32. a. Describe the internal standards and policies of Utilities and Water Service regarding service reliability and quality of its water utility operations.

b. Provide all written standards or policies related to service quality and reliability of water utility operations.

Responses:

a. WSCK is committed to providing our customers with safe and reliable drinking water that meets or exceeds all state and federal Safe Drinking Water Act rules and regulations. We employ a highly trained, professional staff who hold certifications issued by the Commonwealth of Kentucky and take ownership in daily operations to provide complete customer satisfaction. WSCK is diligent in meeting all local, state and federal regulations.

b. As part of our goals and standards in providing safe and reliable service to our customers and to ensure they are provided with the best possible service, WSCK has the following plans in place. These plans have been reviewed in detail by the Division of Water, Commonwealth of Kentucky Department of Environmental Protection, and were developed in accordance with guidelines established by the State, to ensure the safe and reliable service to our customers while protecting the environment. The following standards or policies are attached.

1) Vulnerability Assessment
2) Emergency Response Plan
3) Water Treatment Plant Preventive Maintenance
4) Leak Detection Program
5) Water Shortage Advisory and Water Shortage Response Plan
6) Supply Contamination Response Plan
7) Contingency Plan (Source Water and Wellhead Protection)
8) Groundwater Protection Plan
9) Best Management Practice

Personal information and information for which the disclosure would have a reasonable likelihood of threatening public safety by exposing vulnerability or preventing, protecting against, mitigating, or responding to a terrorist act have been redacted. This information is not relevant to the case presently before the Commission.

Witness – Steve Lubertozzi

Securing America's Drinking Water

A Report Outlining our Security & Emergency Management Systems

Vulnerability Assessment

Includes

- Contact Information
- Critical Equipment
- Critical Customers
- Redundancy Items
- Security Assessment
- Potential Vulnerabilities
- Existing Countermeasures

Water Service Corporation of Kentucky

Completed By:

James Leonard

606-248-~~5730~~ 1785

~~jamesl@kyaccess.net~~ jrleonard@uiwater.com

February 23, 2004

update May 2011

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Securing America's Drinking Water

A Report Outlining our Security & Emergency Management Systems

Contact Information

System Information

PWS ID: KY0070282
Water Station Name: Water Service Corporation of Kentucky
County Served: Bell
Population: 17400

Contact Name: James Leonard
Address: Po Box 818

City: Middlesboro
State: KY **Zip:** 40965

Phone: 606-248-5730
Fax: 606-248-5736

Emergency Contact Information

Contact Name: James Leonard
Daytime Phone: 606-248-~~5730~~ 1185
Emergency Phone: 276-445[redacted]
Cell Phone: 606-269-[redacted]
Fax Number: 606-248-5736
Emergency Email: [redacted]

Securing America's Drinking Water

A Report Outlining our Security & Emergency Management Systems

Securing America's Drinking Water

A Report Outlining our Security & Emergency Management Systems

Inventory

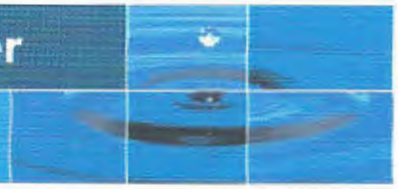
For Water Service Corporation of Kentucky

The inventory listed below itemizes all critical equipment, customers, and redundancy items.

Component	Name / Identification	Description / Location	Priority
Surface Water	[redacted]		Low
Buildings	Raw Water Pump Station [redacted]	[redacted]	Medium
Buildings	Filter Building. Main plant.	Contains filters, chemical treatment process, laboratory, office area, control panels, pipe gallery.Located in main plant on Lake Hill Rd.	Medium
Buildings	Chemical feed & storage building.	Building where chemicals, including polymer, calcium hypochlorite, lime and alum are stored and fed.Located in main plant on Lake Hill Rd.	Medium
Buildings	Flocculator Room Building	This building contains the flocculator motor and a general workshop area.	Low
Buildings	Wood Shed Storage building.	This building is a small wood structure that is used primarily for storage of grass cutting equipment and other misc. items.	Low
Pumps	Raw water pump #1 & #2	[redacted]	High
Pumps	#3 Raw water pump.		Medium
Pumps	3 Low Service Can Pumps.		Medium
Treatment Equipment	Chemical feed pumps / LMI brand.	High pressure variable rate chemical feed pumps used for chemical injection process.	Medium

Securing America's Drinking Water

A Report Outlining our Security & Emergency Management Systems



Inventory

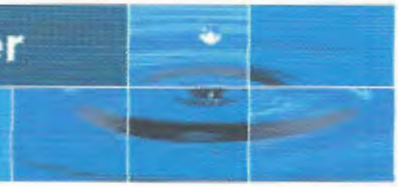
For Water Service Corporation of Kentucky

The inventory listed below itemizes all critical equipment, customers, and redundancy items.

Component	Name / Identification	Description / Location	Priority
Treatment Equipment	Flash Mixer.	10 hp motor mixer used in coagulation process.Located in Chemical Feed Building.	Medium
Treatment Equipment	Mechanical Flocculator	Used in the flocculation process.Located within the Floc Basin under the Chemical Feed Building.	Medium
Treatment Equipment	Settling Basins.	Used for settling particulates out of the water prior to filtration process. Located outside, next to the Chemical Feed Building.	Medium
Treatment Equipment	Rapid Sand Filters	Final process in treatment of water before being chlorinated and pumped to the water storage tanks.Located in the Filter Building.	Medium
Process Controls	Filter Level Control System	Controls rate of flow to filters.Located in the Filter Building.	Medium
Process Controls	Hach in-line turbidity meters	Measures the turbidity of water.Located in Filter Room and Pipe Gallery.	Low
Process Controls	Hach in-line chlorine residual analyzer	Measures the chlorine residual in finished water being pumped to storage tanks.Located on the East wall of the Filter Room.	Medium
Chemicals and Storage	Potassium Permanganate	Oxidizer used in primary treatment of source water.Located in the Raw Water Pump Station	Low
Chemicals and Storage	Calcium Hypochlorite / 50lb pails.	Disinfection purposes in primary treatment.Located in Chemical Feed Building.	Low
Chemicals and Storage	Aluminum Chlorohydrate / 500gal bulk containers	Used in the coagulation process.Located in the Chemical Feed Building.	Medium
Chemicals and Storage	Hydrated Lime	pH adjustment.Located in the Chemical Feed Building.	Low
Chemicals and Storage	Alum / 50lb bags	Used in the coagulation process.Located in the Chemical feed Building.	Low

Securing America's Drinking Water

A Report Outlining our Security & Emergency Management Systems



Inventory

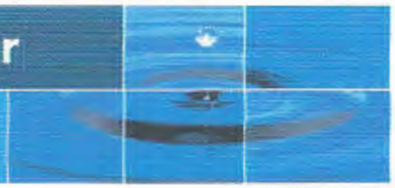
For Water Service Corporation of Kentucky

The inventory listed below itemizes all critical equipment, customers, and redundancy items.

Component	Name / Identification	Description / Location	Priority
Chemicals and Storage	Inorganic phosephate / 50 lb pails.	Sequesters iron and serves as a corrosion inhibitor in the distribution system.Located in the Filter Building	Low
Chemicals and Storage	Hydro-flourosalicic acid / 55 gallon drums	Used for adding flouride to the finished water.Located in the Filter Building.	Low
Chemicals and Storage	12.5% Sodium Hypochlorite solution / 55 gal. drums	Used for the final disinfection process for finished water.Located in the Filter Building.	Medium
Lab Chemicals	Various small quantities of testing reagents used in testing water parametrs.	Tests include; alkalinity, hardness, pH, turbidity, fluoride, chlorine, phosphate, manganese, iron.	Low
Storage Tanks	Two above ground water storage tanks	[redacted]	High
Primary Power	Kentucky Utilities.	The primary supplier of electric power to the region.Located in Pineville, Kentucky.	Low
Pipes	87 miles of distribution watermain.	The watermains range in size from one inch to 24 inches in diameter.Mains are contructed of iron, PVC, andgalvanized steel.All mains run within the city of Middlesboro.	Low
Valves	There are 3,000 valves associated with this water system.	Valve types are primarily gate valves and butterfly valves.Many valves are located in the water treatment plant although a majority are stratigically located throughout the distribution system.	Medium
Appurtenances (e.g. Flush Hydrants)	271 Fire hydrants. / 4 and 6 inch	The hydrants are located throughout the distribution system for effective fire fighting and flushing purposes.	Medium
Other Vulnerable Points	Backflow devices	There are many backflow devices such as Double backflow preventers and Reduced Pressure Zone backflow preventers at all connections that require them.	Medium
Buildings	The Main Office Middlesboro headquarters.	Customer service, operations, accounting, system	Low

Securing America's Drinking Water

A Report Outlining our Security & Emergency Management Systems



Inventory

For Water Service Corporation of Kentucky

The inventory listed below itemizes all critical equipment, customers, and redundancy items.

Component	Name / Identification	Description / Location	Priority
		planning,etc.Located at 1221 East Cumberland Ave.Middlesboro, KY	
Buildings	Filter Building. Main plant.	Contains filters, chemical treatment process, laboratory, office area, control panels, pipe gallery.Located in main plant on Lake Hill Rd.	Medium
Buildings	Chemical feed & storage building.	Building where chemicals, including polymer, calcium hypochlorite, lime and alum are stored and fed.Located in main plant on Lake Hill Rd.	Medium
Buildings	Flocculator Room Building	This building contains the flocculator motor and a general workshop area.	Low
Buildings	Wood Shed Storage building.	This building is a small wood structure that is used primarily for storage of grass cutting equipment and other misc. items.	Low
Computers	Three I-Mac computers.	Used primarily for accounting and customer service purposes.Networks on a closed system.Located in the main Office.	Low
Files	Computer and hardcopy files.	Accounts and customer service. Personnel and operation files. Maps.located in Main Office.	Low
Transportation Work Vehicles	There are eight vehicles assigned to this system.	Two are SUV management vehicles and six are pick-up truck service vehicles.vehicles.Vehicles are assigned to operation personnel on a full-time basis.	Low
Telephones	Water treatment plant phone.	The phone is located in the Filter Building in the office area.	Medium
Telephones	The Main Office phones	Used for customer service and other general communication purposes.	Low
Cell Phones	There are four cell phones asigned to personnel.	Three are asigned to managers and the other is for "On Call" purposes.All cell phones are carried on the person.	Medium
Radio	There is one Base Station radio and	The base station radio is for	Medium

Securing America's Drinking Water

A Report Outlining our Security & Emergency Management Systems

Inventory

For Water Service Corporation of Kentucky

The inventory listed below itemizes all critical equipment, customers, and redundancy items.

Component	Name / Identification	Description / Location	Priority
	several service vehicle radios.	communicating with distribution system personnel and is located at the Main Office. The distribution service vehicles are equipped with service radios.	
Hospitals	Appalachian Regional Hospital	Full service hospital with emergency treatment.3600 WestCumberland Ave.Middlesboro, KY	Medium
Schools	East End Intermediate SchoolWest End Primary SchoolMiddlesboro Middle SchoolMiddlesboro High SchoolGateway Christian SchoolSt. Julian's catholic SchoolChristian Academy day careOld Yellow Creek Elementary SchoolSoutheast Community College	502 Ashebury Ave.3400 West Cumberland Ave.4404 West Cumberland Ave.4404 West cumberland Ave.Binghamtown-North 25th St.116 East Chester Ave.1507 Exeter Ave.West Cumberland Ave.1300 Chichester Ave.	Low
Waste Water Treatment Plants	Middlesboro WWTP	3 mgd treatment plant serving the city of Middlesboro.Located on US#25E, Middlesboro,KY	Low
Food/Beverage Processing Plants	Cumberland Gap ProvisionsCoca-Cola Bottling Company	Meat Processing Plant / S.23rd St.Soft drink Manufacturer/ 1320 East Cumberland Ave.	Medium
Nursing Homes	Middlesboro Health Care FacilityGenerations Center	235 New Wilson Lane504 South 24th Street.	Medium
Prisons and Other Institutions	Middlesboro Group Home	Residence for juvenile boys106 Edgewood Road.	Low
Spare Pumps	Spare Pumps	[redacted]	High
Spare Parts	Spare Parts	Spare parts including pipes, valves, and fittings are warehoused for emergency repairs to the distribution system.	High

Securing America's Drinking Water

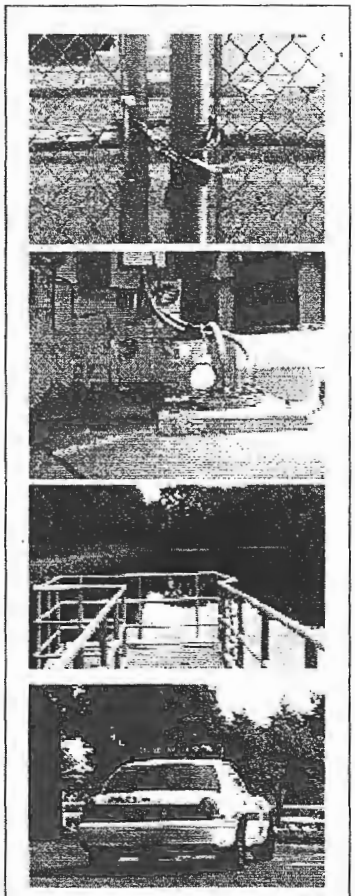
A Report Outlining our Security & Emergency Management Systems

Emergency Response Plan

Based on Our Vulnerability Assessment

Includes

- Emergency Contact Information
- Inventory of Critical Equipment and Customers
- Chain of Command
- Response Procedures, Plans & Actions
- Coordination Activities
- Notification List
- Local Emergency Planning Committee



Water Service Corporation of Kentucky – Middlesboro KY

Completed By:

James Leonard

606-248-5730

~~jamesl@kyaccess.net~~

jr leonard @ wsiwater.com

~~February 23, 2004~~ revised ~~2009~~ May 2011

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Securing America's Drinking Water

A Report Outlining our Security & Emergency Management Systems

Contact Information

System Information

PWS ID: KY0070282
Water Station Name: Water Service Corporation of Kentucky
Town Served: Middlesboro
Population: 17400
Number of Service Connections: 5,800
System Owner: Utilities, Inc.

