Pesticide Monitoring Network
1995-1996

Greg Webb

GEORGIA DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION
GEORGIA GEOLOGIC SURVEY

Atlanta
1996

PROJECT REPORT 27

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Atlanta
1996

PROJECT REPORT 27

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INTRODUCTION

To satisfy the requirements of their Pesticide Management Plan, the Georgia Department of Agriculture (DOA) requested that the Geologic Survey Branch (GGS) of the Environmental Protection Division (EPD) assist in designing a ground-water monitoring network for the agricultural region of southwest Georgia. The original plan called for the installation of a network of shallow monitoring wells in those counties having the highest concentration of agricultural activity (primarily row-crop farming). However, the United States Geological Survey (USGS) was already in the process of installing monitoring wells in the Apalachicola-Chattahoochee-Flint River Basin (ACF) as part of the National Water Quality Assessment Program (NAWQA). Rather than duplicate efforts, the DOA, EPD, and the USGS entered into a cooperative agreement in 1993. The agreement called for EPD to sample the USGS wells, turn the samples over to DOA for analysis using EPA-approved Gas Chromatography/Mass Spectrometry (GC/MS) methods, and for all parties to share the results. EPD planned to sample the USGS wells for one year, then produce a report for the well owners and a project report suitable for publication. The first published report (GGS Project Report 22) included data from 24 selected ACF wells generated during the period between September 1993 and July 1994.

During the latter part of 1994, the USGS installed 23 new wells in the Upper Suwannee River Basin (USRB). The USGS contacted EPD about the new wells and plans were made to include them in the next round of sampling by the Pesticide Monitoring Network (PMN). As with the ACF wells, the owners had to give EPD permission to enter their property and sample the wells in the USRB. In August 1995 sampling continued in the ACF basin on a quarterly basis, while the USRB wells were sampled as frequently as time allowed. The DOA added a new method to the laboratory procedures for the second round of sampling, bringing the total number of analytical screens to five, with more than 200 compounds detectable by the combination of the methods.

WELL LOCATION AND CONSTRUCTION

The USGS installed 36 wells in the ACF and 23 wells in the USRB. EPD attempted to obtain the consent of the landowners to access and sample the wells in both basins. Permission was obtained to sample 24 wells in the ACF and 17 in the USRB. Figure 1 provides the well locations. As sampling progressed, five wells (LC2A, CP15A, CP24A, AC36B, and 9-1) were deleted from the Network due to inaccessibility or very slow recovery. A seventh well (AC39A) was deleted (due to the fact that it was demolished) at the landowner's request to make room for a center-pivot irrigation system. Some wells were sampled less frequently than others due to problems in gaining access to the well such as: muddy fields, damage potential to crops, and locked gates.

Well construction criteria were similar for the USGS monitoring wells in the USRB and the ACF. Where possible, wells were drilled in or near recharge areas, in close proximity to fields that had been continuously cultivated for the preceding 10 or more years. All of the wells were constructed with PVC casings and screens and drilled to a short distance below the water table with 6-inch hollow-stem augers. The annular space around the ten-foot screened interval in each well was backfilled with a filter pack of clean sand and capped with a bentonite plug. The

