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Final Report for the

WATER SYSTEM REGIONALIZATION FEASIBILITY STUDY

Prepared for:

BLUEGRASS AREA DEVELOPMENT DISTRICT

in association with the

Bluegrass Water Supply Consortium

February 27, 2004

Prepared by:

O'BRIEN & GERE ENGINEERS, INC.

CDP ENGINEERS, INC. CARTER DIXON PARTNERS

MapSync

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CONTENTS

EXECUTIVE SUMMARY **1**

INTRODUCTION 1
WHAT ARE BWSC'S STUDY OBJECTIVES? 1
HOW MUCH WATER IS NEEDED? 2
HOW WERE WATER SUPPLY ALTERNATIVES EVALUATED AND WHICH IS PREFERRED? 2
HOW WILL THE SUPPLIES BE DELIVERED TO THE WATER UTILITIES? 4
WHAT WILL IT COST AND HOW WILL IT BE FINANCED? 4
WHO WILL OWN AND MANAGE THE PROPOSED WATER FACILITIES? 5
HOW HAS THE PUBLIC PARTICIPATED IN THE STUDY PROCESS? 5
HAVE THE OBJECTIVES OF THE STUDY BEEN MET? 6
WHAT ARE THE NEXT STEPS? 6

1. INTRODUCTION **7**

1.1. BACKGROUND 7
1.2. BWSC'S STUDY OBJECTIVES 8

2. NEED FOR ADDITIONAL WATER SUPPLIES **10**

2.1. WATER DEMANDS 10
2.1.1. Average and maximum day demands *10*
2.1.2. Aggregate maximum day *11*
2.2. EXISTING WATER SUPPLY SOURCES 12
2.3. PROJECTED SHORTFALL IN SUPPLY 14
2.4. USE OF BASELINE ALTERNATIVES TO REDUCE PROJECTED SHORTFALL 14
2.4.1 Water Credits *15*
2.4.2. Dam 10 ..... *16*

3. WATER SUPPLY ALTERNATIVES **17**

3.1. EVALUATION CRITERIA AND WEIGHTING 17
3.2. FATAL FLAWS 19
3.3. WATER SUPPLY ALTERNATIVES EVALUATED IN THIS STUDY 19
3.4. PREFERRED ALTERNATIVES 20
3.5. KENTUCKY RIVER POOL NO. 3 ALTERNATIVE 21
3.6. COST ANALYSIS 22

4. WATER SYSTEM GRID NETWORK **26**

4.1. NETWORK CONFIGURATION AND SIZING 26
4.2. GRID WATER QUALITY 28
4.3. SUMMARY OF GRID BENEFITS 31

5. FINANCIAL **32**

5.1. FINANCIAL BENEFITS OF A REGIONAL WATER SUPPLY 32
5.2. FUNDING NEW WATER SUPPLY FACILITIES 33
5.3. REVENUE REQUIREMENTS NEEDED TO PAY CAPITAL AND OPERATING COSTS 34
5.4. FINANCIAL IMPACTS ON WATER RATES AND CUSTOMER BILLS 35

6. OWNERSHIP AND MANAGEMENT OF WATER FACILITIES **38**

6.1. EVALUATION OF ORGANIZATION ALTERNATIVES 38
6.2. REGIONAL WATER COMMISSIONS 40

6.2.1. Characteristics of a Regional Water Commission *40*
6.2.2. Selection of the Commissioners and voting privileges *40*
6.2.3. Financing and revenue *41*

7. PUBLIC PARTICIPATION **42**

7.1. PUBLIC WORKSHOPS AND MEETINGS 42
7.2. NEWSLETTERS/MAILERS/E-MAIL 43
7.3. AGENCY BRIEFINGS AND TECHNICAL MEETINGS 43
7.4. EXTENSIVE PRESS COVERAGE 43
7.5. ELECTED OFFICIAL, COUNCIL, COMMISSION AND BOARD UPDATES 43

8. CONCLUSIONS **45**

9. NEXT STEPS **46**

10. BIBLIOGRAPHY **47**

Appendices

Appendix A – Water Demands
Appendix B – Water Demand Peaking Analysis
Appendix C – Kentucky River Withdrawal Permits
Appendix D – Kentucky River Dam No. 10 Information
Appendix E – Weighting Factors for Alternative Scoring and Pairwise Comparison
Appendix F – Fatally-flawed Alternatives and Near-term/long-term Classification
Appendix G – Historic Water Supply Plans of the Kentucky River Basin
Appendix H – Alternative Screening Results
Appendix I – Request for Proposal from Water Suppliers
Appendix J – Kentucky Division of Water's Letter on Kentucky River Pool No. 3
Appendix K – Water Supply Alternative Cost Spreadsheets
Appendix L – Water Supply Alternative Pairwise Results
Appendix M – Roll Call Vote on Endorsement of Kentucky River Pool No. 3
Appendix N – Grid Hydraulic Network
Appendix O – Grid Network Water Quality Memorandum
Appendix P – BWSC's Letter of Intent to Buy
Appendix Q – Benchmarking Study for Regional Water Supply Organizations
Appendix R – Evaluation of Regional Water Commission versus Chapter 58
Appendix S – Information on Regional Water Commissions
Appendix T – Workshops 1-6
Appendix U – Meeting Minutes for June 9, 2003 (Conference with State and Federal Policy and Program Staff, Frankfort, KY)
Appendix V – Meeting Minutes for August 21, 2003 (Briefing for Elected Officials in Lexington, KY and State Agencies Briefing in Frankfort, KY)
Appendix W – News Articles
Appendix X – Public Meetings

Tables

Table 1. Water demands 11
Table 2. Water supplies and treatment plant capacities 13
Table 3. Estimated project costs and present worth costs for water supply alternatives 22
Table 4. Public workshops 39

Figures

Figure 1. Water supply alternatives selection process 18
Figure 2. Grid components 27
Figure 3. Disinfection technique for BWSC participants 30

Glossary of Terms

BGADD	Bluegrass Area Development District
BWSC	Bluegrass Water Supply Consortium
CIP	Capital Improvements Program
CWA	Clean Water Act
D/DBP	Disinfectants/Disinfection Byproducts
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	US Environmental Protection Agency
fps	Feet per second
FY	Fiscal Year
gpm	Gallons per Minute
HAAs	Haloacetic Acids
ICR	Information Collection Rule
IESWTR	Interim Enhanced Surface Water Treatment Rule
KDEP	Kentucky Department of Environmental Protection
KDOW	Kentucky Division of Water
KIA	Kentucky Infrastructure Authority
KNREPC	Kentucky Natural Resources Environmental Protection Cabinet
KRA	Kentucky River Authority
KAW	Kentucky American Water
L	Liter
MCL	Maximum Contaminant Level
MG	Million Gallons
mg/l	Milligrams per Liter
mgd	Million Gallons per Day
MPN/100 ml	Most Probable Number per 100 milliliters
NEPA	National Environmental Policy Act
PSC	Kentucky Public Service Commission
psi	Pounds per Square Inch
RD	Rural Development
SDWA	Safe Drinking Water Act
SRF	State Revolving Fund
SWTR	Surface Water Treatment Rule
TCR	Total Coliform Rule
THMs	Trihalomethanes
ug/L	Micrograms per Liter
UK	University of Kentucky
USACE	US Army Corps of Engineers
USDA	US Department of Agriculture
USEDA	US Economic Development Administration
USEPA	US Environmental Protection Agency
USFWS	US Fish & Wildlife Service
USGS	US Geological Survey
WTP	Water Treatment Plant

WWTP	Wastewater Treatment Plant
7Q10	Seven-day ten-year flow

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Greater Fleming County Regional Water Commission

BWSC Participating Utilities

Berea College Utilities

City of Cynthiana

City of Danville

Frankfort Electric and Water Plant Board

Georgetown Municipal Water and Sewer Service

City of Harrodsburg

Kentucky American Water

City of Lancaster

City of Lawrenceburg

Lexington-Fayette Urban County Government

Mt. Sterling Water and Sewer Commission

Nicholasville Combined Utilities

City of Paris

Richmond Water, Gas, & Sewerage

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Executive Summary

Introduction

A severe drought affected much of the southeastern United States in 1999, and water use was curtailed in numerous parts of central Kentucky. For the past four years, the Bluegrass Water Supply Consortium (BWSC), an alliance of government agencies and water utilities – both public and private - have been working together to address the potable (treated) water needs of central Kentucky. The entities involved include (listed alphabetically):

- Berea College Utilities
- City of Cynthiana
- City of Danville
- Frankfort Electric and Water Plant Board
- Georgetown Municipal Water and Sewer Service
- City of Harrodsburg
- Kentucky American Water
- City of Lancaster
- City of Lawrenceburg
- Lexington-Fayette Urban County Government
- Mt. Sterling Water and Sewer Commission
- Nicholasville Combined Utilities
- City of Paris
- Richmond Water, Gas, & Sewerage
- Shelbyville Municipal Water and Sewer Commission
- City of Versailles
- City of Wilmore
- Winchester Municipal Utilities Commission

BWSC has been working with numerous local, state and federal agencies, including the Kentucky River Authority (KRA), Kentucky Division of Water (KDOW), Kentucky Infrastructure Authority (KIA), Kentucky Public Service Commission (PSC), and the Bluegrass Area Development District (BGADD) to study and address the region's need for additional potable water.

The study was financed by Congressional funding together with matching funds from KIA and BWSC's contributions. A consulting team with expertise in engineering, finance, management and law was retained by BWSC to complete an independent and comprehensive regional study. The study builds upon previous and on-going efforts to meet the region's potable water supply needs.

BWSC's mission statement is:

> *"The Bluegrass Water Supply Consortium will ensure the delivery of an adequate supply of potable water under any conditions to the customers of member entities. We will maximize the utilization of the Kentucky River as a raw water source, maintain reasonable rates, and provide adequate water quality."*

What are BWSC's study objectives?

The key objectives for BWSC's study include:

- Optimizing regional water supplies using a grid network of water pipelines to move potable water to where it is needed.
- Bringing "on line" highly reliable sources of additional water supply within 3 to 5 years.
- Developing a financial plan that is affordable and fairly apportions costs.
- Implementing a management/ownership approach that is fair and flexible.
- Utilizing a comprehensive program of public participation and outreach to effectively communicate the study process and findings.

How much water is needed?

BWSC's approach in the current study is to identify new potable water supplies that augment the existing potable water supplies of BWSC. Water demands for each participating utility were projected through 2020 and reflected water conservation and drought management efforts. Supplies available from existing sources were based on permitted water supply withdrawals from the Kentucky River and other sources during normal and severe drought conditions. Based on projected water demands and existing potable water supplies, a total of 67 million gallons per day (mgd) of additional potable water is needed during a critical drought to meet the needs of BWSC through 2020. Roughly two-thirds of this deficit exists today and the remaining one-third will result from projected future growth in the region. The potable water supply target for this study in 2020 is 67 mgd with an additional projected supply deficit of approximately 2 mgd each year beyond 2020.

How were water supply alternatives evaluated and which is preferred?

The potable water supply needed to meet BWSC water demands in 2020 was reduced from 67 mgd to 45 mgd by taking into account the anticipated increase in near-term water supplies from the Kentucky River (baseline alternatives). Baseline alternatives included estimated water credits for return flows to the Kentucky River (12 mgd) and additional storage provided by constructing a higher Kentucky River Lock and Dam No. 10 (10 mgd). The higher Lock and Dam No. 10 is currently under design by KRA and has received congressional authorization for funding through the US Army Corps of Engineers.

The selection process for identifying the preferred water supply alternative included the following steps:

- Establishing evaluation criteria
- Determining fatal flaws and weighting factors
- Identifying alternatives
- Eliminating fatally-flawed alternatives
- Screening alternatives
- Selecting alternatives

The water supply alternatives were evaluated using the following criteria, which were developed and adopted by BWSC early in the study process:

- Water supply capacity - Reliable quantity of raw water and finished water to meet projected demands through the planning period. This criteria addresses interruptibility of sources of supply.
- Water quality - Raw and finished water quality that meets existing water quality requirements, and can readily achieve future anticipated regulations. This criteria also addresses water quality preferences such as taste.
- Cost - The present worth cost for proposed raw and finished water improvements, including capital, operating and maintenance costs.
- Implementability/risk of delay - The relative ease of implementing the proposed improvements in time to meet projected demands, which BWSC established as 3 to 5 years. This criterion considers the potential that regulatory permitting, public acceptance, property acquisition, or constructability issues could delay implementation.
- Flexibility - The ability to phase implementation and spread the cost over time, while still meeting projected water demands. This criterion addresses ability to expand beyond the planning period and the entrance/exit of BWSC members.

Because of the magnitude of the projected water supply deficit, water supply alternatives that could not provide at least 10 mgd were considered fatally flawed and were eliminated from further

consideration.

Over 40 unique water supply alternatives were identified based on a review of previous studies and work performed in this study:

- Ohio River – seven options
- Kentucky River – eight options
- Existing reservoirs – seven options
- New reservoirs – twelve options
- Groundwater – six options

The list of 40 water supply alternatives was separated into near-term and long-term groups based on the alternative's potential to be implemented within 3 to 5 years. A total of 16 near-term alternatives were carried forward for further evaluation and eight alternatives were deemed "preferred", and were selected for further evaluation:

- Purchase treated water from Cincinnati Water Works via Boone Florence Regional Water Commission.
- Purchase treated water from Cincinnati Water Works via Bracken County.
- Purchase treated water from Louisville Water Company.
- Purchase treated water from Carrollton Utilities/Carroll County Water District No. 1.
- Purchase treated water from Greater Fleming County Regional Water Commission.
- Ohio River water withdrawal and new water treatment plant at Maysville/Dover.
- Ohio River withdrawal and new water treatment plant at Warsaw.
- Kentucky River withdrawal and new water treatment plant at Kentucky River Pool No. 3, with supplemental raw water from the Ohio River.

BWSC conducted a pairwise comparison process, which ranks each alternative against the other alternatives for each evaluation criteria. The ranking showed that three alternatives were superior to the others:

- Treated water purchase from Louisville Water Company,
- Ohio River water withdrawal and new water treatment plant at Maysville/Dover or Warsaw,
- Kentucky River withdrawal and new water treatment plant at Kentucky River Pool No. 3 with supplemental raw water from the Ohio River.

Cost estimates were then updated to reflect a new proposal from Louisville Water Company, and other refinements. While purchasing water from the Louisville Water Company was found to be the lowest cost alternative, the Consultant Team recommended the Kentucky River Pool No. 3 alternative based on its highest overall score. The scoring for Pool No. 3 was driven by first place rankings in implementability, flexibility, and water quality, and second-place ranking in cost. The waterworks facilities included in the Kentucky River Pool No. 3 alternative are:

- Raw water intake and pumping station at Kentucky River Pool No. 3.
- Raw water pipeline from the Kentucky River Pool No. 3 intake and pumping station to the new water treatment plant.
- Water treatment plant near Kentucky River Pool No. 3.
- Raw water intake and pumping station at Ohio River.
- Raw water pipeline from Ohio River intake and pumping station to the new water treatment plant at Kentucky River Pool No. 3.
- Treated water transmission mains from the new water treatment plant near Kentucky River Pool No. 3 to the grid network.
- Treated water transmission mains comprising the grid network.

How will the supplies be delivered to the water utilities?

BWSC is proposing to construct a grid network of waterlines across Central Kentucky to connect the water systems of the participating water utilities. BWSC plans to move treated water through the grid from points of availability to points of need -- wheeling. A conceptual layout and cost of the piping system was developed for each of the eight water supply alternatives. Pipeline sizing for the grid network was based on a hydraulic model that was developed by obtaining the major piping for the existing BWSC water systems, along with water demands representing each community's treatment or supply deficit. Based on the adequacy of the existing major piping, additional connecting pipelines and pumping stations were added to convey the water to where it is needed.

The grid network provides immediate and long-term benefits:

- Peak day attenuation. Water system facilities are typically sized to provide the peak day demand. Because BWSC utilities are not likely to have their peak water demands all occur on the same day, the size and cost of treatment plants, pumping stations and pipelines can be reduced.
- Optimize use of existing sources. The grid provides the network of piping needed to deliver water from existing sources to where it is needed.
- Grant funding. The possibility for grant funding is enhanced by the regional approach afforded by the grid system.
- Economy of scale. A single large additional source of supply will provide economy of scale in comparison to construction and operation of new, small supply projects by each of BWSC's participants.
- Reliability of multiple sources. The grid network allows water from multiple sources to be fed into the grid thereby minimizing the potential for a water supply interruption due to a chemical spill or facility outage.
- Ease of phasing regional growth. The grid network provides flexibility in accommodating changes in growth areas as well as connections to utilities beyond BWSC.

What will it cost and how will it be financed?

The cost for building and operating the facilities needed to produce and deliver additional water to the region will be finalized when more specific commitments are made by the participating utilities as to the quantities of water they will purchase.

Each utility purchasing water from the grid will commit to a portion of the capacity of the new facilities. The annual cost for this commitment will also provide participating utilities with a minimum supply of water every day. This guarantee will provide security for issuance of bonds to build the facilities.

The cost for the raw and finished water system facilities (intakes, treatment plants, pumping stations, pipelines, etc.) includes the components needed to deliver the water up to the wholesale meter connection off of the grid network. The annual fees for purchasing water from the grid network are estimated at $400,000 to $500,000 per mgd of committed capacity. This annual fee includes delivery of 200,000 gallons per day for each 1 million gallons per day of committed capacity. These annual fees are equivalent to about $1.83/1,000 gallons of water purchased if the customer purchases their full committed capacity every day, or equal to about $6.16/1,000 gallons purchased if the customer only purchases the minimum capacity (20% of the committed capacity). As of February 27, 2004, the following BWSC participants had signed non-binding commitments for a total of 31.755 mgd (Berea

College/City of Berea – undefined, City of Cynthiana – 0.5 mgd, City of Danville – 1 mgd, Frankfort Electric and Water Plant Board – 2 mgd, Georgetown Municipal Water and Sewer Service – 0.255 mgd, Kentucky American Water – 22 mgd, City of Lancaster – 0.5 mgd, Mt. Sterling Water and Sewer Commission – 1 mgd, Nicholasville Combined Utilities – 1 mgd, City of Paris – 0.5 mgd, Winchester Municipal Utilities Commission – 3 mgd). After the remaining BWSC participants finalize their decisions regarding the non-binding commitments, the size and cost of the new facilities can be refined.

The objective of the financing plan was to develop a plan that is affordable and fairly apportions costs. In order to keep the financing for the project simple, the financing recommendations for water sold from the grid include:

- Sales only to wholesale customers (i.e., no retail sales).
- Charge a common unit cost to all members.
- Establish "take or pay" contracts for committed capacity, with a minimum daily delivery of water to maintain water quality in the grid.
- Form a regional agency that can issue tax-exempt debt by financing only municipal obligations.

Who will own and manage the proposed water facilities?

A new organization will be formed to oversee management and operation of the proposed waterworks facilities. A benchmarking survey was performed early in this current study to identify and evaluate management and ownership alternatives for the participating utilities. Organizational and management issues that were addressed included organizational structure, services to be provided, financing, management philosophy, and membership. BWSC's participants considered several organizational alternatives before selecting a Regional Water Commission as the preferred alternative. A Regional Water Commission, as formed under Chapter 74 of the Kentucky Revised Statutes, is a distinct legal entity and is both a public corporation and a governmental agency. The proposed name of the Regional Water Commission is the "Bluegrass Water Supply Commission". The Commission will be governed by a Board of Commissioners with each Commissioner having one equal vote. The Commissioners will be appointed by their respective Mayor and approved by the governing body (City Council or City Commission) of the City which owns the utility. Since the Bluegrass Water Supply Commission (Commission) will be a governmental agency, it will be eligible for tax-exempt financing, and state and federal grants and low interest loans. The Commission will be a separate legal entity and, as such, will be responsible for its own debts and legal obligations. Revenues derived from water sales will be used to pay for operating expenses and to repay debts incurred by the Commission. The Board of Commissioners of the Commission will determine the wholesale rates that will be charged to utilities purchasing water from the Commission.

How has the public participated in the study process?

BWSC conducted a uniquely open study, with extensive opportunities for input from the public, elected officials, and governmental agencies:

- Public workshops and meetings. A series of public workshops and "open house" style public meetings facilitated extensive public participation. Since November 2002, six all-day public workshops were held (in Lexington, Georgetown, Frankfort, Nicholasville, Winchester, and Lexington). Two public meetings were held in Lexington during the evening in August 2002 and September 2003. These public work sessions and evening meetings provided a forum for citizen

input and other interested party input as well as an opportunity to ask questions of BWSC's participating utilities and the consultant.

- Newsletters/mailers/e-mail. BGADD provided an update on the status of the study in its bi-monthly newsletters, distributed mailers with the announcements for upcoming meetings, and corresponded by e-mail with the public that attended the meetings.
- Agency briefings and technical meetings. BWSC held several technical meetings and provided updates on the status of the study to the Kentucky River Authority (KRA), Kentucky Division of Water (KDOW), and Kentucky Infrastructure Authority (KIA).
- Extensive press coverage. Numerous articles were written in the Lexington area newspapers documenting the work completed and the upcoming meetings. On the whole, press coverage was positive.
- Elected official, Council, and Board Updates. Consortium members have provided updates to their elected officials and their Councils/Commissions/Boards throughout the study.

Have the objectives of the study been met?

The objectives of the Water System Regionalization Feasibility Study have been met:

- A grid network of water pipelines has been conceptually configured to optimize regional water supplies and move potable water to where it is needed ✓
- BWSC has identified the Kentucky River Pool No. 3 with supplemental raw water from the Ohio River as an alternative that utilizes highly reliable sources of supply and is available within 3 to 5 years ✓
- The management/ownership approach which is based on formation of the Bluegrass Water Supply Commission is fair and flexible ✓
- A financial plan has been developed that is affordable and fairly apportions costs✓
- BWSC has utilized a comprehensive program of public participation and outreach to effectively communicate the study process and findings ✓

What are the next steps?

BWSC identified that the following key items need to be addressed in the near term:

- Finalize the amounts of water each BWSC participant will commit to purchase.
- Form the Bluegrass Water Supply Commission.
- Establish funding so that planning and design of the proposed facilities continues, particularly to implement near term improvements for communities with the greatest needs.
- Continue working with KDOW to formalize commitments on water credits, Kentucky River Pool No. 3 permitting, Ohio River permitting, and grid water quality.
- Pursue grant funding and/or low interest loans.

The Bluegrass Water Supply Consortium intends to move forward aggressively with these and other action items. By endorsing the recommendations of this study, BWSC is "driving a stake in the ground", completing the first step in the long process to bring ample water supplies to the residents of central Kentucky.

1. Introduction

1.1. Background

Most communities in the central Kentucky region use the Kentucky River as their primary source of supply. The severe drought that affected much of the southeastern United States in 1999 illustrated that the Kentucky River, in its present state, cannot reliably meet the growing water supply need of the region. The usage of water in 1999 was curtailed in numerous parts of central Kentucky. Since this drought, the Bluegrass Water Supply Consortium (BWSC), an alliance of government agencies and water utilities, has been working together to address the potable (treated) water needs of central Kentucky. The entities involved include (listed alphabetically):

- Berea College Utilities
- City of Cynthiana
- City of Danville
- Frankfort Electric and Water Plant Board
- Georgetown Municipal Water and Sewer Service
- City of Harrodsburg
- Kentucky American Water
- City of Lancaster
- City of Lawrenceburg
- Lexington-Fayette Urban County Government
- Mt. Sterling Water and Sewer Commission
- Nicholasville Combined Utilities
- City of Paris
- Richmond Water, Gas, & Sewerage
- Shelbyville Municipal Water and Sewer Commission
- City of Versailles
- City of Wilmore
- Winchester Municipal Utilities Commission

BWSC has been working with numerous regional, state and federal agencies, including the Kentucky River Authority (KRA), Kentucky Natural Resources Environmental Protection Cabinet and the Kentucky Division of Water (KDOW), Kentucky Infrastructure Authority (KIA), Kentucky Public Service Commission (PSC), the Bluegrass Area Development District (BGADD), the United States Geological Survey (USGS), and the United States Army Corps of Engineers (USACE) to study and address the region's need for additional potable water.

This study was financed by Congressional funding together with matching funds from KIA and BWSC's contributions. BGADD served as manager for the study. KDOW handled the disbursement of federal funds. KIA handled the disbursement of its own funds. A consulting team with expertise in engineering, finance, management and law, led by O'Brien & Gere Engineers, Inc. of Landover, Maryland was retained by BGADD, in association with BWSC, to complete this study. This study represents an independent and comprehensive assessment that builds upon previous and ongoing efforts to meet the region's potable water supply needs.

BWSC's mission statement is:

> *"The Bluegrass Water Supply Consortium will ensure the delivery of an adequate supply of potable water under any conditions to the customers of member entities. We will maximize the utilization of the Kentucky River as a raw water source, maintain reasonable rates, and provide adequate water quality."*

BWSC solicited frequent input from KRA in developing the study due to the unique role of KRA relative to the participating utilities. The KRA has a critical role in the management of the Kentucky River. The KRA was formed in 1986 and was originally set up to take over the dams and locks on the Kentucky River that the US Army Corps of Engineers planned to abandon. While the locks and dams were originally constructed to facilitate navigation, the pools created by the dams also serve as water supply sources. The KRA's primary mission is now recognized as providing raw water supply from the Kentucky River. The KRA's primary source of revenue is from water utilities that withdraw their raw water from the Kentucky River and its tributaries. The success of BWSC's regionalization approach depends upon KRA's continued success in maintaining and improving the dams on the Kentucky River.

1.2. BWSC's study objectives

The source of future potable (treated) water supplies for the region has been the focus of numerous studies. However, meaningful progress in dealing with this problem has been illusive. The BWSC identified that the time had come to seek a regional solution and, through cooperative action, to implement that solution. The key objectives for the BWSC's study include:

- Identifying highly reliable sources of additional supply within 3 to 5 years.
- Optimizing regional water supplies using a grid network of water pipelines to move water to where it is needed.
- Developing a financial plan that is affordable and fairly apportions costs.

- Identifying a management/ownership approach that is fair and flexible.
- Utilizing a comprehensive program of public participation and outreach to effectively communicate the study process and findings.

The Consultant Team used a combination of independent reviews of prior studies, preparation of technical information, and extensive use of interactive workshops to facilitate decision-making to achieve each of the above objectives.

2. Need for additional water supplies

2.1. Water demands

2.1.1. Average and maximum day demands

Average day demands represent the amount of potable water required in a year, divided by 365 days. Maximum day demands represent the amount of potable water required in a single 24-hour period for a historical day of maximum usage. Maximum hour demands represent the water demand required during the peak usage period of the maximum day. Each of these parameters is used to size or evaluate certain parts of a potable water system. Maximum day demands are typically used to size raw water intakes on river supplies, water treatment plants, and some of the major water transmission mains. As a result, maximum day demands are used extensively in this study.

Water demands for each participating utility were obtained for the year 2000 and projected through 2020 by the BWSC participants using the US Army Corps of Engineer's IWR-MAIN model. The IWR-MAIN model provides water demand forecasts using a number of factors that affect water demands, such as household income, persons per household, weather, water and wastewater rates, housing and employment projections, and conservation programs. The results are summarized in Table1, and a copy of the projected water demands for each utility is included in Appendix A.

To reflect water conservation and drought management efforts, projected "hybrid" maximum day water demands in 2020 were developed based on a reduction of BWSC water demands by 15%, except for the water demands for Kentucky American Water (KAW). The 15% reduction is the expected level of reduction associated with odd/even day water use restrictions for residential/institutional use. KAW's water demand projections are the same as those previously proposed and evaluated as part of their Public Service Commission Case Number 93-434 and appropriately updated, and represents approximately a 26% reduction from the IWR-Main model.

Table 1. Water demands

BWSC Participant	2000		2020		2020
	Average Day Demand (mgd)	Maximum Day Demand (mgd)	Average Day Demand (mgd)	Maximum Day Demand (mgd)	Hybrid Maximum Day Demand (mgd)
Berea College Utilities	2.410	3.167	3.250	4.385	**3.7**
Cynthiana (City)	2.159	3.262	2.596	3.875	**3.3**
Danville (City)[1]	See footnote.				
Frankfort Electric and Water Plant Board	7.950	14.207	8.711	14.565	**12.4**
Georgetown Municipal Water and Sewer Service	2.435	3.805	3.951	6.176	**5.2**
Harrodsburg (City)	2.724	3.650	3.133	4.448	**3.8**
Kentucky American Water	41.020	66.370	51.860	87.670	**64.8**
Lancaster (City)	1.197	1.643	1.899	2.679	**2.3**
Lawrenceburg (City)	1.708	2.442	3.210	4.815	**4.1**
Mt. Sterling Water/Sewer Commission	2.273	3.261	2.540	3.645	**3.1**
Nicholasville (City)	2.939	4.700	5.010	8.015	**6.8**
Paris (City)	1.343	2.079	1.825	2.414	**2.1**
Richmond[1]	See footnote.				
Shelbyville Water/Sewer Commission	3.160	4.640	5.150	6.160	**5.2**
Versailles (City)	2.967	3.802	4.305	7.534	**6.4**
Wilmore (City)	0.580	0.909	0.787	1.286	**1.1**
Winchester Municipal Utilities	3.998	5.311	7.150	11.650	**9.9**
Total	**79**	**123**	**105**	**169**	**134**

[1] Danville and Richmond joined the Bluegrass Water Supply Consortium following development of the projected demands for the study. Danville is proposing to sell water to BWSC and Richmond may have an interest in 1 to 2 mgd. Taken together, the inclusion of their demands (projected needs) is not expected to significantly change the additional regional water requirements.

2.1.2. Aggregate maximum day

A potential benefit of a grid network is the ability to move water from where it is available to where it is needed. Because not all of the BWSC participating utilities would experience their peak demand on the same day, the study evaluated how the grid could attenuate the aggregate peaking factor and "buffer" the impacts experienced by individual systems.

To investigate maximum (peak) day demands for the individual systems versus the future grid network, water production data from July 25 through August 14, 2002 was obtained from BWSC. The largest supplier is KAW, which had a peak day demand on August 5, 2002. Consequently, the aggregated peak day water production for BWSC on August 5, 2002 resulted in a peak day demand of about 157 mgd in 2020. From Table 1, it is anticipated that a 12 mgd reduction in the 2020 maximum (peak) day aggregate capacity need (169 mgd – 157 mgd) can be achieved by connecting the individual utilities through the grid network. A summary of the peaking analysis is included in Appendix B.

2.2. Existing water supply sources

There have been significant studies that looked at only raw water needs on a regional basis and other studies that focused on the needs of individual communities, rather than addressing potable water needs in central Kentucky on a regional basis. BWSC's plan is a regional approach, but yet one in which participating utilities will maintain their autonomy. BWSC does not plan to replace existing water supply sources, treatment facilities and distribution systems, but rather augment those supplies with water from the grid network. The future regional organization would supply potable water on a wholesale basis with the individual utilities remaining as the retail providers.

Table 2 lists the water sources, and reported capacities of each source and water treatment plant currently serving BWSC participants. The capacity of each source of raw water is provided for both worst-case drought and normal (non-drought) conditions. The worst-case drought condition is labeled "Approximate Worst-case Allowable Withdrawal", while the normal condition is labeled " Full Permitted Withdrawal". The withdrawal permits used as the basis for Table 2 are included in Appendix C.

Kentucky River water withdrawal permits typically have multiple steps from the full permitted withdrawal down to the approximate worst-case allowable withdrawal. The amount of water available from the Kentucky River is limited by the lowest seven-day flow in the river with a ten-year recurrence frequency (7Q10 flow condition). The 7Q10 flow is the threshold for passby flows and is established to protect aquatic life. Water utilities must reduce withdrawals below their "full permitted withdrawal" when flows approach the 7Q10 level. If river flow drops down below 7Q10 level, withdrawals must be further reduced, possibly to the level defined by minimal essential uses. Minimal essential uses (i.e., sanitary purposes) are approximated by KDOW as a 20% reduction from the winter water use. In most cases, the "approximate worst-case allowable withdrawal' shown in Table 2 represents KDOW's determination of minimal essential uses.

Table 2. Water supplies and treatment plant capacities

BWSC Participant	Water Source	Approximate Worst-case Allowable Withdrawal (mgd)	Full Permitted Withdrawal (mgd)	2000 Water Treatment Plant Capacity (mgd)
Berea College Utilities	4 College lakes	3.8	3.8	4
Cynthiana (City)	South Fork Licking River + Licking River	0	6	6
Danville	Herrington Lake	See footnote.		
Frankfort Electric and Water Plant Board	KY River Pool 4	5.5	15	18
Georgetown Municipal Water and Sewer Service	Royal Spring	0	4	4
Harrodsburg (City)	KY River Pool 7	1.7	3.2	4
Kentucky American Water	KY River Pool 9 + municipal lake	35	63	65
Lancaster (City)	KY River Pool 8 + Municipal Lake	1.5	1.7	2.1
Lawrenceburg (City)	KY River Pool 5	2.5	2.5	2.59
Mt. Sterling Water/Sewer Commission	Slate Creek + Municipal Lake	3.5	3.5	3
Nicholasville (City)	KY River Pool 8	3	3	6
Paris (City)	Stoner Creek	0.6	2.2	3
Richmond	KY River Pool 11	See footnote.		
Shelbyville Water/Sewer Commission	Municipal Lake	4.6	4.6	6
Versailles (City)	KY River Pool 5	1.9	4	4
Wilmore (City)	KY River Pool 6	1	1	1
Winchester Municipal Utilities	KY River Pool 10 + Municipal Lake	2.8	15	6
Total		**67**	**133**	**135**

[1] Danville and Richmond joined the Bluegrass Water Supply Consortium following development of the projected demands for the study. Danville is proposing to sell water to BWSC and Richmond may have an interest in 1 to 2 mgd. Taken together, the inclusion of their demands (projected needs) is not expected to significantly change the additional regional water requirements.

In summary, the full permitted withdrawal and the 2000 water treatment plant capacity for BWSC are approximately equal (133 mgd versus 135 mgd) while the worst-case withdrawal during a critical drought reduces the full permitted withdrawal from 133 mgd to 67 mgd.

2.3. Projected shortfall in supply

Three deficit conditions were developed based on 2020 water demands and existing water supplies:

- Maximum day permit deficit: 169 mgd of maximum day water demand – 133 mgd permitted water supply withdrawal = 36 mgd of additional water is needed to meet the maximum day needs (non-drought) of the BWSC through 2020. The above maximum day permit deficit is nearly identical to the treatment plant deficit which equals 169 mgd water demand – 135 mgd of water treatment plant capacity = 34 mgd of additional treatment plant capacity needed through 2020.

- Worst case drought deficit: 169 mgd of maximum day water demand – 67 mgd permitted water supply withdrawal = 102 mgd of additional water is needed to meet the unrestricted water demands of the BWSC during critical drought conditions through 2020.

- Hybrid drought deficit: 134 mgd "hybrid" (restricted) water demand – 67 mgd permitted water supply withdrawal = 67 mgd of additional water is needed to meet the restricted needs of the BWSC during critical drought conditions through 2020.

For 2020, the 36 mgd deficit between unrestricted maximum day demands and the current permit "ceiling" is the "low bookend" in terms of water needs. The 102 mgd drought deficit between the unrestricted maximum day demands and the permit "floor" is the "high bookend". The 67 mgd "hybrid" drought deficit represents the difference between restricted 2020 maximum day water demands and the permit "floor". **This 67 mgd "hybrid" drought deficit is selected as the year 2020 supply target for this study.** Roughly two-thirds of this deficit exists today and the remaining one-third will result from projected growth in the region through 2020. While there are no available projections of water demand beyond 2020, an extrapolation of the near term pattern predicts the supply deficit will grow by approximately 2 million gallons per day each year beyond 2020.

2.4. Use of baseline alternatives to reduce projected shortfall

The supply target for 2020 can be reduced by taking into consideration the anticipated increase in near-term water supplies from the Kentucky River. These increases in near-term water supply have been referred to as "baseline alternatives" in the workshops. Baseline alternatives are considered to be part of the future water supply regardless of the water supply alternative selected. There are two baseline alternatives: estimated

"water credits" for return wastewater flows to the Kentucky River (12 million gallons per day), and additional raw water storage provided by raising Kentucky River Lock and Dam No. 10 (10 million gallons per day).

2.4.1 Water Credits

KDOW is developing a new aspect of their raw water withdrawal permitting process, which is called "water credits". While the water credit program is not yet available for review, the Consultant Team met with KDOW several times during the course of the study to understand how this new program would assist the regional water supply initiative. Water credits essentially would allow a party holding a water withdrawal permit, who treats the resulting wastewater and discharges the effluent back to the stream, to withdraw the water again at a downstream location. Essentially, these return flows are considered as if they are still controlled by the original "withdrawer" and that party can withdraw them again, subject to the conditions of the new program. It is envisioned that the water credit program will provide flexibility so that a regional organization could essentially apply the water credit for return flow from one of its participants to the downstream intake of another participant.

Specific to the situation in Central Kentucky, there are several BWSC participants who withdraw water from the Kentucky River, treat the resulting wastewater, and discharge it back to the Kentucky River or one of its tributaries. By far the most significant example is the Lexington area, in which Kentucky American Water withdraws raw water at Pool No. 9, and the wastewater is treated and discharges from West Hickman WWTP into Hickman Creek (which flows to Pool No. 7) and from Town Branch WWTP, which discharges into a tributary of Elkhorn Creek (which flows to Pool No. 3). By using an existing lower pool intake such as Frankfort Electric and Water Plant Board's intake at Pool No. 4, it is anticipated that water credits could make about 12 mgd of additional supply available, thereby reducing the 2020 supply target to 55 mgd (67 mgd target - 12 mgd water credits = 55 mgd). The following considerations apply to the quantity and use of the water credits:

- The portion of the return flow reaching the main stem of the Kentucky River must be verified.
- KDOW's proposed policy would provide credits for about 90% of the verifiable return flows.
- Water credits are not linked to environmental studies.
- KDOW anticipates that about 25 mgd of water credits will be available at or above Kentucky River Pool No. 3.
- KDOW has indicated that the draft policy on water credits is currently being developed and should be implemented in summer 2004.

2.4.2. Dam 10

In July 2000, KRA resolved to rehabilitate Lock and Dam No. 10. In October 2000, legislation was passed for funding rehabilitation of Lock and Dam No. 10. The intent of this project is to stabilize and raise the dam and a secondary goal is to restore the lock if funds are available. The current approach to raising the dam is actually to construct a new higher dam nearby the exiting dam. The purpose in the higher dam is to increase the pool storage by 1.0 to 1.6 billion gallons (for a 4 to 6 foot higher dam) in order to assist with meeting the projected shortfalls in raw water storage in the central Kentucky region. The schedule proposed by the US Army Corps of Engineers presupposes that no significant environmental problems will be encountered. The schedule estimates that the project would be completed in 2008. The higher Dam No. 10 is currently under design by the KRA and has received congressional authorization for funding through the US Army Corps of Engineers (Appendix D). It is assumed in this study that the higher Dam No. 10 will make about 10 mgd of additional supply available thereby further reducing the 2020 supply target to 45 mgd. KDOW has not indicated whether or not the additional storage could lead to a change in the withdrawal permit. The decision on whether the additional storage will lead to a change in the permitted withdrawal is complicated, involving the operation of the valves that release water from the pool , and the river environment, among other factors. The 10 mgd estimate is simply a reflection of the approximate amount that the additional storage would increase the safe yield in a traditional hydrologic analysis. The additional storage from the higher Dam 10 will undoubtedly improve the water supply situation for Kentucky River users.

In summary, the water supply needed to meet BWSC water demands in 2020 was reduced from 67 mgd to 45 mgd by taking into account the anticipated increase in near-term supplies from the Kentucky River (baseline alternatives). Baseline alternatives include estimated water credits for return wastewater flows to the Kentucky River which can be withdrawn by existing intakes (12 mgd) and additional storage provided by the higher Kentucky River Dam No. 10 (10 mgd).

3. Water supply alternatives

The selection process for identifying the preferred water supply alternative included the following steps:

- Establishing evaluation criteria
- Determining fatal flaws and weighting factors
- Identifying alternatives
- Eliminating fatally flawed alternatives
- Screening alternatives
- Selecting alternatives

This selection process is illustrated in Figure 1.

3.1. Evaluation criteria and weighting

The evaluation criteria were developed and refined in Workshop No. 1 and No. 2 as follows:

- Water supply capacity - Reliable quantity of raw water or finished water to meet projected demands through the planning period. This criteria addresses interruptibility of sources of supply.

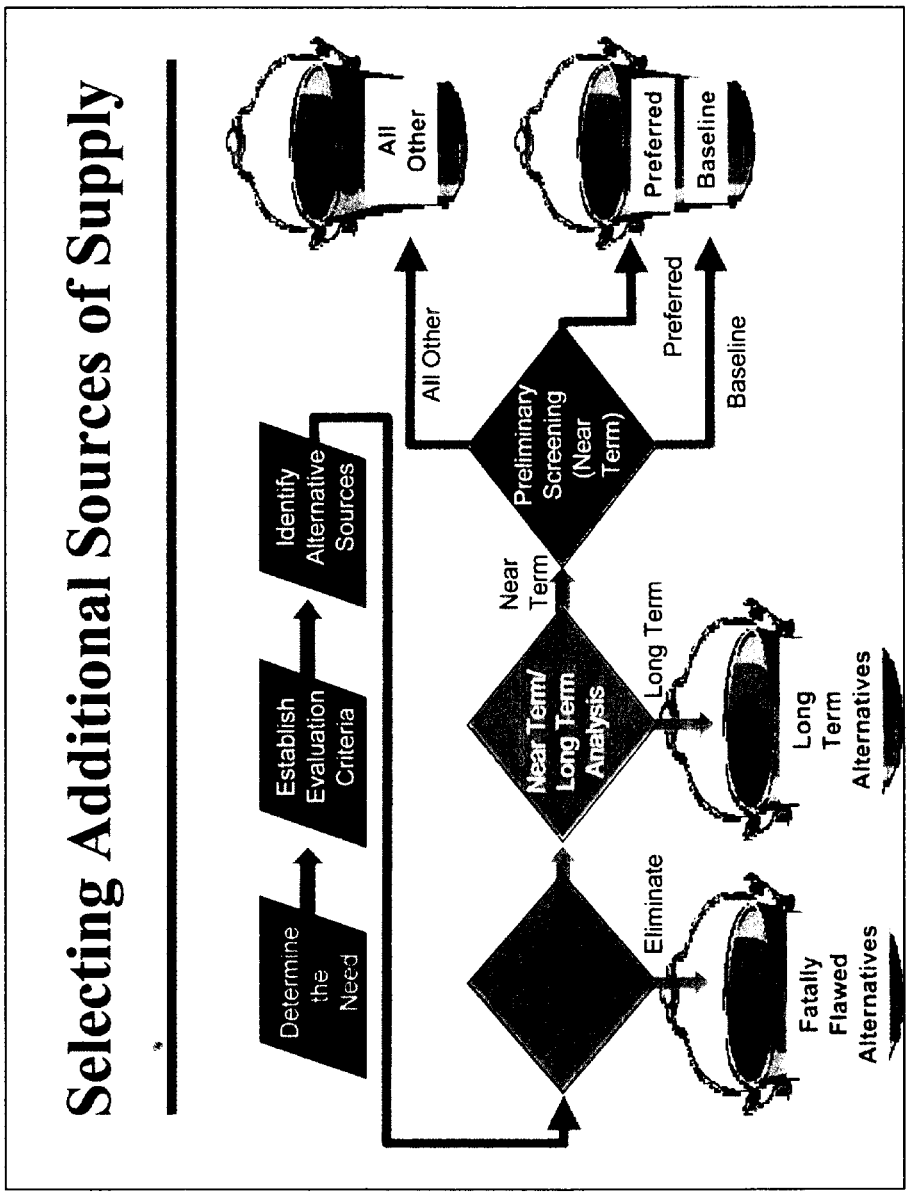
- Water quality - Raw and finished water quality that meets existing water quality requirements, and can readily achieve future anticipated regulations. This criteria also addresses water quality preferences such as superior raw water quality, finished water taste, and potential grid issues such as impact from mixing multiple supplies.

- Cost - The present worth cost for proposed raw and finished water improvements, including capital, operating and maintenance costs.

- Implementability/risk of delay - The relative ease of implementing the proposed improvements in time to meet projected demands, which BWSC established as 3 to 5 years. This criterion considers the potential that regulatory permitting, public acceptance, property acquisition, or constructability issues could delay implementation.

- Flexibility - The ability to phase implementation and spread the cost over time, while still meeting projected demands. This criterion addresses the ability to expand beyond the planning period and the entrance/exit of BWSC members.

Figure 1



Bluegrass Area Development District
Water System Regionalization Feasibility Study
Water Supply Alternatives Selection Process

File No. 11203.30507
Date: January 7, 2004

In order to assign the relative importance of these criteria, a pairwise comparison technique was used at Workshop No. 3 to assign "weighting factors" to each of the evaluation criteria. The pairwise technique compares each criterion against every other criterion to determine their relative importance. The resulting spreadsheet is included in Appendix E. The results are represented as a percentage, with all the criteria totaling up to 100%, as follows:

Evaluation Criteria	Weighting
Water supply capacity	18%
Water quality	8%
Cost	27%
Implementability/risk of delay	27%
Flexibility	20%

It was agreed that water quality issues that could be addressed by cost (i.e., additional treatment measures) would not additionally be considered as part of water quality criteria. This resulted in the low weighting of water quality as a criterion, as most of the existing issues became part of the cost analysis.

3.2. Fatal Flaws

Because of the magnitude of the deficit, water supply alternatives that could not provide at least 10 mgd were considered fatally flawed and were eliminated from further consideration. Only 3 alternatives were eliminated as fatally flawed, and they are listed in table in Appendix F.

3.3. Water supply alternatives evaluated in this study

Over 40 unique water supply alternatives were identified based on a review of previous studies and work performed in this study as summarized below by source:

- Ohio River – seven options
- Kentucky River – eight options
- Existing reservoirs – seven options
- New reservoirs – twelve options
- Groundwater – six options

A complete listing and brief summary of information on numerous water supply alternatives in the central Kentucky region are presented in Appendix G. The list of 40 water supply alternatives was separated into near-term and long-term groups based on the alternative's potential to be implemented within 3 to 5 years (Appendix F). The 3 to 5 year timeframe was based on "meaningful progress" which represented the ability to secure

approvals/required permits within two years and the ability to design, construct, and put the project in service within an additional 3 to 4 years. A total of 16 alternatives were considered to be "near-term", with the remainder viewed as "long-term". The near-term and long-term designations are shown on the table in Appendix F. In most cases, the long-term alternatives were those involving a new dam/reservoir, or significant modification of an existing dam/reservoir. Based on the extended time required for permitting such projects, the Consultant Team placed them in the long-term category during Workshop No. 3.

Six of the sixteen near-term options involved purchasing finished water from any of five different organizations. Interviews with each these "potential seller" organizations were held at BGADD's office on May 12-13, 2003:

- Greater Fleming County Regional Water Commission
- Louisville Water Company
- Northern Kentucky Water District
- Carrollton Utilities/Carroll County WD No. 1
- Cincinnati Water Works (two options)

3.4. Preferred alternatives

At Workshop No. 4, the 16 near term alternatives were reviewed to develop a listing of preferred alternatives. The result of that screening process is documented in Appendix H. Eight alternatives were deemed "preferred", and selected for further evaluation:

- Purchase treated water from Cincinnati Water Works via Boone Florence Regional Water Commission.
- Purchase treated water from Cincinnati Water Works via Bracken County.
- Purchase treated water from Louisville Water Company.
- Purchase treated water from Carrollton Utilities/Carroll County Water District No. 1.
- Purchase treated water from Greater Fleming County Regional Water Commission.
- Ohio River water withdrawal and new water treatment plant at Maysville or Dover.
- Ohio River water withdrawal and new water treatment plant at Warsaw.
- Kentucky River water withdrawal and new water treatment plant at Kentucky River Pool No. 3, with supplemental raw water from the Ohio River.

Five of the eight preferred alternatives involved purchased water, with Cincinnati Water Works involved in two options, and Greater Fleming County Regional Water Commission, Louisville Water Company, Carrollton Utilities/ Carroll County WD No. 1 involved with one each. Requests for proposals from these potential sellers of finished water were issued on June 13, 2003 (Appendix I) and all four organizations submitted responses on July 9-10, 2003. The findings from these proposals were:

- All four entities were interested in selling finished water and have availability in the near term.
- Available supply ranges from about 10 to 15 mgd to the full 67 mgd.
- All entities use either Ohio River or river bank aquifers/groundwater from along the Ohio River
- Finished water quality meets or exceeds SDWA requirements.

The other three preferred alternatives would involve new water treatment facilities owned by the future regional organization. Two of these involve new withdrawals and water treatment plants off the Ohio River, in Maysville/Dover, or Warsaw respectively. The eighth option involves a new intake and water treatment plant utilizing Pool No. 3 off of the Kentucky River with an auxiliary intake on the Ohio River. This is the only option that relies on the Kentucky River.

3.5. Kentucky River Pool No. 3 alternative

The Consultant Team developed the Pool No. 3 alternative, which had not been the subject of prior investigations. The safe yield or reliable capacity of the Kentucky River at Pool No. 3 had been assumed to be adequate based on conversations with KDOW, but needed to be confirmed. In meetings and a subsequent letter from KDOW in July 2003, KDOW identified that the water credit plus the baseline withdrawal available at Pool No. 3 suggests a "floor" for a permit of between 35 and 45 mgd and a "ceiling" up to 113 mgd (Appendix J). Using the lower "floor" of 35 mgd for the purpose of discussion, the 35 mgd is comprised of two components: "minimal essential uses", and "water credits" for wastewater return flows at or above Pool No. 3. The first component, "minimal essential uses", was estimated at 10 mgd, as shown in KDOW's letter. KDOW identified that the water credit component would likely amount to between 25 mgd and 35 mgd, including the 12 mgd which the Consultant Team previously assumed would be available at Frankfort, as part of the baseline alternative. Consequently, using 12 mgd of return flow at Frankfort Electric and Water Plant Board's intake at Pool No. 4 reduces the "floor" for the permit at Pool No. 3 by 12 mgd, to between 23 mgd and 33 mgd during a critical drought. It was apparent that Pool No. 3 could not be relied upon to satisfy the target supply of 45 mgd in 2020, even considering the proposed water credits. However, KDOW estimated that the drought events occurred so

infrequently that the target supply would be available for a large majority of the time. The Pool No. 3 alternative was therefore modified to include supplemental flow from the Ohio River to offset any shortfalls associated with permitted withdrawals from the Kentucky River. The Ohio River pipeline would likely be designed to carry about 25 to 30 mgd of raw water. The ability to withdraw water from both the Kentucky River and the Ohio River provides significant flexibility and reliability to the region. The water treatment plant would be designed to treat water from either source.

3.6. Cost analysis

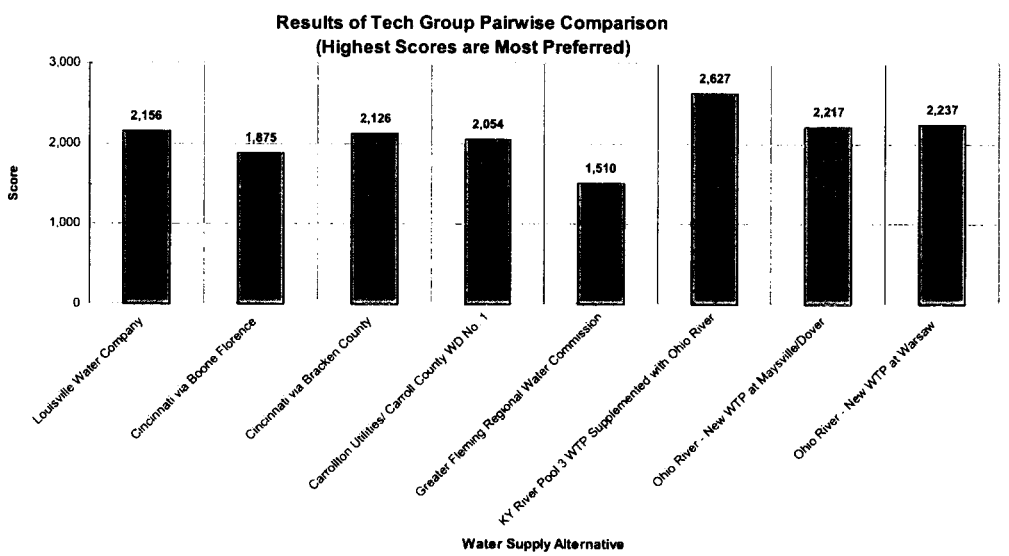
An assessment of the probable cost associated with planning, design, construction and operation of the eight preferred water supply alternatives was developed. Planning-level construction costs were estimated using available information from previous reports, construction cost curves from similar projects, and manufacturers' cost data. The estimates are based on August 2003 prices and an Engineering News Record (ENR) Construction Cost Index of 6733. Operating costs were also included because some of the alternatives involved lower capital costs, but significant annual costs to purchase finished water, while other alternatives involved higher capital costs, no purchased water, but do include costs to staff and operate a new water treatment plant. A present worth analysis was used to compare capital intensive and operational intensive alternatives on an equal basis.

The cost estimates represent the cost for planning, design and construction of river and reservoir intakes, pumping stations, water treatment plants, and transmission mains needed to deliver water through the grid. "Project" costs for each alternative were developed based on planning level estimates of the cost for constructing the individual water supply components (water treatment plants, pumping stations, etc.) associated with each alternative. The project costs include an allowance for construction contingencies (20%); regulatory permitting (5%); and engineering, legal, administrative (20%). Project costs (including the grid network costs) for the eight preferred alternatives are shown in Table 3. Present worth costs are based on a 40-year period and 3 % real interest rate. Spreadsheets outlining the costs for the individual water supply components are included in Appendix K.

Table 3. Estimated project costs and present worth costs for water supply alternatives

Water Supply Alternative	Available Supply (mgd)	Total Project Cost ($ millions)	Present Worth of Annual Operation and Maintenance ($ millions)	Total Present Worth of Alternative ($ millions)	Unit Present Worth of Alternative ($/gallon)
Cincinnati Water Works via Boone Florence	45	320.4	65.6	386.1	8.58
Cincinnati Water Works via Bracken County	45	290.4	65.6	356.0	7.91
Louisville Water Company [1]	45	175.7	117.9	293.7	6.53
Withdrawals and WTP at Maysville/Dover	45	267.8	65.6	333.4	7.41
Withdrawals and WTP at Warsaw	45	278.0	65.6	343.7	7.64
New WTP at Pool No. 3 with Ohio River Pipeline	45	265.0	65.6	330.6	7.35
Purchase water from Carrollton Utilities/CCWD	45	162.3	250.7	413.0	9.18
Purchase water from Greater Fleming	15	45.4	137.0	182.4	12.16

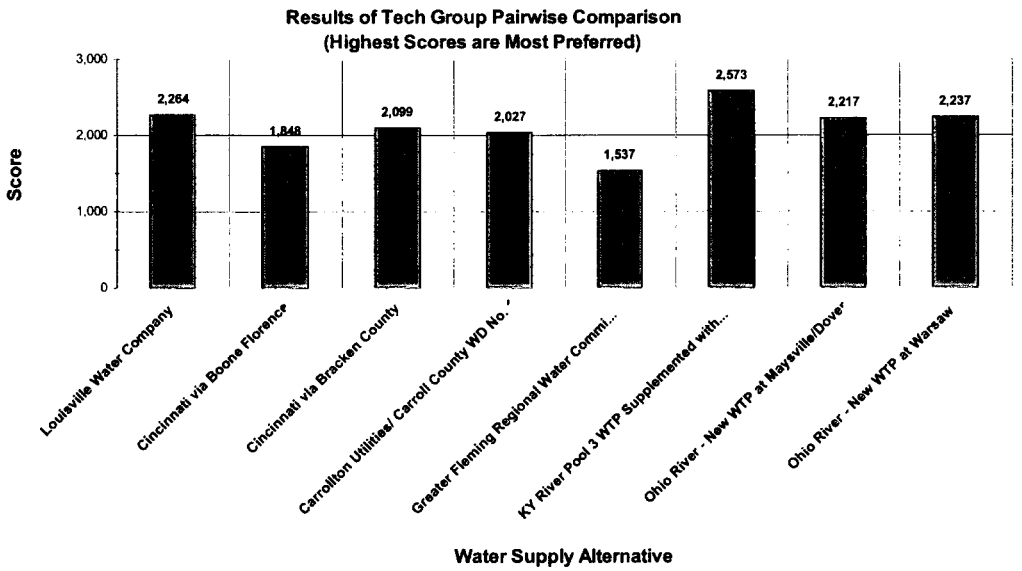
[1] *Costs shown reflect Louisville Water Company's revised lower purchase price.*



At Workshop No. 5, the Consultant Team and BWSC Technical Group ranked each of the eight preferred water supply alternatives using the evaluation criteria and a pairwise comparison technique. The pairwise technique ranks each alternative against every other alternative, and does it separately for each evaluation criteria. The result is a ranking of alternatives for each evaluation criteria. The weighting factors developed in Workshop No. 3 were then used to consolidate the rankings under each criterion into a composite ranking. The pairwise comparison spreadsheets are included in Appendix L. The pairwise comparison showed that three alternatives were superior to the others:

- Purchase treated water from Louisville Water Company,
- Ohio River water withdrawal and new water treatment plant at Maysville/Dover or Warsaw,
- Kentucky River withdrawal and new water treatment plant at Kentucky River Pool No. 3 with supplemental raw water from the Ohio River.

When these results were presented at Workshop No. 5, several of the organizations that had proposed selling finished water to BWSC asked for the opportunity to review their proposal and possibly submit a new proposal. BWSC allowed all four of the potential "sellers" to resubmit proposals, provided they did so promptly (in about two weeks). One organization, the Louisville Water Company, submitted a new proposal.



Cost estimates were then updated prior to Workshop No. 6, to reflect the new proposal from Louisville Water Company, and other refinements. A series of "sensitivity analyses" were conducted to determine whether the results of the cost analysis or the pairwise comparison were sensitive to any of these assumptions: the duration of the present worth analysis, the interest rates used in the present worth analysis, and the amount of additional water that will be purchased by the BWSC participants. As shown in Appendix L, changes to these factors did not change the ranking of the pairwise comparison. While purchasing water from the Louisville Water Company was found to be the lowest cost alternative (about 11-14% lower, depending on present worth duration and interest rates), the Consultant Team recommended the Kentucky River Pool No. 3 alternative based on its highest overall score, which was driven by first place rankings in implementability, flexibility, and water quality, and second place rankings in cost and capacity.

The waterworks facilities included in the Kentucky River Pool No. 3 alternative are:

- Raw water intake and pumping station at Kentucky River Pool No. 3.
- Raw water pipeline from the Kentucky River Pool No. 3 intake and pumping station to the new water treatment plant.
- Water treatment plant near Kentucky River Pool No. 3.
- Raw water intake and pumping station at Ohio River.
- Raw water pipeline from Ohio River intake and pumping station to the new water treatment plant at Kentucky River Pool No. 3.
- Treated water transmission mains from the new water treatment plant near Kentucky River Pool No. 3 to the grid network.
- Treated water transmission mains comprising the grid network.

The recommended water supply alternative, Kentucky River Pool No. 3 with supplemental raw water from the Ohio River, has the following advantages:

- Reliability due to access to two different water supplies. This reliability would be beneficial in the event of a spill or other contamination event in either river.
- Optimal use of the Kentucky River. This option maximizes use of the Kentucky River, consistent with BWSC's mission statement.
- Affordable cost. This option results in a unit cost for finished water that is reasonable and more economical than all but one other alternative.
- Implementability and low risk of delay. By supplementing the Pool No. 3 withdrawal, there should be no significant obstacles to securing a withdrawal permit from KDOW. The Consultant Team is not aware of any other significant obstacles, and finds it reasonable that this alternative could be implemented within 3 to 5 years following project initiation.

A roll call vote was conducted at Workshop No. 6, on whether to endorse the Consultant Team's recommendation to pursue the Pool No. 3 Alternative, with supplemental raw water from the Ohio River. Fifteen BWSC participants voted in support, one participant abstained, and two participants were absent from the workshop. The details of the presentation and the vote are in Appendix M.

4. Water system grid network

4.1. Network configuration and sizing

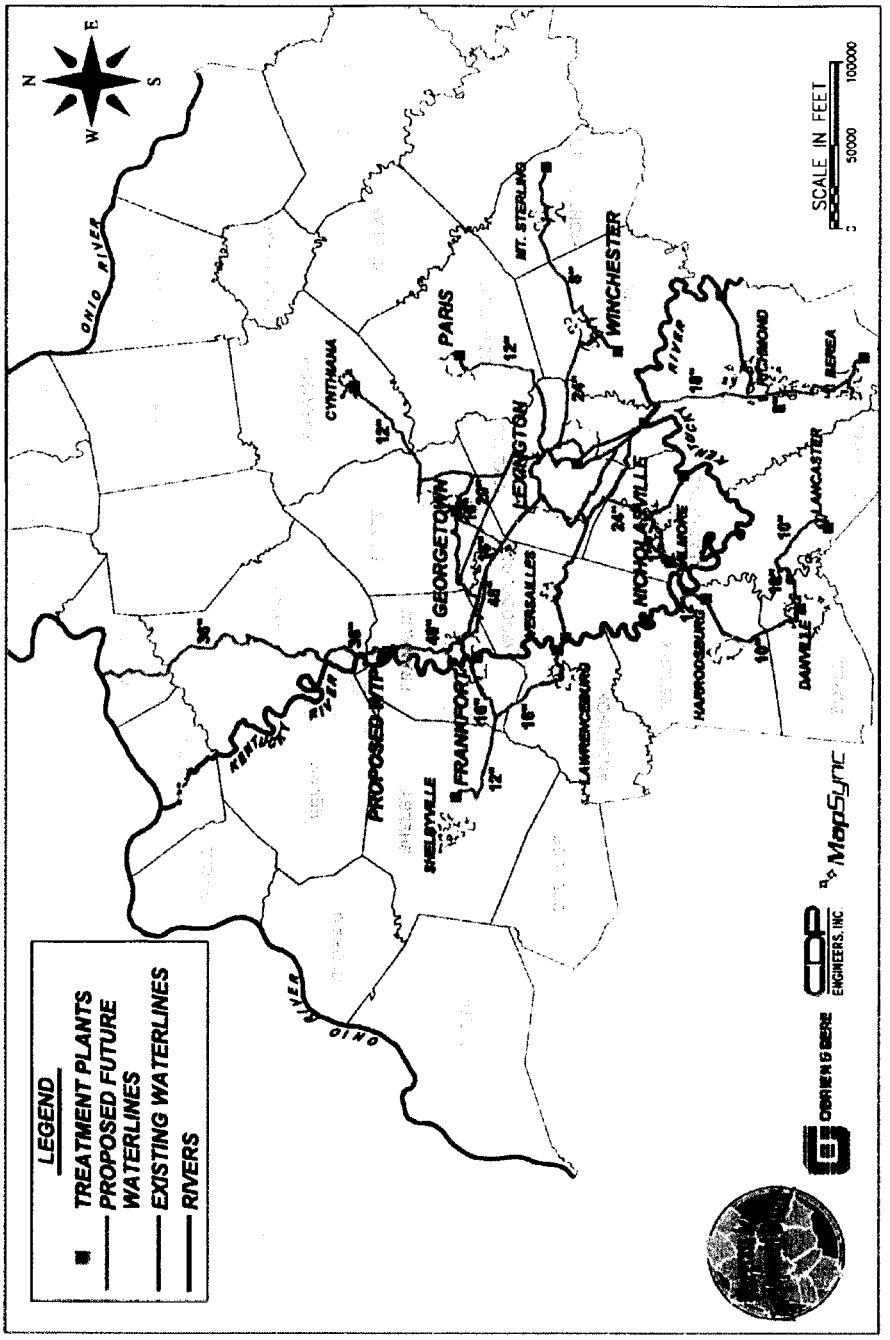
BWSC is proposing to construct a grid network of waterlines across central Kentucky to connect the water systems of the participating water utilities. BWSC plans to move treated water through the grid network from points of availability to points of need -- wheeling. The grid would consist of pipelines interconnecting the BWSC. Many of the consortium members are already interconnected – KAW to Georgetown and Versailles, Frankfort to Georgetown – and in other areas existing pipelines extend relatively close to other communities. For this feasibility study, a concept level hydraulic computer model was prepared to evaluate the existing grid elements and determine required pipe sizes and pumping station locations for new infrastructure. The model was prepared using the KYPIPE modeling software developed at the University of Kentucky.

A conceptual layout and cost of the piping system was developed for each of the eight water supply alternatives. Pipeline sizing for the grid network was based on a hydraulic model that was developed by obtaining the major piping for the existing BWSC water systems, along with water demands representing each community's treatment or supply deficit. Based on the adequacy of the existing major piping, additional connecting pipelines and pumping stations were added to convey the water to where it is needed. Hydraulic analyses were performed for the various water supply alternatives using two criteria: velocities and pressures. The goal was to maintain velocities between 2.5 feet per second (fps) and 8 fps while at the same time maintaining pressures between 30 pounds per square inch (psi) and 150 psi. USGS topographic maps were used to identify the location and estimate high and low elevations for each water line route. These elevations assisted in identifying potential booster pumping station locations along proposed routes where pressures dropped below 30 psi. It was assumed that pumping stations would boost the pressure up to a maximum of 150 psi. Master meters are proposed at each interconnection between the BWSC grid and individual community systems. Figures showing the grid network for the water supply alternatives are included in Appendix N.

Figure 2 illustrates the components of one alternate version of the grid, and the details of each grid component are as follows:

- **Lexington** from **Proposed WTP (additional connection in Frankfort)** – approximately 175,300 feet of 48-inch water main, 3 pumping stations and 2 master meters.
- **Shelbyville** and **Lawrenceburg** from Frankfort – approximately 11,400 feet of 16-inch and 107,100 of 12-inch water main, 3 pumping stations, and 2 master meters.

Figure 2



Bluegrass Area Development District
Water System Regionalization Feasibility Study
Grid Components

O'BRIEN & GERE ENGINEERS

File No. 11203 30507
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- **Paris** from Lexington – approximately 55,400 feet of 12-inch water main and 1 master meter.
- **Cynthiana** from Georgetown – approximately 76,600 feet of 12-inch water main and 1 master meter.
- **Winchester** from Lexington – approximately 59,100 feet of 24-inch water main and 1 master meter.
- **Mt. Sterling** from Winchester – approximately 79,800 feet of 8-inch water main, 2 pumping stations and 1 master meter.
- **Nicholasville** from Lexington – approximately 39,900 feet of 24-inch water main, 1 pumping station and 1 master meter.
- **Wilmore** from Nicholasville – approximately 15,700 feet of 12-inch water main, 1 river crossing and 1 master meter.
- **Harrodsburg** from Wilmore – approximately 44,300 feet of 10-inch water main, 1 pumping station and 1 master meter.
- **Danville** from Harrodsburg – approximately 36,800 feet of 10-inch water main, 1 pumping station and 1 master meter.
- **Lancaster** from Danville – approximately 57,400 feet of 10-inch water main, 1 pumping station, 1 river crossing and 1 master mater.
- **Richmond** from Lexington – approximately 77,500 feet of 18-inch water main, 2 pumping stations, 1 river crossing and 1 master meter.
- **Berea** from Richmond – approximately 51,700 feet of 8-inch water main, 1 pumping station and 1 master meter.

At this time, it appears that opportunities may exist for phasing construction of portions of the grid network. However, details of proposed phasing cannot be fully developed until the list of BWSC participants is confirmed.

4.2. Grid water quality

During the course of the study, KDOW identified several issues related to treated water quality in the grid network, including mixing of chlorine/chloramine disinfectants, corrosion control, and responsibility for and monitoring of water quality. A brief summary of the issues is presented here and a more detailed discussion is presented in Appendix O.