Person Responsible for Maintaining Contact List

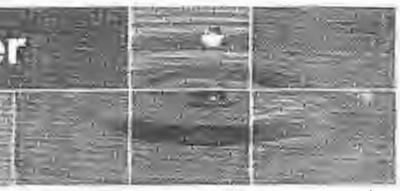
Name: James Leonard
Title: Regional Manager
Phone: 606-248-5730

Telephone and Contact

Contact Name: James Leonard
Daytime Phone: 606-248-5730
Emergency Phone: 276-445[redacted]
Cell Phone: 606-269[redacted]
Fax Number: 606-248-5736
Emergency Email: ~~jamesl@kyaccess.net~~
JRleonard@uiwater.com

Securing America's Drinking Water

A Report Outlining our Security & Emergency Management Systems



Securing America's Drinking Water

A Report Outlining our Security & Emergency Management Systems

Notification List

For Water Service Corporation of Kentucky

Notification / Contact Information

Title	Name	Day Phone	Night Phone	Email
Fire Department	Tim Wilder / Fire Chief	606-248-4683	606-242-2332	No Email Provided
Police Department	Jeff Sharp / Police Chief	606-248-3636	same	No Email Provided
FBI Field Office	Scott Barker / Area Manager	606-878-8922	same	FBI.gov
Emergency Medical Service	Tim Wilder / Fire Chief	606-248-4683	606-242-2332	No Email Provided
Local Health Department	Tim Good / Manager	606-248-7227	606-248-[redacted]	No Email Provided
National Spill Response Center	NRC	800-424-8802	same	EPA.gov
State Spill Hotline	Keith Grubb / DOW	606-878-0157	800-928-2380	No Email Provided
Local Hazmat Team (if any)	Tim Wilder / Fire Chief	606-248-4683	606-242-2332	No Email Provided
Local / Regional Laboratory	Fouser Environmental Serv.	859-873-6211	same	No Email Provided
Water System Operators	Gary mills / Chief Plant Oper	606-248-2306	606-542-[redacted]	gary mills@wsiwater.com No Email Provided
Water System Operators	Greg Bolt	606-499-9137	606-248-[redacted]	gcbolt@wsiwater.com

Securing America's Drinking Water

A Report Outlining our Security & Emergency Management Systems

Notification List

For Water Service Corporation of Kentucky

Local Notification

Title	Name	Day Phone	Night Phone	Email
Government Officials	~~Ben Hickman~~ Bill Kelly / Mayor	606-248-4575	606-248-[redacted]	bellcountyworks.com
Emergency Planning Committee	Tim Radar / Emerg. Dir.	606-337-1012	606-337-[redacted]	No Email Provided
Hospitals	Gene Faile / ARH Admin.	606-242-1100	606-242-[redacted]	No Email Provided
Pharmacy	Kroger Pharmacy	606-248-2093	same	No Email Provided
Nursing Homes	Alice Maddox / Manager	606-248-0925	606-248-[redacted]	No Email Provided
Nursing Homes	Generations / Manager	606-248-1540	same	No Email Provided
Schools	Darryl Wilder / Superint'd.	606-248-5040	606-248-[redacted]	No Email Provided
Schools	Gateway Christian	606-248-6066	same	No Email Provided
Schools	Julian's Catholic School	606-248-2068	same	No Email Provided
Local Hazmat Team (if any)	Tim Wilder / Fire Chief	606-248-4683	606-242-2332	No Email Provided
Local / Regional Laboratory	Fouser Environmental	859-873-6211	same	No Email Provided
Water System Operators	Greg Bolt ~~Dale Russell / Area Mgr.~~	606-[redacted] 999-9137	606-248-[redacted]	gcbolt@uiwater.com
Water System Operators	Gary Mills / Chief Plant Op.	606-248-2306	606-542-[redacted] 549 269	wgmills@uiwater.com

Notification List

For Water Service Corporation of Kentucky

Service / Repair Notification

Title	Name	Day Phone	Night Phone	Email
Electrician	~~John Patterson~~ L&M Electric	606-276-86[redacted] 542	same	No Email Provided
Electric Utility Company	Danny Morrison / Mgr.	800-981-0600	same	No Email Provided
Gas Utility Company	Clyde Russell / Manager	606-248-1845	800-423[redacted]	No Email Provided
Sewer Utility Company	Jim Anderson / Manager	606-248-5240	606-248[redacted]	No Email Provided
Telephone Utility Company	Bell South	800-252-0803	888-423[redacted]	bellsouth.com
Plumber	Paul Price / Owner	423-869-8530	same	No Email Provided
Pump Specialist	Ronnie Eaton / Reynolds	502-585-1241	502-523[redacted]	No Email Provided
"Dig Safe" or Local Equivalent	KY Underground Protecfion	800-752-6007	same	kyunderground.com
Soil Excavator / Backhoe Operator	Bob Green / Owner	606-248-1110	606-248[redacted]	No Email Provided
Power Generator Rentals	Kenneth Wilson / Owner	606-248-2886	606-248[redacted]	No Email Provided
Portable Fencing Rentals	Roy Yonts / Manager	800-274-7207	423-869[redacted]	No Email Provided
Equipment Repairman	Jim Dotson / Owner	606-248-1690	606-248[redacted]	No Email Provided
Bottled Water Service	Doug Michael / Manager	606-248-2660	606-248[redacted]	cocacola.com
Bulk Water Hauler	Doug Michael / Manager	606-248-2660	606-248[redacted]	cocacola.com
Pump Supplier	Allied Pump Rentals	877-987-8677	same	No Email Provided
Pipe Supplier	Jim Baker / Rep.	800-999-2126	606-30[redacted]	No Email Provided
Chemical Supplier	Kathey Switow / Rep.	888-877-1568	865-250[redacted]	No Email Provided

Securing America's Drinking Water

A Report Outlining our Security & Emergency Management Systems

Notification List

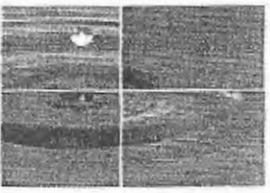
For Water Service Corporation of Kentucky

State Notification

Title	Name	Day Phone	Night Phone	Email
Drinking Water Primary Agency	Keith Grubb / Manager	606-873-0157	800-928-2380	No Email Provided
Dept. of Env. Protection	Donna Marlin / Manager	502-564-2410	800-928-2380	No Email Provided
Department of Health	Tim Good / Manager	606-248-7227	606-337[redacted]	No Email Provided
Emergency Mgmt. Agency	~~Tim Radar~~ Paul Gibson / Director	606-337[redacted]	606-337[redacted]	No Email Provided

Securing America's Drinking Water

A Report Outlining our Security & Emergency Management Systems



Notification List

For Water Service Corporation of Kentucky

Media Notification

Title	Name	Day Phone	Night Phone	Email
Water System Spokesperson	James Leonard / Reg Mgr	606-248-5730	276-445[redacted]	jrleonard@uiwater.com
Newpaper - Local	Pat Cheek / Daily News	606-248-1010	276-861[redacted]	dailynews@wwgap.net
Newspaper - Regional / State	Lexington-Herald Leader	800-950-6397	859-231-3200	hietyregion@heraldleader.com
Radio	William Bingham / WMIK	606-248-5842	606-248[redacted]	No Email Provided
Radio	WFXY	606-248-1530	606-248-1574	No Email Provided
Radio	WXJB	606-248-0001	423-869-2266	No Email Provided
Television	WBIR / Knoxville, TN	865-637-1010	865-637-1272	WBIR.com
Television	WYMT / Middlesboro/Hazard	606-248-5702	606-248-5757	No Email Provided
Television	WTVQ / Lexington, KY	859-299-3636	same	WTVQ.com

Securing America's Drinking Water

A Report Outlining our Security & Emergency Management Systems

Notification List

For Water Service Corporation of Kentucky

Employees Notification

Title	Name	Day Phone	Night Phone	Email
Regional Manager	James Leonard	606-248-5730	276-445[redacted]	jrleonard@uiwater.com ~~jamesl@kyaccess.net~~
Chief Water Plant Operator	Gary Mills	606-248-2306	606 269 [redacted] 606-542-[redacted]	No Email Provided
Distribution Operator	Greg Bolt	606-269-1508	606-248[redacted]	No Email Provided
Distribution Operator	Mike Partin	606-248-5730	423-869[redacted]	No Email Provided
Water Plant Operator	Mike Partin	499-[redacted]	606-248[redacted]	No Email Provided
Water Plant Operator	Harvey Johnson	606-248-2306	606-248[redacted]	No Email Provided
~~Office Manager~~	~~Reba Standifer~~	~~606-248-5730~~	~~606-2~~[redacted]	~~No Email Provided~~
~~Customer Service Rep.~~	~~Renee McIntyre~~	~~606-248-5730~~	~~606-499-7074~~	~~No Email Provided~~
Meter Reader	Bryan Sandefur	606-248-5730	606-499-[redacted]	No Email Provided
Meter Reader	James Onkst	606-248-5730	606-248[redacted]	No Email Provided

Securing America's Drinking Water

A Report Outlining our Security & Emergency Management Systems

Chain of Command

For Water Service Corporation of Kentucky

Internal Chain of Command

Order	Name	Day Phone	Night Phone	Email
1	James Leonard	606-248-5730	276-445[redacted]	jr leonard@uiwater.com ~~jamesl@kyaccess.net~~
2	Greg Bolt	606-499-9137	606-248[redacted]	gcbolt@uiwater.com
3	Gary Mills	606-248-2306	606-542-[redacted]	wgmills@uiwato.com
4	Mike Partin	606-499-9149	606 869-[redacted]	mwpartin@uiwater.com
5	James Onkst	606-248-5730	606-248[redacted]	jhonskt@uiwater.com
6	Bryan Sandefur	606-499-9169	423-869[redacted]	bksandefur@uiwater.com
7	Steve Vaugh	606-269-1533	606-499-[redacted]	srvaughn@uiwater.com.
8	Harvey Johnson	606-499-9192	same	hhjohnson@uiwater.com

FERN LAKE, LOW WATER

EMERGENCY PLAN

MIDDLESBORO, KENTUCKY

LAKE OPTIONS

AND

GROUND WATER SUPPLIES IN THE AREA

Middlesboro Water System

Emergency Response Plan

FOR

Fern Lake Low Water Lever

This plan is in response to the request of Frank Hammond, the Acting Director of the London, Ky Division of Water Office.

Question : What would happen if the lake level dropped below the raw water Pump intakes?

GENERAL INFORMATION,

Measured from the pump base plate down to the intake on the east raw water pump, the distance is 17 ft & 5 inches. The West pump length is 17 ft & 8 inches. The depth from the east raw pump base plate to the lake bottom is 23 ft & 3 inches. This is a length of 5 ft & 10 inches from the east pump intake, down to the lake bottom.

An air gauge water level measurement system has been install in the lake, by the raw water pumps. This unit will measure the water level over the bottom of the pump intakes.

A quick review of this problem could indicate;

Increasing the length of the pump column. The amount to be added should be 2.0 feet, leaving 3 ft & 10 inches down to the lake bottom. If the pump intake caused the silt to be drawn into the pump it could cause high raw water turbidity and treatment problems at the plant. The cost for adding 2.0 feet to one (1) pump column is $ 4,200.00, this breaks down as $1,470.00 for the materials and $2,730.00 for labor & crane to do the work.

During the first nine (9) days of September 1999, Fern Lake was dropping ¾ of an inch per day. At this rate, the added 24 inches of pump column would provide 32 days for the water level to drop to the bottom of the pump intake. **Actually** the pump would vortex and suck air with 12 inches of water above the intake! So, this option should be ruled out due to cost and no benefits. From 9-3-99 to 10-4-99 or 31 days the lake level drop 17 & ¼ inches. This averages 0.56 inches per day.

Another solution would be to place a submergible pump (at 1,600 g/m) on pontoons on the lake. This pump would have a flexible floating water supply line and electrical power supply from the junction box, on the existing starter control panels. Make changes in the existing raw water pump discharge lines, (install a 10" valve and tee).The TDH on the existing pumps are 243 feet.

If the submergible pump was sized for 268 feet TDH, the pump could supply the water plant without double pumping. The cost for this type pump is $14,037.00. This does not include the piping from the pump to the raw water line or the pontoon platform to hold the pump and anchor system. The total cost is estimated at $20,000.00.!

ALTERNATE SOURCE OF SUPPLIES

An alternate source of water supply in the area is the ground water flowing from under the Cumberland Gap Tunnel. The tunnel operators have a meter on this discharge flow, the average daily flow is 600,000 gallons. With a 416 gal/min pump in a pit at the end of this discharge line, it would be possible to pump this water into Fern Lake. Water quality testing has shown this to be about the same water quality as Fern Lake. From the end of the discharge line to the lake is approximately 5,280 ft.

The cost for:

Electrical supply, pit, pump, discharge line and meter is estimated at: $20,000.00.

The major question is:

Water Service Corporation of Kentucky buys the water from Fern Lake Utility, would they allow this tunnel water to be pumped into the lake. Would they deduct this amount from the cost each month? The average monthly flow into Fern Lake would be 18,250,000 gallons.

The second (2^{nd}) alternate source of water is the water line from Cudjo Cave and Spring that runs to the old Middlesboro Tannery, which is now closed.
This line crosses under the road to the overlook. A new line connected to this line would have to be approximately 5,280 feet long to connect the tunnel pump box. Due to the elevation of this line, no pumping would be required. At present no flow rate is known, the Tannery allowed a two (2) inch line to run 24 hours per day.

A third (3rd) option, could be placing a two (2) foot high rubber dam across the spillway, in case of rain the dam would hold back extra water that would normally be lost.

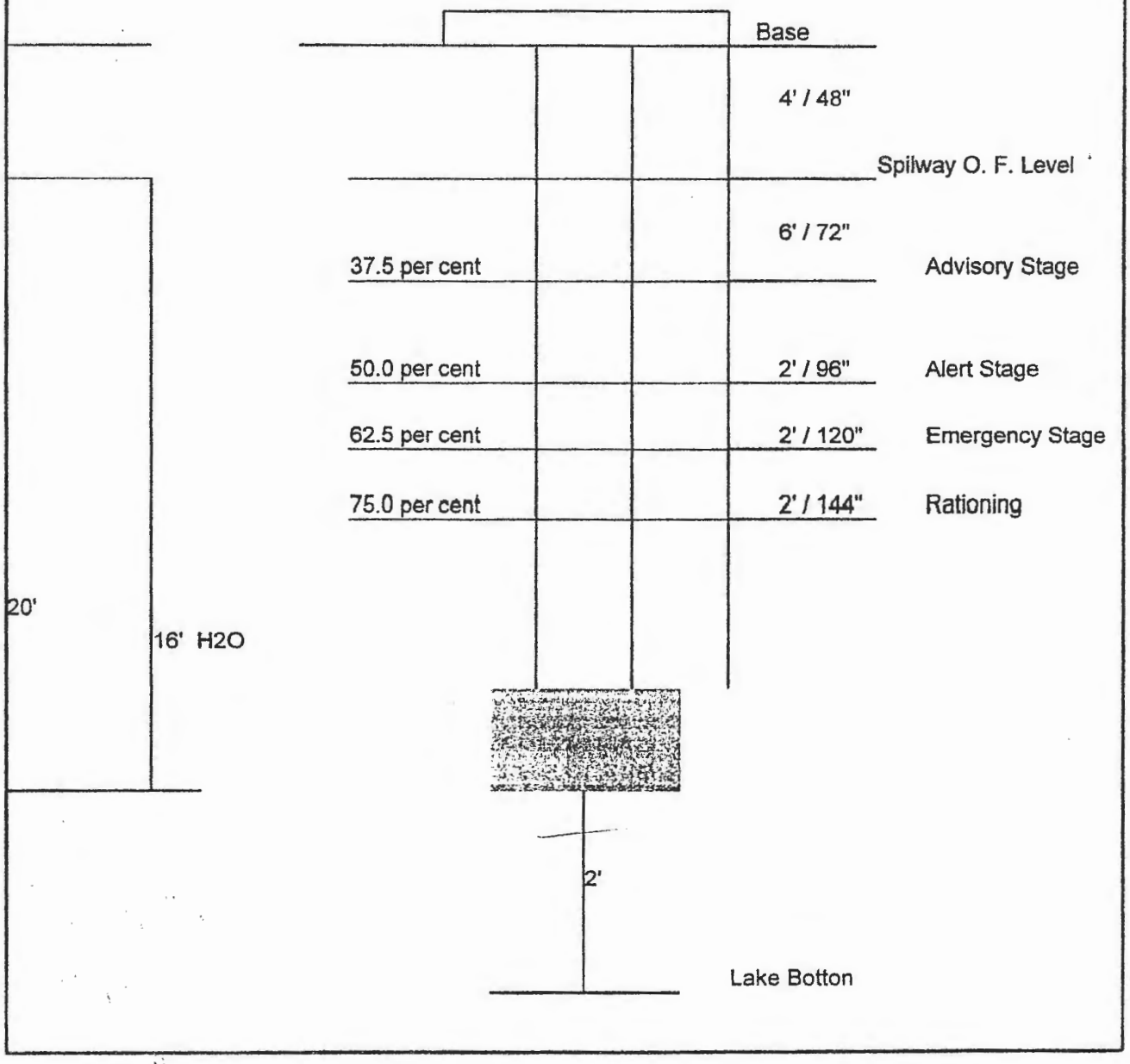
A fourth (4th) option, could be to do a geological survey of the area within the water plants grounds to see if drilling wells were possible.

