



**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”**

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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 third quarter of year six of this grant.

Summary of Expenditures. Total expenditures for this quarter were \$108,786.04. A breakdown of costs can be found in Appendix A.

Task 1: Utility Management Institute. 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.

Task 2: Small Systems Circuit Rider. 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 below 3300, 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.

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 with the Kentucky Department of Agriculture, Division of Pesticides regarding this work, and are continuing data analysis in the agricultural Upper Iowa River watershed, Iowa, in collaboration with the Upper Iowa River Watershed Alliance. We continued work on three educational modules to the internet, including *Introduction to Source Water Protection*, *Impacts of Karst on Source Water Protection*, and *Developing Stakeholder Networks*. We have scheduled four workshops in the next quarter in collaboration with the (Kentucky) Barren River Area Development District, the Kentucky Rural Water Association, and other partners. We developed planning to assist with atrazine problems of several systems on the Rough River, continued sampling at the Marion supply for atrazine, and Hawkins and Logsdon Rivers for a variety of water quality parameters. Within the Disinfection Byproducts and Haloacetic Acids (HAA’s) Program we contacted three small water companies to assess their DBP problems and willingness to collaborate on the THM project.

Task 4: Database Management and Information Tools. The goal of this task is to provide

products and services in the form of information and information tools in order to benefit small water systems, and in turn protect public health. Specific goals for this quarter included testing, refining and distributing tools on CD for small water systems, analyzing water quality data relationships through the use of GIS data, and preparing to present data regarding national patterns of drinking water problems. We have made significant progress in these goals during this quarter.

Task 1: Utility Management Institute

A. Work Progress. During this quarter, the course entitled “Utility Organization, Regulation & Law” was presented in Burkesville, Kentucky on April 28-29, 2004 at the Dale Hollow Lake State Resort Park. Twenty-two (22) students participated in this course.

An updated informational brochure, specifically developed to promote the Utility Management Institute’s course of study and upcoming schedule of UMI classes, was mailed to all water and wastewater utilities during this quarter. The brochure lists the dates and locations for each of the six course presentations scheduled in 2004.

B. Difficulties Encountered. No unanticipated difficulties were encountered.

C. Preliminary Data Results. The Utility Management Institute now claims a total of one hundred fifty-nine (159) students. Thirty-eight (38) 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. Fifteen (15) of the eighteen (18) assessors rated the session at the highest level (very beneficial). Three assessments were marked at the next highest level (beneficial).

D. Anticipated Activities. During the fourth quarter of 2004, the following UMI courses will be presented: “Human Resource Management for Utilities” in Bowling Green, KY on July 21-22, 2004 at the Carroll Knicely Conference Center; “Modern Technology and Utility Management” in Pineville, KY on August 11, 2004 at Pine Mountain State Resort Park; and “Public Relations in Utility Management” in Prestonsburg, KY on September 22, 2004 at Jenny Wiley State Resort Park.

Task 2: Small Systems Circuit Rider

A. Work Progress. During the 3rd Quarter of 2004, the Circuit Rider position logged 580 hours. Of that time, 45% was spent directly assisting systems or their personnel, including 113.75 hours on-site working with systems, 138.5 hours developing plans and reports for systems, and 10.5 hours providing formal training.

Much of this quarter was spent developing consumer confidence reports and vulnerability assessments. Compliance assistance included monitoring and reporting, Groundwater Protection

Plans, TTHM monitoring plans, water withdrawal permits and revising wellhead protection plans. Technical assistance included GPS mapping, leak detection and aquifer testing.

Considerable assistance was provided to Sedalia Water District, Hardeman Water District, Cuba Water System, and Cunningham Water District in preparing their Consumer Confidence Reports.

Sandy Hook Water District, located in Elliott County, KY, serves 1,100 water connections. The system treats groundwater with pressure filtration, approximately 150,000 GPD, from four wells drilled in to the Lee Sandstone. Sandy Hook began experiencing water supply shortage problems as a result of a 42-mile waterline extension project. This increased the operation time of the plant and caused the district to purchase water to supplement their production. A new well was drilled, but before it could go online an aquifer pumping test and water quality analysis were required by the state primacy agency. The circuit rider became involved with these activities at the request of the water district.

Also during the quarter, Sandy Hook Water District was provided with assistance on their Consumer Confidence Report and their Vulnerability Assessment.

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.

Task 3: Source Water Protection Initiative

A. Work Progress

Work on the Source Water Protection Initiative's four primary goals each achieved progress as described below.

Task 3A: Source Water Protection Education Project

The source water protection website that we continue to develop is online at <http://geoggeol.wku.edu/sourcewater> and features the module *Impacts of Karst on Source Water Protection*. There are links to two power point presentations that are the precursors to two modules currently under construction: *Introduction to Source Water Protection*, and *Developing*

Stakeholder Networks for Source Water Protection. These modules are anticipated to be on-line on or before August 15th. Descriptions of our final modules, *Best Management Practices for Source Water Protection*, and *Relationships Between Water Quality and Land Use*, are also available. These modules are anticipated to be on-line by September 1st.

In addition to the on-line modules, the website features links to other entities working to protect water quality, a reading room housing articles pertaining to water quality protection, and a glossary of more than 50 definitions of words relating to water quality and karst environments.

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

During this period we met in person or by telephone with three small water companies to assess their DBP problems and willingness to collaborate on the THM project. Both the Shelbyville and Springfield Water Companies were interested in taking part; planning meetings are scheduled for early July.

We also “de-winterized” the ORES station and brought the mesocosm system back on line in preparation for the THM experiments scheduled for early July.

Task 3C: Impaired Watershed Program

We continued by-weekly sampling and analysis of raw and finished water for atrazine from the Marion, Kentucky water system in cooperation with the Kentucky Department of Agriculture, Division of Pesticides.

