



**Western Kentucky University  
Technical Assistance Center for Water Quality  
Center for Water Resource Studies**

**“Supporting Small Water Systems in  
Meeting the Goal of Public Health Protection”**

<http://water.wku.edu>  
(270) 745-8895

Grant Number X83123601-0

**First Year, First Quarter Report  
1 October – 31 December 2003**

Authors:

TACWQ Director Dr. Andrew Ernest,  
Dr. Chris Groves, Dr. Ouida Meier, Dr. Ritchie Taylor  
Western Kentucky University  
Phillip East, Andy Lange, Joe Burns, Kentucky Rural Water Association  
Dr. Jeff Jack, University of Louisville

Submitted to:  
**U.S. Environmental Protection Agency  
Office of Water  
30 January 2004**

## Table of Contents

Table of Contents .....	i
List of Tables .....	i
List of Figures .....	i
Executive Summary .....	1
Introduction.....	1
Synopsis .....	1
Summary of Expenditures.....	1
Summary of Activities .....	1
Task 1: Utility Management Institute (UMI).....	1
Task 2: Circuit Rider Program.....	2
Task 3: Source Water Protection .....	2
Task 4: Database Management and Information Tools .....	2
Task Reports .....	3
Task 1: Utility Management Institute (UMI).....	3
I. Work Status .....	3
II. Key Personnel Changes.....	3
Task 2: Circuit Rider Program.....	4
I. Work Status .....	4
II. Key Personnel Changes.....	6
Task 3: Source Water Protection Initiative.....	6
I. Work Status .....	6
II. Changes in Key Personnel.....	11
Task 4: Database Management and Information Tools .....	11
I. Work Status .....	11
II. Key Personnel Changes.....	12
Appendix A. Expenditures.....	13
Appendix B. Utility Management Institute Courses.....	14
Appendix C. Utility Management Institute Assessments .....	15

## List of Tables

Table 1. Summary of Expenditures .....	1
----------------------------------------	---

## List of Figures

Figure 1. Expenditures: October 1 - December 31, 2003 .....	13
-------------------------------------------------------------	----

## **Executive Summary**

### ***Introduction***

Western Kentucky University has established a Technical Assistance Center for Water Quality for small water systems. The underlying goal of the Center is to assist small water systems in the protection of public health and the provision of safe drinking water. Assistance is provided to small water systems through the Utility Management Institute, a small systems circuit rider, a source water protection program, and information technology. All aspects of the Center are focused on capacity development of small water systems through the enhancement of managerial, technical and financial capabilities. Information presented in this report represents efforts during the first quarter of year **one** (04) of this grant.

### ***Synopsis***

This first quarter, first contract year report depicts progress in each of the aforementioned tasks, with task activities that are focusing on the ultimate goal of improved public health through the provision of safe drinking water. The Technical Assistance Center for Water Quality's efforts continue in developing and delivering management training courses for small systems; in working with Western Kentucky University to provide technical oversight for online course development and delivery in water utility management; conducting on-site technical assistance for small system compliance; providing technical assistance to develop and promote source water protection, through source water assessments, field investigations, on-site source water assistance and community relations; and developing and distributing information and information tools.

### ***Summary of Expenditures***

Expenditures for this task from October 1 through December 31, 2003 are summarized in Table 1. Greater detail can be found in Appendix A.

**Table 1. Summary of Expenditures**

<b>Task</b>	<b>Expenditure</b>
Administration	\$12,775.51
Task 1 – Utility Management Institute	\$11,525.60
Task 2 – Small Systems Circuit Rider	\$13,511.37
Task 3 – Source Water Protection	\$9,348.94
Task 4 – Data Management	\$9,072.55
<b>Total</b>	<b>\$56,233.97</b>

### ***Summary of Activities***

#### **Task 1: Utility Management Institute (UMI)**

During the quarter, the course entitled “Utility Management 101” was presented in Pineville, Kentucky on November 18-20, 2003 at the Pine Mountain State Resort Park. There were twenty-two (22) students participating in this course. Course assessments for the November 18-20 course are included as Appendix B to this report.

Andy Lange attended the Association of State Drinking Water Administrators (ASDWA) Annual Conference in Boston, Massachusetts on October 5-8, 2003.