FERN LAKE

Date	Rainfall	Lake Dropped
Jan. 2000	2.75" – 6.5" snow	23" filling up
Feb. 2000	2.8" - .5" snow	34" filling up
March 2000	4.75"	Lake overflowing
April 2000	5.57"	Lake overflowing
May 2000	3.5"	Lake overflowing
June 2000	3.3"	4" dropped
July 2000	3.15"	11" dropped
August 2000	3.85"	11.5" dropped
Sept. 2000	1.3"	16.5" dropped
Oct. 2000	.8"	16.5" dropped
Nov. 2000	8"	12" dropped
Dec. 2000	5.10" – 6.75" snow	3" filling up
Jan. 2001	5.5"	37.5" filling up
Feb. 2001	8.6"	43" filling up
March 2001	3.6"	Lake overflowing
April 2001	3.75"	Lake overflowing
May 2001	3.10"	Lake overflowing
June 2001	3.85"	Lake overflowing
July 2001	6.8"	5" dropped
August 2001	2.7"	12.5" dropped
Sept. 2001	3.3"	11.5" dropped
Oct. 2001	2.45"	16" dropped
Nov. 2001	2.55"	12.5" dropped
Dec. 2001	3.6"	21.5" filling up
Jan. 2002	7.15" – 4" snow	Lake overflowing
Feb. 2002	1.9"	Lake overflowing
March 2002	10"	Lake overflowing
April 2002	1.95"	Lake overflowing
May 2002	3.15"	Lake overflowing
June 2002	3.4"	Lake overflowing
July 2002	3.8"	13.5" dropped
August 2002	2.9"	26.5" dropped
Sept. 2002	5.1"	12" dropped
Oct.2002	3.5"	12" dropped
Nov. 2002	6.45"	58" filling up
Dec. 2002	8.65"	Lake overflowing

APPENDIX B

FERN LAKE EAST PUMP



WSCK

CLINTON

WATER TREATMENT PLANT

PREVENTIVE

MAINTENANCE PROGRAM

Water Service Corporation of Kentucky
Clinton, Kentucky

Wells (1 and 2)

- Visual inspection daily for leaks or vibration.
- Each pump is oiled weekly
- Cleaned and painted as needed
- Gates are chained and locked
- All security signs are posted

Water treatment plant

- Plant is checked daily
- High service pumps checked daily for leaks and vibration
- High service pumps greased annually
- Chlorine chemical room checked daily. 2 stenner pumps with #2 tubes that are replaced as needed. Spare parts on hand. Chemicals are delivered monthly.
- Fluoride room checked daily. 2 stenner pumps with # 1 tubes that are replaced as needed. Spare parts on hand. Chemicals are delivered monthly.
- Hach PH meter calibrated weekly – replace probe annually
- DR/2000 spectrophotometer calibrated quarterly. Hach tech calibrates annually.
- CL17 cleaned and calibrated monthly. Reagents replaced monthly. Charts are replaced every Monday.
- 24 hour pressure chart is changed daily.
- 6 inch mag meter tested annually
- Generator is automatically tested under load every Monday @ 9.00 for 30 minutes. Generator is serviced 2 times a year thru a service contract agreement.
- 60,000 Gal. Clear well is inspected every 6 months.
- Overflow and drain screens are inspected every 6 months.
- 600 gpm aerator is inspected and cleaned every 6 months.
- Repairs on any electrical controls shall be performed by qualified electrician only.

House keeping

- Water plant is cleaned weekly.
- Grounds are maintained as needed.
- Building is painted as needed.
- Floors are painted as needed.
- Return air filter is changed monthly.

Security

- All doors are kept locked at all times.
- All gates are chained and locked.
- All outside electrical boxes are locked at all times.
- Plant is patrolled several times a day at different times.
- All batteries are changed every 6 months (when time changes)

General preventive maintenance

- Every valve in the plant should be operated on a monthly basis.
- Any maintenance such as leaking valves, leaking packing, or hard turning valves should be dealt with in a timely fashion.

W S C K

MIDDLESBORO

WATER TREATMENT PLANT

PREVENTIVE

MAINTENANCE PROGRAM

WATER SERVICE CORPORATION OF KENTUCKY
MIDDLESBORO, KENTUCKY

WATER TREATMENT PLANT PREVENTIVE MAINTENANCE PROGRAM

RAW WATER PUMP STATION:

Raw Water Pump No 1 and No II:

Visual Inspection Daily for Leaks and Vibration.
Each pump greased - Semi Annually.
Each Motor oil changed - Annually.
Cleaned or painted - whenever necessary.
Potassium Permanganate Feed Station.
M-Series LMI Pump.
Visually inspected daily.
Flush the assembly with warm water weekly.
Mixer motors oiled Quarterly.
Calibrated - Weekly

Safety Equipment:

All eyewash stations flushed - Weekly and Recorded.
Rubber Gloves, Aprons, Goggles, First Aid Kits, Lock Out Tag Out Station, etc are looked at - monthly.

Housekeeping:

For the complete water plant area inside and out, the Facility should be kept as if it were an Inspection every day.
Do not allow junk to accumulate. Remove all discarded material and equipment from the plant.
Keep lawn neatly trimmed and grounds clean.
Keep paint on hand to touch up rust spots and to keep all facilities labeled.

Laboratory:

Hach 2100 N Turbidimeter - Calibration quarterly, check every 30 days.
Hach Sension 378 PH. Meter - Calibrated Weekly - Replace Probe Annually.
DR/5000 Spectrophotometer - Calibrated quarterly.
1-Liter Distillery - cleaned quarterly.
Computer - Weekly maintenance - Wizard Set up.
Reagent & Laboratory chemicals ordered as needed.

Filter Room:

Two 348sq. ft. dual Media Filters - Sand and Anthracite.
Filter Maintenance requires Filter Inspection - Filter Self-Assessment (See Attached)
Backwash of filters will be justified by the Operator on Head Loss, Time, or Turbidity.

On Line Filter Turbidimeters:

There are two 1720C Turbidimeter units - One on each filter and a 1720E on the combined filters.
Both Turb Units are to be calibrated every 90 days and checked monthly as EPA requires.

Emergency Low Level Tank System:

If water tank's drop to half of it's capacity - A pressure Transducer activates an Auto Dialer to call Five Operators. This will be tested every 90 days.

Panametrics Ultrasonic Flowmeter - DF 868:

This flow meter will be Tested Annually by a Representative from the Manufacture and Results be on hand for PSC and DOW Inspections.
This Dual Channel Flowmeter measures water entering the clear wells, and also the backwash water.

CL17 Chlorine Analyzer:

This Chlorine Monitors the water entering the Distribution System.
The CL17 is to be cleaned and calibrated monthly.
Reagents are changed monthly.

Electrical Problems:

Power outage - Contact Kentucky Utilities.
All electrical problems will be handled, as soon as possible, by WSCK Employees or L & M Electric.

Fluoride and Phosphate Room:

Drums of Fluoride and Pails of Phosphate are to be washed and cleaned upon receiving from Vendor before entering the building.
Calibration of Phosphate Pump - monthly.
Fluoride pump - checked daily - on scales.
Fluoride day tank is vented to the outside atmosphere.
Check vent quarterly for free air flow passage ways.
Spare part kits are on hand always.

Sodium Hypochlorite Room:

Day tanks are on scales and vented to the outside atmosphere.
Check vent quarterly for free air flow passage ways.
LMI feed pump is calibrated daily.
Spare part kits are on hand always.

APS Alarm Security System:

System armed daily when Operator departs the premises.
Disarmed upon arrival.
APS Security runs test on system quarterly.
Main control panel alerts Operators of low Batteries.

Pipe Gallery:

Water plant 3" ~~Metron~~ Badger Meter - read daily - usage for plant.
Meter Tested - Every Two years.

4" Watts 709 Double Check Valve Assembly - Tested Annually.

Three 20 h.p. low service pumps. A.B.C.
Visually check packing - weekly.
Grease - Semi Annually.
Inspect check valves on Filter Pumps for leaking - weekly.
Pumps are in a Rotation - monthly.
A.B.C. Only two pumps used at one time.

Air Compressor:

Back up compressor – change oil - semi-annually.
Check belts, valves, etc. - semi-annually.

Variable Speed Pump:

Greased - semi annually.
Adjust flow pressure - semi annually.

Constant Speed Pump:

Greased - semi annually.
Used for back up for variable speed pump.

Dehumidifiers:

Clean - annually.
Check operation of units weekly.

Injection Points of Phosphate:
Checked daily.

Injection of Fluoride:
Check daily.

Injection Point of Sodium Hypochlorite:
Check Daily.

Air Dryer:
Cleaned Annually.

Actuators:
Actuators on all valves are operated twice weekly.
Note all problems with any valve or actuators.
Contact Supervisor immediately.
Visual Inspection of Air System connected to actuators.

Sump Pump:
Visually inspect daily.

Lighting:
Change bulbs whenever necessary.

Chemical Feed Building - First Floor:
EC-475 - Day tank on scales for proper calibration of LMI feed pump - daily.
Clean foot valve assembly - monthly.
Inspect for leaks - daily.

Alum & Lime Feeder:
Augers, belts, gear boxes, oil level on motors, mixer motors on solution tanks are to be checked monthly.
Solution tanks are to be drained and cleaned - annually.
Discharge pipes to be cleaned - semi-annually.

Calcium Hypochlorite Feed System:
Flowmeter - operated daily.
Hopper on scales checked daily for accuracy.
Hopper to be emptied and cleaned - semi-annually.
Gaskets on discharge line changed - semi-annually.

P.A.C. Feed System
Check Gauges Daily
Clean Hopper Annually
Grease Annually
Heater check daily when in use

Air Compressor:

Change oil - monthly.
Drain excess water from tank - bi-weekly.
Grease - semi-annually.

Chemical Building second floor:

Chemical storage to be kept neat and clean at all times.
Check hoppers for enough chemical for extra shift.
Inspect bulk polymer tanks for volume - weekly.

Flocculator Room:

Hydraulic flocculator system:
Check oil in tank - weekly.
Grease fittings on control arms - monthly.
Motor on Hydraulic Pump System - Grease semi-annually.
Change fluid & filter every two years.
Keep work bench area clean and free of tools, spare parts, oil, grease, etc.

Floc Basin:

All maintenance on submerged Parts performed 2 times a year. New Flocculator installed 11-26-04 See Attach ment Next Pages

Drain & Wash down - monthly.
Raw Water valve inspected - monthly.
Drain valve inspected - monthly.
Polymer injection point inspected - monthly.
Each swing gate inspected for loose paddles or missing bolts - monthly.
All weld joints inspected for fractures in steel - monthly.
Pull & push arms - inspected for broken bolts or fractures in steel - monthly.

Settling Basins:

Drain below tube settlers and wash - weekly.
Drain Basin No 1 & No II - empty every four to six weeks.

Two 1.2 Million Gallon Storage Tanks:

Inspect - monthly.
Foundation Settlement.
Concrete Condition.
Is soil around tank site saturated with water.
Is soil eroded from around tank over flow.

Paint Condition:

Top, Shell, Bottom, Hatch, Vent, Overflow, Ladder, and Safety Harness.

Drain and Inspect Tanks thoroughly every five years.

Sludge Lagoons behind Water Treatment Plant:

Two Horse power submersible pumps.
Check motor chamber oil level and oil for contamination (#10 Non-Detergent) - annually.
Inspect for wear and cloggage - annually.
Move sludge - monthly to area farm ponds.

Farm Pond South Side of Plant:

Have sludge dipped or pumped - annually.

General Preventive Maintenance:

Every valve in the plant should be operated at lease once a month.
Any maintenance such as packing leakage or hard turning should be attended to within two days of discovery.

Study, thoroughly, lubricating instructions on all equipment and follow the recommended schedule.

All indicating gauges should be viewed daily to find unusual readings.
Unusual readings may indicate pump cloggage, open check valve or draining down of basin.
The need to clean a gauge pipe connection or recalibrate a gauge may also appear as unusual readings.
All pump gauges should be cut off except when reading to prevent unnecessary wear and recalibration.

Personal hygiene is also an important procedure in a water treatment plant. Always wash hands after contact with chemicals, etc., and especially before eating. Use a good disinfectant, bactericidal soap. Always clean cuts and apply an anti-bacterial ointment as soon as possible.

Keep all equipment shop drawings and operating instructions on file at the water plant office for ready reference.

Check all motors daily for evidence of excessive heating.

Check starters and switches monthly for burnt and corroded points and parts and preorder replacements.

All recording charts should be checked for any unusual indications. Recording meters and gauges should be changed at the same hour, dated and integrator totals written on the chart daily.

Water Service Corporation of Kentucky Leak Detection Program

- Leak Survey Tools
- Monitor Daily Pumping (Read Meter Daily) Investigate High Pumping/Test meters as PSC requirements
- Purchase Water (Read Master Meter Daily) Investigate High Usage/ Test meters as PSC requirements
- Water Loss Report (Statistical Report) Water sold vs. Water Pumped or Purchased
- Operate Water Treatment Plant and pump stations to eliminate Tank Overflows
- Have local Fire dept monitor water used for fires, training, etc.
- Meter all "Bulk Loading Stations" Read meters monthly
- Use WSCK Fire Hydrant meter and Backflow Prevention Device for any water usage on any Fire Hydrant or Flush Hydrant
- Take readings from Plant meter or Master meter when Flushing Fire Hydrant, (Have accurate numbers after completion of system flushing)
- Read Water Meters same time each month
- Have adequate Inventory for Distribution System Repairs
- If water loss exceeds 10% Begin Patrolling the Distribution system or Service area
- Look and Listen for water in ditches, swamps, creeks crossings, etc.
- Educate the customer on notification to Water Service Corp of KY if leaks are spotted or Fire Hydrants have been opened and continue to flow.
- Use (Heath Aqua Scope) listening device on Fire Hydrants and Meter Services. Listen in one service area or subdivision before moving on to other areas. In heavy traffic areas, Leak Survey may continue in night time hours. (When traffic noise is at a minimum)
- Have two Operators at all times when working in area's where traffic is in operation. Employee's wear proper Personal Protective Equipment (PPE) when working around traffic. Reflective Vest, etc.

Components of a Water Loss Prevention Plan

KY Rural Water

By Barry Back, Circuit Rider

WaterProof - Summer 2006

How do the terms "water loss" and "weight gain" relate? Can it be that apathy, procrastination, or plain idleness might apply to both situations? Definitely, good intentions abound with either problem. No one wants to be overweight just as no one who is responsible for the management and operation of a water utility wants to have excessive water loss. How do we attack these problems? In either case, we must identify the root of the problem, focus on a solution and stick with it! How many times have we heard the phrase, "If you fail to plan you plan to fail?" A good plan is the key to any long-term solution.

A person's physical and psychological make-up has a huge impact when attempting to solve the weight problem. Heredity affects us in many ways, but especially in regards to our ability to lose weight. What about the person who accepted the position of manager and soon learned that they had inherited an inadequately operated water system?

Age is another common factor in both problems. A water distribution that was installed in the WPA days of the 1930s will most likely experience problems that newly installed water lines will not possess. The older that I get, the harder it is to keep the weight off! We can list other analogies such as our body shapes and sizes compared to the geographical terrain of our utilities and our distribution system sizes. However, let's get going with a proactive approach to the problem of water loss.

Accurate records are vital to any water loss prevention plan. How do we know the status of our water loss if we do not keep records? There is a water loss template that is available for download from the Kentucky Rural Water Association website (**www.krwa.org**). This Excel spreadsheet, or a similar record keeping system, can be utilized in a preliminary water audit. The initial step in water loss prevention is the water loss calculation. Secondly, we must locate and eliminate all water leaks. Sounds easy, doesn't it?

The following steps can be utilized to prevent or reduce water loss and should be incorporated into a water loss prevention plan:

1. Read the master meters daily and at the same time each day. At a minimum, they should be read Monday through Friday. This will minimize water loss due to a large leak that can go undetected for a week or month.
2. Read all meters in the distribution system within a 3 to 5 day window. When the meters are read over a two-week period, this will cause fluctuations of monthly water loss numbers. However, these numbers will average out over a year's period of time.
3. Divide the distribution system into zones or sub-sections where possible and calculate water loss for each zone. This will allow for the prioritizing of work based upon the severity of the problem in a particular zone.
4. Utilize computer billing software to generate water loss reports for sections or zones as well as generating an overall water loss report.
5. Install by-pass monitor meters as needed to isolate lines with potential leaks. A 5/8 x 3/4-inch meter will suffice for each 100-customer section of line.
6. Install a two-inch by-pass monitor meter at water storage tanks to isolate sections of line with potential leaks during the night (1:00 a.m. - 4:00 a.m.).
7. Utilize pressure recordings to detect fluctuating pressures and abnormally low or high pressures in distribution system lines.
8. Test and change-out all meters according to Kentucky Public Service Commission (PSC) regulations. PSC regulations require residential meters to be tested and changed-out on a ten-year interval. Four-inch and larger meters are to be tested annually.
9. It may be feasible to hire a part-time operator to utilize leak detection equipment to search for leaks. A portion of the distribution system could be covered each month.
10. Identify sections of pipe in the distribution system with the most frequent line breaks. Budgeting for infrastructure replacement is imperative in any water utility.
11. Having a main transmission line from the master meter to a water storage tank will reduce pressure fluctuations in the distribution system and result in fewer line breaks.
12. Provide the necessary resources for manpower and equipment to properly maintain the distribution system appurtenances such as gate valves, pressure reducing valves, and hydrants.