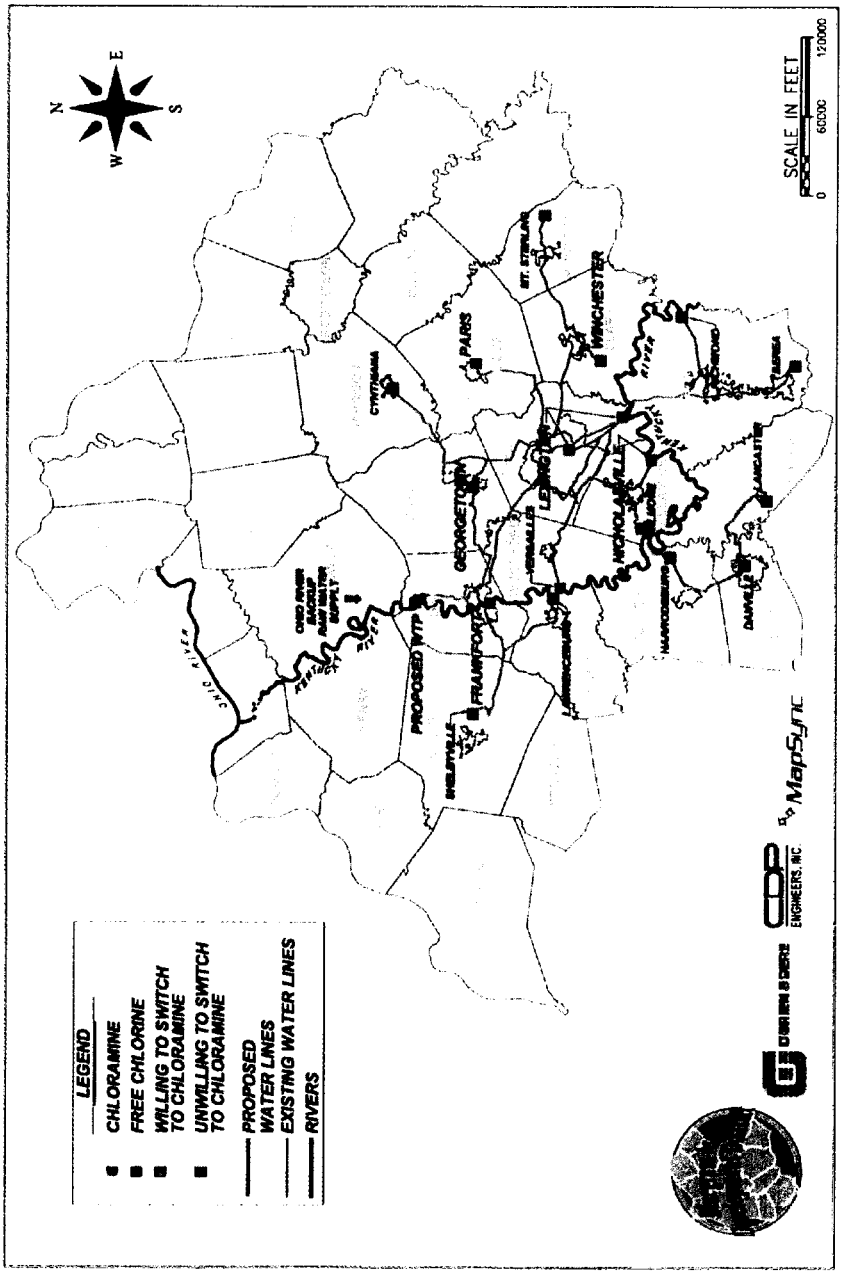
- Disinfection by-products (DBPs) and chloramine/chlorine mixing - The naturally occurring organics in surface water supplies such as the Kentucky River or Ohio River combine with free chlorine to form DBP's, which are regulated by the Safe Drinking Water Act. Water systems using surface water will be challenged to meet the Stage 2 levels in the proposed DBP rule, when they come into effect (likely 2007-2009 timeframe). Some utilities have switched the form of their distribution system chlorine residual from free chlorine to chloramine, in an attempt to reduce their DBP level. Based on a survey conducted by BGADD, thirteen out of

seventeen BWSC utility participants currently use free chlorine, but more than half of the water consumed in the region uses chloramines, because Kentucky American Water, the largest supplier, uses chloramine for its residual disinfectant. It is understood at this time that KAW will not likely switch back to free chlorine, because of difficulty meeting the near-term DBP regulation.

Mixing of free chlorine and chloramine residuals can cause taste and odor problems. Figure 3 shows the form of chlorine residual used by each BWSC participant, and whether those using free chlorine are willing to switch to chloramine, so that all systems would use the same form of chlorine residual. Several "outer ring" utilities indicated they use free chlorine and are unwilling to switch. The Consultant Team therefore proposed an alternative in which chloraminated water would be converted back to a free residual for those utilities. It appears that this could be workable, since the flow could be controlled so that water with free chlorine would not be allowed to move back past the master meters, and mix with chloraminated water. While there are numerous details yet to be resolved, KDOW concurred that the DBP/chlorine residual issue could be worked out, and therefore did not present an insurmountable obstacle to the grid system.

- Corrosion control – There are several different approaches to corrosion control currently employed by BWSC participants. There may be a need to adjust some corrosion techniques in "mixing zones", where the water from adjacent systems mixes. It is possible that the grid may adopt some more consistent approaches to corrosion control to avoid the mixing issue. However, it is unlikely that occasional changes in mixing would create a significant problem. Further water quality studies are recommended, but can be performed after the Regionalization Feasibility study is completed.
- KDOW regulation regarding "consecutive systems" –The grid concept is a challenge from a regulatory perspective, because there could be several suppliers each with the potential to supply water to the same utility. The hydraulics could be dynamic, at least on occasion, making it difficult to always know whose water is reaching that utility. It appears that evolving SDWA regulations will continue to make the retail water provider responsible for the quality of the water they sell. KDOW has the responsibility to issue specific guidance on responsibility for water quality compliance in a grid system, and to clarify the rules governing consecutive systems with multiple sources. Responsibility to own and maintain the monitoring network could likely remain with the retailers, except on BWSC mains. However, given the complexity

Figure 3



Bluegrass Area Development District
Water System Regionalization Feasibility Study
Disinfection Technique for BWSC Participants

File No. 11203.30507
Date: January 7, 2004

of the grid water quality issue, the Consultant Team suggests BWSC consider offering on-line water quality monitoring to assist in assuring compliance for all participants for selected parameters. Further, we suggest BWSC offer voluntary responsibility for general oversight of grid water quality for participants. In this way, BWSC could proactively manage distribution water quality, and help identify and address water quality problems on a regional basis.

Several meetings and conference calls were held with KDOW to address these concerns. Based on these discussions, it was concluded that the grid network concept is not fatally flawed and that these issues could be addressed in future phases of work.

4.3. Summary of grid benefits

In summary, the grid network provides immediate and long-term benefits:

- Peak day attenuation. Water system facilities are typically sized to provide the peak day demand. Because the BWSC utilities are not likely to have their peak water demands all occur on the same day, the size and cost of treatment plants, pumping stations and pipelines can be reduced.
- Optimize use of existing sources. The grid provides the network of piping needed to deliver water from existing sources to where it is needed.
- Grant funding. The possibility for grant funding and low interest loans is enhanced by the regional approach afforded by the grid system.
- Economy of scale. A single large additional source of supply will provide economy of scale in comparison to construction and operation of new, small supply projects by each of the BWSC participants.
- Reliability of multiple sources. The grid network allows water from multiple sources to be fed into the grid thereby minimizing the potential for a water supply interruption due to a chemical spill or facility outage.
- Ease of phasing regional growth. The grid network provides flexibility in accommodating changes in growth areas as well as connections to utilities beyond the BWSC.

5. Financial

The objective of the financing evaluation was to develop a plan that is affordable and fairly apportions costs. The primary financial issues addressed in this study can be stated quite simply:

- From a financial perspective, why should we build a regional water supply?
- How will BWSC obtain the capital funds to build the new regional water supply and pipeline grid?
- How will BWSC raise revenues to repay borrowed capital funds and pay ongoing operating costs?
- What financial impact will the new water supply have on the rates and customer bills of participating communities?

While the questions and answers may sound simple, there is considerable complexity in how the funding and revenue approaches are addressed.

5.1. Financial benefits of a regional water supply

In the traditional approach to developing new water supplies, most communities would develop their own individual supplies with sufficient capacity to meet their present needs as well as some amount of their future needs. In some cases, two or more communities might cooperate to develop a supply. The most widely used source of water supply for central Kentucky is the Kentucky River. However, the Kentucky River has insufficient supply to meet the region's growing water needs during a drought. Further, there exists a water treatment plant capacity deficit. The region's most abundant source is the Ohio River, but it is not in proximity to the communities that need water, and building facilities for individual communities to treat and transport quantities of water from this remote source is expensive and inefficient. Instead, a broad coalition of communities and interested groups have moved toward development of a regional water supply to address the water needs in the region. There are several advantages to this approach:

- Economies of scale – It is generally less expensive to build and operate one large water treatment plant and distribution system than to build numerous small systems that collectively provide the same quantity of water.

- Better financing terms – Lenders generally view a larger water utility as a better credit risk than numerous small utilities, and will therefore generally offer better lending terms to a larger utility.

- Lower unit operating costs – Many of the costs related to treating and distributing water are fixed; that is, they don't change with the quantities of water produced or treated. Generally, the larger the number of customers among whom costs can be shared, the lower the unit cost (i.e., the cost per gallon). Larger water systems generally spend less per gallon in response to new regulatory and environmental standards.

- Reliability – A grid system that connects multiple water supplies is inherently more reliable than a community which relies on a single source of water supply. It can be prohibitively expensive for an individual community to develop standby water sources.

- Efficiency – A single-purpose organization such as a regional water supply agency can focus its energy and attention on doing just one thing, and does not have to spend time and money dealing with the many issues that face a "full-service" local government.

In summary, there appear to be number of financial benefits associated with developing additional water supply on a regional basis, compared with each community developing their own additional supplies.

5.2. Funding new water supply facilities

The cost to design and construct a new water supply and pipeline grid to serve central Kentucky will be significant, costing as much as $200 million to $300 million. This is a major expenditure for any utility or group of utilities, and BWSC will aggressively seek ways to reduce the costs of this project, which may include the following:

- Maximum use of grants and other external funding – BWSC will aggressively seek capital funding from federal and state agencies. The participation of relatively small and distant communities in BWSC will help increase the probability of grant funding from both federal and state agencies. The nature of the proposed water system grid is consistent with State Regionalization Initiative Legislation and should enhance the ability of BWSC to receive funding through the KIA.

- Direct appropriation – In addition to the pursuit of grants, local officials representing BWSC communities will aggressively seek the inclusion of directly appropriated ("earmarked") funds in Congressional spending bills. This approach can expedite

construction, because it eliminates the need to submit competitive grant applications. It must be pointed out, however, that the current federal deficit makes it increasingly difficult to obtain this type of funding.

- Low interest loans – After exhausting available grant funding and direct appropriations, low interest loans from USDA's Rural Utilities Service (successor to the Farmers Home Administration), state revolving loan funds (SRFs), KIA, and other federal loan programs will be aggressively pursued.

- Issuance of long-term debt – Based on firm commitments from its members, BWSC will issue long-term, tax-exempt debt in the form of revenue bonds. These bonds will be guaranteed by the revenues derived from the sale of water. The bonds will not be guaranteed by property taxes or other tax revenues.

The interest rate attached to long-term debt is determined by the lenders view of the risks related to the loan. Generally, water bonds are considered to be relatively low-risk, because water is a necessary commodity, there is no commodity to substitute for the role of water, and water systems are generally monopolies. In order to provide assurance to lenders that their loan (the bonds) is likely to be repaid, BWSC will require long-term financial commitments from its members. Each utility member of BWSC will agree to purchase each year a specific minimum quantity of water on a "take or pay" basis. This guarantee will provide security ("collateral") for the issuance of bonds to build BWSC's facilities. Payments for water purchase commitments will not begin until the water is available to the member or customer. However, there will be some start-up costs incurred before water can be delivered; these costs will likely be paid for by grants and loans or by a combination of grants, loans, and local cash contributions.

5.3. Revenue requirements needed to pay capital and operating costs

BWSC will generate the revenues needed to pay for its capital and operating costs from three principal sources:

- "Take or Pay" contracts - As discussed above, each utility that is a member of BWSC or which otherwise enters into a long-term wholesale purchase contract will commit to paying for a certain amount of capacity that will be reserved for that member, and will commit to taking a minimum daily quantity of water. The minimum daily purchase will keep the water in the grid "fresh" to help maintain acceptable water quality. These commitments will be the principal determinant for the timing of the new BWSC water supply facilities, as well as the service area of the BWSC pipeline grid that will be built.

- Sale of surplus water – To the extent that BWSC has more capacity than its members and long-term wholesale customers require, it will sell surplus water on both a short- and long-term. The revenue from such sales will be used to retire debt or pay for improvements to BWSC's facilities.

- Sale of backup water supply – Some existing utilities may not choose to buy water on a "take or pay" basis, and may want only to have a backup source of water available in cases of shortages or emergencies. BWSC should consider such arrangements as a means of achieving regionalization; however, back-up supplies cannot be "guaranteed" unless the utility financially commits to the desired capacity. The utilities wanting this type of arrangement may have to pay a price that is substantial, because BWSC must build and have available the guaranteed capacity even when "backup" customers do not need or use water.

BWSC will not have any taxing authority. Rather, it will rely on long-term contracts with its members and other wholesale customers. Beyond the terms of the wholesale contracts, BWSC members will not be individually responsible for long-term debt issued by BWSC to construct water supply or pipeline grid facilities.

5.4. Financial impacts on water rates and customer bills

There are several factors that will affect the water costs for participating communities of BWSC:

- No competition – BWSC will sell water on a "wholesale" basis only, so there is no threat of BWSC competing with participating communities or "stealing" retail customers from participating communities. As a regional water commission organized under the laws of Kentucky, BWSC cannot sell water on a retail basis, and BWSC will be effectively "owned" by its members.

- Non-profit organization – The new regional water system will operate on a non-profit basis. That is, the wholesale water rates will be set to recover its capital and operating costs, including any reserves that might be required by bond covenants, loan agreements or good management practice, but it will not to generate a "profit." If a surplus is generated in any given year, it will be used for only four purposes: (1) to pay off outstanding debt; (2) to pay for new capital projects; (3) to minimize future rate increases; or (4) as a reserve for infrastructure replacements. Therefore, BWSC will not artificially inflate the price of its water to produce profits or dividends for its owners.

- Uniform rate – BWSC's plan is to charge a uniform capacity fee based on the amount of capacity that a customer wants BWSC to provide or reserve for that customer, plus an operating fee that is tied to costs of operating the BWSC's water facilities (intakes, pumping stations, treatment plant, and pipelines). BWSC's policy will be to charge the same prices to customers with similar demand and usage characteristics. BWSC will use consistent unit capital and operating costs to calculate bills for all members and long-term wholesale customers with "take or pay" contracts. BWSC will likely use higher unit capital and operating costs to calculate bills for customers who do not enter into long-term "take or pay" contracts.

The cost for the raw and finished water system facilities (intakes, treatment plants, pumping stations, pipelines, etc.) includes the components needed to deliver the water up to the wholesale meter connection off of the grid network. If the entire 45 mgd supply and grid system were to be constructed and operated, the total annual cost is estimated at approximately $16 million (Appendix K). The annual fees for purchasing water from the grid network are currently estimated at $400,000 to $500,000 per one million gallons per day of committed capacity. This annual fee includes delivery of 200,000 gallons per day for each one million gallons per day of committed capacity. These annual fees are equivalent to about $1.83/1,000 gallons of water purchased if the customer purchases their full committed capacity every day, or equal to about $6.16/1,000 gallons purchased if the customer only purchases the minimum capacity (20% of the committed capacity). The "final" cost of water will be established by BWSC based on the actual costs to construct and operate the regional supply system, and based on the amount of "take or pay" commitments, which are formalized by binding contracts. BWSC requested non-binding "letters of intent" from the BWSC Technical Group in August 2003, and subsequently to the other utility participants, to determine how much water each utility is interested in buying (Appendix P). As of February 27, 2004, the following utility members of the BWSC have signed non-binding commitments for a total of 31.755 mgd.

- Berea College/City of Berea - undefined
- City of Cynthiana – 0.5 mgd
- City of Danville – 1 mgd
- Frankfort Electric and Water Plant Board – 2 mgd
- Georgetown Municipal Water and Sewer Service – 0.255 mgd
- Kentucky American Water – 22 mgd
- City of Lancaster – 0.5 mgd
- Mt. Sterling Water and Sewer Commission – 1 mgd
- Nicholasville Combined Utilities – 1 mgd
- City of Paris – 0.5 mgd
- Winchester Municipal Utilities Commission – 3 mgd

The specific financial impact (in terms of rates and customer bills) will therefore vary from one utility to another. For example:

- Some utilities need more/less additional water, as a percent of the current capacity, thereby requiring more/less additional revenue.
- Increased retail sale of water will produce increased revenue thereby reducing the need for increased retail rates.
- In some cases, the water purchased from BWSC might be substituted for building or expanding a treatment plant for individual utilities.

Further, some utilities may decide to use the new water for peak usage periods only; other utilities may decide to use the new water for their normal "base" usage and operate their own treatment plants during peak demand periods. Individual decisions related to use of the BWSC water will be made by each participating utility or community. This study can provide approximate financial impacts on individual utilities, but each utility will likely choose to perform its own detailed financial analysis before making its final decision.

6. Ownership and management of water facilities

6.1. Evaluation of organization alternatives

A new organization will be formed to oversee management and operation of the proposed waterworks facilities. The organizational priorities included:

- Providing maximum local control.
- Being eligible to issue tax-exempt debt.
- Maximizing eligibility for State/Federal grants and low-interest loans.
- Minimizing regulation by external parties (PSC, federal agencies, other Kentucky agencies).

A benchmarking survey was performed early in this study to identify and evaluate management and ownership alternatives for the participating utilities (Appendix Q). Organizational and management issues that were addressed included:

- Organizational structure
  - Legal form of organization
  - Purpose of entity
  - Geographic service area
  - Authority
  - Independence

- Services to be provided
  - Potable versus non-potable water
  - Wholesale versus retail
  - Availability of supply
  - Reliability of supply
  - Water quality

- Financing
  - Issuance of debt
  - Operating revenues
  - Revenue sources
  - Guarantees
  - "Take or pay" contracts
  - Long-term versus short-term contracts
  - Rate approval process

- Management philosophy
  - Lowest life cycle cost
  - Lowest rates over time
  - Use of reserves
  - Compensation policy
  - Key personnel
  - Procurement philosophy

- Governance
  - Board of Directors
  - Policy advisory board
  - Conflicts of interest

- Membership
  - Definition of members versus customers
  - Identity of initial members
  - Addition of members
  - Removal/Withdrawal of members

The BWSC participants considered several organizational alternatives:

- New traditional public agency under existing Kentucky Revised Statutes:
  - Regional Water Commission (KRS 74.420-KRS74.520)
  - Interlocal Cooperation Agreement KRS (65.210)
  - Instrumentality of Governmental Agencies (KRS Chapter 58)

  The Regional Water Commission and the Instrumentality of Governmental Agencies were considered viable options, and were retained for further evaluation.
- New public agency requiring special legislation - This option was considered as a means for including both public and private utilities as members. It carries some risk of delays, and KAW (the major BWSC participant that is an investor owned utility) decided that they would participate without being a member of the regional organization. Therefore, this option was not carried forward for further consideration.
- Existing public agency such as KRA, KIA - None of the existing public agencies was carried forward because a sole purpose agency focused on water system ownership and operation was preferred.
- Non-public agency
  - Non-profit Corporation (KRS Chapter 273)
  - Contractual Agreement (Contract Law)
  - Partnership (KRS Chapter 362)
  - Unincorporated Association (Miscellaneous Laws and Cases)

  None of the non-public agencies was carried forward for further consideration because they either involve limitations on tax exempt financing, or grant eligibility, or were viewed as unnecessarily

cumbersome structures in comparison with a traditional public organization.

Based on a review of the advantages and disadvantages of each of the organizational structures, two organizational alternatives were carried forward for more detailed evaluation: (1) Regional Water Commission, and (2) Instrumentality of Governmental Agencies (Appendix R). A matrix was developed based on 30 evaluation criteria and used to compare the two organizational alternatives (Appendix R). Based on the outcome of this evaluation, the Consultant Team recommended selecting a Regional Water Commission as the preferred alternative. Some of the primary reasons for favoring this alternative include: (1) its use optimizes local control without the participating cities or other entities incurring any legal liability; (2) its use enables each member to have an equal vote; (3) its use ensures continued public support and accountability; and (4) its use ensures immediate acceptance and support of regulatory agencies. A Regional Water Commission can not include investor owned utility members. However, KAW, the largest investor owned utility in the BWSC, has agreed to participate as a long-term wholesale customer and contractual partner, in lieu of membership. BWSC participants voted at Workshop No. 5 to accept the recommendation to form a Regional Water Commission.

6.2. Regional Water Commissions

6.2.1. Characteristics of a Regional Water Commission

A Regional Water Commission, as formed under Chapter 74 of the Kentucky Revised Statutes, is a distinct legal entity and is both a public corporation and a public agency. Its function is to enable two or more utilities to jointly develop and operate sources of drinking water supply. The proposed name of the Regional Water Commission is the "Bluegrass Water Supply Commission".

6.2.2. Selection of the Commissioners and voting privileges

A Regional Water Commission must have at least five Commissioners who then act as the Board of Commissioners to govern the Regional Water Commission. Each member organization will be responsible for selecting its own representative ("Commissioner") to the Board of Commissioners. Each member/utility's representative must be appointed by the Mayor and approved by the governing body – City Council or City Commission – of the City that owns the utility. Each commissioner will serve a four-year term, and commissioners may succeed themselves. Each member organization will have one voting representative on the Commission and each member will have an equal vote on matters coming before the Commission.

6.2.3. Financing and revenue

Since the Bluegrass Water Supply Commission will be a governmental agency, it will be eligible for tax-exempt financing, state and federal grants, and low interest loans. The Bluegrass Water Supply Commission will be a separate legal entity and, as such, will be responsible for its own debts and legal obligations. Revenues derived from water sales will be used to pay for operating expenses and to repay debts incurred by the Commission. The Board of Commissioners of the Commission will determine the wholesale rates that will be charged to utilities purchasing water from the Commission. The Commission is expressly prohibited from selling water to individual, private customers. It can only supply water on a wholesale basis to other utilities, which is one reason why the Commission will be exempt from regulation by the Public Service Commission.

A more detailed discussion of Regional Water Commissions is included in Appendix S.

7. Public participation

The BWSC conducted a uniquely open study, with extensive opportunities for input from the public, elected officials, and governmental agencies. The public participation program consisted of the following:

- Public workshops and meetings
- Newsletters/mailers/e-mail
- Agency briefings and technical meetings
- Extensive press coverage
- Elected official, Council, Commission, and Board updates

A brief description of each of these elements follows.

7.1. Public workshops and meetings

A series of public workshops and "open house" style public meetings facilitated extensive public participation. Since November 2002, six all-day public workshops were held as shown in Table 4.

Table 4. Public workshops

Workshop No.	Workshop Title	Location	Date
1	Kickoff	Lexington	November 11, 2002
2	Benchmarking/Data Collection	Georgetown	January 8, 2003
3	Identifying Options/Preliminary Screening	Frankfort	March 14, 2003
4	Screening Technical Alternatives	Nicholasville	May 28, 2003
5	Decisions	Winchester	July 23, 2003
6	Conclusions	Lexington	October 13, 2003

Two public meetings were held at Henry Clay High School in Lexington during the evening on August 6, 2002 and September 22, 2003.

These public work sessions and evening meetings provided a forum for citizen input and other interested party input as well as an opportunity to ask questions of BWSC's participating utilities and the consultant. Copies of the MS PowerPoint presentations and meeting summaries from the six workshops are included in Appendix T.

7.2. Newsletters/mailers/e-mail

The Bluegrass Area Development District provided an update on the status of the study in its bi-monthly newsletters, over 2,000 distributed mailers with the announcements for upcoming meetings, and corresponded by e-mail with the public that attended the meetings.

7.3. Agency briefings and technical meetings

The BWSC held several technical meetings and provided updates on the status of the study to the Kentucky River Authority (KRA), Kentucky Division of Water (KDOW), and Kentucky Infrastructure Authority (KIA).

- To communicate the status of the work on the study and request cooperation and support, BWSC held a multi-agency meeting on June 9, 2003 with Kentucky Department of Environmental Protection (KYDEP), KRA, KIA, Economic Development Administration (EDA), and Rural Development (RD). Meeting summaries are included in Appendix U.
- A meeting with KRA was held on December 16, 2002 to discuss the status of the Kentucky River model, water supply, and water supply alternatives (e.g., Lock and Dam No. 10).
- Several technical meetings were held with KDOW to address water supply withdrawal permits for the Kentucky River, water supply alternatives, and water quality of the grid network.
- As a follow up to the meeting on June 9, 2003, a second briefing was held on August 21, 2003 with Kentucky Department of Environmental Protection (KYDEP), KRA, KDOW, and KIA, to discuss the findings through Workshop No. 5, and solicit further input. Meeting summaries are included in Appendix V.

7.4. Extensive press coverage

Numerous articles were written in the area newspapers documenting the work completed and the upcoming meetings. A number of newspaper articles are included in Appendix W. On the whole, press coverage was positive.

7.5. Elected Official, Council, Commission and Board Updates

Consortium members provided updates to their elected officials and their Councils/Boards throughout the study. On August 21, 2003, a meeting was held exclusively for the purpose of briefing elected officials and their staffs on the findings of the study through Workshop No. 5. There was considerable discussion and input on how to approach grant-funding

opportunities. BWSC members are continuing to communicate with their City Councils/Commissions/Boards, regarding the opportunity to make non-binding commitments to purchase water from the future Bluegrass Water Supply Commission.

8. Conclusions

The objectives of the Water System Regionalization Feasibility Study have been met:

- BWSC has identified the Kentucky River Pool No. 3 with supplemental raw water from the Ohio River as an alternative that utilizes highly reliable sources of supply and is available within 3 to 5 years ✓
- A grid network of water pipelines has been conceptually configured to optimize regional water supplies and move water to where it is needed ✓
- The management/ownership approach based on the formation of the Bluegrass Water Supply Commission is fair and flexible ✓
- A financial plan has been developed that is affordable and fairly apportions costs ✓
- BWSC has utilized a comprehensive program of public participation and outreach to effectively communicate the study process and findings ✓

9. Next steps

The BWSC identified that the following key items need to be addressed in the near term:

- Finalize the amounts of water each BWSC participant will commit to purchase.
- Form the Bluegrass Water Supply Commission.
- Establish funding so that planning and design of the proposed facilities continues, particularly to implement near-term improvements for communities with the greatest needs.
- Continue working with KDOW to formalize commitments on water credits, Kentucky River Pool No. 3 permitting, Ohio River permitting, and grid water quality.
- Pursue grant funding.

The Bluegrass Water Supply Consortium intends to move forward aggressively with these and other action items. By endorsing the recommendations of this study, BWSC is "driving a stake in the ground", completing the first step in the long process to bring ample potable water supplies to the residents of central Kentucky.

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- *Task III Report – KYBASIN User's Manual: A Water Supply Assessment Model for the Kentucky River Basin*
- *Task III Report – Water Use Estimation and Forecasting for the Kentucky River Basin*
- *Task IV Report – KYROM User's Manual: A Drought Management Model for the Kentucky River Basin*
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Final Appendices
for the
WATER SYSTEM REGIONALIZATION FEASIBILITY STUDY

Prepared for:

BLUEGRASS AREA DEVELOPMENT DISTRICT

in association with the

Bluegrass Water Supply Consortium

February 27, 2004

O'Brien & Gere Engineers, Inc.

Contents

Appendix A – Water demands
- Summary table
- Water demand projections for each utility (listed alphabetically)

Appendix B – Water demand peaking analysis

Appendix C – Kentucky River withdrawal permits
- Kentucky River Basin Water Systems with Surface Sources
- Kentucky River Profile
- Withdrawal Permits (listed alphabetically)

Appendix D – Kentucky River Dam No. 10 information
- Lexington Herald Leader, December 12, 2002
- Minutes from KRA meeting held December 11, 2002
- Handouts from KRA meeting held December 11, 2002

Appendix E – Weighting factors for alternative scoring and pairwise comparison

Appendix F – Fatally-flawed alternatives and near-term/long-term classification

Appendix G – Historic water supply plans of the Kentucky River

Appendix H – Alternative screening results
- Water supply alternatives decision matrix
- Scoring summary
- Graph of scores
- Weighting factors
- Draft Summary of Water Supply Alternatives Matrix
- Draft Summary of Water Supply Alternatives Matrix (prior to scoring)

Appendix I – Request for proposal from water suppliers
- Greater Cincinnati Water Works
- Louisville Water Company
- Proposed Carroll County Regional Water Commission
- Greater Fleming County Regional Water Commission

Appendix J – Kentucky Division of Water's letter on Kentucky River Pool No. 3

Appendix K – Water supply alternative cost spreadsheets (as presented at Workshop Nos. 5 & 6)
- Cost estimate, master
- Water treatment plant costs
- Pumping station and intake costs
- Pipeline costs
- Annual costs and unit costs
- Graph, unit present worth of alternatives
- Graph, annual cost per mgd of capacity

- Graph, effect of WTP capacity on unit present value of alternatives
- Graph, effect of WTP capacity on annual capacity cost

Appendix L – Water supply alternative pairwise results
- Original pairwise comparison
  - Weighting factors
  - Preferred option ranking worksheet (criteria #1-#5)
  - Graph, results of Tech Group pairwise comparison
- Revised pairwise comparison with modified Louisville Water Co. proposal
  - Weighting factors
  - Preferred option ranking worksheet (criteria #1-#5)
  - Graph, results of Tech Group pairwise comparison
  - Final Summary of Water Supply Alternatives Matrix

Appendix M – Roll call vote on endorsement of Kentucky River Pool No. 3

Appendix N – Grid hydraulic network

Appendix O – Grid network water quality memorandum

Appendix P – BWSC's letter of intent to buy
- Draft Letter to BWSC participants
- Non-binding commitment letters received through February 27, 2004

Appendix Q – Benchmarking study for regional water authorities

Appendix R – Evaluation of Regional Water Commission versus Chapter 58
- Comparison of organizational options

Appendix S – Information on Regional Water Commissions
- Questions and answers about regional water commissions
- Paying for a New Regional Water Supply

Appendix T – Workshops 1-6
- Agenda, minutes, sign-in sheets, and presentation slides for each workshop

Appendix U – Meeting minutes for June 9, 2003 (Conference with State and Federal Policy and Program Staff, Frankfort, KY)
- Minutes and presentation slides

Appendix V – Meeting minutes for August 21, 2003 (Briefing for Elected Officials in Lexington, KY and State Agencies in Frankfort, KY)
- Minutes and presentation slides

Appendix W – News articles

Appendix X – Public Meetings
- Public Meeting No. 1
- Public Meeting No. 2

Water Demands

Contents

- **Summary table**
- **Water demand projections for each utility (provided by BGADD in November – December 2002):**
  - **Berea College Utilities**
  - **Cynthiana**
  - **Frankfort Electric & Water Plant Board**
  - **Georgetown MWSS**
  - **Harrodsburg**
  - **Kentucky-American Water Company**
  - **Lancaster**
  - **Lawrenceburg**
  - **Mt. Sterling Water/Sewer Commission**
  - **Nicholasville**
  - **Paris**
  - **Richmond**
  - **Shelbyville Water/Sewer Commission**
  - **Versailles**
  - **Wilmore**
  - **Winchester**

Estimates of Water Demands and Supplies for BWSC Participants (mgd)

Prepared by O'Brein & Gere on July 22, 2003

BWSC Participant	2000			2020			2020 (Modified)			Approx. Worst-case Allowable Withdrawal	Full Permitted Withdrawal	2000 WTP Capacity	2020 Hybrid Maximum Day	Projected Deficit
	Average Day	Maximum Day	Peaking Factor	Average Day	Maximum Day	Peaking Factor	Average Day	Maximum Day	Peaking Factor					
Berea College Utilities	2.410	3.167	1.31	3.250	4.385	1.35	3.250	4.385	1.35	3.8	3.8	4	3.7	-0.1
Cynthiana (City)	2.159	3.262	1.51	2.596	3.875	1.49	2.596	3.875	1.49	0	6	6	3.3	3.3
Danville														
Frankfort Electric and Water Plant Board	7.950	14.207	1.79	8.711	14.565	1.67	8.711	14.565	1.67	5.5	15	18	12.4	6.9
Georgetown Municipal Water and Sewer Service	2.435	3.805	1.56	3.951	6.176	1.56	3.951	6.176	1.56	0	4	4	5.2	5.2
Harrodsburg (City)	2.724	3.650	1.34	3.133	4.448	1.42	3.133	4.448	1.42	1.7	3.2	4	3.8	2.1
Kentucky-American Water Company	41.020	66.370	1.62	51.550	89.010	1.73	51.860	87.670	1.69	35	63	65	64.8	29.8
Lancaster (City)	1.197	1.643	1.37	1.899	2.679	1.41	1.899	2.679	1.41	1.5	1.7	2.1	2.3	0.8
Lawrenceburg (City)	1.708	2.442	1.43	2.768	3.852	1.39	3.210	4.815	1.50	2.5	2.5	2.59	4.1	1.6
Mt. Sterling Water/Sewer Commission	2.273	3.261	1.43	2.540	3.645	1.44	2.540	3.645	1.44	3.5	3.5	3	3.1	-0.4
Nicholasville (City)	2.939	4.700	1.60	4.500	7.200	1.60	5.010	8.015	1.60	3	3	6	6.8	3.8
Paris (City)	1.343	2.079	1.55	1.531	2.480	1.62	1.825	2.414	1.32	0.6	2.2	3	2.1	1.5
Richmond														
Shelbyville Water/Sewer Commission	3.160	4.640	1.47	3.930	5.770	1.47	5.150	6.160	1.20	4.6	4.6	6	5.2	0.6
Versailles (City)	2.967	3.802	1.28	4.016	5.129	1.28	4.305	7.534	1.75	1.9	4	4	6.4	4.5
Wilmore (City)	0.580	0.909	1.57	0.787	1.286	1.63	0.787	1.286	1.63	1	1	1	1.1	0.1
Winchester Municipal Utilities	3.998	5.311	1.33	5.020	6.646	1.32	7.150	11.650	1.63	2.8	15	6	9.9	7.1
Total	79	123	1.56	100	161	1.61	105	169	1.61	67	133	135	134	67

Shading indicates modified data.

WATER UTILITY **Berea College Utilities** DEC - 5 2002

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	2.410	2.617	2.828	3.025	3.250
Peak Day	3.167	3.530	3.815	4.090	4.385

Option A I accept the above water demand projections as reasonable.

Signature _____ Date 12/4/02

OR

Option B I believe that the water demand projections below are more appropriate and reliable.

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	2.410				
Peak Day	3.167				

I believe the figures listed under Option B more accurately reflect our future water demands because_____

_____

_____

_____

Signature _____ Date _____

NOV 25 2002

WATER UTILITY **Cynthiana Municipal**

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	2.159	2.250	2.368	2.485	2.596
Peak Day	3.262	3.360	3.535	3.710	3.875

Option A I accept the above water demand projections as reasonable.

Signature 11-19-02 Date

OR

Option B I believe that the water demand projections below are more appropriate and reliable.

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	2.159				
Peak Day	3.262				

I believe the figures listed under Option B more accurately reflect our future water demands because_____

Signature Date

WATER UTILITY **Frankfort Electric & Water Plant Board**

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	7.950	8.201	8.409	8.580	8.711
Peak Day	14.207	13.713	14.059	14.347	14.565

Option A I accept the above water demand projections as reasonable.

Signature _____ Date _____

OR

Option B I believe that the water demand projections below are more appropriate and reliable.

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	7.950				
Peak Day	14.207				

I believe the figures listed under Option B more accurately reflect our future water demands because_____

_____

_____

_____

Signature _____ Date _____

WATER UTILITY **Georgetown MWSS** NOV 27 2002

	Actual Water Produced/ Purchased (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	2.435	2.744	3.094	3.496	3.951
Peak Day	3.805*	4.288	4.836	5.464	6.176

*Year 2000 Peak Day amount simulated

Option A I accept the above water demand projections as reasonable.

Signature _____ Date 11-25-02

OR

Option B I believe that the water demand projections below are more appropriate and reliable.

	Actual Water Produced/ Purchased (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	2.435				
Peak Day	3.805*				

*Year 2000 Peak Day amount simulated

I believe the figures listed under Option B more accurately reflect our future water demands because _____

_____

_____

_____

Signature _____ Date _____

NOV 20 2002

WATER UTILITY **Harrodsburg Municipal**

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	2.724	2.826	2.928	3.030	3.133
Peak Day	3.650	4.013	4.158	4.303	4.448

Option A I accept the above water demand projections as reasonable.

Carol Dunn Walters 11-19-02

Signature Date

OR

Option B I believe that the water demand projections below are more appropriate and reliable.

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	2.724				
Peak Day	3.650				

I believe the figures listed under Option B more accurately reflect our future water demands because_____

_____

_____

_____

Signature Date

NOV 27 2002

WATER UTILITY **Kentucky-American Water Company**

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	41.020	44.740	46.900	49.080	51.550
Peak Day	66.370	77.770	81.400	85.100	89.010

Option A **I accept the above water demand projections as reasonable.**

Signature _____ Date _____

OR

Option B **I believe that the water demand projections below are more appropriate and reliable.**

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	41.020	44.86	47.09	49.33	51.86
Peak Day	66.370	76.67	80.22	8384	87.67

I believe the figures listed under Option B more accurately reflect our future water demands because

Don - I tweaked the model a little bit from what I gave you previously

Signature Linda Bridwell Date 11/22/02

NOV 2 0 2002

WATER UTILITY **Lancaster Municipal**

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	1.197	1.358	1.522	1.703	1.899
Peak Day	1.643	1.916	2.147	2.403	2.679

Option A I accept the above water demand projections as reasonable.

Fred Simpson 11-19-02

Signature Date

OR

Option B I believe that the water demand projections below are more appropriate and reliable.

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	1.197				
Peak Day	1.643				

I believe the figures listed under Option B more accurately reflect our future water demands because_____

_____

_____

_____

Signature Date

NOV 2 1 2002

WATER UTILITY **Lawrenceburg Municipal**

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	1.708	1.973	2.238	2.503	2.768
Peak Day	2.442	2.747	3.115	3.484	3.852

Option A I accept the above water demand projections as reasonable.

Signature _____ Date _____

OR

Option B I believe that the water demand projections below are more appropriate and reliable.

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	1.708	2.181	2.552		3.210
Peak Day	2.442	3.147	3.668		4.815

I believe the figures listed under Option B more accurately reflect our future water demands because

Based on a resent study completed by Commonwealth Technology November 1,2000

Option B would appear to be the most accurate. (see attachment)

Larry Hoglitt 11-20-02

Signature Date

In 1997, Alton water purchases averaged 170,000 gallons per day. This rate has grown only slightly to 178,000 gallons per day in 2000. There is a 250,000 gallons per day cap on the amount of water that Alton can purchase from Lawrenceburg.

The most recent population estimate is for 1998 (taken from the Kentucky Deskbook of Economic Statistics). The 1998 population for Anderson County was 18,587 and the 1998 population for Lawrenceburg was 7,949.

Population Projections

Census Bureau estimates for Anderson County reflected a 27.6% growth rate between 1990 and 1998 with a resulting population increase from 14,571 in 1990 to 18,587 in 1998. This growth rate ranked first among the Bluegrass Area Development Counties (Anderson, Bourbon, Boyle, Clark, Estill, Fayette, Franklin, Garrard, Harrison, Jessamine, Lincoln, Madison, Mercer, Powell, Scott, and Woodford) and considerably higher than the state growth rate of 6.8%. During the same period, Lawrenceburg grew at a rate of 34.5%, increasing from 5,167 in 1990 to 7,949 in 1998. Thus, there was almost an equal split of growth between Anderson County and the City of Lawrenceburg with about 2,000 additional people to each area.

The county's population projections are 19,375 by 2000, 22,917 by 2010, and 26,394 by 2020. These projections reflect a substantially higher growth rate than projections made in the 1970's.

Water Use Forecast

The Bluegrass Area Development District conducted a water use projection study for the West Bluegrass Water Supply Plan in 1998. In this study, future water demand projections were made through the use of IWR-MAIN, a computer model developed by the U.S. Army Corps of Engineers' Institute of Water Resources.

The IWR-MAIN computer model forecasts water use based on actual and projected socioeconomic characteristics of a study area. Future water use determinants input into the model include: 1) population; 2) number, market value, and type of housing units in the residential sector; 3) employment in commercial and manufacturing industries; 4) water and wastewater rates; 5) lawn and garden watering in connection with residential water use; and

6) weather conditions and other variables such as the number of persons per household. Data required for the model was obtained from various sources including U.S. Bureau of the Census and Bureau of Economic Analysis, Kentucky Directory of Manufacturers, County Business Patterns, and the Urban Studies Center, University of Louisville.

Table 3 shows the results from the model projected out until 2020. The baseline year was 1990, and actual data from 1995 water records was used to calibrate the model. The projection is based on an unrestricted use classification that does not include the potential benefit of conservation measures.

TABLE 3 - WATER DEMAND PROJECTIONS FOR ANDERSON COUNTY, KENTUCKY (MILLION GALLONS PER DAY)

Anderson County Water Service Area	1990	1995	2000	2005	2010	2020
Annual Average Day	1.277	1.638	1.923	2.181	2.552	3.210
Maximum Day*	1.911	2.435	2.732	3.147	3.668	4.815

* Based on a peaking factor of 1.5.

From this table it can be seen that the future design capacity of a water treatment plant, intended to serve all of Anderson County, should be designed to meet a rating of 5.0 MGD.

Lawrenceburg is currently permitted by the Kentucky Division of Water to withdraw 2.5 million gallons per day. Lawrenceburg's water treatment plant has a current existing treatment capacity of 2.59 MGD. Average water withdrawn for treatment in the last 12 months (September 1999 to August 2000) was 1.77 MGD. The peak day recorded during the same period exceeded 2.4 million gallons. The potential maximum day demand currently exceeds the plant's rated capacity. Annual average day demand will exceed plant capacity by 2010.

Justification for a peaking factor of 1.5 is based on the amount that the peak day can exceed the average day in a drought year.

NOV 2 1 2002

WATER UTILITY **Mt. Sterling Water/Sewer Commission**

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	2.273	2.417	2.460	2.499	2.540
Peak Day	3.261	3.467	3.529	3.585	3.645

Option A I accept the above water demand projections as reasonable.

David Pearce 11-20-02

Signature Date

OR

Option B I believe that the water demand projections below are more appropriate and reliable.

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	2.273				
Peak Day	3.261				

I believe the figures listed under Option B more accurately reflect our future water demands because_____

_____

_____

_____

Signature Date

[illegible]
[illegible] Kentucky 40340-0459
[illegible]
[illegible]-9476

City of Nicholasville
Kentucky

Facsimile

To:	Mr. Don Hassall, P.E.	From:	Thomas P. Calkins
Fax:	269-7917	Pages:	5
Phone:	269-8021	Date:	December 6, 2002
[illegible]	IWR-*Wane*	CC:	

[illegible]nt: ☑ *For Review* ☐ *Please Comment* ☐ *Please Reply* ☑ *Please Recycle*

[illegible]icholasville has to go with my projections for the following reasons.

IWR-Main Ave. Day is too low:

- The 2.923 mgd figure shown on the attached has been exceeded by our system for each and evory year since 1998. **CY02 will approximate 3.288 mgd.** My projection for 05 is 3.484 mgd.....and 05 is three years away! If anything, my projection is too low! Please remember, that the continuing trend is for manufacturers to relocate production to Nicholasville from out west, where electric and water rates have skyrocketed.

IWR-Main Max. Day Is too low:

- Not that much difference....about .14 lower than my 1.6. In three of the last six years the City's Max Day Ratio has been 1.6 or greater. Climatologists predict that the Bluegrass will be drier and hotter for decades to come...To use something less than 1.6 for projection purposes, could result in [illegible] for the City.

[illegible] chance to review the following, please give me a call and share your thoughts.

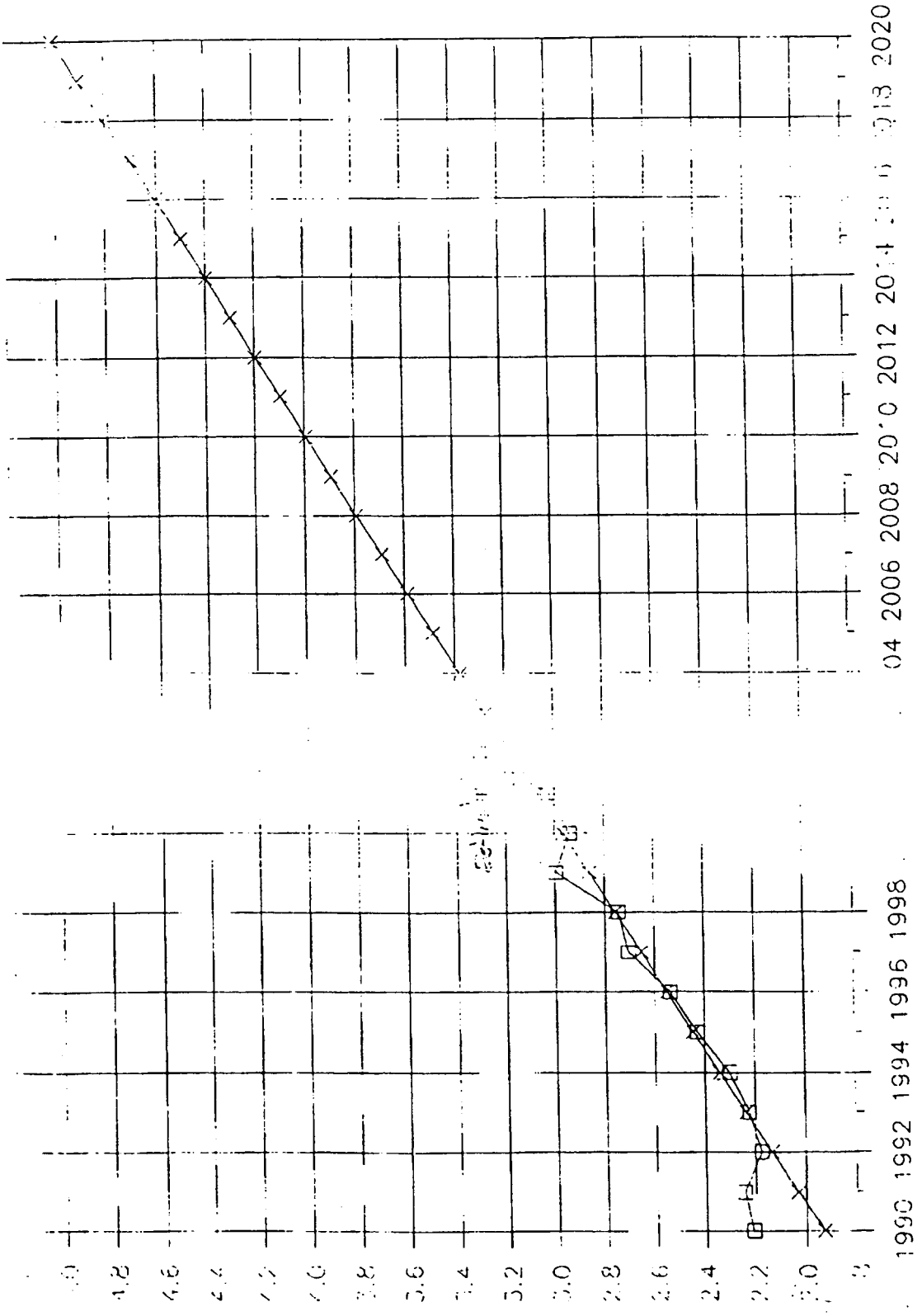
[illegible]nks,

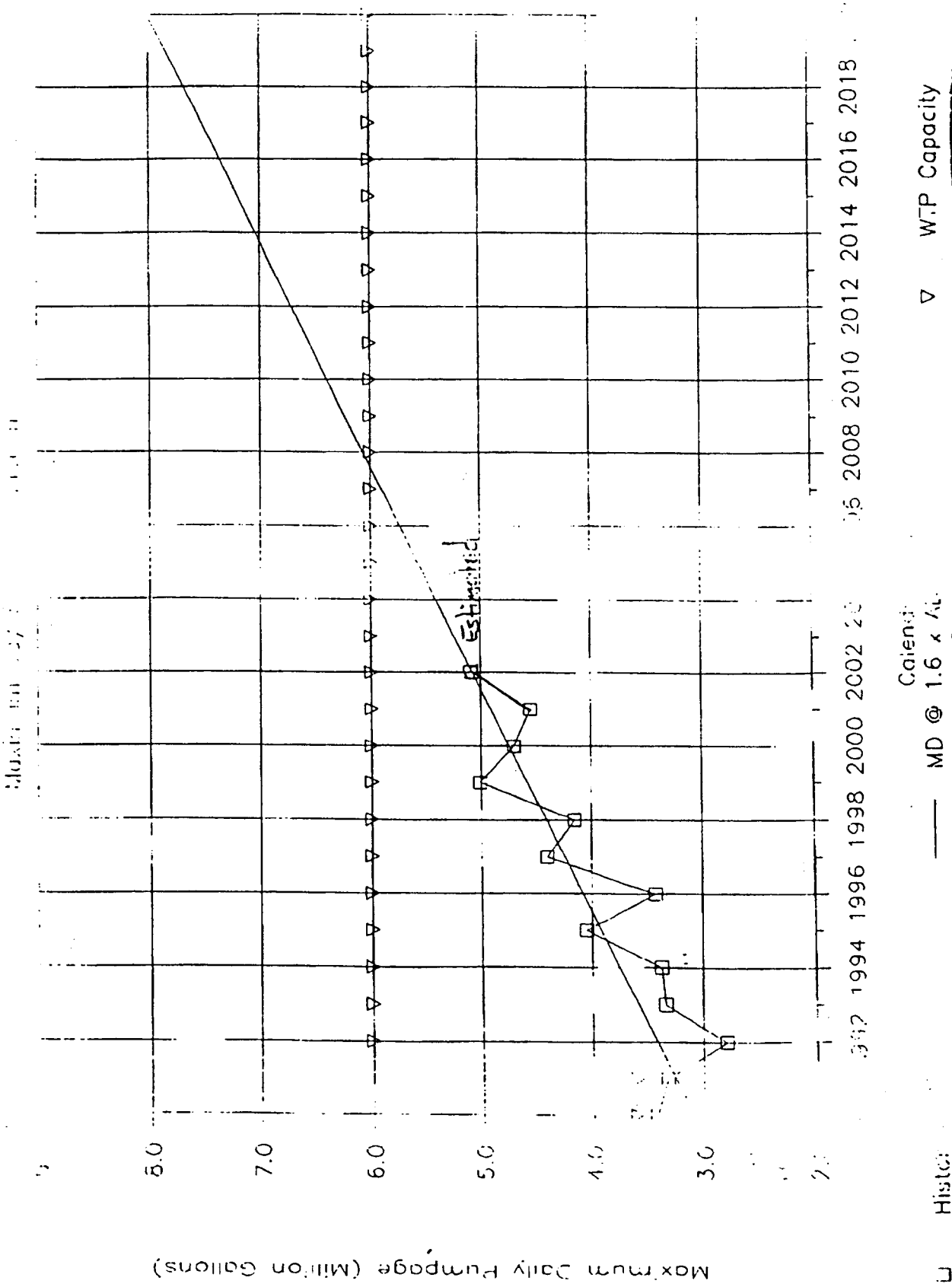
[illegible]m

	1989	1990			1993	1994	1995	1996			1999	2000	2001
January	64,089	67,428	[illegible]	[illegible]	66,532	73,311	70,331	77,366	83,[illegible]		83,954	88,425	90,877
February	57,218	56,188	[illegible]	[illegible]	61,637	58,279	65,701	74,911	70,[illegible]		70,534	80,721	75,225
March	64,612	64,534	65,[illegible]	[illegible]	68,653	64,429	70,909	75,445	76,760	[illegible]	79,811	84,299	85,140
April	65,216	61,431	64,565	61,734	64,537	63,827	70,845	72,952	81,532	73,921	80,990	80,294	90,744
May	67,201	65,678	73,577	69,501	73,458	71,153	72,839	79,982	82,454	83,918	94,543	94,536	96,669
June	67,042	71,626	70,909	69,426	72,755	81,503	74,097	82,718	79,000	82,309	99,073	101,584	94,286
July	73,581	83,207	79,030	73,326	83,001	76,923	87,040	86,612	102,175	88,863	111,997	100,160	98,714
August	68,947	77,345	82,543	71,061	73,868	76,007	92,327	85,756	99,567	102,555	112,717	96,604	102,549
September	65,314	68,557	72,837	67,325	66,842	72,803	75,413	78,495	84,780	106,095	99,682	89,599	98,246
October	67,207	65,740	70,[illegible]	67,651	64,976	74,854	75,949	77,218	84,780	87,618	93,605	88,562	95,556
November	64,244	71,329	62,620	61,118	63,829	70,017	70,986	72,309	78,661	76,538	83,579	81,539	89,304
December	72,422	66,649	64,479	67,631	64,550	69,096	72,967	74,636	76,504	76,635	83,039	86,346	86,098
Yearly Total	797,093	819,712	832,254	808,285	824,638	852,202	899,404	938,398	999,703	1,000,938	1,093,524	1,072,667	1,103,408
Ave. Day (AD)	2,184	2,246	2,280	2,209	2,259	2,335	2,464	2,571	2,739	2,740	2,996	2,939	3,023
Adj. 92-98 (AD)	2,151	2,213	2,237	2,176	2,226	2,302	2,431	2,538	2,706	2,740	2,996	2,939	3,023

Treatment Plant Maximum Days (MD) 1989-2001 (Thousands of gallons)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
January	2,375	2,455	2,442	2,423	2,349	2,813	2,557	3,008	3,019	2,926	3,408	3,331	3,794
February	2,363	2,323	2,281	2,438	2,520	2,317	2,614	3,143	2,930	2,966	2,964	3,291	3,193
March	2,574	2,482	2,355	2,443	2,475	2,450	2,602	2,896	2,985	2,903	3,071	3,286	2,877
April	2,380	3,077	2,[illegible]	2,649	2,424	2,548	2,749	2,868	3,055	2,936	3,084	3,107	4,018
May	2,776	2,359	2,[illegible]	2,462	2,890	3,030	3,069	3,265	3,186	3,645	3,705	3,739	4,465
June	2,646	2,987	2,[illegible]	2,792	2,863	3,371	2,808	3,424	3,088	3,242	4,443	4,700	3,787
July	2,879	3,425	3,[illegible]	2,662	3,336	2,932	3,422	3,358	4,403	3,135	4,784	3,937	4,550
August	2,719	2,950	3,[illegible]	2,593	2,697	2,844	4,054	3,270	4,206	4,121	5,014	3,645	4,282
September	2,484	2,674	3,[illegible]	2,493	2,539	3,018	3,358	2,953	3,482	4,157	4,343	3,792	3,888
October	2,445	2,403	2,[illegible]	2,485	2,354	2,891	2,712	3,002	3,372	[illegible]	3,480	3,415	3,655
November	2,564	2,422	2,[illegible]	2,284	2,401	2,704	2,811	2,620	2,987	[illegible]	3,233	3,219	3,401
December	2,862	2,537	2,[illegible]	2,453	2,340	2,542	2,697	2,568	2,984	[illegible]	3,461	3,004	3,138
Max Day	2,879	3,425	3,[illegible]	2,792	3,336	3,371	4,054	3,424	4,403	[illegible]	5,014	4,700	4,550
MD/AD	1.32	1.52	[illegible]	1.26	1.48	1.44	1.65	1.33	1.61	[illegible]	1.67	1.60	1.51
MD 92-98 AD Trend	[illegible]	[illegible]	3,251	3,616	3,582	3,768	3,914	4,080	4,246	4,412	4,579	4,745	4,911


1990 1992 1994 1996 1998
2.0
2.2
2.4
2.6
2.8
3.0
3.2
3.4
3.6
3.8
4.0
4.2
04 2006 2008 2010 2012 2014 2016 2018 2020
Year
Ave Day Pumpage
Trend (92-98)


Maximum Daily Pumpage (Million Gallons)
8.0
7.0
6.0
5.0
4.0
3.0
1994 1996 1998 2000 2002
2008 2010 2012 2014 2016 2018
Estimated
Calendar
Histo
MD @ 1.6 x
WTP Capacity

WATER UTILITY Nicholasville Municipal

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	[illegible]
[illegible]	2.923	[illegible]	[illegible]	[illegible]	[illegible]
	4.562	[illegible]	[illegible]	[illegible]	[illegible]

[illegible] A: I accept the above water demand projections as reasonable.

Signature Date

OR

Option B I believe that the water demand projections below are more appropriate and reliable.

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
[illegible]erage Day	2.923	3.484	3.996	4.503	5.010
[illegible]k Day	4.562	5.576	6.394	7.204	8.015

[illegible] figures listed under Option B more accurately reflect our future water [illegible]ands because (See attached)

Thomas P. Calkins 12/5/02

Signature Date

WATER UTILITY **Paris Municipal** DEC - 2 2002

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	1.343	1.390	1.437	1.484	1.531
Peak Day	2.079	2.252	2.328	2.404	2.480

Option A I accept the above water demand projections as reasonable.

Signature _____ Date _____

OR

Option B I believe that the water demand projections below are more appropriate and reliable.

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	1.343	1.621	1.705	1.765	1.825
Peak Day	2.079	2.039	2.258	2.336	2.414

I believe the figures listed under Option B more accurately reflect our future water demands because, Based on the initial water supply plan estimates and the current averages for this year, and the residential growth we are experiencing.

Signature _____ Date 11/27/02

WATER UTILITY **Richmond Municipal**

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	5.937	6.482	7.000	7.518	8.051
Peak Day	8.640	9.496	10.263	11.014	11.794

Option A I accept the above water demand projections as reasonable.

Signature Date 19 NOV 02

OR

Option B I believe that the water demand projections below are more appropriate and reliable.

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	5.937				
Peak Day	8.640				

I believe the figures listed under Option B more accurately reflect our future water demands because_____

Signature Date

the IWK-Main water seme
from KIPDA, because those guys approached the
differently from us. Just give us your honest opin

WATER UTILITY **Shelbyville Water/Sewer Commission**

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Day	3.16	3.44	3.62	3.76	3.93
	4.64	5.06	5.31	5.52	5.77

Option A **I accept the above water demand projections as reasonable.**

Signature _____ Date _____

OR

Option B **I believe that the water demand projections below are more appropriate and reliable.**

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	3.16	3.62	4.31	4.73	5.15
Peak Day	4.64	4.96	5.31	5.80	6.16

I believe the figures listed under Option B more accurately reflect our future water demands because Figures Could be between either OPTION — Depends On USAGE FROM TWO Different Water Districts — This would be worst Case & Show be u

Signature _____ Date 11/21/02

DISTRICTS

...ER UTILITY Versailles Municipal

	Actual Water Produced/ Purchased (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	2.967	3.148	3.345	3.642	4.016
Peak Day	3.802	4.020	4.271	4.651	5.129

Option A **I accept the above water demand projections as reasonable.**

Signature Date

OR

Option B **I believe that the water demand projections below are more appropriate and reliable.**

	Actual Water Produced/ Purchased (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	2.967	3.518	3.812	4.057	4.305
	3.802	6.156	6.672	7.100	[illegible]

...the figures listed under Option B more accurately reflect our future water demands because

Our projections are based on our engineering reports and are the basis of our water treatment plant design.

Signature Date 12-4-02

NOV 2 0 2002

WATER UTILITY **Wilmore Municipal**

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	0.580	0.625	0.674	0.727	0.787
Peak Day	0.909	1.022	1.101	1.188	1.286

Option A I accept the above water demand projections as reasonable.

Signature Date 11/18/02

OR

Option B I believe that the water demand projections below are more appropriate and reliable.

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	0.580				
Peak Day	0.909				

I believe the figures listed under Option B more accurately reflect our future water demands because_____

Signature Date

NOV 2 0 2002

WATER UTILITY **Winchester Municipal Utilities**

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	3.998	4.253	4.505	4.764	5.020
Peak Day	5.311	5.631	5.964	6.308	6.646

Option A I accept the above water demand projections as reasonable.

Signature _____ Date _____

OR

Option B I believe that the water demand projections below are more appropriate and reliable.

	Actual Water Production (MGD)	Projected Water Demand in MGD			
	2000	2005	2010	2015	2020
Average Day	3.998	4.9	5.8	6.6	7.5
Peak Day	5.311	7.8	9.2	10.6	12.0

I believe the figures listed under Option B more accurately reflect our future water demands because WMU considered :

Historical water use;

Population projections provided by the University of Louisville's Kentucky Data Center; Future land use planning as documented in the Winchester/Clark County Comprehensive Plan

Vernon Agnew Nov 18 2002

Signature Date

Water Demand Peaking Analysis

Contents

- **Summary table**

Peaking Factor Analysis

Prepared by O'Brein & Gere on July 22, 2003

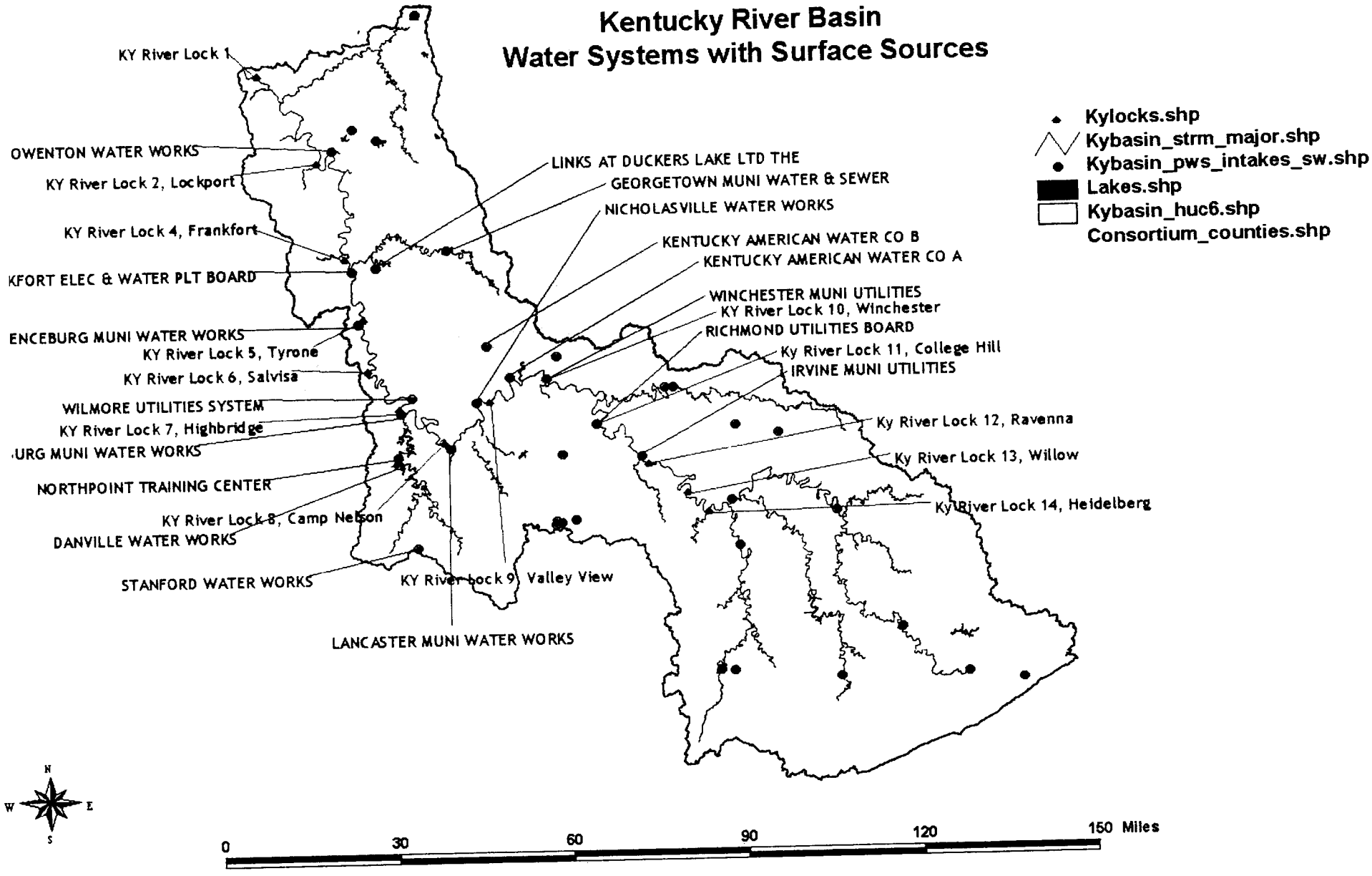
Date	Berea	Cynthiana	Danville	Frankfort	Georgetown	Harrodsburg	KAWC	Lancaster	Lawrenceburg	Mt. Sterling	Nicholasville	Paris	Richmond	Shelbyville	Versailles	Wilmore	Winchester	Total
25-Jul	2,090,000	2,573,000		12,367,000	2,402,500	3,177,724	56,090,000	1,319,000	2,057,340	2,662,000	4,422,500	1,690,000	7,040,000	3,966,000	3,688,000	437,000	4,440,000	110,422,064
26-Jul	2,568,496	3,015,000		11,868,000	2,726,500	3,176,396	56,960,000	1,211,000	2,198,100	2,009,000	4,177,000	1,539,000	4,251,000	3,388,000	3,706,100	612,000	4,480,000	107,885,592
27-Jul	2,457,496	2,406,000		12,013,000	2,916,400	3,102,718	56,320,000	1,236,000	1,928,820	2,916,000	3,679,500	1,458,000	7,940,000	3,686,000	3,720,400	539,000	4,390,000	110,709,334
28-Jul	2,246,496	3,034,000		12,678,000	3,150,300	3,071,908	62,150,000	1,392,000	2,099,160	2,932,800	4,227,500	1,556,000	5,616,000	3,542,000	3,710,000	559,000	4,060,000	116,025,164
29-Jul	2,962,496	2,574,000		13,183,000	2,554,700	3,297,957	63,830,000	1,349,000	2,200,140	994,000	4,429,000	1,506,000	8,106,000	4,037,000	3,697,600	598,000	4,190,000	119,508,893
30-Jul	2,488,748	2,612,000		13,482,000	2,507,530	3,184,347	57,780,000	1,488,000	2,320,500	2,907,000	3,446,800	1,716,000	5,564,000	3,699,000	3,682,800	628,000	4,590,000	112,096,725
31-Jul	2,715,496	2,872,000		12,783,000	3,055,000	3,283,934	59,320,000	1,423,000	2,339,880	2,782,000	4,588,700	1,708,000	7,692,000	4,229,000	3,674,700	580,000	4,300,000	117,346,710
1-Aug	2,467,000	2,940,000		11,319,000	2,805,225	3,411,713	63,950,000	1,370,000	2,259,300	2,814,000	4,940,400	1,830,000	6,743,000	3,929,000	3,669,800	642,000	4,570,000	119,660,438
2-Aug	2,997,496	2,634,000		15,248,000	2,951,167	3,393,395	64,770,000	1,394,000	2,432,700	2,834,000	4,865,100	1,717,000	7,274,000	3,903,000	2,665,100	538,000	4,980,000	124,596,958
3-Aug	2,447,496	2,967,000		12,740,000	2,976,809	3,372,499	63,080,000	1,287,000	2,049,180	3,672,000	4,452,200	1,600,000	7,315,000	4,156,000	3,539,000	452,000	4,690,000	120,796,184
4-Aug	2,425,748	2,870,000		12,140,000	3,000,845	3,375,864	64,220,000	1,461,000	1,807,440	3,672,000	3,933,400	1,785,000	7,522,000	4,165,000	3,355,600	648,000	4,670,000	121,051,897
5-Aug	3,501,496	2,564,000		12,401,000	2,756,584	3,256,124	71,820,000	1,531,000	1,982,880	3,204,000	4,611,200	1,748,000	6,978,000	4,015,000	3,584,200	582,000	4,660,000	129,195,484
6-Aug	2,384,495	3,213,000		15,050,000	3,145,309	3,295,575	66,350,000	1,496,000	2,191,980	2,815,000	4,616,100	1,816,000	7,410,000	4,131,000	3,711,700	568,000	4,790,000	126,984,159
7-Aug	2,576,748	3,202,000		13,801,000	2,942,595	3,272,197	65,410,000	1,396,000	2,316,420	2,845,000	4,906,200	1,936,000	7,902,000	4,317,000	3,478,700	594,000	4,890,000	125,785,860
8-Aug	2,423,748	2,354,000		14,215,000	2,935,676	3,563,868	65,450,000	1,419,000	2,181,780	2,864,000	4,563,100	1,661,000	7,860,000	4,826,000	2,773,700	600,000	5,310,000	125,000,872
9-Aug	2,634,748	3,061,000		12,997,000	2,193,454	3,558,981	70,230,000	1,387,000	2,282,760	3,213,000	4,893,100	1,874,000	6,672,000	4,035,000	3,375,600	739,000	4,460,000	127,606,643
10-Aug	3,117,748	3,220,000		13,835,000	3,059,800	3,554,349	66,590,000	1,325,000	2,109,360	3,744,000	4,524,600	1,741,000	7,194,000	4,860,000	3,488,400	502,000	4,180,000	127,045,257
11-Aug	2,292,496	2,925,000		12,600,000	2,466,000	3,440,133	60,990,000	1,387,000	2,187,900	3,666,000	4,213,000	1,723,000	7,264,000	3,447,000	3,629,000	641,000	4,620,000	117,491,529
12-Aug	2,630,000	2,334,000		11,665,000	2,632,555	3,228,157	58,080,000	1,446,000	2,245,020	2,786,000	4,004,100	1,784,000	7,114,000	3,677,000	3,708,700	599,000	5,290,000	113,223,532
13-Aug	2,752,748	2,990,000		11,414,000	2,722,748	3,405,445	59,130,000	1,544,000	2,269,500	2,867,000	4,022,100	1,895,000	5,750,000	4,842,000	3,701,900	864,000	5,210,000	115,380,441
14-Aug	2,867,496	2,659,000		11,443,000	2,539,742	3,143,420	59,210,000	1,455,000	2,318,460	2,790,000	4,020,100	1,688,000	9,130,000	3,602,000	3,705,700	759,000	4,890,000	116,220,918
Annual average for 2002	2,389,142	2,116,569		8,231,000	2,350,781	2,568,603	43,290,000	1,138,208	1,775,248	2,513,423	3,288,000	1,618,167	6,020,000	2,979,000	2,818,688	579,000	3,590,000	
Production on August 5, 2002	3,501,496	2,564,000		12,401,000	2,756,584	3,256,124	71,820,000	1,531,000	1,982,880	3,204,000	4,611,200	1,748,000	6,978,000	4,015,000	3,584,200	582,000	4,660,000	
Peak on August 5 to annual average	1.47	1.21		1.51	1.17	1.27	1.66	1.35	1.12	1.27	1.40	1.08	1.16	1.35	1.27	1.01	1.30	
2020 (modified) peak factor	1.35	1.49		1.67	1.56	1.42	1.69	1.41	1.50	1.44	1.60	1.32		1.20	1.75	1.63	1.63	
Two week period containing historical peak production																		
1	2,488,748	2,872,000		12,013,000	2,730,580	3,135,300	45,990,000	1,390,000	1,983,900	2,989,000	4,149,200	1,874,000		4,120,000	3,829,950	627,000	4,570,000	
2	2,715,496	2,940,000		12,678,000	2,661,620	3,058,323	51,030,000	1,288,000	1,479,000	2,850,000	4,411,700	1,741,000		3,900,000	3,664,890	813,000	4,980,000	
3	2,467,000	2,634,000		13,183,000	2,443,770	3,405,113	55,010,000	1,337,000	1,878,840	2,832,000	3,936,500	1,723,000		4,760,000	3,411,600	699,000	4,690,000	
4	2,997,496	2,967,000		13,482,000	3,010,325	3,102,442	59,730,000	1,228,000	2,433,720	2,552,000	3,895,500	1,784,000		3,450,000	3,676,500	670,000	4,670,000	
5	2,447,496	2,870,000		12,783,000	2,581,587	3,342,042	57,960,000	1,510,000	2,237,880	1,800,000	4,152,200	1,895,000		4,130,000	3,574,620	667,000	4,660,000	
6	2,425,748	2,564,000		11,319,000	2,910,350	3,893,409	59,130,000	1,515,000	2,067,540	2,625,000	5,009,000	1,688,000		3,720,000	3,725,040	700,000	4,790,000	
7	3,501,496	3,213,000		15,248,000	2,607,200	2,813,059	61,090,000	1,206,000	2,438,820	3,801,000	5,034,300	1,762,000		4,140,000	4,078,080	755,000	4,890,000	
8	2,384,495	3,202,000		12,740,000	3,454,869	3,992,605	66,370,000	1,726,000	2,433,720	3,042,000	3,825,100	2,107,000		5,030,000	4,095,360	987,000	5,310,000	
9	2,576,748	2,354,000		12,140,000	2,848,420	3,402,675	57,580,000	1,433,000	2,432,700	1,950,000	4,487,800	1,421,000		3,610,000	3,690,720	850,000	4,460,000	
10	2,423,748	3,061,000		12,401,000	2,800,816	2,840,608	51,370,000	1,308,000	2,216,460	3,014,000	4,176,800	1,514,000		3,720,000	3,964,320	767,000	4,180,000	
11	2,634,748	3,220,000		15,050,000	2,851,490	2,856,929	50,410,000	1,493,000	1,753,380	2,964,000	2,833,900	1,523,000		3,920,000	3,540,600	628,000	4,620,000	
12	3,117,748	2,925,000		13,801,000	2,701,719	3,184,554	41,560,000	1,522,000	1,706,460	3,042,000	3,388,400	1,965,000		3,620,000	4,033,440	693,000	5,290,000	
13	2,292,496	2,334,000		14,215,000	2,368,490	3,096,201	39,330,000	1,410,000	1,323,960	2,850,000	3,426,300	1,835,000		3,430,000	4,089,600	665,000	5,210,000	
14	2,630,000	2,990,000		12,997,000	2,235,217	3,027,422	37,530,000	1,555,000	1,905,360	2,761,000	4,131,000	1,694,000		3,940,000	4,091,040	734,000	4,890,000	
					2,223,662	2,873,100	42,680,000					1,958,000		4,040,000	3,530,520	849,000		
Annual average for year of historical peak production	2,389,142	2,116,569		8,231,000	2,350,781	2,568,603	39,934,000	1,271,000	1,703,359	2,513,423	3,288,000	1,618,167		3,301,000	3,088,172	579,000	3,590,000	
Historical peak production	3,501,496	3,220,000		15,248,000	3,454,869	3,992,605	66,370,000	1,726,000	2,438,820	3,801,000	5,034,300	2,107,000		5,030,000	4,095,360	987,000	5,310,000	
Historical peak factor	1.47	1.52		1.85	1.47	1.55	1.66	1.36	1.43	1.51	1.53	1.30		1.52	1.33	1.70	1.48	
																		Total
2020 peak day production based on 2020 average day and August 5, 2002 peak factor (grid demand)	4.76	3.14		13.12	4.63	3.97	86.04	2.55	3.59	3.24	7.03	1.97		6.94	5.47	0.79	9.28	157
2020 peak day production based on 2020 average day and individual peak factor from 2020 max day	4.39	3.88		14.57	6.18	4.45	87.67	2.68	4.82	3.65	8.02	2.41		6.16	7.53	1.29	11.65	169

Kentucky River Withdrawal Permits

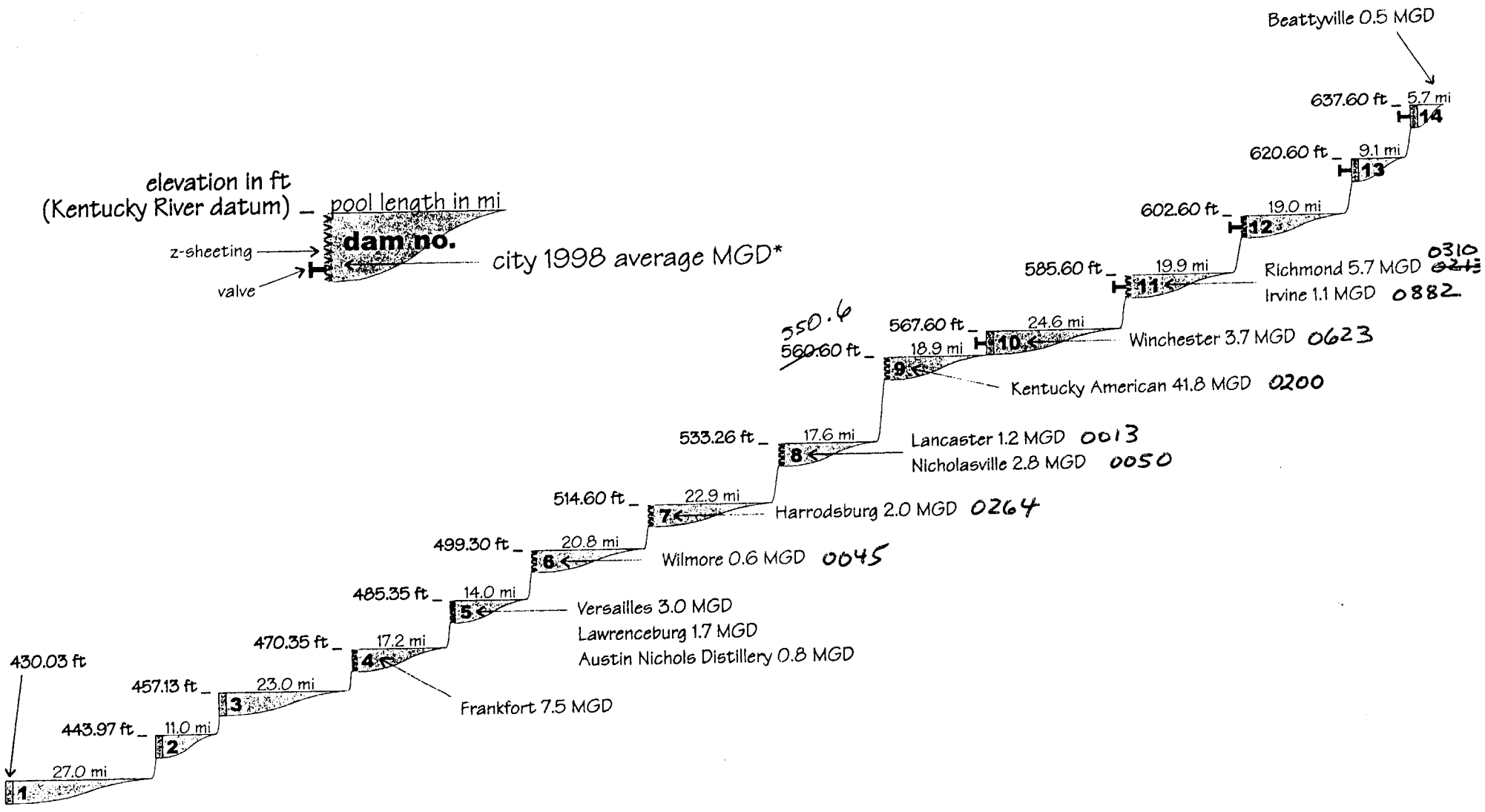
Contents

- **Kentucky River Basin Water Systems with Surface Sources (provided by KDOW)**
- **Kentucky River Profile**
- **Withdrawal Permits (listed alphabetically and provided by BGADD in December 2002)**
  - **Frankfort Electric & Water Plant Board**
  - **Harrodsburg Municipal Water Works**
  - **Kentucky-American Water Company**
  - **Lancaster Water Works**
  - **Lawrenceburg Municipal Water Works**
  - **Nicholasville**
  - **Richmond Utility Board**
  - **Versailles Municipal Water Works**
  - **Wilmore Utilities System**
  - **Winchester Municipal Utilities**

Kentucky River Basin
Water Systems with Surface Sources



KENTUCKY RIVER PROFILE



*Information from Bluegrass Add-Vantage, vol. 22, number 3, June/July 1999.