An updated informational brochure, specifically developed to promote the Utility Management Institute's course of study and upcoming schedule of UMI classes, was completed during the Quarter. The brochure lists the dates and locations for each of the six course presentations scheduled in 2004. Copies of the brochure are included as Appendix C to this report.

### **Task 2: Circuit Rider Program**

During the 1st Quarter of 2003-2004, the Circuit Rider position logged 587.0 hours. Of that time 31% of the total time was spent directly assisting systems or their personnel including 96.5 hours on-site working with systems, 51.0 hours developing plans and reports for systems, and 35.75 hours providing formal training.

Much of this quarter was spent with updating sample site maps in GIS format, source water protection, developing rate structure, training and meetings with state agencies. Compliance assistance included monitoring and reporting, creating a corrective action plan, developing TTHM monitoring plans and revising wellhead protection plans. Technical assistance included system mapping, wastewater flow monitoring for source water protection, water well level monitoring, leak detection and security/vulnerability assessments.

### **Task 3: Source Water Protection**

Work on the Source Water Protection Initiative's four major existing projects: Task 3A, the Source Water Protection Education Project, Task 3B, the Disinfection Byproducts and Haloacetic Acids (HAA's) Project, Task 3C: the Impaired Watershed Program, and Task 3D: Landuse and Source Water in Karst Regions each achieved scheduled progress during the quarter. We continued to work closely with the Kentucky Department of Agriculture, Division of Pesticides regarding this work, and have begun fieldwork in the agricultural Upper Iowa River watershed, Iowa, in collaboration with the Upper Iowa River Watershed Alliance. In our Source Water Education Program, we continued development of the third and fourth modules of our educational project, including Best Management Practices and Relationships Between Land Use and Source Water Quality, and proposed a special session for this fall's National Conference of the Geological Society of America meeting in Denver Colorado: Source Water Protection for Small Systems: Stakeholder Needs, Public Policy, and Geologic Realities, to begin reaching the academic community. Within the Disinfection Byproducts and Haloacetic Acids (HAA's) Program we able to perform a pilot study on the effects of light regime and algal senescence on HAA production, and we have also been communicating the Kentucky Division of Water SWAP committee on suitable sites for our reservoir HAA work.

### **Task 4: Database Management and Information Tools**

This quarter we publicized the work and findings of the TACWQ and the CWRS at a number of meetings and workshops. We also learned new information at these meetings that will be helpful in our service to small water systems and in source water protection. We have made excellent progress toward additional progress toward completing a piece of interactive software for water systems to use in completing their Emergency Response Plans. Our goal is to include this software in a nationally-appropriate Tools CD that will be distributed within the next quarter. We

are continuing to work to complete website updates that will improve navigation and visual appeal.

## **Task Reports**

### ***Task 1: Utility Management Institute (UMI)***

#### **I. Work Status**

The goal of the UMI is to develop and deliver a series of courses to be included in a “Utility Management Professional” certification program. This program is available to system managers, operators, and office managers of water systems serving rural areas and small municipalities with populations under 10,000.

#### **A. Work Progress**

During the quarter, the course entitled “Utility Management 101” was presented in Pineville, Kentucky on November 18-20, 2003 at the Pine Mountain State Resort Park. There were twenty-two (22) students participating in this course. Course assessments for the November 18-20 course are included as Appendix B to this report.

Andy Lange attended the Association of State Drinking Water Administrators (ASDWA) Annual Conference in Boston, Massachusetts on October 5-8, 2003.

An updated informational brochure, specifically developed to promote the Utility Management Institute’s course of study and upcoming schedule of UMI classes, was completed during the Quarter. The brochure lists the dates and locations for each of the six course presentations scheduled in 2004. Copies of the brochure are included as Appendix C to this report.

#### **B. Difficulties Encountered**

No unanticipated difficulties were encountered.

#### **C. Preliminary Data Results**

The Utility Management Institute now claims a total of one hundred forty-eight (148) students. Thirty-five (35) of our students have now completed all six of the courses in the UMI Series and have been awarded the Utility Management Professional designation. Course assessments continue to show a high level of satisfaction with the training. Sixteen (16) of the nineteen (19) assessors rated the session at the highest level (very beneficial). The remaining three assessments were marked at the next highest level (beneficial).

#### **D. Anticipated Activities**

During the second quarter of 2003-2004, the UMI course entitled “Utility Finance and Administration” will be presented in Gilbertsville, Kentucky on March 17-18, 2004 at the Kentucky Dam Village State Resort Park.