Today's advanced technology can certainly enhance our water loss prevention plan. Computers not only utilize software for spreadsheets to calculate water loss expediently but can be used in a variety of ways to identify areas of the distribution system with potential leaks. Both master meters and customer meters can be read by satellites or other automated meter reading mechanisms. Telemetry/SCADA systems operated with computers can produce trend charts for water flows, water pressures and water levels in storage tanks. This kind of data is valuable in determining where leaks are or are not prevalent. Computers analyze hydraulic data to determine if theoretical and actual water flows and water pressures in the distribution system match. Computerized maps with GPS and GIS data are beneficial when used properly. A water utility's budget is the major limiting factor as to why technology is not used more frequently.

By industry standards, more than 15% water loss in a rural system is unacceptable. Probably, no one realizes this more than the managers of water districts, water associations, and investor-owned utilities under the jurisdiction of the Kentucky Public Service Commission. Just as we should be concerned with our health due to being overweight, the PSC is concerned with the financial health and well-being of water utilities under their jurisdiction in Kentucky. PSC inspectors routinely discuss water loss during their inspections. When a water system exceeds 15% water loss on their annual report to the PSC, a deficiency is issued. Numerous water systems' response to the PSC's Deficiency Tracking Reports (DTR) has been deemed unacceptable by PSC. A common request from PSC to the water system with a deficiency due to water loss is for a water loss control plan. A good water loss control plan should include the above-mentioned components with a time frame to implement the improvements and follow-up evaluations to measure the success of the plan.

Whether we are weighing in or wading in, we should always do so with a goal in mind. We cannot continue to ignore our problem and hope it resolves itself. Just as there are various diets to control an individual's weight, there are various methods for controlling water loss.

Let's start implementing all of our good intentions!

WATER SHORTAGE RESPONSE PLAN

WATER SERVICE CORPORATION OF KENTUCKY

MIDDLESBORO, KENTUCKY

SECTION 1 **PURPOSE**: The purpose of this plan is to provide for the declaration official phases of water supply shortages and the implementation of voluntary and mandatory water conservation measures throughout the water system operated by Water Service Corporation of Kentucky, (hereinafter referred to as the Company), in the event a shortage is declared.

Section 2 **Definitions**: These terms are applicable only for this plan unless specifically noted.

(a) "Customer" shall mean any person or entity using water for any purpose from the Company water distribution system and for which either a regular charge is made or, in the case of bulk sales, a cash charge is made a the site of delivery.

(b) " Raw Water Supplies" shall mean all water potentially available to persons in the Company water distribution system.

(c) " Treated Water" shall mean water that has been introduced by the Company into its water distribution system, including water offered for sale. Use of treated water are classified as follows:

(CLASS 1) Essential Water Uses

The following uses of water, listed by site or user type, are essential:

Domestic

Water necessary to sustain human life and the lives of domestic pets, and to Maintain minimum standards of hygiene and sanitation

Health Care Facilities

Patient care and rehabilitation, including related filling and operation of Swimming pools

Water Hauling

Sale of domestic use where not reasonably available elsewhere

Public Use

Firefighting, health and public protection purposes, if specifically approved by health officials

(CLASS 2) Socially or Economically Important Uses

The following uses of water, listed by site or user type, are socially or economically important:

Domestic

Personal, in-house water use including kitchen, bathroom and laundry

Water Hauling

Non-Domestic, when other sources are not reasonably available elsewhere

Commercial and Civic Use

Commercial car and truck washes

Laundromats

Restaurants, clubs and eating places

Schools, churches, motels/hotels and similar commercial establishments

Outdoor Non-Commercial Watering

Minimal watering of vegetable gardens

Minimal watering of trees where necessary to preserve them

Outdoor Commercial or Public Watering (using conservation methods and when other sources of water are not available or feasible to use)

Agricultural irrigation for the production of food and fiber or the maintenance of livestock

Watering by arboretums and public gardens of national, state, regional or community significance where necessary to preserve specimens

Watering by commercial nurseries at a minimum level necessary to maintain stock

Watering at a minimum rate necessary to establish or maintain vegetation or landscape plantings required pursuant to law or regulation

Watering of woody plants where necessary to preserve them

Minimal watering of golf course greens

Recreational

Operation of municipal swimming pools and residential pools that serve more than 25 dwelling units

Air Conditioning

Refilling for startup at the beginning of the cooling season

Makeup of water during the cooling season

Refilling specifically approved by health officials where the system has been drained for health protection or repair service

(CLASS 3) Non-Essential Uses

Any waste or water, as defined herein, is not-essential. The following uses of water, listed by site or user type, are non-essential:

Public Use

Use of fire hydrants (excluding Class 1 and Class 2 used), including uses of sprinkler caps, testing fire apparatus and fire department drills

Flushing of sewers and hydrants except as needed to ensure public health and safety as approved by health officials

Commercial and Civic Use

Serving water in restaurants, clubs, or eating places, except by customer request

Failure to repair a controllable leak

Increasing water levels in scenic and recreational ponds and lakes, except for the minimum amount required to support fish and wildlife

Ornamental Purposes

Fountains, reflecting pools and artificial waterfalls

Outdoor Non-Commercial Watering

Use of water for dirt control or compacting

Watering of annual or non-woody plants, lawns, parks, golf course fairways, playing fields and other recreational areas

Washing sidewalks, walkways, driveways, parking lots, tennis courts and other hard-surface areas

Washing down buildings or structures for purposes other than immediate fire protection

Flushing gutters or permitting water to run or accumulate in any gutter or street

Outdoor Commercial or Public Watering

Expanding nursery facilities, placing new irrigated agricultural land in production, or planting of landscaping except when required by a site design review process

Use of water for dirt control or compacting

Watering of lawns, parks, golf courses fairways, playing fields and other recreational areas

Washing sidewalks, walkways, driveways, parking lots, tennis courts or other hard-surface areas

Washing down buildings or structures for purposed other than immediate fire protection

Flushing gutters or permitting water to run or accumulate in any gutter or street

Recreational uses other than those specified in Class 2

Non-commercial washing of motor and other vehicles

Air Conditioning (see also Class 2 purposes):

Refilling cooling towers after draining

(d) "Base Entitlement" shall mean, the monthly usage for a customer during the same month of the preceding calendar year, or the average per customer usage for each class of service during the same month of the preceding year.

(e) "Curtailed entitlement" shall mean the monthly usage for a customer after any curtailment percentage has been applied.

(f) "Curtailment" shall mean the reduction in entitlement by some percentage to meet anticipated water shortages.

(g) **Water Shortage Response Phases:**

Raw H_2O Pump #1 FT+ins. to First Pump

2FT From bottom of Pump Stage NOI

Any Time Small Inside pump is Running

"Advisory" shall mean that conditions exist which indicate the potential for serious raw or treated water supply shortages

"Alert" shall mean the raw or treated water supplies are consistently below seasonal averages, and if they continue to decline, may not be adequate to meet normal needs

"Emergency" shall mean that raw or treated water supplies are below the level necessary to meet normal needs and that serious shortages exist in the area

"Rationing" shall mean that procedures must be established to provide for the equitable distribution of critically-limited raw or treated water supplies, in order to balance demand and limited available supplies, and to assure that sufficient water is available to preserve public health and safety

Section 3 **Applicability:**

The provisions of this plan shall apply to all retail and wholesale customers of The Company. When implemented, this plan becomes Water Service Corporation of Kentucky water shortage response regulation.

Section 4 **Entitlements:**

Entitlements shall be established for each customer by adjusting the base Entitlement to reflect any known change in usage pattern.

Section 5 **Determination of Water Shortage:**

As the Company buys all of its Raw Water from the Fern Lake Company, they Should have input into this Water Shortage Plan.

Water supply and usage shall be monitored on a continuous basis. Unrestricted demand shall be projected from past records and adjusted for changes such as new developments and weather conditions on a regular basis. (NOTE: A sample calculation page is attached as Appendix A to assist in determining overall water levels. It is important that accurate water measurements be used). Water shortages generally occur for two reasons, a reduction in available supplies or a system failure. Each of these has a distinct influence On the nature and duration of the conservation program implemented. Official declaration of a water shortage stage and implementation of the measures necessary to curtail water shall be approved by the Company, the City of Middlesboro and the Bell County Fiscal Court. Because part of the water system is in Bell County.

Section 6 **Term of Water Shortage Declaration:**

Any Water Shortage declaration shall remain in effect until water supplies of Service conditions have returned to normal. A final determination as to Terminating a water shortage declaration shall be made by the Company, The City of Middlesboro and the Bell County Fiscal Court.

Section 7 **Water Shortage Stage, Criteria, Conservation and Curtailment Measures:**

A. Advisory Stage

(1) Criteria: A water advisory shall be declared when the amount of treated water or raw water available for treatment is projected to be up to TEN (10) percent below demand, or there are periods of low water pressure in one or more areas of the distribution system due to system failure, or inadequacies for the area from which Company draws water. This area is Fern Lake Company

(2) Conservation and Curtailment Measures:

(a) Declare a Water Shortage Advisory

(b) Provide proper notice to all customers and to all local news media

(c) Eliminate all water leaks

(d) Request voluntary conservation of all non-essential (Class 3) water use

(e) Request wholesale customers issue request for voluntary conservation by their customers of all not-essential (Class 3) water use

B. Alert Stage

(1) Criteria: A water alert shall be declared when the amount of treated water available is projected to be up to TEN (10) percent below demand, or raw water supplies are consistently below seasonal averages and if they continue to decline, may not be adequate to meet normal needs. Includes notices from the Fern Lake Company.

(2) Conservation and Curtailments Measures:

(a) Declare Water Shortage Alert

(b) Provide proper notice to all customers and to all local news media

(c) Eliminate all water leaks

(d) Prohibit all not-essential (class 3) water uses

(e) Curtail entitlements to all customers by the same percentage as the projected shortage

(f) Begin billing all customers water usage in excess of curtailed entitlement at the normal rate plus an excess usage charge of $12.00 per 1,000 gallons

C. Emergency Stage

(1) Criteria: A water Emergency shall be declared when the amount of treated water available is projected to be up to five (5.0) percent below demand, or there are periods of no water in one or more areas of the distribution system due to low

water supply, or raw water supplies are below the level necessary to meet normal needs, or conditions are imposed by the Fern Lake Company.

(2) Conservation and Curtailment Measures:

(a) Declare Water Shortage Emergency

(b) Provide proper notice to all customers and to all local news media

(c) Eliminate all water leaks

(d) Prohibit all (class 3) uses of water

(e) Prohibit all (class 2) uses of water except domestic uses for kitchens, bathrooms and laundries

(f) Curtail all commercial and industrial entitlements (except health care facilities) by one hundred (100) percent

(g) Curtail residential entitlements by the same percentage as the projected shortage

(h) Curtail entitlements to all wholesale customers by the same percentage as the projected shortage

(i) Begin billing all customer water usage in excess of curtailed entitlement at the normal rate plus an excess usage charge of $17.00 per 1,000 gallons

D. Rationing Stage

1. Criteria: If treated water available is greater than three (3.0) percent below demand, or raw water supplies are below the level necessary to meet essential needs, in the opinion of, or notice from, the Fern Lake Company then the Company shall start mandatory rationing as required to insure adequate water is available to maintain public health and safety.

2. Conservation and Curtailment Measures:

(a) Declare Water Shortage Rationing

(b) Provide proper notice to all customers and to all local news media

(c) Eliminate all water leaks

(d) Prohibit all (Class 3) and (Class 2) uses of water

(e) Curtail all commercial and industrial entitlements (except health care facilities) by one-hundred (100) percent

(f) Curtail all residential and wholesale entitlements by the same percentage as the projected shortage

(g) Implement service interruptions to portions of system in accordance with approved published schedule. The schedule shall be provided to all local news media

(h) Begin billing customer water usage in excess of curtailment entitlement at the normal rate plus an excess usage charge of $24.00 per 1,000 gallons

Section 8 **Enforcement of Water Restrictions:**

Any person that violates the provisions of this plan, fails to carry out the duties and responsibilities imposed by this plan, or impedes or interferes with any action undertaken or ordered pursuant to this plan shall be subject to following:

(1) If the Company official charged with implementation and enforcement of this plan learns of any violation of any water use restriction imposed, a written notice of the violation shall be affixed to the property where the violation occurred and mailed to the customer of record. Said notice shall describe the violation and order that it be corrected, cured, or abated immediately or within forty-eight (48) hours

(2) The notice will inform the customer of their right to appeal by requesting a hearing before the utility's designee. If a hearing is requested by the customer, he or she shall be given full opportunity to be heard before termination. The governing body shall make finding of fact and decide whether service should continue or terminated

(3) Any customer whose water service is terminated for violating provisions of this water curtailment plan shall be subject to the approved reconnection fee prior to reconnection of service

A fee of $50.00 shall be paid for the reconnection of any water service terminated. In the event of subsequent violations, the reconnection fee shall be $200.00 for the second violation and $300.00 for each additional violation.

(4) The excess usage charge billing provisions of this plan shall not be put in effect if a county or city ordinance containing penalty provisions is in effect to assist enforcement of this plan

Section 9 **Request for Exceptions:**

(A) Exception to water use restrictions: If compliance with any curtailment measure authorized herein would cause a customer to bear extraordinary hardship, that individual or entity may apply to the Company for an exception. For these purposes, "extraordinary hardship" shall be defined as a condition which may threaten health and safety, or cause property or economic losses, each of which must be shown to be substantially more sever than the sacrifices borne by other users. If extraordinary hardship is found to exist, then an exception shall be granted and a written waiver issued to the customer. If an appeal is made, water service shall be continued until a decision is announced. Any person aggrieved by the decision may file a complaint with the Public Service Commission.

(B) Exception to curtailment surcharge: Exceptions to excess use charges shall not be considered or granted.

Section 10 **Servability:**

If any provision of this plan is declared invalid by the courts, the remainder of the plan and its applicability to other persons and circumstances shall not be affected by that declaration.

Section 11 **Effective Date:**

This plan shall take effect immediately upon approval by the Public Service Commission.

Utilities, Inc.

Water Shortage Advisory Phase for Middlesboro KY

Due to the recent abnormally dry weather conditions and little indication of significant rainfall in the foreseeable future, customers of Water Service Corporation of Kentucky should begin conserving water, according to James Leonard, Water Service Corporation of Kentucky's Regional Manager. For the months of May through September, the local area received only about fifty percent of normal rainfall for the comparable period. The 30-day outlook from the National Weather Service does not indicate any significant improvement to the current pattern of dry weather.

A local water shortage ADVISORY has been declared by Water Service Corporation. At this time, there is an immediate need to begin voluntary conservation measures. All non-essential uses of water should be minimized. According to officials at the state's Division of Water, consumers can cut water use by as much as 15 percent with very little difficulty or discomfort with voluntary water conservation practices.

Suggestions for reducing your water usage are:

Conservation for Normal Conditions

- Use dishwashers only when they are full. Washing dishes by hand (don't let the tap run!) saves about 25 gallons.
- Adjust water level on clothes washing machines, if possible. Use full loads only, if not adjustable.
- Turn off faucets while brushing teeth, etc. Saves about 5 gallons per day.
- Reduce water used per flush by installing toilet tank displacement inserts. A plastic jug may often be used as an alternative. DO NOT USE BRICKS – they disintegrate when soaked and the resulting grit hinders closing of the flap valve.
- Do not use the toilet as a trash can.
- Use sink and tub stoppers to avoid wasting water.
- Keep a bottle of chilled water in the refrigerator for drinking.
- Find and fix leaks in toilets, which can leak silently. The following method can be used to see if this is occurring. Place a drop of food coloring in the upper tank and don't flush for 30 minutes. If color appears in the bowl, there's leakage.
- Adapt plumbing with flow-restricting or other water-saving devices. These are usually inexpensive and easy to install.

Conservation for Water Shortage Advisory or Alert

(In addition to measures listed above)

- Take shorter showers and shallower baths. Saves about 25 gallons.
- Reduce the number of toilet flushes per day. Each flush uses about 5 gallons (2-3 if you have water saving toilets).
- Don't use a garbage disposal.
  Use non-phosphate detergent and save laundry water.