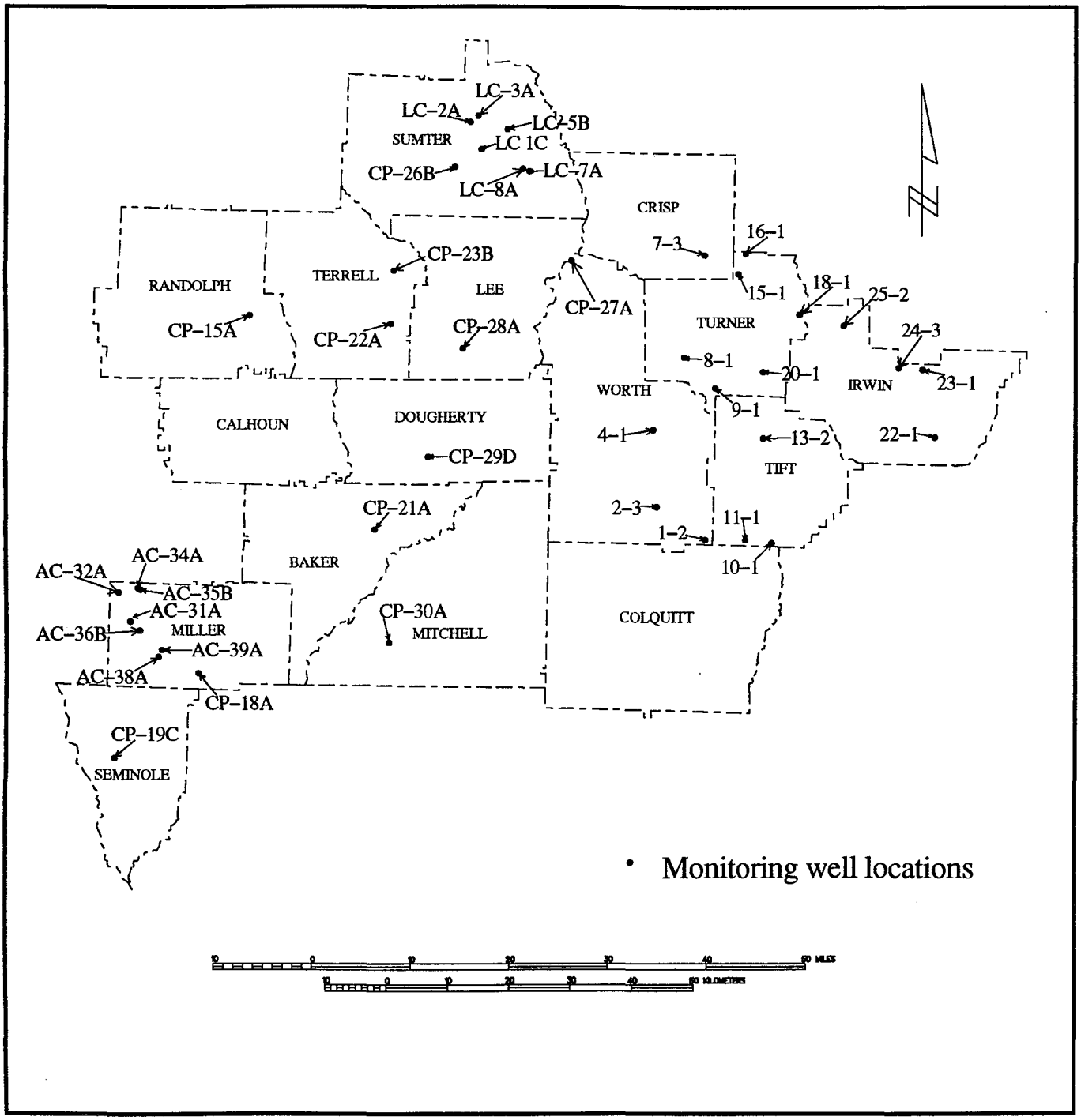

Figure 1. 1995 – 1996 Pesticide Monitoring Network Study Area

annulus above the bentonite plug was backfilled with either bags of sand or native materials and capped with three feet of cement grout. The casings extend one-half foot to three feet above the ground surface and are covered by locking steel boxes set in 18-inch wide concrete aprons. Soon after drilling, the wells were developed with an air bladder pump until they produced clear water. A list of monitoring well construction data is in Appendix A.

SAMPLING EQUIPMENT AND PROCEDURES

Purging and sampling procedures used for the Pesticide Monitoring Network (PMN) were developed from *Recommended Procedures for Collection of Selected Ground Water Data from Wells* (Lapham, Wilde, and Korterba, 1992) and the *Manual for Groundwater Monitoring* (EPD Task Force on Ground Water Monitoring, 1988). Because the original equipment (disposable, PVC, single-use bailers) was destroyed in the Albany floods during the summer of 1994, a Norwell Teflon bailer® and a reel-mounted Grundfos® Redi-flo 2-inch environmental submersible pump are now being used to sample. A YSI Model® 3500 Water Quality Monitoring System is used to simultaneously measure these field parameters: temperature, dissolved oxygen, specific conductance, and pH. (Note: Manufacturers, trade names, or brand names of equipment or supplies mentioned in this report does not constitute endorsement by the Geologic Survey.)

Typically, the monitoring wells are purged until at least three times the volume of standing water in the well has been removed and the temperature, specific conductance and pH of the ground water have stabilized. Samples are collected in one liter amber glass bottles and pre-preserved (1.8ml of monochloroacetic acid) 125-ml opaque, Teflon® bottles. Typically, four one-liter samples for DOA's analytical screens No. 1 through No. 4, (organophosphate, organochlorine pesticides, and phenoxy herbicides) and one 125-ml sample for analytical screen No. 5 (carbamate pesticides) are collected at each well. The sample bottles are individually labeled, bagged, and placed in coolers packed with ice for preservation during transportation to the DOA Pesticide Residue Laboratory in Atlanta. Samples are hand delivered to the lab within three to four days by EPD employees using an EPA-approved chain of custody form.

DECONTAMINATION AND QUALITY ASSURANCE / QUALITY CONTROL

To prevent potential cross-contamination, the sampling equipment was cleaned prior to and between each sampling episode. The sampling bailer and pump were decontaminated in the field using a three-step process: clean in a Liquinox® and tap water solution, thoroughly rinse in tap water, rinse again in deionized water. All sampling equipment is handled with latex gloves to prevent potential cross-contamination. In between uses, the equipment is wrapped in aluminum foil and stored in the EPD warehouse in Albany. Equipment blanks (deionized water) are taken periodically to determine if the decontamination process is effective. Additional quality control (QC) methods include spiked samples and replicate samples. The DOA laboratory runs internal QC standards before, during, and after each sample run. The results of the QC tests indicate that the methods in use at the Pesticide Residue Laboratory are consistently capable of detecting pesticides at or near their listed detection limit and the decontamination

methods used in the field are effective.