## **II. Key Personnel Changes**

There were no personnel changes during this quarter.

## ***Task 2: Circuit Rider Program***

### **I. Work Status**

The "Circuit Rider" approach to providing a combination of on-site technical assistance and training is nationally recognized as the most effective method of assisting small public water systems to comply with state and federal environmental regulations. The Circuit Rider program works in partnership with Kentucky Division of Water (DOW) to target the public water systems serving populations under 3,300, with particular emphasis on systems serving less than 500 people. Our "Circuit Rider" approach works to target those small systems experiencing profound difficulties in complying with SDWA provisions in order to enhance protection of public health.

### **A. Work Progress**

During the 1st Quarter of 2003-2004, the Circuit Rider position logged 587.0 hours. Of that time 31% of the total time was spent directly assisting systems or their personnel including 96.5 hours on-site working with systems, 51.0 hours developing plans and reports for systems, and 35.75 hours providing formal training.

Much of this quarter was spent with updating sample site maps in GIS format, source water protection, developing rate structure, training and meetings with state agencies. Compliance assistance included monitoring and reporting, creating a corrective action plan, developing TTHM monitoring plans and revising wellhead protection plans. Technical assistance included system mapping, wastewater flow monitoring for source water protection, water well level monitoring, leak detection and security/vulnerability assessments.

### ***Significant Contacts***

Both significant contacts are continuations for last quarter. Although many other systems were assisted this quarter these two provided the greatest challenges.

#### **Joshua's Dream Foundation**

Located in Cornettsville, Perry County Kentucky Joshua's Dream Foundation is a non-community non-transient water system serving a drug treatment center.

#### **Brief History**

Their source of water is a pond about one acre in size. Water is treated by slow sand filtration, reverse osmosis and chlorination. The circuit rider became involved after the operator quit and the system fell into non-compliance for turbidity and monitoring and reporting.

#### **Follow-up**

The circuit rider accompanied the system at the October 7, 2003 enforcement hearing. The hearing went very well since the Division of Water recognized that the system was receiving technical assistance and working toward a solution. No penalties were directly assessed at the hearing, but as part of an agreed order monetary fines will apply if certain deadlines were not met.

Since that time a corrective action plan has been submitted to the Division of Water and a certified operator has been contracted. Future plans are to rebuild both slow sand filters modified with granular activated carbon and construct a floating intake.

### **Black Mountain Utility District**

Located in Baxter, Harlan County Kentucky serving approximately 1,400 water connections and 70 wastewater connections.

#### Brief History

The district holds six PWSID's, including the operation of one small groundwater sourced water treatment plant and distributes water from two municipalities to five different areas of the county. They also operate two small wastewater treatment plants rated at 0.150 mgd and a 0.010 mgd respectively.

#### Follow-up

On November 18, 2003 the circuit rider participated with local, state and federal officials at a public meeting in the community of Closplint, KY. The meeting was held to present the environmental and financial impact of the proposed sewer system. The meeting was well organized and allowed the public to ask question and discuss their concerns.

Although the proposed sewer system will be 100% grant the question of how the community of 120 connections can pay the O&M costs. The circuit rider presented his cost of service analysis and a methodology for setting a fixed base rate for sewer service. Instead of the current sewer variable rate scheme based on water usage a fixed rate of \$21.00. This will provide the utility a 12% revenue margin and 30% depreciation. After explaining this fixed rate concept everyone seemed to be agreeable. Mostly because it is easy to budget for and it conserves the cost of their monthly bill if they have a leak.

### **B. Difficulties Encountered**

No unanticipated difficulties were encountered.

### **C. Preliminary Data Results**

See Work Progress above.

### **D. Anticipated Activities**

During the next quarter, the WKU Small System Circuit Rider will continue to assist systems with operational and management problems. An increasing amount of the Circuit Rider's time is expected to be spent on-site demonstrating and training system personnel to use GPS technology to map and manage their utility. Also, time will be spent in developing a monitoring and reporting database. The database will be designed to provide water systems better control and analysis of their monitoring results. The Circuit Rider will continue to create educational opportunities for the communities we serve. Educational activities will focus on elementary, middle, and high school children and will emphasize the role small utilities play and the importance of good source water quality. This work will be coordinated with efforts within the WKU Center for Water Resource Studies.