With cooperation from all customers, local water usage can be cut significantly. If you have questions or suggestions, please contact our local office @ 606-248-5730.

a Utilities, Inc. company Water Service Corp. of Kentuc

P.O. Box 818 Middlesboro, KY 40965 P: 606-248-5730 F: 606-248-5738
1221 E. Cumberland Ave. Middlesboro, KY 40965 www.uiwater.com

Supply Contamination Response Plan

This section describes how the system will supply water to their customers in the event they are unable to use their water source due to contamination or infrastructure failure.

Emergency Response Plan

For the Water Service Corporation of Kentucky Water System

This Emergency Response Plan was developed to identify the immediate actions that must be taken in the event of water supply contamination by a pollutant, as a result of infrastructure failure, or severe raw water shortage. This plan also describes how the water system will supply water to their customers in the event the water system is unable to use their regular water source due to contamination or infrastructure failure.

Section One:
The **Water Service Corporation of Kentucky** Water System shall comply with the procedures set out in this plan. Any and every actual contamination event, infrastructure/raw water failure, as well as any imminent threat of contamination or failure shall evoke the implementation of this plan.

Section Two: Determination and Verification of the Nature and Extent of the Contamination Event

The following water system staff are designated to be the person(s) responsible for the investigation of all potential threats of contamination or actual contamination events:

Name	Title
James Leonard	Regional Manager
Gary Mills	Chief Water Plant Operator
Greg Bolt	Lead Operator Distribution system

When the designated water system staff person(s) discovers or in any way learns of possible contamination, infrastructure failure or raw water shortage, or of an imminent threat of such an event, the designated water system staff person(s) shall personally investigate. The staff person(s) will make a reasonably informed determination of the existence of emergency, or threat thereof, striving to identify if there is a contaminating substance, the source and volume of the contaminant which has entered the water source, the time and duration of the contamination, and whether the incursion is ongoing or apt to re-occur without intervention. If the emergency is infrastructure, an assessment of location and repair will be made. If the failure is raw water the problem will be identified. At the conclusion of this initial investigation, the designated water system staff person(s) shall set out the findings and conclusions in a **signed, time stamped, and dated report**. If it is determined that an emergency event has occurred, or that a threat

of emergency exists, the designated water system staff person(s) shall immediately proceed with those actions set out in Sections 3 and Section 4 of the Emergency Response Plan as follows.

Section Three: Notification of Emergency Responders, Regulatory Agencies, Adjacent Water Systems, Local Elected Officials (County Judge Executives and City Mayors), and Other Water System Staff

Upon making an initial verification of the existence of an emergency or threat thereof, the designated water system staff person(s) shall notify by phone the following Emergency Responders, Regulatory Agencies, Adjacent Water Systems, Local Elected Officials (County Judge Executives and City Mayors), and Other Water System Staff:

Emergency Responders

Contact Agency/Person	Phone Number	Fax Number
Fire Department Tim Wilder	606-248-4683	
Kentucky Natural Resources Environmental Protection Cabinet	1-800-928-2380	502-564-5105

Regulatory Agencies

Contact Agency/Person	Phone Number	Fax Number
County Health Department/ Tim Good	606-248-7227	
County DES Director/ Tim Radar	606-337-1012	
Kentucky Division of Water/	502-564-3410	502-564-9003
Local Division of Water Inspector/ David Messer	606-224-5457	
Division of Emergency Management	502-607-1682	502-607-1614

Adjacent Water Systems

Contact Agency/Person	Pineville Utilities	Phone Number	Fax Number
		606-337-6613	

Local Elected Officials

Name/Elected Office Held	Phone Number	Fax Number
County Judge Excuetive	606-337-3076	

Other Water System Staff

Title	Phone Number	Fax Number
Harvey Johnson Water Plant Operator	606-499-9192	
Mike Partin Water Plant Operator	606-499-9149	
Steve Vaughn Distribution Operator	606-499-3630	
Bryan Sandefur Meter Reader	606-499-9169	
James Onkst Meter Reader	606-499-9181	

A copy of the emergency report referenced in Section 2 of this Plan shall be faxed to each of the above listed Emergency Responders, Regulatory Agencies, Adjacent Water Systems, and Local Elected Officials. Copies of the report will be made available to Other Water System Staff upon their reporting to work after the emergency event has occurred.

Section Four: Notification of Consumers and the Public At Large

The following public service announcement will be prepared by the water system:

Public Service Announcement

Notice is hereby given to the customers of the Water Service Corporation of Kentucky Water System. Please be advised that the source of water or a component of the infrastructure system of the Water Service Corporation of Kentucky Water System is experiencing an emergency. The fact that this emergency event has occurred requires that the water system perform the following emergency acts to ensure the safety of the customers of the water system: _____.

Customers of the Water Service Corporation of Kentucky Water System are advised the following safety measures: _____.

It is expected that this situation will be resolved and routine service will be restored on or after _____.

Time and Date

For additional information you may contact James Leonard at the Water Service Corporation of Kentucky Water System at 606-248-5730, between the hours of 8:00a.m. to 4:30p.m., Monday through Friday.

A public service announcement such as the one indicated above shall be hand delivered or faxed to all news media with local coverage in the service area. News media to be contacted include the following:

Television Stations

Name of Station/Contact Person		Phone Number	Fax Number
WBIR	Knoxville, TN.	865-637-1010	
WYMT	Middlesboro/Hazard	606-248-5702	
WTVQ	Lexington, Ky	859-299-3636	

Radio Stations

Name of Station/Contact Person		Phone Number	Fax Number
WMIK	William Bingham	606-248-5842	
WFXY		606-248-1530	
WXJB		606-248-0001	

Newspapers

Name of Newspaper/Contact Person		Phone Number	Fax Number
Middlesboro Daily News	Pat Cheek	606-248-1010	

A copy of the public service announcement shall also be hand delivered or faxed to each United States Post Office within the affected service area. The postmaster/post mistress at the Post Office will be instructed to post the public service announcement in a location at the Post Office that is visible to anyone entering the Post Office. Listed below are the United States Post Offices located in the service area of the Water Service Corporation of Kentucky Water System:

Name of Post Office/Postmaster	Phone Number	Fax Number
Middleboro	606-248-3690	

Section Five: Alternative Water Sources

If the primary water source has to be shut down due to contamination, infrastructure failure, or raw water source problems, it may be necessary to depend on a secondary or emergency water supply. The primary emergency supply for the Water Service Corporation of Kentucky Water System would come from the supply of water in the water storage tanks owned by the water system. The normal supply on hand in the Two 1.2 million gallon water storage tanks owned by the water system is estimated to last for 2 days or 48 hours.

Should the primary water supply be unavailable longer than the time period of water supply available in the water storage tanks, the water system would seek additional water from any interconnects that might be available with neighboring water systems. At this time the Water Service Corporation of Kentucky Water System has the following interconnects with neighboring water systems:

Name of Water System/Contact Person Phone Number Fax Number

Bill Bunch Pinevill City Utility Commission 606-337-6611

In cases of extreme water supply shortage, it may be necessary for water system and local elected officials to contact the Kentucky National Guard in Frankfort about the possibility of securing additional water for the community. Arrangements could be made with the Kentucky National Guard to truck in water to the community as an emergency supply until normal water service could be restored. The Kentucky National Guard can be contacted at 502-564-8600.

Natural Resources and Environmental Protection Cabinet

DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601
TELEPHONE NUMBER (502) 564-3410
FAX NUMBER (502) 564-4245

Wellhead Protection Plan

PHASE I FORM

SYSTEM Water Service Corporation of Kentucky **PWS ID** 0530077

GENERAL INSTRUCTIONS

- **APPLICABILITY** - This form may be used to comply with the Phase I submittal requirements of the Kentucky Wellhead Protection Program.
- **ASSISTANCE** - Questions regarding this form may be directed in writing to the Division of Water, Groundwater Branch at the address listed above, or by calling (502) 564-3410.
- **SUBMISSION** - Please type or print legibly. Complete all sections of this form. However, if you feel an item is not applicable to your system, please contact the Wellhead Protection Program to discuss its applicability. The completed form should be sent to "Wellhead Protection Coordinator" at the address listed above.
- **LAWS AND REGULATIONS** - This form is intended as guidance for compliance with 401 KAR 4:220 Section 6(6)(e). Completion and submittal of this form in no way constitutes approval of your wellhead protection plan or any other plan required by 401 KAR 4:220 or 401 KAR 5:037.

A. GENERAL INFORMATION

Water Supplier: Aqua/KWS - Clinton

Contact Person: Bobby Yates, JR

Address: P.O. Box 178

Clinton, KY 42031

Phone#: 502-653-3621

FAX#: 502-653-4722

PWS ID#: 0 5 3 0 0 7 7 County: Hickman

Area Development District: Purchase

Planning Representative: Joe Pricimias

Phone: 502-247-7171

Plant Type: C

C = Community
NTNC = Non-Transient/Non-Community
TNC = Transient/Non-Community

Source: Wells [Well(s) or Spring(s)]
(If source is a spring, give the name of the spring)

Average Daily Withdrawal: 165,000 GPD

Latitude/Longitude of Plant: [redacted]

Population Served: ~1800 No. Service Connections: 720

Physiographic Region:

- X Jackson Purchase
- _____ Ohio River Alluvium
- _____ Mississippian Plateau
- _____ Bluegrass
- _____ Western Coal Field
- _____ Eastern Coal Field

- Provide, as **Attachment 1**, a county highway map with the exact location of the water treatment plant clearly marked.

- Provide, as **Attachment 2**, a narrative discussing historical water withdrawal and water quality.

- Provide, as **Attachment 3**, copies of the completed Kentucky Water Well Inspection Form for each well or spring. Any other information relating to well construction (i.e., installation logs, driller's logs, lithologic or geophysical logs) should also be included.

B. STEP 1: COMMUNITY PLANNING TEAM

- Provide, as **Attachment 4**, a list identifying planning team members and the responsibilities of each. The planning team representative should be identified by name and title.

- Provide, as **Attachment 5**, copies of all public notices regarding wellhead protection efforts.

- Provide, as **Attachment 6**, public comments and record of attendance for public meetings on wellhead protection.

C. STEP 2: WHPA DELINEATIONS

- Provide, as **Attachment 7**, a description of the regional geology and hydrology. Include references where published literature is used. If aquifer tests (i.e. pumping tests, slug tests, tracer tests) were performed to determine hydraulic parameters, provide, as **Attachment 8**, a detailed report of the hydrogeologic investigation, including data gathering and evaluation methods.

- Provide, as **Attachment 9**, the rationale for selecting each WHPA delineation method. Show calculations and supporting data for each WHPA (WHPA-1, WHPA-2, and WHPA-3).

- Provide, as **Attachment 10**, an original or exact photocopy of the appropriate U.S.G.S. Topographic Quadrangle Map(s) with WHPA-1, WHPA-2, and WHPA-3 clearly shown and labeled. Each well or spring must also be identified by its AKGWA #.

CERTIFICATION: (TO BE COMPLETED BY PLANNING REPRESENTATIVE)

"I certify that this document and all attachments were prepared under my direction or supervision. The information submitted is, to the best of my knowledge and belief, true, accurate, and complete."

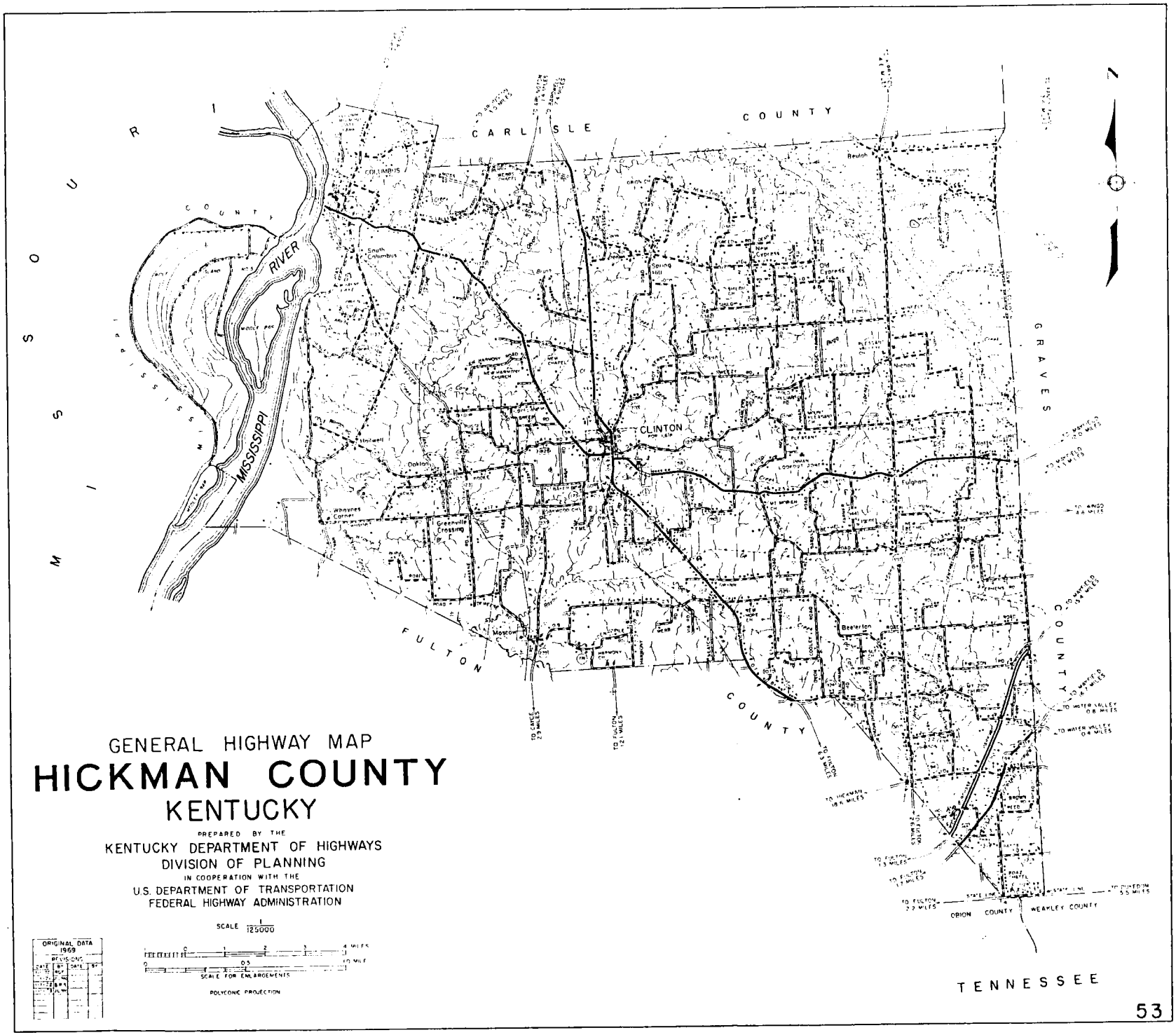
Signature: Bobby C. Yates Jr. Date: 6-17-98

Name (typed or printed): Bobby Yates, Jr

Title: Manager

ATTACHMENT 1:

COUNTY HIGHWAY MAP



GENERAL HIGHWAY MAP

HICKMAN COUNTY

KENTUCKY

PREPARED BY THE
KENTUCKY DEPARTMENT OF HIGHWAYS
DIVISION OF PLANNING
IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE 1/125000

ORIGINAL DATA 1969
REVISIONS

SCALE FOR ENLARGEMENTS

POLYCONIC PROJECTION

ATTACHMENT 2:

HISTORICAL WATER WITHDRAWAL AND QUALITY DATA

KY DIVISION OF WATER / WATER WITHDRAWAL PERMIT FILE

PERMIT FACILITY NAME/ADDRESS:

0141 KENTUCKY WATER SERVICE COMPANY
BOX 178
CLINTON KY 42031

PERMIT INFORMATION:

DATE ISSUED: 06/30/66
LAST REVISED: 10/16/78
STATUS: ACTIVE
INACTIVATED:
CONDITIONS: NONE
CROSS REFERENCE:

COUNTY: HICKMAN
DISTRICT: 01 PADUCAH
PWS ID: 0530077
SIC CODE: 4941

CONTACT PERSON: BOBBY E. YATES, JR. (606) 653-3621

WATER USE INFORMATION:

SOURCE: GROUND
RIVER BASIN: 07 MISSISSIPPI
USE CATEGORY: WATER SUPPLIER

LATITUDE: 0364016
LONGITUDE: 0885937
TOPO MAP NO: 0209

MEASURING METHOD: METER
MEASURING DEVICE: ROCKWELL METER
QUADRANGLE:

DESCRIPTION:
2 WELLS LOCATED ON TRIB TO CANE CRK. (MI. 3.7OL) OPP. MI. 2.15R, HICKMAN CO

AVERAGE MONTHLY WATER WITHDRAWALS IN MILLION GALLONS PER DAY

PERMIT NUMBER	YEAR	JAN/ DAYS	FEB/ DAYS	MAR/ DAYS	APR/ DAYS	MAY/ DAYS	JUN/ DAYS	JUL/ DAYS	AUG/ DAYS	SEP/ DAYS	OCT/ DAYS	NOV/ DAYS	DEC/ DAYS	AVG	MAX MONTH
0141	1988	0.149	0.151	0.154	0.157	0.161	0.176	0.161	0.171	0.155	0.148	0.147	0.148	0.156	0.176
	1989	0.139	0.148	0.144	0.141	0.145	0.145	0.157	0.162	0.145	0.137	0.138	0.157	0.146	0.162
	1990	0.134	0.135	0.152	0.000	0.000	0.000	0.147	0.150	0.140	0.131	0.132	0.138	0.105	0.152
	1991	0.133	0.138	0.136	0.138	0.133	0.139	0.157	0.149	0.143	0.133	0.134	0.132	0.139	0.157
	1992	0.132	0.127	0.134	0.137	0.133	0.142	0.152	0.144	0.144	0.140	0.131	0.135	0.138	0.152
	1993	0.138	0.136	0.132	0.136	0.142	0.152	0.166	0.157	0.150	0.143	0.142	0.141	0.145	0.166
	1994	0.162	0.135	0.134	0.135	0.143	0.158	0.154	0.161	0.146	0.140	0.130	0.141	0.145	0.162
	1995	0.145	0.137	0.140	0.138	0.137	0.144	0.142	0.152	0.141	0.132	0.133	0.134	0.140	0.152
		31	28	31	30	31	30	31	31	30	31	30	31		
	1996	0.132	0.151	0.148	0.145	0.138	0.143	0.149	0.148	0.143	0.145	0.143	0.142	0.144	0.151
		31	29	31	30	31	30	31	31	30	31	30	31		
PERMITTED WITHDRAWAL		0.225	0.225	0.225	0.225	0.225	0.225	0.225	0.225	0.225	0.225	0.225	0.225		

REMARKS:

From: KENTUCKY GEOLOGICAL SURVEY
Computer & Laboratory Services Section
Report of Analysis

December 2, 1996

To: Jim Webb
NAT. RESOURCES AND EPA
FRANKFORT OFFICE PARK
14 REILLY ROAD
FRANKFORT, KY 40601

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

Sample I.D. GS02840 Project ID: DOW
Project account: 4-28873 SAMPLE FIELD ID: Aqua/KY
Sample Collector: JIM WEBB
Sample collection date: 10/09/96 Time: 12:00
Lab submittal date: 10/10/96 Time: 10:30
PINUMBER: 00033888

Parameter	Result	Units	MDL
Fluoride	0.17	mg/L	0.020
Sulfate	Less Than MDL	mg/L	5.00
Chloride	9.8	mg/L	1.00
Conductivity	136	uU/cm	1
pH	6.60	pH Units	0.001
Alkalinity	54	mg/L	4.0
Ammonia (NH3)	0.02	mg/L	0.02
Ammonia (NH3-N)	0.02	mg/L	0.02
Nitrate (NO3)	5.9	mg/L	0.10
Nitrate-N (NO3-N)	1.33	mg/L	0.02
Nitrite (NO2)	Less Than MDL	mg/L	0.002
Nitrite-N (NO2-N)	Less Than MDL	mg/L	0.001
Kjeldahl Nitrogen (NH3)	Less Than MDL	mg/L	0.61
Kjeldahl Nitrogen (NH3-N)	Less Than MDL	mg/L	0.50
Orthophosphate	0.012	mg/L	0.009
Orthophosphate-P (PO4-P)	0.004	mg/L	0.003
Total Suspended Solids	Less Than MDL	mg/L	3.0
Total Dissolved Solids	108	mg/L	10
Biochemical Oxygen Demand	Less Than MDL	mg/L	10.0
Dissolved Metals by ICAP	see below	mg/L	
Dissolved Metals by GFAA	see below	ug/L	
Pesticides by Immunoassay	see below	ug/L	

Data for Dissolved Metals by ICAP mg/L:

Component Name	Result	Component MDL
Aluminum, Dissolved by ICP	Less Than MDL	0.019
Antimony,Dissolved by ICP	Less Than MDL	0.051
Arsenic , Dissolved by ICP	Less Than MDL	0.050
Barium, Dissolved by ICP	0.0412	0.0007

Data for Dissolved Metals by ICAP (continued):

Component Name	Result	Component MDL
Beryllium, Dissolved by ICP	Less Than MDL	0.0024
Boron, Dissolved by ICP	Less Than MDL	0.023
Cadmium, Dissolved by ICP	Less Than MDL	0.006
Calcium, Dissolved by ICP	8.92	0.023
Chromium, Dissolved by ICP	Less Than MDL	0.008
Cobalt, Dissolved by ICP	Less Than MDL	0.012
Copper, Dissolved by ICP	Less Than MDL	0.007
Gold, Dissolved by ICP	Less Than MDL	0.012
Iron, Dissolved by ICP	0.026	0.006
Lead, Dissolved by ICP	Less Than MDL	0.071
Lithium, Dissolved by ICP	Less Than MDL	0.003
Magnesium, Dissolved by ICP	3.94	0.030
Manganese, Dissolved by ICP	Less Than MDL	0.002
Nickel, Dissolved by ICP	Less Than MDL	0.049
Phosphorus, Dissolved by ICP	Less Than MDL	0.121
Potassium, Dissolved by ICP	Less Than MDL	1.210
Selenium, Dissolved by ICP	Less Than MDL	0.129
Silicon, Dissolved by ICP	8.50	0.034
Silver, Dissolved by ICP	Less Than MDL	0.006
Sodium, Dissolved by ICP	11.5	0.018
Strontium, Dissolved by ICP	0.024	0.001
Sulfur, Dissolved by ICP	0.581	0.030
Thallium, Dissolved by ICP	Less Than MDL	0.068
Tin, Dissolved by ICP	Less Than MDL	0.426
Vanadium, Dissolved by ICP	Less Than MDL	0.004
Zinc, Dissolved by ICP	Less Than MDL	0.004

Data for Dissolved Metals by GFAA ug/L:

Component Name	Result	Component MDL
Arsenic, Dissolved by GFAA	Less Than MDL	1.70
Chromium, Dissolved by GFAA	Less Than MDL	1.60
Lead, Dissolved by GFAA	Less Than MDL	1.36

Data for Pesticides by Immunoassay ug/L:

Component Name	Result	Component MDL
Alachlor by Immunoassay	Below MDL	0.06
Triazines by Immunoassay	Below MDL	0.06
Chlorpyrifos by Immunoassay	Below MDL	0.10
Chlorothalonil by Immunoassay	Below MDL	0.07
Metolachlor by Immunoassay	Below MDL	0.08
2,4-D by Immunoassay	Below MDL	0.9
Carbofuran by Immunoassay	Below MDL	0.08

From: KENTUCKY GEOLOGICAL SURVEY
Computer & Laboratory Services Section
Report of Analysis

January 17, 1997

To: Jim Webb
NAT. RESOURCES AND EPA
FRANKFORT OFFICE PARK
14 REILLY ROAD
FRANKFORT, KY 40601

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

Sample I.D. GS03159 Project ID: DOW
Project account: 4-60503 SAMPLE FIELD ID: AQUA/KY
Sample Collector: JIM WEBB
Sample collection date: 12/11/96 Time: 10:00
Lab submittal date: 12/12/96 Time: 09:30
PINUMBER: 00033888

Parameter	Result	Units	MDL
Fluoride	1.00	mg/L	0.02
Sulfate	Less Than MDL	mg/L	5.00
Chloride	6.0	mg/L	1.00
Conductivity	144	uU/cm	1
pH	7.46	pH Units	0.01
Alkalinity	54	mg/L	4.0
Ammonia (NH3)	Less Than MDL	mg/L	0.02
Ammonia (NH3-N)	Less Than MDL	mg/L	0.02
Nitrate (NO3)	5.5	mg/L	0.10
Nitrate-N (NO3-N)	1.24	mg/L	0.02
Nitrite (NO2)	0.002	mg/L	0.002
Nitrite-N (NO2-N)	0.001	mg/L	0.001
Kjeldahl Nitrogen (NH3)	Less Than MDL	mg/L	0.61
Kjeldahl Nitrogen (NH3-N)	Less Than MDL	mg/L	0.50
Orthophosphate	0.016	mg/L	0.009
Orthophosphate-P (PO4-P)	0.005	mg/L	0.003
Total Suspended Solids	Less Than MDL	mg/L	3
Total Dissolved Solids	76	mg/L	10
Biochemical Oxygen Demand	Less Than MDL	mg/L	10.0
Dissolved Metals by ICAP	see below	mg/L	
Dissolved Metals by GFAA	see below	ug/L	
Pesticides by Immunoassay	see below	ug/L	

Data for Dissolved Metals by ICAP mg/L:

Component Name	Result	Component MDL
Aluminum, Dissolved by ICP	Less Than MDL	0.019
Antimony,Dissolved by ICP	Less Than MDL	0.051
Arsenic , Dissolved by ICP	Less Than MDL	0.050
Barium, Dissolved by ICP	0.0416	0.0007

Data for Dissolved Metals by ICAP (continued):

Component Name	Result	Component MDL
Beryllium, Dissolved by ICP	Less Than MDL	0.0024
Boron, Dissolved by ICP	Less Than MDL	0.023
Cadmium, Dissolved by ICP	Less Than MDL	0.006
Calcium, Dissolved by ICP	9.04	0.023
Chromium, Dissolved by ICP	Less Than MDL	0.008
Cobalt, Dissolved by ICP	Less Than MDL	0.012
Copper, Dissolved by ICP	0.013	0.007
Gold, Dissolved by ICP	Less Than MDL	0.012
Iron, Dissolved by ICP	Less Than MDL	0.006
Lead, Dissolved by ICP	Less Than MDL	0.071
Lithium, Dissolved by ICP	Less Than MDL	0.003
Magnesium, Dissolved by ICP	3.92	0.030
Manganese, Dissolved by ICP	Less Than MDL	0.002
Nickel, Dissolved by ICP	Less Than MDL	0.049
Phosphorus, Dissolved by ICP	Less Than MDL	0.121
Potassium, Dissolved by ICP	Less Than MDL	1.210
Selenium, Dissolved by ICP	Less Than MDL	0.129
Silicon, Dissolved by ICP	8.51	0.034
Silver, Dissolved by ICP	Less Than MDL	0.006
Sodium, Dissolved by ICP	12.3	0.018
Strontium, Dissolved by ICP	0.025	0.001
Sulfur, Dissolved by ICP	0.558	0.030
Thallium, Dissolved by ICP	Less Than MDL	0.068
Tin, Dissolved by ICP	Less Than MDL	0.426
Vanadium, Dissolved by ICP	Less Than MDL	0.004
Zinc, Dissolved by ICP	Less Than MDL	0.004

Data for Dissolved Metals by GFAA ug/L:

Component Name	Result	Component MDL
Arsenic, Dissolved by GFAA	Less Than MDL	1.70
Chromium, Dissolved by GFAA	Less Than MDL	1.60
Lead, Dissolved by GFAA	Less Than MDL	1.36

Data for Pesticides by Immunoassay ug/L:

Component Name	Result	Component MDL
Alachlor by Immunoassay	Less Than MDL	0.06
Triazines by Immunoassay	Less Than MDL	0.06
Chlorpyrifos by Immunoassay	Less Than MDL	0.07
Chlorothalonil by Immunoassay	Less Than MDL	0.1
Metolachlor by Immunoassay	Less Than MDL	0.05
2,4-D by Immunoassay	Less Than MDL	0.9
Carbofuran by Immunoassay	Less Than MDL	0.07

If there are any questions regarding this data, please call.

Henry Francis

From: KENTUCKY GEOLOGICAL SURVEY
Computer & Laboratory Services Section
Report of Analysis

March 26, 1997

To: Jim Webb
NAT. RESOURCES AND EPA
FRANKFORT OFFICE PARK
14 REILLY ROAD
FRANKFORT, KY 40601

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

Sample I.D. GS03450 Project ID: DOW
Project account: 4-60503 SAMPLE FIELD ID: AQUA/KY WELL
Sample Collector: JOE DEVERS
Sample collection date: 02/11/97 Time: 10:40
Lab submittal date: 02/13/97 Time: 08:45
PINUMBER: 00033888

Parameter	Result	Units	MDL
Fluoride	0.10	mg/L	0.02
Sulfate	Less Than MDL	mg/L	5.00
Chloride	19.2	mg/L	1.00
Conductivity	135	uU/cm	1
pH	6.63	pH Units	0.01
Alkalinity	49	mg/L	4.0
Ammonia (NH3)	0.02	mg/L	0.02
Ammonia (NH3-N)	0.02	mg/L	0.02
Nitrate (NO3)	7.2	mg/L	0.10
Nitrate-N (NO3-N)	1.63	mg/L	0.02
Nitrite (NO2)	0.003	mg/L	0.002
Nitrite-N (NO2-N)	0.001	mg/L	0.001
Kjeldahl Nitrogen (NH3)	Less Than MDL	mg/L	0.61
Kjeldahl Nitrogen (NH3-N)	Less Than MDL	mg/L	0.50
Orthophosphate	0.028	mg/L	0.009
Orthophosphate-P (PO4-P)	0.009	mg/L	0.003
Total Suspended Solids	Less Than MDL	mg/L	3
Total Dissolved Solids	104	mg/L	10
Biochemical Oxygen Demand	12.8	mg/L	10.0
Dissolved Metals by ICAP	see below	mg/L	
Dissolved Metals by GFAA	see below	ug/L	
Pesticides by Immunoassay	see below	ug/L	

Data for Dissolved Metals by ICAP mg/L:

Component Name	Result	Component MDL
Aluminum, Dissolved by ICP	Less Than MDL	0.019
Antimony,Dissolved by ICP	Less Than MDL	0.051
Arsenic , Dissolved by ICP	Less Than MDL	0.050
Barium, Dissolved by ICP	0.0421	0.0007

Data for Dissolved Metals by ICAP (continued):

Component Name	Result	Component MDL
Beryllium, Dissolved by ICP	Less Than MDL	0.0024
Boron, Dissolved by ICP	0.049	0.023
Cadmium, Dissolved by ICP	Less Than MDL	0.006
Calcium, Dissolved by ICP	9.08	0.023
Chromium, Dissolved by ICP	Less Than MDL	0.008
Cobalt, Dissolved by ICP	Less Than MDL	0.012
Copper, Dissolved by ICP	0.015	0.007
Gold, Dissolved by ICP	Less Than MDL	0.012
Iron, Dissolved by ICP	0.020	0.006
Lead, Dissolved by ICP	Less Than MDL	0.071
Lithium, Dissolved by ICP	Less Than MDL	0.003
Magnesium, Dissolved by ICP	3.91	0.030
Manganese, Dissolved by ICP	Less Than MDL	0.002
Nickel, Dissolved by ICP	0.813	0.049
Phosphorus, Dissolved by ICP	Less Than MDL	0.121
Potassium, Dissolved by ICP	Less Than MDL	1.210
Selenium, Dissolved by ICP	Less Than MDL	0.129
Silicon, Dissolved by ICP	8.41	0.034
Silver, Dissolved by ICP	Less Than MDL	0.006
Sodium, Dissolved by ICP	11.3	0.018
Strontium, Dissolved by ICP	0.024	0.001
Sulfur, Dissolved by ICP	0.615	0.030
Thallium, Dissolved by ICP	Less Than MDL	0.068
Tin, Dissolved by ICP	Less Than MDL	0.426
Vanadium, Dissolved by ICP	Less Than MDL	0.004
Zinc, Dissolved by ICP	Less Than MDL	0.004

Data for Dissolved Metals by GFAA ug/L:

Component Name	Result	Component MDL
Arsenic, Dissolved by GFAA	Less Than MDL	1.70
Chromium, Dissolved by GFAA	Less Than MDL	1.60
Lead, Dissolved by GFAA	29.0	1.36

Data for Pesticides by Immunoassay ug/L:

Component Name	Result	Component MDL
Alachlor by Immunoassay	Less Than MDL	0.06
Triazines by Immunoassay	Less Than MDL	0.06
Chlorpyrifos by Immunoassay	Less Than MDL	0.07
Chlorothalonil by Immunoassay	Less Than MDL	0.1
Metolachlor by Immunoassay	Less Than MDL	0.05
2,4-D by Immunoassay	Less Than MDL	0.9
Carbofuran by Immunoassay	Less Than MDL	0.07

If there are any questions regarding this data, please call.