LABORATORY ANALYSIS

The Department of Agriculture Pesticide Residue Laboratory uses EPA methods 507 (nitrogen and phosphorus containing compounds), 508 (chlorinated pesticides), 515.1 (chlorinated acids), and 531.1(N-methylcarbamoyloximes and N-methylcarbamates) for pesticide analysis. These methods have detection limits for pesticide compounds that are below the maximum contaminant levels (MCLs) established by EPA for safe drinking water. Method 531.1 uses high-pressure liquid chromatography (HPLC) to determine the concentrations of constituents; the other methods rely on gas chromatography/mass spectrometry for compound identification. For more information concerning the specific analytes detectable by each method and their respective detection limits, refer to the laboratory report sheets included in Appendix B.

RESULTS

Results for all of the wells sampled in the ACF and USR basins indicate no pesticide detections above EPA established MCLs. Quality control samples spiked with various pesticides show that the DOA laboratory procedures are capable of detecting pesticide concentrations that are near the MCLs established for the compounds (generally >1 part per billion [ppb]).

Field measurements of parameters taken just prior to sampling are tabulated in Appendix C. This table includes data from September 1993 through June 1996 for all of the wells ever sampled by the PMN, whether they are currently part of the Network or not.

INTERPRETIVE CONCLUSIONS

The results of sampling in the study area (ACF and USR basins) indicate that Best Management Practices for Pesticides currently being employed do not appear to result in the pollution of Georgia's ground water by pesticides. If EPA's risk-based MCLs are appropriate indicators of contamination, then underground sources of drinking water do not currently appear to be in danger of pollution by current farming practices. This interpretation is consistent with previous surveys of pesticides in ground water conducted in Georgia. The lack of detections possibly can be attributed to the rapid dilution and degradation of pesticides due to the low amount of organic material in the soils of the Coastal Plain, the high soil and air temperatures that naturally occur during the peak times for pesticide application, and the abundant rainfall that the study area receives each year (average yearly rainfall is about 59 inches).

REFERENCES

EPD task force on Ground Water Monitoring, 1988. Manual for Ground Water Monitoring, Georgia Department of Natural Resources, Environmental Protection Division (unpublished). 37 p.

Lapham, W., Wilde, F., and Korterba, M., 1992. Protocols and Recommended Procedures for Collection of Selected Ground-water Data from Wells. USGS Open-file report 92-xxxx (provisional document, unfinished) pp 99-324.

Webb, G., 1995. Pesticide Monitoring Network 1993-1994. Project Report 22. Georgia Department of Natural Resources, Environmental Protection Division, Georgia Geologic Survey Branch, 56 p.

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Appendix A

Monitoring Well Construction Data

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Wells in Apalachicola-Chattahoochee-Flint River Basin used between 9/93 and 6/96.

Well ID	County	Pad	Backfill	Bentonite Plug	Filter Pack Interval	Screened Interval	Total Well Depth
LC-1C	Sumter	0 - 2.5	2.5 - 31.3	31.3 - 33.5	33.5- ≈ 41	35 - 45	45.0
LC-2A	Sumter	0 - 3.0	3.0 - 62	62 - 64	64 - 74.7	64.7 - 74.7	74.7
LC-3A	Sumter	0 - 3.0	3.0 - 61	61 - 63	63 - 73.4	63.4 - 73.4	73.4
LC-5B	Sumter	0 - 3. 0	3.0 - 20.2	20.2 - 22.7	22.7 - 27.0	22.4 - 32.4	32.4
LC-7A	Sumter	0 - 2.2	2.2 - 33.5	33.5 - 36.9	36.9 - 48.7	38.7 - 48.7	48.7
LC-8A	Sumter	0 - 1.3	1.3 - 38	38 - 40	40 - 51.7	41.7 - 51.7	51.7
CP-15A	Randolph	0 - 2.2	2.2 - 15.1	15.1 - 17.0	17.0 - 28.6	27.6 - 28.6	28.6
CP-18A	Miller	0 - 1.3	1.3 - 49	49 - 51	51 - 68.8	58.8 - 68.8	68.8
CP-19C	Seminole	0 - 1.3	1.3 - 31.7	31.7 - 33	33 - 54.3	44.3 - 54.3	54.3
CP-21A	Baker	0 - 2.5	2.5 - 37	37 - 39	39 - 48.8	38.8 - 48.8	48.8
CP-22A	Terrell	0 - 2.3	2.3 - 22	22 - 24	24 - 33.8	23.8 - 33.8	33.8
CP-23B	Terrell	0 - 2.0	2.0 - 26.7	26.7 - 32.8	32.8 - 44.2	32.2 - 44.2	44.2
CP-26B	Sumter	0 - 2.0	2.0 - 11.8	11.8 - 15	15 - 28.5	18.5 - 28.5	28.5
CP-27A	Worth	0 - 2.0	2.0 - 10.9	10.9 - 15	15 - 31.2	21.2 - 31.2	31.2
CP-28A	Lee	0 - 1.6	1.6 - 21.2	21.2 - 31.6	31.6 - 43.7	33.7 - 43.7	43.7
CP-29D	Dougherty	0 - 2.0	2.0 - 21	21 - 22	22 - 35.6	25.6 - 35.6	35.6
CP-30A	Mitchell	0 - 2.0	2.0 - 25.5	25.5 - 31.0	31.0 - 47.5	37.5 - 47.5	47.5
AC-31A	Miller	0 - 2.7	2.7 - 24.0	24.0 - 28.9	28.9 - 39.2	29.2 - 39.2	39.2
AC-32A	Miller	0 - 3.3	3.3 - 24.5	24.5 - 29.7	29.7 - 38.3	28.3 - 38.3	38.3
AC-34A	Miller	0 - 3.3	3.3 - 27	27 - 29	29 - 37.5	27.5 - 37.5	37.5
AC-35B	Miller	0 - 2.5	2.5 - 56	56 - 58	58 - 69.3	59.3 - 69.3	69.3
AC-36B	Miller	0 - 2.5	2.5 - 50	50 - 52	52 - 65	55 - 65	65
AC-38A	Miller	0 - 1.7	1.7 - 47	47 - 49	49 - 61	51 - 61	61
AC-39A	Miller	0 - 3.0	3.0 - 31	31 - 33	33 - 57.4	47.4 - 57.4	57.4