## **II. Key Personnel Changes**

No changes in Key Personnel were made during this quarter.

### ***Task 3: Source Water Protection Initiative***

#### **I. Work Status**

##### **A. Work Progress**

Work on the Source Water Protection Initiative's four primary initiatives, a) the Source Water Education Program, b) the Impaired Watershed Program, c) the each, with t, as discussed in the report below.

##### ***Task 3A: Source Water Protection Education Project***

We continued development of the third and fourth modules of our educational project, including *Best Management Practices* and *Relationships Between Land Use and Source Water Quality*. We continue to build a website from this material.

During the quarter we met with our program officer Deborah McCray at EPA Headquarters, along with representatives of EPA's Source Water Protection Program, and discussed a modified direction for our education program, which we have agreed to and have initiated during the quarter, in addition to our already agreed upon tasks. This new emphasis is directed toward the academic community, and to begin we have proposed a special session for this fall's National Conference of the Geological Society of America meeting in Denver Colorado: *Source Water Protection for Small Systems: Stakeholder Needs, Public Policy, and Geologic Realities*. This has been favorably received by the Society, and upon the presumed acceptance, we will report the details in the next quarter. We anticipate organizing and editing a special issue of a refereed hydrological or environmental journal based on this theme.

##### ***Task 3B: Disinfection Byproducts and Haloacetic Acids (HAA's) Program***

We able to perform a pilot study on the effects of light regime and algal senescence on HAA production during Quarter 1. We used the mesocosm facility at Westport Kentucky to manipulate the availability of light to produce either an algal bloom, an algal bloom followed by die back or to maintain algal growth similar to that in the river. We assessed algae as CHLa and through individual cell counts to compare responses. This pilot experiment allowed us to work the "bugs" out of our tank system and prepare for our first full field sampling in May.

We have also been communicating the Kentucky Division of Water SWAP committee on suitable sites for our reservoir HAA work. They are supportive of our choice of Guist Lake in Shelbyville and we are currently attempting to coordinate our efforts with another unrelated sampling program. The state has been supporting new agricultural BMPs in the watershed, so we will be contacting their project leader to see if we can get access to their dataset, which could provide us with very useful pre-project data.

Implications for HAA Research and Model Development and Water Management: We have not yet completed our first full cycle of experiments. The pilot study indicated that the mesocosms were able to maintain "riverine-like" conditions through the study period and that the mesocosms will be a good model system for investigating HAA potential in the Ohio River.

### ***Task 3C: Impaired Watershed Program***

This section of the report summarizes work completed under the Source Water Protection Program – Impaired Watersheds task and in support of capacity development of small water systems. This task within the Source Water Protection Program is designed to work with small water systems to increase capacity development through the application of source water protection methods, technology, partnership initiatives, best management practices and outreach. The intent is to develop frameworks to address restoration of impaired watersheds and improve source water quality.

This quarter report depicts progress in the aforementioned task, with activities that were focused on the ultimate goal of improved public health. The efforts in this quarter continued in providing technical assistance to develop and promote source water protection, through source water assessments, field investigations, on-site source water technical assistance, and presentation of results at meetings conference; and creating frameworks that develop partnerships to assist small water systems. We continue to conduct assistance related to atrazine contamination of drinking water supplies in order to reduce the public health risk of this herbicide and others. A goal in this arena is to work with farmers, agricultural assistance providers, regulators and other stakeholders to determine best management practices that reduce levels of herbicides in drinking water supplies and to create partnership frameworks that help water small water systems go from the assessment to the implementation phase. Additionally, we continue to strive to publish and present results of the task in publications and at conferences of regional and national significance. A focus is to get information to the small systems that this task is designed to benefit.

We have continued to promote capacity development through source water protection by improvement of source water quality in impaired watersheds. Specific activities have included outreach, technical assistance, and research to improve source water protection. Currently, we are working with the City of Marion, McCreary County Water District, the City of Franklin, and small water systems in the Rough River Watershed of Kentucky. All of these small water systems are in Kentucky. However, we are working to expand the McCreary County program into an interstate source water protection initiative. These projects, although regional in nature are designed to be nationally recognized examples of how source water protection of small water systems is accomplished. We have already received recognition on the national level for this and will again be presenting our results at the AWWA 2004 Water Sources Conference and Exposition in Austin, Texas, January 11, 2004, an international meeting.