We completed quarterly sampling and analysis of waters for a full set of water quality parameters in conjunction with the National Park Service at our Logsdon River and Hawkins River monitoring sites. Assuming that the current work plan for FY05 is approved by EPA as submitted, we will discontinue monitoring of these sites with EPA funds, although sampling at the sites, including pesticides, will continue under the National Park Service's Long Term Ecological Monitoring Program.

Task 3D: Landuse and Source Water in Karst Regions

Pat Kambesis received the final version of the atrazine data for the Coldwater Cave groundwater basin in northeastern Iowa. She is currently integrating the land use data with the atrazine results in order to explain the levels of atrazine in the study area.

She was also asked to comment on an application for a hog confinement operation that is being proposed for the northeast section of the Coldwater Cave groundwater basin. Results have been forwarded to the Department of Natural Resources, Iowa.

Ms. Kambesis is currently working with the Upper Iowa Research, Conservation and Development group in producing an educational brochure about karst and its effects on water quality in Northeast Iowa.

Additional Progress

During this quarter, three abstracts were accepted for presentation at three different scientific conferences. “Atrazine Contamination of a Kentucky Drinking Water Source”, co-authored by

Dr. Chris Groves and graduate student Katie Seadler, was accepted for presentation at the International Society for Environmental Information Science's 2004 International Conference on Environmental Informatics, to be held in Regina, Saskatchewan, Canada, in August 2004. "Transport of the Herbicide Atrazine Within Waters of Mammoth Cave National Park", co-authored by C. Groves and J. Meiman, will be presented at the Southeast/Northeast Regional meeting of the Geological Society of America in Washington, DC. Additionally, Pat Kambesis will present "Hydrogeologic Study of the Coldwater Cave Groundwater Basin, Northeast Iowa" at the annual meeting of the National Speleological Society in Marquette, Michigan.

"Atrazine Contamination of a Kentucky Drinking Water Source" was also accepted for publication by *Environmental Informatics Archives* (an electronic publication). This same paper is currently in review by the *Journal of Environmental Informatics* (a refereed publication).

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

C. Preliminary Data Results. Atrazine levels have significantly increased in Marion, KY during the 2004 application season, even though the entire watershed is supposed to be participating in a "no atrazine" spring season. While no finished samples exceed the Maximum Contaminant Level (MCL) of 3.0 parts per billion (ppb), some are as high as 2.8 ppb. It is not clear so far from our data whether this is from application this spring or is older atrazine being released from storage on sediment or otherwise. The timing of the sharp increase of atrazine levels in April does suggest that atrazine is being applied in the watershed.

D. Anticipated Activities. Four workshops have been scheduled on Source Water Protection including *Source Water Protection Principles*, *Source Water Protection Programs and Stakeholder Networks*, *Land Use and Impacts to Source Water Quality*, and *Kentucky's Karst Landscapes and BMP's*. These will be held at the Barren River Area Development District in Bowling Green, Kentucky, in collaboration with the Kentucky Rural Water Association, WKU Hoffman Environmental Research Institute, Kentucky Pesticide Workgroup, and the Kentucky Department of Agriculture, Division of Pesticides in September 2004.

We began planning for the Kentucky Water Resources Annual Symposium to be offered at the Kentucky Water Resources Research Institute (KWRRRI) meeting in February 2005. We will be working with Jim Kipp, KWRRRI Associate Director, on this effort.

II. Discussion of Expenditures

No unusual expenditures to report. The Louisville Water Company (LWC) has agreed to provide in-kind services to our project (they will pay for the analysis of HAAs) to allow us to develop models for the activities of both major DBPs in the Ohio River.

III. Changes in Key Personnel

Roger Tucker from the Louisville Water Company (LWC) has joined the project team to help with the experiments and algal analysis. His salary is being paid by the LWC.

Task 4: Database Management and Information Tools

A. Work Progress.

A second version of the Emergency Response Plan tool has been developed, which includes data security, contact details, log tables, media contacts, flow charts, and a more user-friendly interface. The updated interface includes a help menu, which gives a brief description of each field and instructions on the use of each form in the tool. This tool is currently being tested by KRWA and various small water systems throughout the state.

The TACWQ website has been updated to include a search engine in order to allow users to retrieve needed information more quickly and efficiently. A more visually appealing design was also created. Additional pages were developed and linked to the site, including: Vendors, Rules and Regulations, Kids Pages, Support, and Organizations.

Several maps have been developed using GIS and PivotTable data in order to plot national drinking water patterns, including two maps with source water data, two maps with public water system population data, and three maps that summarize location and frequency of MCL and Treatment Technique violations.

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 the distribution and dissemination of our data and findings through information tools and the Internet.

D. Anticipated Activities. During the next quarter, the Emergency Response Plan tool will be finalized and distributed to KRWA, NRWA and other TACnet participants. Several additional documents and maps will be posted to the appropriate websites in the coming months.

II. Key Personnel Changes

Dr. Ouida Meier's work with Task 4 came to an end at the close of this quarter. Her salary and efforts for next quarter will shift to wastewater and environmental work. The Center is currently interviewing prospective candidates for the position of GIS project coordinator.

We are grateful to our team of bright and talented graduate and undergraduate students who assist with the work in Task 4. Ms. Anupama Oruganti and Mr. Naveen Midde have contributed significantly to this project this quarter through mapping and software programming, respectively. Mr. Gopi Kallepalli has also recently joined the Center to assist with its website work. It is a goal of the Center to help educate students through applied research and to increase the pool of technically talented people that are aware of the issues facing drinking water systems and public health protection.

Appendix A

Expenditures