Henry Francis

JAMES E. BICKFORD
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL SERVICES
CENTRALIZED LABORATORY FACILITY
100 SOWER BLVD STE 104
FRANKFORT KY 40601-8272

June 6, 1997

Division of Environmental Services
Report Number: A39-00044
Sample Number: 9701949

To: Division of Water
14 Reilly Road
Frankfort, Kentucky 40601

Re: Groundwater Monitoring Network

Attn: Peter Goodman

AKGWA Number: 0003-3888

County: Hickman

Facility:

Collected by: Gary Morgan & Joe Devers

Date: 04/29/97 **Time:** 1030

Delivered by: Joe Devers

Date: 05/01/97 **Time:** 0820

Received by: Polly Baker

Date: 05/01/97 **Time:** 0820

Sample Matrix: Water

Collection Method: Grab

Sample Identification: Aqual / Ky Water Services

REPORT OF ANALYSIS

CAS NUMBER	TOTAL CONSTITUENTS	CONCENTRATION
	Alkalinity	52.8 mg/L
	Conductivity	133 µmho
	Bromide	0.040 mg/L
16887-00-6	Chloride	18.8 mg/L
16984-48-8	Fluoride	0.411 mg/L
14797-55-8	Nitrate	1.26 mg/L
1594-56-5	Nitrite	ND @ 0.005 mg/L
	Phosphorus, ortho	ND @ 0.019 mg/L
14808-79-8	Sulfate	1.82 mg/L
	pH	6.53 S.U.
	Total Suspended Solids	ND @ 1 mg/L
	Total Dissolved Solids	80 mg/L
7440-44-0	Organic Carbon	ND @ 0.25 mg/L
	Ammonia-Nitrogen	ND @ 0.05 mg/L
	Total Kjeldhal Nitrogen	0.249 mg/L
	Phosphorus, total	ND @ 0.005 mg/L
77-47-4	1,2,3,4,5,5-Hexachloro-1,3-cyclopentadiene	ND @ 0.000040 mg/L
118-74-1	Hexachlorobenzene	ND @ 0.000010 mg/L
319-84-6	Hexachlorocyclohexane,alpha isomer	ND @ 0.000010 mg/L
319-85-7	Hexachlorocyclohexane,beta isomer	ND @ 0.000010 mg/L
58-89-9	Hexachlorocyclohexane,gamma isomer	ND @ 0.000010 mg/L

CAS NUMBER	TOTAL CONSTITUENTS	CONCENTRATION
319-86-8	Hexachlorocyclohexane,delta isomer	ND @ 0.000010 mg/L
76-44-8	Heptachlor	ND @ 0.000010 mg/L
309-00-2	Aldrin	ND @ 0.000010 mg/L
2921-88-2	Chlorpyrifos	ND @ 0.000010 mg/L
1024-57-3	Heptachlor epoxide	ND @ 0.000010 mg/L
27304-13-8	Oxychlordane	ND @ 0.000010 mg/L
5103-74-2	trans-Chlordane	ND @ 0.000010 mg/L
5103-71-9	cis-Chlordane	ND @ 0.000010 mg/L
39765-80-5	trans-Nonachlor	ND @ 0.000010 mg/L
5103-71-9	alpha-Chlordene	ND @ 0.000010 mg/L
3734-48-3	Chlordene	ND @ 0.000010 mg/L
	gamma-Chlordene	ND @ 0.000010 mg/L
5103-73-1	cis-Nonachlor	ND @ 0.000010 mg/L
12789-03-6	Technical Chlordane	ND @ 0.000010 mg/L
3424-82-6	o,p'-DDE	ND @ 0.000010 mg/L
72-55-9	p,p'-DDE	ND @ 0.000010 mg/L
60-57-1	Dieldrin	ND @ 0.000010 mg/L
72-20-8	Endrin	ND @ 0.000010 mg/L
53-19-0	o,p'-DDD	ND @ 0.000010 mg/L
72-54-8	p,p'-DDD	ND @ 0.000010 mg/L
789-02-6	o,p'-DDT	ND @ 0.000010 mg/L
50-29-3	p,p'-DDT	ND @ 0.000010 mg/L
8017-34-3	Total DDT	ND @ 0.000010 mg/L
72-43-5	Methoxychlor	ND @ 0.000010 mg/L
2385-85-5	Mirex	ND @ 0.000010 mg/L
959-98-8	Endosulfan I	ND @ 0.000010 mg/L
33213-65-9	Endosulfan II	ND @ 0.000010 mg/L
1031-07-8	Endosulfan sulfate	ND @ 0.000010 mg/L
7421-93-4	Endrin aldehyde	ND @ 0.000010 mg/L
53494-70-5	Endrin ketone	ND @ 0.000010 mg/L
8001-35-2	Toxaphene	ND @ 0.000100 mg/L
62-73-7	Dichlorvos	ND @ 0.000050 mg/L
759-94-4	S-Ethyldiisopropyl thiocarbamate (EPTC)	ND @ 0.000050 mg/L
2008-41-5	S-Ethyldiisobutyl thiocarbamate (Butylate)	ND @ 0.000050 mg/L
1929-77-7	S-Propyldipropylthiocarbamate (Vernolate)	ND @ 0.000050 mg/L
34014-18-1	Tebuthiuron	ND @ 0.000400 mg/L
122-34-9	Simazine	ND @ 0.000050 mg/L
1610-18-0	Prometon	ND @ 0.000050 mg/L
1912-24-9	Atrazine	ND @ 0.000050 mg/L
13071-79-9	Terbufos	ND @ 0.000050 mg/L
23950-58-5	Pronamide	ND @ 0.000050 mg/L
333-41-5	Diazinon	ND @ 0.000050 mg/L
298-04-4	Disulfoton	ND @ 0.000050 mg/L
5902-51-2	Terbacil	ND @ 0.000100 mg/L
21087-64-9	Metribuzin	ND @ 0.000050 mg/L
15972-60-8	Alachlor	ND @ 0.000050 mg/L
834-12-8	Ametryn	ND @ 0.000050 mg/L
7287-19-6	Prometryn	ND @ 0.000050 mg/L
121-75-5	Malathion	ND @ 0.000050 mg/L
886-50-0	Terbutryn	ND @ 0.000050 mg/L

CAS NUMBER	TOTAL CONSTITUENTS	CONCENTRATION
314-40-9	Bromacil	ND @ 0.000050 mg/L
51218-45-2	Metolachlor	ND @ 0.000050 mg/L
113-48-4	MGK 264	ND @ 0.000050 mg/L
957-51-7	Diphenamide	ND @ 0.000200 mg/L
5234-68-4	Carboxin	ND @ 0.000050 mg/L
51235-04-2	Hexazinone	ND @ 0.000050 mg/L
23184-66-9	Butachlor	ND @ 0.000050 mg/L
75-99-0	2,2-Dichloropropionic acid (Dalapon)	ND @ 0.00100 mg/L
51-36-5	3,5-Dichlorobenzoic acid	ND @ 0.000050 mg/L
1918-00-9	3,6-Dichloro-2-methoxybenzoic acid (Dicamba)	ND @ 0.000050 mg/L
120-36-5	Dichloroprop	ND @ 0.000150 mg/L
94-75-7	2,4-Dichlorophenoxyacetic acid (2,4-D)	ND @ 0.000100 mg/L
87-86-5	Pentachlorophenol	ND @ 0.000050 mg/L
133-90-4	Chloramben	ND @ 0.000050 mg/L
93-72-1	2-(2,4,5-Trichlorophenoxy)Propionic Acid	ND @ 0.000050 mg/L
	5-Hydroxydicamba	ND @ 0.000050 mg/L
93-76-5	2,4,5-Trichlorophenoxyacetic Acid	ND @ 0.000050 mg/L
94-82-6	4-(2,4-Dichlorophenoxy)butyric acid (2,4-DB)	ND @ 0.000800 mg/L
88-85-7	Dinoseb	ND @ 0.000100 mg/L
25057-89-0	Bentazone	ND @ 0.000100 mg/L
1918-02-1	Picloram	ND @ 0.000050 mg/L
50594-66-6	Acifluorfen	ND @ 0.000050 mg/L
30560-19-1	Acephate	ND @ 0.000400 mg/L
944-22-9	Fonofos	ND @ 0.000050 mg/L
79538-32-2	Tefluthrin	ND @ 0.000050 mg/L
34256-82-1	Acetochlor	ND @ 0.000050 mg/L
298-00-0	Methyl parathion	ND @ 0.000050 mg/L
56-38-2	Parathion	ND @ 0.000050 mg/L
21725-46-2	Cyanazine	ND @ 0.000050 mg/L
40487-42-1	Pendimethalin	ND @ 0.000050 mg/L
1114-71-2	Pebulate	ND @ 0.000050 mg/L
6190-65-4	Atrazine desethyl	ND @ 0.000050 mg/L
12674-11-2	Aroclor 1016	ND @ 0.000100 mg/L
11104-28-2	Aroclor 1221	ND @ 0.000100 mg/L
11141-16-5	Aroclor 1232	ND @ 0.000100 mg/L
53469-21-9	Aroclor 1242	ND @ 0.000100 mg/L
12672-29-6	Aroclor 1248	ND @ 0.000100 mg/L
11097-69-1	Aroclor 1254	ND @ 0.000100 mg/L
11096-82-5	Aroclor 1260	ND @ 0.000100 mg/L
1336-36-3	Aroclor 1262	ND @ 0.000100 mg/L
11100-14-4	Aroclor 1268	ND @ 0.000100 mg/L

CAS NUMBER	DISSOLVED CONSTITUENTS	CONCENTRATION
7429-90-5	Aluminum	ND @ 0.032 mg/L
7440-36-0	Antimony	ND @ 0.037 mg/L
7440-39-3	Barium	0.048 mg/L
7440-41-7	Beryllium	ND @ 0.002 mg/L
7440-70-2	Calcium	9.89 mg/L
7440-47-3	Chromium	ND @ 0.021 mg/L
7440-48-4	Cobalt	ND @ 0.007 mg/L

CAS NUMBER	DISSOLVED CONSTITUENTS	CONCENTRATION
7440-50-8	Copper	ND @ 0.005 mg/L
7439-89-6	Iron	ND @ 0.009 mg/L
7439-95-4	Magnesium	4.56 mg/L
7439-96-5	Manganese	0.010 mg/L
7439-98-7	Molybdenum	0.007 mg/L
7440-02-0	Nickel	0.022 mg/L
7440-09-7	Potassium	0.663 mg/L
7440-22-4	Silver	ND @ 0.003 mg/L
7440-23-5	Sodium	12.4 mg/L
7440-24-6	Strontium	0.026 mg/L
7440-28-0	Thallium	ND @ 0.060 mg/L
7440-31-5	Tin	ND @ 0.017 mg/L
7440-62-2	Vanadium	ND @ 0.003 mg/L
7440-66-6	Zinc	0.115 mg/L
7440-38-2	Arsenic	ND @ 0.002 mg/L
7440-43-9	Cadmium	ND @ 0.001 mg/L
7439-92-1	Lead	ND @ 0.002 mg/L
7439-97-6	Mercury	ND @ 0.00005 mg/L
7782-49-2	Selenium	ND @ 0.002 mg/L

ND = Not Detected

This report has been prepared and reviewed by personnel within the Division of Environmental Services. It has been approved for release.

William E. Davis

William E. Davis, Director
Division of Environmental Services

From: KENTUCKY GEOLOGICAL SURVEY
Computer & Laboratory Services Section
Report of Analysis

June 20, 1997

To: Jim Webb
NAT. RESOURCES AND EPA
FRANKFORT OFFICE PARK
14 REILLY ROAD
FRANKFORT, KY 40601

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

Sample I.D. GS04062 Project ID: DOW
Project account: 4-60503 SAMPLE FIELD ID: AQUA KY
Sample Collector: JOE DIVERS
Sample collection date: 04/29/97 Time: 10:30
Lab submittal date: 05/01/97 Time: 11:10
PINUMBER: 00033888

Parameter	Result	Units	MDL
Fluoride	0.21	mg/L	0.02
Sulfate	Less Than MDL	mg/L	5.00
Chloride	21.2	mg/L	1.00
Conductivity	131	uU/cm	1
pH	6.59	pH Units	0.01
Alkalinity	55	mg/L	4.0
Ammonia (NH3)	Less Than MDL	mg/L	0.02
Ammonia (NH3-N)	Less Than MDL	mg/L	0.02
Nitrate (NO3)	5.6	mg/L	0.10
Nitrate-N (NO3-N)	1.27	mg/L	0.02
Nitrite (NO2)	0.003	mg/L	0.002
Nitrite-N (NO2-N)	0.001	mg/L	0.001
Kjeldahl Nitrogen (NH3)	Less Than MDL	mg/L	0.61
Kjeldahl Nitrogen (NH3-N)	Less Than MDL	mg/L	0.50
Orthophosphate	0.020	mg/L	0.009
Orthophosphate-P (PO4-P)	0.007	mg/L	0.003
Total Suspended Solids	Less Than MDL	mg/L	3
Total Dissolved Solids	78	mg/L	10
Biochemical Oxygen Demand	11.6	mg/L	10.0
Dissolved Metals by ICAP	see below	mg/L	
Dissolved Metals by GFAA	see below	ug/L	
Pesticides by Immunoassay	see below	ug/L	

Data for Dissolved Metals by ICAP mg/L:

Component Name	Result	Component MDL
Aluminum, Dissolved by ICP	Less Than MDL	0.019
Antimony, Dissolved by ICP	Less Than MDL	0.051
Arsenic, Dissolved by ICP	Less Than MDL	0.050
Barium, Dissolved by ICP	0.0400	0.0007

Data for Dissolved Metals by ICAP (continued):

Component Name	Result	Component MDL
Beryllium, Dissolved by ICP	Less Than MDL	0.0024
Boron, Dissolved by ICP	Less Than MDL	0.023
Cadmium, Dissolved by ICP	Less Than MDL	0.006
Calcium, Dissolved by ICP	8.99	0.023
Chromium, Dissolved by ICP	Less Than MDL	0.008
Cobalt, Dissolved by ICP	Less Than MDL	0.012
Copper, Dissolved by ICP	0.016	0.007
Gold, Dissolved by ICP	Less Than MDL	0.012
Iron, Dissolved by ICP	0.061	0.006
Lead, Dissolved by ICP	Less Than MDL	0.071
Lithium, Dissolved by ICP	Less Than MDL	0.003
Magnesium, Dissolved by ICP	3.90	0.030
Manganese, Dissolved by ICP	Less Than MDL	0.002
Nickel, Dissolved by ICP	Less Than MDL	0.049
Phosphorus, Dissolved by ICP	Less Than MDL	0.121
Potassium, Dissolved by ICP	Less Than MDL	1.210
Selenium, Dissolved by ICP	Less Than MDL	0.129
Silicon, Dissolved by ICP	8.27	0.034
Silver, Dissolved by ICP	Less Than MDL	0.006
Sodium, Dissolved by ICP	11.0	0.018
Strontium, Dissolved by ICP	0.024	0.001
Sulfur, Dissolved by ICP	0.627	0.030
Thallium, Dissolved by ICP	Less Than MDL	0.068
Tin, Dissolved by ICP	Less Than MDL	0.426
Vanadium, Dissolved by ICP	Less Than MDL	0.004
Zinc, Dissolved by ICP	0.173	0.004

Data for Dissolved Metals by GFAA ug/L:

Component Name	Result	Component MDL
Arsenic, Dissolved by GFAA	Less Than MDL	1.70
Chromium, Dissolved by GFAA	Less Than MDL	1.60
Lead, Dissolved by GFAA	Less Than MDL	1.36

Data for Pesticides by Immunoassay ug/L:

Component Name	Result	Component MDL
Alachlor by Immunoassay	Less Than MDL	0.06
Triazines by Immunoassay	Less Than MDL	0.06
Chlorpyrifos by Immunoassay	Less Than MDL	0.07
Chlorothalonil by Immunoassay	Less Than MDL	0.1
Metolachlor by Immunoassay	Less Than MDL	0.05
2,4-D by Immunoassay	Less Than MDL	0.9
Carbofuran by Immunoassay	Less Than MDL	0.07

If there are any questions regarding this data, please call.