We continue to work with small water systems to increase the use of technology and methods for mapping infrastructure and resources. Although this specific work is more of a community service area, providing students the opportunity to work with communities and directly assist small water systems, we are hoping to advance the use GPS and GIS in source water protection. However, small water systems must first learn the benefits of this technology and how it can assist them in the management of their systems. Currently, we have a service project with Webster County Water District to map their infrastructure and assist in development of a GIS for their system. We are working in Kentucky to increase the use of GPS and GIS in small water system management. A concern of many small systems is that the location of infrastructure is difficult at best to determine with as built system maps, operator knowledge, and changing system conditions. Therefore, we are assisting small systems in using advanced technology to manage their systems.

## **Publications and Presentations**

This quarter we have produced several presentations and one publication to advance capacity development of small systems. One article was written and submitted to Kentucky Rural Water Association for publication in the spring issue of *Waterproof*. This publication goes out to small rural water systems across Kentucky. Our article, "Utilization of GIS Technology: Part II", highlighted the resources, time, and steps necessary to develop a GIS for a small water system. Additionally, the article provides number of man-hours, pitfalls to avoid, and financial requirements.

We delivered a presentation during the quarter at Rough River State Park to develop the Rough River Source Water Protection Council. The presentation was focused on a framework developed to assist the small water systems in the basins with reducing atrazine levels in their source water, Rough River Lake. Attendees included representatives from Western Kentucky University, University of Kentucky, Kentucky Cooperative Extension Service, U.S. Army Corps of Engineers, Grayson County Water District, USDA, Kentucky Department of Agriculture – Pesticides Division, Kentucky Rural Water Association, and Kentucky Division of Water. Atrazine has been detected above the MCL in the finished water of a small system in the basin. We will be working with the group to monitor the source water, continue the partnership framework, and move from the assessment the implementation phase. The technical assistance will include the development of action plans to reduce atrazine levels. Again, we will be presenting at the AWWA Sources of Water Conference in Austin, TX during the next quarter.

## **Source Water Protection Initiatives**

We are working with KRWA and their counterpart in Tennessee to form a utility based and interstate source water protection advisory council for the Big South Fork of the Cumberland River. This effort will assess the utility-based model for source water protection that has already been successful in McCreary County, KY. By working with small water systems throughout the basin, we anticipate that we can develop a model for source water partnerships and protection at the interstate level. The success of this ongoing project will be dependant upon the input of the small water systems and the communities that are served. The goal is to develop an advisory council that can integrate local concerns, local threats, and local input to reduce the threat of potential sources of contamination by proactive assessment and planning. As we found in McCreary County, having small water utilities as the central focus will be the key. We continue to work in two important areas of source water protection, as well. Our technical assistance continues in the assessment of herbicides/pesticides and the development of partnerships and best management practices to alleviate these problems. Focus has been on the herbicide atrazine and its wide distribution and occurrence in source waters throughout Kentucky. In particular, we have continued to work with the City of Marion and the assessment of Spa Lake. We are working to increase this effort by assisting the Rough River Source Water Protection Council, which includes the City of Leitchfield (a small water system included in the MOA between Syngenta and EPA). These small systems and Marion were listed as priority water supplies in Kentucky in the recent atrazine reregistration document.

The goal of work in the Rough River watershed is to assess the use of the utility based source water protection model, working with the Kentucky Pesticide Workgroup, in a larger watershed that includes several HUC 11 subwatersheds. To investigate methods to improve source water protection of small water systems, we are working to form a partnership with a neighboring

small water system, the City of Franklin. Students will be working to assist the City of Franklin in source water protection efforts.

### **GIS/GPS Technology Initiatives**

Currently, we are working with Webster County Water District to conduct a GIS mapping project of their infrastructure. This project will allow us to test our previous model used at West McCracken Water District for data collection and develop more efficient models for small water systems. As small water systems are limited in time and resources, we are working to increase their efficiencies, provide them with access to new technology, and increase their awareness of how these technologies can be used to increase capacity development. Our project with Webster County has already been kicked off and data collection has begun.

### ***Task 3D: Landuse and Source Water in Karst Regions***

#### **Agricultural Contamination of Karst Water Sources in Northeast Iowa**

During this quarter Ms. Pat Kambesis continued fieldwork for determining groundwater flow and contaminant transport in the Coldwater Creek Groundwater basin of the Upper Iowa River Watershed. Results of this study are being prepared for presentations to be made to local landowners, Iowa Department of Natural Resources and UIRWA personnel in January 2004.

