
# Arkansas Water Resources Center

## COMPLETION REPORT: GROUND WATER MONITORING PROJECT FOR ARKANSAS, PHASE III

1994

by

PART I
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## PREFACE

This report is composed of two parts. The first part is an interpretation of the pesticide and nitrate data collected in Woodruff County based on samples collected during 1994. Because there is an indication that there were hydrological differences between 1994 and 1995, and because most of the pesticide data is from 1994, this interpretive portion is restricted to 1994 data. Six wells initially sampled in 1994 that contained pesticides had continuing contamination in re-sampling in 1994 and 1995. Part I was published with the following citation:

> Steele, Kenneth F., Steven S. Hill, Terry W. Nichols, H. Don Scott, Paul Vendrell, and H.S. Lin, 1996, Impact of Agricultural Chemicals on the Alluvial Aquifer, Lower Mississippi River Delta *in* UCOWR '96 Proceedings, Integrated Management of Surface and Ground Water, The Universities Council on Water Resources, Carbondale, IL, p. 50-59.

The second part of the report is a presentation of the quality assurance and quality control of the analyses. Part II lists a seventh well in Woodruff County that contained pesticides in February and May of 1995.

# PART I

# IMPACT OF AGRICULTURAL CHEMICALS

# ON THE ALLUVIAL AQUIFER

# LOWER MISSISSIPPI RIVER DELTA

# IMPACT OF AGRICULTURAL CHEMICALS ON THE ALLUVIAL AQUIFER, LOWER MISSISSIPPI RIVER DELTA

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## ABSTRACT

Because of the widespread use of pesticides and nitrogen fertilizers, there has been concern about ground water contamination of the alluvial aquifer in the Lower Mississippi Valley. The upper most and major aquifer of the region is the alluvial aquifer which is located in the lower sand and gravel unit of Quaternary deposits. At some locations a clay confining unit occurs at the top of the aquifer. In order to evaluate the impact of agricultural chemicals on the ground water quality of this region, Woodruff County which is representative of the area was chosen for study. Woodruff County has an area of about 378,000 acres of which 73 percent is cropland. Irrigated cropland comprises 53 percent of the county and averages 284 Mgal/d of water withdrawal. Well-drained, loamy soils occur in the central portion of the county, and poorly-drained, clayey and loamy soils occur in the extreme west and east portions.

Water samples were collected from 31 wells in the alluvial aquifer in the cropland areas of Woodruff County. Six of the sites were contaminated with pesticides (acifluorfen, bentazon, fluometuron, metolachlor, and metribuzin). All of the pesticide-contaminated wells were less than 61 ft deep. Samples collected from shallow (<50 ft deep) wells had a median concentration of 2.94 mg/L nitrate-N and for deep (50-90 ft deep) wells was 0.13 mg/L. The median iron concentrations for shallow and deep wells were 0.03 and 0.21 mg/L, respectively. High nitrate and high iron concentrations are mutually exclusive. These observations are consistent with the upper portion of the aquifer being more oxidizing.

Fifteen of the 20 wells with nitrate-N above background concentrations (>0.4 mg/L) are located in areas with relatively high sensitivity based on a modified DRASTIC model. Five of the six wells with pesticide contamination are located in areas of relatively high vulnerability. The DRASCTIC model appears to be useful for indicating areas susceptible to contamination from nitrate and pesticides. Although four of the wells with pesticide contamination also have high nitrate-N concentrations, the difference in degradation rates for nitrate and pesticides make the use of elevated nitrate-N concentrations as an indication of potential pesticide difficult.

## INTRODUCTION

The use of pesticides and commercial fertilizers for intense crop production in the Lower Mississippi Valley Delta region (Delta) has led to concern about the potential contamination of ground water by agricultural chemicals. Throughout the United States there is a significant increase of nitrate in older wells, poorly constructed wells , and wells poorly sited with respect to point source contamination (Helsel, 1995). Such wells are often the types of wells present in the Delta.

The objective of this study was to determine the impact of nitrate and pesticides on the alluvial aquifer in the Delta. Woodruff County, in eastern Arkansas (Figure 1) was selected as the study area because it is representative of a large part of the Delta. The county covers an area of about 378,000 acres with 73% in cropland. Wheat, rice, soybeans, milo, cotton, and vegetables are the major crops (Scott and Smith, 1993). About 53 percent of the county is irrigated. Ground water provides 258.13 million gallons per day (Mgal/d) and surface water 26.07 Mgal/d for irrigation (Holland et al., 1991). The alluvial aquifer supplies much of these withdrawals and is the major source of drinking water for the rural population.

## DESCRIPTION OF THE STUDY AREA

The physiography of Woodruff County consists of floodplains of the White River, the Cache River and the Bayou DeView with oxbow lakes, loessal plains and loessal ridges. The elevation of the land ranges from 190 to 235 feet above sea level, and slopes slightly to the south (Stephenson and Crider, 1916). The slope ranges from less than 1 percent on the floodplains to as much as 8 percent on the loessal plains. Soils are well-

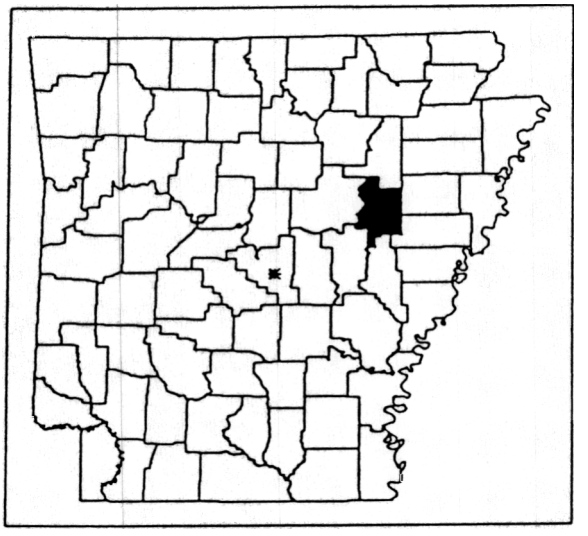

Figure 1. Location of the study area. Little Rock is marked with an asterisk.

drained and loamy in the central portion of the county, and poorly-drained, and clayey and loamy in the extreme west and east.

Three major rivers drain most of Woodruff County. The White River drains the western part of the county, the Cache River the central part, and Bayou DeView the eastern part. Woodruff County has hot humid summers and mild winters. Average air temperatures are 78°F (June) and 44°F (December). Precipitation is about 51 inches a year (1% snow). Short periods of drought, especially during late-summer are frequent (Maxwell et al, 1968). Droughts make irrigation using ground water a common practice.

## HYDROGEOLOGY

The principal aquifer in Woodruff County is the alluvial aquifer the Sparta Sand and Wilcox aquifers the next most important aquifers, respectively. Quaternary alluvium of Pleistocene and younger age consists of two units -- a lower sand and gravel water-bearing unit which grades into an upper silt and clay unit that acts as a confining unit (Stephenson and Crider, 1916; Fitzpatrick et al., 1990). Maximum aquifer thickness is about 150 feet in the study area (Broom and Lyford, 1982).

Well yields are 1000 to 3000 gallon per minute (Fitzpatrick et al., 1990). Hydraulic conductivity ranges from 100 to 400 feet per day (Broom and Lyford, 1982). Recharge comes from percolation of rainfall through the silt and clay cover and by inflow from streams. The water moves in the direction of general land slope and toward streams that drain the alluvial lands (Petersen et al., 1985). The natural direction of flow in the aquifer has been altered by intensive pumping for irrigation in the eastern part of the county. Flow toward the pumping-stressed area is eastward from the Cache River (Broom and Lyford, 1982). During flood stage, the streams recharge the aquifer. In areas of large ground water withdrawals, larger streams can be a year-round source of aquifer recharge, and the alluvial aquifers can receive substantial quantities of recharge from underlying aquifers as a result excessive drawdown from irrigation (Petersen et al., 1985). Stream recharge and the pumping stress both may increase the potential for ground water contamination from surface sources.

Water levels increase from a potentiometric surface of 150 feet (60 feet below land surface) in southeastern Woodruff County to about 190 feet (20 feet below land surface) in northwestern Woodruff County (Westerfield and Poynter, 1994). Shallow water tables are generally more susceptible to pesticide contamination. Water levels fluctuate seasonally, typically rising in the winter and spring, and declining in the summer and fall (Parks et al., 1995).

## METHODOLOGY

The 31 wells sampled in this study were chosen with an emphasis on shallow wells in vulnerable areas (areas with high pesticide usage, and sensitivity to contamination -- see DRASTIC MODEL section below). In order to obtain ground water samples representative of ambient aquifer conditions, the wells were purged until temperature, conductance and pH of the water stabilized. Sampling commenced before pesticide application in May, during pesticide application, and after pesticide application into September, 1994. Well depths were owner reported. Five of the wells had unknown depths.

Analyses were conducted at the Arkansas Water Resources Center Water Quality Laboratory (WQL) using gas chromatography or liquid chromatography as prescribed by EPA 507.1, EPA 515.2, and National Pesticide Survey #4 methods which involve solid-liquid and liquid-liquid extractions (EPA, 1992, 1991a, and EPA, written communication). Any detections were confirmed by the Arkansas State Plant Board Laboratory using a gas chromatograph with a mass spectrometer detector, or by the WQL using a high performance liquid chromatograph with an alternate column. Any well containing pesticides was sampled again and the confirmation process repeated. A raw water sample and a sample spiked with pesticides of interest were collected and preserved at each site and immediately placed on ice or refrigerated until extracted. All extractions and analyses were performed within regulatory holding times in each method. The spiked sample in conjunction with the raw water was used to determine any pesticide loss from time of collection until analysis. Iron (ferrous + ferric) was analyzed using inductively coupled plasma emission spectrometry (EPA 200.7) (EPA, 1991b) and nitrate-N was analyzed by ion chromatography (EPA 300.0) (Pfaff et al., 1989).

## DRASTIC MODEL

Whether a pesticide is likely to migrate to ground water depends on the characteristics of the site where it is applied, and on characteristics of the pesticide such as half-life, solubility in water, volatility, and adsorption. "DRASTIC" is an aquifer sensitivity index developed by the EPA which assesses aquifer sensitivity to contamination (Aller et al., 1987). A modified version of pesticide DRASTIC was developed for Woodruff County and used in a geographical information system (GIS) to generate an aquifer sensitivity map (Lin et al., 1996). The DRASTIC model considers the following factors: (1) depth to water, (2) net recharge, (3) aquifer media, (4) soil media, (5) topography, (6) impact of the vadose zone, and (7) hydraulic conductivity. The weighting factor for impact of the vadose zone was increased from 4 to 7 for this study in order to reflect the significance of the thickness of the clay cap confining unit in the study area. The sensitivity index ranged from 46-84 for Woodruff County. Higher indices indicate greater sensitivity to pollution.

The ground water vulnerability model combines pesticide usage with the sensitivity index to produce a relative vulnerability index (Lin et al., 1996). The vulnerability index was expressed as a percentage of the highest product of the sensitivity index and estimated pesticide application rate. The relative ground water vulnerability index for pesticides ranged from 0-93 for Woodruff County. The lowest vulnerability indices were in the eastern portion of the county where water tables are deeper, soils more impermeable, and the clay confining unit is thicker.

## NITRATE

From July 1, 1993 to June 30, 1994 sales of nitrogen containing fertilizer with nitrogen components were 22,745 tons for Woodruff County (Arkansas Agricultural Statistics Service, 1994). Although these quantities of fertilizer have the potential of impacting the ground water, only one well (30 ft deep) with a concentration of 9.26 mg/L nitrate-N was close to the 10 mg/L maximum contaminant level (MCL) for drinking water

(EPA, 1994). Studies in alluvial deposits in other states have reported a relatively high number of wells exceeding 10 mg/L nitrate-N. For example, Detroy et al. (1990) reported 50% of wells less than 40 deep in an alluvial aquifer in Iowa exceeded the MCL for nitrate-N.

The median nitrate-N concentration for shallow wells (<50 ft deep) was 2.94 mg/L compared to a median concentration of only 0.13 mg/L for deep wells (50-90 ft deep) (Table 1). The median nitrate-N concentration for wells in this intensively-cropped alluvial area is much less than that for predominantly agricultural areas in the Northeast, Midwest and West Coast regions of the U.S.A. (Helsel, 1995). In the Southeast increased denitrification rates have been suggested as part of the reason for less nitrate-N contamination (Spalding and Exner, 1993; Jacobs and Gilliam, 1985). The presence of the clay confining unit in certain areas also limits the amount of surface contamination to the aquifer. The trend of decreasing nitrate-N concentration with increasing well depth (Table 1) is consistent with other studies (e.g., Detroy et al., 1990), but these have often used a depth of 100 ft to separate shallow and deep wells (Helsel, 1995).

High iron concentrations in ground water can be used as an indication of conditions favorable for denitrification. High nitrate-N and high iron concentrations are essentially mutually exclusive in this study (Figure 2 and Table 1). Nitrate occurs in shallow, more oxygenated ground water; whereas, iron tends to occur

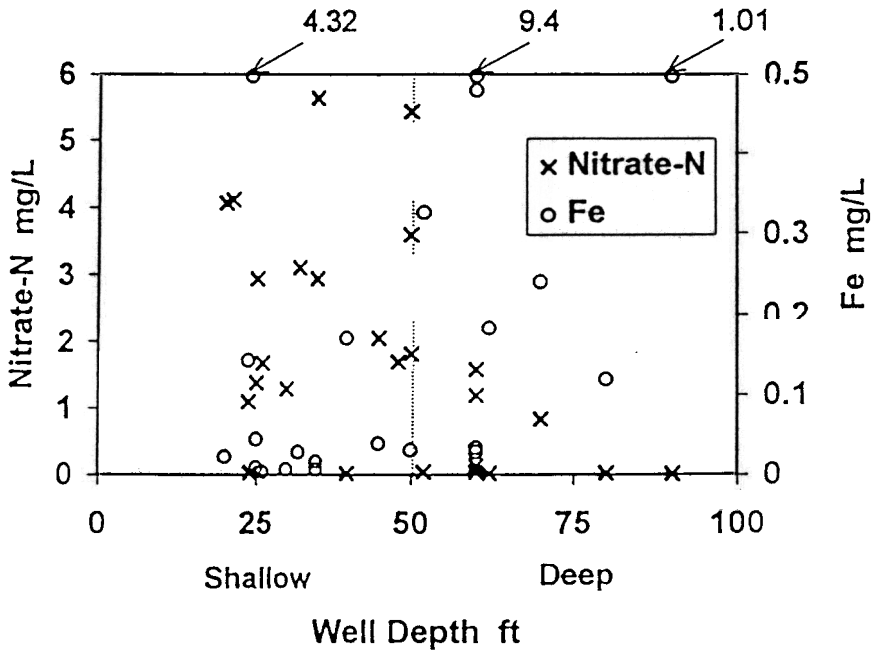


FIGURE 2. Nitrate-N and iron concentrations versus well depth.

TABLE 1. Median concentrations of nitrate-N and iron with respect to well depth. N = number of wells in each category.

| WELL DEPTH ft | NITRATE-N mg/L | Fe mg/L |
|---|---|---|
| < 50 | 2.94 | 0.03 |
| N | 15 | 12 |
| >50-90 | 0.13 | 0.21 |
| N | 11 | 10 |

in deeper, more reduced ground water. Iron in the shallow wells is precipitated as iron oxides or hydroxides leading to lower soluble iron in the ground water. Bacteria utilizing carbon as an electron donor play an important role in the redox reactions of nitrogen and iron. Without bacteria these redox reactions take place slowly. Certain bacteria can use iron as an electron donor in place of organic matter with nitrate acting as the electron acceptor (Korom, 1992). The relationship of iron with depth may involve more than simple lack of oxygen from the surface. Reducing soils cause denitrification; however, denitrification can occur in ground water. Chapelle and Lovely (1992) have described a case where iron has been reduced in a confined aquifer.

Background nitrate-N concentration for Woodruff County is defined as 0.4 mg/L. This background level is based on the median concentration (0.4 mg/L nitrate-N) for another aquifer in Arkansas in a pristine areas with forest cover (Steele et al., 1992). This background level is much less than that of Madison and Brunett (1985) who consider concentrations greater than 3 mg/L nitrate-N as indication of human activities based on a nationwide survey of 87,000 wells, but 0.4 mg/L seems appropriate for this study area (note that the background level for deep wells in this study is 0.13 mg/L).

Utilizing 0.4 mg/L nitrate-N as the background concentration, 20 of the 31 wells may be considered contaminated with nitrate (Table 2). Fifteen of the wells with nitrate exceeding 0.4 mg/L nitrate-N are in high sensitivity areas (sensitivity index greater than 70), and five are located in low sensitivity areas (Figure 3). Ten of the 11 wells not exceeding background concentrations of nitrate-N are in low sensitivity areas.

TABLE 2. Number of wells above and below the background nitrate-N concentration with respect to sensitivity indices (SI) and pesticide contamination.

| NITRATE- N mg/L | SI > 70 | SI < 70 | WITH PESTICIDES | WITHOUT PESTICIDES |
|---|---|---|---|---|
| > 0.4 | 15 | 5 | 4 | 16 |
| <0.4 | 1 | 10 | 2 | 9 |

## PESTICIDES

Pesticide pollution in ground water is potentially harmful to residents, but not much is known about pesticide contamination of ground water in the Delta. Over 345,000 pounds of pesticides with medium to large leaching potentials were used in Woodruff County in 1991 (Ples Spladley, personnel communication, 1992). Mixing/loading sites have a high potential for ground water contamination if proper management is not implemented. Table 3 lists the pesticides that are frequently used in Woodruff County which were monitored by the WQL (Scott and Smith, 1993).

Six of the 31 (19 %) wells monitored in this study contained pesticides (Table 4). This percentage is *not* an indication of the overall of well contamination in the Delta or Woodruff County, because this study focused on shallow wells in the most vulnerable areas of the county. Five of these six sites are in the areas with a vulnerability index greater than 70 (Figure 4). Most of the pesticide concentrations were low, but two wells had bentazon concentrations exceeding the health advisory limit of 20 µg/L (EPA, 1989b) (Table 4). All of the wells had detectable pesticides during re-sampling. Only one well (#9), however, had multiple pesticide detection and these were duplicated in May, June, and July of 1994 and in May, 1995.