All measurements are in feet.

Wells in the Upper Suwannee River Basin used between 8/95 and 6/96.

Well ID	County	Pad	Backfill	Bentonite Plug	Filter Pack Interval	Screened Interval	Total Depth
1-2	Worth	0 - 3	------	3 - 5	5 - 17	7 - 17	17
2-3	Worth	0 - 2.5	2.5 - 11	11 - 14	14 - 24	14 - 24	24
4-1	Worth	0 - 2.5	2.5 - 11	11 - 13	13 - 23	13 - 23	23
7-3	Crisp	0 - 2	2 - 4	4 - 6	6 - 20	5 - 15	20
8-1	Turner	0 - 2	2 - 6	6 - 8	8 - 20	10 - 20	20
9-1	Turner	0 - 2.5	2.5 - 24	24 - 27.7	27.7 - 60	35 - 65	65
10-1	Tift	0 - 2	2 - 9	9 - 10	10 - 22	12 - 22	22
11-1	Tift	0 - 2	2 - 15	15 - 17	17 - 31	21 - 31	31
13-2	Tift	0 - 2	2 - 5	5 - 7	7 - 19	9 - 19	19
15-1	Turner	0 - 2	2 - 16	16 - 18	18 - 51	26 - 46	51
16-1	Turner	0 - 2	2 - 11	11 - 13	13 - 30	20 - 30	30.4
18-1	Turner	0 - 2	2 - 5	5 - 7	7 - 20	5 - 15	20
20-1	Turner	0 - 2	2 - 24	24 - 25	25 - 45	30 - 40	45
22-1	Irwin	0 - 2.5	2.5 - 18	18 - 20	20 - 40	25 - 35	35
23-1	Irwin	0 - 1	1 - 10	10 - 12	12 - 27	17 - 27	27
24-1	Irwin	0 - 2.5	2.5 - 15	15 - 17	17 - 37	27 - 37	37
25-2	Irwin	0 - 2.5	2.5 - 12	12 - 14	14 - 25	15 - 25	25

All measurements are in feet

Appendix B

Laboratory Reporting Sheets / Listing of Analytical Parameters

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Department of Agriculture

AGRICULTURE BUILDING CAPITOL SQUARE
ATLANTA, GEORGIA 30334 - 2001 USA
TELEX: 80 - 4349 GDA TRADE ATLANTA
FAX: (404) 656-9380

Thomas T. Irvin
Commissioner

Pesticide Residue Laboratory Report for pesticide analysis
EPA Method 507 (Screen 1)