In October, and November, water samples were collected at the two springs that serve as the discharge points for the Coldwater Cave groundwater basin. The samples are being analyzed for cations, anions, pesticides and bacteria. Samples that were collected in October 2003 for Nitrogen Isotope analysis were finally delivered for analysis at the Illinois Geologic Survey. Data was also provided on TOC, cations and nitrates. Examples are expected in February of 2004.

Based on stream flow and stage data collected during 2001-2003, a rating curve has been constructed. That data will be used to make discharge/stage curves for stage data that was collected between 1980 and 1992. The stage data is in hard copy format so all stage points must be handed picked and entered into a spreadsheet that will generate discharge stage curves for each year. The ten years worth of discharge/stage data will be analyzed in order to produce a model of how the shallow karst aquifer responds to storm and snow melt events.

A land use analysis map is currently being constructed from field data and aerial photographs. The map will be used in conjunction with dye trace maps and cave maps in order to illustrate the relationship between land use and water.

In October of 2003, fluorescein dye was injected at in a downstream passage that runs parallel with the main conduit in the aquifer. Results indicate that there is a complex underground drainage divide between these two conduits.

### ***Other Progress***

#### **Dissemination of Results**

##### Presentations at Scientific Conferences

The following presentations were given during the quarter

Kuykendall, Jason and Chris Groves, *Atmospheric Transport of the Herbicide Atrazine in South Central Kentucky*. 2003 Annual meeting of the Kentucky Academy of Science, Bowling Green, Kentucky.

Robb, Elizabeth, Chris Groves, John All, and Pat Kambesis, *Protecting Rural Drinking Water Supplies Through Education*. 2003 Annual meeting of the Kentucky Academy of Science, Bowling Green, Kentucky.

Kambesis, Pat, *A Systems Approach to the Understanding of Agricultural Contaminant Sources and Transport Within a Karst Groundwater Basin*. 2003 Annual meeting of the Kentucky Academy of Science, Bowling Green, Kentucky.

Groves, C. and Joe Meiman, *Post Application Season Atrazine Levels Within Waters of Mammoth Cave National Park*. 2003 Annual meeting of the Kentucky Academy of Science, Bowling Green, Kentucky.

Robb, Elizabeth, Chris Groves, John All, and Pat Kambesis, *Protecting Rural Drinking Water Supplies Through Education*. 2003 National Cave and Karst Management Symposium, Gainesville, Florida.

Kambesis, Pat, *A Systems Approach to the Understanding of Agricultural Contaminant Sources and Transport Within a Karst Groundwater Basin*. 2003 National Cave and Karst Management Symposium, Gainesville, Florida.

#### **Collaboration with the Kentucky Pesticide Work Group**

During the quarter we continued active work in collaboration with the Kentucky Pesticide Work Group, particularly in relation to herbicide-based source water contamination problems at Marion and Kentucky, attending the group's quarterly meeting in Frankfort Kentucky, in December. We continue to provide scientific and technical guidance to the Group, as well as providing actual source water quality data from within the state. Other participants include the state Division of Pesticides, the Division of Water, the Department of Conservation, as well as the Kentucky Corn Growers Association, the Kentucky Rural Water Association, the US Geological Survey, the US Natural Resources Conservation Service and the Syngenta Corporation (formerly Novartis, a major manufacturer of atrazine).

#### **B. Difficulties Encountered**

During the quarter there were no difficulties in performing the tasks of the project.

#### **C. Preliminary Data Results**

We have developed a presentation that was presented to the Rough River Source Water Protection Council in order to solidify partnerships and the group. This presentation has been developed into a generic format that can be used by technical service providers, small water systems, and other stakeholders to guide formation of partnerships and source water protection councils. Essentially, this presentation can be used to initiate source water protection activities and lead a discussion of necessary tasks to move from assessment to implementation of source water protection.

## **D. Anticipated Activities**

Work will continue on all aforementioned initiatives

## **II. Changes in Key Personnel.**

No changes in Key Personnel were made during this quarter.

## ***Task 4: Database Management and Information Tools***

### **I. Work Status**

The Database Management component of this Task provides appropriate methods for reporting and retrieving data and metadata. The Information Tools function of our Task works to put technology, information, and the tools to create “information capacity” and capability directly into the hands of water providers, and to make that information technology as accessible as possible in order to promote the protection of public health.