Four of the wells with pesticide contamination also contained relatively high concentrations of nitrate-N (i.e., exceeds the background of 0.4 mg/L) (Tables 2 and 4). Detroy et al. (1990) reported nitrate-N concentrations of 15 mg/L for wells with pesticide contamination and 7.3 m/L for those without pesticides. The high solubility of nitrate compounds combined with lack of anion exchange sites in the soil and aquifer make nitrate very mobile in water. Nitrate in shallow, well oxygenated ground water in highly permeable sediment can migrate large distances from input areas (Freeze, 1979). These observations suggest that high nitrate-Nconcentrations might be useful in predicting potential pesticide contamination. However, as indicated in Table 2, higher nitrate-N concentrations often are not accompanied by pesticide contamination. This situation

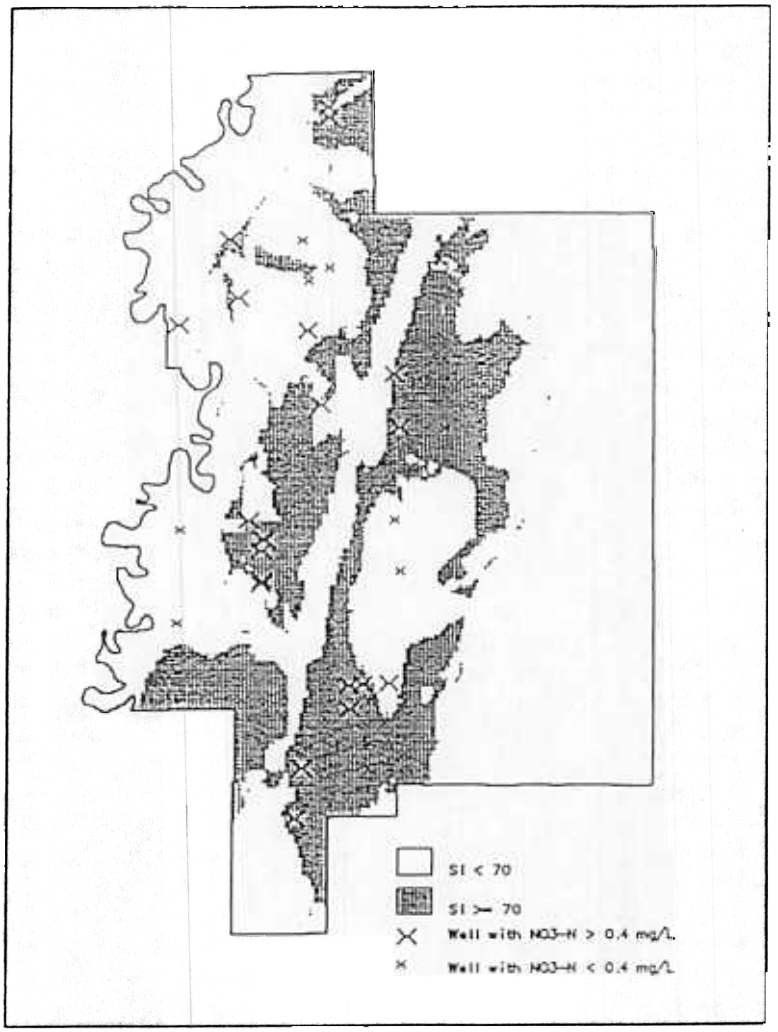


FIGURE 3. Well locations with respect to sensitivity indices (SI) greater than 70 and nitrate-N concentration levels.

TABLE 3. Pesticides in Woodruff Country with medium to high large leaching potential that were monitored in this study. Half-life and typical crop usage for these pesticides also are provided. Rank is based on the pounds of pesticide used.

| RANK | COMPOUND | CROPS | HALF-LIFE days | LEACHING POTENTIAL |
|---|---|---|---|---|
| 1 | Metolachlor | corn, soybeans | 90 | medium |
| 2 | Alachlor | corn, soybeans | 60 | large |
| 3 | Molinate | rice | 21 | medium |
| 4 | Atrazine | corn, sorghum | 60 | medium |
| 5 | 2,4-D | pasture, wheat | 10 | medium |
| 6 | Bentazon | soybeans, rice | 20 | medium |
| 7 | Metribuzin | soybeans, potatoes | 40 | large |
| 8 | Acifluorfen | soybeans, peanuts | 14 | medium |
| 13 | Norflurazon | cotton | 30 | medium |
| 14 | Linuron | soybeans, cotton | 60 | medium |
| 16 | Fluometuron | cotton | 85 | medium |
| 17 | Cyanazine | corn, cotton | 14 | medium |

TABLE 4. Data for wells with pesticide contamination.

| WELL | DATE | DEPTH ft | PESTICIDE µg/L | NITRATE mg/L | Fe mg/L |
|---|---|---|---|---|---|
| 7 | 5/94, 6/94,7/94 5/95 | unknown | bentazon 55, 66, 78, 21 | 0.01,--,<0.01,<0.01 | 2.95,--, 2.08, 2.18 |
| 9 | 5/94,6/94,5/95 | 60 | bentazon 25, 88, 37<br>acifluorfen 1.7, 8.6, 6.8<br>fluometuron 0.9, 0.8, 0.4 | 0.13,--, 0.31 | 0.03,--, 0.82 |
| 11 | 7/94,2/95 | 35 | metolachor 13, 11.5 | 5.65, 6.47 | 0.01, 0.01 |
| 25 | 9/94, 2/95 | 45 | bentazon 4.4, 1.9 | 2.05, 2.87 | 0.04, 0.04 |
| 26 | 9/94, 2/20 | 60 | bentazon 1.5, 0.9 | 1.19, 1.72 | 0.01, 0.70 |
| 29 | 9/94, 2/20 | 26 | metribuzin 0.35, 0.4 | 1.68, 0.75 | 0.16, 0.54 |

may be the result of greater retardation and/or degradation rates for pesticides compared to those for nitrate. The relatively high iron concentration for well #7 (Table 4) indicates that the conditions in this well were favorablefor denitrification. The potential for pesticide contamination cannot be ruled out on the basis of low nitrate concentrations because denitrification may have occurred in the vadose zone, or minimal fertilizer may have been used in an area.

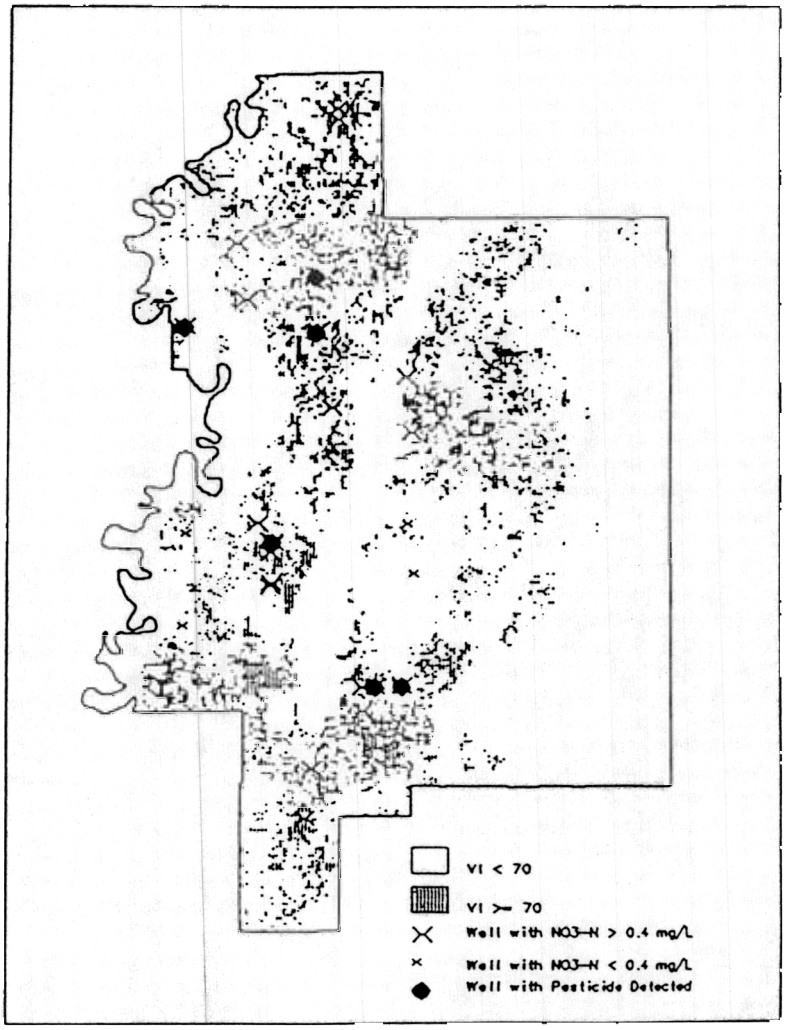


FIGURE 4. Location of wells with respect to vulnerability indices (VI) greater than 70, pesticide contamination, and level of nitrate-N concentration.

## CONCLUSIONS

There are higher nitrate-N concentrations in shallow wells (<50 ft deep) than in deeper wells in the alluvial aquifer. These nitrate-N concentrations are lower in Woodruff County than those reported for other regions of the country. Higher rates of denitrification are probably responsible for these differences in combination with lower nitrogen fertilizer application rates and the presence of the clay confining unit in parts of the region. Wells with elevated nitrate-N concentrations are coincident with areas with higher sensitivity indices, and wells with background nitrate-N concentrations are mostly located in areas with lower sensitivity. The modified DRASTIC model is capable of indicating areas that may have elevated nitrate concentrations.

Because of the difference in application rates and in the chemical and biological reactions involving nitrate and pesticides, there are difficulties in using nitrate-N as an indication of potential pesticide contamination. It appears that the modified DRASTIC model may be helpful in delineating areas potentially susceptible to pesticide contamination.

## ACKNOWLEDGMENTS

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## BIOGRAPHICAL SKETCHES

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H.D. Scott, is a soil physicist with rank of University Professor of Agronomy at the University of Arkansas, Fayetteville. Recently Scott has been in involved in the development of models for contaminant transport utilizing geographical information systems.

P.F. Vendrell is Laboratory Manager of the Arkansas Water Resources Center, Water Quality Laboratory, University of Arkansas Fayetteville. He is a soil scientist who holds the rank of Adjunct Assistant Professor in the Departments of Geology and Agronomy.

H.S. Lin holds a post-doctoral position in the Department of Agronomy at the University of Arkansas. His expertise is in the areas of hydrology, modeling and geographical information systems.

# PART II

# QUALITY ASSURANCE REPORT

AUGUST , 1994 - JULY 31, 1995

PHASE III: WOODRUFF COUNTY

# QUALITY ASSURANCE REPORT: ARKANSAS STATE PESTICIDES IN GROUND WATER MONITORING PROJECT PHASE III WOODRUFF COUNTY

T. Nichols, P. Vendrell, K. Steele[1]

## I. Introduction

Between May, 1994 and May, 1995, seventy water samples were drawn from sixty wells in Woodruff County. 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 and the methods used.

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 |

Of the 60 wells tested, seven showed trace levels of pesticides. Table 2 shows a listing of the contaminated wells including the concentrations detected in samples taken at different times.

## II. Interpretation of QC data.

During the project, thirteen 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

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

Table 2. Wells in Woodruff County Contaminated with Pesticides.

| Well # | Date Sampled | Chemical | Conc. (µg/L) |
|---|---|---|---|
| 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 |
| 9 | May 24, 1994 | Bentazon | 25 |
| | | Aciflurofen | 1.7 |
| | | Fluometuron | 0.9 |
| | June 29, 1994 | Bentazon | 88 |
| | | Aciflurofen | 8.6 |
| | | Fluometuron | 0.8 |
| | May 15, 1995 | Bentazon | 37 |
| | | Aciflurofen | 6.8 |
| | | Fluometuron | 0.4 |
| 11 | July 26, 1994 | Metolachlor | 13 |
| | Feb. 20, 1995 | Metolachlor | 11.5 |
| 25 | Sep. 15, 1994 | Bentazon | 4.4 |
| | Feb. 20, 1995 | Bentazon | 1.9 |
| 26 | Sep. 15, 1994 | Bentazon | 1.5 |
| | Feb. 20, 1995 | Bentazon | 0.9 |
| 29 | Sep. 29, 1994 | Metribuzin | 0.4 |
| | Feb. 20, 1995 | Metribuzin | 0.4 |
| 34(PB) | Feb. 20, 1995 | Alachlor | 1.5 |
| | May 15, 1995 | Bentazon | 1.5 |
| | | Aciflurofen | 0.5 |

QC sheets, 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 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 one in ten samples be field fortified. A consistent, high recovery of the pesticides spiked into the

various ground waters is good indication that sample extraction and analysis are acceptable, that nothing in the ground waters is preventing the detection of pesticides in the non-fortified samples and that 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 pesticide) were analyzed with each batch. Concentrations for the 2X standards are also included in Table 2. For each batch and each method, 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.

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 |

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 Ashley and Mississippi Counties.

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

| Chemical | N | Mean(M) % | Std. Dev.(s) % | Range(M±3s) % |
|---|---|---|---|---|
| Molinate | 62 | 91.2 | 13.5 | 50.8 - 131.7 |
| Atrazine | 67 | 96.8 | 13.3 | 56.9 - 136.7 |
| Metribuzin | 67 | 97.0 | 16.4 | 47.8 - 146.2 |
| Alachlor | 67 | 96.7 | 13.2 | 57.2 - 136.2 |
| Metolachlor | 67 | 99.1 | 13.8 | 57.8 - 140.4 |
| Norflurazon | 67 | 100.1 | 16.5 | 50.7 - 149.5 |
| EPA507 surrogate | 179 | 95.8 | 18.4 | 41.1 - 151.0 |
| Cyanazine | 66 | 94.7 | 14.7 | 50.6 - 138.8 |
| Fluometuron | 66 | 88.0 | 17.3 | 42.4 - 133.6 |
| Diuron | 65 | 89.3 | 12.2 | 52.8 - 125.8 |
| Linuron | 66 | 85.7 | 10.6 | 54.0 - 117.5 |
| NPS4 surrogate | 170 | 84.7 | 14.8 | 40.4 - 129.0 |
| 2,4-D | 38 | 84.1 | 19.7 | 25.1 - 143.1 |
| Bentazon | 38 | 84.6 | 17.8 | 31.1 - 138.0 |
| Aciflurofen | 38 | 82.4 | 18.6 | 26.7 - 138.2 |
| EPA515 surrogate | 86 | 89.2 | 20.7 | 27.2 - 151.2 |

The normal range of recovery is defined as the mean plus/minus 3 standard deviations. For example the mean recovery for molinate was 91.2% with a standard deviation of 13.5% yielding a range of 50.8 - 131.7% (the mean plus/minus 3 standard deviations). If the recovery of a particular analyte from a field spike is outside the normal 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 before extraction as a check on the sample preparation procedure. The 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 were so low as to cause suspicion of false negatives.

As specified in the Quality Assurance Project Plan (QAPP), QC data for nitrate consist of percent relative standard

deviation (%RSD) between duplicate measurements of one sample and percent recovery (%REC) from a sample spiked with a known amount of nitrate-nitrogen. The maximum allowable %RSD is 10% and the allowable range for %REC is 80-120%. QC measurements are made on one sample from each sampling trip.

III.QA/QC Summary

Appendix A contains analysis results and spike recovery information for all thirteen sampling trips in Woodruff County. For the seventy samples there were a total of 910 data points (70 times 13 pesticides) of which 9, or less than one percent, have been reported as suspect. Suspect results have been highlighted with grey shading on the analysis reports. Three results for Wood #2 are reported as suspect because spike recoveries were too high. Bentazon results for 4 samples from Wood #7 and 2 samples from Wood #9 were reported as suspect because spike recoveries were out of the normal range. Bentazon at high concentrations, 55 and 25 ug/L, was detected in these wells. The spike concentration was so low, 7.21 ug/L, in comparison that it was hard to get good recoveries. However, all these detections were confirmed and the results are reported as suspect only to satisfy EPA rules. The authors feel the QC data for these analysis results are adequate for the stated purposes of the study.

Appendix B contains copies of two corrective action reports filed during the course of this study. The problems encountered were corrected and no significant loss of data resulted from either problem.

# APPENDIX A

# ANALYSIS RESULTS

# AND

# QUALITY CONTROL DATA

## RESULTS OF PESTICIDE MONITORING : TRIP #1 TO WOODRUFF COUNTY-MAY, 1994.

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

| | | 2 | 3 | 4 |
|---|---|---|---|---|
| WELL ID: | WOOD#1 | WOOD#2 | WOOD#3 | WOOD#4 |
| DATE SAMPLED: | MAY 5,1994 | 5-May-94 | MAY 5,1994 | MAY 5,1994 |
| LATITUDE: | 35° 18' 03" | 35° 09' 04" | 35° 07' 45" | 35° 13' 30" |
| LONGITUDE: | 91° 21' 32" | 91° 20' 38" | 91° 20' 39" | 91° 14' 01" |
| DEPTH OF WELL, ft: | 50 | 48 | <50 | 21 |
| pH, standard units: | 6.7 | 6.49 | 6.36 | 6.39 |
| CONDUCTIVITY AT 25° C mhos/cm: | 126 | 127 | 185 | 266 |
| TEMPERATURE, ° C | 16.6 | 17.7 | 17.6 | 16.8 |
| NITRATE, mg/L: | 5.44 | 1.71 | 3.59 | 4.12 |
| ACIFLUORFEN, ug/L | ND | ND | ND | ND |
| ALACHLOR, ug/L: | ND | [redacted] | ND | ND |
| ATRAZINE,ug/L: | ND | [redacted] | 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 | [redacted] | 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 #' TO WOODRUFF COUNTY MAY, 994.