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
FRANKFORT, KENTUCKY 40601

PERMIT TO WITHDRAW PUBLIC WATER

Permit Number: #0024

Issued to: **Frankfort Electric & Water Plant Board**
P.O. Box 308
Frankfort, KY 40601

The Natural Resources and Environmental Protection Cabinet authorizes the above named party to withdraw Public Water of the Commonwealth of Kentucky. This permit has been issued under provisions of KRS Chapter 151.125, 151.140 and 151.150 and regulations promulgated with respect to the withdrawal of public waters. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any other permits or licenses required by this Cabinet, or other state, federal or local agencies. Withdrawals are restricted to the stated quantities, times, and locations specified below. This permit represents a limited right of use and does not vest ownership nor absolute right to withdrawal or use of Public Water, nor does it guarantee that requested amounts will be available for use at all times. In times of drought or emergency, the Cabinet may temporarily alter the conditions of the permit. Any violation of the Water Resources Act of 1966 as amended is subject to penalties as set forth in KRS 151.990 and other applicable provisions of law.

The location of the authorized water withdrawal is as follows:

A surface intake at mile 69.8 of the Kentucky River, pool #4, in Franklin County, with coordinates;

latitude 38°10'15.29"N, longitude 84°51'43.84"W.

Water withdrawals are limited to the following rates from the specified location:

Jan.	14.0 MGD	**April**	14.0 MGD	**July**	15.0 MGD	**Oct.**	15.0 MGD
Feb.	14.0 MGD	**May**	14.0 MGD	**Aug.**	15.0 MGD	**Nov.**	14.0 MGD
March	14.0 MGD	**June**	14.0 MGD	**Sept.**	15.0 MGD	**Dec.**	14.0 MGD

Conditions to this permit are as follows:

1. Withdrawal rates must be accurately measured by meter or other device approved by the Cabinet.
2. Frankfort Electric and Water Plant Board shall obtain gaging information for flows from the United States Geological Survey gage (#03287500) at Lock 4 of the Kentucky River. Gage and water withdrawal data shall be reported to the Division of Water when flows are below 175.0 cfs. The Division may specify reasonable reporting intervals, no more frequently than hourly, as flows decrease.

(conditions continued on page 2)

3. When flows measured at Lock 4 of the Kentucky River reach 175.0 cfs Frankfort Electric and Water Plant Board shall conform to the following schedule:

ALLOWABLE WITHDRAWAL (MGD)					
Flow at Lock 4	Amount Sold to Georgetown (MGD)*				
	< 0.500	0.500 - 1.00	1.00 - 1.50	1.50 - 2.00	> 2.50
> 175.0	Full Permitted Amount ** ***				
174.9 - 145.0	12.0	12.0	12.5	12.5	13.0
144.9 - 115.0	10.0	10.0	10.5	11.0	11.5
114.9 - 55.0	8.0	8.5	9.0	9.5	10.0
< 55.0	5.5	6.0	6.5	7.0	7.5

* the appropriate schedule should be determined by calculating the average sales to Georgetown Municipal Water System during the previous seven (7) days.

** the full permitted amount as stated for each month on this permit.

*** allowable withdrawals will be determined by calculating the average flow for the most recent 4-day period at Lock 4 of the Kentucky River.

4. Frankfort Electric and Water Plant Board and the Division of Water recognize that all permitted water withdrawers along the Kentucky River are equal.

Issued: June 17, 1966

Latest Revision: June 07, 2000

Manager, Water Resources Branch
Division of Water

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
FRANKFORT, KENTUCKY 40601

PERMIT TO WITHDRAW PUBLIC WATER

Permit Number: #0264

Issued to: Harrodsburg Municipal Water Works
3025 Shakertown Road
Harrodsburg, KY 40330

The Natural Resources and Environmental Protection Cabinet authorizes the above named party to withdraw Public Water of the Commonwealth of Kentucky. This permit has been issued under provisions of KRS Chapter 151.125, 151.140 and 151.150 and regulations promulgated with respect to the withdrawal of public waters. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any other permits or licenses required by this Cabinet, or other state, federal or local agencies. Withdrawals are restricted to the stated quantities, times and locations specified below. This permit represents a limited right of use and does not vest ownership nor absolute right to withdrawal or use of Public Water, nor does it guarantee that requested amounts will be available for use at all times. In times of drought or emergency, the Cabinet may temporarily alter the conditions of the permit. Any violation of the Water Resources Act of 1966 as amended is subject to penalties as set forth in KRS 151.990 and other applicable provisions of law.

The location of the authorized water withdrawal is as follows:

Two adjacent surface water intakes located at RM 117.85L of the Kentucky River, Pool 7; approximately 2,000 feet downstream of confluence of Kentucky River and Dix River; Mercer County; Latitude 37°49'04.09"N and Longitude 84°43'14.37"W.

Water withdrawals are limited to the following rates from the specified location:

Jan.	3,200,000 gpd	**April**	3,200,000 gpd	**July**	3,200,000 gpd	**Oct.**	3,200,000 gpd
Feb.	3,200,000 gpd	**May**	3,200,000 gpd	**Aug.**	3,200,000 gpd	**Nov.**	3,200,000 gpd
March	3,200,000 gpd	**June**	3,200,000 gpd	**Sept.**	3,200,000 gpd	**Dec.**	3,200,000 gpd

Conditions to this permit are as follows:

1. Withdrawal rates must be accurately measured by meter or other device approved by the Cabinet.

2. When flows measured at Lock 6 are 150 cfs or less for four (4) consecutive days, Harrodsburg Municipal Water Works shall conform to the following schedule:

Lock 6 Flow (cfs)	Allowable Withdrawals
> 150.0	3.2 mgd
125.0-149.9	2.8 mgd
100.0-124.9	2.2 mgd
< 100.0	1.7 mgd

3. Harrodsburg Municipal Water Works shall obtain gaging information for flows from the United States Geological Survey gage at Lock 6. Gage and water withdrawal data shall be reported to the Division of Water when flows are below 150 cfs. The Division may specify reasonable reporting intervals, no more frequently than hourly, as flows decrease.

4. Harrodsburg Municipal Water Works shall create a Water Shortage Response Plan. This plan shall establish appropriate response phases which correspond with the prevailing flow conditions in the river.

5. Harrodsburg Municipal Water Works and the Division of Water recognize that all permitted water withdrawers along the Kentucky River are equal.

6. Harrodsburg Municipal Water Works recognizes its role in protecting the Kentucky River as a source of supply of the Central Kentucky Region.

Issued: September 7, 1966

Latest Revision: December 15, 1997

Manager, Water Resources Branch
Division of Water

WB Unit Code: 05100205-033

JAMES E BICKFORD

PAUL E PATTON

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE
14 R[illegible] 8
FRANKFORT KY 40601
April 27, 2001

Ms. Linda C. Bridwell
Director of Engineering
Kentucky-American Water Company
2300 Richmond Road
Lexington, KY 40502

Re: Temporary modification to water withdrawal permit #0200

Dear Ms. Bridwell:

As you know the Kentucky Division of Water has recently done hydrologic modeling to simulate the impact of severe drought on water availability in the Kentucky River. This letter serves as notification of temporary changes to your allowable withdrawals that are based on the results of these efforts should a severe drought recur in 2001. This amends permit #0200 until December 31, 2001 with temporary changes to your flow reduction schedule as shown in the table below:

Adjustments to Allowable Withdrawals under the Valve Operating Plan for 2001.*

Drought Phase	Kentucky River Conditions	Allowable Withdrawals*** (MGD)
Normal Operation	Flow above 7Q10**	Full Permitted Amount***
Phase 1	Flow at 7Q10 or below	58
Phase 2	Water Level in Pools at or below crest	55
Phase 3	Water Level in Pools 1 foot below crest	50
Phase 4	Water Level in Pools 2 feet below crest	45
Phase 5	Water Level in Pools 3 feet below crest	40
Phase 6	Water Level in Pools 4 feet below crest	35

* Allowble withdrawals are based on an assumed recurrence of the drought of 1953.
** The 7Q10 at Lock 10 is 120 cubic feet per second.
*** The full permitted amount as stated for each month on the face of permit # 0200

These modifications have assumed baseline drought conditions equal in severity to the drought of 1953. Please be aware that the Division of Water may need to adjust or suspend these modifications if conditions in the basin deteriorate below those of 1953.

If you have any questions, please contact Bill Caldwell at (502) 564-3410.

Sincerely,

A. Leon Smothers, Manager
Water Resources Branch
Division of Water

EDUCATION PAYS

ALS:BC
c: Frankfort Regional Office
Kentucky River Authority
Bluegrass Area Development District

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
FRANKFORT, KENTUCKY 40601

PERMIT TO WITHDRAW PUBLIC WATER

Permit Number: # 0200

Issued to: **Kentucky-American Water Company**
2300 Richmond Road
Lexington, Kentucky 40502

The Natural Resources and Environmental Protection Cabinet authorizes the above named party to withdraw Public Water of the Commonwealth of Kentucky. This permit has been issued under provisions of KRS Chapter 151.125, 151.140 and 151.150 and regulations promulgated with respect to the withdrawal of public waters. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any other permits or licenses required by this Cabinet, or other state, federal or local agencies. Withdrawals are restricted to the stated quantities, times and locations specified below. This permit represents a limited right of use and does not vest ownership nor absolute right to withdrawal or use of Public Water, nor does it guarantee that requested amounts will be available for use at all times. In times of drought or emergency, the Cabinet may temporarily alter the conditions of the permit. Any violation of the Water Resources Act of 1966 as amended is subject to penalties as set forth in KRS 151.990 and other applicable provisions of law.

The location of the authorized water withdrawal is as follows:

A surface water intake located at river mile 167.3 (pool 9) of the Kentucky River; latitude 37°54'07" North, longitude 84°22'39" West, Fayette County.

Water withdrawals are limited to the following rates from the specified location:

Jan.	60.0 MGD	**April**	60.0 MGD	**July**	63.0 MGD	**Oct.**	63.0 MGD
Feb.	60.0 MGD	**May**	63.0 MGD	**Aug.**	63.0 MGD	**Nov.**	60.0 MGD
March	60.0 MGD	**June**	63.0 MGD	**Sept.**	63.0 MGD	**Dec.**	60.0 MGD

Conditions to this permit are as follows:

1. Withdrawal rates must be accurately measured by meter or other device approved by the Cabinet.

2. This permit is subject to revision if data collected pursuant to permit condition No. 6 indicate that withdrawals negatively impact the quantity and quality of water below the intake.

For additional conditions see attached sheets

Issued: July 19, 1966

Latest Revision: September 17, 1999

Manager, Water Resources Branch
Division of Water

3. When flows measured at Lock 10 are 140 cfs or less for four (4) consecutive days, Kentucky-American's withdrawals shall conform to the following schedule:

Lock 10 Flow	Allowable Withdrawals Under This Permit
> 140.00 cfs	Full Permitted Amount*
139.99 - 120.00 cfs	58.0 MGD
119.99 - 90.00 cfs	54.0 MGD
89.99 - 60.00 cfs	50.0 MGD
59.99 - 30.00 cfs	48.0 MGD
29.99 - 0.00 cfs	45.0 MGD
Drought Phase 2	45.0 MGD
Drought Phase 3	42.0 MGD
Drought Phase 4	40.0 MGD
Drought Phase 5	35.0 MGD
Drought Phase 6	30.0 MGD

3.1 The full permitted amount is 60.0 MGD for the months November through April and 63.0 MGD for the months May through October.

3.2 Drought phase 2 shall exist between the time that Trigger 2 is met but before Trigger 3 is declared. Drought phase 3 shall exist between the time that Trigger 3 is met but before Trigger 4 is declared, and so on.

The revised Flow Schedule shall remain in effect under the condition that the valves and the valve operating plan are maintained by the Kentucky River Authority or some other entity approved by the Division of Water. If maintenance of the valves and valve operating plan is discontinued for any reason, the flow schedule will revert to that incorporated in permit # 0200 as issued on December 14, 1992.

4. Pursuant to Lexington-Fayette County Urban County Government Ordinance 135-88 Section 11-9 (e), Kentucky-American shall prepare administrative regulations governing water usage and submit these to the Division of Water for approval by November 15, 1999.

5. Kentucky-American shall obtain continuous gaging information for flows at the United States Geological Survey gage at Lock 10. Gage and water withdrawal data shall be reported to the Division of Water daily, Monday through Friday, when flows are below 140 cfs. The Division may specify reasonable reporting intervals, no more frequently than hourly, as flows decrease. Compliance with the permit will be based on a running four day average of withdrawals and not the monthly average withdrawal.

6. Whenever streamflow drops below 120 cfs for four consecutive days at Lock 10, Kentucky-American shall collect dissolved oxygen, temperature, pH and specific conductance samples at the locations noted below. Sampling shall continue each week thereafter until flows return to rates greater than 120 cfs, except it shall be continued as long as the valve operating plan is in effect. Measurements at locations (a), (b), and (c) shall be made three times per week on Monday, Wednesday, and Friday mornings. Measurements at location (d) shall be made one time per week except during the months of June , July, and August and whenever the ambient air temperature is at or above 90° F. Data must be collected at four locations across the river at each site, with measurements taken at the surface, mid-depth, and bottom. These values must be reported at each point.

   (a) About 0.25 miles above the current Kentucky-American intake
   (b) Just above lock 9
   (c) In the vicinity of river mile 156 in the upper end of pool 8
   (d) In the lower third of pool 8

7. The pumpage to the Water Treatment Plant shall not exceed the plant's rated capacity.

8. Kentucky-American shall draft a revised Demand Management Plan to conform to the limits of this permit.

9. Kentucky-American shall notify the Natural Resources and Environmental Protection Cabinet and the Kentucky River Authority as each Management Phase is declared in the Demand Management Plan adopted above, beginning with the Advisory Phase.

10. Kentucky-American Water Company and the Division of Water recognize that all permitted water withdrawers are equals without seniority, priority, or privilege given to any permit holder along the Kentucky River.

11. Kentucky-American Water Company recognizes its role as the largest water purveyor in demonstrating leadership in protecting the Kentucky River as source of supply of the Central Kentucky Region.

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
FRANKFORT, KENTUCKY 40601

PERMIT TO WITHDRAW PUBLIC WATER

Permit Number: #0013

Issued to: **Lancaster Water Works**
367 Water Works Road
Lancaster, Kentucky 40444

The Natural Resources and Environmental Protection Cabinet authorizes the above named party to withdraw Public Water of the Commonwealth of Kentucky. This permit has been issued under provisions of KRS Chapter 151.125, 151.140 and 151.150 and regulations promulgated with respect to the withdrawal of public waters. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any other permits or licenses required by this Cabinet, or other state, federal or local agencies. Withdrawals are restricted to the stated quantities, times, and locations specified below. This permit represents a limited right of use and does not vest ownership nor absolute right to withdrawal or use of Public Water, nor does it guarantee that requested amounts will be available for use at all times. In times of drought or emergency, the Cabinet may temporarily alter the conditions of the permit. Any violation of the Water Resources Act of 1966 as amended is subject to penalties as set forth in KRS 151.990 and other applicable provisions of law.

The location of the authorized water withdrawal is as follows:

River mile 141.67 of the Kentucky River, 0.25 mile above lock 8, immediately below the mouth of Davis Creek; Garrard County; latitude 37°43'43.08", longitude 84°34'12.63".

Water withdrawals are limited to the following rates from the specified location:

Jan.	1,200,000 gpd	**April**	1,400,000 gpd	**July**	1,700,000 gpd	**Oct.**	1,700,000 gpd
Feb.	1,200,000 gpd	**May**	1,600,000 gpd	**Aug.**	1,700,000 gpd	**Nov.**	1,500,000 gpd
March	1,300,000 gpd	**June**	1,700,000 gpd	**Sept.**	1,700,000 gpd	**Dec.**	1,300,000 gpd

Conditions to this permit are as follows:

1. Withdrawal rates must be accurately measured by meter or other device approved by the Cabinet.
2. When flows measured at Lock 7 of the Kentucky River reach 144.0 cfs Lancaster Municipal Water Works shall conform to the following schedule:

Lock 7 Flow (cfs)	Allowable Withdrawals (mgd)
>144.0	1.70
125.0 - 144.0	1.66
100.0 - 124.9	1.58
<100.0	1.50

3. Lancaster Municipal Water Works shall obtain gaging information for flows for the United States Geological Survey gage at Lock 7. Gage and water withdrawal data shall be reported to the

see next pg.

Division of Water when flows are below 144.0 cfs. The Division may specify reasonable reporting intervals, no more frequently than hourly, as flows decrease.

4. Lancaster Municipal Water Works and the Division of water recognize that all permitted water withdrawers along the Kentucky River are equal.

5. Lancaster Municipal Water Works recognizes its role in protecting the Kentucky River as a source of supply of the Central Kentucky Region.

Issued: June 16, 1966

Latest Revision: January 26, 1999

A. Leon Smothers

Manager, Water Resources Branch
Division of Water

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
FRANKFORT, KENTUCKY 40601

PERMIT TO WITHDRAW PUBLIC WATER

Permit Number: #0229

Issued to: Lawrenceburg Municipal Water Works
205 E. Woodford Street
Lawrenceburg, KY 40342

The Natural Resources and Environmental Protection Cabinet authorizes the above named party to withdraw Public Water of the Commonwealth of Kentucky. This permit has been issued under provisions of KRS Chapter 151.125, 151.140 and 151.150 and regulations promulgated with respect to the withdrawal of public waters. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any other permits or licenses required by this Cabinet, or other state, federal or local agencies. Withdrawals are restricted to the stated quantities, times and locations specified below. This permit represents a limited right of use and does not vest ownership nor absolute right to withdrawal or use of Public Water, nor does it guarantee that requested amounts will be available for use at all times. In times of drought or emergency, the Cabinet may temporarily alter the conditions of the permit. Any violation of the Water Resources Act of 1966 as amended is subject to penalties as set forth in KRS 151.990 and other applicable provisions of law.

The location of the authorized water withdrawal is as follows:

Kentucky River, approximately 1000 feet downstream from Blackburn Memorial Bridge on Highway 62, approximately 2 miles east of Lawrenceburg; Anderson County

10/15/99

Lat.	Long.
38°02'41.19"N	84°50'57.42" W
38° 02' 29.50"	84° 50' 47.65"

River mile 83.75

Water withdrawals are limited to the following rates from the specified location:

Jan. 2,500,000 gpd	April 2,500,000 gpd	July 2,500,000 gpd	Oct. 2,500,000 gpd
Feb. 2,500,000 gpd	May 2,500,000 gpd	Aug. 2,500,000 gpd	Nov. 2,500,000 gpd
March 2,500,000 gpd	June 2,500,000 gpd	Sept. 2,500,000 gpd	Dec. 2,500,000 gpd

Conditions to this permit are as follows:

1. Withdrawal rates must be accurately measured by meter or other device approved by the Cabinet.

Issued: March 28, 1979

Latest Revision: February 24, 1997

Manager, Water Resources Branch
Division of Water

WR Unit Code. 05100205--033

DWR-2-03
9-76

COMMONWEALTH OF KENTUCKY
DEPARTMENT FOR NATURAL RESOURCES & ENVIRONMENTAL PROTECTION
BUREAU OF NATURAL RESOURCES
DIVISION OF WATER RESOURCES
FRANKFORT, KENTUCKY 40601

Permit No. 0050

PERMIT TO WITHDRAW PUBLIC WATER

Issued to: City of Nicholasville, Kentucky

Address: 517 North Main Street
(Street)

Nicholasville (City), Jessamine (County), Kentucky (State), 40356 (Zip Code)

The Department for Natural Resources and Environmental Protection acting in accordance with KRS 151.140 - KRS 151.210 authorizes the above named party to withdraw Public Water of the Commonwealth of Kentucky. Withdrawals are restricted to the stated quantities, times and locations specified below. This permit represents a limited right of use and does not vest ownership nor absolute right to withdrawal or use of Public Water. In times of drought or emergency, the Department may temporarily alter the conditions of the permit. Any violation of the Water Resources Act of 1966 as amended is subject to penalties as set forth in KRS 151.990 and other applicable provisions of law.

The location of the authorized water withdrawal is as follows:

Surface intake located at mile 154.1R of the Kentucky River, Jessamine County.

Water withdrawals are limited to the following rates from the specified withdrawal location:

Jan. 2,500,000 gpd.	April 2,700,000 gpd.	July 2,900,000 gpd.	Oct. 2,800,000 gpd.
Feb. 2,000,000 gpd.	May 2,700,000 gpd.	Aug. 3,000,000 gpd.	Nov. 2,600,000 gpd.
Mar. 2,600,000 gpd.	June 2,700,000 gpd.	Sept. 2,900,000 gpd.	Dec. 2,500,000 gpd.

Limitations to this permit are as follows:

Issued this 9th day of November, 19 78

By Dave Rosenbaum
Director, Division of Water Resources

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
FRANKFORT, KENTUCKY 40601

PERMIT TO WITHDRAW PUBLIC WATER

Permit Number: #0310

Issued to: **Richmond Utility Board**
300 Hallie Irvine Street
Richmond, KY 40475

The Natural Resources and Environmental Protection Cabinet authorizes the above named party to withdraw Public Water of the Commonwealth of Kentucky. This permit has been issued under provisions of KRS Chapter 151.125, 151.140 and 151.150 and regulations promulgated with respect to the withdrawal of public waters. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any other permits or licenses required by this Cabinet, or other state, federal or local agencies. Withdrawals are restricted to the stated quantities, times, and locations specified below. This permit represents a limited right of use and does not vest ownership nor absolute right to withdrawal or use of Public Water, nor does it guarantee that requested amounts will be available for use at all times. In times of drought or emergency, the Cabinet may temporarily alter the conditions of the permit. Any violation of the Water Resources Act of 1966 as amended is subject to penalties as set forth in KRS 151.990 and other applicable provisions of law.

The location of the authorized water withdrawal is as follows:

River mile 201.3 of the Kentucky River in Madison County, with coordinates:

latitude 37°46'49"N, longitude 84°06'38"W.

Water withdrawals are limited to the following rates from the specified location:

Jan.	9.0 MGD	**April**	9.0 MGD	**July**	9.0 MGD	**Oct.**	9.0 MGD
Feb.	9.0 MGD	**May**	9.0 MGD	**Aug.**	9.0 MGD	**Nov.**	9.0 MGD
March	9.0 MGD	**June**	9.0 MGD	**Sept.**	9.0 MGD	**Dec.**	9.0 MGD

Conditions to this permit are as follows:

1. Withdrawal rates must be accurately measured by meter or other device approved by the Cabinet.

****(Additional conditions on page 2)**

Issued: September 21, 1966 Latest Revision: July 28, 2000

Manager, Water Resources Branch
Division of Water

Water Withdrawal Permit #0310 (continued)
Additional conditions to the revised permit issued July 28, 2000

2. When flows measured at Lock 10 of the Kentucky River reach 190.0 cfs Richmond Utility Board shall conform to the following schedule:

Lock 10 Flow (cfs)*	Allowable Withdrawals (MGD)
> 190.0	Full Permitted Amount**
189.9 - 140.0	8.3
139.9 - 120.0	7.7
119.9 - 90.0	7.1
89.9 - 60.0	6.8
59.9 - 30.0	6.5
29.9 - 0.0	6.2
Drought Phase 2	6.2
Drought Phase 3	5.9
Drought Phase 4	5.6
Drought Phase 5	5.3
Drought Phase 6	5.0

2.1 The full permitted amount for each month as stated on this permit is 9.0 MGD.
2.2 Drought Phase 2 shall exist between the time that Trigger 2 is met but before Trigger 3 is declared. Drought Phase 3 shall exist between the time that Trigger 3 is met but before Trigger 4 is declared, and so on.

The revised Flow Schedule shall remain in effect under the condition that the valves and the valve operating plan are maintained by the Kentucky River Authority or some other entity approved by the Division of Water. If maintenance of the valves and valve operating plan is discontinued for any reason, the flow schedule will revert to that incorporated in permit #0310 as issued on June 14, 1999.

3. The Richmond Utility Board shall obtain gaging information for flows from the United States Geological Survey gage at Lock 10. Gage and water withdrawal data shall be reported to the Division of Water when flows are below 190.0 cfs. The Division may specify reasonable reporting intervals, no more than hourly, as flows decrease.

4. The Richmond Utility Board and the Division of Water recognize that all permitted water withdrawers are equals without seniority, priority, or privilege given to any permit holder along the Kentucky River.

5. The Richmond Utility Board recognizes its role in protecting the Kentucky River as a source of supply of the Central Kentucky Region.

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
FRANKFORT, KENTUCKY 40601

PERMIT TO WITHDRAW PUBLIC WATER

Permit Number: #0258

Issued to: **Versailles Municipal Water Works**
196 S. Main Street
Versailles, KY 40383

The Natural Resources and Environmental Protection Cabinet authorizes the above named party to withdraw Public Water of the Commonwealth of Kentucky. This permit has been issued under provisions of KRS Chapter 151.125, 151.140 and 151.150 and regulations promulgated with respect to the withdrawal of public waters. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any other permits or licenses required by this Cabinet, or other state, federal or local agencies. Withdrawals are restricted to the stated quantities, times, and locations specified below. This permit represents a limited right of use and does not vest ownership nor absolute right to withdrawal or use of Public Water, nor does it guarantee that requested amounts will be available for use at all times. In times of drought or emergency, the Cabinet may temporarily alter the conditions of the permit. Any violation of the Water Resources Act of 1966 as amended is subject to penalties as set forth in KRS 151.990 and other applicable provisions of law.

The location of the authorized water withdrawal is as follows:

A surface water intake located at mile 85.27 of the Kentucky River (pool 5); latitude 38°01'34" N, longitude 84°49'43" W, Woodford County, Kentucky.

Water withdrawals are limited to the following rates from the specified location:

Jan.	3,000,000 gpd	**April**	3,200,000 gpd	**July**	4,000,000 gpd	**Oct.**	3,800,000 gpd
Feb.	3,000,000 gpd	**May**	3,800,000 gpd	**Aug.**	4,000,000 gpd	**Nov.**	3,200,000 gpd
March	3,200,000 gpd	**June**	4,000,000 gpd	**Sept.**	4,000,000 gpd	**Dec.**	3,000,000 gpd

Conditions to this permit are as follows:

1. Withdrawal rates must be accurately measured by meter or other device approved by the Cabinet.

2. When flows measured at Lock 6 of the Kentucky River reach 140.0 cfs Versailles Municipal Water Works shall conform to the following schedule:

Lock 6 Flow (cfs)	Allowable Withdrawals (mgd)
>140.0	Full Permitted Amount *, **
139.9 – 120.0	3.8
119.9 – 100.0	3.5
99.9 - 80.0	3.0
79.9 - 55.0	2.5
< 55.0	1.9

*The full permitted amount as stated for each month on this permit.

**Allowable withdrawals will be determined by calculating the average flow for the most recent 4-day period at Lock 6 of the Kentucky River.

3. Versailles Municipal Water Works shall obtain gaging information for flows from the United States Geological Survey gage at Lock 6. Gage and water withdrawal data shall be reported to the Division of Water when flows are below 140.0 cfs. The Division may specify reasonable reporting intervals, no more frequently than hourly, as flows decrease.

4. Versailles Municipal Water Works and the Division of water recognize that all permitted water withdrawers along the Kentucky River are equal.

Issued: September 27, 1966

Latest Revision: November 1, 1999

Manager, Water Resources Branch
Division of Water

WR 2-03
4-79

COMMONWEALTH OF KENTUCKY
DEPARTMENT FOR NATURAL RESOURCES & ENVIRONMENTAL PROTECTION
BUREAU OF NATURAL RESOURCES
DIVISION OF WATER RESOURCES
FRANKFORT, KENTUCKY 40601

PERMIT TO WITHDRAW PUBLIC WATER

Permit No. 0045

Issued to: Wilmore Utilities System

Address: 335 East Main Street
(Street)

Wilmore (City) Kentucky (State) 40390 (Zip Code)

The Department for Natural Resouces and Environmental Protection acting in accordance with KRS 151.140 - KRS 151.210 authorizes the above named party to withdraw Public Water of the Commonwealth of Kentucky. Withdrawals are restricted to the stated quantities, times and locations specified below. This permit represents a limited right of use and does not vest ownership nor absolute right to withdrawal or use of Public Water. In times of drought or emergency, the Department may temporarily alter the conditions of the permit. Any violation of the Water Resources Action of 1966 as amended is subject to penalties as set forth in KRS 151.990 and other applicable provisions of law.

The location of the authorized water withdrawal is as follows:

Intake located at mile 114.0R of the Kentucky River, Jessamine County.

Water withdrawals are limited to the following rates from the specified withdrawal location:

Jan.	1,000,000	gpd.	April	1,000,000	gpd.	July	1,000,000	gpd.	Oct.	1,000,000	gpd.
Feb.	1,000,000	gpd.	May	1,000,000	gpd.	Aug.	1,000,000	gpd.	Nov.	1,000,000	gpd.
Mar.	1,000,000	gpd.	June	1,000,000	gpd.	Sept.	1,000,000	gpd.	Dec.	1,000,000	gpd.

Limitations to this permit are as follows:

Issued: June 20, 1966 Latest Revision: March 31, 1980

Jackie Swigart
Secretary, Department for Natural Resources and Environmental Protection

By Dave Rosenbaum
Director, Division of Water Resources

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
FRANKFORT, KENTUCKY 40601

PERMIT TO WITHDRAW PUBLIC WATER

Permit Number: #0623

Issued to: Winchester Municipal Utilities
Water Works Road
Winchester, KY 40391-0098

The Natural Resources and Environmental Protection Cabinet authorizes the above named party to withdraw Public Water of the Commonwealth of Kentucky. This permit has been issued under provisions of KRS Chapter 151.125, 151.140 and 151.150 and regulations promulgated with respect to the withdrawal of public waters. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any other permits or licenses required by this Cabinet, or other state, federal or local agencies. Withdrawals are restricted to the stated quantities, times and locations specified below. This permit represents a limited right of use and does not vest ownership nor absolute right to withdrawal or use of Public Water, nor does it guarantee that requested amounts will be available for use at all times. In times of drought or emergency, the Cabinet may temporarily alter the conditions of the permit. Any violation of the Water Resources Act of 1966 as amended is subject to penalties as set forth in KRS 151.990 and other applicable provisions of law.

The location of the authorized water withdrawal is as follows:

A surface water intake located at mile 176.51 of the Kentucky River, Pool #10 ; Clark County; Latitude 37o54'40"N and Longitude 84o15'88"W.

Water withdrawals are limited to the following rates from the specified location:

Jan.	15,000,000 gpd	April	15,000,000 gpd	July	15,000,000 gpd	Oct.	15,000,000 gpd
Feb.	15,000,000 gpd	May	15,000,000 gpd	Aug.	15,000,000 gpd	Nov.	15,000,000 gpd
March	15,000,000 gpd	June	15,000,000 gpd	Sept.	15,000,000 gpd	Dec.	15,000,000 gpd

Conditions to this permit are as follows:

1. Withdrawal rates must be accurately measured by meter or other device approved by the Cabinet.

2. When flows measured at Lock 10 are 190 cfs or less for four (4) consecutive days, Winchester Municipal Utilities' withdrawals shall conform to the following schedule:

Lock 10 Flow (cfs)	Allowable Withdrawals
>190	15.0 MGD
157.0 - 189.9	10.0 MGD
124.0 - 156.9	5.0 MGD
90.0 - 123.9	4.0 MGD
<90.0	2.8 MGD

3. Winchester Municipal Utilities shall obtain continuous gaging information for flows at the United States Geological Survey gage at Lock 10. Gage and water withdrawal data shall be reported to the Division of Water daily when flows are below 190.0 cfs. The Division may specify reasonable reporting intervals, no more frequently than hourly, as flows decrease.

4. Water withdrawals in excess of the prevailing water treatment plant capacity will be pumped to the Carroll Ecton Reservoir only.

5. The Winchester Municipal Utilities has developed and approved a policy which includes an Emergency Water Conservation Program. The Emergency Water Conservation Program is a guideline for implementing temporary customer demand reduction requests based on the Kentucky River Flows, reservoir levels, and customer demands. The purpose of the customer demand reduction requests would be to maintain an adequate source of supply levels in order to sustain service through a drought period or other water shortage emergency. The decision to implement any level of the Emergency Water Conservation Program is the sole responsibility of the Winchester Municipal Utilities working in conjunction with the city of Winchester, the Kentucky River Authority, and the Division of Water. The decision must consider the time of year, availability of other sources of supply, weather forecast, soil conditions, and public perception. Based on allowable withdrawals under Permit #0623 as listed in Condition 2 and water levels in the Carroll Ecton Reservoir, and assuming average daily demands, the Winchester Municipal Utilities will consider the following phases of the Emergency Water Conservation Program:

Lock 10 Flow (cfs)	Allowable Withdrawal	Action Taken				
		Carroll Ecton Reservoir Levels				
		>880.0	876.0 - 879.9	856.0 - 875.9	841.0 - 855.9	<841.0
>190.0	15.0 MGD	NAT	NAT	NAT	NAT	NAT
157.0 - 189.9	10.0 MGD	NAT	NAT	NAT	WSAdv	WSAdv
124.0 - 156.9	5.0 MGD	NAT	WSAdv	WSAdv	WSAdv	WSAdv
90.0 - 123.9	4.0 MGD	WSAdv	WSAdv	WSAlt	WSE	WSE
<90.0	2.8 MGD	WSAdv	WSAlt	WSE	WSE	WSE

NAT: No Action Taken
WSAdv: Water Shortage Advisory
WSAlt: Water Shortage Alert
WSE: Water Shortage Emergency

Pursuant to the establishment of the policy by the Winchester Municipal Utilities, the city of Winchester has ordained the city of Winchester Code of Ordinance's Ordinance No. 33-97, Section 14-71.

6. Winchester Municipal Utilities shall notify the Natural Resources and Environmental Protection Cabinet and the Kentucky River Authority as each Management Phase is declared, beginning with the Water Shortage Advisory.

7. Winchester Municipal Utilities and the Division of Water recognize that all permitted water withdrawers along the Kentucky River are equal.

8. Winchester Municipal Utilities recognizes its role in protecting the Kentucky River as a source of supply of the Central Kentucky Region.

Issued: March 16, 1968 Latest Revision: November 24, 1997

Manager, Water Resources Branch
Division of Water

Kentucky River Dam No. 10 Information

Contents

- **Lexington Herald Leader, December 12, 2002**
- **Minutes from KRA meeting held December 11, 2002 (prepared by CDP)**
- **Handouts from KRA meeting held December 11, 2002**

Dam is approved for Kentucky River

CONSTRUCTION IS SEVERAL YEARS OFF

By Andy Mead
HERALD-LEADER STAFF WRITER

FRANKFORT — A new, higher dam should be built in front of the existing one at Fort Boonesborough State Park, the Kentucky River Authority decided yesterday.

It instructed the Corps of Engineers to move ahead with design and environmental studies for a dam 4 or 6 feet higher. A final decision could come next fall; construction is several years away.

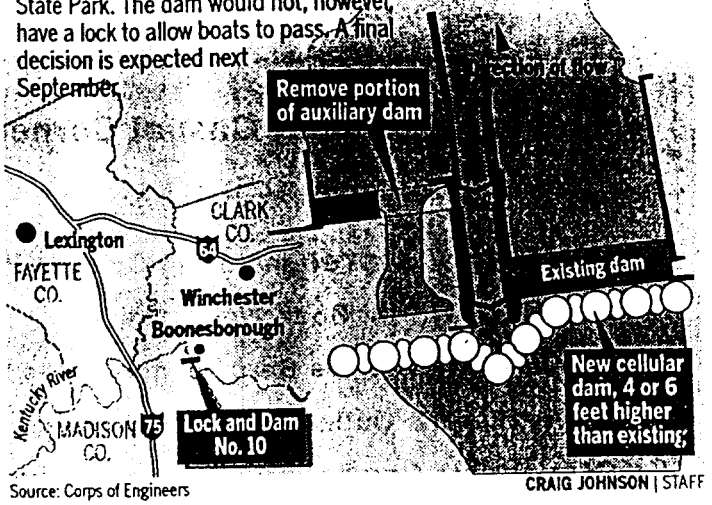
The action came three years after the authority decided to take a more active role in increasing the region's water supply by dams, with No. 10 at Boonesborough being first on the list.

"This is a tremendous step

See DAM, B10

Augmenting the water supply

The Kentucky River Authority told the U.S. Army Corps of Engineers yesterday to move forward with a proposed cellular dam that would be either 4 or 6 feet higher than the existing dam at Fort Boonesborough State Park. The dam would not, however, have a lock to allow boats to pass. A final decision is expected next September.



Source: Corps of Engineers

CRAIG JOHNSON | STAFF

From Page B1

forward in securing the economic stability of Central Kentucky," said Linda Bridwell of Kentucky-American Water Co., which draws Lexington's supply from the pool just down river from No. 10.

The authority decided against raising the existing dam, which is 100 years old. And the new dam won't have a lock, which mean boats won't be able to move past it.

The authority left open the option of refurbishing and using the existing lock some time in the future, but Hank Spaulding of Hazard, the only board member to vote against the new dam, said he doubted that would ever happen.

The reason is money. The Corps of Engineers said a new dam 4 or 6 feet higher than the old dam could cost, respectively, $21 million or $24 million.

Adding a lock could add more than $10 million to either option. The lock has been broken since 2000. The last summer it was in use, only 196 boats used it, although they went through a total of 580 times.

Corps officials stressed that the cost estimates for the new dam are preliminary. But the $24 million figure appealed to the authority because it is just how much Congress authorized the corps to spend on stabilizing or raising the old dam. Twenty percent must come from state funds. Only the first $2 million of that federal authorization has been appropriated.

Rep. Ernie Fletcher, a Lexington Democrat, asked Congress for the money after the drought of 1999.

A University of Kentucky study has shown that, if the worst drought on record happened again in the year 2020, the region could fall short by 3.7 billion gallons of water. A new dam 4 feet higher would hold an additional 1 billion gallons. A 6-foot higher dam would hold 1.6 billion.

A higher dam would mean the state would have to pay some landowners for "flow easements" because their riverside land would be under water more often.

The corps estimates raising the water level 4 feet would mean an additional 400 acres would be submerged once or twice a year. A 6-foot rise would affect 600 acres.

That could cost $3 million to $4 million in easements. And moving a road or improving a bridge could cost an additional $1 million to $2 million, the corps said.

During larger floods, there would be virtually no difference in water levels, corps officials said.

The new dam would be what the corps calls a cellular dam, built of interlocking steel pilings driven into bedrock, filled with gravel and capped with concrete. Each cell would be about 50 feet in diameter.

Reach Andy Mead at (859) 231-3319; 1-800-950-6397, Ext. 3319; or amead@herald-leader.com.

Kentucky River Authority Meeting
December 11, 2002

- July 2000, KRA resolved to rehabilitate Lock & Dam #10
- October 2000, Congressman Ernie Fletcher helped pass legislation for funding ($19.2 million federal, $408,000 state)
- Intent was to stabilize and raise dam. Secondary goal was to restore Lock if funds were available.
- Schedule proposed by COE presupposes no significant environmental problems.
- Need to begin EIS on "best" two options.
- Options selected include raising dam 4 feet with permanent cells and no lock **and** raising dam 6 feet with permanent cells and no lock
- Schedule estimates that project would be completed in six years.
- Reported deficit of 7.7 billion gallons from Pools 8 through 14.
- Installing release valves reduced deficit to 3.7 billion gallons.
- Increasing dam height six feet will provide 1.6 billion gallons additional storage or 43% of deficit.
- Lock #10 has been closed since 2000.
- In 1999 there were 196 "unique" boats (no duplicates) and 400 to 500 lockages.
- Using "Ordinary High Water Line" (OHWL) with dam raised six feet, approximately 600 acres will be impacted.
- Cost overruns must be borne by KRA or some other source.
- KRA Board Member made point that KRA has the authority to increase withdraw fees.

DECISION TREE – LOCK & DAM #10

Eliminated by the Authority

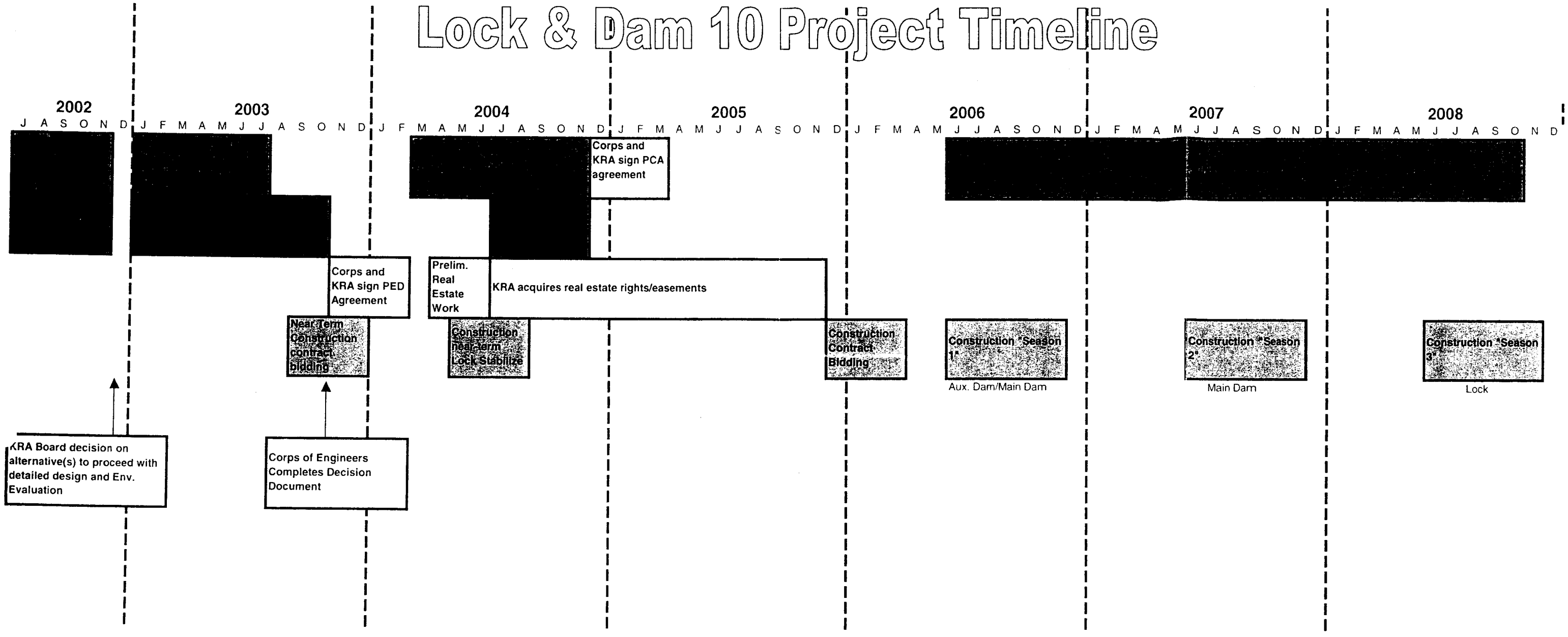
RAISE?	NO	YES – 4 ft.			YES – 6 ft.	
HOW TO RAISE?		CREST	FIXED	CELL	CELL	
COSTS BEYOND AUTHORIZATION						Actual O&M 50 yr. NPV
LARGE LOCK	$2.9	N/A	$6.5M	$7.7M	$11M	$2.3M
SMALL LOCK	$1.4	N/A	$5.1M	$6.7M	$10.6M	$2.2M
NO LOCK	$0	N/A	$0	$0	$0	$0

1. Assumes the "do nothing alternative" will not be considered – stabilization is the minimum solution.
2. Dollars shown are the amount in excess of the authorization for each alternative.
3. KRA portion of the $24M authorization will be $4.8M (20%) – amounts indicated for authorization excess and O&M would be additional KRA responsibility.

Option		Capital Cons. Total	$ to get us to the decision document and EIS	Near Term Stabilization	Real Estate & Environmental Mitigation (estimate)	Total Costs through finished Construction
+0 feet	Stabilize in place	11.7	3.0	1.0	0.0	**15.7**
+4 feet	Add concrete cap to existing dam	13.6	3.0	1.0	3.0	**20.6**
+6 feet		15.1	3.0	1.0	5.0	**24.1**
+4 feet	Cellular Dam along Upstream Face of Existing Dam	14.1	3.0	1.0	3.0	**21.1**
+6 feet		15.0	3.0	1.0	5.0	**24.0**
+4 feet	Crest Gates	15.1	3.0	1.0	3.0	**22.1**

Option		Capital Cons. Total	$ to get us to the decision document and EIS	Near Term Stabilization	Real Estate & Environmental Mitigation (estimate)	Total Costs through finished Construction
+4 feet	Add concrete cap to existing dam, refurbished lock	23.5	3.0	1.0	3.0	**30.5**
+6 feet		25.7	3.0	1.0	5.0	**34.7**
+4 feet	Cellular dam along upstream face of existing dam, refurbished lock	24.7	3.0	1.0	3.0	**31.7**
+6 feet		26.1	3.0	1.0	5.0	**35.1**
+4 feet	Cellular dam along upstream face of existing dam new **small lock**	23.3	3.0	1.0	3.0	**30.3**
+6 feet		24.6	3.0	1.0	5.0	**33.6**

Lock & Dam 10 Project Timeline



Weighting Factors for Alternative Scoring and Pairwise Comparison

Guidance for use of this appendix:
The following pairwise comparison was used to determine the weighting factors, shown as the number of points out of a total of 100 points. The pairwise comparison uses a 1 to 5 scale to rank each evaluation criterion against the other evaluation criteria. The sum of each criterion is divided by 60 and then multiplied by 100 to assign the weighting factors.

BGADD/BWSC - Project Selection Criteria Ranking Worksheet

O'Brien & Gere
May-03

		Adequate Capacity	Raw/Finished Water Quality	Cost	Implementability	Flexibility	Sum	Weighting Factor
#1	Adequate Capacity		5	2	1	3	11	18
#2	Raw/Finished Water Quality	1		1	1	2	5	8
#3	Cost	4	5		3	4	16	27
#4	Implementability	5	5	3		3	16	27
#5	Flexibility	3	4	2	3		12	20
							60 Total	**100 Total**

Note: Rank the relative importance of the left-column criteria against the top-row criteria on a scale of 1 to 5 (1 = much less important, 3 = equivalent, 5 = much greater importance).

DEFINITIONS

#1 **Adequate Capacity** = Reliable quantity of raw water and finished water to meet projected demands through the planning period. This criteria addresses interruptibility of sources of supply.

#2 **Raw/Finished Water Quality** = Raw and finished water quality that meets existing water quality requirements, and can readily achieve future anticipated regulations. This criteria also addresses water quality preferences such as taste.

#3 **Cost** = The present worth cost for proposed raw and finished water improvements, including capital, operating and maintenance costs. This cost could include allowance for additional KRA funding for out-of-basin transfers.

#4 **Implementability** = The relative ease of implementing the proposed improvements in time to meet projected demands. This criterion considers the potential that regulatory permitting, public acceptance, property acquisition, or constructability issues could delay implementation.

#5 **Flexibility** = The ability to phase implementation and spread the cost over time, while still meeting projected demands.

Fatally-flawed Alternatives and Near-term/Long-term Classification

Draft Summary of Water Supply Alternatives – Showing Preferred Near-Term Alternatives from May 28 (Prepared by O'Brien & Gere)

Raw Water Source	Description	Capacity	Implementability/ Timing	
		Exceeds 10 mgd minimum?	Potential Near-term Supply	Potential Long – term Supply
Ohio River				
Purchase Finished Water	Cincinnati Water Works via Boone Florence Water Commission	✓	✓P	✓
Purchase Finished Water	Cincinnati Water Works via Bracken County	✓	✓P	✓
Purchase Finished Water	Louisville Water Company	✓	✓P	✓
Purchase Finished Water	Northern KY Water District	✓	✓	✓
Ohio River				
Raw Water	Withdrawals and WTP at Maysville/Dover	✓	✓P	✓
Raw Water	Withdrawals and WTP at Warsaw	✓	✓P	✓
Raw Water	Withdrawals and raw water transmission to WTP in central KY	✓	✓	✓
Kentucky River				
	Raise Dams 9, 11, 12, and 14	✓		✓
	Raise Dam 10	✓	✓B	✓
	New Dams 10A and 12A	✓		✓
	High Bridge Dam	✓		✓
	Pumpback from lower pools to upper pools	✓	✓	✓
	Dredge KY River	Fatally flawed [1]		
	New WTP at Pool 3	✓	✓P	✓
	Increase withdrawals by negative consumptive use	✓	✓B	✓
Existing Reservoirs				
	Buckhorn Lake or Carr Fork	Fatally flawed [2]		
	Cave Run Lake Diversion			✓
	WTP at Cave Run Lake			✓

P = Preferred Alternative
B = Baseline Component
[1] Dredging will not provide at least 10 mgd of additional safe yield.
[2] These sources do not have available capacity.

Raw Water Source	Description	Capacity	Implementability/ Timing	
		Exceeds 10 mgd minimum?	Potential Near-term Supply	Potential Long – term Supply
	Lake Cumberland Diversion	✓		✓
	WTP at Lake Cumberland	✓		✓
	Herrington Lake			✓
	Scott County Reservoir			✓
New Reservoirs				
	Station Camp Creek			✓
	Sturgeon Creek			✓
	Lower Devils Creek			✓
	Four Mile Creek			✓
	Upper Howard Creek			✓
	Contrary Creek			✓
	Eagle Lake			✓
	Eagle Creek Lake			✓
	Boonesville Reservoir			✓
	Muddy Creek Dam			✓
	Walkers Creek Dam			✓
	Jackson County Reservoir			✓
Groundwater				
Aquifer near Carrollton	Purchase water from Carrollton/CCWD#1	✓	✓P	✓
Aquifer near Carrollton	BWSC well system	✓	✓	✓
Aquifer near Maysville	Purchase water from Greater Fleming	✓	✓P	✓
Aquifer near Maysville	BWSC well system	✓	✓	✓
	Indiana wells across Ohio River from Louisville	✓	✓	✓
	Groundwater other than along Ohio River	Fatally flawed [2]		

P = Preferred Alternative

B = Baseline Component

[1] Dredging will not provide at least 10 mgd of additional safe yield.

[2] These sources do not have available capacity.

Historic Water Supply Plans of the Kentucky River

Kentucky River Basin:

Unified Long-Range Water Resources Plan

Historic Water Supply Plans of the Kentucky River Basin

L. Ormsbee
M. McAlister

Prepared for:
The Kentucky River Authority

Prepared by:
The Kentucky Water Resources Research Institute
University of Kentucky
Lexington, KY 40506

April 2003
DRAFT

Historic Water Supply Plans of the Kentucky River Basin

The Kentucky River Authority was mandated by regulatory statute 420 KAR 1:030, Section 4 to develop a Unified Long-Range Water Resources Plan (ULRWRP) for the Kentucky River Basin. This summary document was written by the Kentucky Water Resources Research Institute under a contractual agreement with the Kentucky River Authority to complete this plan. It addresses several required components of the ULRWRP, including:

- Acquisition and utilization of the Kentucky River Lock and Dam system;
- Construction, acquisition and control of projects and facilities;
- Regulation of flows and allocation of supplies;
- Basin-wide and specific local land and water conservation measures and practices; and
- Economic development.

This report provides summaries of the numerous documents written about the water resources of the Kentucky River. Section 1.0 provides a chronological listing of these documents. Due to the fact that many of these reports were written upon the request of a local, state or federal agency, or were required by state or federal legislation, Section 2.0 categorizes the historical documents by the agency or organization sponsoring the specific study. The document summaries in Section 3.0 are also categorized by the sponsoring entity.

Reports written about the Kentucky River basin cover a variety of topics, but focus primarily on water supply issues and the potential for developing additional supplies in the basin. Many proposals are offered for ways to increase storage in the mainstem pools of the river, as well as for potential reservoir sites in various river tributaries. The summary table at the conclusion of the report lists historically proposed water supply alternatives, along with a notation of which projects were actually implemented. (Section 4.0) For those supply alternatives not completed, an attempt is made to explain why it was not pursued.

Table of Contents

1.0 Chronological Listing of Reports....3

2.0 Listing of Reports by Sponsoring Agency/Organization....3

3.0 Summary of Reports....7
- 2.1 Kentucky River Authority....7
- 2.2 U.S. Army Corps of Engineers....19
- 2.3 Kentucky Office of the Attorney General....25
- 2.4 Kentucky-American Water Company....26
- 2.5 Kentucky River Basin Steering Committee....27
- 2.6 Kentucky Geological Survey....31
- 2.7 Regional Water Supply Planning....32
- 2.8 Lexington-Fayette Urban County Government....34
- 2.9 Kentucky Natural Resources and Environmental Protection Cabinet....36
- 2.10 U.S. Geological Survey....37
- 2.11 Water Resource Development Commission....38
- 2.12 Miscellaneous Reports....38

4.0 Table of Proposed Kentucky River Basin Water Supply Projects....41

1.0 Chronological Listing of Reports

1958, U.S. Army Corps of Engineers, *Review Report on Kentucky River and Tributaries for Flood Control and Allied Purposes.*

1978, U.S. Army Corps of Engineers, *Metropolitan Lexington Urban Study: Water Resources Analysis.*

1978, U.S. Army Corps of Engineers, *Special Report: Water Supply Alternatives to Red River Lake.*

1981, U.S. Department of Agriculture, *Kentucky River Basin Report on Water and Related Land Resources.*

1985, Daugherty & Trautwein, Inc., *Kentucky River Survey, Rehabilitation Study for Locks and Dams 5 through 14.*

1986, *Proceedings of the Kentucky River Conference.*

1987, Rebmann, J.R. and Suzanne M. Kilner, *A Multi-Purpose Surface Impoundment Proposal for the Kentucky River.*

1988, Rebmann, J. and Hassell, D., *The Kentucky River: An Outline of Issues for Water Supply Planning.*

1988, U.S. Army Corps of Engineers, *Interim Report Kentucky River and Tributaries: Station Camp Creek, Kentucky Reconnaissance Report, Volumes 1-3.*

March 1988, University of Kentucky College of Agriculture, *Prospects and Impacts for Reservoir Location: Jackson County, Kentucky.*

July 1989, *Proceedings of the Kentucky River Basin Technical Advisory Committee: Alternative Evaluation Workshop.*

October 1989, C.J. Fuller Consulting Engineers, A.M. Kinney, Inc. and Legeay Inc., *Kentucky River Survey: 1989 Update of Locks & Dams 5 through 14.*

1990, U.S. Army Corps of Engineers, Louisville District, Kentucky River, *Reconnaissance Level Cost Estimate Data.*

1990, HARZA Engineering Company, GRW Engineers, Inc. and Construction Dynamics Group, *Phase I Report: Water Demands and Water Supply Yield and Deficit.*

1990, Carey, D., *Water Availability Modeling and Analysis of the Kentucky River.*

1991, Environmental Science & Engineering, *Kentucky River Aquatic Study.*

1991, HARZA Engineering Company, *Phase II Report: Development of a Long-Range Water Supply Plan.*

1991, U.S. Geological Survey and Kentucky Natural Resources and Environmental Protection Cabinet, *Evaluation of the Drought Susceptibility of Water Supplies Used in the Kentucky River Basin in 1988.*

1992, HARZA Engineering Company, *Source of Supply/Safe Yield Study.*

1992, Carey, D., *Water Quality in the Kentucky River Basin.*

May 1992, University of Kentucky College of Agriculture, *The Kentucky River Basin: A Land Use and Recreation Study for the Kentucky River Authority.*

June 1992, Shepherd, Jack, *Report to Department of Natural Resources: Eagle Lake, Kentucky.*

1993, GRW Engineers, *Kentucky River Pool 9 Capacity Study.*

1994, Tellus Institute, *An Evaluation of Kentucky-American Water Company's Long-Range Planning.*

1994, Carey, D.I., Currens, J.C., Dinger, J.S., Kipp, J.A., Wunsch D.R. and Conrad, P.G., *Groundwater in the Kentucky River Basin.*

1995, Kentucky River Authority, *Station Camp Creek Preliminary Jackson County Reservoir Site Analysis.*

1996, Kentucky Water Resources Research Institute, *Kentucky River Basin Water Supply Assessment Study.*

- June 1996, Task II Report, Part 1 – Evaluation of Water Supplies in the North, South and Middle Fork Kentucky River Watersheds
- August, 1996, Task I Report – Summary and Evaluation of Water Supply Studies for the Kentucky River Basin
- August 1996, Task III Report – Deficit Analysis
- September 1996, Task III Report – KYBASIN User's Manual: A Water Supply Assessment Model for the Kentucky River Basin
- September 1996, Task III Report – Water Use Estimation and Forecasting for the Kentucky River Basin
- October 1996, Task IV Report – KYROM User's Manual: A Drought Management Model for the Kentucky River Basin
- October 1996, Task V Report – Estimation of the Responsiveness of Water Use to Changes in Rates: A Methodology and Final Estimates Using KAWC Data

December 1996, Task II Report, Part 2 – Evaluation of Water Supplies in the Red River, Dix River and Mainstem Watersheds of the Kentucky River
December 1996, Task V Report – Development and Evaluation of Water Supply Alternatives

November 1996, HARZA Engineering Company, *Feasibility and Environmental Assessment for Providing Additional Storage at Kentucky River Locks and Dams 8-14.*

1997, U.S. Army Corps of Engineers, *Upper Kentucky River Basin, Kentucky: Reconnaissance Phase Water Resources Study.*

November 1997, Kentucky Division of Water, *Kentucky River Basin Status Report.*

December 1997, U.S. Army Corps of Engineers, Louisville District, *Kentucky River Survey: Rehabilitation Study for Locks and Dams 5 through 9.*

1998, Kentucky Water Resources Research Institute, *Kentucky River Modeling and Monitoring Needs Assessment.*

1998, Kentucky Water Resources Research Institute, *Kentucky River Basin Water Quality Assessment Study.*

1998, Waltman R.M. and R. Jan Stevenson, *A Review of Research on the Kentucky River Ecosystem: Biota and Human Impacts*

1999, Kentucky Water Resources Research Institute, *Summary Report: 1999 Kentucky River Watershed Watch Data Collection Effort.*

1999, Fayette County Water Supply Planning Council, *Fayette County 20-Year Comprehensive Water Supply Plan.*

1999, Kentucky Infrastructure Authority, et. al., *Water Resource Development: A Strategic Plan.*

2000, Kentucky Water Resources Research Institute, University of Kentucky Dept. of Civil Engineering and Kentucky Division of Water, *1998-1999 Monitoring Strategy: Kentucky River Basin Management Unit.*

2000, Kentucky Water Resources Research Institute, *Summary Report: 2000 Kentucky River Watershed Watch Data Collection Effort.*

December 2000, Kenvirons, *Feasibility Study for the Jackson County Lake Project and Alternatives.*

October 2001, Kentucky Water Resources Research Institute, *Summary Report: 2001 Kentucky River Watershed Watch Data Collection Effort.*

November 2001, University of Kentucky Department of Civil Engineering, *Impact of Raising Crest-Level of the Dam on North Fork Kentucky River in the Vicinity of Hazard Raw-Water Intake Tower.*

April 2002, Kentucky Water Resources Research Institute, *Kentucky River Basin Management Plan.*

November 2002, Kentucky Water Resources Research Institute, *Summary Report: 2002 Kentucky River Watershed Watch Data Collection Effort.*

2.0 Listing of Reports by Sponsoring Agency/Organization

2.1 Kentucky River Authority Studies

2.1.1 Kentucky River Authority, 1995, *Station Camp Creek Preliminary Jackson County Reservoir Site Analysis.*

2.1.2 Kentucky Water Resources Research Institute, 1996, *Kentucky River Basin Water Supply Assessment Study.*

- Task I Report – Summary and Evaluation of Water Supply Studies for the Kentucky River Basin
- Task II Report, Part 1 – Evaluation of Water Supplies in the North, South and Middle Fork Kentucky River Watersheds
- Task II Report, Part 2 – Evaluation of Water Supplies in the Red River, Dix River and Mainstem Watersheds of the Kentucky River
- Task III Report – KYBASIN User's Manual: A Water Supply Assessment Model for the Kentucky River Basin
- Task III Report – Deficit Analysis
- Task III Report – Water Use Estimation and Forecasting for the Kentucky River Basin
- Task IV Report – KYROM User's Manual: A Drought Management Model for the Kentucky River Basin
- Task V Report – Estimation of the Responsiveness of Water Use to Changes in Rates: A Methodology and Final Estimates Using KAWC Data
- Task V Report – Development and Evaluation of Water Supply Alternatives

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3.0 Summary of Reports

3.1 Kentucky River Authority

3.1.1 *Station Camp Creek Preliminary Jackson County Reservoir Site Analysis* (KRA, 1995)

The Jackson County Empowerment Zone Committee approached the Kentucky River Authority to examine the potential of developing a dam and reservoir on Station Camp Creek. This reservoir would serve a dual function as a water supply reservoir and a recreational area.