Henry Francis
Laboratory Manager

From: KENTUCKY GEOLOGICAL SURVEY
Computer & Laboratory Services Section
Report of Analysis

September 15, 1997

To: Jim Webb
NAT. RESOURCES AND EPA
FRANKFORT OFFICE PARK
14 REILLY ROAD
FRANKFORT, KY 40601

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

Sample I.D. GS04876 Project ID: DOW
Project account: 4-60503
SAMPLE FIELD ID: AQUA/KY WATER SERVICE
Sample Collector: JOE DEVERS
Sample collection date: 08/12/97 Time: 10:10
Lab submittal date: 08/14/97 Time: 10:13
PINUMBER: 00033888

Parameter	Result	Units	MDL
Fluoride	0.07	mg/L	0.02
Sulfate	Less Than MDL	mg/L	5.00
Chloride	4.5	mg/L	1.00
Conductivity	130	uU/cm	1
pH	6.45	pH Units	0.01
Alkalinity	56	mg/L	4.0
Ammonia (NH3)	0.02	mg/L	0.02
Ammonia (NH3-N)	0.02	mg/L	0.02
Nitrate (NO3)	6.3	mg/L	0.10
Nitrate-N (NO3-N)	1.42	mg/L	0.02
Nitrite (NO2)	0.007	mg/L	0.002
Nitrite-N (NO2-N)	0.002	mg/L	0.001
Kjeldahl Nitrogen (NH3)	Less Than MDL	mg/L	0.61
Kjeldahl Nitrogen (NH3-N)	Less Than MDL	mg/L	0.50
Orthophosphate	0.027	mg/L	0.009
Orthophosphate-P (PO4-P)	0.009	mg/L	0.003
Total Suspended Solids	Less Than MDL	mg/L	3
Total Dissolved Solids	104	mg/L	10
Total Organic Carbon	Less Than MDL	mg/L	0.5

If there are any questions regarding this data, please call.

Henry Francis
Laboratory Manager

JAMES E. BICKFORD
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL SERVICES
CENTRALIZED LABORATORY FACILITY
100 SOWER BLVD STE 104
FRANKFORT KY 40601-8272

December 3, 1997

Division of Environmental Services
Report Number: A39-00200
Sample Number: 9705489

To: Division of Water
14 Reilly Road
Frankfort, Kentucky 40601

Re: Groundwater Monitoring Network

Attn: James Webb

AKGWA Number: 0003-3888

County: Hickman

Facility:

Collected by: Joseph Devers

Date: 10/21/97 **Time:** 0900

Delivered by: Joseph Devers

Date: 10/23/97 **Time:** 1045

Received by: Polly Baker

Date: 10/23/97 **Time:** 1045

Sample Matrix: Water

Collection Method: Grab

Sample Identification: Aqual / Ky Water Service

REPORT OF ANALYSIS

CAS NUMBER	TOTAL CONSTITUENTS	CONCENTRATION
77-47-4	1,2,3,4,5,5-Hexachloro-1,3-cyclopentadiene	ND @ 0.000040 mg/L
118-74-1	Hexachlorobenzene	ND @ 0.000010 mg/L
319-84-6	Hexachlorocyclohexane,alpha isomer	ND @ 0.000010 mg/L
319-85-7	Hexachlorocyclohexane,beta isomer	ND @ 0.000010 mg/L
58-89-9	Hexachlorocyclohexane,gamma isomer	ND @ 0.000010 mg/L
319-86-8	Hexachlorocyclohexane,delta isomer	ND @ 0.000010 mg/L
76-44-8	Heptachlor	ND @ 0.000010 mg/L
309-00-2	Aldrin	ND @ 0.000010 mg/L
2921-88-2	Chlorpyrifos	ND @ 0.000010 mg/L
1024-57-3	Heptachlor epoxide	ND @ 0.000010 mg/L
27304-13-8	Oxychlordane	ND @ 0.000010 mg/L
5103-74-2	trans-Chlordane	ND @ 0.000010 mg/L
5103-71-9	cis-Chlordane	ND @ 0.000010 mg/L
39765-80-5	trans-Nonachlor	ND @ 0.000010 mg/L
56534-02-2	alpha-Chlordene	ND @ 0.000010 mg/L
3734-48-3	Chlordene	ND @ 0.000010 mg/L
	gamma-Chlordene	ND @ 0.000010 mg/L
5103-73-1	cis-Nonachlor	ND @ 0.000010 mg/L
12789-03-6	Technical Chlordane	ND @ 0.000010 mg/L
3424-82-6	o,p'-DDE	ND @ 0.000010 mg/L
72-55-9	p,p'-DDE	ND @ 0.000010 mg/L

CAS NUMBER	TOTAL CONSTITUENTS	CONCENTRATION
60-57-1	Dieldrin	ND @ 0.000010 mg/L
72-20-8	Endrin	ND @ 0.000010 mg/L
53-19-0	o,p'-DDD	ND @ 0.000010 mg/L
72-54-8	p,p'-DDD	ND @ 0.000010 mg/L
789-02-6	o,p'-DDT	ND @ 0.000010 mg/L
50-29-3	p,p'-DDT	ND @ 0.000010 mg/L
8017-34-3	Total DDT	ND @ 0.000010 mg/L
72-43-5	Methoxychlor	ND @ 0.000010 mg/L
2385-85-5	Mirex	ND @ 0.000010 mg/L
959-98-8	Endosulfan I	ND @ 0.000010 mg/L
33213-65-9	Endosulfan II	ND @ 0.000010 mg/L
1031-07-8	Endosulfan sulfate	ND @ 0.000010 mg/L
7421-93-4	Endrin aldehyde	ND @ 0.000010 mg/L
53494-70-5	Endrin ketone	ND @ 0.000010 mg/L
8001-35-2	Toxaphene	ND @ 0.000100 mg/L
62-73-7	Dichlorvos	ND @ 0.000050 mg/L
759-94-4	S-Ethyldiisopropyl thiocarbamate (EPTC)	ND @ 0.000050 mg/L
2008-41-5	S-Ethyldiisobutyl thiocarbamate (Butylate)	ND @ 0.000050 mg/L
7786-34-7	Mevinphos	ND @ 0.000050 mg/L
1929-77-7	Vernolate (S-Propyldipropylthiocarbamate)	ND @ 0.000050 mg/L
30560-19-1	Acephate	ND @ 0.000400 mg/L
1114-71-2	Pebulate	ND @ 0.000050 mg/L
2212-67-1	Molinate	ND @ 0.000050 mg/L
34014-18-1	Tebuthiuron	ND @ 0.000400 mg/L
1918-16-7	Propachlor	ND @ 0.000050 mg/L
13194-48-4	Ethoprop	ND @ 0.000050 mg/L
1134-23-2	Cycloate	ND @ 0.000050 mg/L
101-21-3	Chlorpropham	ND @ 0.000050 mg/L
1582-09-8	Trifluralin	ND @ 0.000050 mg/L
1861-40-1	Benfluralin (Benefin)	ND @ 0.000050 mg/L
6190-65-4	Atrazine desethyl	ND @ 0.000050 mg/L
1610-17-9	Atraton	ND @ 0.000050 mg/L
1610-18-0	Prometon	ND @ 0.000050 mg/L
122-34-9	Simazine	ND @ 0.000050 mg/L
1912-24-9	Atrazine	ND @ 0.000050 mg/L
139-40-2	Propazine	ND @ 0.000050 mg/L
26399-36-0	Profluralin (Tolban)	ND @ 0.000050 mg/L
13071-79-9	Terbufos	ND @ 0.000050 mg/L
333-41-5	Diazinon	ND @ 0.000050 mg/L
944-22-9	Fonofos	ND @ 0.000050 mg/L
23950-58-5	Pronamide	ND @ 0.000050 mg/L
298-04-4	Disulfoton	ND @ 0.000050 mg/L
79538-32-2	Tefluthrin	ND @ 0.000050 mg/L
5902-51-2	Terbacil	ND @ 0.000100 mg/L
34256-82-1	Acetochlor	ND @ 0.000050 mg/L
15972-60-8	Alachlor	ND @ 0.000050 mg/L
21087-64-9	Metribuzin	ND @ 0.000050 mg/L
1014-70-6	Simetryn	ND @ 0.000050 mg/L
834-12-8	Ametryn	ND @ 0.000050 mg/L
7287-19-6	Prometryn	ND @ 0.000050 mg/L

CAS NUMBER	TOTAL CONSTITUENTS	CONCENTRATION
298-00-0	Methyl parathion	ND @ 0.000050 mg/L
886-50-0	Terbutryn	ND @ 0.000050 mg/L
121-75-5	Malathion	ND @ 0.000050 mg/L
314-40-9	Bromacil	ND @ 0.000050 mg/L
51218-45-2	Metolachlor	ND @ 0.000050 mg/L
43121-43-3	Triadimefon	ND @ 0.000050 mg/L
56-38-2	Parathion	ND @ 0.000050 mg/L
21725-46-2	Cyanazine	ND @ 0.000050 mg/L
113-48-4	MGK 264	ND @ 0.000050 mg/L
957-51-7	Diphenamide	ND @ 0.000200 mg/L
33820-53-0	Isopropalin (Paarlan)	ND @ 0.000200 mg/L
40487-42-1	Pendimethalin	ND @ 0.000050 mg/L
23184-66-9	Butachlor	ND @ 0.000050 mg/L
22248-79-9	Stirofos	ND @ 0.000050 mg/L
15299-99-7	Napropamide	ND @ 0.000050 mg/L
22224-92-6	Fenamiphos (Nemacur)	ND @ 0.000800 mg/L
19666-30-9	Oxadiazone	ND @ 0.000050 mg/L
150-50-5	Merphos (Folex)	ND @ 0.000050 mg/L
42874-03-3	Oxyflurfen (Goal)	ND @ 0.000050 mg/L
5234-68-4	Carboxin	ND @ 0.000050 mg/L
27314-13-2	Norflurazon	ND @ 0.000050 mg/L
51235-04-2	Hexazinone	ND @ 0.000050 mg/L
75-99-0	2,2-Dichloropropionic acid (Dalapon)	ND @ 0.00100 mg/L
51-36-5	3,5-Dichlorobenzoic acid	ND @ 0.000050 mg/L
1918-00-9	3,6-Dichloro-2-methoxybenzoic acid (Dicamba)	ND @ 0.000050 mg/L
120-36-5	Dichloroprop	ND @ 0.000100 mg/L
94-75-7	2,4-Dichlorophenoxyacetic acid (2,4-D)	ND @ 0.000100 mg/L
87-86-5	Pentachlorophenol	ND @ 0.000050 mg/L
133-90-4	Chloramben	ND @ 0.000100 mg/L
93-72-1	2-(2,4,5-Trichlorophenoxy)Propionic Acid	ND @ 0.000050 mg/L
	5-Hydroxydicamba	ND @ 0.000100 mg/L
93-76-5	2,4,5-Trichlorophenoxyacetic Acid	ND @ 0.000050 mg/L
94-82-6	4-(2,4-Dichlorophenoxy)butyric acid (2,4-DB)	ND @ 0.000400 mg/L
88-85-7	Dinoseb	ND @ 0.000100 mg/L
25057-89-0	Bentazone	ND @ 0.000100 mg/L
1918-02-1	Picloram	ND @ 0.000050 mg/L
50594-66-6	Acifluorfen	ND @ 0.000050 mg/L
12674-11-2	Aroclor 1016	ND @ 0.000050 mg/L
11104-28-2	Aroclor 1221	ND @ 0.000050 mg/L
11141-16-5	Aroclor 1232	ND @ 0.000050 mg/L
53469-21-9	Aroclor 1242	ND @ 0.000050 mg/L
12672-29-6	Aroclor 1248	ND @ 0.000050 mg/L
11097-69-1	Aroclor 1254	ND @ 0.000050 mg/L
11096-82-5	Aroclor 1260	ND @ 0.000050 mg/L
1336-36-3	Aroclor 1262	ND @ 0.000050 mg/L
11100-14-4	Aroclor 1268	ND @ 0.000050 mg/L

CAS NUMBER	DISSOLVED CONSTITUENTS	CONCENTRATION
7429-90-5	Aluminum	ND @ 0.032 mg/L
7440-36-0	Antimony	ND @ 0.037 mg/L

CAS NUMBER	DISSOLVED CONSTITUENTS	CONCENTRATION
7440-39-3	Barium	0.036 mg/L
7440-41-7	Beryllium	ND @ 0.002 mg/L
7440-70-2	Calcium	8.99 mg/L
7440-48-4	Cobalt	0.007 mg/L
7439-89-6	Iron	ND @ 0.009 mg/L
7439-95-4	Magnesium	4.23 mg/L
7439-96-5	Manganese	0.006 mg/L
7439-98-7	Molybdenum	ND @ 0.005 mg/L
7440-02-0	Nickel	ND @ 0.018 mg/L
7440-09-7	Potassium	ND @ 0.103 mg/L
7440-22-4	Silver	ND @ 0.003 mg/L
7440-23-5	Sodium	11.8 mg/L
7440-24-6	Strontium	0.025 mg/L
7440-31-5	Tin	ND @ 0.017 mg/L
7440-62-2	Vanadium	ND @ 0.003 mg/L
7440-66-6	Zinc	0.054 mg/L
7440-38-2	Arsenic	ND @ 0.002 mg/L
7440-43-9	Cadmium	ND @ 0.001 mg/L
7440-47-3	Chromium	ND @ 0.001 mg/L
7440-50-8	Copper	0.026 mg/L
7439-92-1	Lead	ND @ 0.002 mg/L
7439-97-6	Mercury	ND @ 0.00005 mg/L
7782-49-2	Selenium	ND @ 0.002 mg/L

ND = Not Detected

This report has been prepared and reviewed by personnel within the Division of Environmental Services. It has been approved for release.

William E. Davis

William E. Davis, Director
Division of Environmental Services

From: KENTUCKY GEOLOGICAL SURVEY
Computer & Laboratory Services Section
Report of Analysis

December 4, 1997

To: Jim Webb
NAT. RESOURCES AND EPA
FRANKFORT OFFICE PARK
14 REILLY ROAD
FRANKFORT, KY 40601

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

Sample I.D. GS05119 PROJECT ID: DOW
PROJECT ACCOUNT: 4-61346 SAMPLE FIELD ID: AQUA WATER SERVICE
Sample Collector: JOE DEVERS
Sample collection date: 10/21/97 Time: 09:00
Lab submittal date: 10/23/97 Time: 10:15
PINUMBER: 00033888

Parameter	Result	Units	MDL
Fluoride	0.08	mg/L	0.02
Sulfate	Less Than MDL	mg/L	5.00
Chloride	4.3	mg/L	1.00
Conductivity	132	uU/cm	1
pH	6.42	pH Units	0.01
Alkalinity	56	mg/L	4.0
Ammonia (NH3)	Less Than MDL	mg/L	0.02
Ammonia (NH3-N)	Less Than MDL	mg/L	0.02
Nitrate (NO3)	5.2	mg/L	0.10
Nitrate-N (NO3-N)	1.18	mg/L	0.02
Nitrite (NO2)	0.007	mg/L	0.002
Nitrite-N (NO2-N)	0.002	mg/L	0.001
Kjeldahl Nitrogen (NH3)	Less Than MDL	mg/L	0.61
Kjeldahl Nitrogen (NH3-N)	Less Than MDL	mg/L	0.50
Orthophosphate	0.024	mg/L	0.009
Orthophosphate-P (PO4-P)	0.008	mg/L	0.003
Total Recoverable Phosphorus	Less Than MDL	mg/L	0.05
Total Suspended Solids	Less Than MDL	mg/L	3
Total Dissolved Solids	84	mg/L	10
Total Organic Carbon	Less Than MDL	mg/L	0.5

If there are any questions regarding this data, please call.

Henry Francis
Laboratory Manager