EPA METHOD 507

PERCENT RECOVERIES

| | | SURROGATE | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON |
|---|---|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | | | |
| | WOOD #1 | 93 | 74 | 127 | 90 | 98 | 99 | 107 |
| | WOOD #2 | 133 | 112 | 149 | 133 | 147 | 149 | 149 |
| | WOOD #3 | 63 | 63 | 118 | 85 | 94 | 99 | 98 |
| | WOOD #4 | 76 | 63 | 116 | 85 | 93 | 97 | 137 |
| NON-FORTIFIED SAMPLES | | | | | | | | |
| | WOOD #1 | 61 | | | | | | |
| | WOOD #2 | 66 | | | | | | |
| | WOOD #3 | 77 | | | | | | |
| | WOOD #4 | 60 | | | | | | |
| LAB BLANKS | p665bl | 103 | | | | | | |

CONCENTRATIONS FOR LAB BLANKS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| p665bl | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | 0 | 0 |

PEAK AREAS FOR A 2X* STANDARD

| | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | ORFLURAZON |
|---|---|---|---|---|---|---|
| 2X STANDARD | 31969 | 14888 | 8658 | 7398 | 10536 | 27271 |

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| P613 | P614 | %RSD |
|---|---|---|
| 141800 | 143153 | 0.95 |

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| 1ST RUN | 2ND RUN | %RSD |
|---|---|---|
| 225626 | 206545 | 8.83 |

ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO WOODRUFF COUNTY - MAY, 1994.

EPA METHOD 515

PERCENT RECOVERIES

| | SURROGATE | 2,4-D | BENTAZON | ACIFLUROFEN |
|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | 114 | 84 | 81 | 87 |
| WOOD #1 | 64 | 86 | 75 | 83 |
| WOOD #2 | 84 | 71 | 76 | 82 |
| WOOD #3 | 80 | 65 | 64 | 71 |
| WOOD #4 | | | | |
| NON-FORTIFIED SAMPLES | | | | |
| WOOD #1 | 95 | | | |
| WOOD #2 | 129 | | | |
| WOOD #3 | 111 | | | |
| WOOD #4 | 109 | | | |



LAB BLANKS

| | | | |
|---|---|---|---|
| p661b | 80 | | |

CONCENTRATIONS FOR LAB BLANKS

| | | |
|---|---|---|
| p661b | 0 | 0 |

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

p640

42703

# QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO WOODRUFF COUNTY - MAY, 1994.

NPS METHOD 4

## PERCENT RECOVERIES

| | CYANAZINE | FLUOMETURON | DIURON | LINURON | SURROGATE |
|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | |
| WOOD#1 | 92 | 90 | 93 | 90 | 74 |
| WOOD#2 | 81 | 82 | 94 | 85 | 73 |
| WOOD#3 | 83 | 76 | 84 | 77 | 82 |
| WOOD#4 | 82 | 83 | 89 | 82 | 80 |
| NON-FORTIFIED SAMPLES | | | | | |
| WOOD#1 | | | | | 101 |
| WOOD#2 | | | | | 92 |
| WOOD#3 | | | | | 98 |
| WOOD#4 | | | | | 99 |
| LAB BLANKS | | | | | |
| P664 | | | | | 93 |
| P668 | | | | | 83 |

## CONCENTRATIONS FOR LAB BLANKS

| | | | | |
|---|---|---|---|---|
| P664 | 0 | 0 | 0 | 0 |
| P668 | 0 | 0 | 0 | 0 |

## PEAK AREAS FOR A 2X* STANDARD

| | CYANAZINE | FLUOMETURON | DIURON | LINURON | SURROGATE |
|---|---|---|---|---|---|
| 2X STANDARD | 4850 | 2417 | 5999 | 14739 | 364872 |

## DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| P624 | P625 | %RSD |
|---|---|---|
| 330715 | 356785 | 7.58 |

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

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #1 TO WOODRUFF COUNTY - MAY, 1994.

NITRATE

## SPIKE RECOVERY

| WELL NUMBER | %RECOVERY |
|---|---|
| WOOD 2 | 100% |

## DUPLICATE ANALYSIS

| 1ST MEASUREMENT | 2ND MEASUREMENT | % RSD |
|---|---|---|
| 5.44 | 5.43 | 0.12% |

## RESULTS OF PESTICIDE MONITORING : TRIP #2 TO WOODRUFF COUNTY-MAY, 1994.

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

| | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|
| WELL ID: | WOOD#5 | WOOD#6 | WOOD#7 | WOOD#8 | WOOD#9 |
| DATE SAMPLED: | MAY 23,1994 | MAY 23,1994 | MAY 23,1994 | MAY 24,1994 | MAY 24,1994 |
| LATITUDE: | 35° 24' 41" | 35° 25' 26" | 35° 19' 27" | 35° 20' 41" | 35° 17' 09" |
| LONGITUDE: | 91° 17' 16" | 91° 17' 19" | 91° 18' 20" | 91° 21' 55" | 91° 18' 29" |
| DEPTH OF WELL, ft: | 60 | unk | unk | 32 | 60 |
| pH, standard units: | 6.57 | 6.31 | 6.82 | 6.71 | 6.89 |
| CONDUCTIVITY AT 25° C mhos/cm: | 98 | 139 | 149 | 136 | 198 |
| TEMPERATURE, ° C | 17.3 | 17.3 | 18.8 | 16.6 | 17.5 |
| NITRATE, mg/L: | 1.58 | 9.26 | 0.01 | 3.11 | 0.13 |
| ACIFLUORFEN, ug/L | ND | ND | ND | ND | 1.7 |
| ALACHLOR, ug/L: | ND | ND | ND | ND | ND |
| ATRAZINE,ug/L: | ND | ND | ND | ND | ND |
| BENTAZON, ug/L | ND | ND | [redacted] 65 [redacted] | ND | [redacted] 25 |
| CYANAZINE, ug/L: | ND | ND | ND | ND | ND |
| DIURON, ug/L: | ND | ND | ND | ND | ND |
| FLUOMETURON, ug/L: | ND | ND | ND | ND | 0.9 |
| 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 WOODRUFF COUNTY - MAY, 1994.

EPA METHOD 507

PERCENT RECOVERIES

| | | SURROGATE | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON |
|---|---|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | | | |
| | WOOD #5 | 70 | 77 | 86 | 80 | 90 | 88 | 95 |
| | WOOD #6 | 72 | 83 | 99 | 93 | 101 | 100 | 105 |
| | WOOD #7 | 121 | 104 | 109 | 101 | 107 | 103 | 108 |
| | WOOD #8 | 74 | 78 | 92 | 92 | 86 | 86 | 93 |
| | WOOD #9 | 120 | 86 | 89 | 82 | 88 | 85 | 89 |
| NON-FORTIFIED SAMPLES | | | | | | | | |
| | WOOD #5 | 110 | | | | | | |
| | WOOD #6 | 114 | | | | | | |
| | WOOD #7 | 104 | | | | | | |
| | WOOD #8 | 106 | | | | | | |
| | WOOD #9 | 63 | | | | | | |
| LAB BLANKS | p760bl | 129 | | | | | | |

CONCENTRATIONS FOR LAB BLANKS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| p760bl | 0 | 0 | 0 | 0 | 0 | 0 |

PEAK AREAS FOR A 2X* STANDARD

| | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON |
|---|---|---|---|---|---|---|
| 2X STANDARD | 12765 | 25684 | 10606 | 9673 | 29219 | 32641 |

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| P713 | P715 | %RSD |
|---|---|---|
| 236292 | 244181 | 3.28 |

ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO WOODRUFF COUNTY - MAY, 1994.

EPA METHOD 515

PERCENT RECOVERIES

| | SURROGATE | 2,4-D | BENTAZON | ACIFLUROFEN |
|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | |
| WOOD #5 | omitted | 67 | 65 | 65 |
| WOOD #6 | omitted | 90 | 89 | 91 |
| WOOD #7 | omitted | 87 | 31^ | 86 |
| WOOD #8 | omitted | 78 | 79 | 77 |
| WOOD #9 | omitted | 66 | 18^ | 95 |
| NON-FORTIFIED SAMPLES | | | | |
| WOOD #5 | 80 | | | |
| WOOD #6 | 86 | | | |
| WOOD #7 | 119 | | | |
| WOOD #8 | 123 | | | |
| WOOD #9 | 77 | | | |
| LAB BLANKS | | | | |
| p768 | 85 | | | |
| P766 | 73 | | | |

CONCENTRATIONS FOR LAB BLANKS

| | | | |
|---|---|---|---|
| p768 | 0 | 0 | 0 |
| P766 | 0 | 0 | 0 |

PEAK AREAS FOR A 2X* STANDARD

| | SURROGATE | 2,4-D | BENTAZON | ACIFLUROFEN |
|---|---|---|---|---|
| 2X STANDARD | 68054 | 46209 | 34599 | 217456 |

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| p739 | p730 | %RSD |
|---|---|---|
| 64016 | 52517 | 19.74 |

^THE HIGH BENTAZON CONCENTRATION IN THE SAMPLE RELATIVE TO THE SPIKE AND VARIABILITY WITHIN THE METHOD, RESULTED IN MEANINGLESS RECOVERY NUMBERS FOR THESE SPIKES.
*ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO WOODRUFF COUNTY MAY, 1994.

NPS METHOD 4

PERCENT RECOVERIES

| | CYANAZINE | FLUOMETURON | DIURON | LINURON | SURROGATE |
|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | |
| WOOD #5 | 66 | 79 | 81 | 73 | 89 |
| WOOD #6 | 65 | 75 | 61 | 65 | 108 |
| WOOD #7 | 94 | 68 | 60 | 61 | 88 |
| WOOD #8 | 57 | 73 | 67 | 70 | 70 |
| WOOD #9 | 73 | 76 | 61 | 67 | 87 |
| NON-FORTIFIED SAMPLES | | | | | |
| WOOD #5 | | | | | 82 |
| WOOD #6 | | | | | 70 |
| WOOD #7 | | | | | 93 |
| WOOD #8 | | | | | 84 |
| WOOD #9 | | | | | 78 |
| LAB BLANKS | | | | | |
| p763 | | | | | 94 |
| p764 | | | | | 64 |

CONCENTRATIONS FOR LAB BLANKS

| | | | | |
|---|---|---|---|---|
| p763 | 0 | 0 | 0 | 0 |
| p764 | 0 | 0 | 0 | 0 |

PEAK AREAS FOR A 2X* STANDARD

| | CYANAZINE | FLUOMETURON | DIURON | LINURON | SURROGATE |
|---|---|---|---|---|---|
| 2X STANDARD | 2982 | 1055 | 4250 | 11786 | 364450 |

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| p734 | p735 | %RSD |
|---|---|---|
| 383890 | 335832 | 13.35 |

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| FIRST | SECOND | %RSD |
|---|---|---|
| 193880 | 224263 | 14.53 |

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

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #2 TO WOODRUFF COUNTY - MAY, 1994.

## NITRATE

### SPIKE RECOVERY

| WELL NUMBER | %RECOVERY |
|---|---|
| WOOD 6 | 97% |

### DUPLICATE ANALYSIS

| 1ST MEASUREMENT | 2ND MEASUREMENT | % RSD |
|---|---|---|
| 58 mg/l | 58 mg/L | 0.00% |

## RESULTS OF PESTICIDE MONITORING : TRIP #3 TO WOODRUFF COUNTY-JUNE 1994.

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

| | 10 | 11 | 12 |
|---|---|---|---|
| WELL ID: | WOOD#7R1 | WOOD#9R1 | WOOD#10 |
| DATE SAMPLED: | JUN 29,1994 | JUN 29,1994 | JUN 29,1994 |
| LATITUDE: | 35° 19' 27" | 35° 17' 09" | 35° 19' 10" |
| LONGITUDE: | 91° 18' 20" | 91° 18' 29" | 91° 18' 16" |
| DEPTH OF WELL, ft: | unk | 40-60 | 80-100 |
| pH, standard units: | 6.77 | 6.97 | 7.24 |
| CONDUCTIVITY AT 25° C , umhos/cm: | 138 | 199 | 460 |
| TEMPERATURE, ° C | 17.7 | 18.6 | 17 |
| NITRATE, mg/L: | NC | NC | <0.01 |
| ACIFLUORFEN, ug/L | ND | 8.6* | ND |
| ALACHLOR, ug/L: | ND | ND | ND |
| ATRAZINE,ug/L: | ND | ND | ND |
| BENTAZON, ug/L | [redacted] | [redacted] | ND |
| CYANAZINE, ug/L: | ND | ND | ND |
| DIURON, ug/L: | ND | ND | ND |
| FLUOMETURON, ug/L: | 0.4 | 0.8 | ND |
| LINURON, ug/L: | ND | ND | ND |
| METOLACHLOR, ug/L: | ND | ND | ND |
| METRIBUZIN, ug/L: | ND | ND | ND |
| MOLINATE, ug/L: | ND | ND | ND |
| NORFLURAZON, ug/L | ND | ND | ND |
| 2,4-D, ug/L | ND | ND | ND |

*DUE TO A RECENTLY DISCOVERED SPREADSHEET ERROR, THESE CONCENTRATIONS HAVE BEEN REVISED UPWARD SINCE THE DATA WERE ORIGINALLY REPORTED IN JULY, 1994.

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #3 TO WOODRUFF COUNTY-JUNE 1994.

EPA METHOD 507

PERCENT RECOVERIES

| | | SURROGATE | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON |
|---|---|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | | | |
| | WOOD #7R1 | 65 | 88 | 98 | 99 | 96 | 96 | 114 |
| | WOOD #9R1 | 63 | 85 | 96 | 90 | 92 | 93 | 116 |
| | WOOD #10 | 71 | 76 | 88 | 70 | 69 | 89 | 97 |
| NON-FORTIFIED SAMPLES | | | | | | | | |
| | WOOD #7R1 | 75 | | | | | | |
| | WOOD #9R1 | 80 | | | | | | |
| | WOOD #10 | 81 | | | | | | |
| LAB BLANKS | P933 | 71 | | | | | | |
| | P934 | 80 | | | | | | |

CONCENTRATIONS FOR LAB BLANKS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| P933 | 0 | 0 | 0 | 0 | 0 | 0 |
| P934 | 0 | 0 | 0 | 0 | 0 | 0 |

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| P903 | P905 | %RSD |
|---|---|---|
| 168289 | 138413 | 19.48 |

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #3 TO WOODRUFF COUNTY-JUNE 1994.

EPA METHOD 515

PERCENT RECOVERIES

| | SURROGATE | 2,4-D | BENTAZON | ACIFLUROFEN |
|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | |
| WOOD #7R1 | 103 | 87 | 144^ | 94 |
| WOOD #9R1 | 95 | 68 | -26^ | 37 |
| WOOD #10 | 94 | 87 | 100 | 96 |
| NON-FORTIFIED SAMPLES | | | | |
| WOOD #7R1 | 105 | | | |
| WOOD #9R1 | 115 | | | |
| WOOD #10 | 122 | | | |
| LAB BLANKS | | | | |
| 930b | 90 | | | |
| 931b | 84 | | | |

CONCENTRATIONS FOR LAB BLANKS

| | | | |
|---|---|---|---|
| 930b | 0 | 0 | 0 |
| 931b | 0 | 0 | 0 |

PEAK AREAS FOR A 2X* STANDARD

| | SURROGATE | 2,4-D | BENTAZON | ACIFLUROFEN |
|---|---|---|---|---|
| 2X STANDARD | 46660 | 25889 | 19141 | 112045 |

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| P929 | P920 | %RSD |
|---|---|---|
| 61772 | 52208 | 16.78 |

^THE HIGH BENTAZON CONCENTRATION IN THE SAMPLE RELATIVE TO THE SPIKE AND VARIABILITY WITHIN THE METHOD RESULTED, IN MEANINGLESS RECOVERY NUMBERS FOR THESE SPIKES.
*ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #3 TO WOODRUFF COUNT -JUNE 1994.

NPS METHOD 4

PERCENT RECOVERIES

| | CYANAZINE | FLUOMETURON | DIURON | LINURON | SURROGATE |
|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | |
| WOOD #7R1 | 48 | 62 | 61 | 53 | 64 |
| WOOD #9R1 | 48 | 64 | 56 | 49 | 74 |
| WOOD #10 | 60 | 104 | 76 | 65 | 89 |
| NON-FORTIFIED SAMPLES | | | | | |
| WOOD #7R1 | | | | | 92 |
| WOOD #9R1 | | | | | 71 |
| WOOD #10 | | | | | 96 |
| LAB BLANKS | | | | | |
| 936B | | | | | 70 |
| 937B | | | | | 111 |

CONCENTRATIONS FOR LAB BLANKS

| | | | | |
|---|---|---|---|---|
| 936B | 0 | 0 | 0 | 0 |
| 937B | 0 | 0 | 0 | 0 |

PEAK AREAS FOR A 2X* STANDARD

| | CYANAZINE | FLUOMETURON | DIURON | LINURON | SURROGATE |
|---|---|---|---|---|---|
| 2X STANDARD | 5494 | 927 | 5303 | 17798 | |

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| P914 | P915 | %RSD |
|---|---|---|
| 281982 | 292026 | 3.50 |

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

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #3 TO WOODRUFF COUNTY-JUNE 1994.