### **A. Work progress.**

This quarter we publicized the work and findings of the TACWQ and the CWRS at a number of meetings and workshops. We also learned new information at these meetings that will be helpful in our service to small water systems and in source water protection. We have made excellent progress toward additional progress toward completing a piece of interactive software for water systems to use in completing their Emergency Response Plans. Our goal is to include this software in a nationally-appropriate Tools CD that will be distributed within the next quarter. We are continuing to work to complete website updates that will improve navigation and visual appeal.

Events during this past quarter that had relevance to the work of the TACWQ included the following:

- September 30 – October 3, 2003: The **Kentucky-Tennessee section of the American Water Works Association** held its annual conference in Bowling Green, KY. Dr. Meier and students assisted with the mechanics of the meeting for several days, troubleshooting laptops, projectors, and software for speakers’ presentations.
- November 6-8, 2003: We helped organize, host, and made several presentations at the annual Kentucky Academy of Sciences conference, held this year in Bowling Green, KY jointly with the annual Kentucky Biodiversity conference, Mammoth Cave National Park research conference, and the Cave Research Foundation conference. Dr. Meier presented a paper entitled, “**Relationships between Land Use and Water Quality in the Upper Green River Basin and CREP Region,**” authored by Ouida Meier, Scott Grubbs, Albert Meier, and Jaga Anmala. Jenna Harbaugh presented a paper entitled, “**GIS analysis of the Upper Green River Conservation Reserve Enhancement Program in South Central Kentucky,**” authored by Ouida Meier, Jenna Harbaugh, Anupama Oruganti, Scott Grubbs, and Albert Meier. Anupama Oruganti presented a paper entitled, “**Patterns of Challenges to Safe Drinking Water in the United States: Population Distribution of Drinking Water Sources and Maximum Contaminant Level Violations of Drinking Water Systems,**” authored by Ouida Meier, Anupama Oruganti, and Rupesh Mamidi. Dr. Kerrie McDaniel presented a paper entitled, “**Impacting Elementary Science Education Through Hands-on Science Labs,**” and was coauthored by Dr. Kerrie McDaniel and Dr. Ouida Meier.

- November 9-10, 2003: Drs. Albert and Ouida Meier brought a group of students to the University of Georgia Institute of Ecology to interview internationally reputable scientists about their methods and their research questions.
- November 14, 2003: Dr. Ouida Meier and the Center for Water Resource Studies hosted the annual Upper Green River Watershed Watch fall conference on the WKU campus. Citizen volunteers and regional scientists came together to review the year's data. Data mapping and presentation was handled by Dr. Meier's lab in a presentation entitled, "**Upper Green River Watershed Watch: Data 2003**" authored by Dr. Meier and Anupama Oruganti.
- December 3, 2003: A presentation was made to the Barren River Area Development District regarding onsite sewage disposal alternatives. Dr. Meier prepared and presented a series of maps, using Warren County as an example, highlighting the interactions among karst geology, suitability of soils for use in septic treatment, and population density as a means of selecting appropriate onsite sewage treatment alternatives where there is a lack of sewage treatment plant service. The presentation was entitled, "**Physical Parameters Influencing Wastewater Treatment Choices: Maps for Warren County, Kentucky and the Barren River Area Development District**" and was authored by Ouida Meier, Anupama Oruganti, and Mark Graham.
- December 6, 2003: Dr. Ouida Meier was asked to make a presentation on endocrine disruptors as emerging pollutants to the annual science conference of the Upper Cumberland Watershed Watch group, who had measured estradiol-17b in their sampling protocol and was interested in potential effects on humans through drinking water supplies. The presentation was entitled, "**Endocrine Disruptors and Estrogen Sampling by Watershed Watch,**" authored by Dr. Meier.

Through our activities this quarter we have made significant progress toward our stated goals and workplan commitments, including: better internet communication of information, services, and products; progress on information tools and services for small water systems (including the national Tools CD and the Emergency Response Planning Tool), research on source water quality issues and challenges, analyzing national patterns of drinking water problems (including presenting data at a conference), and professional cooperation with agencies, groups, and institutions.

### **B. Difficulties encountered**

No insurmountable difficulties have been encountered.

### **C. Preliminary data results**

Data results have been presented in previous quarters. We are currently focusing on moving our data and findings into publications.