Well Name/ID _____

Sampling Date _____ Time _____

Collected by _____ GDA Lab Number _____

Date Received _____ Was sample filtered before analysis? Yes or No

Date Analyzed _____ Volume analyzed (in ml) _____

Analyte	Storet #	Limits (ppb)	Level (ppb)		Analyte	Storet #	Limits (ppb)	Level (ppb)
Alachlor (Lasso)	77825	(m) 2.0			Merphos*	38496	1.0	
Ametryn (Evik)	38401	0.3			Methyl paraoxon	30009	1.0	
Atraton	38414	0.2			Metolachlor (Dual)	38923	1.0	
Atrazine (Aatrex)	39033	(m) 3.0			Metribuzin (Sencor)	81408	1.13	
Bromacil (Hyvar)	82198	0.6			(Mevinphos)	39610	1.0	
Butachlor (Machete)	77860	0.5			Molinate (Ordram)	49562	1.0	
Butylate (Sutan)	81410	0.7			Napropamide (Devrinol)	79195	0.1	
Carboxin (Vitavax)	70978	1.0			Norflurazon (Zorial)	78064	0.1	
Chlorpropham (ChloroIPC)	82322	0.5			Pebulate (Tillam)	79192	0.5	
Cycloate (RoNeet)	04031	1.0			Prometon (Pramitol)	39056	1.0	
Diazinon* (Spectracide)	39570	1.0			Prometryn (Caparol)	04036	1.0	
Dichlorvos (DDVP)	38775	1.0			Pronamide* (Kerb)	39080	0.5	
Diphenamid (Dymid)	30255	1.0			Propazine (Milogard)	38535	1.0	
Disulfoton* (Di-Syston)	39010	1.0			Simazine (Princep)	39055	1.0	
Disulfoton sulfone*	81031	1.0			Simetryn	39054	1.0	
Disulfoton Sulfoxide*	81888	1.0			Stirofos	38877	1.0	
EPTC (Eptam)	81894	0.5			Tebuthiuron (Spike)	45607	0.1	
Ethoprop (Prophos)	81758	0.5			Terbacil (Sinbar)	38883	0.2	
Fenamiphos (Nemacur)	38929	1.0			(Terbufos)*	82088	1.0	
Fenarimol	04101	1.0			Terbutryn (Igram)	38888	1.0	
Fluridone (Sonar)	4100	1.0			Triadimefon	38893	0.2	
Hexazinone (Velpar)	30264	1.0			Tricyclazole	38903	0.6	
MGK 264	4098	1.0			Vernolate (Vernam)	82200	1.0	

Limits: (m) is a Primary Maximum Contaminant Level for drinking water, * is qualitative results only.
Samples are collected in one liter amber glass bottles with no preservation added in the field.

Sudhir G. Kapadia
Analyst

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AGRICULTURE BUILDING CAPITOL SQUARE
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Pesticide Residue Laboratory Report for pesticide analysis
EPA Method 508 (Screen 2)

Well Name/ID _____

Sampling Date _____ Time _____

Collected by _____ GDA Lab Number _____

Date Received _____ Was sample filtered before analysis? Yes or No

Date Analyzed _____ Volume analyzed (in ml) _____

Analyte	Storet #	Limits (ppb)	Level (ppb)	Analyte	Storet #	Limits (ppb)	Level (ppb)
4,4-DDD (Rothane)	78427	1		Heptachlor	39410	(m) 0.4	
4,4-DDE	78426	1		Heptachlor epoxide	39420	(m) 0.2	
4,4-DDT	78425	1		Hexachlorobenzene	39700	1.0	
Aldrin	39330	1		Methoxychlor (Marlate)	39480	(m) 40	
Chlorobenzilate*	39460	1		Propachlor (Ramrod)	38533	1	
Chloroneb	38423	1		Trifluralin	81284	1	
Chlorothanlonil (Bravo)	49306	1		alpha-HCH	39336	0.2	
DCPA (Dacthal)	39770	.01		beta-HCH	81288	0.2	
Dieldrin	39380	1		delta-HCH	34198	0.2	
Endosulfan I (Thiodan)	34361	1		gamma-HCH (Lindane)	39782	(m) 0.2	
Endosulfan II	34356	1		alpha-chlordane (Belt)	39348	(m) 2.0	
Endosulfan sulfate	82623	1		gamma-chlordane	39810	(m) 2.0	
Endrin (Rid-a-Bird)	39390	(m) 2.0		cis-Permethrin (Ambush)	82687	0.3	
Endrin aldehyde	82622	1		trans-Permethrin	82420	0.3	
Etridiazole (Terrazole)	38793	1		—	—	—	

Limits: (m) is a Primary Maximum Contaminant Level for drinking water, * is qualitative results only.
Samples are collected in one liter amber glass bottles with no preservation added in the field.

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Pesticide Residue Laboratory Report for pesticide analysis
EPA Method 515.1 (Screen 3)

Well Name/ID _____

Sampling Date _____ Time _____

Collected by _____ GDA Lab Number _____

Date Received _____ Was sample filtered before analysis? Yes or No

Date Analyzed _____ Volume analyzed (in ml) _____

Analyte	Storet #	Limits (ppb)	Levels (ppb)		Analyte	Storet #	Limits (ppb)	Levels (ppb)
2, 4 -D (Demise)	39730	(m) 70			DCPA acid metabolites	39770	1.0	
2, 4-DB (Butoxone)	38746	1.9			Dalapon	38432	(m) 200	
2, 4, 5-TP (Silvex)	39760	(m) 50			Dicamba (Banvel)	38442	0.2	
2, 4, 5-T	39740	0.11			Dicamba, 5-hydroxy-	04094	1	
3, 5 Dichlorobenzoic Acid	1093	1.0			Dichlorprop	38451	1.0	
4-Nitrophenol*	34646	1.23			Dinoseb (DNBP)	38779	0.1	
Acifluoren* (Blazer)	79193	1.0			Petachlorophenol (PCP)	39032	(m) 1.0	
Bentazon (Basagran)	38711	1.9			Picloram	39720	(m) 500	
Chloramben (Amiben)	82051	0.2						

Limits: (m) is a Primary Maximum Contaminant Level for drinking water, * is qualitative results only.
Samples are collected in one liter amber glass bottles with no preservation added in the field.