NITRATE

SPIKE RECOVERY

| WELL NUMBER | % RECOVERY |
|---|---|
| NONE | |

DUPLICATE ANALYSIS

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

## RESULTS OF PESTICIDE MONITORING : TRIP #4 TO WOODRUFF COUNTY-JULY, 1994.

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

| | 13 | 14 | 15 | 15a | 16 | 17 |
|---|---|---|---|---|---|---|
| WELL ID: | WOOD#11 | WOOD#12 | WOOD#7R2 (outside) | WOOD#7R2 (inside) | WOOD#13 | WOOD#14 |
| DATE SAMPLED: | JUL 26,1994 | JUL 26,1994 | JUL 27,1994 | JUL 27,1994 | JUL 27,1994 | JUL 27,1994 |
| LATITUDE: | 35° 09' 23" | 35° 09' 11" | 35° 19' 27" | NC | 35° 10' 02" | 35° 07' 04" |
| LONGITUDE: | 91° 20' 33" | 91° 20' 31" | 91° 18' 20" | 91° 18' 20" | 91° 20' 59" | 91° 20' 35" |
| DEPTH OF WELL, ft: | 35 | 35 | unk | unk | 30 | unk |
| pH, standard units: | 6.28 | 5.95 | 6.47 | 6.47 | 6.26 | 5.92 |
| CONDUCTIVITY AT 25° C , umhos/cm: | 149 | 120 | 146 | 146 | 61 | 134 |
| TEMPERATURE, ° C | 18.2 | 17.5 | 17.6 | 17.6 | 18.6 | 18.3 |
| NITRATE, mg/L: | 5.65 | 2.94 | <0.01 | NC | 1.28 | 4.49 |
| ACIFLUORFEN, ug/L | ND | ND | ND | ND | ND | ND |
| ALACHLOR, ug/L: | ND | ND | ND | NC | ND | ND |
| ATRAZINE,ug/L: | ND | ND | ND | NC | ND | ND |
| BENTAZON, ug/L | ND | ND | 69 | 78 | ND | ND |
| CYANAZINE, ug/L: | ND | ND | ND | NC | ND | ND |
| DIURON, ug/L: | ND | ND | ND | NC | ND | ND |
| FLUOMETURON, ug/L: | ND | ND | ND | NC | ND | ND |
| LINURON, ug/L: | ND | ND | ND | NC | ND | ND |
| METOLACHLOR, ug/L: | 13 | ND | ND | NC | ND | ND |
| METRIBUZIN, ug/L: | ND | ND | ND | NC | ND | ND |
| MOLINATE, ug/L: | ND | ND | ND | NC | ND | ND |
| NORFLURAZON, ug/L | ND | ND | ND | NC | ND | ND |
| 2,4-D, ug/L | ND | ND | ND | ND | ND | ND |

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #4 TO WOODRUFF COUNTY-JULY 1994.

EPA METHOD 507

PERCENT RECOVERIES

| | | SURROGATE | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON | INT. STD. |
|---|---|---|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | | | | |
| | WOOD #11 | 86 | 112 | 106 | 100 | 121 | 97 | 108 | 83 |
| | WOOD #12 | 89 | 123 | 123 | 123 | 114 | 127 | 125 | 102 |
| | WOOD #7R2 | 101 | 112 | 102 | 100 | 110 | 111 | 112 | 77 |
| | WOOD #13 | 84 | 91 | 87 | 89 | 93 | 96 | 94 | 102 |
| | WOOD #14 | 123 | 115 | 106 | 104 | 108 | 111 | 109 | 84 |
| NON-FORTIFIED SAMPLES | | | | | | | | | |
| | WOOD #11 | 102 | | | | | | | 92 |
| | WOOD #12 | 72 | | | | | | | 97 |
| | WOOD #7R2 | 114 | | | | | | | 86 |
| | WOOD #13 | 82 | | | | | | | 102 |
| | WOOD #14 | 104 | | | | | | | 108 |
| LAB BLANKS | 066BL | 106 | | | | | | | |
| | 083BL | 92 | | | | | | | |

CONCENTRATIONS FOR LAB BLANKS

| | | | | | |
|---|---|---|---|---|---|
| 066BL | 0 | 0 | 0 | 0 | |
| 083BL | 0 | 0 | 0 | 0 | |

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| 1023 | 1025 | %RSD |
|---|---|---|
| 57971 | 152730 | 3.37 |

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #4 TO WOODRUFF COUNTY-JULY 1994.

EPA METHOD 515

PERCENT RECOVERIES

| | SURROGATE | 2,4-D | INT. STD. | BENTAZON | ACIFLUROFEN |
|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | |
| WOOD #11 | 96 | 110 | 88 | 103 | 110 |
| WOOD #12 | 105 | 125 | 86 | 127 | 122 |
| WOOD #7R2 (out) | 98 | 114 | 93 | 171^ | 107 |
| WOOD #7R2 (in) | 95 | 130 | 87 | 35^ | 123 |
| WOOD #13 | 100 | 110 | 94 | 107 | 101 |
| WOOD #14 | 77 | 92 | 99 | 89 | 88 |
| NON-FORTIFIED SAMPLES | | | | | |
| WOOD #11 | 102 | | 102 | | |
| WOOD #12 | 105 | | 93 | | |
| WOOD #7R2 (out) | 90 | | 97 | | |
| WOOD #7R2 (in) | 102 | | 109 | | |
| WOOD #13 | 110 | | 110 | | |
| WOOD #14 | 107 | | 98 | | |
| LAB BLANKS | | | | | |
| 1061B | 96 | | 118 | | |
| 1063B | 79 | | 108 | | |

CONCENTRATIONS FOR LAB BLANKS

| | | | |
|---|---|---|---|
| 1061B | 0 | 0 | 0 |
| 1063B | 0 | 0 | 0 |

PEAK AREAS FOR A 2X* STANDARD

| | 2,4-D | BENTAZON | ACIFLUROFEN |
|---|---|---|---|
| 2X STANDARD | 39283 | 17955 | 103365 |

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE CONCENTRATION COMPARISON

| P1059 | P1050 | %RSD |
|---|---|---|
| 4.277 | 4.49 | 16.78 |

MACHINE DUPLICATE - SURROGATE CONCENTRATION COMPARISON

| FIRST | SECOND | %RSD |
|---|---|---|
| 4.168 | 3.523 | 16.77 |

^THE HIGH BENTAZON CONCENTRATION IN THE SAMPLE RELATIVE TO THE SPIKE AND VARIABILITY WITHIN THE METHOD, RESULTED IN MEANINGLESS RECOVERY NUMBERS FOR THESE SPIKES.
*ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #4 TO WOODRUFF COUNTY - JULY, 1994.

NPS METHOD 4

PERCENT RECOVERIES

| | CYANAZINE | FLUOMETURON | DIURON | LINURON | SURROGATE | INT. STD. |
|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | |
| WOOD #11 | 61 | 93 | 92 | 67 | 77 | 99 |
| WOOD #12 | 78 | 80 | 94 | 83 | 66 | 103 |
| WOOD #7R2 | 86 | 93 | 92 | 85 | 78 | 93 |
| WOOD #13 | 79 | 73 | 85 | 75 | 86 | 97 |
| WOOD #14 | 72 | 93 | 80 | 73 | 74 | 110 |
| NON-FORTIFIED SAMPLES | | | | | | |
| WOOD #11 | | | | | 81 | 99 |
| WOOD #12 | | | | | 79 | 100 |
| WOOD #7R2 | | | | | 78 | 99 |
| WOOD #13 | | | | | 83 | 99 |
| WOOD #14 | | | | | 81 | 105 |



LAB BLANKS

1072

1073

CONCENTRATIONS FOR LAB BLANKS

| | | | | |
|---|---|---|---|---|
| 1072 | 0 | 0 | 0 | 0 |
| 1073 | 0 | 0 | 0 | 0 |

PEAK AREAS FOR A 2X* STANDARD

| | CYANAZINE | FLUOMETURON | DIURON | LINURON |
|---|---|---|---|---|
| 2X STANDARD | 5860 | 3085 | 6624 | 3422 |

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| 1034 | 1035 | %RSD |
|---|---|---|
| 29701 | 33202 | 11.13 |

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

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #4 TO WOODRUFF COUNTY - JULY, 1994.

NITRATE

SPIKE RECOVERY

| WELL NUMBER | %RECOVERY |
|---|---|
| WOOD 11 | 102% |

DUPLICATE ANALYSIS

| 1ST MEASUREMENT | 2ND MEASUREMENT | % RSD |
|---|---|---|
| 9.70 mg/L | 9.73 mg/L | 0.31% |

## RESULTS OF PESTICIDE MONITORING : TRIP #5 TO WOODRUFF COUNTY-AUGUST, 1994.

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

| | 18 | 19 | 20 | 21 | | 23 |
|---|---|---|---|---|---|---|
| WELL ID: | WOOD#15 | WOOD#16 | WOOD#17 | WOOD#18 | WOOD#19 | WOOD#20 |
| DATE SAMPLED: | AUG. 15, 1994 | AUG. 15, 1994 | AUG. 15, 1994 | AUG. 15, 1994 | AUG. 16, 1994 | AUG. 17, 1994 |
| LATITUDE: | 17' 03" | 5° 15' 30" | 35° 13' 03" | 35° 14' 21" | 35°09' 58" | 35°08' 10"" |
| LONGITUDE: | 18' 24" | 1° 13' 58" | 91° 11' 56" | 91° 17' 48" | 91° 14' 15" | 91° 13' 55" |
| DEPTH OF WELL, ft: | unk | 50 | 62 | 70 | 80 | unk |
| pH, standard units: | 6.4 | 6 | 7.1 | 6.6 | 7.4 | 7.5 |
| CONDUCTIVITY AT 25° C , umhos/cm: | 117 | 157 | 244 | 230 | 567 | 318 |
| TEMPERATURE, ° C | 17.1 | 17.2 | 17.5 | 21 | 19 | 18 |
| NITRATE, mg/L: | 1.9 | 1.82 | 0.01 | 0.82 | 0.02 | <0.01 |
| ACIFLUORFEN, ug/L | ND | ND | ND | ND | ND | ND |
| ALACHLOR, ug/L: | ND | ND | ND | ND | ND | ND |
| ATRAZINE,ug/L: | ND | ND | ND | ND | ND | ND |
| BENTAZON, ug/L | ND | ND | ND | ND | ND | ND |
| CYANAZINE, ug/L: | ND | ND | ND | ND | ND | ND |
| DIURON, ug/L: | ND | ND | ND | ND | ND | ND |
| FLUOMETURON, ug/L: | ND | ND | ND | ND | ND | ND |
| LINURON, ug/L: | ND | ND | ND | ND | ND | ND |
| METOLACHLOR, ug/L: | ND | ND | ND | ND | ND | ND |
| METRIBUZIN, ug/L: | ND | ND | ND | ND | ND | ND |
| MOLINATE, ug/L: | ND | ND | ND | ND | ND | ND |
| NORFLURAZON, ug/L | ND | ND | ND | ND | ND | ND |
| 2,4-D, ug/L | ND | ND | ND | ND | ND | ND |

# QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #5 TO WOODRUFF COUNTY - AUGUST, 1994.

EPA METHOD 507

## PERCENT RECOVERIES

| | | SURROGATE | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON | INT. STD |
|---|---|---|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | | | | |
| | WOOD #15 | 68 | 74 | 80 | 74 | 79 | 87 | 77 | 107 |
| | WOOD #16 | 78 | 74 | 83 | 81 | 85 | 89 | 81 | 96 |
| | WOOD #17 | 84 | 76 | 76 | 73 | 81 | 83 | 76 | 97 |
| | WOOD #18 | 93 | 82 | 80 | 78 | 85 | 86 | 81 | 95 |
| | WOOD #19 | 87 | 75 | 74 | 73 | 75 | 78 | 78 | 108 |
| | WOOD#20 | 78 | 69 | 70 | 69 | 71 | 73 | 72 | 114 |
| NON-FORTIFIED SAMPLES | | | | | | | | | |
| | WOOD #15 | 84 | | | | | | | 118 |
| | WOOD #16 | 98 | | | | | | | 101 |
| | WOOD #17 | 119 | | | | | | | 95 |
| | WOOD #18 | 89 | | | | | | | 96 |
| | WOOD #19 | 106 | | | | | | | 104 |
| | WOOD#20 | 92 | | | | | | | 101 |
| LAB BLANKS | | | | | | | | | |
| | 1098bl | 103 | | | | | | | 102 |
| | 1099bl | 118 | | | | | | | 100 |

## CONCENTRATIONS FOR LAB BLANKS

| | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON |
|---|---|---|---|---|---|---|
| 1098bl | 0 | 0 | 0 | 0 | 0 | 0 |
| 1099bl | 0 | 0 | 0 | 0 | 0 | 0 |

## PEAK AREAS FOR A 2X* STANDARD

| | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON |
|---|---|---|---|---|---|---|
| 2X STANDARD | 1440 | 2623 | 1307 | 1662 | 3930 | 3994 |

## DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| 1103 | 1105 | %RSD |
|---|---|---|
| 30182 | 29545 | 2.13 |

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| 1ST RUN | 2ND RUN | %RSD |
|---|---|---|
| 27302 | 28005 | 2.54 |

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

# QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #5 TO WOODRUFF COUNTY - AUGUST, 1994.

EPA METHOD 515

## PERCENT RECOVERIES

| | SURROGATE | 2,4-D | INT. STD. | BENTAZON | ACIFLUROFEN | |
|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | |
| WOOD #15 | 82 | 116 | 135 | 89 | 70 | |
| WOOD #16 | 86 | 0 | 123 | 0 | 0 | spike omitted in field |
| WOOD #17 | 105 | 91 | 122 | 92 | 73 | |
| WOOD #18 | 97 | 90 | 125 | 104 | 81 | |
| WOOD #19 | 89 | 86 | 129 | 87 | 74 | |
| WOOD#20 | 70 | 80 | 137 | 82 | 68 | |
| NON-FORTIFIED SAMPLES | | | | | | |
| WOOD #15 | 72 | | 133 | | | |
| WOOD #16 | 77 | | 126 | | | |
| WOOD #17 | 111 | | 115 | | | |
| WOOD #18 | 108 | | 105 | | | |
| WOOD #19 | 106 | | 107 | | | |
| WOOD#20 | 83 | | 112 | | | |
| LAB BLANKS | | | | | | |
| 1095bl | 59 | | 121 | | | |

## CONCENTRATIONS FOR LAB BLANKS

| | | | |
|---|---|---|---|
| 1095bl | 0 | 0 | 0 |

## DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| 1129 | 1120 | %RSD |
|---|---|---|
| 246003 | 189023 | 26.20 |

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| 1ST RUN | 2ND RUN | %RSD |
|---|---|---|
| 219134 | 204602 | 6.86 |

# QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #5 TO WOODRUFF COUNTY - AUGUST, 1994.

NPS METHOD 4

## PERCENT RECOVERIES

| | CYANAZINE | FLUOMETURON | DIURON | LINURON | SURROGATE | INT. STD. |
|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | |
| WOOD #15 | 75 | 71 | 80 | 73 | 73 | 114 |
| WOOD #16 | 79 | 75 | 85 | 78 | 77 | 109 |
| WOOD #17 | 77 | 70 | 82 | 71 | 68 | 116 |
| WOOD #18 | 83 | 81 | 94 | 83 | 84 | 97 |
| WOOD #19 | 69 | 80 | 83 | 77 | 76 | 112 |
| WOOD#20 | 75 | 70 | 79 | 69 | 67 | 114 |
| NON-FORTIFIED SAMPLES | | | | | | |
| WOOD #15 | | | | | 59 | 117 |
| WOOD #16 | | | | | 74 | 115 |
| WOOD #17 | | | | | 69 | 114 |
| WOOD #18 | | | | | 68 | 120 |
| WOOD #19 | | | | | 79 | 110 |
| WOOD#20 | | | | | 68 | 114 |
| LAB BLANKS | | | | | | |
| 1164 | | | | | 78 | 112 |
| 1165 | | | | | | 115 |

## CONCENTRATIONS FOR LAB BLANKS

| | | | | |
|---|---|---|---|---|
| 1164 | 0 | 0 | 0 | 0 |
| 1165 | 0 | 0 | 0 | 0 |

## PEAK AREAS FOR A 2X* STANDARD

| | CYANAZINE | FLUOMETURON | DIURON | LINURON |
|---|---|---|---|---|
| 2X STANDARD | 4195 | 2092 | 7248 | 14362 |

## DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| 1124 | 1125 | %RSD |
|---|---|---|
| 324208 | 352373 | 8.33 |

MACHINEDUPLICATE - SURROGATE AREA COMPARISON

| 1ST. RUN | 2ND. RUN | %RSD |
|---|---|---|
| 412342 | 422983 | 2.55 |

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

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #5 TO WOODRUFF COUNTY - AUGUST, 1994.

NITRATE

SPIKE RECOVERY

| WELL NUMBER | %RECOVERY |
|---|---|
| WOOD 16 | 103.00% |

DUPLICATE ANALYSIS

| 1ST MEASUREMENT | 2ND MEASUREMENT | % RSD |
|---|---|---|
| .90 mg/L | 1.89 mg/L | 0.58% |

## RESULTS OF PESTICIDE MONITORING : TRIP #6 TO WOODRUFF COUNTY-SEPTEMBER, 1994.

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

| | 24 | 25 | 26 | 27 | 28 | 29 |
|---|---|---|---|---|---|---|
| WELL ID: | WOOD#21 | WOOD#22 | WOOD#23 | WOOD#24 | WOOD#25 | WOOD#26 |
| DATE SAMPLED: | EPT. 14, 1994 | EPT. 14, 1994 | SEPT. 14, 1994 | SEPT. 15, 1994 | SEPT. 15, 1994 | SEPT. 15, 1994 |
| LATITUDE: | 35°09' 01" | 35°06' 13" | 35° 19' 24" | 35° 20' 36" | 35° 17' 08" | 35° 03' 51" |
| LONGITUDE: | 91° 24' 19" | 91° 24' 23" | 91° 18' 08" | 91° 17' 16" | 91° 24' 08" | 91° 14' 39" |
| DEPTH OF WELL, ft: | 60 | 40 | 52 | 24 | 45 | 60 |
| pH, standard units: | 7 | 6.8 | 7.6 | 6.9 | 6.4 | 7.1 |
| CONDUCTIVITY AT 25° C , umhos/cm: | 510 | 315 | 411 | 189 | 210 | 504 |
| TEMPERATURE, ° C | 18.5 | 19.6 | 18 | 18.4 | 18 | 18.1 |
| NITRATE, mg/L: | 0.04 | 0.02 | 0.03 | 0.03 | 2.05 | 1.19 |
| ACIFLUORFEN, ug/L | ND | ND | ND | ND | ND | ND |
| ALACHLOR, ug/L: | ND | ND | ND | ND | ND | ND |
| ATRAZINE,ug/L: | ND | ND | ND | ND | ND | ND |
| BENTAZON, ug/L | ND | ND | ND | ND | 4.4 | 1.5 |
| CYANAZINE, ug/L: | ND | ND | ND | ND | ND | ND |
| DIURON, ug/L: | ND | ND | ND | ND | ND | ND |
| FLUOMETURON, ug/L: | ND | ND | ND | ND | ND | ND |
| LINURON, ug/L: | ND | ND | ND | ND | ND | ND |
| METOLACHLOR, ug/L: | ND | ND | ND | ND | ND | ND |
| METRIBUZIN, ug/L: | ND | ND | ND | ND | ND | ND |
| MOLINATE, ug/L: | ND | ND | ND | ND | ND | ND |
| NORFLURAZON, ug/L | ND | ND | ND | ND | ND | ND |
| ,4-D, ug/L | ND | ND | ND | ND | ND | ND |

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #6 TO WOODRUFF COUNTY - SEPTEMBER, 1994.

