO JACKSON COUNTY - DECEMBER, 1995.

NITRATE

SPIKE RECOVERY

WELL NUMBER	% RECOVERY
JACK 10	106%

DUPLICATE ANALYSIS

1ST MEASUREMENT	2ND MEASUREMENT	% RSD
5.15mg/L	5.17 mg/L	0.37%