_____
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Pesticide Residue Laboratory Report for pesticide analysis
EPA Method (Screen #4)

Well Name/ID _____

Sampling Date _____ Time _____

Collected by _____ GDA Lab Number _____

Date Received _____ Was sample filtered before analysis? Yes or No

Date Analyzed _____ Volume analyzed (in ml) _____

Analyte	Storet	Limits (ppm)	Levels (ppm)		Analyte	Storet	Limits (ppm)	Levels (ppm)
Atrazine, deethylated	75981	0.04			Linuron	38477	0.006	
Barban	38418	1.04			Metribuzin DA	81408	0.007	
Carbofuran, phenol-3-keto-	81450	0.01			Metribuzin DADK*	81408	0.007	
Carbofuran, phenol	81450	1.5			Metribuzin DK*	81408	0.044	
Cyanzine	81757	0.04			Neburon	38521	0.096	
Diuron	39650	0.03			Pronamide metabolite	39080	0.04	
Fenamiphos sulfone		0.012			Propanil	82679	0.007	
Fenamiphos sulfoxide		0.19			Propham	82620	0.11	
Fluometuron	38810	0.19			Swep	38554	0.02	

Samples are collected in one liter amber glass bottles with no preservation added in the field.

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Pesticide Residue Laboratory Report for pesticide analysis
EPA Method 531.1 (Screen #5)

Well Name/ID _____

Sampling Date _____ Time _____

Collected by _____ GDA Lab Number _____

Date Received _____ Was sample filtered before analysis? Yes or No

Date Analyzed _____ Volume analyzed (in ml) _____

Analyte	Storet #	Limits (ppb)	Level (ppb)
Aldicarb (Temik)	39053	1.0	
Aldicarb sulfone	04257	2.0	
Aldicarb sulfoxide	04260	2.0	
Aprocarb (Baygon)	38587	1.0	
Carbaryl (Sevin)	77700	2.0	
Carbofuran (Furadan)	81450	2.0	
3-Hydroxycarbofuran	82584	2.0	
Methiocarb (Mesurol)	38500	4.0	
Methomyl (Lannate)	39051	1.0	
Oxyamyl (Vydate)	38866	2.0	

BDL=Below Detection Limit
Samples collected in 60 ml FEP with 1.8ml of a buffer solution added as a preservative.

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Appendix C

Tabulation of Field Parameters

(wells arranged by county)

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Baker County: CP21A

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
10/19/93		5.96	25.0		25.7
1/5/94	8.59	4.80	20.5	.200	24.9
4/4/94	7.06	5.50	21.6	262	16.1
5/3/94	9.49	4.40	21.7		11.8
6/2/94	7.44	6.0	22.0		18.4
9/12/95	7.65	4.3	23.9	0.210	29.15
5/2/96	7.55	4.9	24.7	0.234	18.9

Crisp County: 7-3

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
4/4/96	4.79	8.7	16.4	0.159	3.9
6/18/96	3.95	7.9	20.3	0.171	8.7

Dougherty County: CP29D

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
10/13/93		11.6	17.3		18.8
11/16/93	7.77		20.0		17.4
2/1/94		7.9	18.8		12.5
4/4/94	7.9	8.4	19.1	0.202	11.3
5/3/94	6.86	8.2	19.3		9.8
6/20/94	6.27	8.6	19.4		14.1
8/10/95	7.30	5.8	20.9	0.213	12.2
1/25/96	6.96	5.4	17.1	0.213	20.1
2/29/96	7.08	6.1	19.6	0.201	15.2
5/8/96	7.61	6.8	18.5	0.209	13.9

Irwin County: 22-1

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
11/28/95	5.66		23.0	0.032	9.0
4/23/96	5.52	4.3	23.8	0.030	4.5
5/25/96	4.49	5.7	19.4	0.023	5.6

Irwin County: 23-1

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
11/27/95	4.72		21.3	0.047	18.2
4/2/96	4.73	8.4	19.6	0.047	9.6
6/25/96	3.95	8.0	20.1	0.060	12.2

Irwin County: 24-1

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
11/1/95	4.84	9.9	20.9	0.071	21.6
4/2/96	5.51	6.8	22.2	0.111	8.4

Irwin County: 25-2

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
4/24/96	5.14	5.6	19.2	0.057	8.6
1/16/96	5.20	3.4	20.4	0.048	12.0

Lee County: CP28A

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
10/12/93	7.42	9.2	17.7		18.2
11/16/93	9.24		21.8		13.9
1/12/94		6.7	19.6	0.300	13.7
4/27/94	6.75	6.2	21.9		13.5
6/14/94	6.81	5.6	21.3		14.6
8/10/95	7.01	5.3	23.3	0.374	16.5
3/14/96	7.24	5.3	21.0	0.370	14.2
4/30/96	7.32	6.0	21.9	0.392	17.0