EPA METHOD 507

PERCENT RECOVERIES

| | | SURROGATE | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON | INT. STD. |
|---|---|---|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | | | | |
| | WOOD #21 | 88 | 77 | 96 | 92 | 85 | 90 | 100 | 93 |
| | WOOD #22 | 93 | 75 | 88 | 87 | 85 | 86 | 92 | 92 |
| | WOOD #23 | 93 | 76 | 92 | 91 | 88 | 89 | 100 | 90 |
| | WOOD #24 | 90 | 72 | 86 | 84 | 79 | 86 | 92 | 83 |
| | WOOD #25 | 82 | 71 | 88 | 85 | 83 | 85 | 91 | 97 |
| | WOOD#26 | 98 | 84 | 91 | 87 | 85 | 85 | 87 | 99 |
| NON-FORTIFIED SAMPLES | | | | | | | | | |
| | WOOD #21 | 71 | | | | | | | 94 |
| | WOOD #22 | 71 | | | | | | | 103 |
| | WOOD #23 | 99 | | | | | | | 94 |
| | WOOD #24 | 73 | | | | | | | 92 |
| | WOOD #25 | 78 | | | | | | | 100 |
| | WOOD#26 | 83 | | | | | | | 98 |
| LAB BLANKS | | | | | | | | | |
| | 1273 | 77 | | | | | | | 90 |
| | 1275 | 97 | | | | | | | 88 |
| | 1276 | 88 | | | | | | | 96 |

CONCENTRATIONS FOR LAB BLANKS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1273 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1275 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1276 | 0 | 0 | 0 | 0 | 0 | 0 |

PEAK AREAS FOR A 2X* STANDARD

| | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON |
|---|---|---|---|---|---|---|
| 2X STANDARD | 4749 | 8432 | 4941 | 3410 | 11244 | 12727 |

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| 1313 | 1315 | %RSD |
|---|---|---|
| 61246 | 60908 | 0.55 |

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| 1ST RUN | 2ND RUN | %RSD |
|---|---|---|
| 70356 | 70990 | 0.90 |

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

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #6 TO WOODRUFF COUNTY-SEPTEMBER, 1994.

EPA METHOD 515

PERCENT RECOVERIES

| | SURROGATE | 2,4-D | INT. STD. | BENTAZON | ACIFLUROFEN |
|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | |
| WOOD #21 | 77 | 92 | 109 | 105 | 96 |
| WOOD #22 | 71 | 62 | 98 | 55 | 57 |
| WOOD #23 | 62 | 72 | 126 | 68 | 64 |
| WOOD #24 | 92 | 102 | 107 | 103 | 87 |
| WOOD #25 | 79 | 93 | 108 | 117 | 80 |
| WOOD#26 | 92 | 88 | 110 | 93 | 73 |
| NON-FORTIFIED SAMPLES | | | | | |
| WOOD #21 | 83 | | 90 | | |
| WOOD #22 | 109 | | 94 | | |
| WOOD #23 | 93 | | 92 | | |
| WOOD #24 | 67 | | 90 | | |
| WOOD #25 | 66 | | 109 | | |
| WOOD#26 | 59 | | 126 | | |
| LAB BLANKS | | | | | |
| 1281BL | 69 | | 103 | | |
| 1278BL | 105 | | 116 | | |

CONCENTRATIONS FOR LAB BLANKS

| | | | |
|---|---|---|---|
| 1281BL | 0 | 0 | 0 |
| 1278BL | 0 | 0 | 0 |

PEAK AREAS FOR A 2X* STANDARD

| | SURROGATE | 2,4-D | INT. STD. | BENTAZON | ACIFLUROFEN |
|---|---|---|---|---|---|
| 2X STANDARD | 141123 | 110609 | 679867 | 77285 | 377036 |

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| 1329 | 1320 | %RSD |
|---|---|---|
| 73789 | 117228 | 45.48 |

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| 1ST RUN | 2ND RUN | %RSD |
|---|---|---|
| 182674 | 185646 | 1.61 |

ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

# QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #6 TO WOODRUFF COUNTY - SEPTEMBER, 1994.

NPS METHOD 4

## PERCENT RECOVERIES

(mistakes corrected 1/23/96)

| | CYANAZINE | FLUOMETURON | DIURON | LINURON | SURROGATE | INT. STD. |
|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | |
| WOOD #21 | 84 | 85 | 103 | 89 | 91 | 91 |
| WOOD #22 | 73 | 74 | 85 | 78 | 86 | 103 |
| WOOD #23 | 76 | 73 | 89 | 79 | 85 | 99 |
| WOOD #24 | 58 | 70 | 70 | 63 | 81 | 109 |
| WOOD #25 | 79 | 74 | 93 | 80 | 83 | 96 |
| WOOD#26 | 80 | 80 | 92 | 85 | 92 | 99 |
| NON-FORTIFIED SAMPLES | | | | | | |
| WOOD #21 | | | | | 70 | 119 |
| WOOD #22 | | | | | 69 | 93 |
| WOOD #23 | | | | | 73 | 105 |
| WOOD #24 | | | | | 80 | 108 |
| WOOD #25 | | | | | 79 | 98 |
| WOOD#26 | | | | | 78 | 108 |
| LAB BLANKS | | | | | | |
| 1270 | | | | | 69 | 115 |
| 1272 | | | | | 70 | 101 |

## CONCENTRATIONS FOR LAB BLANKS

| | | | | |
|---|---|---|---|---|
| 1164 | 0 | 0 | 0 | 0 |
| 1165 | 0 | 0 | 0 | 0 |

## PEAK AREAS FOR A 2X* STANDARD

| | CYANAZINE | FLUOMETURON | DIURON | LINURON |
|---|---|---|---|---|
| 2X STANDARD | 4576 | 2492 | 5586 | 13448 |

## DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| 1304 | 1305 | %RSD |
|---|---|---|
| 330307 | 341756 | 3.41 |

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

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #6 TO WOODRUFF COUNTY - SEPTEMBER, 1994.

NITRATE

SPIKE RECOVERY

| WELL NUMBER | %RECOVERY |
|---|---|
| WOOD 22 | 107% |

DUPLICATE ANALYSIS

| 1ST MEASUREMENT | 2ND MEASUREMENT | % RSD |
|---|---|---|
| 0.04 mg/L | 0.04 mg/L | 0.00% |

## RESULTS OF PESTICIDE MONITORING : TRIP #7 TO WOODRUFF COUNTY-SEPTEMBER, 1994.

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

| | 30 | 31 | 32 | 33 | 34 | 35 |
|---|---|---|---|---|---|---|
| WELL ID: | WOOD 27 (aka PR#1) | WOOD 28 | WOOD 29 | WOOD 30 | WOOD 31 | WOOD 32 |
| DATE SAMPLED: | sept. 28, 1994 | SEPT. 28, 1994 | SEPT. 29, 1994 | SEPT. 29, 1994 | SEPT. 29, 1994 | SEPT. 29, 1994 |
| LATITUDE: | 35° 00' 28" | 34° 59' 04" | 35° 03' 50" | 35° 00' 53" | 35° 02' 57" | 35° 03' 47" |
| LONGITUDE: | 91° 23' 58" | 91° 19' 10" | 91° 15' 51" | 91° 18' 56" | 91° 16' 28" | 91° 16' 28" |
| DEPTH OF WELL, ft: | 32 | 25 | 26 | 25 | 23 | 20 |
| pH, standard units: | 6.8 | 6.6 | 7.3 | 6.3 | 6.8 | 6.7 |
| CONDUCTIVITY AT 25° C , umhos/cm: | 846 | 126 | 143 | 110 | 246 | 177 |
| TEMPERATURE, ° C | 17 | 18 | 18.2 | 17.3 | 17.9 | 18.6 |
| NITRATE, mg/L: | 0.02 | 2.94 | 1.68 | 3.81 | 1.09 | 4.07 |
| ACIFLUORFEN, ug/L | ND | ND | ND | ND | ND | ND |
| ALACHLOR, ug/L: | ND | ND | ND | ND | ND | ND |
| ATRAZINE,ug/L: | ND | ND | ND | ND | ND | ND |
| BENTAZON, ug/L | ND | ND | ND | ND | ND | ND |
| CYANAZINE, ug/L: | ND | ND | ND | ND | ND | ND |
| DIURON, ug/L: | ND | ND | ND | ND | ND | ND |
| FLUOMETURON, ug/L: | ND | ND | ND | ND | ND | ND |
| LINURON, ug/L: | ND | ND | ND | ND | ND | ND |
| METOLACHLOR, ug/L: | ND | ND | ND | ND | ND | ND |
| METRIBUZIN, ug/L: | ND | ND | 0.35& | ND | ND | ND |
| MOLINATE, ug/L: | ND | ND | ND | ND | ND | ND |
| NORFLURAZON, ug/L | ND | ND | ND | ND | ND | ND |
| 2,4-D, ug/L | ND | ND | ND | ND | ND | ND |

# QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #7 TO WOODRUFF COUNTY - SEPTEMBER, 1994.

EPA METHOD 507

GH

## PERCENT RECOVERIES

| | | SURROGATE | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON | INT. STD. |
|---|---|---|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | | | | |
| | WOOD #27 | 130 | 126 | 121 | 121 | 119 | 116 | 115 | 116 |
| | WOOD #28 | 133 | 123 | 121 | 119 | 119 | 114 | 111 | 136 |
| | WOOD #29 | 102 | 89 | 99 | 87 | 95 | 92 | 109 | |
| | WOOD #30 | 81 | 88 | 94 | 89 | 90 | 93 | 100 | 108 |
| | WOOD #31 | 83 | 85 | 95 | 86 | 91 | 89 | 92 | 117 |
| | WOOD#32 | 81 | 82 | 70 | 66 | 74 | 84 | 92 | 110 |
| NON-FORTIFIED SAMPLES | | | | | | | | | |
| | WOOD #27 | 128 | | | | | | | 117 |
| | WOOD #28 | 109 | | | | | | | 97 |
| | WOOD #29 | 126 | | | | | | | 114 |
| | WOOD #30 | 96 | | | | | | | 113 |
| | WOOD #31 | 83 | | | | | | | 99 |
| | WOOD#32 | 80 | | | | | | | 96 |
| LAB BLANKS | | | | | | | | | |
| | 1370 | 110 | | | | | | | 119 |
| | 1373 | 123 | | | | | | | 107 |

## CONCENTRATIONS FOR LAB BLANKS

| | | | | | | |
|---|---|---|---|---|---|---|
| 1370 | 0 | 0 | 0 | 0 | | 0 |
| 1373 | 0 | 0 | 0 | 0 | | 0 |

### FIELD DUPLICATE - SURROGATE AREA COMPARISON

| 1423 | 1425 | %RSD |
|---|---|---|
| 102677 | 80769 | 23.88 |

### MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| 1ST RUN | 2ND RUN | %RSD |
|---|---|---|
| 73935 | 74015 | 0.11 |

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #7 TO WOODRUFF COUNT -SEPTEMBER, 1994.

EPA METHOD 515

PERCENT RECOVERIES

| | SURROGATE | 2,4-D | INT. STD. | BENTAZON | ACIFLUROFEN |
|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | |
| WOOD #28 | 126 | 79 | 85 | 85 | 89 |
| WOOD #29 | 128 | 81 | 87 | 82 | 96 |
| WOOD #30 | 121 | 61 | 95 | 61 | 64 |
| WOOD #31 | 121 | 73 | 93 | 84 | 88 |
| NON-FORTIFIED SAMPLES | | | | | |
| WOOD #27 | 102 | | 105 | | |
| WOOD #28 | 133 | | 79 | | |
| WOOD #29 | 121 | | 78 | | |
| WOOD #30 | 110 | | 79 | | |
| WOOD #31 | 130 | | 80 | | |
| WOOD#32 | 128 | | 79 | | |
| LAB BLANKS | | | | | |
| 1379 | 111 | | 96 | | |

CONCENTRATIONS FOR LAB BLANKS

| | | | |
|---|---|---|---|
| 1379 | 0 | 0 | 0 |

PEAK AREAS FOR A 2X* STANDARD

| | 2,4-D | BENTAZON | ACIFLUROFEN |
|---|---|---|---|
| 2X STANDARD | 83018 | 100689 | 407516 |

DUPLICATE ANALYSIS

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| 1ST RUN | 2ND RUN | %RSD |
|---|---|---|
| 82582 | 83022 | 0.53 |

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

# QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #7 TO WOODRUFF COUNTY - SEPTEMBER, 1994.

NPS METHOD 4

## PERCENT RECOVERIES

| | CYANAZINE | FLUOMETURON | DIURON | LINURON | SURROGATE | INT. STD. |
|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | |
| WOOD #27 | 102 | 73 | 84 | 77 | 81 | none |
| WOOD #28 | 86 | 76 | 88 | 82 | 83 | none |
| WOOD #29 | 112 | 90 | 95 | 87 | 98 | 91 |
| WOOD #30 | 86 | 82 | 87 | 82 | 87 | 99 |
| WOOD #31 | 85 | 84 | 83 | 77 | 89 | 98 |
| WOOD#32 | 98 | 94 | 99 | 95 | 97 | 91 |
| NON-FORTIFIED SAMPLES | | | | | | |
| WOOD #27 | | | | | 95 | 90 |
| WOOD #28 | | | | | 83 | 102 |
| WOOD #29 | | | | | 92 | 114 |
| WOOD #30 | | | | | 85 | 96 |
| WOOD #31 | | | | | 103 | 98 |
| WOOD#32 | | | | | 98 | 87 |
| | | | | | | 82 |
| LAB BLANKS | | | | | | |
| 1374 | | | | | 96 | 91 |
| 1376 | | | | | 89 | 89 |

## CONCENTRATIONS FOR LAB BLANKS

| | | | | |
|---|---|---|---|---|
| 1374 | 0 | 0 | 0 | 0 |
| 1376 | 0 | 0 | 0 | 0 |

## PEAK AREAS FOR A 2X* STANDARD

| | CYANAZINE | FLUOMETURON | DIURON | LINURON |
|---|---|---|---|---|
| 2X STANDARD | 4180 | 2663 | 5463 | 11785 |

## DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| 1444 | 1445 | %RSD |
|---|---|---|
| 364593 | 310823 | 15.92 |

MACHINEDUPLICATE - SURROGATE AREA COMPARISON

| 1ST. RUN | 2ND. RUN | %RSD |
|---|---|---|
| 325353 | 328857 | 1.07 |

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

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #7 TO WOODRUFF COUNTY - SEPTEMBER, 1994.

## NITRATE

### SPIKE RECOVERY

| WELL NUMBER | %RECOVERY |
|---|---|
| WOOD 28 | 99% |

### DUPLICATE ANALYSIS

| 1ST MEASUREMENT | 2ND MEASUREMENT | % RSD |
|---|---|---|
| 0.02 mg/L | 0.03. mg/L | 38.25% |

## RESULTS OF PESTICIDE MONITORING : TRIP #8 TO WOODRUFF COUNTY-NOVEMBER, 1994.

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

| | 36 | 37 | 38 | 39 | 40 | 41 |
|---|---|---|---|---|---|---|
| WELL ID: | WOOD 33 (SW) | WOOD 34 (SW) | WOOD 35 (SW) | WOOD 36 (SW) | WOOD 37 (SW) | WOOD 38 (SW) |
| DATE SAMPLED: | 16-Nov-94 | 16-Nov-94 | 16-Nov-94 | 16-Nov-94 | 16-Nov-94 | 16-Nov-94 |
| LATITUDE: | 35° 20' 25" | 35° 14' 08" | 35° 13' 19" | 35° 13' 59" | 35° 02' 25" | 5° 02' 23" |
| LONGITUDE: | 91° 05' 01" | 91° 05' 43" | 91° 05' 33" | 91° 02' 23" | 91° 02' 34" | 1° 02' 23" |
| DEPTH OF WELL, ft: | 60 | 120 | 90+ | 120? | 140 | 500 |
| pH, standard units: | 7.3 | 7.4 | 7.1 | 6.8 | 6.5 | 7.1 |
| CONDUCTIVITY AT 25° C , umhos/cm: | 660 | 600 | 567 | 815 | 1247 | 598 |
| TEMPERATURE, ° C | 16 | 16 | 15.5 | 15.5 | 16 | 19 |
| NITRATE, mg/L: | 0.01 | 0.04 | 0.06 | 0.02 | 0.14 | 0.01 |
| ACIFLUORFEN, ug/L | ND | ND | ND | ND | ND | ND |
| ALACHLOR, ug/L: | ND | ND | ND | ND | ND | ND |
| ATRAZINE,ug/L: | ND | ND | ND | ND | ND | ND |
| BENTAZON, ug/L | ND | ND | ND | ND | ND | ND |
| CYANAZINE, ug/L: | ND | ND | ND | ND | ND | ND |
| DIURON, ug/L: | ND | ND | ND | ND | ND | ND |
| FLUOMETURON, ug/L: | ND | ND | ND | ND | ND | ND |
| LINURON, ug/L: | ND | ND | ND | ND | ND | ND |
| METOLACHLOR, ug/L: | ND | ND | ND | ND | ND | ND |
| METRIBUZIN, ug/L: | ND | ND | ND | ND | ND | ND |
| MOLINATE, ug/L: | ND | ND | ND | ND | ND | ND |
| NORFLURAZON, ug/L | ND | ND | ND | ND | ND | ND |
| 2,4-D, ug/L | ND | ND | ND | ND | ND | ND |

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #8 TO WOODRUFF COUNTY - NOVEMBER, 1994.