Four sites were evaluated for their potential as a new Jackson County Reservoir. The reservoir surface area at normal pool ranged from 900 to 1250 acres, with storage capacities of 24 to 27 billion gallons. Cost estimates ranged from $27.2 million to $29.2 million.

3.1.2 *Kentucky River Basin Water Supply Assessment Study* (KWRI, 1996)

This study was initiated through a contract between the Kentucky River Authority and the University of Kentucky – Kentucky Water Resources Research Institute in 1995. The purpose of the study was to review the results and recommendations of the 1991-1992 Harza reports in light of the 1990 census data and new modifications to the Kentucky River. The study resulted in eight separate reports as identified below:

Task I Report – Summary and Evaluation of Water Supply Studies for the Kentucky River Basin

Task II Report – Part 1: Evaluation of Water Supplies in the North, South and Middle Fork Kentucky River Watersheds

Task II Report – Part 2: Evaluation of Water Supplies in the Red River, Dix River and Mainstem Watersheds of the Kentucky River

Task III Report – Water Use Estimation and Forecasting for the Kentucky River Basin

Task III Report – Deficit Analysis

Task IV Report – KYROM User's Manual: A Drought Management Model for the Kentucky River Basin

Task V Report – Development and Evaluation of Water Supply Alternatives

Task V Report – Estimation of the Responsiveness of Water Use to Changes in Rates: A Methodology and Final Estimates Using KAWC Data

Task I Report – Summary and Evaluation of Water Supply Studies for the Kentucky River Basin

The Task I report provided a review and critique of previous water supply studies of the Kentucky River Basin. In particular, the review focused on the 1990 Harza study, entitled "Phase I Report: Water Demands and Water Supply Yield and Deficit" (see 2.5.1) and the 1991 Harza study entitled "Phase II Report: Development of a Long-Range Water Supply Plan" (see 2.5.2). The purpose of the overall KWRI study was to identify and assess unexamined or changed conditions that could significantly impact the conclusions and recommendations of the previous Harza studies.

Task II Report – Part I: Evaluation of Water Supplies in the North, South and Middle Fork Kentucky River Watersheds

This report examined municipal and private water supplies in the North, South and Middle Fork watersheds of the Kentucky River. The three basins, with a combined area of over 2,600 square miles, form the upper forks region of the Kentucky River and lie entirely within the Eastern Coal Field physiographic region of Kentucky.

Current and projected water supply adequacy and water system needs were examined for the municipal water systems in Breathitt, Knott, Leslie and Letcher Counties in the North Fork Kentucky River basin, Leslie County in the Middle Fork Kentucky River basin and Clay and Owsley Counties in the South Fork Kentucky River basin. These included the following eight municipal water suppliers: Fleming-Neon Water Company, Whitesburg Municipal Water, Hindman Municipal Water Works, Hazard Water Department, Jackson Municipal Water Works, Booneville Water & Sewer and Manchester Water Works. These also included the following three purchasing districts: Vicco Water System, Hima-Sibert Water District and North Manchester Water District.

Demographics: Population projections from the Kentucky State Data Center were combined with service area expansion projections from Long Range Water Supply Plans to produce estimates of water use for the years 2000, 2010 and 2020. The projected average and peak water needs were compared with estimates of available water supplies during droughts. Evaluation procedures recommended by the Kentucky Division of Water were used to determine the drought susceptibility of each municipal water supplier.

Water Suppliers: As of 1994, ten municipal water suppliers provided water for about 39,310 people in the region, either directly or through purchasing water districts. Projected growth in residential water service varied widely among systems, ranging from very limited growth at the Jackson Municipal Water Works to the more than doubling of Whitesburg Municipal Water's service.

Water Resources: Given an average annual precipitation rate for the basin of 46 inches, the water yield from the basin was estimated to be 1.36 cubic feet per second per square mile, or 880,000 gallons per day per square mile. This water yield corresponded to about 8,800 gallons per day for every person living in the basin.

Water Quality: Streams in the North and Middle Fork basins continued to have problems caused by siltation and pathogens. Mining, agriculture, septic systems and petroleum activities were the major sources of stream pollution. Other potential sources of pollution in the region were effluent discharge sites, hazardous waste handling sites, water treatment plants and solid waste landfills.

Water Supply Adequacy: The Water Resources Branch of the Kentucky Division of Water groups water systems into three classes of susceptibility to water shortages during drought conditions. Systems are grouped by comparing average withdrawal rates to water availability at the point of withdrawal during drought conditions. The drought susceptibility classes are:

A. Systems unlikely to experience water shortage during drought conditions.
B. Systems that should be examined for susceptibility to water shortage during drought. Plans need to be made for response to possible shortage.
C. Systems that are likely to have water shortage during drought conditions. Plans for response to shortage are necessary.

The ability of each system to meet demands, either at the time of the study or over the projected planning period, was evaluated by determining its drought susceptibility. Water supplies for the Hazard Water Department, Whitesburg Municipal Water, Hyden-Leslie County Water District, Booneville Water and Sewer and Manchester Water Works were considered inadequate for current and future needs (Class C). Water supplies for the Fleming-Neon Water System were adequate for current needs, but were not certain to meet peak demands during a drought by the year 2000 or average demand during a drought by the year 2010 (Class B). Water supplies for Jackson Municipal Water Works and Hindman Municipal Water Works were considered adequate for current needs (Class A).

Cost of Full Service: Cost estimates for providing full public water service in the Upper Forks region were developed. It was assumed that water service would be provided along every road in the county. The total estimated cost was about $200 million, or an average of about $27.5 million per county. An additional 90,000 people, or 34,000 households, in the region would be provided with public water through the installation of 2,500 miles of new water lines.

Task II Report – Part 2: Evaluation of Water Supplies in the Red River, Dix River and Mainstem Watersheds of the Kentucky River

This report examined municipal and private water supplies in the Red River, Dix River and mainstem Kentucky River watersheds.

The current and projected water supply adequacy and water system needs were examined for the municipal water systems in Boyle, Grant, Lincoln, Madison, Owen, Powell, Scott, and Wolfe Counties. The study included the following eight municipal water suppliers: Bullock Pen Water District, Owenton Water Works, Georgetown Municipal Water, Danville Water Works, Stanford Water Works, Berea College Water, Beech Fork Water Commission and Campton Water Works. It also included the following twelve water purchasers: Tri-Village Water District, Perryville Water District, Parksville Water District, Junction City Water System, Lake Village Water Association, Hustonville Water Works, McKinney Water District, Southern Madison Water District, Garrard County Water Association, Stanton Water, Clay City Water and Powells Valley Water District.

Demographics: Moderate growth and high growth population projections from the Kentucky State Data Center, and the assumption that each county would provide a level of service by the year 2020 that was commensurate with the average level of service currently provided in the Bluegrass region, were used to produce estimates of water use for the years 2000, 2010 and 2020. Moderate growth assumes only minor gains from migration; high growth reflects recent trends in migration (1990-94). Growth in population of 13 to 30 percent is projected for the eight county study area.

Water Suppliers: Nineteen water suppliers provided water for about 36,000 people in the region, either directly or through purchasing water districts. Regional growth through extension of service and population growth was estimated to range from 25 to 40 percent greater than that provided by 1994 service. Projected growth for the Stanford, Georgetown, Berea and Beech Fork systems was similar to that for the region. The Danville system is projected to have limited growth. High growth is expected for the Bullock Pen, Owenton and Campton Systems.

Water Resources: Given an average annual precipitation rate for the basin of 46 inches, the water yield from the basin was estimated to be 1.36 cubic feet per second per square mile, or 880,000 gallons per day per square mile. This water yield corresponded to about 8,800 gallons per day for every person living in the basin.

Water Supply Adequacy: The Water Resources Branch of the Kentucky Division of Water groups water systems into three classes of susceptibility to water shortages during drought conditions. Systems are grouped by comparing average withdrawal rates to water availability at the point of withdrawal during drought conditions. The drought susceptibility classes are:

A. Systems unlikely to experience water shortage during drought conditions.
B. Systems that should be examined for susceptibility to water shortage during drought. Plans need to be made for response to possible shortage.
C. Systems that are likely to have water shortage during drought conditions. Plans for response to shortage are necessary.

The ability of each system to meet demands, either at the time of the study or over the projected planning period, was evaluated by determining its drought susceptibility. Except for Georgetown Municipal Water, supply system improvements in recent years

had created sources of supply which were expected to be adequate to meet anticipated demands through the year 2020. The Georgetown system was serving 25-33 percent of its customers by purchasing water from the Frankfort Plant Board system. This alternative source, combined with the potential for reducing system leakage, mitigates the drought susceptibility of Georgetown. Based on projected demands, Stanford Water Works and Bullock Pen Water District needed to expand their treatment capabilities within the next five to ten years, and Owenton Water Works needed to expand its treatment capability within ten to fifteen years.

Task III Report – Water Use Estimation and Forecasting for the Kentucky River Basin

In this report, aggregate monthly water use was estimated for summer, peak demand and non-summer off-peak demand periods for the Kentucky River Basin. Water use was estimated for the 1970-1993 period, using Kentucky Division of Water use data, U.S. Census data for county demographic and economic conditions and U.S. Weather Service data for weather conditions. Factors such as population and manufacturing employment were found to generally affect water use. Temperature and rainfall in current and preceding months were found to affect use during the summer, peak period.

Population forecasts, both moderate and high growth series, were used along with manufacturing employment forecasts for water use forecasts. Water use forecasts were made for years out to 2020 under 1930 drought conditions for comparison with water supply estimates. The use estimates were made assuming pricing and other demand management policies remained constant. For Pool 9, under 1930 weather conditions and high (moderate) population growth, 2020 water use was forecast to be 70 (55) mgd, which is equal to 220 (220) gallons per person per day. The aggregate water use for the basin was forecast to be 129 (110) mgd.

Since less was known about agricultural use of water for irrigation in the Kentucky River Basin, it could not be estimated in the same manner as use by existing water systems. A different approach was taken, which relied on inventories of agricultural activity, use rates of the activity, and the sources of supply other than the Kentucky River. It was estimated that agricultural demand for the Kentucky River water would be approximately 5 mgd during a 1930 drought, and would largely be drawn from areas which are near or below Pool 9.

Task III Report – KYBASIN User's Manual: A Water Supply Assessment Model for the Kentucky River Basin

KYBASIN is a computer model developed for the Kentucky River Authority by the Kentucky Water Resources Research Institute (KWRI) for the express purpose of simulating the Kentucky River Basin under a severe drought. This model was developed as part of the KWRI *Kentucky River Basin Water Supply Assessment Study.*

The KYBSASIN computer model was developed to simulate water exchanges and movement in the basin. KYBASIN is a planning tool designed to quantify daily water supply and deficits in the basin under a series of user-defined conditions. These conditions describe the design drought, demand forecasts, and physical parameters of the river system. This model was turned over to the Authority for its use in evaluating water supply alternatives.

Task III Report – Deficit Analysis

This report quantified water supply in the Kentucky River Basin during a severe drought for the existing supply system/resources under current and projected demand forecasts.

This quantification of the susceptibility of the basin to a severe drought was necessary for the Kentucky River Authority to properly develop a long-range water supply plan.

Impacts of the two most severe droughts on record, occurring in 1930 and 1953, were imposed on water demand forecasts for 1994, 2000, 2010 and 2020. Two demand forecasts were developed for each future year to reflect two population projections, one assuming a moderate population growth rate and one assuming a high population growth rate.

The analyses in this report identify potential water supply deficits in the basin under a severe drought occurrence, assuming current supply resources are not upgraded. The deficits ranged from 2.2 billion gallons for the 1953 drought occurring in 1994 to 9.7 billions gallons for the 1930 drought occurring in 2020 with high population growth.

The main finding of the deficit predictions was that significant water shortages would be incurred if a severe drought was to occur in the basin. Water shortages of varying intensity would occur basin-wide, with the largest deficits concentrating in pool 9. The susceptibility of the basin to a severe drought reinforced the need for an effective drought management strategy and long range water supply plan.

The results of this report were intended to inform and alert decision makers of the susceptibility of the basin to a severe drought; identify the magnitude and location of water shortages; isolate significant factors influencing water supply shortages; and provide an initial reference point for evaluating potential water supply alternatives aimed at eliminating or reducing water supply deficits in the basin during a severe drought.

Task IV Report – KYROM User's Manual: A Drought Management Model for the Kentucky River Basin

The Kentucky River Operation and Management model is a computer application developed for the Kentucky River Authority by the Kentucky Water Resource Research Institute (KWRRI) for the purpose of simulating the Kentucky River Basin during drought periods. The model is intended as a tool, providing estimates for future deficits in the basin over a 28-day horizon. Potential deficit management measures can be evaluated by their impact on reducing predicted deficits. The model allows decision-makers to quickly determine the impact of changes in reservoir releases, valve release strategies, crest gate operation, and demand curtailment on predicted deficits. The KYROM results enable decision-makers to develop an effective plan to manage water supply during a drought. Additionally, the model can assist in water supply planning negotiations between conflicting user groups by quickly illustrating the impact of potential management strategies, as opposed to relying on ad-hoc hypotheses about the system response to these changes.

The KYROM model uses a similar hydraulic engine to that used by the KYBASIN model to simulate river behavior and predict deficits. A primary difference between the two models is their planning horizons. The KYROM model is intended to assist decision-

makers at the time of drought, whereas the KYBASIN model is intended to assist decision-makers in preparing for a specific design drought. Consequently, the decision variables available in the KYROM model reflect drought management strategies/solutions that can be implemented immediately. KYROM decision variables do not include long-term structural changes to the river system as a means to manage the drought.

Task V Report – Development and Evaluation of Water Supply Alternatives

This report addressed the development and evaluation of alternative plans to provide for the long-range water supply needs for the Kentucky River Basin. The report is divided into the following four chapters: Chapter 1 – a summary of the previous Harza study and overview of the current KWRRI study; Chapter 2 – a review of the results of the Task III deficit analysis; Chapter 3 – a discussion and evaluation of alternative long range plans; and Chapter 4 – a summary of the study along with conclusions and recommendations.

For the purposes of the report, the long-range water supply needs were quantified on the basis of forecasted demands for the years 1994, 2000, 2010 and 2020 under a 1930 drought. Each alternative was evaluated using the KYBASIN model (Ormsbee and Herman, 1996). The model was used to identify the reduction in water supply deficits associated with each supply alternative. The cost of each alternative was then determined using "reconnaissance level" costs developed as part of this study.

Potential supply alternatives were sub-divided into two major categories: 1) demand-side alternatives and 2) supply-side alternatives. Demand-side alternatives included those alternatives where future water supply deficits were reduced or managed through either long-term conservation pricing or short-term demand (drought) management strategies. Supply-side alternatives included those alternatives where future supply deficits were met through the development of additional water supplies. It was determined that the overall water shortage problem in the Kentucky River Basin could not be solved through conservation or demand management alone, but would require the implementation of some type of supply-side alternative.

Three major categories of supply alternatives were considered. These included main-stem alternatives, off-stem reservoirs and a treated water pipeline from Louisville to Lexington.

In order to reduce/eliminate the deficit for the lower basin (Pools 2-8), three separate options were considered, including: 1) short-term demand management; 2) relaxation of the minimum flow requirements; and 3) installation/rehabilitation of low-level release valves in dams 4-8. Based on an evaluation of the alternatives, it was recommended that the deficits in Pools 2-8 be eliminated by construction of low-level release valves in dams 4-8.

An evaluation of the impact of the installation/rehabilitation of low-level valves in dams 9-14 revealed that the 2020 high-demand deficit of 7.0 (in Pools 9-14) could be reduced to 3.0 billion gallons. The remaining deficit of 3 billion gallons could be addressed

through five separate strategies, including 1) demand management; 2) installation of temporary crest gates on dams 9-14; 3) construction of a new dam at Lock and Dam Site 8; 4) construction of one or more off-stem reservoirs; and 5) construction of a treated water pipeline from Louisville to Lexington. From an economic perspective, the construction of valves in dams 9-14 along with the construction of temporary crest gates was found to be the best water-supply alternative. The second most economically viable option was the construction of an off-stem reservoir. Either alternative completely eliminated the remaining 3 billion gallon deficit.

Based on the results of this study, the following overall recommendations were made:

1.) Provide inter-pool release capabilities for Pools 4-14.
2.) Determine an effective operational policy for such facilities by considering the environmental impacts associated with their operation.
3.) Provide supplemental supply augmentation for Nicholasville by lowering the raw water intake (if necessary).
4.) Select a secondary water supply alternative from the following: temporary crest gates or permanent raising of dams 9–14, off-stem reservoirs, treated water pipeline from Louisville to Lexington and main-stem dam at Lock and Dam 8.
5.) Utilize demand management to supplement the selected water supply alternative.
6.) Continue to work toward the development of a drought management plan for implementation prior to completion of adequate water supply facilities.

The conclusions of this report were inherently dependent on deficit projections made using the KYBASIN model. Variations in the KYBASIN model assumptions could increase or decrease the deficit projections by 1 to 2 billion gallons. In addition, reliance on the valve alternative for elimination of the majority of the deficit was dependent on an assumption that it would not result in adverse environmental impacts. Finally, more detailed studies of any selected plan would be necessary to finalize the selection of the optimum location and size of facilities, evaluate the potential environmental impact, optimize the engineering design of the facilities and determine the associated financial and political feasibility.

Task V Report – Estimation of the Responsiveness of Water Use to Changes in Rates: A Methodology and Final Estimates Using KAWC Data

This report analyzed the impact of changes in water and sewer rates on aggregate water use by Kentucky American Water Company (KAWC) customers from 1970 to 1993. For this estimation, researchers used a slightly modified version of the same econometric model developed to forecast use of the entire Kentucky River Basin.

Estimates based on the model showed that increases in water rates lead to statistically and economically significant changes in water use. "Elasticities" measure changes in use in percentage terms, thus, price (or rate) elasticity is simply the percentage change in (per capita) water use with respect to a given percentage change in rate. In this report, elasticities for water use with respect to water rates were estimated to be approximately -

0.69 for peak use, -0.30 for off-peak use and -0.43 for the entire year. Thus, the response of water users to water rates was found to be especially noticeable during the summer months of peak demand.

3.1.3 *Feasibility and Environmental Assessment for Providing Additional Storage at Kentucky River Locks and Dams 8-14* (HARZA, 1996)

This study was conducted in order "to develop and evaluate alternative measures to increase water supply storage and minimize the effects of major droughts on water supply in the Kentucky River basin." Specifically, for Locks and Dams 8-14, it examined alternative methods of raising the dams up to four feet and using the water stored in the four feet below the existing dam crests. These alternatives were identified as short-range improvements by the Kentucky River Basin Steering Committee following Harza's prior 1990 study.

It was found that the amount of water available within the four feet below the dam crests approximates the amount of water that could be made available by raising the dams. Approximately 3.7 billion gallons, or 40 percent of the expected water supply deficit in the event of a 1930 drought, would be made available. In addition, the cost of accessing this water was much less than the cost of raising the dams. In order to access the water, measures must be in place to transfer water from upstream to downstream pools when water levels are below the dam crests.

By raising the dams four feet, an additional 3.8 billion gallons would be made available. Various approaches to raising the dams were evaluated, including permanent fixed increases, various types of gates, flashboards and bulkheads and combinations of these measures. The fixed crest alternative was shown to be the least expensive, but had the greatest potential environmental impact since it would result in a permanent year-round increase in the normal pool levels. The gated alternatives are the most expensive, but minimize potential impacts since they would only be raised during low flow periods. The study recommended that the Authority implement the hydraulically operated hinged steel crest gate alternative for raising the dams.

Based on the findings of potential water storage increases and associated cost estimates, the following sequence of recommendations was made in the report:

1) Develop storage below dam crests (Pools 9, 10, 13 and 14)
2) Lower Beattyville and Nicholasville intakes (Pools 14 and 8)
3) Raise Dam 10
4) Raise Dam 9
5) Raise Dam 14
6) Raise Dam 13
7) Raise Dam 11 (following further study of potential impacts to agricultural fields)
8) Raise Dam 12 (following further study of potential impacts to agricultural fields)

3.1.4 *Kentucky River Modeling and Monitoring Needs Assessment* (KWRI, 1998)

In this report, three basic monitoring responsibilities of the Kentucky River Authority were identified: planning, operations and management. The report characterized all data currently available for use in supporting these functions, including streamflow, rainfall and water quality data. An attempt was then made to identify additional data needs. As a guide to satisfying these data needs and implementing a comprehensive monitoring network, the report provided a prioritization of proposed monitoring stations. By developing and implementing such a monitoring network, additional data could be collected on a continuing basis so as to provide a framework from which the Kentucky River Authority could make informed and scientifically-based operations and management decisions.

3.1.5 *Kentucky River Basin Water Quality Assessment Study* (KWRI, 1998)

This reports documents the procedures and results of the KWRRI Kentucky River Water Quality Assessment Study, which was authorized by the Kentucky River Authority in 1997. The major tasks of the study included:

1) Develop water quality model of the Kentucky River system.
2) Identify and access existing sources of data.
3) Characterize biological impacts during low flow periods.
4) Test the developed water quality model with existing data.
5) Identify additional data needs and develop a monitoring network proposal.

Specifically, this report summarizes the work associated with the development, calibration and application of the CE-QUAL-W2 (Cole and Buchak, 1994; Corps of Engineers, 1990) water quality model to the Kentucky River. The primary objective of applying this model to the Kentucky River was to assess the impact of the operation of low-level control valves on the water quality of the river. This was accomplished by modeling the impact of the valves for low flow conditions associated with the 1930 drought of record along with demand projections for the year 2020. The results of the study indicated that for the modeled scenario, the proposed valves can be used to draw down the individual pools on the Kentucky River by at least four feet without causing significant chronic or acute impacts to the biota of the river.

3.1.6 *A Review of Research on the Kentucky River Ecosystem: Biota and Human Impacts* (Waltman R.M. and R. Jan Stevenson, 1998)

This report was prepared for the Kentucky River Authority as a part of the "Development of a Water Quality Model for the Kentucky River: Preliminary Identification of Basin Monitoring Needs." Its purpose was to supply relevant information for the development of a model to characterize biological impacts during low flow periods in the mainstem of the Kentucky River.

Specific communities susceptible to the alteration of the natural flow regime included decomposers, benthic organisms and pelagic organisms. Through this study, critical values for temperature and dissolved oxygen in relation to fish, and for dissolved oxygen in relation to macroinvertebrates, were identified in order to develop a dynamic model of the Kentucky River Ecosystem.

3.1.7 *Summary Report: 1999 Kentucky River Watershed Watch Data Collection Effort* (KWRI, 1999)

This report summarizes the results of the 1999 volunteer water quality sampling effort in the Kentucky River Basin. The Kentucky River Authority provided funding in support of the Kentucky River Watershed Watch monitoring network, and the Kentucky Water Resources Research Institute produced the annual summary report.

Sampling occurred at 93 separate sites across the basin at three different times for three main groups of parameters: herbicides/pesticides, pathogens, and nutrients and metals. In addition, basic physical parameters (temperature, pH and dissolved oxygen) were also sampled. In general, the observed impacts associated with the measured herbicides and pesticides were minimal. In addition, dissolved oxygen readings were above a minimum threshold of 5 mg/L for nearly all cases. High fecal counts were observed in the North Fork of the Kentucky River and in both the North and South Forks of Elkhorn Creek, as well as Clear Creek, Town Branch and Jessamine Creek. The main nutrient of concern was phosphorus, which appeared in significant concentrations in both the North and South Forks of Elkhorn Creek and in Jessamine Creek. Significant metal concentrations were observed at three different sites on the Eagle Creek East Fork, North Fork of Kentucky River and Benson Creek.

It was recommended that, for at least the next two years, additional synoptic sampling be conducted in the headwater basins, while more frequent sampling is conducted at a smaller set of focused sites and for fewer constituents in the lower basins.

3.1.8 *1998-1999 Monitoring Strategy: Kentucky River Basin Management Unit* (KWRI, U.K. Dept. of Civil Engineering and KDOW, 2000)

During the fall of 1997 and spring of 1998, more than 30 organizations and agencies provided input for the development of a monitoring strategy for the Kentucky River Basin under the Kentucky Watershed Management Framework. The intent of the coordinated planning process was to carefully consider agency resources and capabilities, taking into account where and when each was conducting field work, in order to make the best use of available resources and collect the best information at the least cost. The coordinated planning effort was to take a multimedia approach by considering surface water and groundwater, water quality and quantity, biology, toxicity, fish tissue and sediment. Six overall objectives were to be met in developing the basin monitoring plan. These were:

1) Describe current conditions.
2) Characterize the impacts of predominant land uses.
3) Characterize least-impacted streams.
4) Meet sampling requirements for TMDL determinations.
5) Analyze trends.
6) Characterize groundwater/surface water interaction.

This report provides a summary of the strategic monitoring plan and the results associated with the 1997-1998 sampling effort in the Kentucky River Basin. It describes a standard set of water quality parameters and sampling regimes which were designed around types of land use/land cover to enable maximum utilization of programmatic resources and the best characterization of water quality.

3.1.9 *Summary Report: 2000 Kentucky River Watershed Watch Data Collection Effort* (KWRI, 2000)

This report summarizes the results of the 2000 volunteer water quality sampling effort in the Kentucky River Basin. The Kentucky River Authority provided funding in support of the Kentucky River Watershed Watch monitoring network, and the Kentucky Water Resources Research Institute produced the annual summary report.

The sampling effort was conducted so as to be consistent with the scientific study plan developed by the Kentucky River Watershed Watch scientific advisory board, which describes monitoring objectives, methods, parameters, quality assurance and data management. Sampling occurred at 140 different sites across the basin. Sampling parameters assessed in the report include temperature, dissolved oxygen, conductivity, pH, fecal coliform, nutrients, herbicides, pesticides and metals.

In general, the observed impacts associated with the measured herbicides and pesticides were minimal. In addition, dissolved oxygen readings were above a minimum threshold of 5 mg/l for nearly all cases. High fecal counts were observed in the North Fork of the Kentucky River and in both the North and South Forks of Elkhorn Creek, as well as Clear Creek, Hickman Branch and Jessamine Creek. This finding was consistent with sample results from previous years.

The main nutrient of concern was phosphorus, which appeared in significant concentrations in both the North and South Forks of Elkhorn Creek and in Jessamine Creek. Significant metal concentrations were observed at several sites. Two of the sites had maximum metal concentrations in multiple categories: Hickman Creek, south of Nicholasville and Lotts Creek.

Following this fourth year of monitoring by the Kentucky River Watershed Watch sampling program, it was again recommended that additional synoptic sites be established in the headwater basins, while more frequent sampling be conducted at a smaller set of focused sites and for fewer constituents in the lower basins.

3.1.10 *Summary Report: 2001 Kentucky River Watershed Watch Data Collection Effort* (KWRI, 2001)

This report summarizes the results of the 2001 volunteer water quality sampling effort in the Kentucky River Basin. The Kentucky River Authority and Eastern Kentucky PRIDE provided funding in support of the Kentucky River Watershed Watch monitoring network, and the Kentucky Water Resources Research Institute produced the annual summary report.

The sampling effort was conducted so as to be consistent with the scientific study plan developed by the Kentucky River Watershed Watch scientific advisory board, which describes monitoring objectives, methods, parameters, quality assurance and data management. Sampling occurred at 144 different sites across the basin. Sampling parameters assessed in the report include temperature, dissolved oxygen, conductivity, pH, fecal coliform, nutrients, herbicides, pesticides and metals.

Dissolved oxygen readings were above a minimum threshold of 5 mg/l for nearly all cases. High fecal counts were observed in the North Fork of the Kentucky River, as well as in Clear Creek, Hickman Branch and Jessamine Creek. Focused fecal sampling in Breathitt County revealed continued significant impacts from straight pipes.

An evaluation of the nutrient results revealed that the main nutrient of concern was phosphorus, which appeared in significant concentrations in Jessamine Creek. Significant metal concentrations were observed at several sites. Five of the sites had maximum metals concentrations in multiple categories: Hickman Creek, south of Nicholasville; Muddy Creek, Army Depot in Union City; Black Spring, tributary of Clear Creek; Lost Creek; and Beech Fork, at Stone Coal Branch.

3.1.11 ***Impact of Raising Crest-Level of the Dam on North Fork Kentucky River in the Vicinity of Hazard Raw-Water Intake Tower*** (U.K. Dept. of Civil Engineering, November 2001)

Due to increasing water demand, the City of Hazard planned to expand its water treatment plant capacity. The raw water source for the Hazard plant is a pool formed on the North Fork of the Kentucky River by a low-level dam located a short distance (approximately 500 feet) downstream of its water intake structure. In order to insure adequate water supply during drought conditions, Hazard was considering increasing pool storage on the North Fork by raising the existing dam an additional two feet. The Kentucky River Authority, which oversees the North Fork of the Kentucky River, contracted with the University of Kentucky to perform a hydraulic modeling study to assess the potential floodplain impact of raising the dam.

Researchers at the University of Kentucky evaluated the impacts of raising the dam on 10-year, 50-year and 100-year flood water profiles. Varying profiles were computed by raising the dam's crest level by 8 feet above its existing height at 1-foot intervals. The well-established modeling tool, HEC-RAS, was utilized to compute the water surface profiles. All necessary data for the study was provided by the Kentucky River Authority.

The stream reach modeled in the study covered a length of 14.25 miles of the North Fork, from the upstream side of Raccoon Branch to the downstream side of Lick Branch. It was found that the greatest increase in water surface elevation was 2.7 inches, which resulted from an 8-foot increase in the crest level of the dam during a 100-year flood event. Corresponding values for 50-year and 10-year flood discharges were 3.2 inches and 4.5 inches, respectively. An increase in dam height of only 2-3 feet resulted in much more moderate increases in water surface elevation, ranging from 0.5 to 0.9 inches.

Guidelines established by the Federal Emergency Management Agency (FEMA) normally do not permit any increases to the 100-year floodplain water surface elevation as a result of changes or development within the floodplain. However, the Kentucky Division of Water may provide a waiver in cases involving increased water storage, as long as the increase in 100-year floodplain water surface elevations is negligibly small.

Considering Hazard's necessity for increased raw water storage and the minor increase in water surface elevation associated with raising the dam by two feet, the study recommended that Hazard file for a permit to increase the height of the dam. A request to waive the FEMA guidelines should be based on the HEC-RAS results of this study.

3.1.12 *Kentucky River Basin Management Plan* (KWRI, April 2002)

The *Kentucky River Basin Management Plan* was prepared for the KRA by the University of Kentucky – Kentucky Water Resources Research Institute. It is a product of the activities associated with the first cycle of the Kentucky Watershed Management Framework, a dynamic, flexible structure for coordinating watershed management across Kentucky. Through this framework, watershed data are analyzed at five-year intervals, and watershed planning is expanded and improved in each cycle. Existing state and local programs are connected through the geographic focus of the watershed, promoting comprehensive efforts mobilized around managing these watersheds.

The Management Plan presents information and priorities identified in the first Kentucky River basin cycle (1997 – 2002), and sets forth priorities for activities during the second cycle. The document is divided into two major sections, entitled *Management Plans* and *Watershed Summaries by Region*. The first section provides Watershed Management Plans for the three priority watersheds in the basin—the Red River Gorge Watershed, the South Elkhorn Creek Watershed and the Eagle Creek Mouth Watershed. This section also summarizes Program Management Plans, which describe how activities of partner agencies will be coordinated during the second basin cycle scheduled to take place from July 2002 to July 2007. The *Watershed Summaries* describe relevant conditions in each of the basin's 97 watersheds, providing descriptive information (geography, waterways, land and water use and agency data assessment), results of framework rankings, highlights of critical issues and activities, diagrams of the watershed's position in the basin and related maps. The Management Plan can be viewed in its entirety at the website address http://www.uky.edu/WaterResources/Watershed.

3.1.13 *Summary Report: 2002 Kentucky River Watershed Watch Data Collection Effort* (KWRI, 2002)

This report summarizes the results of the 2002 volunteer water quality sampling effort in the Kentucky River Basin. The Kentucky River Authority provided funding in support of the Kentucky River Watershed Watch monitoring network, and the Kentucky Water Resources Research Institute produced the annual summary report.

The sampling effort was conducted so as to be consistent with the scientific study plan developed by the Kentucky River Watershed Watch scientific advisory board, which describes monitoring objectives, methods, parameters, quality assurance and data management. Sampling occurred at 165 different sites across the basin. Sampling parameters assessed in the report include temperature, dissolved oxygen, conductivity, pH, fecal coliform, nutrients, herbicides and metals. Based on the findings of the 2002 report, ten of the most impacted streams are listed in the following table.

2002 KRWW Ten Most Impacted Streams

Stream	County	Pollutants
Ten Mile Creeek	Grant	High conductivity/sulfate
Dreaming Creek	Madison	High metals, nitrogen, phosphorus
Town Branch/Wolf Run	Fayette	High nitrogen, phosphorus, fecals
South Fork Elkhorn Creek	Fayette, Woodford, Scott	High metals, nitrogen, phosphorus
Clarks Run	Boyle	High metals, nitrogen, fecals
Muddy Creek	Madison	High metals, fecals
West Hickman Creek	Jessamine	High fecals
Jessamine Creek	Jessamine	High fecals
Silver Creek	Madison	High fecals
Clear Creek	Woodford	High fecals

3.2 U.S. Army Corps of Engineers

3.2.1 *Review Report on Kentucky River and Tributaries for Flood Control and Allied Purposes* (USACOE, 1958)

This report addressed the advisability of improvements to the Kentucky River and its tributaries for flood control and other compatible purposes, and the improvement and expansion of the navigation system. In conducting the survey, the Corps held two public hearings and consulted various federal, state and local agencies.

The report describes existing and authorized Corps of Engineers' flood control projects, including one that had been completed, one under construction and three that had been authorized:

1) The "Jackson local protection project," located on the North Fork of the Kentucky River in Breathitt County, involved a 150-foot cutoff channel to reduce the 100-year frequency flood height by five feet. Construction of the channel was completed in October of 1956.
2) The construction of Buckhorn Reservoir had begun on the Middle Fork of the Kentucky River, about one-half mile upstream of Buckhorn. The reservoir was planned to provide flood control, as well as low flow increases in summer months.
3) Although construction had not yet begun, three additional flood control projects had been authorized by the Flood Control Act of 1938 for the Kentucky River Basin: the Jessamine Creek Reservoir on the main stem, the Booneville Reservoir on the South Fork and the local protection project at Frankfort. Under the Flood Control Act of 1944, the two planned reservoirs were also authorized for expansion to provide for hydroelectric power in combination with flood control.

During one of the public hearings, considerable opposition was expressed over the proposed construction of the Jessamine Creek dam. Representatives of the Kentucky Historical Society were concerned that the resulting reservoir would inundate

Boonesboro, the site of the first white settlement west of the Appalachian Mountains. Others were concerned that the scenic value of the Kentucky River would be diminished.

Further to these projects, twenty-five dam sites were investigated for flood control, water supply, low-flow regulation and pollution abatement in the Kentucky River Basin. Several channel improvement and local protection projects were also investigated. Additional studies were conducted to determine the advisability of improving the current navigation system on the Kentucky River and expanding it to the upper tributaries. Factors considered for navigation improvements included existing and potential commerce and potential savings in transportation costs.

In summary, the following recommendations were issued in the report:

1) The comprehensive plan for flood control and related purposes in the Ohio River should be modified to include reservoirs on Carr Fork, North Fork near Walkers Creek, Red River and Eagle Creek at an estimated cost to the federal government of $37,598,000.
2) That the existing authority for the Jessamine Creek Reservoir should be disregarded upon authorization of the four recommended reservoirs.
3) That further improvements for navigation on the Kentucky River and its tributaries not be conducted at this time, due to limited prospective benefits to commerce.

In addition to their flood control benefits, the reservoirs at Carr Fork, Red River and Eagle Creek were anticipated to provide recreational benefits. The Carr Fork Reservoir was also expected to provide increased flow in the North Fork of the Kentucky River for the Hazard area. The Red River Reservoir would provide low flow regulation, which would improve water quality, propagate aquatic life and benefit recreational use. Additionally, the Red River Reservoir was cited as a source of future water supply for communities below the mouth of the Red River currently using the main stem of the Kentucky River as a source (i.e., Winchester, Lexington, Harrodsburg and Frankfort).

The Appendices of this report contain further details about the Kentucky River Basin's hydrology and flood control studies and include multiple flood profile curves, stage frequency curves and dam outlet discharge rating curves.

3.2.2 *Metropolitan Lexington Urban Study: Water Resources Analysis* (USACOE, 1978)

This report summarized the study area's water resource problems and needs, outlined water resource objectives and assessed the impacts of alternatives. In doing so, it identified a range of water resource alternatives for local consideration. Focus areas of the report included 1) flood control and flood plain management; 2) water related recreation; 3) water supply; 4) wastewater management; and 5) sludge management.

The section on water supply projected water supply demands for the 50-year planning period (1980-2030), based on high and low population projections. Due to hydrologic characteristics, the present location of water supply service areas, and the identification of existing and future water demand/supply relationships, the study area was divided into three segments: 1) Kentucky River, downstream of Dix River confluence; 2) Kentucky River, upstream of Dix River confluence; and 3) secondary tributaries which are used as a supply source for communities in the study area. It was determined that existing and future water demands downstream of the Dix River confluence could be met by the sum of the combination of flows from uncontrolled basin runoff, navigation lock leakages, municipal sewage treatment discharges and Dix Dam leakage. Thus, alternative water supply sources were not necessary for this segment of the Kentucky River. For water suppliers upstream of the Dix River, it was determined that in order to meet future demand during 1930 drought conditions, pool drawdown would expose some of the water intakes. Therefore, it was concluded that supply alternatives would need to be developed for this segment. Of the communities using secondary tributaries for water supply, four were found to be in need of supplemental supply storage in order to meet future demand. These communities requiring supplemental storage included Paris, Millersburg, North Middletown and Georgetown.

3.2.3 *Special Report: Water Supply Alternatives to Red River Lake* (USACOE, 1978)

This report presented a general overview of the future water supply needs and potential alternatives for central Kentucky, including Red River Lake. The primary study area included communities which used the Kentucky River as their primary water supply source and would have benefited from water storage at the proposed Red River Lake. These communities included Clay City, Frankfort, Harrodsburg, Lancaster, Lawrenceburg, Lexington, Nicholasville, Owenton, Richmond, Stanton, Versailles, Wilmore and Winchester. In order to best evaluate all water supplies available to those in the primary study area, the entire Kentucky River Basin was considered as a secondary study area. Further, areas outside the basin were considered for interbasin transfer of water supplies that could meet the needs of the primary study area.

Two different population projections were used to estimate water demand for a 50-year planning period. Population projections calculated by OBERS (Office of Business Economics Research Service) were generally significantly lower than those made by Spindletop Research. This resulted in two significantly different projections for the 2030 water demand during 1930 drought conditions. However, water supply alternatives were considered in relation to their ability to meet demands of either or both projections.

Both demand-side measures to reduce water consumption and supply-side measures to provide additional water supplies were evaluated in the study. Although demand reduction through water pricing strategies, reuse and conservation was predicted to potentially reduce consumption by 20 percent, future demands would still exceed available supplies. Such measures were, however, included as components in combination with other supply-side alternatives.

Supply-side measures were categorized as meeting demands of the individual community or regionally. Alternatives considered for individual communities included independent reservoirs requiring the construction of a new treatment plant facility and reservoirs that would supplement flows in the Kentucky River near each community's existing water supply intake. Regional alternatives included utilization of Kentucky River pool storage, interbasin water transfer, groundwater sources, reallocation of water storage in existing multi-purpose reservoirs and new impoundments. Economically, the regional alternatives were found to be more cost-effective for the communities being studied.

Based on an evaluation of water demand through 2030 and a 1930 drought reoccurrence, it was determined that the study communities of Lancaster, Lexington, Nicholasville, Richmond and Winchester would need additional water supply storage. It was concluded that two major components could provide for the storage needs. The region could utilize 2½ feet of the 6 feet of authorized navigational pool storage between Lock and Dam 8 and Lock and Dam 14. In addition, the construction of a reservoir on Station Camp Creek would provide water storage of 16,000 acre-feet. The cost of these two plan elements was estimated to be $6.1 million. Further studies were recommended to refine economic data and integrate social and economic considerations for the plan.

3.2.4 *Interim Report Kentucky River and Tributaries: Station Camp Creek, Kentucky Reconnaissance Report, Volumes 1-3* (USACOE, 1988)

This report was requested due to continuing flood damage problems, minor water supply problems and concerns over future water shortages in the Station Camp Creek watershed. The U.S. Corps of Engineers conducted studies of Station Camp Creek for a multipurpose reservoir that could meet the areas' water supply, flood control and recreation needs.

Station Camp Creek is a fifth-order stream formed by the confluence of South Fork Station Camp Creek and War Fork in Jackson County, Kentucky. Over one-half of the 217 square miles of Station Camp Creek watershed lies within the Daniel Boone National Forest. Most of the basin is heavily forested, although significant agricultural development exists in the floodplain of the lower 15 miles of the Station Camp Creek channel.

The first step in determining the feasibility of a reservoir was selecting an initial dam site for evaluation and developing cost curves for a range of storage capacities. Then, current and projected flood reduction, water supply, recreation and hydropower needs were determined and the potential for the site to meet the needs ascertained. The results of these evaluations were used to develop a cost allocation analysis and determine economic feasibility.

To minimize environmental impact, a proposed dam site was chosen at river mile 11.8 on lower Station Camp Creek. A design and cost estimate study analyzed a variety of pool configurations and construction methodologies.

In order to be considered for federal support, a water supply project cannot be deemed a single-purpose water supply project. National policy assigns the financial burden for municipal and industrial water supply to the users, municipalities or other non-Federal entities. An exception is made for a project where at least ten percent of the anticipated benefits are attributable to flood control, navigation and/or agricultural water supply (or National Economic Development). The Station Camp Creek study determined that less than 10 percent of the anticipated benefits for the reservoir were attributable to flood control, navigation and/or agricultural water supply. Based on the conclusions of the report, it was determined that the Corps of Engineers would no longer consider the proposed Station Camp Creek dam.

3.2.5 *Reconnaissance Level Cost Estimate Data* (USACOE, 1990)

As authorized by the Water Resources Department Act of 1974, the Kentucky Department of Natural Resources and Environmental Protection Cabinet requested this study from the U.S. Army Corps of Engineers for fiscal year 1990. The title of the request was the "Central Kentucky Water Supply Study."

Costs were estimated for a list of priorities that were selected by Harza Engineering Company, a consulting engineer previously hired by the Kentucky River Basin Steering Committee. These projects related to the construction of new locks and dams on the upper Kentucky River.

The following table summarizes the 34 alternative projects for which cost estimates were provided.

Lock and Dam #	Dam Only	Lock and Dam	# of Pool Levels Considered	# of Cost Estimates
5	Yes	Yes	2	4
8	Yes	Yes	2	4
9	Yes	Yes	3	6
10	Yes	Yes	2	4
Pool of 10	Yes	Yes	2	4
11	Yes	Yes	2	4
Pool of 12	Yes	Yes	2	4
14	Yes	Yes	2	4

The Corps' cost estimates were to be assessed by order of magnitude only (preliminary reconnaissance estimates), and more detailed study was recommended. However, the cost estimates were intended to be of assistance in narrowing down the range of water supply alternatives under consideration. The study's resulting reconnaissance level estimates ranged from $17 million for a new dam only at Lock and Dam 8 to $134 million for a new, higher Lock and Dam 9.

3.2.6 *Kentucky River Survey: Rehabilitation Study for Locks and Dams 5 through 9* (USACOE, 1997)

The purpose of this study was to perform inspections on Kentucky River Locks 5-9 and identify features that were in need of repair in order to restore operation of the locks. The preliminary designs, repair sequence and cost estimates were prepared as a result of these inspections.

A list of general and specific repair items were compiled and prioritized based on their importance to restoring lock operations. General tasks outlined in the repair recommendation included dewatering of the locks, installation and/or rehabilitation of gate valves, replacement of miter gate components, repair of lock walls, and miscellaneous repairs identified after the locks are dewatered.

Cost estimates were developed based on the assumption that work on Locks 8 and 9 would be completed in 1998 and work at Locks 5, 6 and 7 would be performed in 1999.

3.2.7 *Upper Kentucky River Basin, Kentucky: Reconnaissance Phase Water Resources Study* (USACOE, 1997)

In the 1996 Energy and Water Appropriation Bill, the Corps of Engineers was directed to conduct a reconnaissance level study that addressed the potential for reallocating water storage in existing Corps lakes (Carr Creek Lake) and other alternatives, in order to meet increasing water supply needs in the Upper Kentucky River Basin. Specifically, the area of concern included the three uppermost counties of Knott, Letcher and Perry in the North Fork Kentucky River Basin.

Although the primary focus of the study was the water supply reallocation of Carr Creek Lake storage, secondary objectives included the consideration of an alternate single-purpose water supply impoundment and a regional water treatment plant and distribution lines.

The study was based on water needs through the year 2020, when most, if not all, of the systems under consideration would have difficulty meeting needs during a severe and prolonged drought. It was determined that the service area would require approximately 10 million gallons per day (mgd) by 2020 in order to serve the current service area, as well as the rural unserved area.

Two alternatives were considered for supply storage—Carr Creek Lake and a potential impoundment on Line Fork. Each of these alternatives would be used to provide supplemental flows to the North Fork Kentucky River. The estimated cost of providing the flows from Carr Creek Lake was $40 million, and the cost estimate for the Line Creek impoundment was estimated to be $32 million. However, the Carr Creek Lake option is less costly for combined releases and river flows of up to 12 mgd, and the Line Creek option is more cost effective for flows greater than 12 mgd. As long as slight losses in recreation and flood control are acceptable, the Carr Creek Lake option appeared to be the preferred choice.

In order to treat water from either of these alternatives, a regional water treatment plant on the North Fork Kentucky River, downstream of Line Fork and Carr Fork, was considered. The initial plant capacity would be 5 mgd and cost approximately $11.2 million, with the ability to expand the plant to treat 10 mgd for an additional estimated cost of $5.2 million (1996 dollars). Transferring the water to existing water systems in the three-county area would require about 70.2 miles of water lines at an approximate cost of $37.1 million. A preliminary estimate of $112 million was made for constructing rural water lines to currently unserved areas.

In order to request any amount of water supply storage affecting authorized purposes of Carr Creek Lake, applicants were directed to submit a report providing detailed

information on related costs and impacts. The appropriation of this storage allocation would then require Congressional approval.

3.3 Kentucky Office of the Attorney General

3.3.1 ***An Evaluation of Kentucky American Water Company's Long-Range Planning*** (Tellus Institute, 1994)

The Kentucky Office of the Attorney General's Utility and Rate Intervention Division retained The Tellus Institute to evaluate the demand management and water supply planning activities of the Kentucky-American Water Company. This review resulted from the Attorney General's intervention in *An Investigation of the Sources of Supply and Future Demand of Kentucky-American Water Company*, Kentucky Public Service Commission Case No. 93-434.

The areas of Tellus' investigation included the planning process, demand forecasting, demand-side management programs, supply assessment, integration of supply and demand, and pricing, metering and rate design. The review was ultimately designed to answer two main questions:

1) Is KAWC using reasonable and prudent programs and methods to cost-effectively plan for the future water supply needs of its customers?

2) Is the proposed pipeline needed and cost-effective in comparison to other reasonably available alternatives?

The study noted that KAWC had ample water supply to meet its average day demand through the year 2020, as well as for the maximum day of the year under normal conditions. The uncertainty was with KAWC's ability to serve its maximum day demand under extreme weather conditions, particularly during a severe and prolonged drought.

Among Tellus' concerns with KAWC's approach were the following:

1) KAWC never quantified the risk of extreme weather. Information is needed to determine if the cost of alleviating the problem bears a reasonable relationship to the benefits achieved.
2) Given the potential shortage during extreme drought conditions, it was expected that the company would plan for peak management or emergency response, rather than the construction of major baseload facilities. Options to the pipeline included conservation programs, rate structure changes designed to reduce peak demand, drought emergency measures, more rigorous examination of other purchased water alternatives and the upgrading of Kentucky River facilities. The KAWC's chosen supply alternative, the pipeline to the Louisville Water Company, was very expensive—for the cost of the treated water, as well as for the construction of the pipeline.
3) The company's demand model did not factor in their increase in water rates resulting from the high cost of constructing the pipeline.

4) The public should have been more involved in this type of long-term planning. Further, KAWC did not integrate supply and demand options into a consistent framework, and dismissed less expensive conservation options in favor of the more costly pipeline proposal.

Given these findings, Tellus concluded that KAWC failed to successfully meet several aspects of the planning process and ultimately failed to develop a course of action which provided cost-effective, reliable service for its customers. Therefore, Tellus recommended that the Kentucky Public Service Commission instruct KAWC to conduct a more thorough, integrated analysis of its water service options.

3.4 Kentucky American Water Company

3.4.1 *Kentucky River Aquatic Study* (Environmental Science & Engineering, 1991)

In 1990, the Kentucky-American Water Company (KAWC) contracted Environmental Science & Engineering, Inc. (ESE) to conduct a water quality/biota study of the Kentucky River Basin. The study area was the set of pools located between Lock and Dam #10 and Lock and Dam #4 (Pools 9 through 4). This stretch is the most populated 111 miles of the main stem of the river. ESE focused on the effect that low-flow scenarios (those below the 7Q10 flow) would have on water quantity, water quality, recreational users, downstream users and aquatic life.

The ESE study implemented the use of a dynamic water quality model developed by the U.S. Army Corps of Engineers called the Water Quality for River-Reservoir Systems (WQRRS). Due to the lack of historical information, much of the data for the ESE study was manufactured, and calibration relied heavily on the recommended coefficients of the manual. Available data that was used included United States Geological Survey (USGS) river stage and flow for locks and dams 4, 6 and 10.

The ESE Kentucky River Aquatic Study provided three main recommendations. The first recommendation was that the water quality in Pools 9 and 6 be monitored when the flow rates of Pools 10 and 6 fall beneath 150 cfs. In particular, temperature and dissolved oxygen measurements should be collected. The second recommendation was that the stage at Pool 9 should be continuously monitored, possibly through the installation of a gaging station at Lock and Dam #9. Thirdly, the report recommended that a low-flow assessment on large aquatic animals be performed. The ESE water quality report concluded that the KAWC withdrawal permit for Pool 9 could be increased from 55 mgd to 62 mgd without significantly impacting the biota of the river during short-term, low-flow conditions (i.e., 7Q10 flows for less than 30 days).

3.4.2 *Source of Supply/Safe Yield Study* (HARZA, 1992)

This study was performed for the Kentucky-American Water Company (KAWC) by HARZA Engineering Company in order to evaluate the safe yield of the Kentucky River

for the KAWC intakes in Pool 9 of the river. The safe yield was determined by simulating the operation of the Kentucky River system for the 1930 drought as adjusted for current conditions in the basin. The safe yield was defined as the maximum flow rate that could be sustained during the period when projected demands for the year 2020 could not be met. In computing the safe yield, the leakage through all locks and dams was assumed to be 50 cfs. In addition, it was assumed that the water stored in the pools was available for use and that minimum release requirements would not be met whenever pool water levels were below the crest levels. However, demands for Kentucky-American were reduced to the safe yield level during the time period that the projected demands could not be met. Under these conditions and assuming the 7Q10 requirement at Pool 9 to be 120 cfs, a safe yield of 35 MGD was determined.

3.4.3
Kentucky River Pool 9 Capacity Study (GRW Engineers, 1993)

Report not available.

3.5 Kentucky River Basin Steering Committee

Following the drought in of 1988, Lexington Mayor Scotty Baesler formed the Kentucky River Basin Steering Committee to address the perceived water supply problem in central Kentucky. The outcome of the Committee's discussions was a list of potential water supply alternatives that could be further evaluated by an engineering and consulting firm.

3.5.1 *Proceedings of the Kentucky River Basin Technical Advisory Committee: Alternative Evaluation Workshop (1989)*

The Technical Advisory Committee was formed to assist decision-making by the Kentucky River Basin Steering Committee. In this capacity, the Technical Committee conducted a workshop at the Carnahan House in Lexington, Kentucky, to evaluate the major alternative categories proposed for dealing with the regional water supply problem. The alternative categories included: [1)] Pool Storage (on-river storage), [2)] Release Storage (tributary storage), [3)] Off-Site Storage (single community reservoirs and pump storage), [4)] Interbasin Transfers and [5)] Conservation. The goal of the workshop was to identify the advantages and disadvantages of each category, as well as provide a list of critical data needs for use in preparing Requests for Proposals.

Discussion during the workshop was summarized in a table format, titled *Outline of Long-Range Water Supply Proposals*. This table lists proposed water supply projects according to the major categories listed above and provides the following types of information: plan description, plan components, and technological, environmental, economic, social and legal impacts (both adverse and beneficial). This information was intended to help the overall Steering Committee in drafting a request for proposals to evaluate selected water supply alternatives which resulted in the selection of Harza

Engineering Company performing a comprehensive water supply study of the Kentucky River Basin.

The Harza study resulted in two separate reports entitled "Phase I Report: Water Demands and Water Supply Yield and Deficit" and "Phase II Report: Development of a Long Range Water Supply Plan." The purpose of the Phase I study was to develop a recommended design drought and design deficit for use in evaluating supply alternatives in the Phase II study.

3.5.2 *Phase I Report: Water Demands and Water Supply Yield and Deficit* (Harza et. al., 1990)

This report identified expected future demands in the region, as well as the resulting deficit for a range of hydrologic conditions including the 1930 drought of record and the 1953 and 1988 droughts.

Daily Streamflows: Daily streamflows in the historical drought periods were computed using flows recorded by the U.S. Geological Survey (USGS) at Kentucky River Locks and Dams 4, 6, 10 and 14. The Harza analysis of historical droughts confirmed that the 1930 drought is the most severe of record with a return period greater than 100 years at all the USGS recording stations within the study area. The 1953 drought is the second most severe with a return period of approximately 100 years at Locks 10 and 14 and a return period of less than 50 years at Lock 6. The 1930 and 1953 droughts lasted for periods of 4 to 6 months. The 1988 drought, although severe, lasted for a relatively short period (2 months). Streamflows for the 1930 historical drought were adjusted for the effects of Carr Forks and Buckhorn Reservoirs and differing levels of municipal and industrial withdrawals and discharges so that consistent sequences of adjusted streamflows were used in the analysis.

Water Demands: Water demands were forecast on a monthly average basis for each of the major municipalities and industries in the study area and combined into the total demand for each pool. A summary of the observed 1990 and forecasted 2050 net demands (withdrawals minus return flows) for the month of August are provided in the following table.

Observed and Forecasted August Monthly Demands (mgd)

Pool	1990 Demands	2050 Demands (Without Conservation)	2050 Demands (With Conservation)
4	8.0	6.7	5.7
5	3.3	3.9	3.3
6	0.8	0.9	0.9
7	- 11.7	- 12.7	- 12.9
8	6.0	6.7	6.0
9	44.8	48.8	42.8
10	2.5	2.6	1.9
11	11.1	11.0	10.2
12	3.2	3.2	3.2
13	0.0	0.0	0.0
14	1.1	1.2	1.1

Water Supply Deficits: Water supply deficits were computed for each of the Kentucky River pools between Frankfort (Pool 4) and Beattyville (Pool 14) for current water demands and for projected water demands through the year 2050. Hydrologic conditions considered included the drought of record (1930), the second most severe drought (1953) and the most recent drought (1988), as well as "statistical" droughts (100-year and 50-year). The effects of a conservation program and a water shortage response plan were developed. A water supply deficit was defined as the difference between the water demand and the water supply when the water supply is less than the demand. In calculating the deficit, Harza included irrigation as one of the major demand types. The following table provides the computed total deficits for Kentucky River Pools 4 through 14 for historical droughts for 1990 and 2050 projected demands.

Simulated Demand Deficits (Billion Gallons)

Drought	Conservation	1990	2050
1930	No	8.1	8.7
1953	No	6.4	7.0
1988	No	1.3	1.2
1930	Yes[1]	5.9	6.5
1988	Yes[1]	1.0	1.2

[1]Assumed a water shortage response program reduces demand during droughts similar to the demand reductions during the 1988 drought. Water shortage response measures were assumed to be in effect for all water users in the basin.

Recommendations: Based on the results of the study, the report recommended that the 1930 year drought be used as the design drought and that the design deficit be 7 billion gallons. The design deficit of 7 billion gallons was found to be the deficit for the 1930

drought for 2050 forecasted water demands with implementation of an effective water shortage response program, rounded upward from 6.5 billion gallons to account for slightly higher forecasted demands in 2020 than in 2050. The Harza report determined that the recommended design deficit was similar to the deficit that would occur for the 100-year drought for 2020 conditions without an effective water shortage response plan.

3.5.3 *Phase II Report: Development of a Long Range Water Supply Plan* (Harza et. al., 1991)

Based on the results of the Phase I report, Harza completed this second study developing, evaluating and recommending a long-range plan to provide for the projected water supply deficits for the various communities/utilities and individuals who depend on the Kentucky River for water supply.

Alternative Plans: Twenty-seven alternative water supply plans were developed and evaluated for the study. All of the plans would provide for the entire projected supply deficit. Major elements of the plans included:

1.) Rehabilitation/reconfiguration of the Kentucky River Locks and Dams;
2.) Small Upstream Reservoirs on Kentucky River tributaries; and
3.) Pipelines from the Ohio River

The Kentucky River plan elements included new dams at existing sites of Locks and Dams, as well as at new sites. Increasing pool water levels by up to 15 feet and the lowering of existing water supply intakes were considered. Small Upstream Reservoir plan elements included dams of 50 to 150 feet in height with storage volumes of 1.2 to 7.0 billion gallons. Ohio River pipelines included pipelines from Maysville and Louisville with capacities of 40 million gallons per day (mgd) to 60 mgd and having lengths of 72 miles to 155 miles. The alternative long-range plans were developed by using single plan elements capable of meeting the entire deficit and by combining smaller elements.

Criteria Evaluation: The supply plans were evaluated based on ten criteria specified by the Kentucky River Basin Steering Committee, including cost, environmental, social and cultural concerns; water quality impacts; legal, administrative and operational concerns; and potential recreational and tourism benefits. The evaluation was carried out using a scoring procedure that weighted the importance of the various criteria and scored each alternative's performance in meeting each criterion. The selection of the recommended plan was based on the ranking of the 27 alternatives on all the prescribed criteria.

Comparison of Alternatives: Long-range water supply plans utilizing dams at the existing or proposed new sites on the Kentucky River scored consistently higher than plans utilizing other elements. Plans utilizing a combination of Kentucky River sites and small Upstream Reservoirs scored slightly lower than those using only Kentucky River sites. Plans utilizing solely Small Upstream Reservoirs ranked third. Plans utilizing pipelines from the Ohio River ranked fourth.

The eleven highest ranked plans utilized new dams on the Kentucky River for all or a part of the required storage. Of these, the five most favorable plans used only the Kentucky River and included between two and four new dams. The highest ranked plan included a new dam at a site between existing Locks and Dams 10 and 11 and a new dam at Lock and Dam 12.

The following table was provided to show a comparison of the estimated present value costs of the alternatives. The first column shows the range of estimated costs of the water storage facilities alone. The second column shows the range of estimated costs including the estimated cost of rehabilitating/reconfiguring the Locks and Dams that are not part of the water storage facilities. The least cost alternative was the development of Small Upstream Reservoirs. A single Small Upstream Reservoir could be developed to satisfy the projected deficit of 7 billion gallons at an estimated present value cost of approximately $111 million, including the cost of rehabilitating or reconfiguring the Kentucky River Locks and Dams not used for water storage purposes. This was approximately $16 million less than the least costly alternative using the Kentucky River Locks and Dams.

Summary Comparison of Present Value Construction and Operation and Maintenance Costs (Costs in Million Dollars)

	Water Storage Plan Elements		Water Storage Plus Rehab/Reconfig of Locks and Dams	
Alternative	Minimum	Maximum	Minimum	Maximum
Kentucky River Dams	$60M	$127 M	$127 M	$180 M
Small U/S Res and L/Ds	$51 M	$82 M	$124 M	$149 M
Small U/S Rservoirs	$29 M	$57 M	$111 M	$139 M
Pipelines and Combinations	$126 M	$163 M	$207 M	$245 M

The Recommended Plan: The recommended long-range water supply plan was to develop two or three new dams on the Kentucky River to store water for use during droughts. The new dams would replace existing locks and dams or would be constructed at new sites. The sites considered most favorable were existing Locks and Dams 10, 11 and 12 and two new sites identified in this report as 10A and 12A, which are in the pools of the existing Locks and Dams 10 and 12. Combinations of new facilities at these sites consistently scored higher than all other alternatives.

The recommended plan was not the least costly alternative. Alternatives based on the Kentucky River were ranked higher than those based on Small Upstream Reservoirs because the Kentucky River alternatives were expected to result in fewer potential environmental, social and cultural impacts. In relation to most other criteria, including legal, administrative, operational and water quality, the alternatives were generally equal.

A key element of the recommended plan was the development and implementation of conservation measures including a water shortage response program as described in the Phase 1 report. If these measures were not implemented, or were ineffective, the water supply deficit for the design drought would exceed the storage capacity of the recommended plan by over one billion gallons.

3.6 Kentucky Geological Survey

3.6.1 *Water Availability Modeling and Analysis of the Kentucky River* (Carey, 1990)

This report provided a preliminary evaluation of water supply in the Kentucky River basin down to and including Pool 5. The evaluation was conducted by using historical streamflow records from Lock 10 (1908-1960) and a computer model of the Locks and Dams, Buckhorn Lake and Reservoir #4 in Lexington.

Conclusions of the report included:

1) Leakages through Lock and Dams 5 and 9 threaten significant water supply shortages in both pools.
2) With reasonable maintenance of the locks and dams, water supplies would be adequate for all users through 2050, except for those in Pool 9. Thus, the demand for water from Pool 9 will require alternative supplies.
3) Alternative #1 – Piping water from Pool 6 to Pool 9: With average lock and dam maintenance (maximum of 34.1 mgd leakage), piping 40 mgd of water from Pool 6 would be required to relieve demand in Pool 9 by the year 2042. With good L&D maintenance (maximum of 16.3 mgd leakage), 20 mgd would be required from Pool 6.
4) Alternative #2 – Surface water reservoir: With average L&D maintenance, 13,800 acre-feet of water storage would be required to meet demand in 2042. With good L&D maintenance, 4,600 acre-feet of storage would be needed.
5) With a reasonable level of L&D maintenance, water supply needs can be met without extraordinary measures. Maintenance of the existing locks and dams, in combination with piping water from Pool 6, would be a feasible alternative to meeting demands with minimal adverse impacts. However, if pool leakage problems are not addressed, it will be difficult to meet water supply needs.

3.6.2 *Water Quality in the Kentucky River Basin* (Carey, 1992)

This report summarized the most recently published information on water quality and related regulations in the Kentucky River Basin. A review of data collected up to 1990 showed that water pollution problems existed throughout the basin. Due to inadequate treatment of municipal wastes, failing septic systems and agricultural runoff, fecal coliform bacteria in stream was a widespread problem. Iron, lead, manganese, mercury and silver were all found to exceed state standards and federal guidelines for drinking water and aquatic life at most sampling sites. Chloride discharges from oil and gas operations had impaired aquatic life in many smaller streams in the Knobs region. In the

Bluegrass Region, organic enrichment and high nutrient loads from wastewater treatment plants and farms reduced aquatic life. In addition, detectible levels of heavy metals and the organic pesticides chlordane, aldrin, dieldrin and DDT were found in tissues of fish living in the Kentucky River.

3.6.3 *Ground Water in the Kentucky River Basin* (Carey et. al., 1994)

This study investigated the hydrogeology of the Kentucky River Basin and the potential of ground water as a water supply source for its residents. At the time of the study, ground water supplied approximately 135,000 people in the basin, or approximately 19 percent of the total population and 36 percent of the rural population. It was concluded that discharge from well fields and springs could be used to supplement surface supplies during a drought. Additional research into ground water distribution and quality was found to be needed, as well as the establishment of wellhead protection programs and other pollution prevention programs.

3.7 Regional Water Supply Planning Meeting Report

In November 1988, Mayor Scotty Baesler called a meeting to discuss issues relating to water supply planning in the Bluegrass Region of Kentucky.

3.7.1 *The Kentucky River: An Outline of Issues for Water Supply Planning* (Rebmann, J. and D. Hassell, 1988)

This report was prepared as background information for the Regional Water Supply Planning Meeting, held on November 30, 1988. Thus, the report simply provided a summary of relevant issues and did not provide specific water supply recommendations. It includes sections covering the following topics:

- Physical Features of the Kentucky River Basin
- Population and Area Statistics
- Other Impacts of Water Use on Kentucky River
  Waste/Sewage Disposal, Industrial/Agricultural, Mining/Silviculture, Construction/ Sedimentation, Recycling of Water and Wastewater
- Locations of Locks and Dams
  History, Pools for Water Use, Disposition of Locks and Dams
- Water Supply Approach
  Imagined or Real Need, Normal Water Use, Use in a Drought Situation, Benchmark 1930 Drought, Drought Effect upon Communities, Communities' Effect on the River in a Drought Situation
- Conservation
  Industrial Water Re-Use, Pricing, Residential Plumbing Restrictions, Drought Mandated Limitations, Public Information, No Growth Policy
- Economics of Dams for Multi-Use

Limited Multi-Purpose Benefits, Economics and Future Development and Growth, Flood Control, Water Quality, Water Quantity, Recreational Benefits, Cost-Benefit Ratio

- Water Recreation Benefits
  Problems and Needs, Specific Planning Objectives, Potential Recreation
- Water Supply – How to Finance our Future Needs
- Environmental Impacts of Dam Construction
  Tributary Dams vs. Mainstem or Modification of Current Locks and Dams, Physical Elements, Hydrological Elements, Biological Elements, Socio-Economic Elements, Unavoidable Adverse Effects, Environmental Enhancement of an Impoundment
- Alternatives for Future Water Supply
  Larger Dams on Kentucky River, Red River Dam, Booneville Dam, Diversion of Water from Cave Run Lake, Muddy Creek, Modification of Current Locks and Dams 9 and 10, North Fork Reservoir, Falmouth Lake, Station Camp Creek, High Bridge Dam, Water from Ohio River or Cumberland Lake, New System of Replacement Dams for the Kentucky River

3.8 Lexington-Fayette Urban County Government

3.8.1 *A Multi-Purpose Surface Impoundment Proposal for the Kentucky River* (Rebmann, J.R., 1987)

This report was prepared for Lexington Mayor Scotty Baesler and the Urban County Council. It addressed how a moderate sized multi-purpose dam placed just upstream of High Bridge on Pool 7 could address a variety of water needs. The proposed dam would affect Pools 7, 8 and 9 and would create an impoundment approximately 50 miles long. The impoundment would ensure an adequate water supply for the Fayette County region, as well as providing recreational benefits.

Recommendations of the report included:
- providing financial support for the maintenance and upkeep of the existing Kentucky River Locks and Dams;
- encouraging the creation of the Kentucky River Authority;
- requesting that the U.S. Army Corps of Engineers initiate a study of costs, socioeconomic benefits and negative impacts of construction of the proposed dam;
- continuing to investigate and promote positive aspects of the dam for water supply, recreation, potential hydroelectric power and the potential of providing 10% of benefits as flood control; and
- investigating state, local and private funding sources for construction of the dam.

3.8.2 *Fayette County 20-Year Comprehensive Water Supply Plan* (Fayette County Water Supply Planning Council, 1999)

This water supply plan was developed in response to a regulatory requirement of the Kentucky Division of Water. The Lexington-Fayette Urban County Government developed the county's water supply plan, rather than having it completed by the Bluegrass Area Development District. The LFUCG worked in conjunction with the county's water supplier, the Kentucky-American Water Company, to complete the plan.

The Fayette County plan followed the prescribed format outlined by the Kentucky Division of Water and included:
Section 1 – Introduction and Formation of Planning Unit
Section 2 – Planning Council and Planning Representative
Section 3 – Notification
Section 4 – Planning Objectives and the Work Plan
Section 5 – County Base Map
Section 6 – Water Use and Water Use Forecast
Section 7 – Water Supplier Source Assessment
Section 8 – Supply Adequacy Assessment
Section 9 – Supply Protection
Section 10 – Water Resources Inventory
Section 11 – Water Supply Alternatives
Section 12 – Primary Water Supply Alternative
Section 13 – Emergency Plans: Water Shortage Response Plan and Supply Contamination Plan
Section 14 – Implementation Plan
Section 15 – Plan Approval Signatures

Kentucky-American's primary water intake is located in Pool 9 of the Kentucky River approximately 12 miles south of Lexington, and a secondary intake is located in Jacobson Reservoir (Reservoir #4). KAWC has a permit to withdraw up to 63 mgd from the Kentucky River and 16 mgd from Jacobson Reservoir. Raw water is treated at two separate facilities that are able to treat a combined capacity of 65 million gallons per day.