### **D. Anticipated activities**

In the coming quarter, we anticipate substantive additional work on the Emergency Response Plan template, which is a new commitment for FY04. We also expect the needed modifications to the website to be substantially complete.

## **II. Key Personnel Changes**

No changes in Key Personnel were made during this quarter.

## Appendix A. Expenditures

### Drinking Water Grant X83123601- 0 Expenditures Oct 1 - Dec 31, 2003

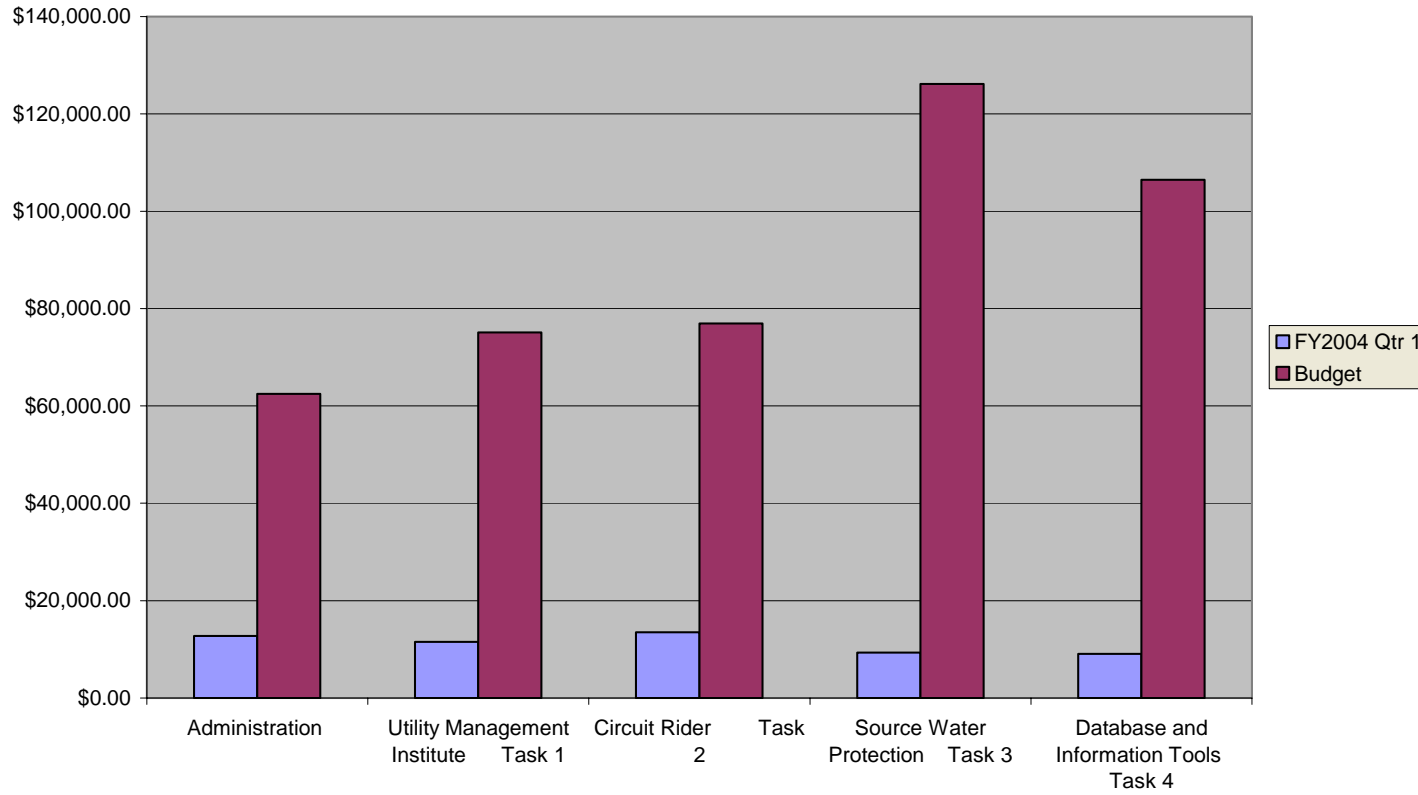


Figure 1. Expenditures: October 1 - December 31, 2003

## **Appendix B. Utility Management Institute Courses**

**Appendix C. Utility Management Institute Assessments**