EPA METHOD 507

PERCENT RECOVERIES

| | SURROGATE | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON | INT. STD. |
|---|---|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | | | |
| WOOD 33 (SW) | 93 | 100 | 56 | 86 | 61 | 108 | 116 | 78 |
| WOOD 34 (SW) | 65 | 98 | 104 | 108 | 110 | 113 | 117 | 68 |
| WOOD 35 (SW) | 83 | 99 | 102 | 104 | 106 | 105 | 107 | 89 |
| WOOD 36 (SW) | 91 | 101 | 106 | 115 | 106 | 108 | 115 | 79 |
| WOOD 37 (SW) | 69 | 82 | 93 | 101 | 92 | 94 | 105 | 78 |
| WOOD 38 (SW) | 83 | 88 | 98 | 103 | 97 | 100 | 115 | 94 |
| NON-FORTIFIED SAMPLES | | | | | | | | |
| WOOD 33 (SW) | 78 | | | | | | | 99 |
| WOOD 34 (SW) | 82 | | | | | | | 81 |
| WOOD 35 (SW) | 106 | | | | | | | 82 |
| WOOD 36 (SW) | 94 | | | | | | | 79 |
| WOOD 37 (SW) | 91 | | | | | | | 89 |
| WOOD 38 (SW) | 75 | | | | | | | 83 |
| LAB BLANKS | | | | | | | | |
| 1560 | 73 | | | | | | | 93 |
| 1562 | 69 | | | | | | | 91 |

CONCENTRATIONS FOR LAB BLANKS

| | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON |
|---|---|---|---|---|---|---|
| 1560 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1562 | 0 | 0 | 0 | 0 | 0 | 0 |

PEAK AREAS FOR A 2X* STANDARD

| MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON |
|---|---|---|---|---|---|
| 2101 | 5509 | 2862 | 2519 | 8581 | 7401 |

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| 1603 | 1605 | %RSD |
|---|---|---|
| 59806 | 42450 | 33.95 |

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| 1ST RUN | 2ND RUN | %RSD |
|---|---|---|
| 88547 | 92520 | 4.39 |

ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

# QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #8 TO WOODRUFF COUNTY - NOVEMBER, 1994

EPA METHOD 515

## PERCENT RECOVERIES

| | SURROGATE | 2,4-D | INT. STD. | BENTAZON | ACIFLUROFEN |
|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | |
| WOOD 33 (SW) | 60 | 72 | 85 | 68 | 70 |
| WOOD 34 (SW) | 65 | 67 | 97 | 60 | 63 |
| WOOD 35 (SW) | 58 | 80 | 104 | 63 | 73 |
| WOOD 36 (SW) | 77 | 67 | 108 | 56 | 64 |
| WOOD 37 (SW) | 55 | 75 | 107 | 64 | 66 |
| WOOD 38 (SW) | 66 | 145 | 74 | 86 | 118 |
| NON-FORTIFIED SAMPLES | | | | | |
| WOOD 33 (SW) | 81 | | 74 | | |
| WOOD 34 (SW) | 93 | | 79 | | |
| WOOD 35 (SW) | 72 | | 80 | | |
| WOOD 36 (SW) | 99 | | 83 | | |
| WOOD 37 (SW) | 60 | | 128 | | |
| WOOD 38 (SW) | 90 | | 118 | | |
| LAB BLANKS | | | | | |
| 1571BL | 72 | | 97 | | |
| 1573BL | 103 | | 69 | | |

## CONCENTRATIONS FOR LAB BLANKS

| | | | |
|---|---|---|---|
| 1571BL | 0 | 0 | 0 |
| 1573BL | 0 | 0 | 0 |

## PEAK AREAS FOR A 2X* STANDARD

| | 2,4-D | BENTAZON | ACIFLUROFEN |
|---|---|---|---|
| 2X STANDARD | 65685 | 77813 | 359064 |

## DUPLICATE ANALYSIS

FIRLD DUPLICATE - SURROGATE CONCENTRATION COMPARISON

| 1629 | 1620 | %RSD |
|---|---|---|
| 2.893 | 2.565 | 12.02 |

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| 1ST RUN | 2ND RUN | %RSD |
|---|---|---|
| 235312 | 243893 | 3.58 |

ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

# QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #8 TO WOODRUFF COUNTY - NOVEMBER, 1994.

NPS METHOD 4

## PERCENT RECOVERIES

| | CYANAZINE | FLUOMETURON | DIURON | LINURON | SURROGATE | INT. STD. |
|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | |
| WOOD 33 (SW) | 84 | 80 | 85 | 81 | 74 | 108 |
| WOOD 34 (SW) | 93 | 83 | 93 | 88 | 74 | 91 |
| WOOD 35 (SW) | 88 | 77 | 89 | 83 | 78 | 105 |
| WOOD 36 (SW) | 86 | 73 | 86 | 78 | 72 | 90 |
| WOOD 37 (SW) | 82 | 83 | 84 | 77 | 73 | 108 |
| WOOD 38 (SW) | 86 | 82 | 88 | 83 | 77 | 104 |
| NON-FORTIFIED SAMPLES | | | | | | |
| WOOD 33 (SW) | | | | | 78 | 99 |
| WOOD 34 (SW) | | | | | 78 | 104 |
| WOOD 35 (SW) | | | | | 73 | 106 |
| WOOD 36 (SW) | | | | | 74 | 102 |
| WOOD 37 (SW) | | | | | 71 | 97 |
| WOOD 38 (SW) | | | | | 64 | 98 |
| LAB BLANKS | | | | | | |
| 1563 | | | | | 79 | 108 |
| 1565 | | | | | 71 | 105 |

## CONCENTRATIONS FOR LAB BLANKS

| | | | | |
|---|---|---|---|---|
| 1563 | 0 | 0 | 0 | 0 |
| 1565 | 0 | 0 | 0 | 0 |

## PEAK AREAS FOR A 2X* STANDARD

| | CYANAZINE | FLUOMETURON | DIURON | LINURON |
|---|---|---|---|---|
| 2X STANDARD | 5212 | 3002 | 5784 | 14538 |

## DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| 1614 | 1615 | %RSD |
|---|---|---|
| 373258 | 374868 | 0.43 |

MACHINEDUPLICATE - SURROGATE AREA COMPARISON

| 1ST. RUN | 2ND. RUN | %RSD |
|---|---|---|
| 460576 | 459891 | 0.15 |

ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #8 TO WOODRUFF COUNTY - NOVEMBER, 1994.

NITRATE

## SPIKE RECOVERY

| WELL NUMBER | %RSD |
|---|---|
| WOOD 34 | 96% |

## DUPLICATE ANALYSIS

| 1ST MEASUREMENT | 2ND MEASUREMENT | % RSD |
|---|---|---|
| 0.01 mg/L | 0.02 mg/L | 66.60% |

## RESULTS OF PESTICIDE MONITORING : TRIP #9 TO WOODRUFF COUNTY-NOVEMBER, 1994.

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

| | 42 | 43 | 44 | 45 | 46 | 47 |
|---|---|---|---|---|---|---|
| WELL ID: | WOOD 39(SW) | WOOD 40 (SW) | WOOD 41 (SW) | WOOD 42 (SW) | WOOD 43 (SW) | WOOD 44 (SW) |
| DATE SAMPLED: | 30-Nov-94 | 30-Nov-94 | 30-Nov-94 | 30-Nov-94 | 30-Nov-94 | 30-Nov-94 |
| LATITUDE: | 35° 00' 18" | 35° 00' 24" | 35° 03' 11" | 35° 02' 49" | 35° 03' 49" | 35° 03' 38" |
| LONGITUDE: | 91° 14' 53" | 91° 09' 04" | 91° 07' 26" | 91° 04' 51" | 91° 05' 19" | 91° 10' 11" |
| DEPTH OF WELL, ft: | 275 | 140 | 350 | 100-140 | 100-140 | 40-50 |
| pH, standard units: | 7.4 | 7.3 | 7.1 | 7.1 | 7.2 | 7 |
| CONDUCTIVITY AT 25° C , umhos/cm: | 259 | 585 | 513 | 950 | 664 | 756 |
| TEMPERATURE, ° C | 15 | 16.5 | 18 | 16.6 | 17 | 17 |
| NITRATE, mg/L: | <0.01 | 0.03 | 0.02 | 0.04 | 0.03 | 0.04 |
| ACIFLUORFEN, ug/L | ND | ND | ND | ND | ND | ND |
| ALACHLOR, ug/L: | ND | ND | ND | ND | ND | ND |
| ATRAZINE,ug/L: | ND | ND | ND | ND | ND | ND |
| BENTAZON, ug/L | ND | ND | ND | ND | ND | ND |
| CYANAZINE, ug/L: | ND | ND | ND | ND | ND | ND |
| DIURON, ug/L: | ND | ND | ND | ND | ND | ND |
| FLUOMETURON, ug/L: | ND | ND | ND | ND | ND | ND |
| LINURON, ug/L: | ND | ND | ND | ND | ND | ND |
| METOLACHLOR, ug/L: | ND | ND | ND | ND | ND | ND |
| METRIBUZIN, ug/L: | ND | ND | ND | ND | ND | ND |
| MOLINATE, ug/L: | ND | ND | ND | ND | ND | ND |
| NORFLURAZON, ug/L | ND | ND | ND | ND | ND | ND |
| 2,4-D, ug/L | ND | ND | ND | ND | ND | ND |

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #9 TO WOODRUFF COUNTY NOVEMBER, 1994.

EPA METHOD 507

PERCENT RECOVERIES

| | SURROGATE | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON | INT. STD. |
|---|---|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | | | |
| WOOD 39 (SW) | 76 | 78 | 91 | 94 | 102 | 102 | 85 | 90 |
| WOOD 40 (SW) | 87 | 87 | 94 | 87 | 101 | 103 | 95 | 88 |
| WOOD 41 (SW) | 88 | 92 | 100 | 104 | 105 | 107 | 107 | 91 |
| WOOD 42 (SW) | 103 | 102 | 107 | 107 | 112 | 113 | 111 | 89 |
| WOOD 43 (SW) | 95 | 102 | 105 | 103 | 106 | 109 | 109 | 91 |
| WOOD 44 (SW) | 100 | 91 | 96 | 93 | 115 | 97 | 99 | 85 |
| NON-FORTIFIED SAMPLES | | | | | | | | |
| WOOD 39 (SW) | 74 | | | | | | | 68 |
| WOOD 40 (SW) | 97 | | | | | | | 73 |
| WOOD 41 (SW) | 87 | | | | | | | 87 |
| WOOD 42 (SW) | 130 | | | | | | | 90 |
| WOOD 43 (SW) | 78 | | | | | | | 97 |
| WOOD 44 (SW) | 75 | | | | | | | 106 |
| LAB BLANKS | | | | | | | | |
| 1576bl | 111 | | | | | | | |
| 1578bl | 81 | | | | | | | |

CONCENTRATIONS FOR LAB BLANKS

| | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON |
|---|---|---|---|---|---|---|
| 1576bl | 0 | 0 | 0 | 0 | 0 | 0 |
| 1578bl | 0 | 0 | 0 | 0 | 0 | 0 |

PEAK AREAS FOR A 2X* STANDARD

| MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON |
|---|---|---|---|---|---|
| 3879 | 8056 | 4088 | 3836 | 12025 | 9353 |

FIELD DUPLICATE - SURROGATE CONCENTRATION COMPARISON

| 1703 | 1705 | %RSD |
|---|---|---|
| 0.74 | 0.88 | 17.28 |

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| 1ST RUN | 2ND RUN | %RSD |
|---|---|---|
| 81683 | 77366 | 5.43 |

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

# QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #9 TO WOODRUFF COUNTY - NOVEMBER, 1994

EPA METHOD 515

## PERCENT RECOVERIES

| | SURROGATE | 2,4-D | INT. STD. | BENTAZON | ACIFLUROFEN |
|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | |
| WOOD 39 (SW) | 70 | 94 | 77 | 90 | 90 |
| WOOD 40 (SW) | 27 | 76 | 89 | 66 | 70 |
| WOOD 41 (SW) | 105 | 87 | 95 | 84 | 80 |
| WOOD 42 (SW) | 79 | 64 | 97 | 61 | 59 |
| WOOD 43 (SW) | 73 | 81 | 103 | 77 | 76 |
| WOOD 44 (SW) | NONE* | 72 | 101 | 52 | 66 |
| NON-FORTIFIED SAMPLES | | | | | |
| WOOD 39 (SW) | 91 | | 92 | | |
| WOOD 40 (SW) | 50 | | 100 | | |
| WOOD 41 (SW) | 113 | | 108 | | |
| WOOD 42 (SW) | 99 | | 105 | | |
| WOOD 43 (SW) | 74 | | 108 | | |
| WOOD 44 (SW) | NONE* | | 106 | | |
| AB BLANKS | | | | | |
| 1585BL | 85 | | 102 | | |
| 1588BL | 98 | | 108 | | |

## CONCENTRATIONS FOR LAB BLANKS

| | | |
|---|---|---|
| 1585BL | 0 | 0 |
| 1588BL | 0 | 0 |

## DUPLICATE ANALYSIS

FIRLD DUPLICATE - SURROGATE CONCENTRATION COMPARISON

| 1729 | 1720 | %RSD |
|---|---|---|
| 4.2 | 4.6 | 9.09 |

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| 1ST RUN | 2ND RUN | %RSD |
|---|---|---|
| | | #VALUE! |

*NO RESULT DUE TO INTERFERENCE

# QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #9 TO WOODRUFF COUNTY - NOVEMBER, 1994.

NPS METHOD 4

## PERCENT RECOVERIES

| | CYANAZINE | FLUOMETURON | DIURON | LINURON | SURROGATE | INT. STD. |
|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | |
| WOOD 39 (SW) | 78 | 69 | 88 | 78 | 80 | 98 |
| WOOD 40 (SW) | 86 | 83 | 93 | 86 | 88 | 97 |
| WOOD 41 (SW) | 86 | 79 | 95 | 84 | 87 | 96 |
| WOOD 42 (SW) | 100 | 89 | 101 | 88 | 88 | 93 |
| WOOD 43 (SW) | 82 | 75 | 90 | 78 | 81 | 100 |
| WOOD 44 (SW) | 90 | 59 | 92 | 81 | 84 | 97 |
| NON-FORTIFIED SAMPLES | | | | | | |
| WOOD 39 (SW) | | | | | 80 | 95 |
| WOOD 40 (SW) | | | | | 92 | 94 |
| WOOD 41 (SW) | | | | | 91 | 95 |
| WOOD 42 (SW) | | | | | 85 | 94 |
| WOOD 43 (SW) | | | | | 83 | 96 |
| WOOD 44 (SW) | | | | | 80 | 95 |
| LAB BLANKS | | | | | | |
| 1580 | | | | | 82 | 98 |
| 1583 | | | | | 71 | 96 |

## CONCENTRATIONS FOR LAB BLANKS

| | | | | |
|---|---|---|---|---|
| 1580 | 0 | 0 | 0 | 0 |
| 1583 | 0 | 0 | 0 | 0 |

## PEAK AREAS FOR A 2X* STANDARD

| | CYANAZINE | FLUOMETURON | DIURON | LINURON |
|---|---|---|---|---|
| 2X STANDARD | 4895 | 2526 | 5577 | 13038 |

## DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| 1714 | 1715 | %RSD |
|---|---|---|
| 386542 | 341145 | 12.48 |

MACHINEDUPLICATE - SURROGATE AREA COMPARISON

| 1ST. RUN | 2ND. RUN | %RSD |
|---|---|---|
| 378652 | 378164 | 0.13 |

ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #9 TO WOODRUFF COUNTY - NOVEMBER, 1994.

NITRATE

SPIKE RECOVERY

| WELL NUMBER | %RECOVERY |
|---|---|
| WOOD 40 | 99% |

DUPLICATE ANALYSIS

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

## RESULTS OF PESTICIDE MONITORING : TRIP #10 TO WOODRUFF COUNTY-FEBRUARY, 1995.

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

| | 48 | 49 | 50 | 51 | 52 | 53 |
|---|---|---|---|---|---|---|
| WELL ID: | WOOD 11R1 | WOOD 25 R1 | WOOD26R1 | WOOD29R1 | WOOD33(PB) | WOOD34(PB) |
| DATE SAMPLED: | 20-FEB-95 | 20-FEB-95 | 20-FEB-95 | 20-FEB-95 | 20-FEB-95 | 20-FEB-95 |
| LATITUDE: | 35° 17' 08" | 35° 17' 08" | 35° 03' 51" | 35° 03' 50" | 5° 09' 25" | 35° 03' 21" |
| LONGITUDE: | 91° 24' 08" | 91° 24' 08" | 91° 14' 39' | 91° 15' 51" | 1° 20' 35" | 91° 13' 13" |
| DEPTH OF WELL, ft: | 45 | 45 | 60 | 26 | 62 | 62 |
| pH, standard units: | 6.2 | 6.2 | 6.6 | 6.1 | 6.3 | 6.5 |
| CONDUCTIVITY AT 25° C , umhos/cm: | 150 | 213 | 562 | 138 | 160 | 129 |
| TEMPERATURE, ° C | 17.4 | 17.7 | 17.5 | 17 | 16.7 | 17.5 |
| NITRATE, mg/L: | NA | NA | NA | NA | 4.77 | 2.6 |
| ACIFLUORFEN, ug/L | ND | ND | ND | ND | ND | ND |
| ALACHLOR, ug/L: | ND | ND | ND | ND | ND | 1.5& |
| ATRAZINE,ug/L: | ND | ND | ND | ND | ND | ND |
| BENTAZON, ug/L | ND | 1.9 | 0.9 | ND | ND | ND |
| CYANAZINE, ug/L: | ND | ND | ND | ND | ND | ND |
| DIURON, ug/L: | ND | ND | ND | ND | ND | ND |
| FLUOMETURON, ug/L: | ND | ND | ND | ND | ND | ND |
| LINURON, ug/L: | ND | ND | ND | ND | ND | ND |
| METOLACHLOR, ug/L: | 11.5 | ND | ND | ND | ND | ND |
| METRIBUZIN, ug/L: | ND | ND | ND | 0.4 | ND | ND |
| MOLINATE, ug/L: | ND | ND | ND | ND | ND | ND |
| NORFLURAZON, ug/L | ND | ND | ND | ND | ND | ND |
| 2,4-D, ug/L | ND | ND | ND | ND | ND | ND |

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #10 TO WOODRUFF COUNTY FEBRUARY, 1995.