The KAWC developed a spreadsheet computer model for calculating water demand projections. Using population projections from the Urban Research Institute at the University of Louisville, historical average daily use and other factors, the "average day demand," "maximum day demand" and "drought average day demand" were calculated. The average day demand was expected to increase from 43.39 mgd in 1998 to 45 mgd in 2020. The projected maximum day demand increased from 64.67 mgd in 1998 to 81.97 mgd in 2020. And, the drought average day demand was predicted to increase from 50 mgd in 1998 to 58 mgd in 2020.

An assessment of supply availability in Kentucky River Pool 9 and projected demand showed that the river has a sufficient water supply to meet demand under normal conditions. However, during even a mild drought, the demand would likely exceed the existing available river supply prior to the year 2010, and certainly by 2020. It was also projected that the current treatment capacity of 65 mgd would be adequate until shortly

after the year 2000, based on average monthly demand projections. Additional treatment capacity and/or another source of treated water would be needed at this time.

The Council considered a variety of alternatives for additional water supply and narrowed these to a few options which seemed to be the most feasible. All potential long-term solutions involved the continued use of the Kentucky River and the presence of the existing dams. Therefore, the structural stability of the dams and the operability of the low-flow valves were critical to maintaining the Kentucky River as the major supply source. One considered alternative was increased water storage on the Kentucky River and additional pumping and treatment capacity. Increased river storage capacity would be developed through the addition of crest gates on all or some of dams 9 – 14, a single large reservoir on the Kentucky River or a dam/reservoir on a tributary of the river. Another alternative was the construction of a treated water pipeline to the Louisville Water Company.

The Council evaluated the supply alternative of developing additional storage on the mainstem Kentucky River, along with added treatment capacity of about 25 mgd at the KAWC plant. The option of increased river storage through the construction of movable crest gates on locks #9, #10, #13 and #14 would increase the available raw water to 70 mgd during the peak demand month of a drought. Technical and funding obstacles, as well as potential environmental problems, resulted in the dismissal of this option in favor of the treated water pipeline to Louisville. Additionally, it was determined that the storage capacity of the Kentucky River would have to be improved beyond installing crest gates in order to meet projected demands.

The construction of a dam and reservoir at a location off the main stem of the Kentucky River was chosen as the Council's secondary alternative. Stored water would be released only when needed to make up for a shortfall from the Kentucky River source. The reservoir could be located anywhere upstream of Pool 9. This alternative would require the addition of 23 mgd of treatment capacity.

Ultimately, a 23 mgd pipeline was designed by the KAWC to transport treated water from the Louisville Water Company. Water from this pipeline would supplement the existing supply from the Kentucky River. Citizen concerns regarding construction, environmental impact and water quality were being addressed in the pipeline design. This alternative supply source was selected as the preferred alternative, and the KAWC expected to petition the Kentucky Public Service Commission in late 1999 for the construction of the water line.

It was the charge of the Planning Council to make recommendations for meeting the water supply needs of Fayette County. Ultimately, the selection of an acceptable alternative was to be determined through the input and approval of entities such as the Kentucky River Authority, Kentucky American Water Company, the Public Service Commission, Lexington-Fayette Urban County Government, U.S. Army Corps of Engineers and the Kentucky State Legislature.

3.9 Kentucky Natural Resources and Environmental Protection Cabinet

3.9.1 *Kentucky River Survey, Rehabilitation Study for Locks and Dams 5 through 14* (Daugherty & Trautwein, 1985)

After signing the Memorandum of Understanding with the U.S. Army Corps of Engineers transferring ownership responsibilities of Locks and Dams Number 5 through 14, the Kentucky Finance and Administration Cabinet authorized the completion of this report. The report described the condition of the Locks and Dams, the rehabilitation costs for needed repairs, minor and major maintenance needs, historical information and usage data.

A combination rehabilitation and replacement program was recommended. Locks and Dams #5 and #12 were cited as needing the most immediate repairs. The report recommended the replacement of #5 within the next 5-10 years and the replacement of #12 within the next 10-15 years. These repairs were to be followed by the sequential replacement of Locks and Dams #6 through #14 at the rate of one lock and dam every five years. In support of the cost-effectiveness of this recommendation, the report noted the relatively high yearly maintenance costs on the structures and the likelihood of continuing crib failures in each lock and dam.

3.9.2 *Kentucky River Survey: 1989 Update of Locks & Dams 5 through 14* (C.J. Fuller Consulting Engineers, Inc. et. al., 1989)

This report provided an update of portions of the 1985 study by Daugherty and Trautwein to show the current condition of Locks and Dams 5 through 14, changes in condition that may have occurred since the 1985 survey, maintenance operations or the lack thereof, and any remedial construction of the facilities. It also identified the extent of routine and major maintenance required to enable the facilities to operate adequately. In addition, this study concurred with the dam replacement schedule proposed in the 1985 study.

Due to signs of their potential failure, the survey focused on the oldest four of the ten Locks and Dams studied; 5, 6, 7 and 8. Updated costs of major maintenance, routine maintenance and safety/ improvement items for all ten locks and dams were estimated in the report.

3.9.3 *Kentucky River Basin Status Report* (Kentucky NREPC Division of Water, 1997)

This report fulfilled the first activity of Phase I (scoping and data gathering) of the Kentucky Watershed Management Framework. It described conditions and trends in water quality and quantity, as well as watershed integrity, for the Kentucky River Basin. It was intended to provide indicators of the basin's condition and predictors of areas needing attention. Based on this report and other information sources, the Kentucky River Basin team prepared a strategic data collection plan.

3.10 U.S. Geological Survey

3.10.1 *Evaluation of the Drought Susceptibility of Water Supplies Used in the Kentucky River Basin in 1988* (USGS, 1991)

Major public water supply systems and self-supplied commercial and industrial water systems in the Kentucky River Basin were inventoried to evaluate the adequacy of raw water sources to meet its 1988 system demand during a drought. Future demand was not evaluated in this report.

The study indicated that 70 public water suppliers withdrew about 80 million gallons of water per day in 1988, and provided treated water to more than 554,000 people. Domestic per capita use averaged 72 gallons per day in the study area. Nearly 98 percent of the water withdrawn by the permitted facilities was from surface water sources.

It was found that water supplies were adequate to meet most of the supplier demands in the basin. However, public suppliers in Lexington, Georgetown and Stanford were found to be likely to have water supply shortages during drought conditions. Additionally, five other public water suppliers in the Kentucky River basin had the potential for water shortages during drought situations due to inadequate drinking water treatment plant capacities. During 1988, the average withdrawals were near or greater than 80 percent of capacity at Danville City Water Works, Hyden-Leslie County Water District, Manchester Municipal Utilities, Owenton Water Works and Versailles Municipal Water.

3.11 Water Resource Development Commission

3.11.1 *Water Resource Development: A Strategic Plan* (KIA, et. al., 1999)

As directed by Governor Paul Patton's Executive Order 96-1339, the Water Resource Development Commission prepared this strategic plan for water resource development in Kentucky with the goal of providing the best available water and sewer service to every Kentuckian by the year 2020. The main objectives of the strategic plan for water systems were as follows:

- Inventory all water systems in Kentucky and assess their respective strengths and weaknesses;
- Develop recommendations to build on the strengths and eliminate the weaknesses of Kentucky's water systems; and
- Develop strategies to improve the level of water service for Kentucky.

In order to fulfill these objectives, the following tasks were completed:

- Characterized the physical plant, finances and management of existing systems;

- Identified areas where immediate and long-term extension of public water service is indicated, as well as any improvements to existing systems to accommodate expansion, and estimated costs;
- Identified areas where extension of public water service is not indicated and developed recommendations for improving water systems in these areas;
- Identified areas of health and safety concerns about drinking water and wastewater treatment and developed recommendations;
- Developed recommendations and strategies for the operation, maintenance and management of water systems that enhance the use, efficiency and effectiveness of resources; and
- Developed recommendations and strategies to improve the regulatory and funding environment for water development.

It was projected that an additional 500,000 Kentuckians will be served by public water systems by the year 2020. Twelve-thousand miles of new water distribution lines would enable these new customers to be served.

Following the involvement of more than 40 state, regional and local groups, several general recommendations were made to improve water service to Kentuckians, including the encouragement of a regional approach to planning and developing of public water supplies.

3.12 Miscellaneous

3.12.1 *Kentucky River Basin Report on Water and Related Land Resources* (USDA, 1981)

This study was conducted by the U.S. Department of Agriculture in cooperation with the Kentucky Department for Natural Resources and Environmental Protection. It was intended to assist the state in alleviating basic resource problems and meeting present and projected food and fiber needs. The main objectives of the study were to:

1) Identify the basic water and related land resource problems and concerns;
2) Provide information on the quantity and relative quality of the basin's natural resources;
3) Identify and evaluate alternatives for reducing soil resource problems and meeting future food and fiber production needs; and
4) Indicate opportunities and ways that federal, state and local agencies may alleviate the basic resource problems.

Major water and related land resource problems and concerns identified were: excessive soil erosion and sedimentation, loss of prime farmland, flooding, water supply and quality and pollution—particularly due to solid waste. Water supply and quality problems were cited as being predominantly seasonal shortages, inadequate local sources, inferior quality and inadequate storage, treatment and distribution systems. The most

obvious pollutants were noted as being suspended sediment, sewage and industrial or mining refuse.

A water supply estimate of 69 million gallons per day was predicted for "key cities and towns that obtain water from the Kentucky and Red Rivers" in the year 2000. Further, present and projected 2000 water needs were provided for individual cities.

The majority of the study focuses on nine alternative plans that are primarily directed toward reducing the agricultural resource problems and meeting projected food and fiber needs for 2000. These alternatives suggest a variety of approaches to preserving agricultural land, shifting agricultural uses of the land and implementing conservation and management programs.

3.12.2 *Proceedings of the Kentucky River Conference* (1986)

The Kentucky River Conference was held in November 1986 at Shakertown in Kentucky. It was organized by the citizen group, Lexington Directions, a group dedicated to identifying issues of public concern to the residents of Lexington and Central Kentucky; informing residents, through public discussion groups, about issues important to the community; and assisting the local government in developing solutions to community problems. The Kentucky River Conference was organized to generate further discussions about the Kentucky River and its importance to lives of Central Kentuckians.

This document includes copies of the presentations made during the 1986 conference. The titles of the presentations are as follows:

- "Kentucky River Overview," James R. Rebmann, Lexington-Fayette Urban County Government
- "Population Projections for the Kentucky River Basin," Thomas R. Ford, Ph.D., Center for Developmental Change, University of Kentucky
- "Kentucky River Water Usage, Trends and Projections," Don R. Hassall, Bluegrass Area Development District
- "The Kentucky River Locks and Dams: Their Future and Their Importance," Vic Hellard, Kentucky River Task Force
- "Outlook for Lexington and Surrounding Counties," Robert Edens, Kentucky-American Water Company
- "Corps of Engineers Current Projects and Plans for Future Projects," Jim Duck, U.S. Army Corps of Engineers
- "Perspectives of a Small Water Company," Richard Lewis, Winchester Municipal Utilities
- "Maintaining Good Water Quality on the Kentucky River," Donald Harker, Division of Water, Cabinet for Natural Resources and Environmental Protection
- "The New National Water Quality Assessment Program and the Kentucky River," James Smoot, United States Geological Survey
- "Ongoing Strip Mine Pollution in the Upper Kentucky River," Bradley Branson, Ph.D., Department of Biology, Eastern Kentucky University

- "Water Resources Programs at the Kentucky Geological Survey," Jim Dinger, Ph.D., Water Resources Section, Kentucky Geological Survey
- "Monitoring the Kentucky River," Dillard Griffin, Kentucky-American Water Company
- "Environmental Protection and Economic Development," William A. Duncan, Mountain Association for Community Economic Development

3.12.3 ***Prospects and Impacts for Reservoir Location: Jackson County, Kentucky*** (U.K. College of Agriculture, 1988)

This study was conducted in order to identify potential impoundment sites and funding sources for a reservoir in Jackson County, Kentucky. Jackson County residents foresaw several potential benefits of a reservoir, including flood control, an alternative water supply, recreation and a catalyst for a diversified economic base. In general, residents believed that a "large" reservoir would best meet a variety of needs.

The Jackson County Development Commission invited landuse planning researchers from the University of Kentucky to evaluate alternative reservoir sites and to develop and present a computer-aided model of the proposals. The main objectives of the study were:

1) To utilize citizen participation in determining model criteria for locating reservoir sites;
2) To develop planning criteria for locating a reservoir;
3) To provide economic data for potential funding of a reservoir;
4) To document the process of the study for public officials, concerned citizens and others in the future;
5) To provide a presentation to inform the public on site selection and the impacts of alternative reservoir sites.

A variety of proposed reservoir sizes, locations and uses were considered, along with their potential funding mechanisms. Economically and environmentally, a 600-acre reservoir on the Steer/War/Hughes Forks was deemed the most defensible. Additional investigation by geologists, soil experts and others was recommended. Following this assessment, it was also recommended that two single purpose floodwater retarding structures be constructed.

3.12.4 ***The Kentucky River Basin: A Land Use and Recreation Study for the Kentucky River Authority*** (U.K. College of Agriculture, May 1992)

This study was conducted by fifth year landscape architecture students at the University of Kentucky and was submitted to the Kentucky River Authority and other appropriate agencies "for the purpose of guiding the wise use of the Kentucky River Basin as a resource for humans, plants and animals which share this unique environment." It covered land use policies and defined the recreational potential of the basin.

3.12.5 ***Report to Department of Natural Resources: Eagle Lake, Kentucky*** (Shepherd, J., June 1992)

This report provided a proposal for a dam site to be located 61.3 miles above the mouth of Eagle Creek, a tributary of the Kentucky River. With a drainage area of 156 square miles, the resulting reservoir was estimated to have the potential for a maximum storage of 510,000 acre-feet of water. It would be located 24 miles north of Lexington in Scott and Owen Counties. The report author foresaw the proposed reservoir as a water supply source for central and northern Kentucky, as well as a flood control impoundment.

3.12.6 ***Feasibility Study for the Jackson County Lake Project and Alternatives*** (Kenvirons, 2000)

This study was authorized by a contract between the Jackson County Empowerment Zone Community, Inc. and Kenvirons in order to evaluate potential projects which could increase the county's water supply. Costs were estimated for four alternative long-range water supply projects:

- Reservoir on War Fork
- Reservoir on Sturgeon Creek
- Potable Water Transmission Main from the Wood Creek Water District
- Raw Water Transmission Main from Lock 14 of the Kentucky River

These alternatives were evaluated and ranked based on the costs associated with the project's construction, land acquisition, household relocations, utility relocations and operation, maintenance and replacement costs.

In addition to potential reservoir sites on War Fork and Sturgeon Creek, 13 other potential sites were evaluated and subsequently eliminated. Criteria for their continued consideration included a minimum yield of 3.5 mgd; the absence of any threatened, endangered or protected species; and no special resource designation for the waterway.

The most feasible and recommended alternative for sufficiently increasing Jackson County's water supply was the construction of a reservoir on War Fork. In addition to building the reservoir, the implementation of this alternative would require the construction of a raw water transmission main from the reservoir to the Jackson County Water Association's treatment facilities and the expansion of the water treatment plant. Further detailed engineering, environmental and economic studies were recommended to optimize the specific features of this recommended alternative.

4.0 Proposed Kentucky River Basin Water Supply Projects

The following table provides a comprehensive listing of historically proposed water supply projects for the Kentucky River Basin. The organizations proposing these alternatives are also listed, along with references to the specific report detailing their proposal. Additionally, a brief discussion of each proposed project is provided with a description of any action taken toward implementing the project. In instances where projects have not implemented, an explanation is given as to why it was not pursued.

3.0 Proposed Kentucky River Basin Water Supply Projects

Rehabilitation/Reconfiguration of Kentucky River Locks and Dams			
Proposal	**Source, Year***	**Discussion**	**Action Taken**
Rehabilitation of Locks 5-9	USACOE, 1997 (2.2.6)	Specific repairs were recommended and prioritized for each of the five Locks (5, 6, 7, 8 and 9) in order to restore their operation. A repair sequence and preliminary designs and cost estimates were provided. General tasks outlined in the repair recommendation included dewatering of the locks, installation and/or rehabilitation of gate valves, replacement of miter gate components, repair of lock walls, and miscellaneous repairs identified after the locks are dewatered.	These repairs were not implemented. The KRA has determined that it will apply fee revenues toward funding this work.
Increase height of dams 10, 9, 14, 13, 11 and 12 (in that order)	Harza, 1996 (2.1.3)	Increased dam heights would increase storage capacities of upstream pools. Unit cost of creating storage in Pool 13 much higher than in Pools 10-12, and less demand to justify expense; therefore, lower priority. Projects to raise dams 11 and 12 will first require further study of potential impacts to agricultural fields.	KRA funding approved to build new Dam 10, raising it by 4-6 feet. Expect to begin construction in 2005. Evaluation and design of renovation on Dam 9 expected to be complete in FY 2003. Next priority will be Lock & Dam 11.
Installation of temporary crest gates or permanent raising of dams 9 - 14 WITH low-level valves in Locks & Dams 9-14	KWRI, 1996 (2.1.4)	Assuming pools are mined to within 4 feet below dam crests, the projected 1930 drought supply deficits would be eliminated. Determined to be most cost-effective of solutions considered.	Low level valves have been installed. KRA is currently pursuing implementation on dam 10 with possible implementation on dams 9, and 11.
Increase height of Dams 5-8	Harza, 1991 (2.5.3)	The Harza study examined the effects of raising all Kentucky River Dams 5-14 as a plan element for consideration in a water supply solution. Initial screening criteria included: location of site in relation to location of water supply deficit, cost of developing storage at the site, and heigh of dam with potential impacts of flood hazards.	Not implemented. Proposal to increase to the heights of Dams 5-8 eliminated because projected water supply deficit downstream of Pool 9 is insufficient to justify the expense of raising these dams to increase storage.
Proctor Proposal - Raise Dams 12 (by 17 ft), 13 (by 10 ft) and 14 (by 5 ft), then raise Dams 5-10 (each by 5 ft)	KRB Tech. Advisory Committee, 1989 (2.12.5)	Increases storage capacity by 22.8 billion gallons at an estimated cost of $65 million. Not certain to be a long-term solution.	Not implemented due to high cost and flooding impacts.
Rehabilitation and replacement of Locks and Dams 5-14	C.J. Fuller Consulting, 1989 and Daugherty & Trautwein, 1985 (2.9.1 and 2.9.2)	Initially, recommends maintenance of Locks & Dams 5-8. Within 5-10 years, replacement of Lock & Dam #5. Within 10-15 years, replacement of L&D #12. Every 5 years thereafter, sequential replacement of L&D #6-14.	Kentucky River Authority plans to build new higher dam (by 4-6 feet) immediately upstream of Lock & Dam 10. Plan also includes rehab/ replacement and raising of Lock and Dam 9. Minor maintenance measures have been conducted on the Locks and Dams on an as needed basis.
Raise Locks and Dams 9 and 10	USACOE, 1978 (2.2.3)	Dam 9 would be raised by 21 feet and Dam 10 by 24 feet at a cost of $65.3 million. Not cost-effective as a single component to adequately increasing water supply storage.	In 2002, the KRA decided to raise Dam 10 by either 4 or 6 feet to create additional storage. Plans to increase height of Dam 9 are also being developed.

* Number in parentheses refers to reference document in summary of historical reports.

Low-Level Release Valves in Kentucky River Locks & Dams

Proposal	Source, Year*	Discussion	Action Taken
Installation/Rehabilitation of low-level release valves in Locks & Dams 9-14	KWRI, 1996 (2.1.4)	Enables continued flows between pools during drought conditions through releases of water below dam crests. Will not completely eliminate the 1930 drought year supply deficits in Pools 9-14, but reduces 2020 high demand deficit from 7.0 to 3.0 billion gallons.	KRA funded and completed installation of valves in Dams 11-14. Rehab/replacement of lock filling/emptying valves for 9-10 completed.
Installation/Rehabilitation of low-level release valves in Dams 4 - 8	KWRI, 1996 (2.1.4)	Enables continued flows between pools during drought conditions.	Not completed. KRA waiting to combine valve installation with dam repairs. Meanwhile, Locks 5-8 have gate valves that can be used to release water downstream (but are in need of renovation).
Install low-level release valves in Dams 8, 9, 10, 13 and 14	Harza, 1996 (2.1.3)	Develops storage capacities below dam crests by enabling transfer of water from upstream to downstream pools when water levels fall below dam crest levels. In addition to transfering water to meet supply needs, low-level valves enable minimum flow requirements for water quality needs.	KRA funded and completed installation of valves in Dams 11-14. Rehab/replacement of lock filling/emptying valves for 9-10 completed.

Mainstem Impoundments

Proposal	Source, Year*	Discussion	Action Taken
Construction of new dam at Lock and Dam #8 WITH low-level valves in Locks & Dams 9-14	KWRI, 1996 (2.1.4)	Proposed dam would be approx. 52 feet high with a crest elevation of 554 feet. Resulting pool would exceed height of Lock and Dam #9 by 5 feet. A residual supply deficit of 1.1 billion gallons remains for projected 2020 high-demand conditions.	Not implemented due to high cost, environmental and cultural impacts, potential concerns on flooding, the elimination of recreational boat traffic between downstream pools.
Construction of two to three new dams in Pools 10, 11 and/or 12	Harza, 1991 (2.5.3)	Dams to be sited at two or three of the following potential locations: existing Lock and Dam 10, 11 and/or 12 OR new sites in Pools 10 and/or 12 (10A and/or 12A). Site 10A is located between existing Locks and Dams 10 and 11 and Site 12A is located between Locks and Dams 12 and 13. *In this study, this was determined to be the ultimate solution for providing adequate water supply within the Kentucky River Basin.*	Not implemented due to high cost, environmental and cultural impacts, potential concerns on flooding, the elimination of recreational boat traffic between downstream pools.
Multi-Purpose Impoundment at Pool 7 (High Bridge Dam site)	Harza, 1991 (2.5.3), USACOE, 1988 (2.2.4) and Rebmann and Kilner, 1987 (2.8.1)	Dam to be constructed just upstream of High Bridge in Pool 7, creating an approx. 50-mile impoundment. Proposed dam would raise Pool 7 water level by approx. 45 feet, submerging Locks and Dams 8 and 9. Would provide an additional 80,000 to 90,000 AF of storage at a 1987-estimated cost of $45 million. Additional storage would ensure an adequate water supply for the Fayette County region, including Lancaster, Nicholasville, Lexington and Winchester; as well as provide recreational benefits.	Not implemented because of high cost, environmental and cultural impacts, and the elimination of recreational boating traffic between downstream pools.
Multi-Purpose Impoundment in Pool 7 (Jessamine Creek Reservoir)	Rebmann and Hassell, 1988 (2.7.1)	To be located in Pool 7 just below the mouth of Little Hickman Creek, less than 1 mile upstream from Camp Nelson. Would have increased pool by about 115 feet, flooding up to Dam 14. Construction authorized in 1938, expanded in 1944 to provide hydropower, and deauthorized in 1962.	Not implemented because of increased development along the stream, as well as public opposition to the project due to potential impacts to Boonesboro and the Palisades region of the river.
Multi-Purpose Impoundment in Pool 5	USACOE, 1982, Rebmann and Hassell (2.7.1, p.XI-1)	Studied in relation to flooding problems in southern Frankfort. Proposed dam increased Pool 5 elevation by 135 feet, flooding up to Dam 13, at a cost of $958 million to $1 billion. Assessment of dams of various heights with multiple purposes resulted in cost-benefit ratios of 0.46 to 0.51, much less than the greater than 1.0 necessary for federal projects.	Not implemented due to poor cost-benefit ratios resulting from high relocation costs, high construction costs and low net storage volumes.

Other Mainstem Alternatives

Proposal	Source, Year*	Discussion	Action Taken
Relaxation of the minimum flow requirement between pools 4-8	KWRI, 1996 (2.1.4)	Could result in significant environmental impacts, but would eliminate the supply deficit in Pools 2-8.	Not pursued in favor of use of low-level valves in dams 4-8, and because of potential environmental impacts.
Pipe water from Pool 6 to Pool 9	KGS, 1990 (2.6.1)	The pipeline from Pool 6 to 9 would augment Pool 9 supplies and was being considered by the Kentucky-American Water Company. KGS estimated that, with average lock and dam maintenance (maximum of 34.1 mgd leakage), piping 40 mgd of water from Pool 6 would be required to relieve demand in Pool 9 by the year 2042. With good L&D maintenance (maximum of 16.3 mgd leakage), 20 mgd would be required from Pool 6.	Not implemented due to the cost of a new treatment plant, pumping, and pipeline. Would still need additional storage on the river to make this feasible.
Dredging Pools to increase storage	KRB Technical Advisory Comm., 1989 (2.12.5)	Dredging would be a continuous process, as an estimated 580,000 tons of sediment are suspended and flow pass Lock & Dam 4 each year. Intakes would need to be altered to withdraw water from the expanded river pools. Also, could be disposal issues for hazardous or non-usable dredged materials.	Not implemented because dredging was not considered a reliable way to significantly increase river storage.
Utilization of navigational storage in Pools 8 - 14 for water supply	USACOE, 1978 (2.2.3)	Original lock and dam system was created to provide for a 6-foot navigation channel. Current uses on the Kentucky River only require a 3 1/2-foot navigational pool. The remaining 2 1/2 feet of navigational pool storage have the potential for water supply usage. This option was conditional on the presence of functioning flow regulation devices between Locks and Dams 8 - 14. Estimated to provide 7,490 AF of storage at 1978 cost of $975,000 to $2.655 million.	This plan has been essentially implemented through the installation/rehabilitation of low level valves in dams 9-14, with a maximum allowable drawdown of up to 4 feet.

Offstream Impoundments

Proposal	Source, Year*	Discussion	Action Taken
War Fork Reservoir (Jackson County)	Kenvirons, 2000 (2.12.7); Harza, 1991 (2.5.3)	The Harza study noted the potential storage of a reservoir on War Fork to be 979 million gallons at a cost of $9 million. In a study requested by the Jackson County Empowerment Zone Community, it was concluded that a reservoir on War Fork would be the most cost-effective alternative for providing an adequate long-range water supply to Jackson County residents.	Jackson County Water Association is continuing to pursue the construction of the War Fork Reservoir as their primary water supply alternative to Beulah Lake.
Line Fork impoundment	USACOE, 1997 (2.2.7)	Water storage in Carr Creek Reservoir determined to be more cost-effective than Line Fork Reservoir for amount of storage needed.	Not pursued in favor of Carr Creek Reservoir storage.
Construction of one or more off-stem reservoirs WITH low-level valves in Locks & Dams 9-14	KWRI, 1996 (2.1.4)	Eliminates deficit for 2020 high-demand condition. Rated as second most economically viable to temporary crest gate option.	Partially implemented. Low-level valves functioning in Locks and Dams 9 and 11-14, but off-stem reservoir(s) not constructed due to higher unit costs than other alternatives, and potential environmental impacts.
Station Camp Creek Reservoir (Jackson County)	KRA, 1995 (2.1.2); Harza, 1991 (2.5.3); and USACOE, 1988 and 1978 (2.2.3 and 2.2.4)	Station Camp Creek is a tributary entering Pool 11 of the Kentucky River. Harza proposed five potential sites in this upstream basin with estimated costs of $9 to $35 million. A Station Camp reservoir could eliminate the entire supply deficit by creating storage of 3 to 7 billion gallons. The proposed reservoir would dually serve water supply and recreation purposes. Consideration for federal funding was dropped because less than 10% of reservoir's benefits attributable to national economic development (i.e., flood control, navigation or agricultural water supplies)	Not implemented because federal funding was not available for reservoir as proposed. Also, there is strong opposition against a dam on Station Camp Creek due to its environmental and biological resources and habitat.
Eagle Lake (Scott and Owen Counties)	Shepherd, 1992 (2.12.6)	Proposed dam site 61.3 miles upstream of mouth of Eagle Creek tributary of Kentucky River. Drainage area of 156 square miles, estimated water storage capacity of 146 billion gallons.	Not implemented due to cost and environmental concerns.
Falmouth Lake	KRB Technical Advisory Comm., 1989 (2.12.5)	Authorized for construction in 1936 at mile 60.6 of Licking River, with total storage of 898,300 acre-feet. A proposal suggested pumping raw water from Falmouth Lake to Georgetown (about 14 miles), then to a new or existing treament plant. Cost-effectiveness studies in 1985 resulted in cost-benefit ratios of 0.37 to 0.89. Project classified as authorized but inactive in 1981.	Not implemented due to poor cost-benefit ratios.

Offstream Impoundments (Continued)

Proposal	Source, Year*	Discussion	Action Taken
South Fork impoundment (Booneville Reservoir)	KRB Technical Advisory Comm., 1989 (2.12.5); Rebmann and Hassell, 1988 (2.7.1); and USACOE, 1978 (2.2.3)	Located on South Fork Kentucky River in Owsley and Clay counties. Booneville Dam originally authorized by 1938 Flood Control Act. Project site covers 2,500 to 2,900 acres, with a drainage area of 665 square miles and potential capacity of 192,000 acre feet.	Not implemented due to poor cost-benefit ratios. Also, site more densely populated than other proposed reservoir sites.
Billey Fork impoundment	Harza, 1991 (2.5.3)	Tributary to Pool 12 of the Kentucky River. Proposed reservoir has potential usable storage of 1.45 billion gallons at cost of approx. $10.6 million.	Not implemented due to expectation that water supply alternatives utilizing small upstream reservoirs would result in greater environmental, social and cultural impacts than other alternatives.
Boone Creek impoundment	Harza, 1991 (2.5.3)	No viable water impoundment sites in the lower part of this basin. Upper basin contains sites for minor impoundments.	Not implemented due to expectation that water supply alternatives utilizing small upstream reservoirs would result in greater environmental, social and cultural impacts than other alternatives.
Contrary Creek impoundment*	Harza, 1991 (2.5.3)	Tributary to Pool 14 of the Kentucky River. Proposed reservoir has potential usable storage of 1.55 billion gallons at cost of approx. $8.5 million.	Not implemented due to expectation that water supply alternatives utilizing small upstream reservoirs would result in greater environmental, social and cultural impacts than other alternatives.
Crystal Creek impoundment	Harza, 1991 (2.5.3)	Tributary to Pool 14 of the Kentucky River. Proposed reservoir has potential usable storage of 998 million gallons at cost of approx. $7.9 million.	Not implemented due to expectation that water supply alternatives utilizing small upstream reservoirs would result in greater environmental, social and cultural impacts than other alternatives.
Fourmile Creek impoundment*	Harza, 1991 (2.5.3); USACOE, 1978 (2.2.3)	Tributary to Pool 10 of the Kentucky River. Developed area around Winchester drains into basin, and one major power line crosses probable site of impoundment. Recommended for consideration as a minor water impoundment. Potential usable storage of 2.6 billion gallons at a cost of approx. $8.7 million. Was also considered by the USACOE as single-community water supply solution for Winchester, but was determined that a regional supply solution would be more cost-effective.	Not implemented due to expectation that water supply alternatives utilizing small upstream reservoirs would result in greater environmental, social and cultural impacts than other alternatives.
Holly Creek impoundment	Harza, 1991 (2.5.3)	Tributary to Pool 14 of the Kentucky River. Proposed reservoir has potential usable storage of 1.24 billion gallons at cost of approx. $12 million. Eliminated due to high unit cost of storage.	Not implemented due to expectation that water supply alternatives utilizing small upstream reservoirs would result in greater environmental, social and cultural impacts than other alternatives.

Offstream Impoundments (Continued)

Proposal	Source, Year*	Discussion	Action Taken
Lower Buffalo impoundment	Harza, 1991 (2.5.3)	Tributary to Pool 14 of the Kentucky River. Proposed reservoir has potential usable storage of 1.23 billion gallons at cost of approx. $10.9 million.	Not implemented due to expectation that water supply alternatives utilizing small upstream reservoirs would result in greater environmental, social and cultural impacts than other alternatives.
Lower Devils Creek impoundment*	Harza, 1991 (2.5.3)	Tributary to Pool 14 of the Kentucky River. Proposed reservoir has potential usable storage of 1.68 billion gallons at cost of approx. $9.1 million.	Not implemented due to expectation that water supply alternatives utilizing small upstream reservoirs would result in greater environmental, social and cultural impacts than other alternatives.
Lower Howard impoundment	Harza, 1991 (2.5.3)	Tributary to Pool 9 of Kentucky River. Proposed reservoir has potential usable storage of 2.1 billion gallons at cost of approx. $10.5 million.	Not implemented due to expectation that water supply alternatives utilizing small upstream reservoirs would result in greater environmental, social and cultural impacts than other alternatives.
Miller Creek impoundment	Harza, 1991 (2.5.3)	Although total drainage area of basin represents one of the larger subbasins of the Kentucky River, there is no suitable site for a major impoundment. Four subbasins of Miller Creek of less than 25 square miles each are candidates for very small reservoirs.	Not implemented due to expectation that water supply alternatives utilizing small upstream reservoirs would result in greater environmental, social and cultural impacts than other alternatives.
Muddy Creek reservoir	Harza, 1991 (2.5.3); KRB Technical Advisory Committee, 1989 (2.12.5); USACOE, 1978 (2.2.3)	Muddy Creek is tributary to Kentucky River at Pool 10 in Madison County. Reservoir would offer up to 15,600 AF of storage, with 54 square miles of drainage area. Would require relatively little relocation and no major highway relocation. However, a major gas pipeline intersects the proposed site and would need to be relocated. Also, a large portion of the Blue Grass Army Depot lies within the headwaters of this basin and has the potential to contribute chemicals and other materials harmful to a water supply. The reservoir would not create sufficient storage to meet entire demand projections. Harza eliminated in 1991 due to water quality concerns. Removed from consideration by Kentucky River Basin Steering Committee on 7/26/89.	Not implemented due to water quality concerns.
Noland Creek impoundment	Harza, 1991 (2.5.3)	Tributary to Pool 10 of Kentucky River. Proposed reservoir has potential usable storage of 735 million gallons at approx. cost of $7.4 million.	Not implemented due to high unit cost of storage.

Offstream Impoundments (Continued)

Proposal	Source, Year*	Discussion	Action Taken
North Fork impoundment near Beattyville (Lee and Breathitt Counties)	Harza, 1991 (2.5.3); KRB Technical Advisory Comm., 1989 (2.12.5); Rebmann and Hassell, 1988 (2.7.1); and USACOE, 1978 (2.2.3)	Reservoir would be close to point of demand, relatively small and located in areas where environmental and cultural impacts would not preclude development. Would store water in reservoir during wet season and release it into the main channel during periods of water deficiency. USACOE report proposed reservoir with 1,318 square mile drainage area and 38,000 AF of storage. 1978 cost cited as $24.3 million. Would require levees in Jackson for flood protection and has potential for heavy siltation from adjacent strip mining activities. Recommended by USACOE District Office, eliminated by Federal Office. Also, removed from consideration by Kentucky River Basin Steering Committee on 7/26/89.	Not pursued due to high cost and potential damage to Jackson.
North Fork impoundment (Walker Creek Site)	Harza, 1991 (2.5.3, p.IV-5)	Has a large drainage basin. Most likely location about 7 miles upstream of Beattyville in remote reach of North Fork of Kentucky River. Reservoir construction would involve relatively minimal relocation of people and roads. Would require construction of levee at Jackson to protect from flooding. Would also require significant silt control measures due to extensive coal mining activity in headwaters of this basin.	Not implemented due to water quality concerns.
Otter Creek impoundment	Harza, 1991 (2.5.3)	No viable water impoundment sites in the lower part of this basin due to presence of numerous power lines and pipelines and part of the Richmond urban area. However, the basin does contain candidate sites for minor impoundments.	Not implemented due to expectation that water supply alternatives using small upstream reservoirs would result in greater environmental, social and cultural impacts.
Sturgeon Creek impoundment*	Harza, 1991 (2.5.3)	Includes several upstream sites that are technically suitable for major water storage project. An approx. 100-foot high dam on this tributary to Pool 13 would meet all projected deficits in Pools 13 and downstream. Potential storage of 7 billion gallons at a cost of approx. $25.2 million.	Not implemented due to significant relocation requirements. Also, region's coal mining activity could negatively impact water quality and reservoir siltation.
Upper Howard Creek impoundment*	Harza, 1991 (2.5.3)	Relatively large basin, with stream discharging into Pool 10 of the Kentucky River above Lexington's intake. Several technically feasible sites for minor and major impoundments. Potential storage of approx. 1.44 billion gallons at cost of approx. $7.1 million.	Not implemented due to need to relocate numerous gas pipelines, roads, railroads and bridges, as well as other types of development. Also eliminated due to the low amount of storage provided.
Upper Devils Creek impoundment	Harza, 1991 (2.5.3)	Tributary to Pool 14 of Kentucky River. Proposed reservoir has potential usable storage of 1.3 billion gallons at cost of approx. $8.4 million.	Not implemented due to expectation that water supply alternatives using small upstream reservoirs would result in greater environmental, social and cultural impacts. Also eliminated due to the low amount of storage provided.

Offstream Impoundments (Continued)

Proposal	Source, Year*	Discussion	Action Taken
Walker Creek impoundment	Harza, 1991 (2.5.3)	Tributary to Pool 14 of Kentucky River. Proposed reservoir has potential usable storage of 1.5 billion gallons at approx. cost of $13.6 million.	Not implemented due to high unit cost of storage and water quality concerns.
Boone Creek Reservoir (Garrard County)	USACOE, 1978 (2.2.3)	Considered as a single community alternative for Lancaster, replacing its Kentucky River source. Depending on demand predictions and storage requirement, was estimated to cost $2 to $2.3 million.	Not implemented because of determination that a regional supply solution would be more cost-effective than this single-community alternative.
Clear Creek Reservoir (Woodford County)	USACOE, 1978 (2.2.3)	Considered as single community alternative for Nicholasville, replacing its Kentucky River source. Depending on demand predictions and storage requirement, was estimated to cost $7.7 to $9.1 million.	Not implemented because of determination that a regional supply solution would be more cost-effective than this single-community alternative.
Drowning Creek Reservoir	USACOE, 1978 (2.2.3)	Considered as single community alternative for Richmond in order to supplement Kentucky River flows at its intake. Depending on demand predictions and storage requirement, was estimated to cost $1.9 to $2.06 million.	Not implemented because of determination that a regional supply solution would be more cost-effective than this single-community alternative.
Red River Lake	USACOE, 1978 (2.2.3) and Rebmann and Hassell, 1988 (2.7.1)	This reservoir was authorized for construction as part of the flood control plan for the Kentucky River Basin in the Flood Control Act of 1962. It was planned by the USACOE as a multipurpose reservoir for flood control, recreation, and water supply and water quality storage. Expected to provide approx. 24,770 acre-feet of water storage.	Not implemented due to public interest in protecting the Red River Gorge natural area. It was determined that region's water supply needs could be better met through Kentucky River pools and Station Camp Creek Reservoir.
Shallow Ford Reservoir	USACOE, 1978 (2.2.3)	Considered as single community storage for Nicholasville in order to supplement Kentucky River flows at its intake. Depending on demand predictions and storage requirement, was estimated to cost $1.25 to $1.39 million.	Not implemented because of determination that a regional supply solution would be more cost-effective than this single-community alternative.
Sugar Creek Reservoir (Garrard County)	USACOE, 1978 (2.2.3)	Considered as single community storage for Lancaster in order to supplement Kentucky River flows at its intake. Depending on demand predictions and storage requirement, was estimated to cost approx. $1.75.	Not implemented because of determination that a regional supply solution would be more cost-effective than this single-community alternative.
Eagle Creek Lake	KRB Technical Advisory Committee, 1989 (2.12.5)	To be located in Grant and Owen Counties with 247 square mile drainage area. Estimated summer pool storage capacity of 66,271 acre-feet. 1974 estimated cost of $27.8 million. Authorized by Flood Control Act of 1962. Classified as inactive in April 1975.	Not implemented due to excessive inundation of farmland that would result from reservoir's construction.
Construction of reservoirs on Carr Fork, North Fork near Walkers Creek, Red River and Eagle Creek	USACOE, 1958 (2.2.1)	Included in a comprehensive plan for flood control and related purposes in the Ohio River, issued by the U.S. Army Corps of Engineers.	Carr Creek Lake completed in 1976. Proposed reservoirs on North Fork, Red River and Eagle Creek not implemented.

Ohio River Pipeline Alternatives

Proposal	Source, Year*	Discussion	Action Taken
Treated water pipeline from Louisville to Lexington WITH low-level valves in Locks & Dams 9-14	KWRI, 1996 (2.1.4)	Assuming a minimum capacity of 15 mgd is reserved for use as drought augmentation, a residual supply deficit of 1.1 billion gallons remains for 2020 projected high-demand conditions. Rated as third most economically attractive option, behind temporary crest gates and off-stem reservoir.	Partially implemented. Low-level valves functioning in Locks and Dams 9 and 11-14, but pipeline not constructed due to public opposition.
Raw water pipeline from Ohio River (Maysville) to Kentucky River (Beattyville) -103.8 miles long	Harza, 1991 (2.5.3)	Raw water delivery directly to Kentucky River. Design flow is 61.1 mgd, which was expected to meet the entire design deficit. Determined to be among most costly of considered pipeline alternatives.	Not implemented due to higher cost than other pipeline alternatives.
Raw water pipeline from Ohio River (Dover) to Lexington/Winchester, with branch pipelines to Beattyville and Richmond--84.8 miles long*	Harza, 1991 (2.5.3)	Raw water is discharged to Kentucky River just above Winchester's treatment plant. Design flow is 52.7 mgd. Meets the total water supply deficit. Third-least costly of considered pipeline alternatives. Retained for further consideration. The Harza report ranked this option third among its considered pipeline alternatives.	Not implemented due to higher cost than other pipeline alternatives.
Raw water pipeline from Ohio River (Dover) to Kentucky River (Richmond)--109.5 miles long	Harza, 1991 (2.5.3)	Design flow is 57.8 mgd. Determined to be most costly of considered pipeline alternatives.	Not implemented due to higher cost than other pipeline alternatives.
Raw water pipeline from Ohio River (Dover) to Lexington/Winchester, with branch pipeline to Richmond--84.8 miles long	Harza, 1991 (2.5.3)	Main pipeline designed for a flow of 52.7 mgd.	Not implemented due to higher cost than other pipeline alternatives.
Raw water pipeline from Ohio River (Dover) to Winchester--84.8 miles long	Harza, 1991 (2.5.3)	Design flow is 52.7 mgd. Determined to be among most costly of considered pipeline alternatives.	Not implemented due to higher cost than other pipeline alternatives.
Raw water pipeline from Ohio River (Dover) to KAWC's Jacobson Reservoir--78.8 miles long*	Harza, 1991 (2.5.3)	Would serve only the region covered by the Kentucky-American Water Company. Pipeline designed for a flow of 40 mgd. Second lowest-cost option of considered pipeline alternatives. Retained for further consideration. The Harza report ranked this option second among its considered pipeline alternatives.	Not implemented because only serves Kentucky-American Water Company customers.
Treated water pipeline from Louisville to Lexington (72 miles long) - operated only during drought*	Harza, 1991 (2.5.3)	Pipeline would also be tapped to provide treated water to Frankfort, which is located along the route. Design flow is 44.6 mgd. This option is premised on the assumption that Louisville would supply 44 mgd of treated water. Determined to be least costly of considered pipeline alternatives. The Harza report ranked this option first among its considered pipeline alternatives. It was retained for further consideration.	Not implemented due to public opposition.
Treated water pipeline from Louisville to Lexington - operated as primary water supply	Harza, 1991 (2.5.3)	Option eliminated because cost of operating the new system as the primary water source exceeds the cost of operating the existing system.	Not implemented due to excessive operating costs.

Ohio River Pipeline Alternatives (Continued)

Proposal	Source, Year*	Discussion	Action Taken
Treated water pipeline from new plant at Dover to KAWC system (75 miles long) - operated only during drought	Harza, 1991 (2.5.3)	Pipeline would be designed for flow of 39.6 mgd.	Not implemented because only serves Pool 9 (Kentucky-American).
Treated water pipeline from new plant at Dover to KAWC system - operated as primary water supply	Harza, 1991 (2.5.3)	Operated as primary source of water supply for Kentucky-American service area.	Not implemented because only serves Pool 9 (Kentucky-American).

Demand Management

Proposal	Source, Year*	Discussion	Action Taken
Demand management WITH low-level valves in Locks & Dams 9-14	KWRI, 1996 (2.1.4)	If all withdrawals from the Kentucky River are held at winter levels, the 2020 high demand condition deficit for Pool 9 can be reduced to 1.1 billion gallons. However, this represents an extreme demand management policy that would likely result in millions of dollars in damages, as well as adverse environmental impacts.	Strategy eliminated because it does not completely eliminate deficit. Demand management recommended as a supplement to another water supply alternative.
Conservation Pricing	KWRI, 1996 (2.1.4, Task V)	Represents a long-term demand management alternative. A supply option will still be required to meet reduced demands.	Not implemented because would not significantly address water supply deficit.
Short-Term Demand Management	KWRI, 1996 (2.1.4, Task V)	Could include strategies such as voluntary demand reduction, odd-even day lawn watering, mandatory rationing, etc. A supply option will still be required to meet reduced demands.	Will be implemented as needed during drought conditions.

Interbasin Transfers

Proposal	Source, Year*	Discussion	Action Taken
Transfer from Cumberland Lake	KRB Technical Advisory Comm., 1989 (2.12.5)	Closest connection to Kentucky River Basin would be to Dix River or near Beattyville. Both distances are greater than that between Cave Run Lake and Kentucky River Basin.	Not implemented due to excessive capital and annual operating costs.
Transfer from Cave Run Lake to Red River	KRB Technical Advisory Comm., 1989 (2.12.5) and USACOE, 1978 (2.2.3)	Interbasin transfer from Licking River Basin.	Not implemented due to excessive capital and annual operating costs.

Other

Proposal	Source, Year*	Discussion	Action Taken
Reallocation of storage from Carr Creek Reservoir	USACOE, 1997 and 1978 (2.2.3 and 2.2.7)	1997 study estimated cost to be $40 million for storage space allowing up to 12 mgd of combined releases and river flows to meet needs of North Fork region. An additional cost of $11.2 million would be required to construct a 5 mgd treatment plant.	Not implemented as supply solution for central Kentucky region due to high unit cost of storage, high transmission and evaporation losses and insufficient storage. However, option is still being pursued by Carr Creek Water Commission to meet water supply needs of Knott, Letcher and Perry counties.
Lower the raw water intake at Nicholasville	KWRI, 1996 (2.1.4) and Harza, 1996 (2.1.3)	Enables water withdrawals from Pool 8 during low flow conditions.	Not yet implemented. Expansion and additional lower intakes planned for approximately 2004.
Lower the Beattyville intake	Harza, 1996 (2.1.3)	Enables water withdrawals during low flow conditions.	Not yet implemented. New plant planned for construction approximately 2004-2005 and may install lower intake in conjunction with this effort.
Reallocation of storage from Buckhorn Lake	USACOE, 1978 (2.2.3)	Existing multipurpose reservoir on Middle Fork of Kentucky River, serving flood control and low flow augmentation purposes. Has drainage area of 408 square miles. Was considered as sole supply source option, in combination with Station Camp Creek Reservoir, and in combination with Muddy Creek Reservoir.	Not implemented because was not as cost-effective as a single supply component. Other downfalls were the high cost of storage reallocation, excessive costs of relocating recreational facilities and Highway 257, and high transmission losses that occur during drought conditions.
Groundwater wells	USACOE, 1978 (2.2.3)	Insufficient groundwater supplies, except as possible supplemental source for small service areas.	Not implemented due to inadequacy of groundwater supplies.

KRA Schedule for Locks and Dams 9-11:

* According to KRA's 2002-2008 Capital Plan*
(to achieve "Kentucky River Water Storage Enhancements" goal of increasing river storage by 3 billion gallons)

FY 2002
Leakage control buttress walls at Lock & Dams 8 and 9 completed?
Valve installed in temporary buttress wall at Lock & Dam 9 completed
Geotechnical evaluation, design and environmental analysis at Lock and Dam 9 begins

FY 2003
Final design and environmental analysis of Lock & Dam 10 construction completed
Final design and environmental analysis at Lock & Dam 9 completed
Preliminary design and geotechnical evaluation of Dam 11 begins

FY 2004
Renovation of the auxiliary dam and bay at Dam 10 completed
Final design for Lock and Dam 11 completed
Construction of auxiliary dam at Lock & Dam 9

FY 2005
Main dam at Lock & Dam 10 to be stabilized and raised 4-6 feet
Dam abutments and cut-off walls at Lock & Dam 10 to be stabilized
Main dam at Lock & Dam 9 to be stabilized and raised 4-6 feet

FY 2006
Begin renovation of lock structure at Lock & Dam 10
Lock and abutment walls at Lock & Dam 9 to be stabilized

FY 2007
Renovation of lock structure at Lock & Dam 10 completed
Main dam at Lock & Dam 11 stabilized and raised 4-6 feet

FY 2008
Lock and dam abutments at Lock & Dam 11 stabilized

Alternative Screening Results

Contents

- Water supply alternatives decision matrix
- Scoring summary
- Graph of scores
- Weighting factors
- Draft Summary of Water Supply Alternatives Matrix
- Draft Summary of Water Supply Alternatives Matrix (prior to scoring)

Guidance on use of this appendix:
This initial screening of alternatives used a scoring of 1 to 5, with 5 being most preferred, and 1 being least preferred. Each evaluation criteria was scored for each alternative. Cost scores are based on an algorithm using the present worth values shown. Weighted scores are derived by multiplying the 1 to 5 raw scores by the weighting factor. Each member of the Tech Group scored the alternatives, and their scores are designated as "Participant A", "Participant B", etc.

WATER SUPPLY ALTERNATIVE DECISION MATRIX
(5 = Best, 1 = Worst)

Bluegrass Area Development District
Lexington, KY

Prepared by O'Brien & Gere and presented at Workshop No. 4

Project Selection Criteria	Raw Score: Cincinnati Water Works	Louisville Water Company	Northern KY Water District	Withdrawals and WTP at Maysville/Dover	Withdrawals and WTP at Warsaw	Withdrawals and WTP in Central KY	New WTP at Pool 3 or lower	Purchase water from Carrollton/CCWD #1	Purchase water from Greater Fleming	Cincinnati Water Works (Alt. Route)	Weighting Factor
1. Adequate Capacity	5.0	5.0	5.0	5.0	5.0	1.0	5.0	5.0	5.0	5.0	18
2. Raw/Finished Water Quality	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	8
3. Cost	3.7	3.9	3.8	4.2	4.3	4.2	5.0	3.1	3.3	3.7	27
4. Implementability	5.0	5.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	5.0	27
5. Flexibility	5.0	5.0	3.0	5.0	5.0	1.0	3.0	5.0	5.0	5.0	20
Totals	21.7	21.9	17.8	20.2	20.3	12.2	21.0	21.1	21.3	21.7	100.0
Present Worth (40 years)	$ 8.07	$ 7.79	$ 7.90	$ 7.18	$ 6.95	$ 7.18	$ 6.03	$ 9.88	$ 9.05	$ 8.07	

Weighted Score: Cincinnati Water Works	Louisville Water Company	Northern KY Water District	Withdrawals and WTP at Maysville/Dover	Withdrawals and WTP at Warsaw	Withdrawals and WTP in Central KY	New WTP at Pool 3 or lower	Purchase water from Carrollton/CCWD #1	Purchase water from Greater Fleming	Cincinnati Water Works (Alt. Route)
90.0	90.0	90.0	90.0	90.0	18.0	90.0	90.0	90.0	90.0
24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
100.9	104.5	103.0	113.4	117.1	113.4	135.0	82.4	90.0	100.9
135.0	135.0	81.0	81.0	81.0	81.0	135.0	135.0	135.0	135.0
100.0	100.0	60.0	100.0	100.0	20.0	60.0	100.0	100.0	100.0
449.9	453.5	358.0	408.4	412.1	256.4	444.0	431.4	439.0	449.9

Name: **Participant A**

WATER SUPPLY ALTERNATIVE DECISION MATRIX
(5 = Best, 1 = Worst)

Bluegrass Area Development District
Lexington, KY

Prepared by O'Brien & Gere and presented at Workshop No. 4

Project Selection Criteria	Raw Score: Cincinnati Water Works	Louisville Water Company	Northern KY Water Distnct	Withdrawals and WTP at Maysville/Dover	Withdrawals and WTP at Warsaw	Withdrawals and WTP in Central KY	New WTP at Pool 3 or lower	Purchase water from Carrollton/CCWD #1	Purchase water from Greater Fleming	Cincinnati Water Works (Alt. Route)	Weighting Factor
1. Adequate Capacity	3.0	5.0	2.0	2.0	3.0	3.0	4.0	4.0	3.0	5.0	18
2. Raw/Finished Water Quality	5.0	5.0	5.0	5.0	5.0	3.0	4.0	4.0	4.0	5.0	8
3. Cost	3.7	3.9	3.8	4.2	4.3	4.2	5.0	3.1	3.3	3.7	27
4. Implementability	4.0	4.0	2.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	27
5. Flexibility	5.0	5.0	5.0	3.0	4.0	4.0	5.0	4.0	4.0	5.0	20
Totals	20.7	22.9	17.8	18.2	20.3	18.2	22.0	18.1	18.3	22.7	100.0
Present Worth (40 years)	$ 8.07	$ 7.79	$ 7.90	$ 7.18	$ 6.95	$ 7.18	$ 6.03	$ 9.68	$ 9.05	$ 8.07	

Weighted Score: Cincinnati Water Works	Louisville Water Company	Northern KY Water Distnct	Withdrawals and WTP at Maysville/Dover	Withdrawals and WTP at Warsaw	Withdrawals and WTP in Central KY	New WTP at Pool 3 or lower	Purchase water from Carrollton/CCWD #1	Purchase water from Greater Fleming	Cincinnati Water Works (Alt. Route)
54.0	90.0	36.0	36.0	54.0	54.0	72.0	72.0	54.0	90.0
40.0	40.0	40.0	40.0	40.0	24.0	32.0	32.0	32.0	40.0
100.9	104.5	103.0	113.4	117.1	113.4	135.0	82.4	90.0	100.9
108.0	108.0	54.0	108.0	108.0	108.0	108.0	81.0	108.0	108.0
100.0	100.0	100.0	60.0	80.0	80.0	100.0	80.0	80.0	100.0
402.9	442.5	333.0	357.4	399.1	379.4	447.0	347.4	364.0	438.9

Name: **Participant B**

WATER SUPPLY ALTERNATIVE DECISION MATRIX
(5 = Best, 1 = Worst)

Bluegrass Area Development District
Lexington, KY

Prepared by O'Brien & Gere and presented at Workshop No. 4

Project Selection Criteria	Raw Score: Cincinnati Water Works	Louisville Water Company	Northern KY Water District	Withdrawals and WTP at Maysville/Dover	Withdrawals and WTP at Warsaw	Withdrawals and WTP in Central KY	New WTP at Pool 3 or lower	Purchase water from Carrollton/CCWD #1	Purchase water from Greater Fleming	Cincinnati Water Works (Alt. Route)	Weighting Factor
1 Adequate Capacity	5.0	4.0	3.0	3.0	3.0	2.0	3.0	2.0	3.0	5.0	18
2 Raw/Finished Water Quality	5.0	5.0	5.0	4.0	3.0	2.0	3.0	2.0	3.0	5.0	8
3 Cost	3.7	3.9	3.8	4.2	4.3	4.2	5.0	3.1	3.3	3.7	27
4 Implementability	5.0	4.0	4.0	3.0	3.0	2.0	3.0	2.0	3.0	4.0	27
5 Flexibility	5.0	5.0	4.0	3.0	3.0	2.0	3.0	2.0	3.0	4.0	20
Totals	23.7	21.9	19.8	17.2	16.3	12.2	17.0	11.1	15.3	21.7	100.0
Present Worth (40 years)	$ 8.07	$ 7.79	$ 7.90	$ 7.18	$ 6.95	$ 7.18	$ 6.03	$ 9.88	$ 9.05	$ 8.07	

Weighted Score: Cincinnati Water Works	Louisville Water Company	Northern KY Water District	Withdrawals and WTP at Maysville/Dover	Withdrawals and WTP at Warsaw	Withdrawals and WTP in Central KY	New WTP at Pool 3 or lower	Purchase water from Carrollton/CCWD #1	Purchase water from Greater Fleming	Cincinnati Water Works (Alt. Route)
90.0	72.0	54.0	54.0	54.0	36.0	54.0	36.0	54.0	90.0
40.0	40.0	40.0	32.0	24.0	16.0	24.0	16.0	24.0	40.0
100.9	104.5	103.0	113.4	117.1	113.4	135.0	82.4	90.0	100.9
135.0	108.0	108.0	81.0	81.0	54.0	81.0	54.0	81.0	108.0
100.0	100.0	80.0	60.0	60.0	40.0	60.0	40.0	60.0	80.0
465.9	424.5	385.0	340.4	336.1	259.4	354.0	228.4	309.0	418.9

Name **Participant C**

WATER SUPPLY ALTERNATIVE DECISION MATRIX
(5 = Best, 1 = Worst)

Bluegrass Area Development District
Lexington, KY

Prepared by O'Brien & Gere and presented at Workshop No 4

Project Selection Criteria	Raw Score: Cincinnati Water Works	Louisville Water Company	Northern KY Water District	Withdrawals and WTP at Maysville/Dover	Withdrawals and WTP at Warsaw	Withdrawals and WTP in Central KY	New WTP at Pool 3 or lower	Purchase water from Carrollton/CCWD #1	Purchase water from Greater Fleming	Cincinnati Water Works (Alt. Route)	Weighting Factor
1. Adequate Capacity	4.0	5.0	3.0	3.0	3.0	3.0	2.0	3.0	3.0	4.0	18
2. Raw/Finished Water Quality	5.0	5.0	3.0	4.0	4.0	4.0	4.0	3.0	3.0	5.0	8
3. Cost	3.7	3.9	3.8	4.2	4.3	4.2	5.0	3.1	3.3	3.7	27
4. Implementability	3.0	4.0	2.0	4.0	4.0	3.0	5.0	4.0	4.0	4.0	27
5. Flexibility	2.0	4.0	4.0	4.0	4.0	2.0	3.0	3.0	4.0	3.0	20
Totals	17.7	21.9	15.8	19.2	19.3	16.2	19.0	16.1	17.3	19.7	100.0

Present Worth (40 years)	$ 8.07	$ 7.79	$ 7.90	$ 7.18	$ 6.95	$ 7.18	$ 6.03	$ 9.88	$ 9.05	$ 8.07

Weighted Score: Cincinnati Water Works	Louisville Water Company	Northern KY Water District	Withdrawals and WTP at Maysville/Dover	Withdrawals and WTP at Warsaw	Withdrawals and WTP in Central KY	New WTP at Pool 3 or lower	Purchase water from Carrollton/CCWD #1	Purchase water from Greater Fleming	Cincinnati Water Works (Alt. Route)
72.0	90.0	54.0	54.0	54.0	54.0	36.0	54.0	54.0	72.0
40.0	40.0	24.0	32.0	32.0	32.0	32.0	24.0	24.0	40.0
100.9	104.5	103.0	113.4	117.1	113.4	135.0	82.4	90.0	100.9
81.0	108.0	54.0	108.0	108.0	81.0	135.0	108.0	108.0	108.0
40.0	80.0	80.0	80.0	80.0	40.0	60.0	60.0	80.0	60.0
333.9	422.5	315.0	387.4	391.1	320.4	398.0	328.4	356.0	380.9

Name **Participant D**

WATER SUPPLY ALTERNATIVE DECISION MATRIX
(5 = Best, 1 = Worst)

Bluegrass Area Development District
Lexington, KY

Prepared by O'Brien & Gere and presented at Workshop No. 4

Project Selection Criteria	Raw Score: Cincinnati Water Works	Louisville Water Company	Northern KY Water District	Withdrawals and WTP at Maysville/Dover	Withdrawals and WTP at Warsaw	Withdrawals and WTP in Central KY	New WTP at Pool 3 or lower	Purchase water from Carrollton/CCWD #1	Purchase water from Greater Fleming	Cincinnati Water Works (Alt. Route)	Weighting Factor
1 Adequate Capacity	4.0	5.0	4.0	4.0	4.0	5.0	5.0	3.0	2.0	4.0	18
2 Raw/Finished Water Quality	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	8
3 Cost	3.7	3.9	3.8	4.2	4.3	4.2	5.0	3.1	3.3	3.7	27
4 Implementability	3.0	2.0	3.0	3.0	3.0	4.0	4.0	3.0	3.0	3.0	27
5 Flexibility	4.0	4.0	4.0	4.0	4.0	4.0	5.0	4.0	4.0	4.0	20
Totals	18.7	18.9	18.8	19.2	19.3	21.2	23.0	17.1	16.3	18.7	100.0

Present Worth (40 years)	$ 8.07	$ 7.79	$ 7.90	$ 7.18	$ 6.95	$ 7.18	$ 6.03	$ 9.88	$ 9.05	$ 8.07

Weighted Score: Cincinnati Water Works	Louisville Water Company	Northern KY Water District	Withdrawals and WTP at Maysville/Dover	Withdrawals and WTP at Warsaw	Withdrawals and WTP in Central KY	New WTP at Pool 3 or lower	Purchase water from Carrollton/CCWD #1	Purchase water from Greater Fleming	Cincinnati Water Works (Alt. Route)
72.0	90.0	72.0	72.0	72.0	90.0	90.0	54.0	36.0	72.0
32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
100.9	104.5	103.0	113.4	117.1	113.4	135.0	82.4	90.0	100.9
81.0	54.0	81.0	81.0	81.0	108.0	108.0	81.0	81.0	81.0
80.0	80.0	80.0	80.0	80.0	80.0	100.0	80.0	80.0	80.0
365.9	360.5	368.0	378.4	382.1	423.4	465.0	329.4	319.0	365.9

Name **Participant E**

WATER SUPPLY ALTERNATIVE DECISION MATRIX
(5 = Best, 1 = Worst)

Bluegrass Area Development District
Lexington, KY

Prepared by O'Brien & Gere and presented at Workshop No 4

Project Selection Criteria	Raw Score: Cincinnati Water Works	Louisville Water Company	Northern KY Water Distrct	Withdrawals and WTP at Maysville/Dover	Withdrawals and WTP at Warsaw	Withdrawals and WTP in Central KY	New WTP at Pool 3 or lower	Purchase water from Carrollton/CCWD #1	Purchase water from Greater Fleming	Cincinnati Water Works (Alt Route)	Weighting Factor
1. Adequate Capacity	3.0	5.0	1.0	5.0	5.0	5.0	5.0	3.0	3.0	5.0	18
2. Raw/Finished Water Quality	5.0	5.0	3.0	5.0	5.0	5.0	5.0	3.0	3.0	5.0	8
3. Cost	3.7	3.9	3.8	4.2	4.3	4.2	5.0	3.1	3.3	3.7	27
4. Implementability	4.0	4.0	3.0	4.0	3.0	2.0	5.0	4.0	5.0	4.0	27
5. Flexibility	4.0	5.0	3.0	4.0	3.0	2.0	5.0	3.0	3.0	5.0	20
Totals	19.7	22.9	13.8	22.2	20.3	18.2	25.0	16.1	17.3	22.7	100.0
Present Worth (40 years)	$ 8.07	$ 7.79	$ 7.90	$ 7.18	$ 6.95	$ 7.18	$ 6.03	$ 9.88	$ 9.05	$ 8.07	

Weighted Score: Cincinnati Water Works	Louisville Water Company	Northern KY Water Distrct	Withdrawals and WTP at Maysville/Dover	Withdrawals and WTP at Warsaw	Withdrawals and WTP in Central KY	New WTP at Pool 3 or lower	Purchase water from Carrollton/CCWD #1	Purchase water from Greater Fleming	Cincinnati Water Works (Alt Route)
54.0	90.0	18.0	90.0	90.0	90.0	90.0	54.0	54.0	90.0
40.0	40.0	24.0	40.0	40.0	40.0	40.0	24.0	24.0	40.0
100.9	104.5	103.0	113.4	117.1	113.4	135.0	82.4	90.0	100.9
108.0	108.0	81.0	108.0	81.0	54.0	135.0	108.0	135.0	108.0
80.0	100.0	60.0	80.0	60.0	40.0	100.0	60.0	60.0	100.0
382.9	442.5	286.0	431.4	388.1	337.4	500.0	328.4	363.0	438.9

Name Participant F

Bluegrass Area Development District
Lexington, KY

Water Supply Alternative
Scoring Summary

Prepared by O'Brien & Gere and presented at Workshop No. 4

Raw Scores										
Name	Cincinnati Water Works	Louisville Water Company	Northern KY Water District	Withdrawals and WTP at Maysville/Dover	Withdrawals and WTP at Warsaw	Withdrawals and WTP in Central KY	New WTP at Pool 3 or lower	Purchase water from Carrollton/CC WD #1	Purchase water from Greater Fleming	Cincinnati Water Works (Alt. Route)
A	21.7	21.9	17.8	20.2	20.3	12.2	21.0	21.1	21.3	21.7
B	20.7	22.9	17.8	18.2	20.3	18.2	22.0	18.1	18.3	22.7
C	23.7	21.9	19.8	17.2	16.3	12.2	17.0	11.1	15.3	21.7
D	17.7	21.9	15.8	19.2	19.3	16.2	19.0	16.1	17.3	19.7
E	18.7	18.9	18.8	19.2	19.3	21.2	23.0	17.1	16.3	18.7
F	19.7	22.9	13.8	22.2	20.3	18.2	25.0	16.1	17.3	22.7
Average	**20.4**	**21.7**	**17.3**	**19.4**	**19.3**	**16.4**	**21.2**	**16.6**	**17.7**	**21.2**

Water Supply Alternative
Scoring Summary

Weighted Scores										
Name	Cincinnati Water Works	Louisville Water Company	Northern KY Water District	Withdrawals and WTP at Maysville/Dover	Withdrawals and WTP at Warsaw	Withdrawals and WTP in Central KY	New WTP at Pool 3 or lower	Purchase water from Carrollton/CC WD #1	Purchase water from Greater Fleming	Cincinnati Water Works (Alt. Route)
A	449.9	453.5	358.0	408.4	412.1	256.4	444.0	431.4	439.0	449.9
B	402.9	442.5	333.0	357.4	399.1	379.4	447.0	347.4	364.0	438.9
C	465.9	424.5	385.0	340.4	336.1	259.4	354.0	228.4	309.0	418.9
D	333.9	422.5	315.0	387.4	391.1	320.4	398.0	328.4	356.0	380.9
E	365.9	360.5	368.0	378.4	382.1	423.4	465.0	329.4	319.0	365.9
F	382.9	442.5	286.0	431.4	388.1	337.4	500.0	328.4	363.0	438.9
Average	**400.2**	**424.3**	**340.9**	**383.9**	**384.8**	**329.4**	**434.7**	**332.2**	**358.3**	**415.5**

Bluegrass Area Development District
Lexington, KY

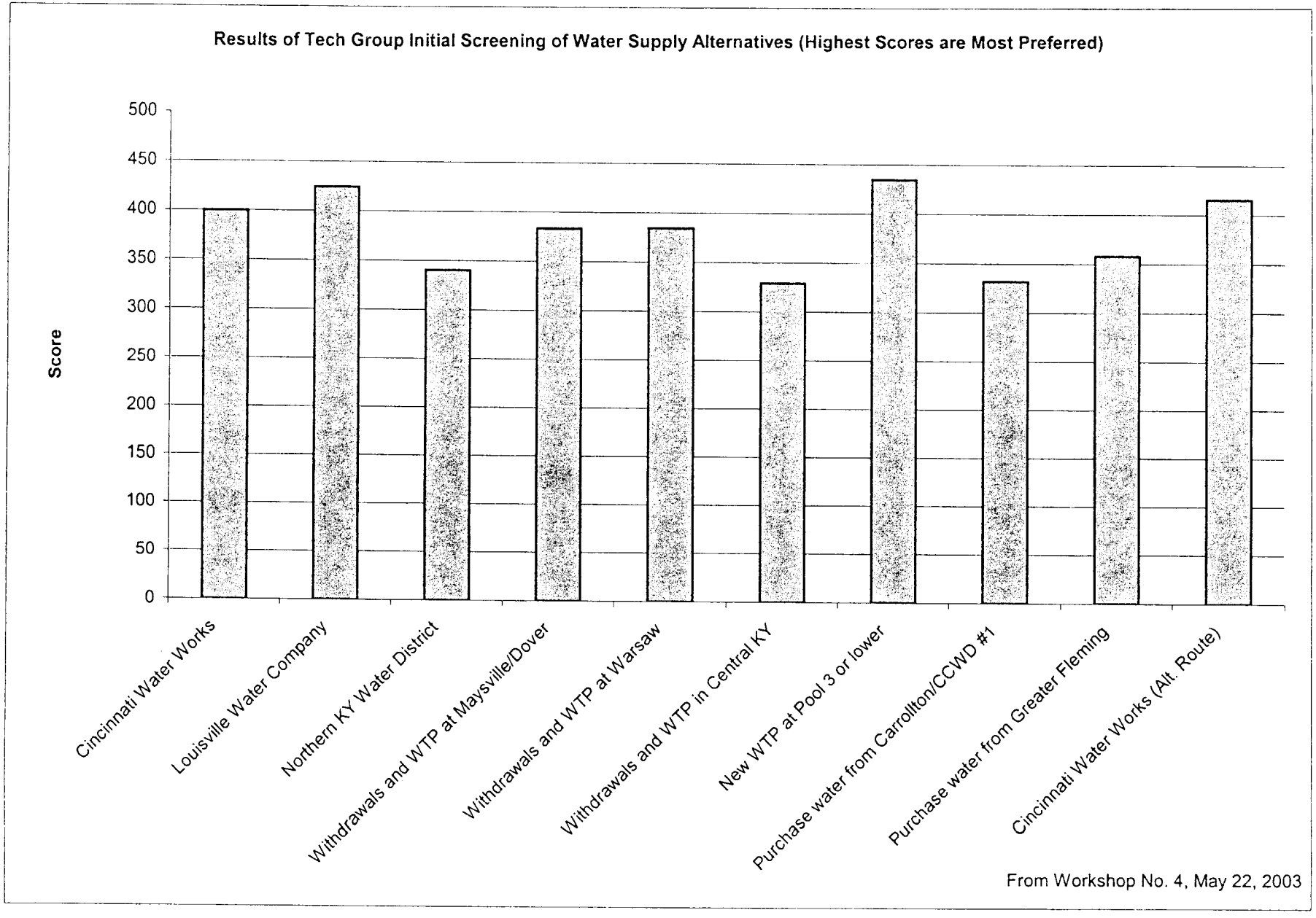
Water Supply Alternative
Scoring Summary
Average of all responses

Prepared by O'Brien & Gere and presented at Workshop No. 4

Raw Score											
Property	Cincinnati Water Works	Louisville Water Company	Northern KY Water District	Withdrawals and WTP at Maysville/Dover	Withdrawals and WTP at Warsaw	Withdrawals and WTP in Central KY	New WTP at Pool 3 or lower	Purchase water from Carrollton/C CWD #1	Purchase water from Greater Fleming	Cincinnati Water Works (Alt. Route)	Weighting Factor
1. Adequate Capacity	4.0	4.8	3.0	3.7	3.8	3.2	4.0	3.3	3.2	4.7	18.0
2. Raw/Finished Water Quality	4.5	4.5	3.8	4.2	4.0	3.5	3.8	3.2	3.3	4.5	8.0
3. Cost	3.7	3.9	3.8	4.2	4.3	4.2	5.0	3.1	3.3	3.7	27.0
4. Implementability	4.0	3.8	2.8	3.5	3.3	3.0	4.3	3.5	4.0	4.0	27.0
5. Flexibility	4.2	4.7	3.8	3.8	3.8	2.5	4.0	3.5	3.8	4.3	20.0
Totals	**20.4**	**21.7**	**17.3**	**19.4**	**19.3**	**16.4**	**21.2**	**16.6**	**17.7**	**21.2**	**100.0**

Water Supply Alternative
Scoring Summary
Average of all responses

Weighted Score										
Property	Cincinnati Water Works	Louisville Water Company	Northern KY Water District	Withdrawals and WTP at Maysville/Dover	Withdrawals and WTP at Warsaw	Withdrawals and WTP in Central KY	New WTP at Pool 3 or lower	Purchase water from Carrollton/C CWD #1	Purchase water from Greater Fleming	Cincinnati Water Works (Alt. Route)
1. Adequate Capacity	72.0	87.0	54.0	66.0	69.0	57.0	72.0	60.0	57.0	84.0
2. Raw/Finished Water Quality	36.0	36.0	30.7	33.3	32.0	28.0	30.7	25.3	26.7	36.0
3. Cost	100.9	104.5	103.0	113.4	117.1	113.4	135.0	82.4	90.0	100.9
4. Implementability	108.0	103.5	76.5	94.5	90.0	81.0	117.0	94.5	108.0	108.0
5. Flexibility	83.3	93.3	76.7	76.7	76.7	50.0	80.0	70.0	76.7	86.7
Totals	**400.2**	**424.3**	**340.9**	**383.9**	**384.8**	**329.4**	**434.7**	**332.2**	**358.3**	**415.5**


Results of Tech Group Initial Screening of Water Supply Alternatives (Highest Scores are Most Preferred)
Score
500
450
400
350
300
250
200
150
100
50
0
Cincinnati Water Works
Louisville Water Company
Northern KY Water District
Withdrawals and WTP at Maysville/Dover
Withdrawals and WTP at Warsaw
Withdrawals and WTP in Central KY
New WTP at Pool 3 or lower
Purchase water from Carrollton/CCWD #1
Purchase water from Greater Fleming
Cincinnati Water Works (Alt. Route)
From Workshop No. 4, May 22, 2003

BGADD/BWSC - Weighting Factors

O'Brien & Gere
May-03

		Adequate Capacity	Raw/Finished Water Quality	Cost	Implementability	Flexibility	Sum	Weighting Factor
#1	Adequate Capacity		5	2	1	3	11	18
#2	Raw/Finished Water Quality	1		1	1	2	5	8
#3	Cost	4	5		3	4	16	27
#4	Implementability	5	5	3		3	16	27
#5	Flexibility	3	4	2	3		12	20
							60 Total	**100 Total**

Note: Rank the relative importance of the left-column criteria against the top-row criteria on a scale of 1 to 5 (1 = much less important, 3 = equivalent, 5 = much greater importance).