Miller County: CP18A

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
12/15/93	9.12	8.1	19.9		30.8
4/5/94	7.59	7.6	20.9		27.1
5/4/94		9	20.9		19.9
10/10/95	7.72	6.4	22.6	0.233	34.9
2/6/96	7.77	6.8	21.7	0.247	26.3
3/12/96	7.75	6.2	21.1	0.250	23.3
6/4/96	7.54	7.2	20.7	0.193	31.3

Miller County: AC31A

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
12/1/93	5.19		18.3		15.2
2/7/96	5.78	5.2	22.7	0.040	3.1
3/12/96	5.96	5.9	22.2	0.056	2.35
5/29/96	5.12	6.2	20.7	0.053	6.45

Miller County: AC32A

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
12/13/95	6.31	4.5	20.3	0.053	33.7
2/20/96	6.21	5.8	19.8	0.059	4.85
5/29/96	5.55	6.1	20.2	0.068	6.2

Miller County: AC34A

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
12/1/93	7.48		18.3		22.2
1/5/94	7.52	8.5	19.3		14.1
3/2/94	7.81	10.1	19.2		8.1
4/19/94		7.3	21.2		0.4
9/27/95	7.61		22.1	0.178	26.3
2/6/96	7.75	6.0	20.7	0.202	8.0
3/5/96	7.58	6.1	21.3	0.170	4.9
4/13/96	7.58	8.0	21.3	0.158	5.7

Miller County: AC35B

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
10/28/93	7.75	8.4	19.1		42.3
12/7/94	8.88		18.4		37.8
2/24/94	7.47	6.5	19.5		21.4
4/19/94	6.88	6.2	21.1		12.0
9/13/95	7.44	5.0	22.3	0.278	38.8
2/7/96	7.41	5.7	20.6	0.238	24.4
3/5/96	7.52	5.2	21.2	0.214	18.8
5/13/96	7.46	6.2	21.3	0.208	18.5

Miller County: AC36B

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
12/15/93		6.4	19.6	0.200	34.9

Miller County: AC38A

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
10/20/93	7.57	8.6	21.7		37.7
12/8/93	7.65	7.3	19.8		36.4

Miller County: AC39A

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
10/19/93	6.15		22.6		33.6
12/8/93	7.75	4.8	20.2		32.2
2/23/94	6.93	4.8	20.4		19.9
4/20/94		5.9	21.6		16.5
10/30/95	7.42	7.2	21.6	0.238	38.3

Mitchell County: CP30A

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
10/18/93		8.7	22.5		33.1
12/2/93	7.83		19.4		34.6
2/22/94	7.26	6.8	20.3		35.6
4/5/94	7.50	7.6	20.6	0.225	35.0
5/4/94		9.8	21.0		24.1
9/12/95	7.47	5.4	26.0	0.218	33.3
2/8/96	7.47	6.4	20.3	0.200	36.4
2/29/96	7.45	6.2	19.7	0.242	35.2
5/6/96	7.44	7.0	20.8	0.247	29.2

Randolph County: CP15A

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
10/13/93		11.5	19.1		20.9
12/2/93	5.56		19.3		22.2

Seminole County: CP19C

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
10/28/93	7.70	8.9	20.3		44.5
4/20/94		5.8	22.9		25.9
9/27/95	7.55		21.4	0.255	43.2
2/15/96	7.41	6.0	20.6	0.286	42.8
6/4/96	7.53	5.2	21.2	0.283	39.9

Sumter County: LC1C

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
11/2/93		8.5	17.1		14.7
12/8/93	8.19	7.0	18.2		7.1
2/2/94		7.5	18.0		1.3
8/16/95	7.41	4.4	21.8	0.192	12.4
8/29/95	6.93	4.5	21.5	0.225	18.5

Sumter County: LC2A

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
9/29/93	7.11				59.6

Sumter County: LC3A

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
10/6/93	6.35	8.3	22.6		66.6
11/1/93	6.25	10.6	17.1		64.9
1/6/94	6.65	7.4	19.1		65.1
3/14/94	6.11	7.7	19.1		64.2
9/14/95	6.30	6.8	20.2	0.143	67.6
3/4/96	6.57	7.3	19.1	0.107	64.2

Sumter County: LC5B

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
10/6/93	5.52	8.3	22.9	0.030	17.9
11/1/93	4.69	11.33	17	0.030	12.4
1/11/94		7.9	19.3	0.020	7.9
3/29/94	4.52	7.0	19.3	0.060	3.0
4/27/94	4.59	7.4	20.2	0.082	8.6
6/13/94	4.12	6.3	20.9	0.071	11.3
8/16/95	5.42	6.8	22.8	0.055	11.0
8/29/95	5.16	6.2	21.5	0.050	19.7
1/29/96	5.65	6.5	20.7	0.062	5.4
2/27/96	5.42	6.1	21.3	0.064	26.4
5/1/96	5.64	6.9	20.8	0.055	6.0