EPA METHOD 507

PERCENT RECOVERIES

| | | SURROGATE | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON | INT. STD. |
|---|---|---|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | | | | |
| | WOOD 11R1 | 73 | 85 | 75 | 82 | 102 | 98 | 92 | 93 |
| | WOOD 25 R1 | 69 | 74 | 66 | 68 | 74 | 94 | 82 | 88 |
| | WOOD26R1 | 82 | 85 | 73 | 75 | 81 | 102 | 86 | 80 |
| | WOOD29R1 | 65 | 75 | 70 | 70 | 76 | 96 | 89 | 79 |
| | WOOD33(PB) | 95 | 94 | 77 | 79 | 86 | 106 | 88 | 78 |
| | WOOD34(PB) | 68 | 76 | 69 | 70 | 57 | 95 | 84 | 75 |
| NON-FORTIFIED SAMPLES | | | | | | | | | |
| | WOOD 11R1 | 70 | | | | | | | 76 |
| | WOOD 25 R1 | 64 | | | | | | | 70 |
| | WOOD26R1 | 72 | | | | | | | 72 |
| | WOOD29R1 | 75 | | | | | | | 69 |
| | WOOD33(PB) | 72 | | | | | | | 66 |
| | WOOD34(PB) | 67 | | | | | | | 69 |
| LAB BLANKS | | | | | | | | | |
| | 1794b | 82 | | | | | | | 76 |
| | 1796b | 73 | | | | | | | 71 |
| | 1798b | 76 | | | | | | | 66 |

CONCENTRATIONS FOR LAB BLANKS

| | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON |
|---|---|---|---|---|---|---|
| 1794b | 0 | 0 | 0 | 0 | 0 | 0 |
| 1796b | 0 | 0 | 0 | 0 | 0 | 0 |
| 1798b | 0 | 0 | 0 | 0 | 0 | 0 |

PEAK AREAS FOR A 2X* STANDARD

| MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON |
|---|---|---|---|---|---|
| 11284 | 14665 | 9548 | 6216 | 14678 | 12149 |

FIELD DUPLICATE - SURROGATE CONCENTRATION COMPARISON

| 1813 | 1815 | %RSD |
|---|---|---|
| 279293 | 329294 | 16.43 |

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| 1ST RUN | 2ND RUN | %RSD |
|---|---|---|
| 454713 | 457926 | 0.70 |

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

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #10 TO WOODRUFF COUNT -FEBRUARY, 1995.

EPA METHOD 515

PERCENT RECOVERIES

| | SURROGATE | 2,4-D | INT. STD. | BENTAZON | ACIFLUROFEN |
|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | |
| WOOD 11R1 | 85 | 100 | 97 | 100 | 111 |
| WOOD 25 R1 | 102 | 89 | 96 | 84 | 90 |
| WOOD26R1 | 98 | 94 | 97 | 87 | 99 |
| WOOD29R1 | 126 | 92 | 95 | 81 | 95 |
| WOOD33(PB) | 89 | 103 | 101 | 92 | 101 |
| WOOD34(PB) | 107 | 114 | 103 | 99 | 119 |
| NON-FORTIFIED SAMPLES | | | | | |
| WOOD 11R1 | 89 | | 104 | | |
| WOOD 25 R1 | 102 | | 103 | | |
| WOOD26R1 | 120 | | 107 | | |
| WOOD29R1 | 72 | | 109 | | |
| WOOD33(PB) | 78 | | 108 | | |
| WOOD34(PB) | 99 | | 112 | | |
| LAB BLANKS | | | | | |
| 1863b | 76 | | 114 | | |
| 1799b | 77 | | 100 | | |
| 1860b | 88 | | 105 | | |
| 1863b | | 0 | | 0 | 0 |
| 1799b | | 0 | | 0 | 0 |
| 1860b | | 0 | | 0 | 0 |

PEAK AREAS FOR A 2X* STANDARD

| 2,4-D | BENTAZON | ACIFLUROFEN |
|---|---|---|
| 107668 | 243177 | 479156 |

DUPLICATE ANALYSIS

FIRLD DUPLICATE - SURROGATE CONCENTRATION COMPARISON

| 1859 | 1850 | %RSD |
|---|---|---|
| 303117 | 293235 | 3.31 |

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| 1ST RUN | 2ND RUN | %RSD |
|---|---|---|
| 327860 | 335415 | 2.28 |

ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #10 TO WOODRUFF COUNTY - FEBRUARY, 1995.

NPS METHOD 4

PERCENT RECOVERIES

| | CYANAZINE | FLUOMETURON | DIURON | LINURON | SURROGATE | INT. STD. |
|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | |
| WOOD 11R1 | 99 | 105 | 122 | 96 | 95 | 88 |
| WOOD 25 R1 | 85 | 79 | 86 | 79 | 80 | 83 |
| WOOD26R1 | 95 | 94 | 97 | 92 | 94 | 92 |
| WOOD29R1 | 95 | 97 | 100 | 94 | 94 | 80 |
| WOOD33(PB) | 120 | 82 | 87 | 79 | 83 | 97 |
| WOOD34(PB) | 82 | 74 | 86 | 75 | 81 | 96 |
| NON-FORTIFIED SAMPLES | | | | | | |
| WOOD 11R1 | | | | | 81 | 94 |
| WOOD 25 R1 | | | | | 70 | 98 |
| WOOD26R1 | | | | | 91 | 94 |
| WOOD29R1 | | | | | 86 | 97 |
| WOOD33(PB) | | | | | 74 | 97 |
| WOOD34(PB) | | | | | 90 | 94 |
| LAB BLANKS | | | | | | |
| 1789 | | | | | 88 | 94 |
| 1791 | | | | | 83 | 101 |
| 1792 | | | | | 87 | 93 |
| 1789 | 0 | 0 | 0 | 0 | | |
| 1791 | 0 | 0 | 0 | 0 | | |
| 1792 | 0 | 0 | 0 | 0 | | |

PEAK AREAS FOR A 2X* STANDARD

| | CYANAZINE | FLUOMETURON | DIURON | LINURON |
|---|---|---|---|---|
| 2X STANDARD | 2461 | 1050 | 3238 | 6498 |

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| 1804 | 1805 | %RSD |
|---|---|---|
| 125396 | 135377 | 7.65 |

MACHINEDUPLICATE - SURROGATE AREA COMPARISON

| 1ST. RUN | 2ND. RUN | %RSD |
|---|---|---|
| 128696 | 130978 | 1.76 |

ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #10 TO WOODRUFF COUNTY - FEBRUARY, 1995.

NITRATE

## SPIKE RECOVERY

| WELL NUMBER | %RECOVERY |
|---|---|
| WOOD 34 | 108% |

## DUPLICATE ANALYSIS

| 1ST MEASUREMENT | 2ND MEASUREMENT | % RSD |
|---|---|---|
| 4.765 mg/L | 4.771 mg/L | 0.10% |

## RESULTS OF PESTICIDE MONITORING : TRIP #11 TO WOODRUFF COUNTY-MARCH, 1995.

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

| | 54 | 55 | 56 | 55 | 56 | 57 |
|---|---|---|---|---|---|---|
| WELL ID: | WOOD35(PB) | WOOD 36(PB) | WOOD 37(PB) | WOOD 38(PB) | WOOD 39(PB) | WOOD 40(PB) |
| DATE SAMPLED: | 13-Mar-95 | 13-Mar-95 | 13-Mar-95 | 14-Mar-95 | 14-Mar-95 | 14-Mar-95 |
| LATITUDE: | 35° 07' 03" | 35° 07' 02" | 35° 09' 36" | 35° 12' 44" | 35° 13' 42" | 35° 13' 34" |
| LONGITUDE: | 91° 22' 02" | 91° 22' 00" | 91° 18' 27" | 91° 19' 16" | 91° 16' 32" | 91° 16' 26' |
| DEPTH OF WELL, ft: | 30 | 37 | 50 | 35 | 35 | 40 |
| pH, standard units: | 6.9 | 6.7 | 7.2 | 7 | 6.5 | 7.1 |
| CONDUCTIVITY AT 25° C , umhos/cm: | 237 | 219 | 158 | 179 | 163 | 295 |
| TEMPERATURE, ° C | 16.8 | 17.1 | 17.4 | 14.5 | 16.6 | 16.7 |
| NITRATE, mg/L: | <0.01 | <0.01 | <0.01 | 0.75 | 0.42 | <0.01 |
| ACIFLUORFEN, ug/L | ND | ND | ND | ND | ND | ND |
| ALACHLOR, ug/L: | ND | ND | ND | ND | ND | ND |
| ATRAZINE,ug/L: | ND | ND | ND | ND | ND | ND |
| BENTAZON, ug/L | ND | ND | ND | ND | ND | ND |
| CYANAZINE, ug/L: | ND | ND | ND | ND | ND | ND |
| DIURON, ug/L: | ND | ND | ND | ND | ND | ND |
| FLUOMETURON, ug/L: | ND | ND | ND | ND | ND | ND |
| LINURON, ug/L: | ND | ND | ND | ND | ND | ND |
| METOLACHLOR, ug/L: | ND | ND | ND | ND | ND | ND |
| METRIBUZIN, ug/L: | ND | ND | ND | ND | ND | ND |
| MOLINATE, ug/L: | ND | ND | ND | ND | ND | ND |
| NORFLURAZON, ug/L | ND | ND | ND | ND | ND | ND |
| 2,4-D, ug/L | ND | ND | ND | ND | ID | ND |

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #11 TO WOODRUFF COUNTY - MARCH, 1995.

EPA METHOD 507

PERCENT RECOVERIES

| | | SURROGATE | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON | INT. STD. |
|---|---|---|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | | | | |
| | WOOD35(PB) | 90 | 79 | 80 | 84 | 84 | 97 | 62 | 112 |
| | WOOD 36(PB) | 85 | 77 | 81 | 86 | 82 | 95 | 69 | 98 |
| | WOOD 37(PB) | 90 | 82 | 85 | 91 | 84 | 97 | 77 | 104 |
| | WOOD 38(PB) | 72 | 73 | 80 | 84 | 76 | 88 | 75 | 100 |
| | WOOD 39(PB) | 68 | 77 | 83 | 92 | 80 | 102 | 89 | 90 |
| | WOOD 40(PB) | 68 | 81 | 89 | 95 | 77 | 90 | 113 | 110 |
| NON-FORTIFIED SAMPLES | | | | | | | | | |
| | WOOD35(PB) | 68 | | | | | | | 101 |
| | WOOD 36(PB) | 59 | | | | | | | 102 |
| | WOOD 37(PB) | 82 | | | | | | | 109 |
| | WOOD 38(PB) | 68 | | | | | | | 112 |
| | WOOD 39(PB) | 64 | | | | | | | 111 |
| | WOOD 40(PB) | 70 | | | | | | | 106 |
| LAB BLANKS | | | | | | | | | |
| | 1873bl | 76 | 0 | 0 | 0 | 0 | 0 | 0 | 97 |
| | 1876bl | 70 | 0 | 0 | 0 | 0 | 0 | 0 | 108 |

CONCENTRATIONS FOR LAB BLANKS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1873bl | | 0 | 0 | 0 | 0 | 0 | 0 |
| 1876bl | | 0 | 0 | 0 | 0 | 0 | 0 |

PEAK AREAS FOR A 2X* STANDARD

| MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON |
|---|---|---|---|---|---|
| 9250 | 10847 | 6269 | 5987 | 13598 | 6680 |

FIELD DUPLICATE - SURROGATE CONCENTRATION COMPARISON

| 1902 | 1905 | %RSD |
|---|---|---|
| 554504 | 661614 | 17.62 |

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| 1ST RUN | 2ND RUN | %RSD |
|---|---|---|
| 930921 | 902399 | 3.11 |

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

# QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #11 TO WOODRUFF COUNTY - MARCH, 1995.

EPA METHOD 515

## PERCENT RECOVERIES

| | SURROGATE | 2,4-D | INT. STD. | BENTAZON | ACIFLUROFEN |
|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | |
| WOOD35(PB) | 71 | 73 | 103 | 71 | 73 |
| WOOD 36(PB) | 148 | 100 | 102 | 102 | 111 |
| WOOD 37(PB) | 70 | 69 | 103 | 67 | 73 |
| WOOD 38(PB) | 73 | 86 | 105 | 85 | 93 |
| WOOD 39(PB) | 60 | 57 | 103 | 56 | 59 |
| WOOD 40(PB) | 112 | 90 | 94 | 94 | 102 |
| NON-FORTIFIED SAMPLES | | | | | |
| WOOD35(PB) | 87 | | 109 | | |
| WOOD 36(PB) | 87 | | 106 | | |
| WOOD 37(PB) | 79 | | 109 | | |
| WOOD 38(PB) | 93 | | 97 | | |
| WOOD 39(PB) | 128 | | 106 | | |
| WOOD 40(PB) | interference | | 109 | | |
| LAB BLANKS | | | | | |
| 1881BL | 102 | | 114 | | |
| 1884B | 121 | | 100 | | |

## CONCENTRATIONS IN BLANKS

| | | | |
|---|---|---|---|
| 1881BL | 0 | 0 | 0 |
| 1884B | 0 | 0 | 0 |

## PEAK AREAS FOR A 2X* STANDARD

| 2,4-D | BENTAZON | ACIFLUROFEN |
|---|---|---|
| 175384 | 330781 | 905810 |

## DUPLICATE ANALYSIS

FIRLD DUPLICATE - SURROGATE AREA COMPARISON

| 1959 | 1950 | %RSD |
|---|---|---|
| 1315122 | 1132614 | 14.91 |

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| 1ST RUN | 2ND RUN | %RSD |
|---|---|---|
| 218972 | 224043 | 2.29 |

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

# QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #11 TO WOODRUFF COUNTY - MARCH, 1995.

NPS METHOD 4

## PERCENT RECOVERIES

| | CYANAZINE | FLUOMETURON | DIURON | LINURON | SURROGATE | INT. STD. |
|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | |
| WOOD35(PB) | 99 | 100 | 103 | 103 | 90 | 99 |
| WOOD 36(PB) | 86 | 74 | 83 | 84 | 71 | 106 |
| WOOD 37(PB) | 90 | 91 | 90 | 95 | 81 | 101 |
| WOOD 38(PB) | 83 | 71 | 82 | 80 | 64 | 106 |
| WOOD 39(PB) | 99 | 91 | 106 | 102 | 83 | 99 |
| WOOD 40(PB) | 82 | 77 | 86 | 90 | 77 | 93 |
| NON-FORTIFIED SAMPLES | | | | | | |
| WOOD35(PB) | | | | | 78 | 100 |
| WOOD 36(PB) | | | | | 77 | 97 |
| WOOD 37(PB) | | | | | 67 | 95 |
| WOOD 38(PB) | | | | | 74 | 98 |
| WOOD 39(PB) | | | | | 77 | 101 |
| WOOD 40(PB) | | | | | 78 | 101 |
| LAB BLANKS | | | | | | |
| 1877bl | | | | | 74 | 101 |
| 1879bl | | | | | 74 | 95 |
| 1877bl | 0 | 0 | 0 | 0 | | |
| 1879bl | 0 | 0 | 0 | 0 | | |

## PEAK AREAS FOR A 2X* STANDARD

| | CYANAZINE | FLUOMETURON | DIURON | LINURON |
|---|---|---|---|---|
| 2X STANDARD | 2350 | 970 | 3057 | 6487 |

## DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| 1914 | 1915 | %RSD |
|---|---|---|
| 124530 | 122255 | 1.84 |

MACHINEDUPLICATE - SURROGATE AREA COMPARISON

| 1ST. RUN | 2ND. RUN | %RSD |
|---|---|---|
| 136023 | 136140 | 0.09 |

ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #11 TO WOODRUFF COUNTY - MARCH, 1995.

NITRATE

SPIKE RECOVERY

| WELL NUMBER | %RECOVERY |
|---|---|
| WOOD 35 PB | 96% |

DUPLICATE ANALYSIS

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

## RESULTS OF PESTICIDE MONITORING : TRIP #12 TO WOODRUFF COUNTY-APRIL, 1995.

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

| | 60 | 61 | 62 | 63 | 64 | 65 | |
|---|---|---|---|---|---|---|---|
| WELL ID: | WOOD 41(PB) | WOOD 42(PB) | WOOD 43(PB) | WOOD 44(PB) | WOOD 45(PB) | WOOD 46(PB) | WOOD 47(PB) |
| DATE SAMPLED: | 11-Apr-95 | 11-Apr-95 | 12-Apr-95 | 12-Apr-95 | 13-Apr-95 | 13-Apr-95 | 13-Apr-95 |
| LATITUDE: | 35° 13' 29" | 35° 13' 29" | 35° 01' 26" | 35° 02' 06" | 34° 57' 35" | 34° 57' 35" | 35° 05' 21" |
| LONGITUDE: | 91° 11' 09" | 91° 10' 08" | 91° 19' 33" | 91° 19' 22" | 91° 18' 31" | 91° 18' 31" | 1° 12' 32" |
| DEPTH OF WELL, ft: | 24 | 20 | 20 | 20 | 60 | 50 | 60 |
| pH, standard units: | 6.1 | 7.5 | 6.6 | 7.3 | 6.1 | 6.1 | 6.2 |
| CONDUCTIVITY AT 25° C , umhos/cm: | 89 | 392 | 154 | 298 | 203 | 136 | 152 |
| TEMPERATURE, ° C | 16.8 | 16.4 | 17.3 | 17.3 | 16.7 | unk | 17.8 |
| NITRATE, mg/L: | 1.7 | <0.01 | 0.5 | 0.04 | 10.17 | 2.5 | 0.06 |
| ACIFLUORFEN, ug/L | ND | ND | ND | ND | ND | ND | ND |
| ALACHLOR, ug/L: | ND | ND | ND | ND | ND | ND | ND |
| ATRAZINE,ug/L: | ND | ND | ND | ND | ND | ND | ND |
| BENTAZON, ug/L | ND | ND | ND | ND | ND | ND | ND |
| CYANAZINE, ug/L: | ND | ND | ND | ND | ND | ND | ND |
| DIURON, ug/L: | ND | ND | ND | ND | ND | ND | ND |
| FLUOMETURON, ug/L: | ND | ND | ND | ND | ND | ND | ND |
| LINURON, ug/L: | ND | ND | ND | ND | ND | ND | ND |
| METOLACHLOR, ug/L: | ND | ND | ND | ND | ND | ND | ND |
| METRIBUZIN, ug/L: | ND | ND | ND | ND | ND | ND | ND |
| MOLINATE, ug/L: | ND | ND | ND | ND | ND | ND | ND |
| NORFLURAZON, ug/L | ND | ND | ND | ND | ND | ND | ND |
| 4-D, ug/L | ND | ND | ND | ND | ND | ND | ND |

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #12TO WOODRUFF COUNTY - APRIL, 1995.