DEFINITIONS

#1 **Adequate Capacity** = Reliable quantity of raw water and finished water to meet projected demands through the planning period. This criteria addresses interruptibility of sources of supply.

#2 **Raw/Finished Water Quality** = Raw and finished water quality that meets existing water quality requirements, and can readily achieve future anticipated regulations. This criteria also addresses water quality preferences such as taste.

#3 **Cost** = The present worth cost for proposed raw and finished water improvements, including capital, operating and maintenance costs. This cost could include allowance for additional KRA funding for out-of-basin transfers.

#4 **Implementability** = The relative ease of implementing the proposed improvements in time to meet projected demands. This criterion considers the potential that regulatory permitting, public acceptance, property acquisition, or constructability issues could delay implementation.

#5 **Flexibility** = The ability to phase implementation and spread the cost over time, while still meeting projected demands.

Draft Summary of Water Supply Alternatives Matrix (Revised to show only the eight options selected at Workshop #4, on May 28, 2003)

Raw Water Source	Description	Evaluation Criteria				
		Adequate Capacity	Raw/Finished Water Quality	Cost	Implementability	Flexibility
Ohio River						
Purchase Finished Water	Cincinnati Water Works (via the Boone Florence Water Commission)	- Minimum 10-15 mgd currently available via Boone Florence Regional Water Commission. - Full 67 mgd is possible. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is highly treated Ohio River water. - Finished water quality is/should be very good. Finished water quality in pipeline is not expected to noticeably deteriorate even under low demand conditions. Disinfectant residual good for 7 to 10 days which equates to a low "maintenance" flow through the pipeline. - Granular activated carbon used in water treatment process to remove synthetic organic chemicals that can result from spills of hazardous materials or substances.		- Constructing a pipeline through the Boone Florence service area would involve wheeling through that utility. - Public acceptance of a treated water pipeline from Northern Kentucky to Lexington could be an issue, although no known opposition to the pipeline. - Construction of the pipeline is a relatively quick project. Construction schedule for additional treatment capacity (beyond current availability) will be dependent on both Cincinnati and Boone Florence (if routed through BF. - Nationally recognized organization with a well-established track record serving large wholesale customers. Water treatment occurs at two plants with a capacity of 235 mgd and 16 mgd which indicates capability to produce large amounts of water. - Long treated water pipeline could be used to provide supply to customers along pipeline route with supply shortfalls that are not members of BWSC. - Additional piping under the Ohio River is required to get beyond 30 mgd of existing capacity. - Limited regulatory permitting anticipated.	- Phasing is possible if multiple pipelines are used. - Ohio River is capable of meeting demands beyond 2020. - Expandability of water treatment and associated facilities to meet water needs beyond the planning period will be dependent on the desire of the purveyor to execute an agreement with BWSC for additional capacity.
Purchase Finished Water	Cincinnati Water Works (via eastern route through Bracken County)	- Full 67 mgd is possible. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is highly treated Ohio River water. - Finished water quality is/should be very good. Finished water quality in pipeline is not expected to noticeably deteriorate even under low demand conditions. Disinfectant residual good for 7 to 10 days which equates to a low "maintenance" flow through the pipeline. - Granular activated carbon used in water treatment process to remove synthetic organic chemicals that can result from spills of hazardous materials or substances.		- Public acceptance of a treated water pipeline from Northern Kentucky to Lexington could be an issue, although no known opposition to the pipeline. - Construction of the pipeline is a relatively quick project. Construction schedule for additional treatment capacity (beyond current availability) will be dependent on Cincinnati . - Nationally recognized organization with a well-established track record serving large wholesale customers. Water treatment occurs at two plants with a capacity of 235 mgd and 16 mgd which indicates capability to produce large amounts of water. - Long treated water pipeline could be used to provide supply to customers along pipeline route with supply shortfalls that are not members of BWSC. - New piping under the Ohio River is required. - Limited regulatory permitting anticipated.	- Phasing is possible if multiple pipelines are used. - Ohio River is capable of meeting demands beyond 2020. - Expandability of water treatment and associated facilities to meet water needs beyond the planning period will be dependent on the desire of the purveyor to execute an agreement with BWSC for additional capacity.
Purchase Finished Water	Louisville Water Company	- 25 mgd is currently available from the 60-inch water main at I-265 and US 60. - Full 67 mgd possible with construction of transmission to the treatment plant, and additional WTP capacity. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is/will be highly treated Ohio River/riverbank aquifer water. - Finished water quality is/should be very good. Finished water quality in pipeline is not expected to noticeably deteriorate even under low demand conditions. Disinfectant residual good for 7 to 10 days which equates to a low "maintenance" flow through the		- Public acceptance of a treated water pipeline from Louisville to Lexington could be an issue. - Construction of the pipeline is a relatively quick project. Construction schedule for additional treatment capacity (beyond current availability) will be dependent on purveyor. - Crossing of KY river will be difficult contraction (tunnel required).	- Phasing is possible if multiple pipelines are used. - Ohio River/RBI is capable of meeting demands beyond 2020. - Expandability of water treatment and associated facilities to meet water needs beyond the planning period will be dependent on the desire of the purveyor to execute an agreement with BWSC for

Raw Water Source	Description	Evaluation Criteria				
		Adequate Capacity	Raw/Finished Water Quality	Cost	Implementability	Flexibility
			pipeline. - Member of the *Partnership for Safe Water* which includes water suppliers striving to exceed current water quality goals through optimization of existing facilities.		- Pipeline could be constructed in I-64 right-of-way. - Minimal permitting required for a linear project, such as pipeline. - Nationally recognized organization with well-established track record serving large wholesale customers. Water treatment at two plants with capacities of 180 mgd and 45 mgd which indicates capability to produce large amounts of water. - Limited regulatory permitting anticipated.	additional capacity.
Ohio River						
Raw Water	Withdrawals and WTP at Maysville/Dover	- Ohio River is an abundant and reliable source that can support the full 67 mgd withdrawal. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is raw water from the Ohio River. - Based on experience at Cincinnati, finished water quality in pipeline is not expected to noticeably deteriorate even under low demand conditions.		- Construction of the pipeline is a relatively quick project. BWSC can control schedule for construction of facilities independent of other purveyors. - Regulatory permits will be required for construction of the river intake, but should be readily obtainable. - Overall somewhat longer time req'd than pipeline only projects.	- BWSC has flexibility to make independent decisions on water treatment production rates. - BWSC has an independent decision on expansion of water treatment and associated facilities to meet water needs beyond the planning period.
Raw Water	Withdrawals and WTP at Warsaw	- Ohio River is an abundant and reliable source that can support the full 67 mgd withdrawal. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is treated water from the Ohio River. - Based on experience at Cincinnati, finished water quality in pipeline is not expected to noticeably deteriorate even under low demand conditions.		- Construction of the pipeline is a relatively quick project. BWSC can control schedule for construction of facilities independent of other purveyors. - Regulatory permits will be required for construction of the river intake. - Overall somewhat longer time req'd than - pipeline only projects.	- BWSC has flexibility to make independent decisions on water treatment production rates. - BWSC has an independent decision on expansion of water treatment and associated facilities to meet water needs beyond the planning period.
Kentucky River						
Kentucky River	Raise Dam 10	Baseline option included in each alternative.				
Kentucky River	Utilize negative consumptive use above Dam 4	Baseline option included in each alternative.				
Kentucky River	New WTP at Pool 3 utilizing negative consumptive use	- KDOW indicated that withdrawal of full 67 mgd is possible. - Permitted withdrawal should continue to increase through the planning period as negative consumptive use increases (West Hickman WWTP, Town Branch WWTP, and McManis WWTP). - Sole reliance on Kentucky River for supply to a majority of customers in central Kentucky is a potential concern, however use of multiple pools partially mitigates.	- Source is treated water from the Kentucky River.		- Satisfies mission to utilize Kentucky River. - Treated water from Pool 3 could be used to provide supply to customers in the vicinity of Pool 3 with supply shortfalls that are outside of the BWSC. - Heavy reliance of region on Kentucky River for supply increases potential impact associated with temporary loss of supply due to contamination. - Construction of the intake in Pool 3 would require Federal and State regulatory permits as well as engineering and environmental studies. It is likely that these studies could be very limited in scope and expedited because the construction in the pool is limited to the intake footprint and the change in flow regime downstream is to be offset by negative consumptive use inputs. - BWSC can control schedule for construction of facilities independent of other purveyors. -	- BWSC has flexibility to make independent decisions on water treatment production rates. - Provides opportunity to stage construction of the water treatment plant facilities and to expand beyond the planning period. - BWSC has an independent decision on expansion of water treatment and associated facilities to meet water needs beyond the planning period.

Raw Water Source	Description	Evaluation Criteria				
		Adequate Capacity	Raw/Finished Water Quality	Cost	Implementability	Flexibility
Groundwater						
Aquifer near Carrollton	Purchase water from Carrollton Utilities/CCWD	- USGS has completed studies which indicate that the aquifer is capable of providing the full 67 mgd. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is groundwater from along bank of Ohio River. - Finished water is/should be very good. Very low organics/DBP levels anticipated. - Will require softening		- Less than 4 mgd of current municipal treatment capacity and therefore limited experience with production of large amounts of water. - Formation of Carroll Regional Water Commission would be required which would include: Carroll County Water District #1, Carrollton Utilities, and West Carroll Water District. - Construction schedule for additional treatment capacity (beyond current availability) will be dependent on purveyor. - Limited regulatory permitting.	- Ability to scale back water treatment production capacity will be limited to some extent by terms of agreement. - Expandability of water treatment and associated facilities to meet water needs beyond the planning period will be dependent on the desire of the purveyor to execute an agreement with BWSC for additional capacity.
Aquifer near Maysville	Purchase water from Greater Fleming	- Minimum 10-15 mgd available. - Additional studies required to assess supply capability of aquifer beyond 10-15 mgd. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is groundwater from along bank of Ohio River. - Will likely require softening - Finished water is/should be very good.		- Limited opportunities to connect in future customers along the pipeline route that are outside of BWSC due to lack of significant demand centers along route. - Construction schedule for additional treatment capacity (beyond current availability) will be dependent on purveyor. - Limited regulatory permitting.	- Ability to scale back water treatment production capacity will be limited to some extent by terms of agreement. - Expandability of water treatment and associated facilities to meet water needs beyond the planning period will be dependent on the desire of the purveyor to execute an agreement with BWSC for additional capacity.

Draft Summary of Water Supply Alternatives Matrix (From Workshop No. 4 - Prior to Scoring)

Raw Water Source	Description	Evaluation Criteria				
		Adequate Capacity	Raw/Finished Water Quality	Cost	Implementability	Flexibility
Ohio River						
Purchase Finished Water	Cincinnati Water Works (via the Boone Florence Water Commission)	- Minimum 10-15 mgd currently available via Boone Florence Regional Water Commission. - Full 67 mgd is possible. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is highly treated Ohio River water. - Finished water quality is/should be very good. Finished water quality in pipeline is not expected to noticeably deteriorate even under low demand conditions. Disinfectant residual good for 7 to 10 days which equates to a low "maintenance" flow through the pipeline. - Granular activated carbon used in water treatment process to remove synthetic organic chemicals that can result from spills of hazardous materials or substances.		- Constructing a pipeline through the Boone Florence service area would involve wheeling through that utility. - Public acceptance of a treated water pipeline from Northern Kentucky to Lexington could be an issue, although no known opposition. - Construction of the pipeline is a relatively quick project. Construction schedule for additional treatment capacity (beyond current availability) will be dependent on both Cincinnati and Boone Florence (if routed through BF. - Nationally recognized organization with a well-established track record serving large wholesale customers. Water treatment occurs at two plants with a capacity of 235 mgd and 16 mgd which indicates capability to produce large amounts of water. - Long treated water pipeline could be used to provide supply to customers along pipeline route with supply shortfalls that are not members of BWSC. - Additional piping under the Ohio River is required to get beyond 30 mgd of existing capacity. - Limited regulatory permitting anticipated.	- Phasing is possible if multiple pipelines are used. - Ohio River is capable of meeting demands beyond 2020. - Expandability of water treatment and associated facilities to meet water needs beyond the planning period will be dependent on the desire of the purveyor to execute an agreement with BWSC for additional capacity.
Purchase Finished Water	Louisville Water Company	- 25 mgd is currently available from the 60-inch water main at I-265 and US 60. - Full 67 mgd possible with construction of transmission to the treatment plant. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is/will be highly treated Ohio River/riverbank aquifer water. - Finished water quality is/should be very good. Finished water quality in pipeline is not expected to noticeably deteriorate even under low demand conditions. Disinfectant residual good for 7 to 10 days which equates to a low "maintenance" flow through the pipeline. - Member of the *Partnership for Safe Water* which includes water suppliers striving to exceed current water quality goals through optimization of existing facilities.		- Public acceptance of a treated water pipeline from Louisville to Lexington could be an issue. - Construction of the pipeline is a relatively quick project. Construction schedule for additional treatment capacity (beyond current availability) will be dependent on purveyor. - Crossing of KY river will be difficult contraction (tunnel required). - Pipeline could be constructed in I-64 right-of-way. - Minimal permitting required for a linear project, such as pipeline. - Nationally recognized organization with well-established track record serving large wholesale customers. Water treatment at two plants with capacities of 180 mgd and 45 mgd which indicates capability to produce large amounts of water. - Limited regulatory permitting anticipated.	- Phasing is possible if multiple pipelines are used. - Ohio River/RBI is capable of meeting demands beyond 2020. - Expandability of water treatment and associated facilities to meet water needs beyond the planning period will be dependent on the desire of the purveyor to execute an agreement with BWSC for additional capacity.
Purchase Finished Water	Northern KY Water District	- Minimum 10-15 mgd available. - Full 67 mgd possible. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is treated Ohio River water. - Finished water is/should be very good. - Finished water quality in pipeline is not expected to noticeably deteriorate even under low demand conditions. Disinfectant residual good for 7 to 10 days which equates to a low "maintenance" flow through the pipeline.		- Substantial additional infrastructure required in NKWD to bring supply to county line. - Construction of the pipeline is a relatively quick project. Construction schedule for additional treatment capacity (beyond current availability) will be dependent on purveyor. - Public acceptance of a treated water pipeline from Northern Kentucky to Lexington could be an issue, although no known opposition.	- Phasing is possible if multiple pipelines are used. - Ohio River is capable of meeting demands beyond 2020. - Expandability of water treatment and associated facilities to meet water needs beyond the planning period will be dependent on the desire of the purveyor to execute an agreement with BWSC for additional capacity.

Raw Water Source	Description	Evaluation Criteria				
		Adequate Capacity	Raw/Finished Water Quality	Cost	Implementability	Flexibility
Ohio River						
Raw Water	Withdrawals and WTP at Maysville/Dover	- Ohio River is an abundant and reliable source that can support the full 67 mgd withdrawal. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is raw water from the Ohio River. - Based on experience at Cincinnati, finished water quality in pipeline is not expected to noticeably deteriorate even under low demand conditions.		- Construction of the pipeline is a relatively quick project. BWSC can control schedule for construction of facilities independent of other purveyors. - Regulatory permits will be required for construction of the river intake, but should be readily obtainable. - Overall somewhat longer time req'd than pipeline only projects.	- BWSC has flexibility to make independent decisions on water treatment production rates. - BWSC has an independent decision on expansion of water treatment and associated facilities to meet water needs beyond the planning period.
Raw Water	Withdrawals and WTP at Warsaw	- Ohio River is an abundant and reliable source that can support the full 67 mgd withdrawal. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is treated water from the Ohio River. - Based on experience at Cincinnati, finished water quality in pipeline is not expected to noticeably deteriorate even under low demand conditions.		- Construction of the pipeline is a relatively quick project. BWSC can control schedule for construction of facilities independent of other purveyors. - Regulatory permits will be required for construction of the river intake. - Overall somewhat longer time req'd than - pipeline only projects.	- BWSC has flexibility to make independent decisions on water treatment production rates. - BWSC has an independent decision on expansion of water treatment and associated facilities to meet water needs beyond the planning period.
Raw Water	Withdrawals and WTP in central KY	- Ohio River is an abundant and reliable source that can support the full 67 mgd withdrawal. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is treated water from the Ohio River. - Addresses potential water quality concerns related to transporting finished water for long distances by piping raw water and providing treatment near demand center.		- Construction of the pipeline is a relatively quick project. BWSC can control schedule for construction of facilities independent of other purveyors. - Regulatory permits will be required for construction of the river intake.	- BWSC has flexibility to make independent decisions on water treatment production rates. - BWSC has an independent decision on expansion of water treatment and associated facilities to meet water needs beyond the planning period.
Kentucky River						
Kentucky River	Raise Dam 10	Baseline option included in each alternative.				
Kentucky River	Utilize negative consumptive use above Dam 4	Baseline option included in each alternative.				
Kentucky River ***Alternative Removed Prior to Scoring***	Pumpback from lower pools to upper pools (Pool 6 to Pool 9)	- Permitted withdrawal should continue to increase through the planning period as negative consumptive use increases (West Hickman WWTP). - Sole reliance on Kentucky River for supply to a majority of customers in central Kentucky is a potential concern from an interruptibility standpoint, however the use of several different pools partially mitigates.	- Source is treated water from the Kentucky River.		- Satisfies mission to utilize Kentucky River. - Expansion of existing KAWC intake and raw water facilities in Pool 9 is difficult construction due to steep slopes. - Heavy reliance of region on Kentucky River for supply increases potential impact associated with temporary loss of supply due to contamination. - BWSC can control schedule for construction of facilities independent of other purveyors. - Regulatory permits will be required for construction of the river intake in Pool 6.	- BWSC has flexibility to make independent decisions on water treatment production rates. - BWSC has an independent decision on expansion of water treatment and associated facilities to meet water needs beyond the planning period.
Kentucky River	New WTP at Pool 3 utilizing negative consumptive use	- KDOW indicated that withdrawal of full 67 mgd is possible. - Permitted withdrawal should continue to increase through the planning period as negative consumptive use increases (West Hickman WWTP, Town Branch WWTP, and McManis WWTP). - Sole reliance on Kentucky River for supply to a majority of customers in central Kentucky is a potential concern, however use of multiple pools partially mitigates.	- Source is treated water from the Kentucky River.		- Satisfies mission to utilize Kentucky River. - Treated water from Pool 3 could be used to provide supply to customers in the vicinity of Pool 3 with supply shortfalls that are outside of the BWSC. - Heavy reliance of region on Kentucky River for supply increases potential impact associated with temporary loss of supply due to contamination. - Construction of the intake in Pool 3 would require Federal and State regulatory permits as well as engineering and environmental studies. It is likely that these studies could	- BWSC has flexibility to make independent decisions on water treatment production rates. - Provides opportunity to stage construction of the water treatment plant facilities and to expand beyond the planning period. - BWSC has an independent decision on expansion of water treatment and associated facilities to meet water needs beyond the planning period.

Raw Water Source	Description	Evaluation Criteria				
		Adequate Capacity	Raw/Finished Water Quality	Cost	Implementability	Flexibility
					be very limited in scope and expedited because the construction in the pool is limited to the intake footprint and the change in flow regime downstream is to be offset by negative consumptive use inputs. - BWSC can control schedule for construction of facilities independent of other purveyors. -	
Groundwater						
Aquifer near Carrollton	Purchase water from Carrollton Utilities/CCWD	- USGS has completed studies which indicate that the aquifer is capable of providing the full 67 mgd. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is groundwater from along bank of Ohio River. - Finished water is/should be very good. Very low organics/DBP levels anticipated. - Will require softening		- Less than 4 mgd of current municipal treatment capacity and therefore limited experience with production of large amounts of water. - Formation of Carroll Regional Water Commission would be required which would include: Carroll County Water District #1, Carrollton Utilities, and West Carroll Water District. - Construction schedule for additional treatment capacity (beyond current availability) will be dependent on purveyor. - Limited regulatory permitting.	- Ability to scale back water treatment production capacity will be limited to some extent by terms of agreement. - Expandability of water treatment and associated facilities to meet water needs beyond the planning period will be dependent on the desire of the purveyor to execute an agreement with BWSC for additional capacity.
Aquifer near Carrollton ***Alternative Removed Prior to Scoring***	BWSC well system	- USGS has completed studies which indicate that the aquifer is capable of proving the full 67 mgd. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is groundwater from along bank of Ohio River. - Finished water is/should be very good. Very low organics/DBP levels anticipated. - Will require softening		- BWSC can control schedule for construction of facilities independent of other purveyors. - Limited regulatory permitting. - May be opposed by local jurisdictions unless implemented through new Commission (above).	- BWSC has flexibility to make independent decisions on water treatment production rates. - BWSC has an independent decision on expansion of water treatment and associated facilities to meet water needs beyond the planning period.
Aquifer near Maysville	Purchase water from Greater Fleming	- Minimum 10-15 mgd available. - Additional studies required to assess supply capability of aquifer beyond 10-15 mgd. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is groundwater from along bank of Ohio River. - Will likely require softening - Finished water is/should be very good.		- Limited opportunities to connect in future customers along the pipeline route that are outside of BWSC due to lack of significant demand centers along route. - Construction schedule for additional treatment capacity (beyond current availability) will be dependent on purveyor. - Limited regulatory permitting.	- Ability to scale back water treatment production capacity will be limited to some extent by terms of agreement. - Expandability of water treatment and associated facilities to meet water needs beyond the planning period will be dependent on the desire of the purveyor to execute an agreement with BWSC for additional capacity.
Aquifer near Maysville ***Alternative Removed Prior to Scoring***	BWSC well system	- Additional studies required to assess supply capability of aquifer beyond 10-15 mgd. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is groundwater from along bank of Ohio River. - Will likely require softening - Finished water is/should be very good.		- Limited opportunities to connect in future customers along the pipeline route that are outside of BWSC due to lack of significant demand centers along route. - BWSC can control schedule for construction of facilities independent of other purveyors. - Limited regulatory permitting.	- BWSC has flexibility to make independent decisions on water treatment production rates. - BWSC has an independent decision on expansion of water treatment and associated facilities to meet water needs beyond the planning period.
Aquifer near Louisville ***Alternative Removed Prior to Scoring***	Indiana wells across Ohio River from Louisville	- Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is groundwater from along bank of Ohio River. - Will likely require softening - Finished water is/should be very good.		- BWSC can control schedule for construction of facilities independent of other purveyors. - Limited regulatory permitting.	- BWSC has flexibility to make independent decisions on water treatment production rates. - BWSC has an independent decision on expansion of water treatment and associated facilities to meet water needs beyond the planning period.

Request for Proposal from Water Suppliers

Contents

- **Greater Cincinnati Water Works**
- **Louisville Water Company**
- **Proposed Carroll County Regional Water Commission**
- **Greater Fleming County Regional Water Commission**

June 13, 2003

Mr. David E. Rager, Director
Greater Cincinnati Water Works
4747 Spring Grove Avenue
Cincinnati, Ohio 45232-1986

Re: Request for Proposal to supply water to
Bluegrass Water Supply Consortium

Dear Mr. Rager:

On behalf of the Bluegrass Water Supply Consortium, the Bluegrass Area Development District is pleased to inform you that purchase of finished water from the Greater Cincinnati Water Works (GCWW) is one of eight alternatives that remain under consideration as near term options for their additional water supply. This determination was the result of the preliminary screening of alternatives performed at Public Workshop No. 4, on May 28, 2003, based in part upon the information provided at your Interview on May 13, 2003. We now request your written proposal for the sale of finished water, as described below. This proposal will be used in the selection of a recommended option(s). It should be as accurate as possible, recognizing that some details of any future agreement for water purchase would be resolved subsequently. We request your proposal for two options; in each case, please address the following items:

Supply via Boone Florence Regional Water Commission

1. Quantity, location and pressure of finished water- Based on your prior submission, BWSC requests the cost to supply an initial guaranteed capacity of approximately 15 mgd at a location in southern Boone County via Boone Florence Regional Water Commission's existing transmission mains. Also provide the cost to supply an initial guaranteed capacity of approximately 45 mgd at the same location, or at another location that you identify. Please confirm that you would provide water at an hydraulic gradient of 1080 feet msl.

2. Please confirm that your treated water hardness level is less than 150 mg/1.

3. Minimum purchase- For each of the two alternatives, please assume that BWSC will contract to purchase a minimum annual average daily quantity equal to 5.0 mgd if the contracted capacity is 15 mgd, or 9.0 mgd if the contracted capacity is 45 mgd.

4. Annual "fixed" fees - Provide the proposed annual "fixed" fees for the commitment of the above guaranteed quantities of finished water, including the provision of the above minimum purchase. Please identify any proposed adjustment over time for "cost of living" or other purposes, and include any fees that would be charged by Boone Florence Regional Water Commission. Please assume:

- BWSC would pay the full annual fixed fee regardless of whether they took the full minimum on any day.

- A 20-year contract term with, with provisions for renewal for at least an additional 30 years.

5. "Variable" fees - Provide the fee per 1,000 gallons sold beyond the daily minimum, up to the full guaranteed capacity. Please include any fees that would be charged by Boone Florence Regional Water Commission. If you propose a variable fee, please explain the rationale for such a fee.

6. Alternate proposals- We welcome alternate proposals or supplemental information that may help us in our evaluation. For example, please explain if there are some intermediate capacities such as 25, 30 or 35 mgd that define a " breakpoint" in your cost to serve. We also request any back-up information showing your basis for capital and operating costs, so that we can assess whether we are comparing " apples and apples".

Supply via Bracken County

1. Quantity, location and pressure of finished water- BWSC requests the cost to supply approximately 45 mgd across the Ohio River, to a pumping station constructed in Bracken County at a convenient location to be determined. The pumping station would be owned and operated by GCWW, and would provide an hydraulic gradient of 1080 feet msl to the BWSC, immediately outside the pumping station.

2. Please confirm that your treated water hardness level is less than 150 mg/1.

3. Minimum purchase- Please assume that BWSC will contract to purchase a minimum annual average daily quantity equal to 5 mgd if the contracted capacity is 15 mgd or 20% of the full capacity if the contracted capacity is 25 gpd or greater.

4. Annual "fixed" fees - Provide the proposed annual "fixed" fees for the commitment of the above guaranteed quantities of finished water, including the provision of the above minimum purchase. Please identify any proposed adjustment over time for "cost of living" or other purposes. Please assume:

   - BWSC would pay the full annual fixed fee regardless of whether they took the full minimum on any day.

   - A 20-year contract term with, with provisions for renewal for at least an additional 30 years.

5. "Variable" fees - Provide the fee per 1,000 gallons sold beyond the daily minimum, up to the full guaranteed capacity. If you propose a variable fee, please explain the rationale for such a fee.

6. Alternate proposals- We welcome alternate proposals or supplemental information that may help us in our evaluation. For example, please explain if there are some intermediate capacities such as 25, 30 or 35 mgd that define a " breakpoint" in your cost to serve. We also request any back-up information showing your basis for capital and operating costs, so that we can assess whether we are comparing " apples and apples".

Please submit your proposals no later than July 9, 2003, to my attention, with a copy to our consultant, O'Brien and Gere Engineers, Inc. Attn.: George B. Rest P.E. (see contact information below). In the meantime, please contact George Rest if you have any questions. Thank you for your interest in supplying water to the BWSC.

Very truly yours,

Don R. Hassall, P. E.
Assistant Executive Director

Contact Information :

George B. Rest, P. E.
O'Brien & Gere Engineers, Inc.
8201 Corporate Drive Suite 1000
Landover Md. 20785
email restgb@obg.com
direct dial 301-731-1162
fax dial 301-577-4737

June 13, 2003

Mr. Jim Smith, Manager, Infrastructure Planning
Louisville Water Company
550 South Third Street
Louisville, Kentucky 40202

Re: Request for Proposal to supply water to
Bluegrass Water Supply Consortium

Dear Mr. Smith:

On behalf of the Bluegrass Water Supply Consortium (BWSC), the Bluegrass Area Development District is pleased to inform you that purchase of finished water from the Louisville Water Company is one of eight alternatives that remain under consideration as near term options for their additional water supply. This determination was the result of the preliminary screening of alternatives performed at Public Workshop No. 4, on May 28, 2003, based in part upon the information provided at your interview on May 12, 2003. We now request your written proposal for the sale of finished water, as described below. This proposal will be used in the selection of a recommended option(s). It should be as accurate as possible, recognizing that some details of any future agreement for water purchase would be resolved subsequently. Please address the following items:

1. Quantity, location and pressure of finished water- Based on your prior submission, BWSC requests the cost to supply an initial guaranteed capacity of approximately 25 mgd at the English Station Standpipe location. Also provide the cost to supply an initial guaranteed capacity of approximately 45 mgd at the same location, or at another location that you identify. Please confirm that you would provide water at an hydraulic gradient of 900 feet msl.

2. Please confirm that your treated water hardness level is less than 150 mg/1.

3. Minimum purchase- For the two cases identified above, please assume that BWSC will contract to purchase a minimum annual average daily quantity equal to 5.0 mgd if the contracted capacity is 25 mgd, or 9.0 mgd if the contracted capacity is 45 mgd.

4. Annual "fixed" fees - Provide the proposed annual "fixed" fees for the commitment of the above guaranteed quantities of finished water, including the provision of the above minimum purchase. Please identify any proposed adjustment over time for "cost of living" or other purposes. Please assume:

   - BWSC would pay the full annual fixed fee regardless of whether they took the full minimum on any day.

   - A 20-year contract term with, with provisions for renewal for at least an additional 30 years.

5. "Variable" fees - Provide the fee per 1,000 gallons sold beyond the daily minimum, up to the full guaranteed capacity. If you propose a variable fee, please explain the rationale for such a fee.

6. Alternate proposals- We welcome alternate proposals or supplemental information that may help us in our evaluation. For example, please explain if there are some intermediate capacities such as 30 or 35 mgd that define a " breakpoint" in your cost to serve. We also request any back-up information showing your basis for capital and operating costs, so that we can assess whether we are comparing " apples and apples".

Please submit your proposal no later than July 9, 2003, to my attention, with a copy to our consultant, O'Brien and Gere Engineers, Inc. Attn.: George B. Rest P.E. (see contact information below). In the meantime, please contact George Rest if you have any questions. Thank you for your interest in supplying water to the BWSC.

Very truly yours,

Don R. Hassall, P. E.
Assistant Executive Director

Contact Information :

George B. Rest, P. E.
O'Brien & Gere Engineers, Inc.
8201 Corporate Drive Suite 1000
Landover Md. 20785
email restgb@obg.com
direct dial 301-731-1162
fax dial 301-577-4737

June 13, 2003

Mr. Bill R. Osbourne, P. E., General Manager
Carrollton Utilities
P.O. Box 269
Carrollton, Kentucky 41008

Re: Request for Proposal to supply water to
Bluegrass Water Supply Consortium

Dear Mr. Osbourne:

On behalf of the Bluegrass Water Supply Consortium, the Bluegrass Area Development District is pleased to inform you that purchase of finished water from the proposed Carroll County Regional Water Commission is one of eight alternatives that remain under consideration as near term options for their additional water supply. This determination was the result of the preliminary screening of alternatives performed at Public Workshop No. 4, on May 28, 2003, based in part upon the information provided at your Interview on May 13, 2003. We now request your written proposal for the sale of finished water, as described below. This proposal will be used in the selection of a recommended option(s). It should be as accurate as possible, recognizing that some details of any future agreement for water purchase would be resolved subsequently. Please address the following items:

1. Quantity, location and pressure of finished water- Based on your prior submission, BWSC requests the cost to supply an initial guaranteed capacity of approximately 15 mgd at a location between Ghent and Carrollton along US 42 as identified during the May 12th Interview. Also provide the cost to supply an initial guaranteed capacity of approximately 45 mgd at the same location, or at another location that you identify. For the purpose of this proposal, please assume that you would provide water at an hydraulic gradient of 900 feet msl.

2. Treatment requirements- BWSC will require a hardness level of less than 150 mg/l, which we understand will require softening of your water. You may include these capital and operating costs in your proposed fees, or you may identify that they are not included, and our consultant will account for them.

3. Minimum purchase- Please assume that BWSC will contract to purchase a minimum annual average daily quantity equal to 5.0 mgd if the contracted capacity is 15 mgd, or 9.0 mgd if the contracted capacity is 45 mgd.

4. Annual "fixed" fees - Provide the proposed annual "fixed" fees for the commitment of the above guaranteed quantities of finished water, including the provision of the above minimum purchase. Please identify any proposed adjustment over time for "cost of living" or other purposes. Please assume:

- BWSC would pay the full annual fixed fee regardless of whether they took the full minimum on any day.

- A 20-year contract term with, with provisions for renewal for at least an additional 30 years.

5. "Variable" fees - Provide the fee per 1,000 gallons sold beyond the daily minimum, up to the full guaranteed capacity. If you propose a variable fee, please state the rationale for such a fee.

6. Alternate proposals- We welcome alternate proposals or supplemental information that may help us in our evaluation. For example, please explain if there are some intermediate capacities such as 20, 25 or 30 mgd that define a " breakpoint" in your cost to serve. We also request any back-up information showing your basis for capital and operating costs, so that we can assess whether we are comparing " apples and apples".

Please submit you proposal no later than July 9, 2003, to my attention, with a copy to our consultant, O'Brien and Gere Engineers, Inc. Attn.: George B. Rest P.E. (see contact information below). In the meantime, please contact George Rest if you have any questions. Thank you for your interest in supplying water to the BWSC.

Very truly yours,

Don R. Hassall, P. E.
Assistant Executive Director

Contact Information :

George B. Rest, P. E.
O'Brien & Gere Engineers, Inc.
8201 Corporate Drive Suite 1000
Landover Md. 20785
email restgb@obg.com
direct dial 301-731-1162
fax dial 301-577-4737

June 13, 2003

Mr. Bill Graham, Chairman
Greater Fleming Regional Water Commission
2772 Morehead Road
Flemingsburg, KY 41041

Re: Request for Proposal to supply water to
Bluegrass Water Supply Consortium

Dear Mr. Graham:

On behalf of the Bluegrass Water Supply Consortium, the Bluegrass Area Development District is pleased to inform you that purchase of finished water from the Greater Fleming Regional Water Commission is one of eight alternatives that remain under consideration as near term options for their additional water supply. This determination was the result of the preliminary screening of alternatives performed at Public Workshop No. 4, on May 28, 2003, based in part upon the information provided at your Interview on May 12, 2003. We now request Greater Fleming Regional Water Commission's written proposal for the sale of finished water, as described below. This proposal will be used in the selection of a recommended option(s). It should be as accurate as possible, recognizing that some details of any future agreement for water purchase would be resolved subsequently. Please address the following items:

1. Quantity, location and pressure of finished water- Based on your prior submission, BWSC requests the cost to supply an initial guaranteed capacity of 15 mgd. Please identify the location at which the water would by provided, and the hydraulic grade line (pressure) at which it would be delivered. If you can guarantee the supply of 45 mgd, please furnish that cost too, along with the location and pressure at which that service would be available. In each case, please identify when these supplies will be available.

2. Treatment requirements- BWSC will require a hardness level of less than 150 mg/l, which we understand will require softening of your water. You may include these capital and operating costs in your proposed fees, or you may identify that they are not included, and our consultant will account for them.

3. Minimum purchase- For the two cases identified above, please assume that BWSC will contract to purchase a minimum annual average daily quantity equal to 5.0 mgd if the contracted capacity is 15 mgd, or 9.0 mgd if the contracted capacity is 45 mgd.

4. Annual "fixed" fees - Provide the proposed annual "fixed" fees for the commitment of the above guaranteed quantities of finished water, including the provision of the above minimum purchase. Please identify any proposed adjustment over time for "cost of living" or other purposes. Please assume:

- BWSC would pay the full annual fixed fee regardless of whether they took the full minimum on any day.

- A 20-year contract term with, with provisions for renewal for at least an additional 30 years.

5. "Variable" fees - Provide the fee per 1,000 gallons sold beyond the daily minimum, up to the full guaranteed capacity. If you propose a variable fee, please state the rationale for such a fee.

6. Alternate proposals- We welcome alternate proposals or supplemental information that may help us in our evaluation. For example, please explain if there are some intermediate capacities such as 10 mgd that define a " breakpoint" in your cost to serve. We also request any back-up information showing your basis for capital and operating costs, so that we can assess whether we are comparing " apples and apples".

Please submit your proposal no later than July 9, 2003, to my attention, with a copy to our consultant, O'Brien and Gere Engineers, Inc. Attn.: George B. Rest P.E. (see contact information below). In the meantime, please contact George Rest if you have any questions. Thank you for your interest in supplying water to the BWSC.

Very truly yours,

Don R. Hassall, P. E.
Assistant Executive Director

Contact Information :

George B. Rest, P. E.
O'Brien & Gere Engineers, Inc.
8201 Corporate Drive Suite 1000
Landover Md. 20785
email restgb@obg.com
direct dial 301-731-1162
fax dial 301-577-4737

cc: Mr. Bob Blankenship, P. E., HMB Engineers

Kentucky Division of Water's Letter on Kentucky River Pool No. 3

HENRY C. LIST
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY RD
FRANKFORT KY 40601

July 22, 2003

George Rest, P.E.
O'Brien & Gere Engineers
8201 Corporate Drive, Suite 1000
Landover, Maryland 20785

Dear Mr. Rest,

We appreciate the opportunity that we had to meet with you to discuss important issues related to the Bluegrass Water Supply Consortium's Regionalization Feasibility Study. You are to be commended for being at the forefront of exploration for innovative responses to the water supply challenge facing a large portion of the eastern United States.

It is apparent from our meeting that progress has been made on several fronts related to both finished water distribution and potential raw water sources. However, you raised a few questions that, upon further reflection, we may not have answered fully or definitively. Specifically those questions centered around a floor-level withdrawal that would be based on credits and baseline needs from pool # 3. To that, further explanation is in order, but first some discussion of the considerations behind this question may be helpful.

It is difficult to assign absolute significance to any preliminary estimates because they are predicated on several assumed conditions. One assumption is that, a majority of pool # 3 usage will occur when flow in the Kentucky River above the intake is at or below the 7Q10. To accommodate this usage there will have to be in place a mechanism to use the stored volume of water in pools #1 through #6 to meet the new demand while maintaining a minimum flow below the new intake. Therefore, the valve operating plan of the Kentucky River Authority must be expanded to include all pools on the Kentucky River. The details of operation must be in place before any assurances as to available water could be made. Second, we assume that there will be a minimum flow that must be sustained using the valve operating plan when flows in pool three fall below 7Q10. As we discussed in the meeting, this minimum flow would be determined by considering in depth water quality impacts on human health and aquatic habitat.

The issue of credits and baseline is a little more straightforward, but no less preliminary at this point. We have calculated a conservative estimate of the amount of water being returned

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via sewage treatment plant discharges for all consortium members whose discharges are either into a tributary or into the mainstem of the Kentucky River. Based on these calculations, the magnitude of the credit should lie somewhere between 25 and 35 MGD depending on the method used to calculate withdrawals in 2020. With regards to the baseline "minimum necessary use" from pool #3, you gave a preliminary estimate of 20 percent of the maximum needed 67 MGD. Assuming that a withdrawal permit in pool #3 would allow 75 percent of the minimum necessary use, the floor withdrawal would be increased by about 10 MGD (0.20 x 67 MGD x 0.75). Taken together, the credit and baseline withdrawal suggest a floor value for a pool three permit of between 35 and 45 MGD. Please note that because all Kentucky River discharges have been included in these calculations, the 12 MGD that you anticipated recovering at Frankfort is included in the estimate of the total credit available by the consortium.

Finally, it might be useful to provide to you an example of what a full permit and associated withdrawal conditions might contain. Based on standard permitting criteria, a permit in pool #3 could be issued with a face value of up to 113 MGD, obviously greater than your anticipated needs of 67 MGD. However, the permit must be conditioned to provide for stepwise reductions in withdrawals during periods of low flow in the river. As discussed in our meeting, the permit withdrawal reduction schedule would call for a 25 percent reduction by the time that the valve operating plan would be implemented followed by a gradual reduction to the minimum withdrawal calculated from credits and baseline use from pool #3.

Sincerely,

Jeffrey W. Pratt, Director
Division of Water

JWP:MS:rh

Water Supply Alternative Cost Spreadsheets (as presented in Workshop Nos. 5 & 6)

Contents

- **Cost estimate, master**
- **Water treatment plant costs**
- **Pumping station and intake costs**
- **Pipeline costs**
- **Annual costs and unit costs**
- **Graph, unit present worth of alternatives**
- **Graph, annual cost per mgd of capacity**
- **Graph, effect of WTP capacity on unit present value of alternatives**
- **Graph, effect of WTP capacity on annual capacity cost**

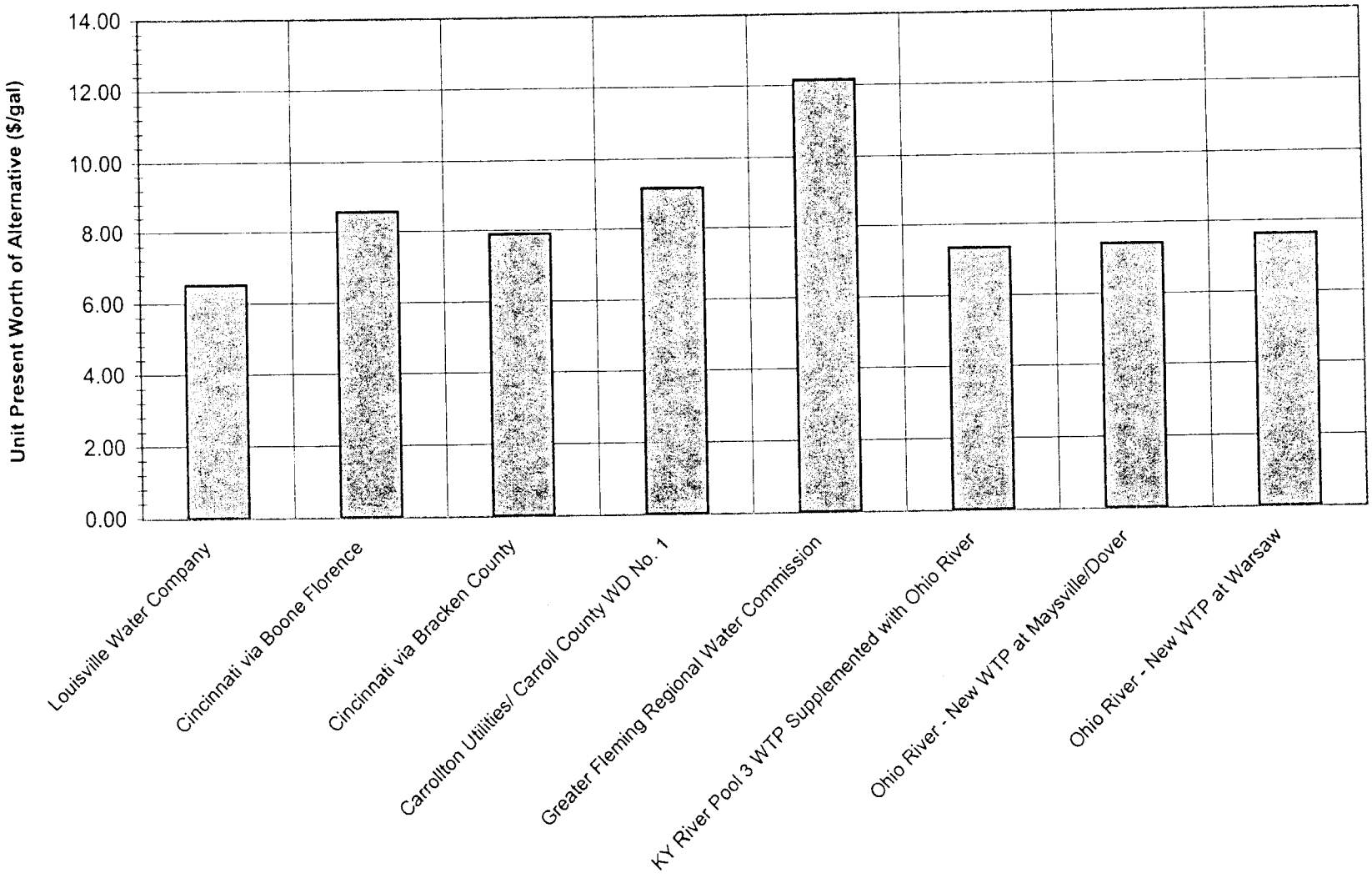
Prepared by O'Brien & Gere and presented at Workshops 4-6

Alternative Number	Description	Increase in Safe Yield (mgd)	Project Cost: WTPs ($)	PS + Intakes ($)	Pipes ($)	Wells ($)	Dams ($)	Dredging ($)	Transportation ($)	Subtotal ($)	Contingencies (20% of Subtotal) ($)	Total Capital Cost ($)	Regulatory Permitting (5% of Total Cap) ($)	Engineering Legal & Admin (20% of Total Cap) ($)	Upfront Capital Cost ($)	Total Project Cost ($)	Unit Cost based on Project Cost ($/gallon)	Present Worth of Annual Operation & Maintenance ($)	Total Present Value of Alternative ($)	Unit Present Value of Alternative ($/gallon)
Ohio River																				
	Cincinnati Water Works via Boone Florence	45	0	6,750,000	87,558,400	0				94,308,400	18,861,680	113,170,080	5,658,504	22,634,016	179,000,000	320,462,600	7.12	65,626,832	386,089,432	8.58
	Cincinnati Water Works via Bracken County	45	0	17,500,000	104,764,800	0				122,264,800	24,452,960	146,717,760	7,335,888	29,343,552	107,000,000	290,397,200	6.45	65,626,832	356,024,032	7.91
	Louisville Water Company	45	0	6,750,000	79,075,200	0				85,825,200	17,165,040	102,990,240	5,149,512	20,598,048	47,000,000	175,737,800	3.91	117,961,616	293,699,416	6.53
	Withdrawals and WTP at Maysville/Dover	45	56,250,000	17,500,000	104,764,800	0				178,514,800	35,702,960	214,217,760	10,710,888	42,843,552		267,772,200	5.95	65,626,832	333,399,032	7.41
	Withdrawals and WTP at Warsaw	45	56,250,000	17,500,000	111,616,000	0				185,366,000	37,073,200	222,439,200	11,121,960	44,487,840		278,049,000	6.18	65,626,832	343,675,832	7.64
Kentucky River																				
	New WTP at Pool 3 with Ohio River Pipeline	45	56,250,000	22,250,000	98,183,680	0				176,683,680	35,336,736	212,020,416	10,601,021	42,404,083		265,025,520	5.89	65,626,832	330,652,352	7.35
Groundwater																				
	Purchase water from Carrollton Utilities/CCWD	45	0	6,750,000	101,478,400	0				108,228,400	21,645,680	129,874,080	6,493,704	25,974,816		162,342,600	3.61	250,673,322	413,015,922	9.18
	Purchase water from Greater Fleming/LWC	15	0	2,250,000	28,037,333	0				30,287,333	6,057,467	36,344,800	1,817,240	7,268,960		45,431,000	3.03	136,975,570	182,406,570	12.16

Prepared by O'Brien & Gere and presented at Workshops 4-6

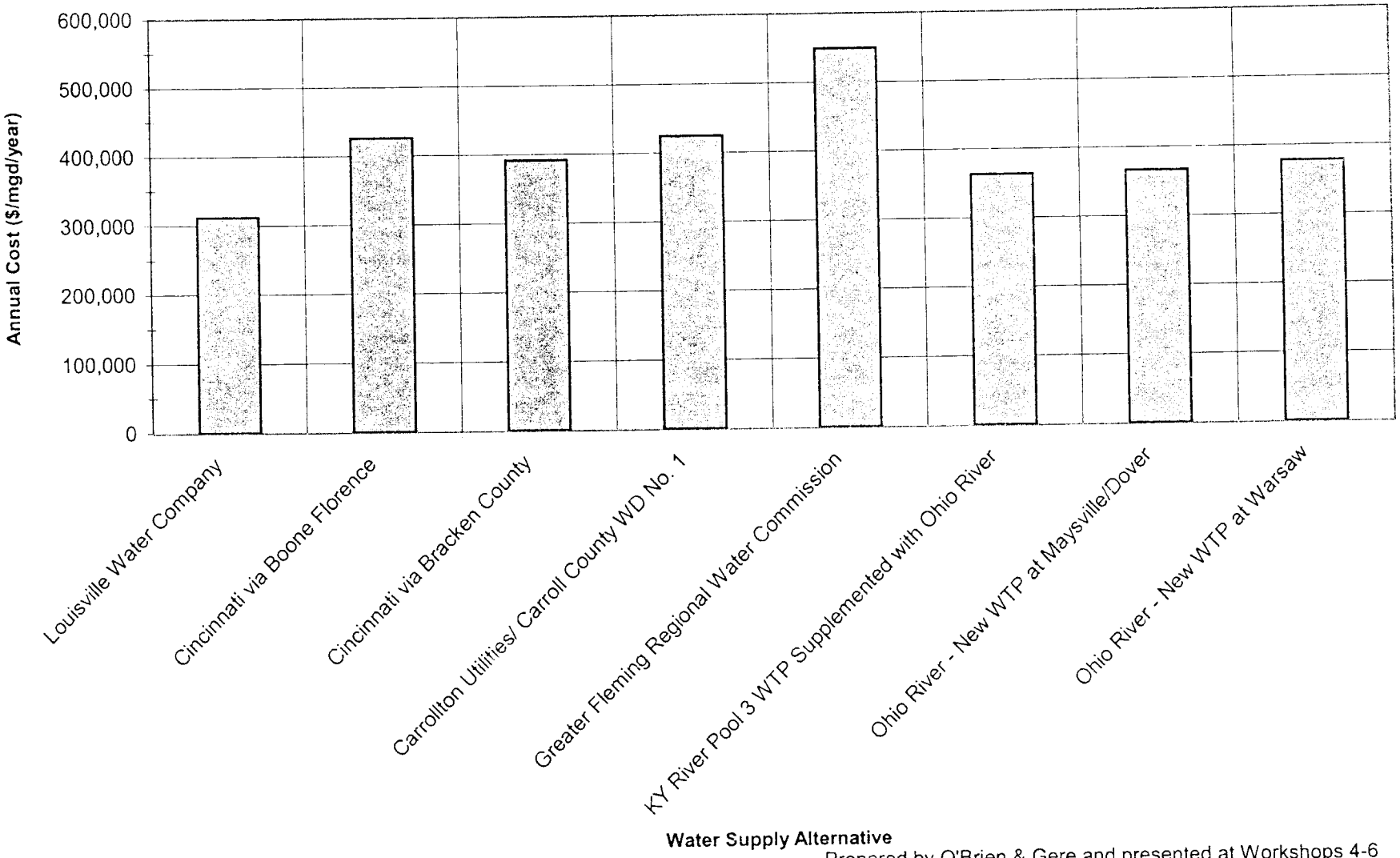
Alternative Number		Water Treatment Plant Costs				
		Capacity (mgd)	Unit	Quantity	Unit Cost ($)	Cost ($)
Ohio River						
	Cincinnati Water Works via Boone Florence	0	gal	0	0.00	0
	Cincinnati Water Works via Bracken County	0	gal	0	0.00	0
	Louisville Water Company	0	gal	0	0.00	0
	Withdrawals and WTP at Maysville/Dover	45	gal	1	1.25	56,250,000
	Withdrawals and WTP at Warsaw	45	gal	1	1.25	56,250,000
Kentucky River						
	New WTP at Pool 3 with Ohio River Pipeline	45	gal	1	1.25	56,250,000
Groundwater						
	Purchase water from Carrollton Utilities/CCWD	0	gal	0	0.00	0
	Purchase water from Greater Fleming	0	gal	0	0.00	0

Figure 1. Unit Present Worth of Alternatives (40 years)



Prepared by O'Brien & Gere and presented at Workshops 4-6

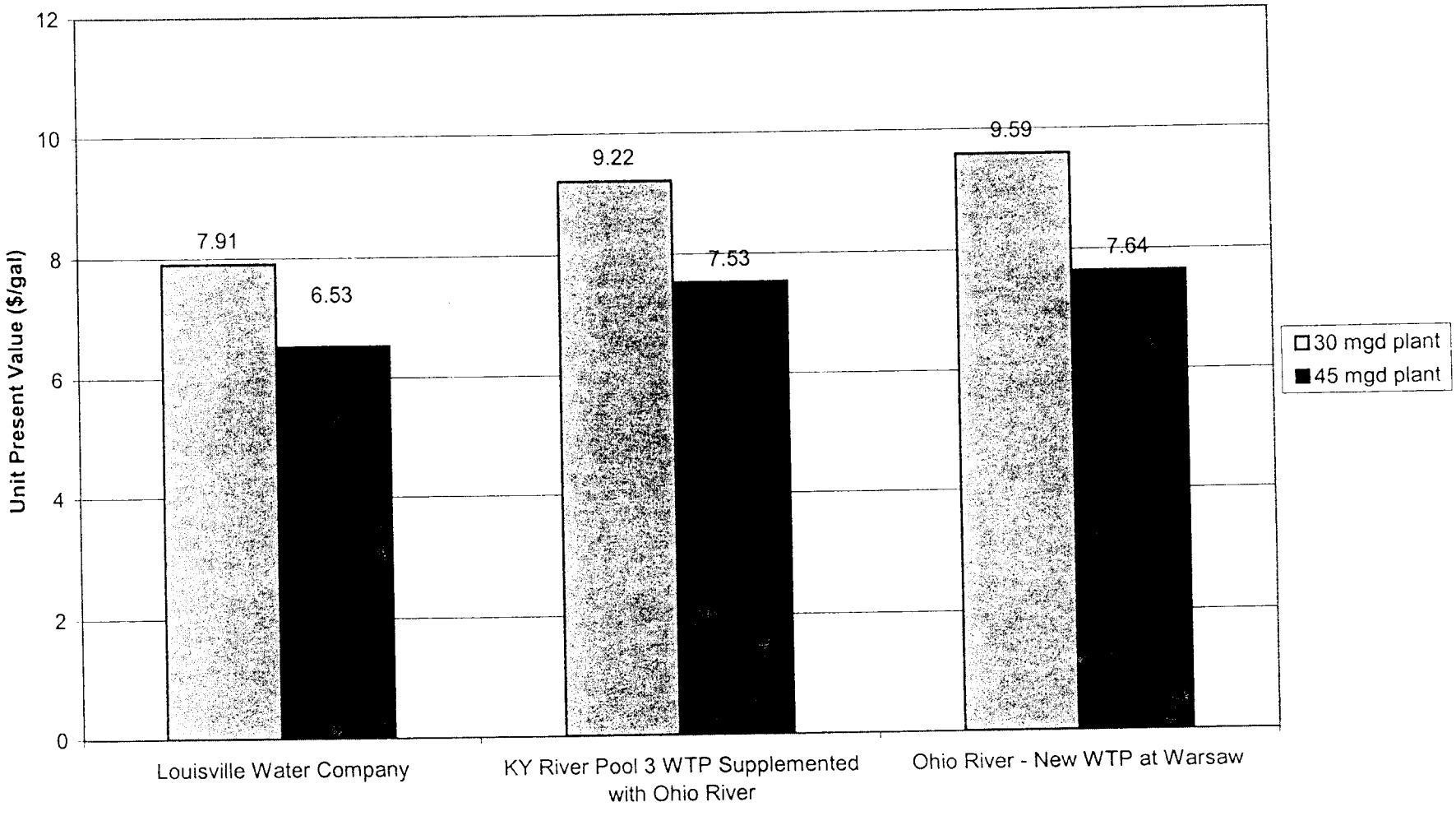
Figure 2. Annual Cost per MGD of Capacity



Prepared by O'Brien & Gere and presented at Workshops 4-6

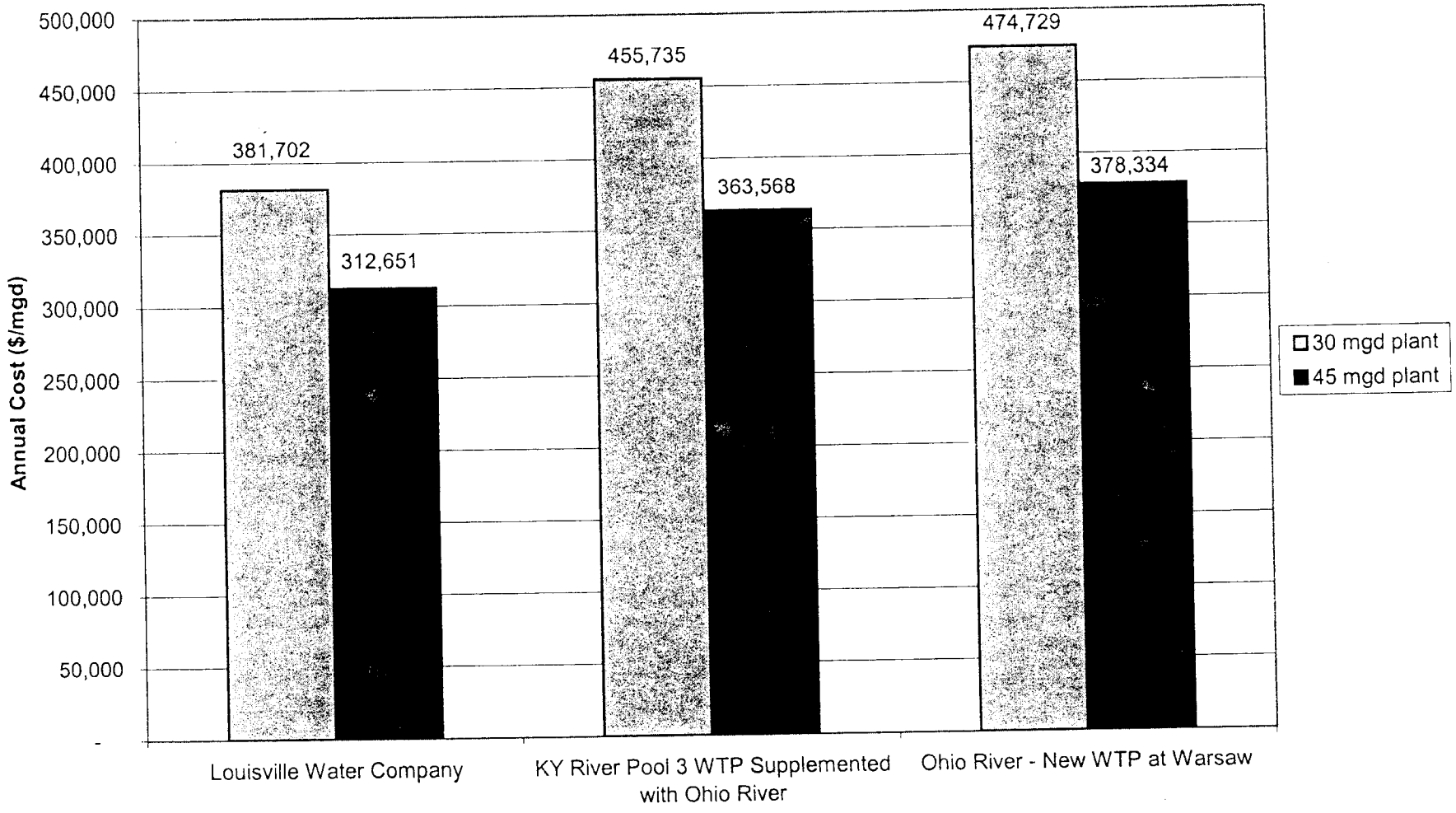
Effect of WTP Capacity on Unit Present Value of Alternatives
(3% real interest rate*, 40 year duration)

* Real interest rate = the expected real cost of money over the planning period after adjustment to eliminate the effects of expected inflation.



Prepared by O'Brien & Gere and presented at Workshop 6

Effect of WTP Capacity on Annual Capacity Cost



Prepared by O'Brien & Gere and presented at Workshop 6

Water Supply Alternative Pairwise Results

Contents

- Original pairwise comparison
  - Weighting factors
  - Preferred option ranking worksheet (criteria #1-#5)
  - Graph, results of Tech Group pairwise comparison
- Revised pairwise comparison with modified Louisville Water Co. proposal
  - Weighting factors
  - Preferred option ranking worksheet (criteria #1-#5)
  - Graph, results of Tech Group pairwise comparison
  - Final Summary of Water Supply Alternatives Matrix

Guidance on use of this appendix:
The pairwise technique compares each alternative against every other alternative. The comparisons are made for each of the five evaluation criteria. The evaluation criterion is shown on top of the page. Then the scores are summed and multiplied by the weighting factors to produce the "weighted score" on the right side of the pages. Following the five evaluation criteria pages is a Criteria Summary showing the totals for each criteria, a "sum of scores" and the ranking of alternatives. The scores were developed by consensus of the BWSC Tech Group and the Consultant Team.

Original Pairwise Comparison

BGADD/BWSC - Weighting Factors

O'Brien & Gere
May-03

		Adequate Capacity	Raw/Finished Water Quality	Cost	Implementability	Flexibility	Sum	Weighting Factor
#1	Adequate Capacity		5	2	1	3	11	18
#2	Raw/Finished Water Quality	1		1	1	2	5	8
#3	Cost	4	5		3	4	16	27
#4	Implementability	5	5	3		3	16	27
#5	Flexibility	3	4	2	3		12	20
							60 Total	**100 Total**

Note: Rank the relative importance of the left-column criteria against the top-row criteria on a scale of 1 to 5 (1 = much less important, 3 = equivalent, 5 = much greater importance).

DEFINITIONS

#1 **Adequate Capacity** = Reliable quantity of raw water and finished water to meet projected demands through the planning period. This criteria addresses interruptibility of sources of supply.

#2 **Raw/Finished Water Quality** = Raw and finished water quality that meets existing water quality requirements, and can readily achieve future anticipated regulations. This criteria also addresses water quality preferences such as taste.

#3 **Cost** = The present worth cost for proposed raw and finished water improvements, including capital, operating and maintenance costs. This cost could include allowance for additional KRA funding for out-of-basin transfers.

#4 **Implementability** = The relative ease of implementing the proposed improvements in time to meet projected demands. This criterion considers the potential that regulatory permitting, public acceptance, property acquisition, or constructability issues could delay implementation.

#5 **Flexibility** = The ability to phase implementation and spread the cost over time, while still meeting projected demands.

BGADD/BWSC - Project Selection Criteria Ranking Worksheet

		Adequate Capacity	Raw/Finished Water Quality	Cost	Implementability	Flexibility	Sum	Weighting Points
#1	Adequate Capacity		5	2	1	3	11	18
#2	Raw/Finished Water Quality	1		1	1	2	5	8
#3	Cost	4	5		3	4	16	27
#4	Implementability	5	5	3		3	16	27
#5	Flexibility	3	4	2	3		12	20
								100 Total

Note: Rank the relative importance of the left-column criteria against the top-row criteria on a scale of 1 to 5 (1 = much less important, 3 = equivalent, 5 = much greater importance).

DEFINITIONS

#1 **Adequate Capacity** = Reliable quantity of raw water and finished water to meet projected demands through the planning period. This criteria addresses interruptibility of sources of supply.

#2 **Raw/Finished Water Quality** = Raw and finished water quality that meets existing water quality requirements, and can readily achieve future anticipated regulations. This criteria also addresses water quality preferences such as taste.

#3 **Cost** = The present worth cost for proposed raw and finished water improvements, including capital, operating and maintenance costs. This cost could include allowance for additional KRA funding for out-of-basin transfers.

#4 **Implementability** = The relative ease of implementing the proposed improvements in time to meet projected demands. This criterion considers the potential that regulatory permitting, public acceptance, property acquisition, or constructability issues could

#5 **Flexibility** = The ability to phase implementation and spread the cost over time, while still meeting projected demands.

BGADD - Preferred Option Ranking Worksheet

Criteria #1: Adequate Capacity

Weight: 18

	Louisville Water Company	Cincinnati via Boone Florence	Cincinnati via Bracken County	Carrollton Utilities/ Carroll County WD No. 1	Greater Fleming Regional Water Commission	KY River Pool 3 WTP Supplemented with Ohio River	Ohio River - New WTP at Maysville/Dover	Ohio River - New WTP at Warsaw	Sum	Weighted Score
1 Louisville Water Company		3.5	3.5	3.5	5	3.5	3.5	3.5	26	468
2 Cincinnati via Boone Florence	2.5		3	3.5	5	3	3	3	23	414
3 Cincinnati via Bracken County	2.5	3		3.5	5	3	3	3	23	414
4 Carrollton Utilities/ Carroll County WD No. 1	2.5	2.5	2.5		4	2.5	2.5	2.5	19	342
5 Greater Fleming Regional Water Commission	1	1	1	2		1	1	1	8	144
6 KY River Pool 3 WTP Supplemented with Ohio River	2.5	3	3	3.5	5		3	3	23	414
7 Ohio River - New WTP at Maysville/Dover	2.5	3	3	3.5	5	3		3	23	414
8 Ohio River - New WTP at Warsaw	2.5	3	3	3.5	5	3	3		23	414

Note: Rank the relative importance of the left-column criteria against the top-row criteria on a scale of 1 to 5
(1 = much less important, 3 = equivalent importance, 5 = much greater importance).