Sumter County: LC7A

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
10/11/93		4.7	18.6		24.8
11/3/94	7.32	4.8	18.3		16.7
2/22/94	7.70	3.7	18.6		5.4
3/15/94	7.73	2.5	20.8		4.5
4/11/94					5.6
5/9/94	7.19				7.2
6/21/94	7.09	2.6	20.3		6.7
8/30/95	7.54	3.7	23.3	0.219	20.2
1/23/96	7.43	3.4	20.0	0.225	10.1
5/6/96	7.54	3.3	22.5	0.232	9.3

Sumter County: LC8A

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
9/30/93	7.43				38.2
11/2/93	7.81	9.6	17.2		29.6
1/6/94	7.69	6.8	18.3		15.2
3/15/94	7.42	6.2	20.4		11.9
4/11/94	7.99	7.1	19.8	0.203	15.4
5/9/94	7.38				15.1
10/30/95	7.51	5.7	20.4	0.217	28.0
1/23/96	7.79	6.0	20.4	0.216	17.4
5/16/96	7.75	7.0	21.6	0.210	17.5

Sumter County: CP26B

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
11/30/93	4.4	9.2	19.3		4.2
1/12/94		6.2	19.8		3.3
4/27/94	4.33	5.1	22.2		7.6
6/13/94	3.26	4.5	22.2		3.25
9/25/95	4.67		20.2	0.068	13.85
1/30/96	4.62	6.1	20.0	0.065	4.65
3/4/96	4.81	5.4	19.3	0.078	8.15
5/15/96	5.55	7.3	22.8	0.094	6.0

Terrell County: CP22A

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
10/27/93	5.38	10.5	21.7		16
10/12/95	5.75	6.5	19.5	0.026	17.5
2/14/96	5.77	7.2	19.5	0.034	5.5
5/22/96	5.92	7.0	25.7	0.044	4.0

Terrell County: CP23B

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
10/13/93		9.34	20.0		32.2
12/13/95	5.23	5.7	19.1	0.020	28.2
2/14/96	5.64	7.2	19.4	0.023	23.1
3/13/96	5.68	5.4	19.4	0.026	21.8
5/23/96	5.45	7.1	20.2	0.024	25.6

Tift County: 10-1

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
1/9/96	4.56		18.6	0.230	5.9
4/17/96	4.91	8.2	16.9	0.181	3.5
6/13/96	4.17	7.9	18.5	0.183	5.2

Tift County: 11-1

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
1/9/96	4.84		19.4	0.108	2.6
4/9/96	5.36	5.4	21.8	0.121	1.8
6/11/96	4.15	6.8	19.0	0.119	3.2

Tift County: 13-2

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
1/17/96	4.54	6.6	18.4	0.161	4.8
3/26/96	4.64	6.5	16.9	0.163	0.8
6/17/96	3.88	6.1	20.6	0.187	4.5

Turner County: 8-1

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
2/22/96	4.68	7.2	18.5	0.051	9.2
4/8/96	4.03	6.6	18.0	0.063	6.1
6/12/96	3.95	7.3	19.3	0.063	9.6

Turner County: 9-1

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
2/22/96	5.14	2.7	20.3	0.053	11.15

Turner County: 15-1

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
1/10/96	5.43	5.7	19.8	0.043	14.2
4/24/96	5.15	6.2	22.4	0.026	13.8
6/18/96	4.61	7.6	20.3	0.045	15.2

Turner County: 16-1

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
4/3/96	4.64	8.9	19.4	0.154	9.1
6/12/96	3.86	8.2	19.6	0.154	14.3

Turner County: 18-1

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
2/21/96	3.80	8.5	14.1	0.142	2.5
4/8/96	5.13	4.9	19.2	0.186	0.9
6/26/96	3.86	6.2	22.2	0.197	4.3

Turner County: 20-1

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
10/18/95	4.74	6.4	20.4	0.082	23.3

Worth County: CP27A

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
10/11/93		9.5	20.3		10.9
11/3/93	7.53	9.3	20.4		7.4
2/22/94	7.00	8.8	19.7		5.5
4/28/94	6.29	7.8	20.3		4.5
6/14/94	6.67	6.8	20.4		7.3
8/30/95	7.18	6.8	24.3	0.210	12.0
1/30/96	7.11	6.7	21.4	0.202	7.6
2/27/96	6.99	6.8	22.2	0.207	7.3
5/6/96	6.57	6.8	23.3	0.201	7.5

Worth County: 1-2

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
10/12/95	5.91	1.6	23.6	0.070	10.4
3/25/96	4.91	8.4	16.0	0.120	2.7
6/5/96	3.93	7.4	22.0	0.127	4.8

Worth County: 2-3

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
11/29/95	5.34		21.3	0.101	9.6
4/22/96	5.32	7.1	18.4	0.111	8.5

Worth County: 4-1

Date Sampled	pH (std. units)	Dissolved Oxygen (ppm)	Temp. °C	Specific Conductance (μS)	Depth to ground water
11/29/95	4.52		21.6	0.128	12.5
3/25/96	4.67	7.9	16.8	0.122	5.4
6/5/96	3.94	7.0	19.8	0.166	5.8

Note: A blank square indicates the parameter was not measured due to equipment failure.

Quantity: 100
Cost: $588.00

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