EPA METHOD 507

PERCENT RECOVERIES

| | SURROGATE | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON | INT. STD. |
|---|---|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | | | |
| WOOD 41(PB) | 72 | 78 | 100 | 96 | 84 | 87 | 91 | 108 |
| WOOD 42(PB) | 72 | 72 | 83 | 87 | 75 | 82 | 85 | 98 |
| WOOD 43(PB) | 81 | 86 | 100 | 99 | 90 | 96 | 99 | 98 |
| WOOD 44(PB) | 74 | 82 | 93 | 97 | 85 | 89 | 93 | 103 |
| WOOD 45(PB) | 92 | 93 | 101 | 101 | 90 | 98 | 102 | 100 |
| WOOD 46(PB) | 72 | 73 | 87 | 91 | 78 | 84 | 91 | 97 |
| WOOD 47(PB) | 78 | 79 | 89 | 91 | 81 | 85 | 92 | 98 |
| NON-FORTIFIED SAMPLES | | | | | | | | |
| WOOD 41(PB) | 75 | | | | | | | 91 |
| WOOD 42(PB) | 76 | | | | | | | 95 |
| WOOD 43(PB) | 103 | | | | | | | 102 |
| WOOD 44(PB) | 92 | | | | | | | 98 |
| WOOD 45(PB) | 80 | | | | | | | 97 |
| WOOD 46(PB) | 124 | | | | | | | 118 |
| WOOD 47(PB) | 100 | | | | | | | 107 |
| LAB BLANKS | | | | | | | | |
| 1988BL | 82 | | | | | | | 96 |
| 1990BL | 92 | | | | | | | 98 |

CONCENTRATIONS FOR LAB BLANKS

| | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON |
|---|---|---|---|---|---|---|
| 1988BL | 0 | 0 | 0 | 0 | 0 | 0 |
| 1990BL | 0 | 0 | 0 | 0 | 0 | 0 |

PEAK AREAS FOR A 2X* STANDARD

| MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON |
|---|---|---|---|---|---|
| 27138 | 24558 | 18091 | 11929 | 35143 | 33556 |

FIELD DUPLICATE - SURROGATE CONCENTRATION COMPARISON

| 2013 | 2015 | %RSD |
|---|---|---|
| 928130 | 1068490 | 14.06 |

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| 1ST RUN | 2ND RUN | %RSD |
|---|---|---|
| 993611 | 883679 | 11.71 |

ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #12TO WOODRUFF COUNTY - APRIL, 1995.

EPA METHOD 515

PERCENT RECOVERIES

| | SURROGATE | 2,4-D | INT. STD. | BENTAZON | ACIFLUROFEN |
|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | |
| WOOD 41(PB) | 76 | 78 | 94 | 78 | 71 |
| WOOD 42(PB) | 71 | 66 | 93 | 67 | 61 |
| WOOD 43(PB) | 78 | 81 | 94 | 82 | 77 |
| WOOD 44(PB) | 69 | 59 | 97 | 60 | 54 |
| WOOD 45(PB) | 88 | 77 | 96 | 79 | 76 |
| WOOD 46(PB) | 96 | 79 | 98 | 80 | 75 |
| WOOD 47(PB) | 100 | 82 | 98 | 83 | 80 |
| NON-FORTIFIED SAMPLES | | | | | |
| WOOD 41(PB) | 72 | | 97 | | |
| WOOD 42(PB) | 131 | | 98 | | |
| WOOD 43(PB) | 69 | | 99 | | |
| WOOD 44(PB) | 84 | | 104 | | |
| WOOD 45(PB) | 77 | | 104 | | |
| WOOD 46(PB) | 106 | | 102 | | |
| WOOD 47(PB) | 108 | | 105 | | |
| LAB BLANKS | | | | | |
| 1993 | 90 | | 95 | | |
| 1994 | 72 | | 99 | | |
| 1995 | 66 | | 103 | | |

CONCENTRATIONS IN BLANKS

| | | | |
|---|---|---|---|
| 1993 | 0 | 0 | 0 |
| 1994 | 0 | 0 | 0 |
| 1995 | 0 | 0 | 0 |

PEAK AREAS FOR A 2X* STANDARD

| 2,4-D | BENTAZON | ACIFLUROFEN |
|---|---|---|
| 185983 | 394742 | 1023574 |

DUPLICATE ANALYSIS

FIRLD DUPLICATE - SURROGATE AREA COMPARISON

| 2039 | 2030 | %RSD |
|---|---|---|
| 254532 | 385351 | 40.89 |

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| 1ST RUN | 2ND RUN | %RSD |
|---|---|---|
| 196699 | 187904 | 4.57 |

ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #12TO WOODRUFF COUNTY - APRIL, 1995.

NPS METHOD 4

PERCENT RECOVERIES

| | CYANAZINE | FLUOMETURON | DIURON | LINURON | SURROGATE | INT. STD. |
|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | |
| WOOD 41(PB) | 84 | 103 | 88 | 87 | 89 | 106 |
| WOOD 42(PB) | 81 | 97 | 84 | 81 | 83 | 103 |
| WOOD 43(PB) | 89 | 105 | 91 | 92 | 97 | 102 |
| WOOD 44(PB) | 81 | 97 | 82 | 79 | 85 | 105 |
| WOOD 45(PB) | 85 | 108 | 89 | 88 | 90 | 106 |
| WOOD 46(PB) | 81 | 103 | 84 | 83 | 86 | 92 |
| WOOD 47(PB) | 97 | 116 | 101 | 104 | 95 | 105 |
| NON-FORTIFIED SAMPLES | | | | | | |
| WOOD 41(PB) | | | | | 103 | 93 |
| WOOD 42(PB) | | | | | 104 | 91 |
| WOOD 43(PB) | | | | | 103 | 93 |
| WOOD 44(PB) | | | | | 108 | 90 |
| WOOD 45(PB) | | | | | 107 | 92 |
| WOOD 46(PB) | | | | | 94 | 97 |
| WOOD 47(PB) | | | | | 106 | 91 |
| LAB BLANKS | | | | | | |
| 1985 | | | | | 105 | 98 |
| 1991 | | | | | 100 | 92 |
| 1985 | 0 | 0 | 0 | 0 | | |
| 1991 | 0 | 0 | 0 | 0 | | |

PEAK AREAS FOR A 2X* STANDARD

| | CYANAZINE | FLUOMETURON | DIURON | LINURON |
|---|---|---|---|---|
| 2X STANDARD | 2286 | 1354 | 2982 | 6056 |

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| 2004 | 2005 | %RSD |
|---|---|---|
| 156391 | 142082 | 9.59 |

MACHINEDUPLICATE - SURROGATE AREA COMPARISON

| 1ST. RUN | 2ND. RUN | %RSD |
|---|---|---|
| 158492 | 160627 | 1.34 |

ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #12TO WOODRUFF COUNTY - APRIL, 1995.

NITRATE

SPIKE RECOVERY

| WELL NUMBER | %RECOVERY |
|---|---|
| WOOD 42 | 93% |

DUPLICATE ANALYSIS

| 1ST MEASUREMENT | 2ND MEASUREMENT | % RSD |
|---|---|---|
| 1.70 mg/L | 71 mg/L | 0.32% |

## RESULTS OF PESTICIDE MONITORING : TRIP #13 TO WOODRUFF COUNTY-MAY, 1995.

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

| | 67 | 68 | 69 | 70 |
|---|---|---|---|---|
| WELL ID: | WOOD48(PB) | WOOD#7R3 | WOOD#9R2 | WOOD 34(PB) |
| DATE SAMPLED: | 15-May-95 | 15-May-95 | 15-May-95 | 15-May-95 |
| LATITUDE: | 35° 19' 50" | 35° 19' 27" | 35° 17' 09" | 35° 03' 21" |
| LONGITUDE: | 91° 21' 28" | 91° 18' 20" | 91° 18' 29" | 91° 13' 13" |
| DEPTH OF WELL, ft: | 65 | unk | 40-60 | 62 |
| pH, standard units: | 6.7 | 6.6 | 6.6 | 6.3 |
| CONDUCTIVITY AT 25° C , umhos/cm: | 205 | 193 | 262 | 259 |
| TEMPERATURE, ° C : | 19 | 17 | 19 | 19 |
| NITRATE, mg/L: | 2.09 | <0.01 | 0.31 | 4.9 |
| ACIFLUORFEN, ug/L | ND | ND | 6.8 | 0.5 |
| ALACHLOR, ug/L: | ND | ND | ND | ND |
| ATRAZINE,ug/L: | ND | ND | ND | ND |
| BENTAZON, ug/L | ND | 21.1 | 36.6 | 1.5 |
| CYANAZINE, ug/L: | ND | ND | ND | ND |
| DIURON, ug/L: | ND | ND | ND | ND |
| FLUOMETURON, ug/L: | ND | ND | 0.4 | 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 #13 TO WOODRUFF COUNTY MAY, 1995.

EPA METHOD 507

PERCENT RECOVERIES

| | SURROGATE | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON | INT. STD. |
|---|---|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | | | |
| WOOD #48 | 63 | 73 | 104 | 89 | 83 | 86 | 88 | 102 |
| WOOD #7R3 | 65 | 74 | 100 | 88 | 81 | 87 | 90 | 102 |
| WOOD #9R2 | 66 | 75 | 88 | 89 | 81 | 86 | 85 | 101 |
| WOOD#34(PB)R1 | 65 | 77 | 91 | 94 | 85 | 87 | 89 | 97 |
| NON-FORTIFIED SAMPLES | | | | | | | | |
| WOOD #48 | 63 | | | | | | | 92 |
| WOOD #7R3 | 100 | | | | | | | 124 |
| WOOD #9R2 | 73 | | | | | | | 111 |
| WOOD#34(PB)R1 | 89 | | | | | | | 87 |
| LAB BLANKS | | | | | | | | |
| 2162bl | 71 | | | | | | | |
| 2164bl | 75 | | | | | | | |

CONCENTRATIONS FOR LAB BLANKS

| | MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON |
|---|---|---|---|---|---|---|
| 2162bl | 0 | 0 | 0 | 0 | 0 | 0 |
| 2164bl | 0 | 0 | 0 | 0 | 0 | 0 |

PEAK AREAS FOR A 2X* STANDARD

| MOLINATE | ATRAZINE | METRIBUZIN | ALACHLOR | METOLACHLOR | NORFLURAZON |
|---|---|---|---|---|---|
| 14948 | 14659 | 8447 | 7479 | 19351 | 18500 |

FIELD DUPLICATE - SURROGATE CONCENTRATION COMPARISON

| 2133 | 2135 | %RSD |
|---|---|---|
| 792533 | 778011 | 1.85 |

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| 1ST RUN | 2ND RUN | %RSD |
|---|---|---|
| 663087 | 695389 | 4.76 |

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

# QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #13 TO WOODRUFF COUNTY - MAY, 1995.

EPA METHOD 515

## PERCENT RECOVERIES

| | SURROGATE | 2,4-D | INT. STD. | BENTAZON | ACIFLUROFEN |
|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | |
| WOOD #48 | 73 | 73 | 108 | 73 | 71 |
| WOOD #7R3 | 63 | 62 | 104 | 81 | 62 |
| WOOD #9R2 | 73 | 67 | 110 | 66 | 50 |
| WOOD#34(PB)R1 | 62 | 64 | 110 | 56 | 55 |
| NON-FORTIFIED SAMPLES | | | | | |
| WOOD #48 | 81 | | 101 | | |
| WOOD #7R3 | omitted | | 109 | | |
| WOOD #9R2 | 69 | | 107 | | |
| WOOD#34(PB)R1 | 75 | | 114 | | |
| LAB BLANKS | | | | | |
| 2168 | 64 | | 109 | | |
| 2169 | 58 | | 117 | | |

## CONCENTRATIONS IN BLANKS

| | 2,4-D | BENTAZON | ACIFLUROFEN |
|---|---|---|---|
| 2168 | 0 | 0 | 0 |
| 2169 | 0 | 0 | 0 |

## PEAK AREAS FOR A 2X* STANDARD

| 2,4-D | BENTAZON | ACIFLUROFEN |
|---|---|---|
| 73805 | 161401 | 498026 |

## DUPLICATE ANALYSIS

FIRLD DUPLICATE - SURROGATE AREA COMPARISON

| | | |
|---|---|---|
| 2119 | 2110 | %RSD |
| omitted | 102785 | |

MACHINE DUPLICATE - SURROGATE AREA COMPARISON

| 1ST RUN | 2ND RUN | %RSD |
|---|---|---|
| 114931 | 106188 | 7.91 |

ANALYTE CONCENTRATIONS ARE ABOUT 2 TIMES THE EPA ESTIMATED DETECTION LIMIT

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #13 TO WOODRUFF COUNTY - MAY, 1995.

NPS METHOD 4

PERCENT RECOVERIES

| | CYANAZINE | FLUOMETURON | DIURON | LINURON | SURROGATE | INT. STD. |
|---|---|---|---|---|---|---|
| FIELD FORTIFIED SAMPLES | | | | | | |
| WOOD #48 | 97 | 87 | 96 | 90 | 94 | 102 |
| WOOD #7R3 | 92 | 77 | 90 | 84 | 88 | 100 |
| WOOD #9R2 | 88 | 84 | 88 | 73 | 91 | 108 |
| WOOD#34(PB)R1 | 89 | 73 | 89 | 75 | 75 | 104 |
| | | | | | | |
| WOOD #48 | | | | | 79 | 102 |
| WOOD #7R3 | | | | | 86 | 105 |
| WOOD #9R2 | | | | | 90 | 103 |
| WOOD#34(PB)R1 | | | | | 85 | 106 |
| LAB BLANKS | | | | | | |
| 2166bl | | | | | 89 | 103 |
| 2167bl | | | | | 75 | 104 |
| | | | | | | |
| 2166bl | 0 | 0 | 0 | 0 | | |
| 2167bl | 0 | 0 | 0 | 0 | | |

PEAK AREAS FOR A 2X* STANDARD

| | CYANAZINE | FLUOMETURON | DIURON | LINURON |
|---|---|---|---|---|
| 2X STANDARD | 2734 | 1190 | 3610 | 7640 |

DUPLICATE ANALYSIS

FIELD DUPLICATE - SURROGATE AREA COMPARISON

| 2104 | 2105 | %RSD |
|---|---|---|
| 134484 | 152636 | 12.64 |

MACHINEDUPLICATE - SURROGATE AREA COMPARISON

| 1ST. RUN | 2ND. RUN | %RSD |
|---|---|---|
| 148627 | 148668 | 0.03 |

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

QUALITY CONTROL DATA FOR PESTICIDE MONITORING: TRIP #13 TO WOODRUFF COUNTY - MAY, 1995.

NITRATE

SPIKE RECOVERY

| WELL NUMBER | %RECOVERY |
|---|---|
| WOOD 18 | 100% |

DUPLICATE ANALYSIS

| 1ST MEASUREMENT | 2ND MEASUREMENT | % RSD |
|---|---|---|
| 2.0336 mg/L | 2.0340 mg/L | 0.02% |

# APPENDIX B

# CORRECTIVE ACTION REPORTS

AWRC WATER QUALITY LABORATORY

June 15, 1994

CORRECTIVE ACTION REPORT

On May 26, 1994, after some liquid was inadvertently drawn into it, our Eppendorf automatic pipet (adjustable from 200-1000 uL) was found to be poorly calibrated and inconsistent. Efforts to calibrate the pipet were unsuccessful and the pipet was returned to Eppendorf for repair. Today, eppendorpf sent us a new pipet-at no cost as the old one was under warranty. QC on the pipet shows good accuracy and consistency. All the pipets used in the pesticide project will be tested daily for accuracy and consistency.

Terry Nichols

Terry Nichols

Research Assistant

AWRC WATER QUALITY LABORATORY

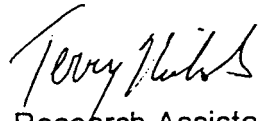
July 21, 1994

CORRECTIVE ACTION REPORT

On July 19th it was determined that Steve Hill, a graduate student working at the lab doing extractions for pesticides, was following improper procedures during removal of the extracts from the concentrator tubes. He was rinsing the tube sidewalls with the extract rather than with clean solvent. Up to 20 percent of the recovered pesticides were being lost due to this error. This determination was made by rerinsing some concentrator tubes after the extracts had been brought to volume. The rinsate was then subjected to gc or hplc analysis-depending on the method for which the original extractions were done. Mr. Hill began doing these extractions on May 23 after being trained during the previous week. Poor and variable recoveries have been noticed during this time.

Since then Mr. Hill has been instructed in the proper rinsing procedure and was observed carrying out the process for several extractions. Several concentrator tubes were rerinsed after he was finished extracting.. The rinsates were subjected to the same analysis as detailed above and no pesticides were detected. To guard against this happening again, at least one concentraor tube from each day's work will be rerinsed and the rinsate analyzed for pesticide residue.

Terry Nichols



Research Assistant