DEFINITIONS

#1 **Adequate Capacity** = Reliable quantity of raw water and finished water to meet projected demands through the planning period. This criteria addresses interruptibility of sources of supply.

#2 **Raw/Finished Water Quality** = Raw and finished water quality that meets existing water quality requirements, and can readily achieve future anticipated regulations. This criteria also addresses water quality preferences such as taste.

#3 **Cost**
for additional KRA funding for out-of-basin transfers.

#4 **Implementability** = The relative ease of implementing the proposed improvements in time to meet projected demands. This criterion considers the potential that regulatory permitting, public acceptance, property acquisition, or constructability issues could

#5 **Flexibility** = The ability to phase implementation and spread the cost over time, while still meeting projected demands.

BGADD - Preferred Option Ranking Worksheet

Criteria #2: Raw/Finished Water Quality

Weight: 8

	Louisville Water Company	Cincinnati via Boone Florence Regional Water Commission	Cincinnati via Bracken County	Carrollton Utilities/ Carroll County WD No. 1	Greater Fleming Regional Water Commission	KY River Pool 3 WTP Supplemented with Ohio River	Ohio River - New WTP at Maysville/Dover	Ohio River - New WTP at Warsaw	Sum	Weighted Score
1 Louisville Water Company		3	3	3	3	3	3	3	21	168
2 Cincinnati via Boone Florence Regional Water Commission	3		3	3	3	3	3	3	21	168
3 Cincinnati via Bracken County	3	3		3	3	3	3	3	21	168
4 Carrollton Utilities/ Carroll County WD No. 1	3	3	3		3	3	3	3	21	168
5 Greater Fleming Regional Water Commission	3	3	3	3		3	3	3	21	168
6 KY River Pool 3 WTP Supplemented with Ohio River	3	3	3	3	3		3	3	21	168
7 Ohio River - New WTP at Maysville/Dover	3	3	3	3	3	3		3	21	168
8 Ohio River - New WTP at Warsaw	3	3	3	3	3	3	3		21	168

Note: Rank the relative importance of the left-column criteria against the top-row criteria on a scale of 1 to 5
(1 = much less important, 3 = equivalent importance, 5 = much greater importance).

DEFINITIONS

#1 **Adequate Capacity** = Reliable quantity of raw water and finished water to meet projected demands through the planning period. This criteria addresses interruptibility of sources of supply.

#2 **Raw/Finished Water Quality** = Raw and finished water quality that meets existing water quality requirements, and can readily achieve future anticipated regulations. This criteria also addresses water quality preferences such as taste.

#3 **Cost**
allowance for additional KRA funding for out-of-basin transfers.

#4 **Implementability** = The relative ease of implementing the proposed improvements in time to meet projected demands. This criterion considers the potential that regulatory permitting, public acceptance, property acquisition, or constructability issues could

#5 **Flexibility** = The ability to phase implementation and spread the cost over time, while still meeting projected demands.

BGADD - Preferred Option Ranking Worksheet
Criteria #3: Cost

Weight: 27

	Louisville Water Company	Cincinnati via Boone Florence Regional Water Commission	Cincinnati via Bracken County	Carrollton Utilities/ Carroll County WD No. 1	Greater Fleming Regional Water Commission	KY River Pool 3 WTP Supplemented with Ohio River	Ohio River - New WTP at Maysville/Dover	Ohio River - New WTP at Warsaw	Sum	Weighted Score
1 Louisville Water Company		3	3	3	5	3	3	3	23	621
2 Cincinnati via Boone Florence Regional Water Commission	3		3	3	5	3	3	3	23	621
3 Cincinnati via Bracken County	3	3		3	5	3	3	3	23	621
4 Carrollton Utilities/ Carroll County WD No. 1	3	3	3		4	2	3	3	21	567
5 Greater Fleming Regional Water Commission	1	1	1	2		1	2	2	10	270
6 KY River Pool 3 WTP Supplemented with Ohio River	3	3	3	4	5		3	3	24	648
7 Ohio River - New WTP at Maysville/Dover	3	3	3	3	4	3		3	22	594
8 Ohio River - New WTP at Warsaw	3	3	3	3	4	3	3		22	594

Note: Rank the relative importance of the left-column criteria against the top-row criteria on a scale of 1 to 5
(1 = much less important, 3 = equivalent importance, 5 = much greater importance).

DEFINITIONS

#1 **Adequate Capacity**
of sources of supply.

#2 **Raw/Finished Water Quality** = Raw and finished water quality that meets existing water quality requirements, and can readily achieve future anticipated regulations. This criteria also addresses water quality preferences such as taste.

#3 **Cost** = The present worth cost for proposed raw and finished water improvements, including capital, operating and maintenance costs. This cost could include allowance for additional KRA funding for out-of-basin transfers.

#4 **Implementability** = The relative ease of implementing the proposed improvements in time to meet projected demands. This criterion considers the potential that regulatory permitting, public acceptance, property acquisition, or constructability issues could

#5 **Flexibility** = The ability to phase implementation and spread the cost over time, while still meeting projected demands.

BGADD - Preferred Option Ranking Worksheet

Criteria #4: Implementability

Weight: 27

	Louisville Water Company	Cincinnati via Boone Florence Regional Water Commission	Cincinnati via Bracken County	Carrollton Utilities/ Carroll County WD No. 1	Greater Fleming Regional Water Commission	KY River Pool 3 WTP Supplemented with Ohio River	Ohio River - New WTP at Maysville/Dover	Ohio River - New WTP at Warsaw	Sum	Weighted Score
1 Louisville Water Company		3	3	2	2	1	3	3	17	459
2 Cincinnati via Boone Florence Regional Water Commission	3		2	2	2	1.5	2	2	14.5	391.5
3 Cincinnati via Bracken County	3	4		3	3	2	2	2	19	513
4 Carrollton Utilities/ Carroll County WD No. 1	4	4	3		2	2	3	3	21	567
5 Greater Fleming Regional Water Commission	4	4	3	4		2	3.5	3.5	24	648
6 KY River Pool 3 WTP Supplemented with Ohio River	5	4.5	4	4	4		4	4	29.5	796.5
7 Ohio River - New WTP at Maysville/Dover	3	4	4	3	2.5	2		3	21.5	580.5
8 Ohio River - New WTP at Warsaw	3	4	4	3	2.5	2	3		21.5	580.5

Note: Rank the relative importance of the left-column criteria against the top-row criteria on a scale of 1 to 5
(1 = much less important, 3 = equivalent importance, 5 = much greater importance).

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#2 **Raw/Finished Water Quality** = Raw and finished water quality that meets existing water quality requirements, and can readily achieve future anticipated regulations. This criteria also addresses water quality preferences such as taste.

#3 **Cost** = The present worth cost for proposed raw and finished water improvements, including capital, operating and maintenance costs. This cost could include allowance for additional KRA funding for out-of-basin transfers.

#4 **Implementability** = The relative ease of implementing the proposed improvements in time to meet projected demands. This criterion considers the potential that regulatory permitting, public acceptance, property acquisition, or constructability issues could delay implementation.

#5 **Flexibility** = The ability to phase implementation and spread the cost over time, while still meeting projected demands.

BGADD - Preferred Option Ranking Worksheet

Criteria #5: Flexibility

Weight: 20

	Louisville Water Company	Cincinnati via Boone Florence Regional Water Commission	Cincinnati via Bracken County	Carrollton Utilities/ Carroll County WD No. 1	Greater Fleming Regional Water Commission	KY River Pool 3 WTP Supplemented with Ohio River	Ohio River - New WTP at Maysville/Dover	Ohio River - New WTP at Warsaw	Sum	Weighted Score
1 Louisville Water Company		4	3.5	3.5	4	2	2.5	2.5	22	440
2 Cincinnati via Boone Florence Regional Water Commission	2		2	2	3	1	2	2	14	280
3 Cincinnati via Bracken County	2.5	4		3	4	2	2.5	2.5	20.5	410
4 Carrollton Utilities/ Carroll County WD No. 1	2.5	4	3		4	2	2.5	2.5	20.5	410
5 Greater Fleming Regional Water Commission	2	3	2	2		1	2	2	14	280
6 KY River Pool 3 WTP Supplemented with Ohio River	4	5	4	4	5		4	4	30	600
7 Ohio River - New WTP at Maysville/Dover	3.5	4	3.5	3.5	4	2		2.5	23	460
8 Ohio River - New WTP at Warsaw	3.5	4	3.5	3.5	4	2	3.5		24	480

Note: Rank the relative importance of the left-column criteria against the top-row criteria on a scale of 1 to 5
(1 = much less important, 3 = equivalent importance, 5 = much greater importance).

DEFINITIONS

#1 **Adequate Capacity** = Reliable quantity of raw water and finished water to meet projected demands through the planning period. This criteria addresses interruptibility of sources of supply.

#2 **Raw/Finished Water Quality** = Raw and finished water quality that meets existing water quality requirements, and can readily achieve future anticipated regulations. This criteria also addresses water quality preferences such as taste.

#3 **Cost** = The present worth cost for proposed raw and finished water improvements, including capital, operating and maintenance costs. This cost could include allowance for additional KRA funding for out-of-basin transfers.

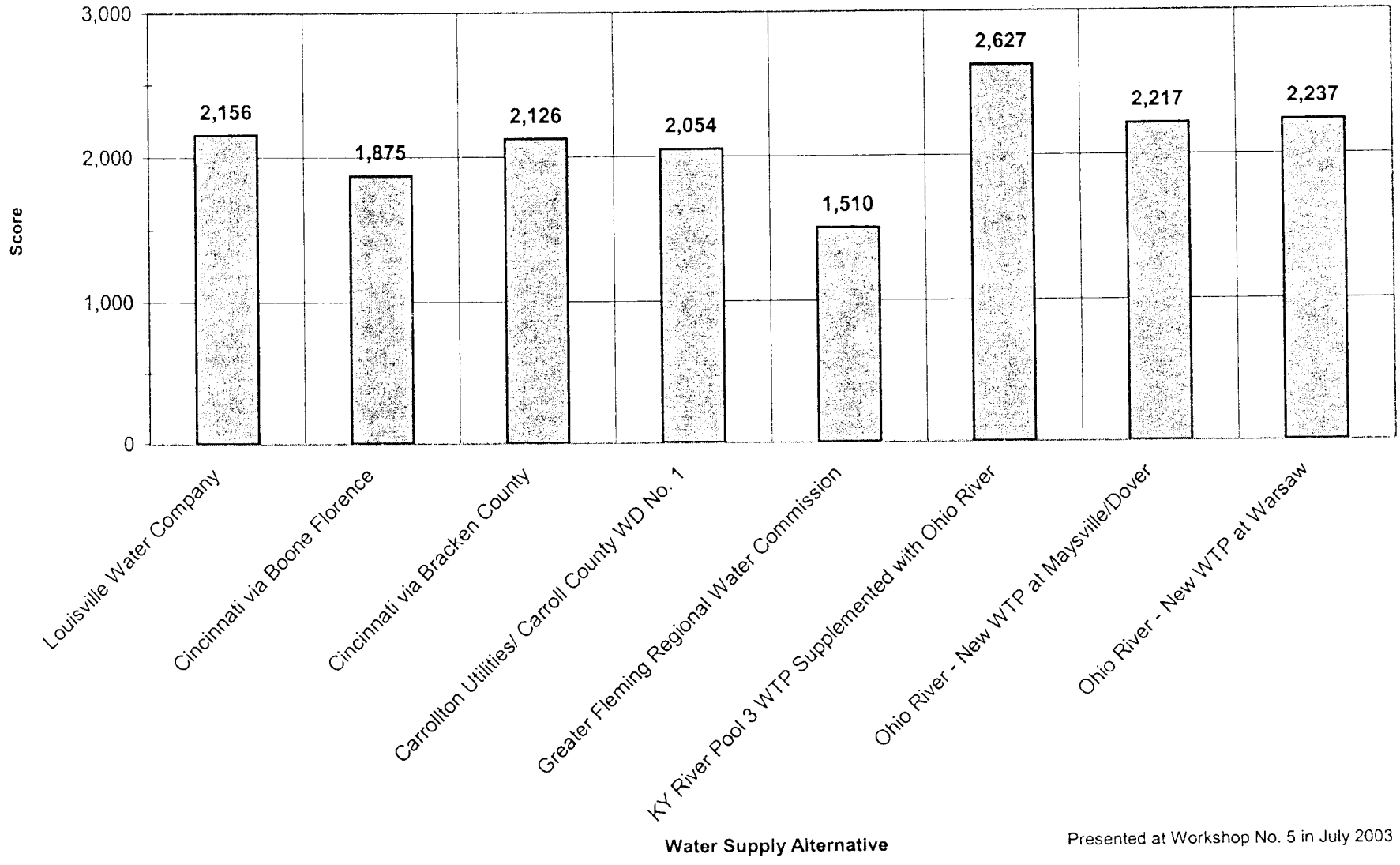
#4 **Implementability** = The relative ease of implementing the proposed improvements in time to meet projected demands. This criterion considers the potential that regulatory permitting, public acceptance, property acquisition, or constructability issues could

#5 **Flexibility** = The ability to phase implementation and spread the cost over time, while still meeting projected demands.

BGADD - Preferred Option Ranking Worksheet
Criteria Summary

	Adequate Capacity	Raw/Finished Water Quality	Cost	Implementability	Flexibility	Sum of Scores	Rank
1 Louisville Water Company	468	168	621	459	440	2,156	4
2 Cincinnati via Boone Florence	414	168	621	391.5	280	1,875	7
3 Cincinnati via Bracken County	414	168	621	513	410	2,126	5
4 Carrollton Utilities/ Carroll County WD No. 1	342	168	567	567	410	2,054	6
5 Greater Fleming Regional Water Commission	144	168	270	648	280	1,510	8
6 KY River Pool 3 WTP Supplemented with Ohio River	414	168	648	796.5	600	2,627	1
7 Ohio River - New WTP at Maysville/Dover	414	168	594	580.5	460	2,217	3
8 Ohio River - New WTP at Warsaw	414	168	594	580.5	480	2,237	2

Figure 3. Results of Tech Group Pairwise Comparison
(Highest Scores are Most Preferred)



Presented at Workshop No. 5 in July 2003

Revised Pairwise Comparison with Modified Louisville Water Company Cost Proposal

BGADD/BWSC - Weighting Factors

O'Brien & Gere
May-03

		Adequate Capacity	Raw/Finished Water Quality	Cost	Implementability	Flexibility	Sum	Weighting Factor
#1	Adequate Capacity		5	2	1	3	11	18
#2	Raw/Finished Water Quality	1		1	1	2	5	8
#3	Cost	4	5		3	4	16	27
#4	Implementability	5	5	3		3	16	27
#5	Flexibility	3	4	2	3		12	20
							60 Total	**100 Total**

Note: Rank the relative importance of the left-column criteria against the top-row criteria on a scale of 1 to 5 (1 = much less important, 3 = equivalent, 5 = much greater importance).

DEFINITIONS

#1 **Adequate Capacity** = Reliable quantity of raw water and finished water to meet projected demands through the planning period. This criteria addresses interruptibility of sources of supply.

#2 **Raw/Finished Water Quality** = Raw and finished water quality that meets existing water quality requirements, and can readily achieve future anticipated regulations. This criteria also addresses water quality preferences such as taste.

#3 **Cost** = The present worth cost for proposed raw and finished water improvements, including capital, operating and maintenance costs. This cost could include allowance for additional KRA funding for out-of-basin transfers.

#4 **Implementability** = The relative ease of implementing the proposed improvements in time to meet projected demands. This criterion considers the potential that regulatory permitting, public acceptance, property acquisition, or constructability issues could delay implementation.

#5 **Flexibility** = The ability to phase implementation and spread the cost over time, while still meeting projected demands.

BGADD - Preferred Option Ranking Worksheet

Criteria #1: Adequate Capacity

Weight: 18

	Louisville Water Company	Cincinnati via Boone Florence	Cincinnati via Bracken County	Carrollton Utilities/ Carroll County WD No. 1	Greater Fleming Regional Water Commission	KY River Pool 3 WTP Supplemented with Ohio River	Ohio River - New WTP at Maysville/Dover	Ohio River - New WTP at Warsaw	Sum	Weighted Score
1 Louisville Water Company		3.5	3.5	3.5	5	3.5	3.5	3.5	26	468
2 Cincinnati via Boone Florence	2.5		3	3.5	5	3	3	3	23	414
3 Cincinnati via Bracken County	2.5	3		3.5	5	3	3	3	23	414
4 Carrollton Utilities/ Carroll County WD No. 1	2.5	2.5	2.5		4	2.5	2.5	2.5	19	342
5 Greater Fleming Regional Water Commission	1	1	1	2		1	1	1	8	144
6 KY River Pool 3 WTP Supplemented with Ohio River	2.5	3	3	3.5	5		3	3	23	414
7 Ohio River - New WTP at Maysville/Dover	2.5	3	3	3.5	5	3		3	23	414
8 Ohio River - New WTP at Warsaw	2.5	3	3	3.5	5	3	3		23	414

Note: Rank the relative importance of the left-column criteria against the top-row criteria on a scale of 1 to 5
(1 = much less important, 3 = equivalent importance, 5 = much greater importance).

DEFINITIONS

#1 **Adequate Capacity** = Reliable quantity of raw water and finished water to meet projected demands through the planning period. This criteria addresses interruptibility of sources of supply.

#2 **Raw/Finished Water Quality** = Raw and finished water quality that meets existing water quality requirements, and can readily achieve future anticipated regulations. This criteria also addresses water quality preferences such as taste.

#3 **Cost**
for additional KRA funding for out-of-basin transfers.

#4 **Implementability** = The relative ease of implementing the proposed improvements in time to meet projected demands. This criterion considers the potential that regulatory permitting, public acceptance, property acquisition, or constructability issues could

#5 **Flexibility** = The ability to phase implementation and spread the cost over time, while still meeting projected demands.

BGADD - Preferred Option Ranking Worksheet

Criteria #2: Raw/Finished Water Quality

Weight: 8

	Louisville Water Company	Cincinnati via Boone Florence Regional Water Commission	Cincinnati via Bracken County	Carrollton Utilities/ Carroll County WD No. 1	Greater Fleming Regional Water Commission	KY River Pool 3 WTP Supplemented with Ohio River	Ohio River - New WTP at Maysville/Dover	Ohio River - New WTP at Warsaw	Sum	Weighted Score
1 Louisville Water Company		3	3	3	3	3	3	3	21	168
2 Cincinnati via Boone Florence Regional Water Commission	3		3	3	3	3	3	3	21	168
3 Cincinnati via Bracken County	3	3		3	3	3	3	3	21	168
4 Carrollton Utilities/ Carroll County WD No. 1	3	3	3		3	3	3	3	21	168
5 Greater Fleming Regional Water Commission	3	3	3	3		3	3	3	21	168
6 KY River Pool 3 WTP Supplemented with Ohio River	3	3	3	3	3		3	3	21	168
7 Ohio River - New WTP at Maysville/Dover	3	3	3	3	3	3		3	21	168
8 Ohio River - New WTP at Warsaw	3	3	3	3	3	3	3		21	168

Note: Rank the relative importance of the left-column criteria against the top-row criteria on a scale of 1 to 5
(1 = much less important, 3 = equivalent importance, 5 = much greater importance).

DEFINITIONS

#1 **Adequate Capacity** = Reliable quantity of raw water and finished water to meet projected demands through the planning period. This criteria addresses interruptibility of sources of supply.

#2 **Raw/Finished Water Quality** = Raw and finished water quality that meets existing water quality requirements, and can readily achieve future anticipated regulations. This criteria also addresses water quality preferences such as taste.

#3 **Cost**
allowance for additional KRA funding for out-of-basin transfers.

#4 **Implementability** = The relative ease of implementing the proposed improvements in time to meet projected demands. This criterion considers the potential that regulatory permitting, public acceptance, property acquisition, or constructability issues could

#5 **Flexibility** = The ability to phase implementation and spread the cost over time, while still meeting projected demands.

BGADD - Preferred Option Ranking Worksheet

Criteria #3: Cost

Weight: 27

	Louisville Water Company	Cincinnati via Boone Florence Regional Water Commission	Cincinnati via Bracken County	Carrollton Utilities/ Carroll County WD No. 1	Greater Fleming Regional Water Commission	KY River Pool 3 WTP Supplemented with Ohio River	Ohio River - New WTP at Maysville/Dover	Ohio River - New WTP at Warsaw	Sum	Weighted Score
1 Louisville Water Company		4	4	5	5	3	3	3	27	729
2 Cincinnati via Boone Florence Regional Water Commission	2		3	3	5	3	3	3	22	594
3 Cincinnati via Bracken County	2	3		3	5	3	3	3	22	594
4 Carrollton Utilities/ Carroll County WD No. 1	1	3	3		4	3	3	3	20	540
5 Greater Fleming Regional Water Commission	1	1	1	2		2	2	2	11	297
6 KY River Pool 3 WTP Supplemented with Ohio River	3	3	3	3	4		3	3	22	594
7 Ohio River - New WTP at Maysville/Dover	3	3	3	3	4	3		3	22	594
8 Ohio River - New WTP at Warsaw	3	3	3	3	4	3	3		22	594

Note: Rank the relative importance of the left-column criteria against the top-row criteria on a scale of 1 to 5
(1 = much less important, 3 = equivalent importance, 5 = much greater importance).

DEFINITIONS

#1 **Adequate Capacity**
of sources of supply.

#2 **Raw/Finished Water Quality** = Raw and finished water quality that meets existing water quality requirements, and can readily achieve future anticipated regulations. This criteria also addresses water quality preferences such as taste.

#3 **Cost** = The present worth cost for proposed raw and finished water improvements, including capital, operating and maintenance costs. This cost could include allowance for additional KRA funding for out-of-basin transfers.

#4 **Implementability** = The relative ease of implementing the proposed improvements in time to meet projected demands. This criterion considers the potential that regulatory permitting, public acceptance, property acquisition, or constructability issues could

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BGADD - Preferred Option Ranking Worksheet

Criteria #4: Implementability

Weight: 27

	Louisville Water Company	Cincinnati via Boone Florence Regional Water Commission	Cincinnati via Bracken County	Carrollton Utilities/ Carroll County WD No. 1	Greater Fleming Regional Water Commission	KY River Pool 3 WTP Supplemented with Ohio River	Ohio River - New WTP at Maysville/Dover	Ohio River - New WTP at Warsaw	Sum	Weighted Score
1 Louisville Water Company		3	3	2	2	1	3	3	17	459
2 Cincinnati via Boone Florence Regional Water Commission	3		2	2	2	1.5	2	2	14.5	391.5
3 Cincinnati via Bracken County	3	4		3	3	2	2	2	19	513
4 Carrollton Utilities/ Carroll County WD No. 1	4	4	3		2	2	3	3	21	567
5 Greater Fleming Regional Water Commission	4	4	3	4		2	3.5	3.5	24	648
6 KY River Pool 3 WTP Supplemented with Ohio River	5	4.5	4	4	4		4	4	29.5	796.5
7 Ohio River - New WTP at Maysville/Dover	3	4	4	3	2.5	2		3	21.5	580.5
8 Ohio River - New WTP at Warsaw	3	4	4	3	2.5	2	3		21.5	580.5

Note: Rank the relative importance of the left-column criteria against the top-row criteria on a scale of 1 to 5
(1 = much less important, 3 = equivalent importance, 5 = much greater importance).

DEFINITIONS

#1 **Adequate Capacity** = Reliable quantity of raw water and finished water to meet projected demands through the planning period. This criteria addresses interruptibility of sources of supply.

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#4 **Implementability** = The relative ease of implementing the proposed improvements in time to meet projected demands. This criterion considers the potential that regulatory permitting, public acceptance, property acquisition, or constructability issues could delay implementation.

#5 **Flexibility** = The ability to phase implementation and spread the cost over time, while still meeting projected demands.

BGADD - Preferred Option Ranking Worksheet

Criteria #5: Flexibility

Weight: 20

	Louisville Water Company	Cincinnati via Boone Florence Regional Water Commission	Cincinnati via Bracken County	Carrollton Utilities/ Carroll County WD No. 1	Greater Fleming Regional Water Commission	KY River Pool 3 WTP Supplemented with Ohio River	Ohio River - New WTP at Maysville/Dover	Ohio River - New WTP at Warsaw	Sum	Weighted Score
1 Louisville Water Company		4	3.5	3.5	4	2	2.5	2.5	22	440
2 Cincinnati via Boone Florence Regional Water Commission	2		2	2	3	1	2	2	14	280
3 Cincinnati via Bracken County	2.5	4		3	4	2	2.5	2.5	20.5	410
4 Carrollton Utilities/ Carroll County WD No. 1	2.5	4	3		4	2	2.5	2.5	20.5	410
5 Greater Fleming Regional Water Commission	2	3	2	2		1	2	2	14	280
6 KY River Pool 3 WTP Supplemented with Ohio River	4	5	4	4	5		4	4	30	600
7 Ohio River - New WTP at Maysville/Dover	3.5	4	3.5	3.5	4	2		2.5	23	460
8 Ohio River - New WTP at Warsaw	3.5	4	3.5	3.5	4	2	3.5		24	480

Note: Rank the relative importance of the left-column criteria against the top-row criteria on a scale of 1 to 5
(1 = much less important, 3 = equivalent importance, 5 = much greater importance).

DEFINITIONS

#1 **Adequate Capacity** = Reliable quantity of raw water and finished water to meet projected demands through the planning period. This criteria addresses interruptibility of sources of supply.

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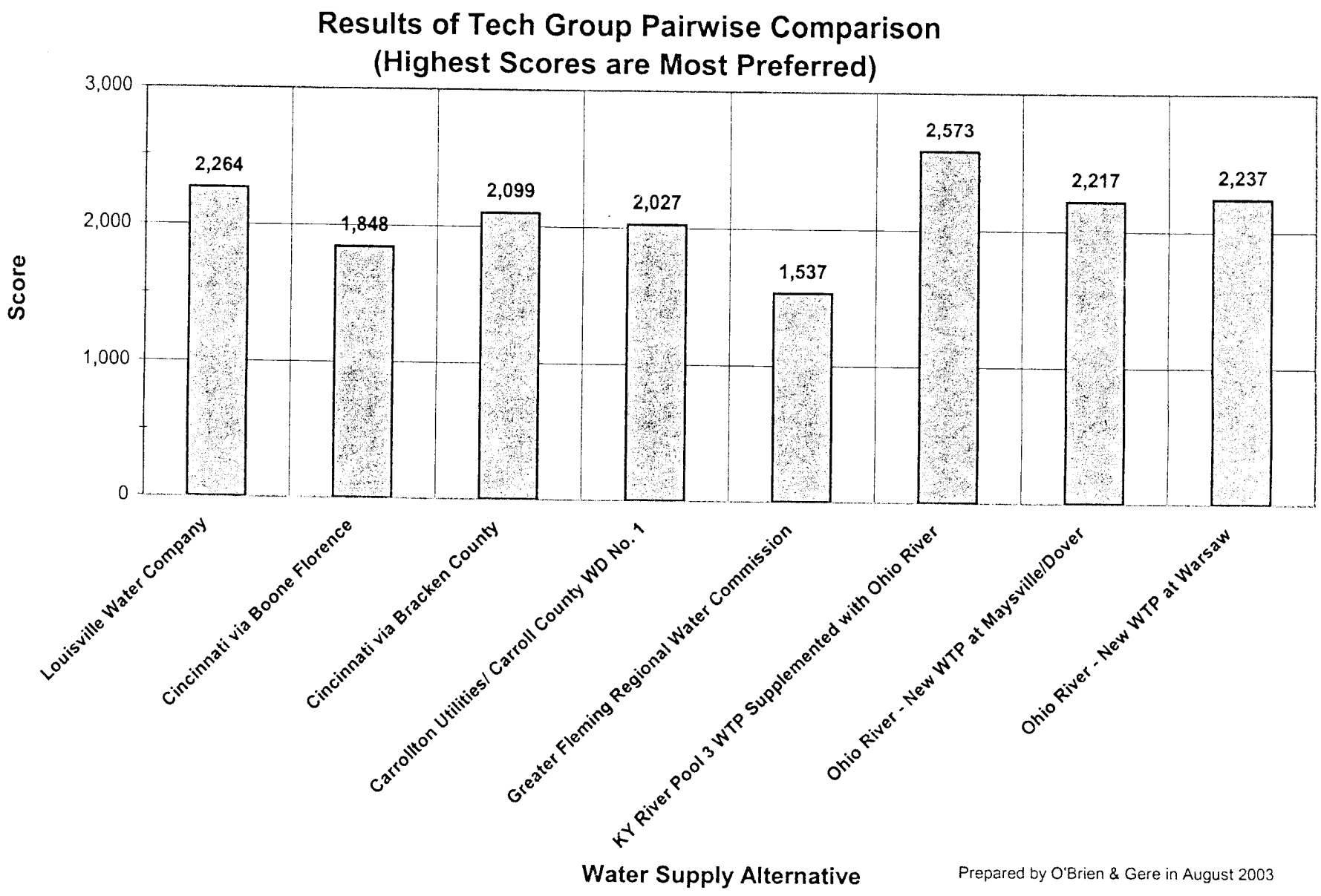
#4 **Implementability** = The relative ease of implementing the proposed improvements in time to meet projected demands. This criterion considers the potential that regulatory permitting, public acceptance, property acquisition, or constructability issues could

#5 **Flexibility** = The ability to phase implementation and spread the cost over time, while still meeting projected demands.

BGADD - Preferred Option Ranking Worksheet
Criteria Summary

	Adequate Capacity	Raw/Finished Water Quality	Cost	Implementability	Flexibility	Sum of Scores	Rank
1 Louisville Water Company	468	168	729	459	440	2,264	2
2 Cincinnati via Boone Florence	414	168	594	391.5	280	1,848	7
3 Cincinnati via Bracken County	414	168	594	513	410	2,099	5
4 Carrollton Utilities/ Carroll County WD No. 1	342	168	540	567	410	2,027	6
5 Greater Fleming Regional Water Commission	144	168	297	648	280	1,537	8
6 KY River Pool 3 WTP Supplemented with Ohio River	414	168	594	796.5	600	2,573	1
7 Ohio River - New WTP at Maysville/Dover	414	168	594	580.5	460	2,217	4
8 Ohio River - New WTP at Warsaw	414	168	594	580.5	480	2,237	3



Prepared by O'Brien & Gere in August 2003

Summary of Water Supply Alternatives Matrix (Revised for Workshop #5, on July 23, 2003)

Description/*Raw Water Source*	Evaluation Criteria				
	Adequate Capacity	**Raw/Finished Water Quality**	**Cost (See Cost Spreadsheets)**	**Implementability**	**Flexibility**
Purchase Finished Water					
Louisville Water Company/*Ohio River and Riverbank Aquifer Sources*	- 45 mgd spare plant capacity currently available. - Full 67 mgd possible with construction of transmission to the treatment plant, and additional WTP capacity. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is/will be highly treated Ohio River/riverbank aquifer water. - Finished water quality is/should be very good. Finished water quality in pipeline is not expected to noticeably deteriorate even under low demand conditions. Disinfectant residual good for 7 to 10 days which equates to a low "maintenance" flow through the pipeline. - Member of the *Partnership for Safe Water* which includes water suppliers striving to exceed current water quality goals through optimization of existing facilities.		- Public acceptance of a treated water pipeline from Louisville to Lexington could be an issue. - Construction of the pipeline is a relatively quick project. - Crossing of KY river will be difficult construction (tunnel required). - Minimal permitting required for a linear project, such as pipeline. - Long treated water pipeline could be used to provide supply to customers along pipeline route with supply shortfalls that are not members of BWSC. - Nationally recognized organization with well-established track record serving large wholesale customers. - Limited regulatory permitting anticipated.	- Phasing is possible if multiple pipelines are used. - Ohio River/RBI is capable of meeting demands beyond 2020. - Expandability of water treatment and associated facilities to meet water needs beyond the planning period will be dependent on the desire of the purveyor to execute an agreement with BWSC for additional capacity.
Cincinnati Water Works (via the Boone Florence Water Commission)/*Ohio River Source*	- Proposal has options to construct new WTP in Kentucky to avoid costs to transport water from existing WTP in Ohio. - Approx. 10 mgd currently available via Boone Florence Regional Water Commission. - Potential access to approx. 10 mgd from No. Kentucky Water District on temporary basis. - Full 67 mgd is possible. - Provides an alternate source of supply from outside the KY River basin that enhances the reliability of supply to the region.	- Source is highly treated Ohio River water. - Granular activated carbon used in existing Ohio WTP process to remove synthetic organic chemicals that can result from spills of hazardous materials or substances. - Finished water quality is/should be very good. Finished water quality in pipeline is not expected to noticeably deteriorate even under low demand conditions. Disinfectant residual good for 7 to 10 days which equates to a low "maintenance" flow through the pipeline.		- Constructing a pipeline through the Boone- Florence service area would involve wheeling through that utility. - Public acceptance of a treated water pipeline from Northern Kentucky to Lexington could be an issue, although no known opposition to the pipeline. - Construction of the pipeline is a relatively quick project. Construction schedule for additional treatment capacity (beyond current availability) will be dependent on both Cincinnati and Boone- Florence (if routed through BF). - Nationally recognized organization with a well-established track record serving large wholesale customers. - Long treated water pipeline could be used to provide supply to customers along pipeline route with supply shortfalls that are not members of BWSC. - Regulatory permits will be required for construction of a new river intake, but should be readily obtainable.	- Phasing is possible by initial access to spare capacity, and in longer term by phased construction of treatment facilities, and by multiple pipelines. - Ohio River is capable of meeting demands beyond 2020.
Cincinnati Water Works (via eastern route through Bracken County)/*Ohio River Source*	- Proposal has options to construct new WTP in Kentucky to avoid costs to transport water from existing WTP in Ohio. - Full 67 mgd is possible. - Provides an alternate source of supply from outside the KY River basin that enhances the reliability of supply to the region.	- Source is highly treated Ohio River water. - Granular activated carbon used in existing Ohio WTP process to remove synthetic organic chemicals that can result from spills of hazardous materials or substances. - Finished water quality is/should be very good. Finished water quality in pipeline is not expected to noticeably deteriorate even under low demand conditions. Disinfectant residual good for 7 to 10 days which equates to a low "maintenance" flow through the pipeline.		- Public acceptance of a treated water pipeline from Northern Kentucky to Lexington could be an issue, although no known opposition to the pipeline. - Construction of the pipeline is a relatively quick project. Construction schedule for additional treatment capacity (beyond current availability) will be dependent on Cincinnati. - Nationally recognized organization with a well-established track record serving large wholesale customers. - Long treated water pipeline could be used to provide supply to customers along pipeline route with supply shortfalls that are not members of BWSC. - Regulatory permits will be required for construction of a new river intake, but should be readily obtainable.	- Phasing is possible by staged construction of treatment facilities, and by multiple pipelines. - Ohio River is capable of meeting demands beyond 2020.

Description/*Raw Water Source*	Evaluation Criteria				
	Adequate Capacity	**Raw/Finished Water Quality**	**Cost (See Cost Spreadsheets)**	**Implementability**	**Flexibility**
Purchase water from Proposed Carroll County Regional Water Commission/*Source is Aquifer near Carrollton*	- USGS has completed studies that indicate the aquifer is capable of providing the full 67 mgd. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is groundwater from along bank of Ohio River. - Proposal includes softening - Finished water is/should be very good. Very low organics/DBP levels on existing supply.		- Less than 4 mgd of current municipal treatment capacity and therefore limited experience with production of large amounts of water. - Formation of Carroll Regional Water Commission would be required; it would include: Carroll County Water District #1, Carrollton Utilities, and West Carroll Water District. - Long treated water pipeline could be used to provide supply to customers along pipeline route with supply shortfalls that are not members of BWSC. - Construction schedule for additional treatment capacity (beyond current availability) will be dependent on purveyor. - Limited regulatory permitting.	- Expandability of water treatment and associated facilities to meet water needs beyond the planning period will be dependent on the desire of the purveyor to execute an agreement with BWSC for additional capacity.
Purchase water from Greater Fleming/*Source is Aquifer near Maysville*	- Proposed 15 mgd supply. - Additional studies required to assess supply capability of aquifer beyond 15 mgd. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is groundwater from along bank of Ohio River. - Proposal includes softening - Finished water is/should be very good.		- GFRWC sill implementing supply facilities. BWSC supply depends on funding and implementation of additional wells and piping to point of connection. - Limited regulatory permitting. - Long treated water pipeline could be used to provide supply to customers along pipeline route with supply shortfalls that are not members of BWSC.	- Expandability to meet water needs beyond the initial capacity will be dependent on results of studies into aquifer capacity.
Kentucky River					
Raise Dam 10 on *Kentucky River*	Baseline option included in each alternative.				
Utilize water credits above Dam 4 of *Kentucky River*	Baseline option included in each alternative.				
Kentucky River Pool 3 WTP Supplemented with Ohio River	- Optimizes use of Kentucky River by withdrawing as much from Pool 3 as KDOW permits over time. - Connection to Ohio River provides an abundant and reliable source that can support the full 67 mgd. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is treated water from the Kentucky River, except during during drought. - Proximity of WTP to Grid Network reduces water age in the transmission pipeline. - Advanced treatment should provide finished water quality in pipeline that would not noticeably deteriorate even under low demand conditions.		- Satisfies mission to utilize Kentucky River. - Treated water from Pool 3 could be used to provide supply to customers in the vicinity of Pool 3 with supply shortfalls that are outside of the BWSC. - Construction of the intakes in Pool 3 and the Ohio River would require Federal and State regulatory permits as well as engineering and environmental studies. It is likely that these studies could be limited in scope and expedited because the construction in the pool and Ohio River is limited to the intake footprint, and the use of the Ohio River during droughts would minimize the need for environmental studies. - BWSC can control schedule for construction of facilities independent of other purveyors.	- BWSC has flexibility to make independent decisions on water treatment production rates. - Provides opportunity to stage construction of the water treatment plant facilities and to expand beyond the planning period. - BWSC has an independent decision on expansion of water treatment and associated facilities to meet water needs beyond the planning period.

Description/*Raw Water Source*	Evaluation Criteria				
	Adequate Capacity	**Raw/Finished Water Quality**	**Cost (See Cost Spreadsheets)**	**Implementability**	**Flexibility**
Ohio River					
Withdrawal and WTP at Maysville or Dover/*Ohio River Source*	- Ohio River is an abundant and reliable source that can support the full 67 mgd withdrawal. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is raw water from the Ohio River. - Based on experience at Cincinnati, advanced treatment should provide finished water quality in pipeline that would not noticeably deteriorate even under low demand conditions.		- Construction of the pipeline is a relatively quick project. BWSC can control schedule for construction of facilities independent of other purveyors. - Regulatory permits will be required for construction of the river intake, but should be readily obtainable. - Overall somewhat longer time req'd than pipeline only projects. - Long treated water pipeline could be used to provide supply to customers along pipeline route with supply shortfalls that are not members of BWSC.	- BWSC has flexibility to make independent decisions on water treatment production rates. - BWSC has an independent decision on expansion of water treatment and associated facilities to meet water needs beyond the planning period.
Withdrawal and WTP at Warsaw/*Ohio River Source*	- Ohio River is an abundant and reliable source that can support the full 67 mgd withdrawal. - Provides an alternate source of supply from outside the KY River basin which enhances the reliability of supply to the region.	- Source is treated water from the Ohio River. - Based on experience at Cincinnati, advanced treatment should provide finished water quality in pipeline that would not noticeably deteriorate even under low demand conditions.		- Construction of the pipeline is a relatively quick project. BWSC can control schedule for construction of facilities independent of other purveyors. - Regulatory permits will be required for construction of the river intake. - Overall somewhat longer time req'd than pipeline only projects. - Long treated water pipeline could be used to provide supply to customers along pipeline route with supply shortfalls that are not members of BWSC.	- BWSC has flexibility to make independent decisions on water treatment production rates. - BWSC has an independent decision on expansion of water treatment and associated facilities to meet water needs beyond the planning period.

Roll Call Vote on Endorsement of Kentucky River Pool No. 3

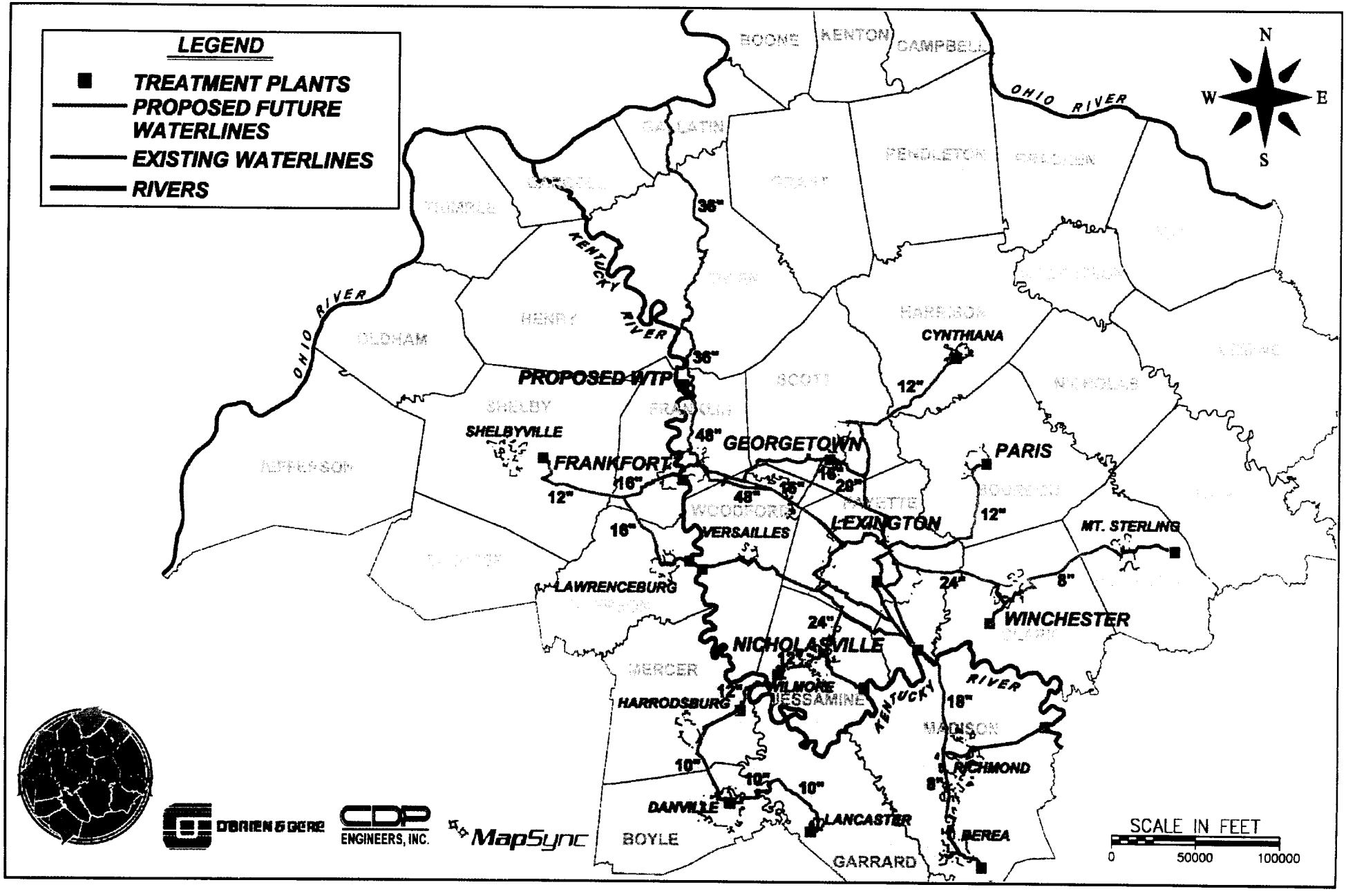
Roll Call Votes – Bluegrass Water Supply Consortium
October 13, 2003

Tech Group	Endorsement of Water Supply Alternative – Pool 3
Bluegrass Area Development District	Yes
Frankfort Electric & Water Plant Board	Yes
Georgetown Municipal Water and Sewer Service	Yes
Lexington-Fayette Urban County Government	Yes
Kentucky-American Water Company	Yes
City of Nicholasville	Yes
Winchester Municipal Utilities	Yes

Outer Ring Water Utilities

Berea College Utilities	Yes
City of Cynthiana	Yes
City of Danville	Yes
City of Harrodsburg	Absent
City of Lancaster	Yes
City of Lawrenceburg	Yes
Mt. Sterling Water & Sewer Commission	Yes
City of Paris	Yes
Richmond Utilities	Abstain
Shelbyville Water & Sewer Commission	Yes
City of Versailles	Yes
City of Wilmore	Absent

Grid Hydraulic Network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TREATMENT PLANTS
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FRANKFORT
GEORGETOWN
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VERSAILLES
MT. STERLING
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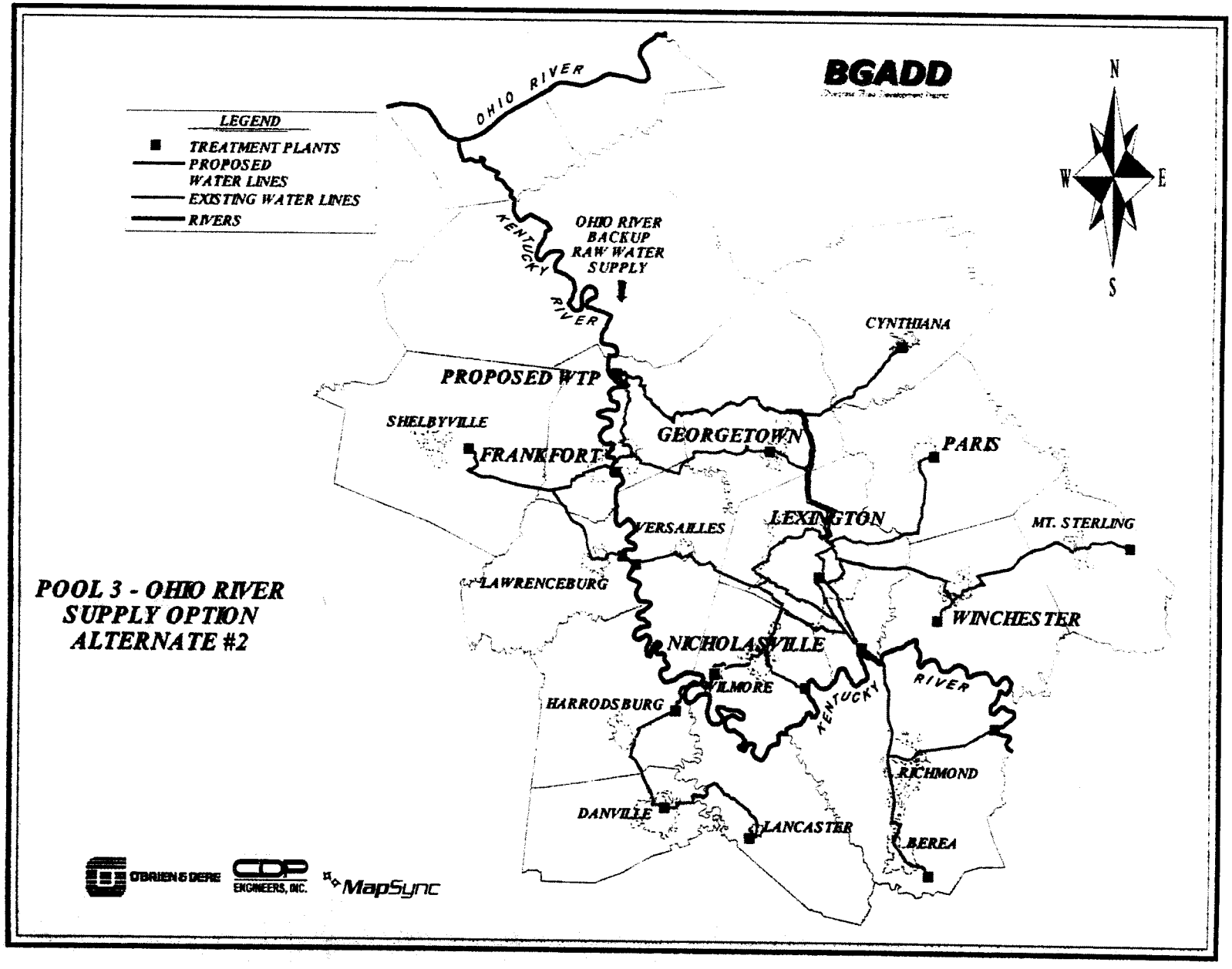
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CDP ENGINEERS, INC.
MapSync

Grid Network Water Quality Memorandum

From: George B. Rest
Re: BWSC Water Quality Approaches
File: 30507
Date: January 8, 2004

cc: D Hassall, BGADD
BWSC
A Duke
T Dumm

This memo responds to BGADD's request to identify the approaches that might be used to address distribution water quality issues.

Issue No. 1 - Disinfection by-products (DBP's) and Chloramine/free chlorine mixing

Background
The naturally occurring organics in surface water supplies such as the Kentucky River or Ohio River combine with free chlorine to form DBP's. Most water systems using surface water will be challenged to meet Stage 2 DBP levels, when they come into effect (likely 2007-2009 timeframe). As the scope of this study does not include general SDWA compliance, O'Brien & Gere is not aware of how each community intends to address DBP compliance. The following table identifies which form of chlorine is currently used by each of the BWSC members. Thirteen out of seventeen currently use free chlorine, but more than half of the water consumed in the region uses chloramines, because Kentucky American, the dominant supplier, uses chloramine.

Utility	Primarily Free Chlorine	Primarily Chloramine
Berea	X	
Cynthiana	X	
Danville	X	
Frankfort Plant Board		X
Georgetown MWSS		X
Harrodsburg	X	
KAWC		X
Lancaster	X	
Lawrenceburg	X	
Mt. Sterling	X	
Nicholasville	X	
Paris		X (10 months/year)
Richmond Utilities	X (8 months/year)	
Shelbyville W&S Commission	X	
Versailles		X
Wilmore	X	
Winchester Municipal Utilities	X	

We suspect that some of the "free chlorine" BWSC members may also switch to chloramines in the future, if they cannot meet future DBP limits with free chlorine. They have several years before Stage 2 limits come into effect, and may not have yet decided on their approach. Chloramines is a likely option, because they do not form DBP's, and serve as a persistent/long lasting residual. However they are not as strong a disinfectant as free chlorine, and therefore must be used following other disinfection processes that satisfy the "CT" requirements. Typically, systems using chloramination use free chlorine

to satisfy their CT requirements, then add ammonia to halt the formation of DBP's. Chloramines may also increase the potential for "regrowth" in the distribution system, because the ammonia is a potential nitrogen source for organisms in the water/pipeline. To minimize the potential for regrowth, most systems using chloramines enhance their flushing programs, and many convert back to free chlorine for several weeks in the summer to "disinfect" the distribution system.

One of the preferred alternative supplies, Louisville Water Co., currently uses chloramines, and three other alternatives could end up using them (Pool 3, and Ohio River intakes at Maysville/Dover or Warsaw). The other four alternatives use free chlorine. Carrollton and Greater Fleming's groundwater supplies are low in organics, and should meet future DBP requirements using free chlorine. Cincinnati uses granular activated carbon treatment to lower the organic levels, and apparently will be able to continue their use of free chlorine.

The issue at hand is that mixing water with chloramine and free chlorine residuals may cause objectionable tastes and odors. Tom Calkins mentioned such an event at the Tech Group meeting on June 9, 2003. A grid system would increase the potential for mixing of waters. In order for BWSC to avail itself of the full set of water supply alternatives, and in order to operate a grid system, BWSC directed O'Brien & Gere to perform a preliminary review of approaches.

Potential Approaches

Approach No. 1: The simplest and most reliable approach to avoid the taste and odor problem is for all BWSC members to use chloramines as a common residual. Chloramines would be the common disinfectant because some of the systems require chloramines to meet DBP limits. This approach would require the addition of ammonia, once CT's are met, for all supplies. This involves a relatively modest capital cost, but significantly more vigilance in monitoring and assuring distribution water quality. As noted above, most systems employing chloramines increase their flushing, especially in the summer, and many convert back to free chlorine for a short period each year to "disinfect" the pipelines, all in an effort to prevent " regrowth". The primary objection some utilities have to chloramination is the increased operational cost and attention.

Approach No. 2: This is a variation of the above, in which only those utilities who agree to use chloramines join the BWSC.

Approach No. 3: A third approach is for BWSC members to use free chlorine as their common residual. However that would also likely require the existing "chloramine utilities" to improve their removal of precursor organics for DBP compliance. It would also likely require enhanced treatment for some of the new supply alternatives, as noted above. The potential treatment techniques include nanofiltration, ozone followed by biologically active carbon filtration, or possibly granular activated carbon filtration with frequent changeouts, similar to the way Cincinnati operates. Of these, nanofiltration is the most costly but most effective at removing precursor organics. Pilot studies would be required to determine whether the other treatment technologies would achieve DBP compliance.

Approach No. 4: The fourth approach would allow use of both forms of residual, with each utility responsible for converting to the residual form they prefer. This could mean the residual in some water

would be converted several times before it reaches the tap. Changes in water flow patterns will require increased real time monitoring of distribution water quality, and more operator attention. If ammonia is added several times to the same water, the increasing nitrogen level may increase the potential for regrowth. With each utility maintaining responsibility for their distribution residual, the BWSC role could be one of regional coordination and awareness of changes in flow patterns and water quality. This approach is preferred by some consortium members, and appears to be feasible, however we would prefer to see as many utilities employ a common residual as practical, so as to minimize the frequency of changing the residual form back and forth in the distribution system.

Of the four approaches, it appears that the first and second would combine reliable compliance with DBP requirements, and modest cost. The third approach would result in high quality water, but at a substantially higher price. The fourth approach should be feasible, with cost potentially above that of approaches 1 & 2, but still relatively moderate. It likely would be favored by most utilities, since it may not require a change in the residual present at their customer's taps. It also provides some flexibility to accommodate changes in chlorination (unrelated to regionalization) that may occur in some systems to meet Stage 2 DBP levels.

O'Brien & Gere believes that members of BWSC should address the issue of chlorine residual regardless of new supply options, because: (1) some may decide to change to meet future DBP requirements, and/or (2) members currently use both forms of chlorine residual, and they should assess their flexibility to change to avoid the mixing problem. Since BWSC must address the issue anyway, the decision on chlorine residual should not eliminate any of the eight preferred new supply alternatives. All of the above four approaches are reasonable to meet finished water quality requirements. Further water quality studies are recommended, but can be performed after the Regionalization Feasibility study is completed.

Issue No. 2 Hardness and corrosion control

Hardness and corrosion control should be less significant problems.
Hardness – O'Brien & Gere will include costs to soften hard groundwater, even if it is currently supplied without softening. We propose a maximum hardness target of about 150 mg/l.

Corrosion control - There may be a need to adjust some corrosion techniques in mixing zones. It is possible that the grid may adopt some more consistent approaches to corrosion control to avoid the mixing issue. It is unlikely that occasional changes in mixing would create a significant problem. Further water quality studies are recommended, but can be performed after the Regionalization Feasibility study is completed in September.

Issue No. 3 KDOW Regulations regarding consecutive systems

KDOW has a regulatory initiative to make water suppliers responsible for water quality in consecutive systems. The grid concept is a challenge from a regulatory perspective, because there could be several suppliers each with the potential to supply water to the same utility. The hydraulics could be dynamic, at least on occasion, making it difficult to always know whose water is reaching that utility.

KDOW has the responsibility to issue specific guidance on responsibility for water quality compliance in a grid system, and to clarify the rules governing consecutive systems with multiple sources. However, given the need to move quickly, and the complexity of KDOW's challenge, O'Brien & Gere suggests BWSC consider a voluntary role to provide an on-line water quality monitoring network for selected parameters, and responsibility for oversight of grid water quality. In this way, BWSC could make alerts to retailers when there are water quality changes. Responsibility to own and maintain the monitoring network could remain with the retailers, except on BWSC mains. However, by using BWSC to collect and monitor both theirs and the retail network's water quality, the BWSC could proactively manage distribution water quality, and help identify and address water quality problems on a regional basis.

BWSC Letter of Intent to Buy

Contents

- **Draft Letter to BWSC participants**
- **Non-binding commitment letters received through February 27, 2004**

August 11, 2003

Re: Proposed Bluegrass Regional Water Commission

Subject: Resolution of Intent to Enter into an Agreement to Purchase Finished Water

Dear (potential wholesale customer):

The Bluegrass Water Supply Consortium Regionalization Feasibility Study is nearing completion. In order to finalize the size and cost of facilities to furnish finished water, we need to confirm how much capacity each utility intends to purchase. Please help us properly size the future regional facilities by providing your *non-binding commitment*. (A *legally binding contract* for commitment of water capacity will be required after the proposed Region Water Commission is formed.) While we are not yet requesting a legally binding commitment, we ask that you be as accurate and realistic as possible, since the accuracy of the facility sizes impacts the accuracy of our cost estimates. We therefore request your Resolution of Intent to Enter into an Agreement to Purchase Finished Water. We request that you secure the endorsement of the authorized body (City Council, City Commission, Utility Commission, etc.) that will ultimately need to approve the future *legally binding contract*. To assist you in determining your intent to purchase finished water, we suggest you anticipate the following conditions:

1. The proposed Bluegrass Regional Water Commission will construct or contract for water supply, treatment, pumping and transmission facilities, including a "pipeline grid," up to the point of connection to your system. (Note: The Bluegrass Regional Water Commission will provide water at a reasonable pressure, but each wholesale customer will be responsible for adjusting the pressure as needed to meet their specific requirements.)
2. The proposed Bluegrass Regional Water Commission will supply water on a wholesale basis, with each wholesale customer responsible for distribution, retail billing, etc.
3. In order to commit to the above facilities, the Bluegrass Regional Water Commission will require signed, long-term agreements to purchase water. We expect to establish the minimum at 1 million gallons/day of *committed capacity*, in order to underwrite the above facilities.

    - The term of the agreement will likely be 50 years.

- If you are interested in committing to less than the above minimum, please so indicate, and the proposed Bluegrass Regional Water Commission will consider on a case by case basis.

4. The proposed Bluegrass Regional Water Commission may construct some spare capacity in some of the water system components. If you decide to increase your *committed capacity* in the future, and purchase some of this spare capacity, you can expect to pay a higher amount due to deferring this commitment.
5. Your water utility may be required to exercise a daily withdrawal of a minimum amount of water necessary to maintain "fresh" water in the connecting grid pipeline. We expect that this minimum usage will approximate 20% of your committed capacity, depending on the size of the connecting pipeline.
6. The annual cost per mgd, of *committed capacity* is estimated to be in the range of $400,000 to $500,000 per year. (Note: These estimates do not assume grant funding) This cost is expected to include a *minimum daily allotment* of 200,000 gallons/day of finished water for every 1 mgd of committed capacity. Additional water taken on any day beyond the *minimum daily allotment* would be billed at a *standard wholesale unit rate*, which will likely be initially in the range of $0.60 to $.90 per 1,000 gallons of water in excess of the *minimum daily allotment*. These two cost components can be added together to arrive at these estimated average or effective rates:

   Example 1- If you purchase 1 mgd capacity and take the full 1 mgd every day, the average or effective rate is estimated to be in the range of $1.75 to $2.00 per 1,000 gallons delivered.

   Example 2- If you purchase 1 mgd capacity but only take the minimum 200,000 gallons every day, the average or effective rate is approximately $6.00 per 1,000 gallons delivered.

   This wide range in average or effective rates is because most of the costs will be essentially fixed costs associated with constructing and staffing the new facilities. The variable costs such as power and chemicals, etc. represent a much smaller share of the total costs.
7. Purchase of water on any day in an amount beyond your *committed capacity* may be allowed on a case by case basis, depending on available capacity. This situation could be caused by an emergency, such as a natural disaster or malfunction at your water treatment plant. The fee for this service has not yet been determined.
8. Many factors could affect the costs and fees provided herein. Such factors include:
   - receipt of grants and/or low interest loans,
   - phased construction of water supply facilities,
   - decisions to provide some spare capacity now, to maintain lowest possible cost over the long term.
   - changes in the nature and cost of water supply facilities due to site conditions, regulatory and permit requirements, or other factors,
   - decisions by other utilities regarding the amounts of their *committed capacities.*

The commitments requested in this letter, together with continuing efforts under the Regionalization Feasibility Study will allow for refinements of the costs presented herein.

If (City name) intends to enter into an agreement with the proposed Bluegrass Regional Water Commission to purchase capacity in the proposed facilities, we request that the (City) adopt a resolution similar to that shown below, and forward a copy of the adopted resolution to the undersigned by (date):

> **Resolved,** that the (City Council, City Commission, Utility Commission, Board, etc.) intends to enter into a long-term agreement with the proposed Bluegrass Regional Water Commission to secure *committed capacity* for_____ million gallons of water per day. This resolution is based on the information contained in the letter dated____, from the Bluegrass Area Development District.

If you have any questions about this letter, please contact the undersigned. We look forward to your response.

Very truly yours,

BGADD

JAN 15 2004

BEREA COLLEGE
Berea, Kentucky 40404

Office of Business and Administration
(859) 985-3131
Fax: (859) 985-3904
CPO 2211

January13, 2004

Mr. Don R. Hassall
Blue Grass Area Development District
699 Perimeter Drive
Lexington Ky 40517-4120

Re: Proposed Bluegrass Water Supply Commission

Dear Mr. Hassal:

I am writing to you on behalf of Berea College in response to the letter from you dated October 17, 2003 regarding Berea College Utilities' interest in the Bluegrass Water Supply Commission. As I have indicated to by phone and email, BCU continues to be interested in this regional project and would like to continue to be part of the conversation.

As I have also indicated to you, Berea College is considering the transfer of the water utility company to the City of Berea. They are very interested in continuing this discussion as well, if this transfer occurs. The City is aware of your inquiry and our conversations and will be expressing their interest in a separate letter to you, as they may be the governing authority of the water company when binding agreements are required for the next step.

You have asked for an 'official sign' regarding a commitment from Berea College. Please consider this and the letter from the City of Berea an expression of interest in continuing to be part of the discussion.

Very truly yours,

BEREA COLLEGE

E. Diane Kerby
Vice President for
Business and Administration

Copy to: Ronald E. Smith, Vice President for Finance
Randy Stone, City Administrator, City of Berea College
Michael [illegible]

Coy, Gilbert & Gilbert
LAW OFFICES

*James T. Gilbert
Jerry W. Gilbert
Mark A. Shepherd
Evan B. Jones
Wm. Baxter Jennings
Charles R. Coy
Of Counsel

*BOARD CERTIFIED CIVIL TRIAL ATTORNEY
NATIONAL BOARD OF TRIAL ADVOCACY

January 15, 2004

Don R. Hassall P.E.
Bluegrass Area District
699 Perimeter Drive
Lexington, Kentucky 40517-4120

Re: Bluegrass Water Supply Consortium

Dear Mr. Hassall:

I am corporation counsel for the City of Berea, and as you are undoubtedly aware, the City has been discussing with Berea College the possibility of the City's purchase of the water utility in Berea. We have been given copies of your correspondence with the College concerning the Bluegrass Water Supply Consortium, and particularly your request to Diane Kerby for a response concerning the College water utility's interest in the regional water supply effort.

As the City's discussions and negotiations with the College have proceeded, and as we have discussed this matter, we believe it would be appropriate to evidence the City's interest in entering the consortium. Consequently, please accept this as the City's non-binding response to evidence that, if the City obtains the water utility, it is interested in becoming a part of the consortium. In addition, we have asked the College to respond to evidence its interest and intent to enter into the Bluegrass Water Supply Consortium.

If you would like to discuss this with the City, you should direct your inquiry to Mayor Steve Connelly, or City Administrator, Randy Stone, both of whom may be contacted at 859-986-8528.

212 North Second Street • P.O. Box 1178 • Richmond, Kentucky 40476-1178 • 859-623-3877 • Fax 859-624-5435
www.coygilbertgilbert.com

In closing, please accept my best wishes and prayers to you and your family for your good health, happiness, and success in all of your endeavors.

Very truly yours,

COY, GILBERT & GILBERT

James T. Gilbert

JTG/cjr

pc: City of Berea

City of
DANVILLE
KENTUCKY

P.O. Box 670
Danville, KY 40423
(606) 238-1200

DEC 30 2003

December 22nd, 2003

Don Hassall, PE
Assistant Executive Director
699 Perimeter Drive
Lexington, KY 40517

Re: Bluegrass Water Consortium

Dear Mr. Hassall:

I am writing in response to your letter dated October 17th, 2003. It was in this letter that you on behalf of the Bluegrass Water Supply Consortium requested a Resolution of Intent to Enter into an Agreement to Purchase Finished Water.

As stated in a previous letter, the City Commission desires that Danville participate in the Consortium's effort to resolve water supply issues in the bluegrass area. Accordingly, by motion on December 9th, 2003 the commission agreed to the non-binding resolution to remain an interested party in the consortium with a minimum purchase capacity of 1 MGD and a daily draw of 0.2 MGD.

The final resolution as you requested will be voted on during a special called meeting on December 30th, 2003. A signed copy will be forwarded immediately to the consortium.

In the meantime if you have any questions you may contact me at 859-238-1200.

Sincerely,

Earl Coffey, PE
City Engineer

525 HIGH STREET
PARIS, KENTUCKY 40361

The City of Paris

"THOROUGHBRED CAPITAL OF THE WORLD"

PHONE (859) 987-2110
FAX (859) 987-4640
TDD (859) 987-2100

December 3, 2003

Mr. Don Hassall
Bluegrass Area Development District
699 Perimeter Dr.
Lexington, KY 40517-4120

Dear Mr. Hassall:

Attached is a resolution passed by the Paris City Commission expressing our non-binding intent to enter into a long term agreement for 500,000gpd of finished water from the proposed Bluegrass Water Supply Commission. If you require any additional information, please feel free to contact me.

Sincerely,

Robert E. Casher, Jr.
City Manager

Harney moved, Long seconded and motion unanimously carried to adopt the following resolution authorizing the city's commitment to participate in the Bluegrass Water Supply Commission .

CITY OF PARIS
RESOLUTION 2003-17

A RESOLUTION EXPRESSING THE NON-BINDING INTENT OF THE CITY OF PARIS TO ENTER INTO A LONG TERM AGREEMENT FOR COMMITTED RESERVED CAPACITY OF ONE HALF MILLION GALLONS PER DAY OF FINISHED WATER FROM THE PROPOSED BLUEGRASS WATER SUPPLY COMMISSION, WITH AN EXPECTED DRAW OF ONE HUNDRED THOUSAND GALLONS PER DAY.

Be it resolved by the City of Paris:

Section 1. That the City hereby expresses its intent to enter into a long term agreement with the proposed Bluegrass Water Supply Commission.

Section 2. This City intends to secure a committed capacity of one half million gallons per day, reserved, of finished water.

Section 3. The City expects to draw one hundred thousand gallons per day from the water supply grid.

Section 4. This expression of intent is based on the information contained in the letter from the Bluegrass Area Development District dated October 17, 2003, attached hereto and incorporated herein by reference.

Section 5. It is the understanding of the City in executing this expression of intent that same be non-binding, and that further legally binding authority must be forthcoming from the City.

Section 6. This Resolution shall take effect upon its passage as required by law.

Introduced and enacted at the Regular Meeting on November 11, 2003.

Don Kiser, Mayor

ATTEST:

Cheryl Marsh
City Clerk/Treasurer

Harney moved and Long seconded to give second reading to the following ordinance amending the budget to allow for $500,000 CDBG Economic Development Grant.

CITY OF PARIS

ORDINANCE 2003-20

AN ORDINANCE AMENDING THE ANNUAL BUDGET FOR FISCAL YEAR 2003/2004 OF THE CITY OF PARIS, REFLECTING A TRANSFER OF $500,000.00 FROM THE DEPARTMENT OF LOCAL GOVERNMENT AND AN APPROPRIATION OF $500,000.00 TO THE MONESSEN HEARTH SYSTEMS EXPANSION PROJECT.

WHEREAS, the City of Paris is the recipient of a Grant from the Kentucky Department for Local Government in conjunction with Monessen Hearth Systems expansion project.

Be it ordained by the City of Paris:

Section 1. That the annual budget for fiscal year 2003/2004 is amended as follows:

(A) Increase revenue account 01.000.651 Monessen Hearth Systems Project from Zero to $500,000.00, reflecting a transfer from the Department of Local Government.

(B) Increase expense account 01.113.592 DLG Monessen Hearth Systems Disbursement from Zero to $500,000.00, reflecting an appropriation.

Section 2. This Ordinance shall take effect upon its passage and publication in summary as required by law.

Introduced and First Reading: Regular Meeting, October 28, 2003.

Second Reading and Enacted: Regular Meeting, November 11, 2003.

Signed by the Mayor: November 11, 2003.

Published in summary: November 19, 2003.

CITY OF PARIS, KENTUCKY

BY:_____

Don Kiser, Mayor

City of Lancaster

101 Stanford Street
Lancaster, Kentucky 40444
Phone 859-792-2241
Fax 859-792-3341

DEC 15 2003

BILLY C. MOSS
Mayor
SHARI LANE
City Clerk
JAMES S. SANDERS
City Attorney

KENNY ADAMS
Fire Chief
FRED SIMPSON
Utility Manager
MILLARD ROSE
Asst. Utility Manager
RUSSELL PRESTON
Police Chief

December 11, 2003

Bluegrass Area Development District
699 Perimeter Drive
Lexington, Kentucky 40517-7917
Attn: Don Hassell

Re: Proposed Bluegrass Water Commission

Subject: Resolution of Intent into an Agreement to Purchase Finished Water

To Whom It May Concern:

Resolved, that the City of Lancaster intends to enter into a long-term agreement with the proposed Bluegrass Water Supply Commission to secure *committed capacity* for 500 thousand gallons of water per day. Of that amount of reserved capacity, we would expect to actually draw from the grid an amount of 100 thousand gpd. This resolution is based on the information contained in the October 17, 2003 letter from the Bluegrass Area Development District.

The City of Lancaster understands this is a **non-binding commitment** and not a *legally binding contract.*

Sincerely,

Billy Moss
Mayor Billy Moss

COUNCIL MEMBERS: CECELIA ADAMS, RANDY STATHERS, DANIEL NAPIER, DELMAR WARREN, JESSE WAGONER, DONNA POWELL

MT. STERLING WATER & SEWER SYSTEM
POST OFFICE BOX 392 – 300 EAST MAIN STREET
MOUNT STERLING, KENTUCKY 40353-0392

DEC 0 9 2003

Resolved, that whereas, as of this date, Mt. Sterling Water and Sewer Commission intends to enter into a long-term agreement with the proposed Bluegrass Water Supply Commission to secure *committed capacity* for 1.0 million gallons of water per day. Of that amount of reserved capacity, we would expect to actually draw from the grid an amount of 1.0 million gpd. This resolution is based on the information contained in the October 17, 2003 letter from the Bluegrass Area Development District.

Jeff Murphy, Chairman — Date 11/26/03

Attested by:

Dennis Bonfield, Secretary and Treasurer — Date 12-8-03

Winchester Municipal Utilities

P.O. Box 4177, 150 N. Main Street
Winchester, KY 40392-4177
Phone: 859 744-5434
Fax: 859 745-4146

September 9, 2003

Mr. Don Hassall, PE
Assistant Executive Director
Bluegrass Area Development District
699 Perimeter Drive
Lexington, KY 40517-7917

Dear Mr. Hassall,

The Winchester Municipal Utilities Commission (WMUC), in regular session September 4, 2003, voted unanimously to participate with the Bluegrass Water Supply Consortium (BWSC) as it finalizes the water system regionalization study. With this vote, WMUC commits to 3.0 million gallons per day to be purchased from the water system grid in order that the grid can be sized and the cost of water from the grid determined.

The following conditions were placed with this commitment:

- This is a non-binding commitment pending the final price structure for water purchased from the water system grid.
- A long-term agreement for purchase of water from the water system grid will be based upon terms and conditions as presented by BWSC and approved WMUC.
- Pending the final terms and conditions, WMUC reserves the right to increase the amount of water purchased from the grid.

Sincerely,

Vernon Azevedo

Vernon Azevedo, PE
General Manager

October 6, 2003

Mr. Don R. Hassall, P.E.
Assistant Executive Director
Bluegrass Area Development District
699 Perimeter Drive
Lexington, KY 40517-4120

Re: Proposed Bluegrass Regional Water Consortium Intent to Enter into a Purchase Finished Water Agreement

Dear Mr. Hassall:

This letter is in response to your August 22, 2003 letter to Georgetown Municipal Water & Sewer Service (GMWSS).

For the last 20 years, Georgetown's water problems have been well-known throughout the Central Kentucky area. The lack of water during several droughts and throw in several benzene contamination events and you have the recipe for disaster in one of the State's fastest growing communities. As a result of near disasters, the Board of Commissioners approved the following:

1. In 1991, a $2,000,000 project of purchasing water from Frankfort Electric and Plant Board. Through this connection, we now purchase a required minimum amount daily of 255,000 gallons of treated water with a maximum amount of about 2,500,000 gpd available.

2. Also, during the past 10 years or so, two additional connections for purchased water were made available through Kentucky American Water Company.

3. While the three connections have been tremendous, the GMWSS Board has also been working in parallel with the Scott County Fiscal Court for the construction of a new reservoir in Scott County. This project is nearing the final planning and permitting phase. GMWSS has committed to use the raw water. This project will guarantee, at the absolute minimum, another 4 mgd of raw water to the existing water treatment plant.

P.O. Box 640 • Georgetown, Kentucky 40324 • 502-863-7816 • FAX 502-863-3575

Now, with all the above said, this sets the stage for yet another commitment for GMWSS to make to supplement the above four connections.

The GMWSS Board, at its September 16, 2003, meeting committed by the attached Resolution to purchase an additional 255,000 gpd from the Regional Water Commission (once established). We want a major part in the organization and establishment of the Commission and are firmly committed to the cause for the benefit of all in Central Kentucky.

If you have any questions, or need additional information, please feel free to contact our office at (502) 863-7816.

Sincerely,

GEORGETOWN MUNICIPAL WATER &
SEWER SERVICE

Robert L. Riddle, P.E.
General Manager

RLR:jbt

pc: Mayor Everette Varney
Board of Commissioners
Bruce Lankford

RESOLUTION

KNOW ALL PERSONS BY THESE PRESENTS THAT:

RESOLVED: that the Georgetown Municipal Water & Sewer Service intends to enter into a long-term agreement with the proposed Bluegrass Regional Water Commission to secure community capacity for 255,000 gallons of water per day.

THIS Resolution is based on the information contained in the August 22, 2003, letter from the Bluegrass Area Development District.

IN TESTIMONY WHEREOF, Georgetown Municipal Water & Sewer Service has hereunto set its hand, by and through its duly authorized representative, to be effective as of the 16th day of September, 2003.

GEORGETOWN MUNICIPAL WATER
& SEWER SERVICE

BY: _____
LESLIE W. JARVIS
Chairman of the Board

ATTEST:

_____
GERVIS C. SHOWALTER
Secretary of the Board

P.O. Box 653 Georgetown, Kentucky 40324 502-863-7816 FAX 502-863-3575

Sam Corman
Mayor

Roberta Warren
City Clerk

CITY OF NICHOLASVILLE
Post Office Box 450
601 N. Main Street
Nicholasville, KY 40340-0450
(859) 885-9473

October 9, 2003

Mr. Don Hassall, P.E.
Assistant Director
Bluegrass Area Development District
699 Perimeter Drive
Lexington, Kentucky 40517

Re: BWSC Non-Binding Purchase Commitment

Dear Mr. Hassall:

On this day, the Board of Commission of the City of Nicholasville resolved to commit to a daily purchase of one million gallons of water from the proposed regional water facilities, as set forth in the ongoing study being conducted by O'Brien & Gere Engineers, Inc. This non-binding commitment from the City of Nicholasville, along with the commitments of other utilities in the Bluegrass Region, will facilitate the design of the proposed water main grid and treatment facilities.

The City's commitment in this matter is non-binding until the City makes a determination that the final purchase price of water from the grid will not place an undue burden on City customers, and is able to agree to a long-term water purchase agreement with the new regional authority that permits the City to increase the amount of water purchased from the grid.

Very Truly Yours,
City of Nicholasville

John P. Martin

John P. Martin
Mayor

Kentucky
American Water

October 10, 2003

Don R. Hassall, P.E.
Assistant Executive Director
Bluegrass Area Development District
699 Perimeter Drive
Lexington, Kentucky 40517-4120

RE: Proposed Bluegrass Regional Water Commission

Dear Don:

By your letter dated August 22, 2003, you have asked Kentucky American Water to indicate how much capacity it intends to purchase in the facilities under consideration for construction by the proposed Bluegrass Regional Water Commission.

Please accept this letter as an expression of interest of Kentucky-American Water in 22,000,000 gallons per day of capacity.

This letter should be construed by you as an expression of intention only. It is not intended to be an offer or a binding agreement and it shall not give rise to any obligations for Kentucky American Water. Considering the complexity of the endeavor, and particularly the fact that the Bluegrass Regional Water Commission does not now exist as a legal entity, no binding contractual agreement shall exist between Kentucky American Water and any other entity unless and until Kentucky-American Water executes an agreement acceptable to it in its sole discretion.

Very truly yours,

Linda C. Bridwell

Linda C. Bridwell, Director Engineering

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American Water
2100 Richmond Road
Lexington KY 40502
T (859)269-2386
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I www.amwater.com

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October 22, 2003

OCT 2 4 2003

Mr. Don R. Hassall, P.E.
Assistant Executive Director
Bluegrass Area Development District
699 Perimeter Drive
Lexington, KY 40517-4120

REF: BLUEGRASS REGIONAL
WATER COMMISSION

Dear Mr. Hassall:

We have reviewed your correspondence of August 22, 2003 (attached) and have the following comments:

At our regularly scheduled board meeting held on Tuesday, October 21, 2003, our Board approved the draft and submittal of this letter. Please be advised that the Plant Board has an interest in 2,000,000 gallons per day of capacity. As noted in your referenced letter this is a non-binding commitment and subject to change. A final determination of commitment is pending on many unknown factors, such as the amount of available grant monies, actual participation costs, water rates, and the successful formation of the Commission itself.

Sincerely,

Warner J. Caines
General Manager

HWB/mw
cc: Board Members
Bob Bowman

Benchmarking Study for Regional Water Authorities

Draft Report on Benchmarking for the

WATER SYSTEM REGIONALIZATION FEASIBILITY STUDY

Prepared for:

BLUEGRASS AREA DEVELOPMENT DISTRICT

in association with the

Bluegrass Water Supply Consortium

February 6, 2003

Prepared by:

O'BRIEN & GERE ENGINEERS, INC.

CDP ENGINEERS INC
CARTER DIXON PARTNERS

MapSync

Contents

A. INTRODUCTION 2
B. SELECTION OF COMPARATIVE ORGANIZATIONS 3
C. ORGANIZATION DISCUSSIONS 4
1. Massachusetts Water Resources Authority 4
2. Denver Water Board 6
3. Rivanna Water and Sewer Authority 9
4. Logan-Todd Regional Water Commission 11
5. Truckee Meadows Water Authority 12
6. Santa Clara Valley Water District 14
7. Detroit Water and Sewerage Department 16
8. Monroe County Water Authority 18
9. Appomattox River Water Authority 20
D. "BEST" FEATURES 22
1. Board of Directors 22
2. Rates 22
3. Financing 23
4. Advisory Board 23

A. INTRODUCTION

In an effort to obtain information that will enable the Bluegrass Area Development District (BGADD) to make more informed decisions about the options pertaining to the development of some form of regional water supply organization, a comparative benchmarking study of various districts, authorities and commissions was prepared. The study includes an initial review of nine entities with an emphasis on particular aspects of each organization which differentiate the entity from others, to provide a broad view of issues related to the development and operation of a regional water supply organization.

The benchmarking study focuses on the management, organizational structure and financial aspects of the ten selected districts/authorities/commissions. The benchmarking study provides valuable insight into the best practices and positive features of each organization as well as the challenges faced. The primary source of information was personal conversations by telephone with key personnel at each of the organizations. In addition, a significant amount of information was obtained from information published on the organizations' websites.

B. SELECTION OF COMPARATIVE ORGANIZATIONS

Ten different districts/authorities/commissions were selected for review in the study. The O'Brien & Gere project team selected the authorities for review for a couple of reasons. Several entities were selected because they are widely known, and have demonstrated successful track records. Several entities were selected based upon particular features of interest to the BGADD project team. The remainder were lesser known wholesale utilities that are roughly comparable in size and function. The following table presents the ten entities selected for review accompanied with a few of their basic features. .

Organization	Location	Services Provided
Logan-Todd Regional Water Commission	Logan and Todd Counties, KY	Wholesale Potable Water
Massachusetts Water Resources Authority	Boston, MA	Potable Water & Sewer Collection and Treatment
Denver Water Board	Denver, CO	Potable Water and sells hydroelectric power to electric utility companies.
Rivanna Water and Sewer Authority	Charlottesville, VA	Potable Water & Sewer Collection and Treatment
Truckee Meadows Water Authority	Reno, NV	Wholesale and Retail Potable Water
Detroit Water and Sewerage Department	Detroit, MI	Retail Potable Water & Sewer Collection and Treatment
Appomattox River Water Authority	Petersburg, VA	Wholesale Potable Water
Monroe County Water Authority	Rochester, NY	Whole & Retail Potable Water (Majority retail)
Santa Clara Valley Water District	Santa Clara, CA	Wholesale Potable Water & Flood protection

C. DISCUSSIONS OF INDIVIDUAL ORGANIZATIONS

The remainder of this report presents an overview of each of the various organizations. The overview includes a general profile of the organization, organizational structure, governing body, financing (debt policies, rate methodology, etc.) and positive and negative features as presented by individual personnel of the organizations.

1. Massachusetts Water Resources Authority

Profile

The Massachusetts Water Resources Authority (MWRA) is a Massachusetts public authority that was established by an act of the state Legislature in 1984. The Authority inherited operations and facilities beginning in 1985 from the Metropolitan District Commission, a century-old department of state government. The Authority provides wholesale water and sewer service to 2.5 million customers and more than 5,000 large industrial users in 61 metropolitan Boston communities. The Authority's stated mission is to "provide reliable, cost-effective, high-quality water and sewer services that protect public health, promote environmental stewardship, maintain customer confidence, and support a prosperous economy." The Authority emphasizes continuous improvements in service and systems and focuses on aggressive performance targets for operating the water and wastewater systems and maintaining new and existing facilities. MWRA attempts to maintain a balance between its goal of carrying out capital projects and operating programs while limiting rate increases to its customer communities. Historically MWRA has done a good job of balancing between these to issues.

Governing Body

MWRA is governed by an eleven member Board of Directors appointed by both the Governor (3 members are appointed by the Governor) and either directly or indirectly by elected officials in MWRA customer communities. The 3 members appointed by the Governor are currently the Secretary of Environmental Affairs, a member from Connecticut River Basin and a member from the Merrimack River Basin. Each Director has an equal vote.

In addition to the Board of Directors the Authority also has an Advisory Board. The MWRA Advisory Board was created by the Legislature to represent the interests of MWRA service area communities in the 1984 Enabling Act that established the MWRA. Its members include the chief elected official and a designee from each of the 60 cities and towns serviced by the Authority, along with a member of the Metropolitan Area Planning Council, and six gubernatorial appointees representing various interests. The Advisory Board reviews and comments on MWRA capital

and current expense budgets as well as MWRA practices and policies. In addition, the Advisory Board appoints three members to the MWRA Board of Directors and serves as a liaison between the communities and the MWRA. Discussion with MWRA revealed that the Advisory Board has helped to contribute to the overall success of the Authority.

Financing

Each year the MWRA Board of Directors must approve an annual operating budget and capital spending plan as well as community assessments adequate to cover all planned expenses. Each MWRA member community, in turn, establishes local water and sewer charges to support both the community's MWRA assessment and the cost of operating the local water distribution and wastewater collection system. The annual assessment for water and sewer are calculated separately. The annual water assessment is based on the individual community's previous year's consumption. The sewer assessments are based upon a previous three-year average sewage production and also includes a component which factors in population and industrial strength.

In Fiscal Year 2002 (July 2001 through June 2002) the Board approved $508 million for current operating expenses and $457 million in capital spending to continue rehabilitation and improvements to pipes, pump stations, interceptors, treatment facilities, and other components of MWRA's physical assets.

Historically, state and federal grant receipts have been a significant source of funds for MWRA's capital program. However, over the last few years and looking forward, proceeds from borrowing have been and will continue to be the primary source of funding for capital projects. MWRA also funds a small but increasing portion of the capital program from current revenue. As of August 2001, MWRA had $4.7 billion in outstanding debt with the majority of the debt being fixed rate revenue bonds. In addition, the Authority has variable rate debt, state revolving fund loans, and tax exempt commercial paper. The long-term debt (revenue bonds, variable rate and state revolving fund) are used for long term capital projects. The commercial paper is used to borrow funds short term to cover construction progress. MWRA cannot issue general obligation bonds as it has no taxing authority to provide as backing for this type of bond. The Authority generally issues debt with 40-year maturities in an effort to match the life of the assets with the debt obligation. MWRA currently maintains a AA bond rating.

Positive Features / Negative Features

The MWRA is one of the most successful water and sewer authorities in the United States. The Authority has been used as a model for the formation of water and/or sewer authorities around the Country. Discussions with MWRA personnel provided insight into the some of the reasons for the Authority's success. Some of the reasons included the following:

- A strong progressive management team.
- The Board of Directors - the fact that no one faction can take control, provides for a method of equal representation and has allowed for difficult decision to be made more effectively than in the past.
- A dedication to planning in all aspects of the Authority.
- Positive relationships with customers - both retail and wholesale.

MWRA personnel did not identify any features that have negatively impacted the Authority.

2. Denver Water Board

Profile

The Denver Water Board is responsible for the collection, storage, quality control and distribution of drinking water to nearly one forth of all Coloradoans or 1.1 million people. Denver Water also sells hydroelectric power to electric utilities. The Denver City Water Company was established in 1870. It was merged into the Denver Union Water Company in 1894, along with several smaller companies serving various parts of growing Denver. In November 1918, the five-member governing board of the Denver Water Department purchased the company for the citizens of the City and County of Denver. Denver Water has complete charge and control of a water works system and plant, which supplies water to customers located within the City and to entities serving other customers locating in outlying areas in the Denver metropolitan area. Denver Water is a legally separate and distinct entity from the City under the Charter of the City and the City is not financially responsible for Denver Water. The majority of Denver Water wholesale customers are nonprofit entities. There are two for profit entities that purchase water from the Board but they account for only about 3% of the total water sold by the Water Board. These for profit entities do not maintain any type of ownership in the Water Board.

Governing Body and Organizational Structure

Denver Water is governed by a five member Board of Water Commissioners. The Board members are appointed by the Mayor of Denver to staggered six-year terms. Each of the Board members must be at least 25 years of age, a citizen of the United States and a resident of the City and County of Denver. The Board works at the policy level and does not get involved in micro-managing the day-to-day operations of the organization. Each of the Board members receives one vote and all votes are equally weighted. A majority by the Board constitutes a quorum.

The Board appoints a manager who is chief executive officer of the daily operations and the manager also serves as Secretary to the Board. The manager works at the discretion of the Board which means that the manger holds executive discretion and serves solely at the pleasure of the Board. The manager is responsible for appointing the Division

Directors, who manage each of the different divisions of the organization. The Directors are also discretionary and report directly to the manager. Organizationally, Denver Water is divided into several divisions, which at then further defined into sections, which include: management, public affairs, legal, finance, engineering, planning and operating and maintenance.

Financing

Denver Water operates from the Water Works Fund, which ensures the separation between city hall and the Water Board. The general city government does not have access to the Water Works Fund and the Water Board does not have access to the city's general fund. Both funds, however, are accounted for by the City Auditor. Each year the Board of Water Commissioners must approve an annual operating budget and capital spending plan.

The total operating revenues for fiscal year 2001 were approximately $151 million, which represented a decrease of 1% compared to 2000. The actual expenses during fiscal year 2001 totaled $129 million, which represented a 4% increase over the pervious year. As of December 2001, outstanding bonds totaled $208 million. During 2001, Denver Water issued $86 million of City and County of Denver general obligation bonds in two series.

The guidelines for the use of debt were adopted on December 19, 1995. The guidelines reaffirmed the Boards long-standing policy of using debt financing for system expansion and improvements and prohibiting its use for payment of operating and maintenance expenses. The Board also reaffirmed its long-standing current refunding program. The refunding program has enabled Denver Water to obtain a lower average cost of debt by making it possible to borrow at a shorter average maturity. Also, because Denver Water's facilities generally remain useful beyond the original maturity of debt issued to construct the facility, the refunding program has enabled Denver Water to better match loans used to construct facilities to the lives of the facilities. Closer matching, in principal, means that the cost of each facility is shared by all customers who will use the facility – both present and future water customers. In addition, because one effect of the refunding program is to increase the funds available for current year capital requirements, the refunding program has also had the effect of reducing current year revenue requirements for capital projects. This has allowed Denver Water to avoid erratic fluctuations in rates and fees.

Although Denver Water's general obligation bond rating is strongly influenced by the ratings assigned to the City and County of Denver, it is the goal of Denver Water to be able to obtain an investment grade stand-alone rating should it desire to do so. To meet this goal, Denver Water uses the following criteria to evaluate the appropriateness of increasing debt or capital lease obligations and to evaluate both the adequacy of rate proposals and the structure of proposed borrowings or lease arrangements.

- The debt ratio should not exceed 40%
- Current debt service coverage excluding System Development Charges should be equal to or greater than 1.1x
- Project interest coverage excluding System Development Charges should be equal to or greater than 2.5x
- The year-end balance in the Water Works Fund, net of principal and interest requirements for the next 12 months should be equal to or greater than $5 million.

Denver Water maintains five different rate schedules, which are based on type of customer (location, residential/commercial) and services provided. The five different rate schedules include the following.

- Rate Schedule No. 1 - Includes all water users inside the limits of the City and the County of Denver. Bills include a service charge and a consumption charge and are billed monthly or bimonthly.
- Rate Schedule No. 2 - Includes wholesale customers outside the City and County of Denver that receive total service (the Board of Water Commissioners operates and maintains the water system used to supply the licensee water). Denver Water provides complete service to the licensees customers include billing and meter reading. Bills include a service charge and a consumption charge.
- Rate Schedule No. 3 - Includes all water users outside the City and County of Denver served under agreements whereby the Distributor in some manner operates and maintains portions of the water system used to supply the licensee and the Board of Water Commissioners is responsible for billing each licensee on an individual basis. Bills include a service and consumption charge.
- Rate Schedule No. 4 - Includes wholesale customers outside the City and County who maintain their own system and enter into agreement with the Board of Water Commissioners to purchase water based upon readings from "master meters." Wholesale customers are charged a consumption charge based metered consumption.
- Rate Schedule No. 5 - Includes any customer (inside or outside City and County) who purchases non-potable water from the Water Board. Customers are charged a consumption charge based upon metered consumption.

Positive / Negative Features

Denver Water has been a very successful organization. The Water Board maintains a strong management team with a focus on continuous improvement and progressive leadership. Some of the recent initiatives that Board has undertaken to increase operating efficiency include an automated meter reading project, development of a new treated water distribution model, an e-billing system, remote payment stations and an e-bidding pilot project. Discussions with the Water Board revealed that the factor that has most significantly contributed to the success of the organization has been the strong management team and the Board of Water Commissioners. Both the management and the Board of Directors have provided the Board with strong leadership and guidance. No

negative features pertaining to the Board were mentioned during discussions with the Board.

3. Rivanna Water and Sewer Authority

Profile

The Rivanna Water and Sewer Authority is an independent public agency providing impoundment, treatment, storage and transmission of potable water and transport and treatment of wastewater for the citizens of Charlottesville and Albemarle County, Virginia. The Authority is a wholesale agency with two customers: the Charlottesville Water and Sewer Division and the Albemarle County Service Authority. These two agencies in turn provide service to the individual retail customers. The Authority was established in 1972 under the Virginia Water and Sewer Authorities Act (1950). The Authority operates under the terms of a Service Agreement signed June 12, 1973 by the officers of the Charlottesville City Council, the Albermarle County Board of Supervisors, the Albemarle County Service Authority and the Rivanna Water and Sewer Authority. The Authority is independent and not a part of the reporting entity of either the City of Charlottesville or the County of Albemarle.

The Authority operates and maintains five water treatment plants and five wastewater treatment plants and the associated water storage facilities, pump stations, transmission mains and interceptor sewers, as well as a hydropower generating facility. Retail distribution of water and sewer is performed by the Authority's two customers: the City of Charlottesville's Public Utilities Division and the Albemarle County Service Authority.

Governing Body and Organizational Structure

The powers of the Authority are exercised by a five member Board of Directors. The Board consists of the four persons holding the offices, from time to time, of City Manager and Director of Public Works of the City of Charlottesville, County Executive of Albemarle County and the Executive Director of the Albemarle County Service Authority, and a fifth person appointed by the concurrent action of the Council of the City of Charlottesville and the Board of Supervisors of Albemarle County. The fifth person is the chairman of the Board and the election of this person alternates between the City and County every 2 years. The Chairman is typically a private citizen. The Board appoints an Executive Director, who manages the Authorities day-to-day operations under the direction of the Board. By mutual agreement of the respective Boards of Directors, the Authority currently shares administrative staff and office space with the Rivanna Solid Waste Authority, which is billed monthly for its portion of the operating costs.

The Authority currently maintains a Citizens Advisory Committee. The Advisory Committee is a nine member Board-appointed group

representing residential, commercial, industrial and institutional customers within the service area. The Advisory Committee was formed to assist the Board of Directors on community water and wastewater issues.

Financing

The Authority is organizational as well as financially independent from any local government entity. The Authority issues its own debt and generates revenues to cover operating and capital expenditures inherent with operating a water and wastewater system from rates and fees. The Authority has no taxing authority.

The Authority's revenues from water service charges totaled $6.5 million in fiscal year 2002, representing an increase of 5% compared to 2001. The new debt issuances to finance the capital program resulted in the need for a rate increase, which attributed to the increase in revenues. Wastewater service charges were up 10% to $5.1 million for the year. Wastewater revenues were higher due to increased flows. Operating expenses during 2002 totaled $11.4 million, up almost 9% from fiscal year 2001. The increase was primarily a result of several engineering studies pertaining to environmental issues.

The Authority is required by the Service Agreement to adopt an annual budget for setting wholesale rates. The Authority is somewhat unique in that it does not charge a flat rate for all wholesale customers. Separate fiscal year budgets are currently prepared for five rate centers to include direct costs and allocations of administrative, maintenance and debt service expenses. Projections of flows and expenses are used to calculate rates per thousand gallons for the two urban rate centers and flat monthly charges for the other rate centers.

The Authority's outstanding bonded debt totaled $56 million as of the end of fiscal year 2001. The current bond ratings are A+ and Aa3, from Standard and Poor's and Moody's, respectively.

Positive / Negative Features

Unfortunately the Rivanna Water and Sewer Authority is currently facing a number of serious issues. One of the most significant issues is that for a number of years the Authority's maintenance expense has apparently been under-budgeted. The budgeted amount for maintenance in FY 2002 was $134,000 or roughly only 7% of the actual depreciation expense reported on the audited financial statements, which was $1.8 million. This under-budgeting of maintenance seems to have placed the Authority in an unfavorable position both financially and operationally. The Finance Director stated that steps are being taken to correct this issue such as increasing the budgeted amount of maintenace or the next few years. The Director also mentioned that the methodology used for developing the rate schedules has not been very effective. The use of different rates for the different rate centers has been cumbersome and introduces the opportunity for disputes and inaccuracies.

4. Logan-Todd Regional Water Commission

Profile

The Logan-Todd Regional Water Commission is located in the western part of Kentucky and operates within Logan County. The Commission provides wholesale water to Logan and Todd Counties as well as ten other local entities. The Commission was formed in Logan County in 1995 under the Kentucky Revised Statues 74.420 - 74.520. The development of the Commission has taken nearly 12 years. As the of the completion of this study the Commission is in the final stages of construction and anticipates delivering water to its' customers by early February 2003. Once construction is complete the Commission will have capacity of 10 million gallons a day (mgd). The Commission expects to sell between 4 and 5 mgd initially. Currently the member entities acquire water from a number of sources. A number of the entities currently purchase water from each other.

Governing Body and Organizational Structure

The Commission is governed by a twelve-member Board of Directors. Each of the twelve members represents one of the purchasing entities. Board Members can be elected officials or private citizens and the current Board is made up of mix. The Members serve four year staggered terms and Members can serve multiple terms. Each Board Member has one vote and all votes are equally weighted. The Board handles primarily policy level decisions, which provides guidance and direction for the Commission. The Board is responsible for annually reviewing the Commission's operating budget, for passing rate increases and approving the issuance of debt.

Financing

The Commission operates as a nonprofit organization. Thus the revenues generated by the Commission are required to meet operating and maintenance expenses, capital expenditures and any outstanding debt service. The Commission thus sets its' water rates in order to meet these expenses. One of the key factors in coming to an agreement with all members involved in the development of the Commission was the establishment of a uniform water rate for all purchasing members. Once water is delivered to the members each entity will pay the same water rate which is applied to the entities metered consumption for a specific period of time.

The Commission issues its own debt, which is typically in the form of revenue bonds. The Commission cannot issue general obligation bonds because it does not have any taxing authority to offer as backing as required for bonds of this type. In addition to issuing revenue bonds, the Commission has taken advantage of grant funding to help fund projects and various initiatives.

Positive / Negative Features

Discussions with the Commission's personnel provided some insight into the positive and negative features of the organization. The insight was somewhat limited due to the fact that the organization has not actually become operational. However, from a policy level some insight was provided. The best feature identified was the Board of Directors. The fact that each member receives one vote with equal weighting has been a very positive feature. Each of the purchasing entities has an equal amount of control over the decisions made by the Commission which has allowed for decisions to be made and for the Commission to move forward. In addition the fact that the Commission was able to develop a uniform rate for all member entities has been positive. Without a uniform rate it is believed that the Commission would not have been able to form based upon disputes between the different entities.

Several of negative features (difficulties faced by the Commission) that were mentioned include the following:

- A number of the Commission's wholesale customers historically have not raised rates and fees commensurate with the actual cost of operations. When the wholesale customers begin to purchase water from the Commission they will be required to significantly raise rates and fees to adequately cover expenses. The resulting increase in rates and fees has caused a significant amount of strife in the wholesale customer communities.
- Several of the member entities sell water to other members of the newly formed Commission. When all of the member entities begin purchasing water from the Commission the entities that previously sold water will experience decreases in their revenues. While the operating costs of these entities will decrease they have had to to identify means of cutting costs to handle the decrease in revenues.

5. Truckee Meadows Water Authority

Profile

The Truckee Meadows Water Authority is a Joint Power Authority that was formed as a result of a collaboration of the Cities of Reno and Sparks and Washoe County, Nevada. The Authority's primary water assets were purchased from Sierra Pacific Power Company, when Sierra Pacific decided to shed this portion of its operations. The Authority was established under the Joint Power Legislation of the State of Nevada in 2000 and pursuant to the provisions of Chapter 277 of the Nevada Revised Statues. The Authority owns and operates two water treatment facilities in the Reno area. Approximately 158 million gallons of water is produced daily from the two treatment plant and several groundwater wells.

Governing Body and Organizational Structure

The Authority is governed by a seven member Board of Directors. The Board consists of three Directors appointed by the City Reno, two Directors appointed by the City of Sparks, one Director appointed by Washoe County and one at-large Director, required to be an elected official, who is nominated by the one or more of appointed Directors and must be approved by each of the Director. Each Director may also appoint an alternate who shall serve in their absence. There is no alternate selected for the at-large Director. Each of the Directors serves two-year terms on the Board. Each Director receives one vote and all votes are equally weighted. A majority vote is required for approval on budgets and typical issues. However, the cooperative agreement defines several special approval provisions. Some of the special approval provisions include a vote of two-thirds of the Directors in office is required for; a new water supply option, the extension of the Authority's service territory, approval of a new wholesale agreement to a non-Member and the issuance of bonds or other securities.

In addition to the Board of Directors, the Authority has established a Technical Advisory Committee consisting of City/County Managers or their designees, the Finance Directors of each Member, and the Public Works Director of the City of Reno, City Engineer of the City of Sparks and Water Resources Director of Washoe County. The Advisory Committee provides recommendations on all matters relating to the operation of the Authority, including budgets.

In terms of the organizational structure the General Manager of the Authority is the chief administrative officer of the Authority and operates the Authority on a day-to-day basis. The general manager is appointed by and serves at the will of the Board.

Financing

The Authority is organizational as well as financially independent from any local government entity. The Authority issues its own debt and generates revenues to cover operating and capital expenditures inherent with operating a water system from rates and fees. The Authority has no taxing authority. An operating and capital budget is developed and adopted by the Board annually.

The Authority issued $450 million in revenue bonds in 2000 to assist with the startup of the organization. The Authority's customers are charged for water based upon consumption. The Authority is both a retail as well as wholesale provider of water. Under the retail operations there are three customer classes including, residential, multifamily and commercial. In addition there are two tiers for type of water use (indoor or outdoor). Wholesale customers are charged a flat rate based on consumption as read by master meters monitoring flow to these customers. The wholesale customers are free to set their retail rates as desired as long as the rates allow for payment to the Authority for water provided. Wholesale customers are billed monthly.

Positive / Negative Features

Discussion with the Districts personnel revealed some of the features both positive and negative related to the organization. Some of the positive features include the following:

- The Board of Directors has had a very positive impact upon the District. The members all get along very well which is unusual for these three entities historically.
- Authority has a very good management team.
- The technical advisory board, which includes personnel from each entity, has allowed for the District to solve financial and technical issues effectively.

The singular negative feature that was mentioned was the current policy pertaining to the appointment of an at-large seventh Director. As previously mentioned that at-large Director is to be appointed by the other Board of Directors and all of the Directors must agree upon the individual's appointment. Unfortunately the Board of Directors have not been able to agree upon an at-large Director. Thus the seventh seat on the Board has remained vacant.

6. Santa Clara Valley Water District

Profile

The Santa Clara Valley Water District as it stands today was formed in 1968 with the merger of the Santa Clara Valley Water Conservation District and the Santa Clara County Flood Control and Water District. The merger created an agency with the dual missions of providing water and flood protection to the citizens of Santa Clara Valley and the surrounding County. The merger's catalyst was the belief that a coordinated operation of the County's water supply and flood control systems would result in optimum water resources management. The District operates as a State of California special district under the authority of the State's Special Districts Act. The primary mission of the District is to provide "A healthy, safe and enhanced quality of living in Santa Clara County through the comprehensive management of water resources in a practical, cost-effective and environmentally sensitive manner."

Each year the District sells approximately 400,000 acre-feet of drinking water, both treated water and groundwater, to 13 water retail agencies that service communities within the County via their own distribution systems serving approximately 78,000 customers. This annual demand requires the District to operate three water treatment plants, 10 reservoirs, 18 groundwater recharge facilities, three pump stations and more then 165 miles of canals, tunnels and pipelines. In addition the District has five flood control zones corresponding to major watersheds.

One of the unique features of the Santa Clara Valley Water District is the fact that nearly 70% of the Districts water is purchased by investor (privately) owned utilities, the largest being the San Jose Water Company at approximately 40%. This is unique because the District itself is a non-profit entity.

Governing Body and Organizational Structure

The District is governed by a seven-member Board of Directors. Five of the members are elected from Santa Clara County supervisorial districts and two at-large representatives appointed by County supervisors. The Directors serve four-year overlapping terms. The Board of Directors have created eight advisory committees that assist in developing policies to guide district operations. Each of the different committees and their functions are listed below.

- The Water Commission - assists the board in formulating policy on matters regarding the municipal and industrial water program.
- The Environmental Advisory Committee - advises the board on issues of environmental restoration and enhancement.
- The Agricultural Water Advisory Committee - assists the board in developing policy regarding water supply for agricultural uses.
- The Landscape Advisory Committee - assists the board in developing landscape guidelines for water conservation.
- Five Flood Zone and Watershed Advisory Committees - make recommendations relative to the district's priorities and financing policies for flood protection improvements within the zones.

The District is managed by a Chief Executive Officer (CEO) who reports directly to the Board of Directors. Positions directly underneath the CEO include Chief Administrative Officer, Chief Operating Officer and Chief of Public Affairs, which completes the executive management of the District.

Financing

The District is an independent agency with the authority to issue its own debt. The District uses a Rolling Biennial Budget process, which was approved by the Board of Directors in 1999. The Rolling Biennial Budget is carried out by the development of a one year adopted budget with a second year in place as a spending plan. At the end of the first year, a mid-cycle review of the second-year spending plan is required before adoption. The objectives of the a Rolling Biennial Budget are to stabilize operating expenditures from year to year, to ensure the operating expenditures are within agreed-upon levels and to align operating and capital expenditures with fairly stable and predictable revenue sources. The Board of Directors approval is required for any mid-year budget adjustments that increase or decrease revenue projections. The District has a flat rate pricing policy for its water customers, with the one exception being a slightly different rate for customers in the northern portions of the County in comparison to customers in the southern portion. Customers in the northern portion of

the County receive treated water and thus a slightly higher rate due to operating costs compared to the southern customers who receive groundwater and a slightly lower rate.

As previously mentioned, a large portion of the District's water is sold to investor owned utilities. Since the District itself is a non-profit entity the District's ability to issue tax-exempt debt is limited. Historically the District has been able to issue tax-exempt debt for funds used to provide service to customers other then the privately owned utilities. However, any funds required to cover capital expenditures for providing service to the privately owned utilities cannot be tax-exempt, in the opinion of the District's Bond Counsel. In these cases the District has historically issued taxable debt and plans to do so in the future. Neither of the two privately owned utilities has any type of ownership in the District. The investor owned utilities have historically agreed to annual "take or pay" contracts with the District. Since nearly 70% of the water sales go to these utilities these contracts provide a great deal of stability for the District in terms of annual revenues and in enhancing its bond ratings. Overall the District has been able to maintain positive working relationships with the private utilities.

Positive / Negative Features

Discussion with the Districts personnel revealed some of the features both positive and negative related to the organization. The most commonly stated positive features pertained to the Board of Directors and the organization's management team. The Board of Directors have been successful in developing policies and procedures that have provided the District with a clear vision of where the organization is headed and the management team has been successful in carrying out this vision. The development and adoption of the Rolling Biennial Budget is a prime example. This type of budget forces the District's management to look beyond just the next budget and inherently requires additional foresight and planning. The personnel that were contacted did not provide insight into any negative features related to the District.

7. Detroit Water and Sewerage Department

Profile

The Detroit Water and Sewerage Department (DSWD) is the third largest water and sewer utility in the United States and has a rich history in public utility service dating back to the early 1800's, beginning with a water system of wooden logs and the "Grand Sewer" made up of brick and stone. Today, DWSD provides water service to approximately one million people in Detroit and three million people in neighboring southeastern Michigan communities, making up 43 percent of the state's population. DWSD services nearly three million people with wastewater service. The Department is a branch of the City of Detroit government that dates back to 1836. The mission of the Department is to "Exceed our customers' expectations through the innovative treatment and

transmission of water and wastewater, and provision of services that promote healthy communities and economic growth."

Governing Body and Organizational Structure

The Detroit Water and Sewerage Department is governed by a seven-member Board of Water Commissioners. The members of the Board are appointed by and serve at the pleasure of the Mayor. The members serve four-year terms and the terms are staggered so that not more than two members' terms expire each year. Board members must be citizens of the United States and residents of Michigan. The City Charter provides that at least four of the members of the Board must be residents of the City. The Board consists of four City residents plus one member each representing the Departments suburban wholesale customers. The Commissioners operate on the policy level and leave the day-to-day operation of the Department up to the Director and the executive management team.

The Department is organized into six operating groups. The groups include: administrative support, engineering services, facilities and materials management operations, financial services, wastewater operations and water supply operations. The Department is staffed so that various groups provide services for both the water and sewer systems. In all, the Department employs 3,200 people.

Financing

The Detroit Water and Sewerage Department operates two enterprise funds including the Water Fund and the Sewerage Disposal Fund. While the Department is a part of the City government the finances of the Department are run independently of the City. The operating and maintenance expenses incurred by the Department are recovered completely from Water and Sewer rates and fees. The Department utilizes four sources of funding to finance capital improvements. The sources include federal and state grants, state revolving fund loans, revenue generated (pay-go) funds and revenue bonds. The Departments primary source is revenue bonds and typically 30-year bonds are issued. As a rule DWSD finances 18-24 months worth of capital improvements at a time, which helps to minimize impacts upon rates while new construction costs are recovered over the useful life of the facility.

DSWD provides both retail and wholesale water and sewer service. The methodology used for the two types of customers is described below:

- Retail Customers - Water rates for Detroit customers include a service charge determined by meter size and a consumption charge based on billed quantities of water. The retail sewer rates include a uniform per-bill charge for recovery of meter reading costs, a commodity charge to recover sanitary and infiltration costs, and a drainage charge to recover costs of wet weather inflow.

- Wholesale Customers - The current water rate schedule consists of a single commodity charge unique for each wholesale customer community. Wastewater rates for wholesale customers contain a fixed monthly charge designed to recover wet weather inflow and CSO control program costs, and a commodity charge to recover all remaining allocated revenue requirements. Sewer rates are unique for each community. The individual communities set their own rates in order to cover the allocated wholesale charge plus their operating costs.

The Department maintains the policy of raising water and sewer rates over time to minimize the impact on customers. Based on the Departments projections, rates needed to recover actual costs would require too large an increase in one installment and thus the Department will implement gradual rate hikes over the next five to ten years.

Positive / Negative Features

Discussion with the Department's personnel revealed some of the positive features related to the organization. The most commonly stated positive feature was the strong leadership provided by the Board of Water Commissioners. The Board has provided the Department with ability to move forward by making the difficult decisions which are inherent with a large and aging distribution and collection system. The Department's personnel did not offer any insight into the negative features related to the organization.

8. Monroe County Water Authority

Profile

The Monroe County Water Authority (MCWA) was established in 1950 after a number of private utilities had failed to adequately provide water service to customers in Monroe County, NY. The Authority was established under the New York Public Authorities Law and is classified as a public benefit organization in the State of New York. The Authority provides water to most of Monroe County outside the City of Rochester, either on a retail or a wholesale basis. Outside of Monroe County MCWA provides water on a retail basis to a number of small towns and on a wholesale basis to several adjacent counties. Through a cooperative agreement the Authority and the Rochester Water Works exchange water on a daily basis. MCWA has a storage capacity in excess of 130 million gallons, with an average daily system demand of approximately 55 million gallons. MCWA delivers water through approximately 1,780 miles of pipelines.

Governing Body and Organizational Structure

The Monroe County Water Authority is governed by a seven-member Board of Directors. Each of the Board members are appointed by the County Legislature and serve for staggered five-year terms. Members

are allowed to serve multiple terms which do not have to occur in succession. The Board of Directors is responsible for making policy decisions and is required to approve an annual operating budget for the Authority.

An Executive Director reports to the Board and oversees the daily operations of the Authority. The Authority is organized into four departments which serve to provide the necessary functions for daily operation. The departments include; production and transmission, engineering, facilities fleet maintenance and operations and finance and business services.

Financing

The Monroe County Water Authority operates as an independent nonprofit organization. The Authority has no taxing authority and thus covers operating and maintenance expenses with revenues from water rates and fees. The Authority can issue its own debt but is limited to issuing revenue bonds. However, in the initial trust indenture the Authority was limited to issuing debt to a maximum of 5% of its annual revenues. In order to allow for the Authority to exceed this limit the Charter was modified to allow Monroe County to issue debt on behalf of the Authority. Thus at one time the County issued debt on behalf of the Authority. However, since then the initial trust indenture has been modified allowing the Authority to issue substantially more debt on its own. The Authority no longer utilizes the ability to receive funding from the County. The Board of Directors is required to approve the annual budget and any new debt issue.

The Authority charges retail rates based upon customer class as well as location. All retail customers are charged the same base charge based on meter size. Residential customers are charged a commodity charge per 1000 gallons of usage and non-industrial customers are charged the same commodity charge for the first 125,000 gallons and then pay a decreased rate for consumption beyond this level. Retail customers outside the County pay a slightly higher commodity charge per 1000 gallons. Wholesale rates are established based upon agreements between the Authority and the individual customers.

Positive / Negative Features

Some of the positive features of the Authority mentioned by personnel include positive relationships with the majority of its customers, a strong management team including strong financial management and position and the leadership of the Board of Directors. The only negative feature that was mentioned was the view that some customers have of the Authority. It was mentioned several times that customers complain that the Authority is a monopoly and it charges its customers too much. However, once customers actually deal with the Authority and come to understand that it is a nonprofit organization, these concerns are usually addressed.

9. Appomattox River Water Authority

Profile

The Appomattox River Water Authority (ARWA) was chartered in 1962, issued bonds in 1964 and began operation in 1968. The Authority was created by the General Assembly under the Water and Sewer Authorities Act. The Authority is located in Petersburg, Virginia and provides finished wholesale water to five member localities. The Authority recently began a major expansion from 46 million gallons per day (mgd) to 96 mgd which is estimated to be completed in early 2005. The expansion is expected to meet the demands of the localities until 2025 or beyond.

Governing Body and Organizational Structure

The Authority is governed by a five-member Board of Directors. Each of the members represents one of the wholesale customer locations and is appointed by the local governing body. Members serve four-year staggered terms and are eligible for reappointment. The Members are responsible for setting the Authority's policies and approving budgets, rates and debt issuance. Each Member receives one vote and all votes are equally weighted.

The daily operations of the Authority are managed by the Executive Director. The Authority operates with 19 full time employees which include two administrative, three laboratory, four maintenance and ten operational. One of the primary reason for such a limited staff is because the Authority does not provide retail services and has a limited number of wholesale customers.

Financing

The Appomattox River Water Authority (AWRA) is an independent nonprofit entity. ARWA has the authority to issue revenue bonds and covers operating and maintenance expenses from water rates and fees. The Authority originally issued $8.5 million of revenue bonds in 1964 to build a treatment plant, water lines, dam and reservoir, providing facilities with 22 million gallons per day (mgd) capacity. In 1983 the Authority issued an additional $12.5 million of revenue bonds to expand the plant capacity to 46 mgd. The 1964 issues have been retired and a small portion of the 1983 issue still remain outstanding. The Authority will require additional funding over the next several years as the plant is expanding once again.

The Authority has 12 water meters to register consumption by its wholesale customers. The customers are billed on a quarterly basis for water consumption over the period. The Authority's wholesale rates are composed to two components. The rates include a base rate, which is the same for all customers and covers annual operating and maintenance expenses this rate is currently $0.45 / 1000 gallons. The second part of

the rate relates to the Authorities outstanding debt. The current outstanding debt is divided among the customers based upon a number of factors including direct (debt related) expenses related to the customer and annual consumption (i.e. plant utilization). The appropriated debt expense for each customer is then divided by the estimated consumption for each customer, which results in a unique "debt portion rate" for each customer. Since the estimated consumption is used for calculate this rate the positive or negative balance for each customer is adjusted at the end of the year.

Positive / Negative Features

Discussions with the Executive Director of ARWA regarding positive and negative features of the Authority resulted in the following items.

The positive features include the following:

- The Authority was set up for one function, water supply, thus the organization can be narrowly focused.
- The governing body deals with one type of issues (water), not police, fire, schools, taxes, etc.
- The Authority is one step removed from local politics.
- The Authority must exist on revenues received.
- The Authority is a political subdivision of state and thus tax exempt.
- Unlike private utilities, the authority's rates are regulated by the State PSC.

The negative features include the following:

- Since the Authority is multi-jurisdictional there has been some political bickering but it has not been significant.
- The Authority cannot control the watershed issues. The localities have the erosion control under them, while the member localities are responsive to problems, the up-shed jurisdictions that are not members have shown little or no concern.
- The Executive Director has to be personnel, finance, safety, purchasing, etc person, which result in the Director often being spread too thin.

D. "BEST" FEATURES

The through review of the selected districts/authorities/commissions reveals a number of "best" features that are common among the different entities. Some of the "best" features were specifically identified by the individuals contacted while others were identified by simply identifying the common features among the entities that have enabled the organizations to be successful. Four "best" features were identified and are discussed in the remainder of the report.

1. Board of Directors

Each of the different organizations are governed by a Board of Directors or equivalent body. The existence of a governing Board was commonly stated as a positive feature by a number of the individuals contacted. There a number of reasons why the existence of a Board of Directors is considered a "best feature". Some of the reasons include the fact that the Board allows for equal representation for all of the different members of the organization. The Board does not allow for one member to take control or allow other to decide its fate.

The Board also allows for the organization to operate independently. In most cases the Board has the ability to avoid the local/city government politics and develop policy based on the best interests of the member entities. Another benefit related to the Board is the fact that the Directors are tasked with making policy decisions, not with managing the organization. This feature allows the Board to provide guidance to the organization from a big picture perspective and does not allow the Board to micro-manage the day to day operations. Lastly, the Board of Directors provides the organization with a certain level of continuity. While the organizations management may change frequently the specified staggered terms used at a number of the organization allows for continuity within the organization.

2. Rates

Another "best" feature that became evident following the review of the different organization relates to the rate setting process as well as the type of rate structure utilized by the organization. In terms of the rate setting process all of the organizations that were reviewed require the Board to approve any modification to existing rates. The approval of the Board helps to ensure that the organization's management provides a reasonable case supporting any requested modification to rates. In addition a number of the entities require an annual review of the rates and fees by the organization's management. The regular review and revision of rates allows for organization to ensure that revenues adequately support expected expenses.

The review of the organizations revealed a number of different rate structures. Some of the structures were viewed as positive while others

were not. However, in the case of organizations which provide wholesale service, the use of a uniform wholesale rate was identified as a "best" feature. The use of a uniform wholesale rate tends to limit the disputes among the different members. Attempts to allocate costs among different members via different rates is often arbitrary and difficult to come to a perfectly equitable solution.

3. Financing

The ability to use a several key financial instruments to serve an organization's funding requirements is another 'best" feature. In particular the ability to issue tax-exempt debt and be eligible for grants are both key "best" features that were identified in the review. The majority of the organizations reviewed issues tax-exempt revenue bonds. These bonds offer very favorable interest rates and are thus attractive means of securing funding for capital intensive projects and initiatives. The other key financing issue is the ability to receive grant funding for various projects and initiatives.

4. Advisory Board

A number of the larger organizations that were contacted mentioned that the development and use of an Advisory Board was a key "best" feature of their respective organizations. At a number of larger organizations the advisory board serves as a liaison between the communities and the organization. Since some organizations provide service to a significant number of different wholesale customers (all of which cannot have representation on the Board of Directors) the advisory board allows these members to be heard. In addition, most organizations require members from the Board of Directors to be on the advisory board which allows consistency between the two. Advisory boards are also valuable because they typically include members who bring relevant technical expertise to the board as well as individuals familiar with the day to day operations are also often represented on the advisory board.

Bluegrass Area Development District - Bench Marking Matrix

Organization	Location	Contact	Form of Organization	Serv Prov	ost Allocation Methodology	Positives	Negatives
l Todd Regional Commission	Logan and Todd Counties, KY	Sandra Walton (270) 483-6990	Regional Commission, first established in 1995 in Logan County. Formed under the Kentucky Revised Statues 74.420 - 74.520	Wholes: Potable	olesale customers pay the same r water and then set their own Water is metered and wholesale ers are billed based on quantities r used.	The Board of Directors - in particular the fact that each entity gets one vote with equal weighting has been very positive.	A number of the wholesale purchasers did not raise rates properly over time which was required with water purchased from Logan-Todd which has caused some strife.
Massachusetts Water Resources Authority (MWRA)	Boston, MA	Jonathan Yeo (617) 788-1178 Jyeo@mwra.state.ma.us	Public Authority established by Legislature in 1984. The Authority was originally run by the State and was dependent upon State funding.	Potable & Sewer Collectio Treatme	ner communities are provided with vidual assessment each year. assessment is based upon s years flow (ie. 30% of flow tes into 30% of the costs) Sewer d on a three year average of flow, lion and include an industrial h component.	The Board of Directors has allowed for difficult decisions to be made. No one faction has more power then the others.	None
Denver Water Board	Denver, CO	(303) 628-6000 (ph) (303) 628-6199 (f)	Independent City water agency, established in 1918	Potable and sells hydroele power to electric u companie		The Water Board is very effectively and efficiently operated. Strong management team has significantly contributed to the success of the Board.	None
Rivanna Water & Sewer A ity	Charlottesville, VA	Lonnie Wood (434) 977-2970 ext. 198	Independent Public agency, formed as a joint venture of the City of Charlottesville and Albermarle County pursuant to the Virginia Water and Sewer Authorities Act (1950 as amended), established in 1972	Potable & Sewer Collectio Treatmer	ers are charged based upon ption for operations portion of equally. Debt service rates are d based upon estimated amount of which each locale is responsible.	No Input	Methodology used for calculating debt service rate is not effective and needs to be changed.
Truckee Meadows Water Authority	Reno, NV	Kim Marezes (775) 834-8032	Public Authority established by Joint Powers Legislation of the State of Nevada, formally owned by a private utility that provided water & electric established in 2000	Wholesa Retail Pole Water	ers are charged based upon ption. There are three different classes commercial, residential ltifamily. There are two tiers for water use (indoor and outdoor).	Board of Directors all get along very well which is unusual for these three entities historically. Authority has a very good management team. There is a technical advisory board that has an engineer, finance person from each of the entities that works very well.	The 7th seat on the Board has not been filled. The guidelines state that the individual must be an elected official and that all entities must agree on the person, the groups cannot agree.
Pittsburgh Water & Sewer Authority	Pittsburgh, PA	Holly Parada (412) 255-0767 (ph) (412) 255-2304 (f)	Public Authority established in 1984	Retail Pot Water & Sewer Collectio Transfer	ers are charged based upon ption for water usage. tial customers see the highest d commercial and industrial ers receive a slightly lower rate.	No Input	No Input
Detroit Water & Sewerage Department	Detroit, MI	Valena Wiggins (313) 964-9225	Branch of the City government, established in 1835	Retail Pole Water & Sewer Collectio Treatmen	er are charged based upon water ption. All customers are charged e rate for water usage. The nment uses a declining block rate le for water billing and a flat rate ge generation.		
Appomattox River Water Authority	Petersburg, VA	Dee Hartman - Executive Director (804) 590-1145	Independent Authority, Chartered in 1962, first bonds in 1964 and operations began in 1968	Wholesale Potable W	thority uses a tiered rate structure. rate is charge to all customers to &M and routine capital itures. Individual 2nd and 3rd tier e calculated for each locale n expansion costs, paying for Customers are billed quarterly pon usage.	The Board of Directors and the fact that each wholesale customer has a representative on the Board.	None
Monroe County Water Authority	Rochester, NY	Cherly Harmon - Customer Service - (585) 442-2001 ext 250 Herb Grabb Finance - ext 220	Public Authority established under the NY Public Authorities Law in 1951, formed after a number of private utilities could not meet demand	Whole & R Potable W (Majority r	ers within Monroe County are for their water consumption. customers outside the county are a 10% surcharge and are based upon usage.	No Input	No Input
Sa ara Valley Wa District	Santa Clara, CA	Teddy Morris - Public Relations - (408) 265-2607 ext. 2279 John Ryan - Finance - ext 2402	Water District originally formed in 1929, renamed SVWD in 1970 when the water conservation and floodplan management formed the new district	Wholesale Potable W & Flood protection	ers are charged based upon ption and where water is from - art of County water is from water wells (cheaper) and part of the County water is (more expensive), otherwise all rs are charged the same le rate. The two private rs have take or pay contracts District.	No Input	No Input

Evaluation of Regional Water Commission Versus Chapter 58

Contents

- **Comparison of organizational options**

COMPARISON OF ORGANIZATIONAL OPTIONS

(Prepared by Damon Talley, P.S.C. and presented at Workshop No. 5)

	EVALUATION CRITERIA	SCORING 0 (lowest) to 5 (highest)	
		CHAPTER 58 GOVERNMENTAL AGENCY	REGIONAL WATER COMMISSION
1.	Autonomous	4	5
2.	No Liability for Member Utilities	5	5
3.	Ease of Creation	5	5
4.	Speed of Creation	5	5
5.	Issue Revenue Bonds	5	5
6.	Eligible for Grants	5	5
7.	Eligible for Low Interest Loans	5	5
8.	Public Accountability	5	5
9.	Acceptance by Regulators	1	5
10.	Membership Eligibility		
	* City Owned Utilities	5	5
	* Non-Profit Utilities	0	5
	* Investor Owned Utilities	0	0
	* LFUCG	5	5
11.	Expansion of Membership	5	5
12.	Withdrawal from Membership	5	5
13.	One Member, One Vote	1	5
14.	Board Membership		
	* Appointment	3	2
	* Compensation	1	5
	* Continuity	5	5
	* Independence	3	3
	* Professionalism	1	1
15.	Exempt from PSC	0	5

	EVALUATION CRITERIA	SCORING 0 (lowest) to 5 (highest)	
		CHAPTER 58 GOVERNMENTAL AGENCY	REGIONAL WATER COMMISSION
16.	Rate Oversight	0	5
17.	Own & Operate WTP	5	5
18.	Purchase Water from Others	5	5
19.	Own and Operate Grid	5	5
20.	Wholesale Water	5	5
21.	Retail Water	Yes 0	No 5
22.	Must Sell Water to Non-Members	Yes 0	No 5
23.	Acquire Existing Infrasture	5	5
24.	Uniform Wholesale Rate	2	5
25.	No Threat to Existing Utilities	2	4
26.	Eminent Domain	5	5
27.	Adjustability	4	1
28.	Flexibility (Purpose)	5	1
29.	Implementability (Risk of Delays)	1	5
30.	Simplicity	3	4
TOTALS		121	161

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Information on Regional Water Commissions

Contents

- **Questions and answers about regional water commissions**
- **Paying for a New Regional Water Supply**

QUESTIONS AND ANSWERS

ABOUT

REGIONAL WATER COMMISSION

WORKSHOP NO. 6

LEXINGTON, KENTUCKY

OCTOBER 13, 2003

PREPARED BY:

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B W S C TO FORM

REGIONAL WATER COMMISSION

INTRODUCTION

The Bluegrass Water Supply Consortium ("BWSC") has decided to form a Regional Water Commission to oversee management and operation of the proposed waterworks facilities. This decision was made at Workshop No. 5 held in Winchester, Kentucky on July 23, 2003 by the participants of the BWSC Regional Water Supply Study. The BWSC participants considered several other organizational alternatives before settling upon the Regional Water Commission as the preferred alternative.

The following questions are typical of those asked by participants in the BWSC Study. Hopefully, the answers to these questions will make you better informed about Regional Water Commissons.

QUESTIONS AND ANSWERS

1. **What is a Regional Water Commission?**

A Regional Water Commission is a distinct legal entity authorized by the provisions of KRS 74.420 to 74.520. It is both a public corporation and a public agency. Its function is to enable two (2) or more utilities to jointly develop and operate sources of **drinking** water supply.

2. **Are there any other Regional Water Commissions in Kentucky?**

Yes. At present there are five (5) other Regional Water Commissions operating in Kentucky:

Beech Fork Water Commission
Boone-Florence Water Commission
Cave Run Water Commission
Greater Fleming County Regional Water Commission
Logan/Todd Regional Water Commission

There are also at least three (3) other Regional Water Commissions in the process of being created at this time.

3. **What will be the name of the Regional Water Commission?**

No official name has been selected. By statute, the name of the organization must include the words "Water Commission". Thus far, the following suggestions have been made:

Bluegrass Water Commission
Bluegrass Regional Water Commission
Bluegrass Water Supply Commission

Do you have a suggested name?

4. **Will the meetings of the Regional Water Commission be open to the public?**

Yes. The Regional Water Commission will be a public agency. As such, it will be subject to all "Sunshine Laws" (KRS 61.805 to 61.884) pertaining to open meetings and open records.

5. **What will be the governing body of the Regional Water Commission?**

The Regional Water Commission will be governed by a Board of Commissioners. The board members will be referred to as "commissioners".

6. **Who selects the Commissioners that will govern the Regional Water Commission?**

Each utility which participates in the creation of the Regional Water Commission will have a "seat at the table". Each utility will be responsible for selecting its own representative ("commissioner") to the Board of Commissioners of the Regional Water Commission. Each commissioner will serve a four (4) year term, but commissioners may succeed themselves. (Technically, each utility's representative must be appointed by the Mayor and approved by the governing body (City Council or City Commission) of the City which owns the utility). See KRS 74.450.

7. **Will each member of the Regional Water Commission have a vote?**

Yes. KRS 74.450 dictates that each utility will have one (1) voting representative on the Regional Water Commission. Each member ("commissioner") of the Regional Water Commission will have one (1) vote on all matters coming before the Regional Water Commission. Therefore, each utility that participates in the formation of the Regional Water Commission will have an equal voice in conducting the business of the Regional Water Commission.

8. **Will the Regional Water Commission be eligible for grants and low interest loans?**

Yes. Since a Regional Water Commission is a public corporation (public body) instead of a private corporation, it will be eligible for all state and federal grants and low interest loans. This is one of the reasons that the Regional Water Commission was selected as the preferred organizational alternative.

9. **Can the Regional Water Commission borrow money or issue revenue bonds in its own name or must it depend upon its members to raise the necessary funds?**

The Regional Water Commission will have the legal authority to borrow money and to issue revenue bonds in its own name (See KRS 74.470). It will **not** have to depend upon the participating utilities to raise the necessary capital. The participating utilities will **not** have to incur any debt on behalf of the Regional Water Commission. Revenues to be derived from water sales will be the source of repayment for the debt incurred by the Regional Water Commission.

10. **Will the utilities who are members of the Regional Water Commission be liable for the debts and obligations of the Regional Water Commission?**

No. The Regional Water Commission will be a separate and distinct legal entity. As such, the Regional Water Commission will be responsible for its own debts and legal obligations. The participating utilities will **not** be financially responsible for any of the expenses, debts or obligations incurred by the Regional Water Commission.

11. **Can a utility purchase water from the Regional Water Commission if the utility is not a member of the Regional Water Commission?**

Yes, provided the Regional Water Commission agrees to sell that utility water. KRS 74.480 and 74.490 permit the Regional Water Commission to supply water to both member and non-member utilities. The length of the water supply contracts cannot exceed 50 years.

12. Who will set the rate that the Regional Water Commission will charge?

The Board of Commissioners of the Regional Water Commission will determine the wholesale rate that will be charged to utilities purchasing water from the Regional Water Commission. KRS 74.480(2) requires that the rate be sufficient to pay debt service, to pay the cost of operation and maintenance, and to provide an adequate fund for renewals, replacements, and reserves.

13. Will the Regional Water Commission be subject to jurisdiction by the Kentucky Public Service Commission ("PSC")?

No. KRS 74.510 grants a Regional Water Commission a specific exemption from PSC jurisdiction. This means that the Regional Water Commission will **not** have to obtain a certificate of public convenience and necessity from the PSC before constructing waterworks facilities and will **not** have to get its wholesale rate approved by the PSC. Any water supply contract between the Regional Water Commission and a utility regulated by the PSC (e.g. Kentucky-American Water Company) must be reviewed, however, by the PSC.

14. Can a Regional Water Commission sell water to retail customers?

No. KRS 74.510 expressly prohibits a Regional Water Commission from selling water to individual, private consumers. It can only supply water on a wholesale basis to other utilities. This is one reason a Regional Water Commission is exempt from regulation by the PSC.

15. Can the Regional Water Commission "take over" a water utility?

No. The role of the Regional Water Commission is to acquire and develop sources of water supply and then distribute (wholesale) the water to utilities. Numerous provisions of Kentucky law prohibit a Regional Water Commission from performing any other activities. KRS 74.510 expressly prohibits a Regional Water Commission from retailing water to individual consumers. Since a Regional Water Commission **cannot** serve individual customers, it **cannot** perform the role of a water utility.

16. Can the Regional Water Commission provide wastewater collection or treatment services?

No. A Regional Water Commission has **no** legal authority to provide **wastewater** collection or treatment services. By statute, its role is limited to acquiring and developing sources of **drinking** water supply and distributing **drinking** water to utilities.

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DATE: October 13, 2003

Paying For A New Regional Water Supply

Financial Reasons To Build A Regional Water Supply

Economies of Scale – A single large additional source of supply will provide economy of scale, in comparison to small supply projects by each of the Consortium members. The same economies of scale apply to building pipeline networks - the grid to carry water to individual utilities.

Better Financing – An organization that has a larger customer base can obtain better interest rates when it borrows money than a smaller organization. The larger organization will generally have more credibility with lenders, and will be considered a better credit risk.

Lower Unit Operating Costs – Economy of scale also helps control operating costs. The grid network will help the member's communities optimize their operations, and their existing resources. A larger wholesale organization can better afford highly trained and specialized staff, and is also better able to respond to new regulatory and environmental standards.

Efficiency – A single-purpose organization can focus all of its energy on doing the one thing that it does, and doesn't have other activities to divert its attention.

How Will We Pay For A New Water Supply?

Maximum Use of Grants and Other External Funding – The Regional Water Commission will aggressively seek capital funding from federal and state agencies. If available, low interest rate loans will be used.

Long-Term Commitment from Participating Utilities – Each utility member of the Regional Water Commission will commit to a portion of the capacity of the new facilities. The annual cost of this commitment will also provide them with a minimum supply of water every day. This guarantee will provide security for issuance of bonds to build the facilities. Payments for water purchase commitments will not begin until the water is available to the member or customer. However, there will be some start-up costs incurred before water can be delivered; these costs will likely be paid for by grants and loans.

Sale of Surplus Water – To the extent that the Regional Water Commission has more water than its members require, it will sell surplus water on both short- and long-term bases to other water providers. The revenue from such sales will be used to pay off debt or pay for improvements to the Commission's facilities.

Sale of Backup Water Guarantees – Some existing utilities may not choose to buy water on a "take or pay" basis, and may want only to have a backup source of water available in cases of shortages. The Regional Water Commission will probably agree to such arrangements, but the utilities wanting this type of arrangement may have to pay a price that is substantial, because the Regional Water Commission must build and have available the guaranteed capacity even when "backup" customers don't need water.

Issuance of Long-Term Debt – Based on firm commitments from its members, the Regional Water Commission will issue long-term tax-

exempt debt in the form of revenue bonds. These bonds will be guaranteed by the revenues coming from the sale of water. The bonds will not be guaranteed by property taxes or other tax revenues.

Financial Impact On Present Water Providers

No Competition – The new regional water commission will sell water "wholesale" only to water utilities; it won't be allowed to sell water to individual customers. Basically, the Regional Water Commission will be "owned" by its members.

Non-Profit Organization – The new regional water system will operate on a non-profit basis. If a surplus is generated, it can be used only to pay off debt, pay for new capital projects or reduce future rate increases.

Uniform Rate – Water will be sold on a wholesale basis to all members at the same unit price.

How Much Will It Cost? – We won't know the "final" cost of water provided by the Regional Water Commission until we have chosen the source of the new supply, and until we have a solid commitment from the members of the Commission. The Bluegrass Water Supply Consortium is presently soliciting non-binding "letters of intent" from numerous water utilities in the Bluegrass area, attempting to determine the levels of interest in buying quantities of water at varying prices.

How Will This New Water Supply Affect Water Rates For Specific Utilities? – The specific financial impact will vary from one utility to another. In some cases, the water purchased from the Regional Water Commission might be substituted for building or expanding a treatment plant for individual utilities. Some utilities may decide to use the new water for peak usage periods only; other utilities may decide to use the new water for their normal "base" usage, and operate their own treatment plants during peak demand periods. Individual decisions will be made by each participating utility or community. The Regional

Feasibility Study undertaken by BWSC can provide approximate financial impacts on individual utilities, but each utility will have to perform its own detailed financial analysis (i.e., an informal "rate study") before making its final decision.

For additional information, please contact:

Ed Donahue
Municipal & Financial Services Group
906-A Commerce Road
Annapolis, MD 21401
410.266.9101 / edward.donahue@mfsgllc.com

Workshops 1-6

Contents

- **Agenda, minutes, sign-in sheets, and presentation slides for each workshop**

Workshop No. 1 – Kickoff Meeting

Bluegrass Water Supply Consortium
Kickoff Meeting
November 11, 2002

AGENDA

9:00 Welcome and Introductions

9:15 Meeting Objectives

9:20 Establishing Working Relationships

9:45 Study Objectives

Review and Input on Study Approach:

10:30 Management/Ownership
- Key Issues/Goals
- Organizational Alternatives
  - Brainstorming
  - Preliminary List of Options

11:15 Source of Supply/Wheeling
- Goals & Policies
- Information Collection
  - Demands
  - Sources
- Other

11:45 Break

1:00 Source of Supply Review (Continuation)
- Goals
- Source Options
- Previous Comments by COE, KDOW
- Planned Agency Meetings
- Draft Evaluation Criteria
  - Brainstorming Session

1:45 Wheeling
- Goals
- Benefits
- Study Approach
- Information Needs

2:00 Financial Alternatives
- Goals
- Key Issues
  - Financing Alternatives
  - Other Issues
  - Simplicity
- Initial Meetings with Funding Agencies

2:30 Communications/Public Outreach
- Goals
- Roles & Responsibilities
- Near Term Actions

3:00 Public Comment Period (Maximum 60 minutes)

Wrap Up
- Next Meeting
- Action Item Summary
- Feedback on Kick-off Meeting
  - Format
  - Content

From: Thomas Dumm
Re: December 9, 2002 - Workshop 1
File: 30507/3_memos/111102mtgmnts.doc
Date: November 26, 2002

Cc: George Rest
Tim Kraus
Don Hassall
Ed Donahue
John Steinmetz

The first workshop for the Bluegrass Water Supply Consortium (BWSC) was held on November 11, 2002 at 9 AM. The meeting was held at the offices of the Bluegrass Area Development District, in Lexington, Ky.

The following is a summary of the pertinent items discussed.

Management/Ownership

1. Maintaining local autonomy and an autonomous decision-making process for local participation and operation was stated as being critical for the BWSC Participants.
2. The physical water system and organizational structure should be flexible to accommodate the needs of the BWSC Participants. Members indicated that only organizational structures that can accommodate both private/public or public ownership are to be considered.
3. If an element of an organizational structure has benefits outside the obvious it should be noted by O'Brien & Gere.
4. For the Operational Alternatives, BWSC Participants agreed that Option 2 as shown in the presentation (Ownership of the Entire System) should be eliminated from consideration and that Option 1 shown in the presentation (Coordinating Function Only) should be retained as a last resort. An operational alternative between Option 1 and Option 2 may exist.
5. Damon Talley suggested deferring a decision on the Management structure, if possible, until supply options and wheeling are more defined.

Source of Supply/Wheeling

1. Water demands were requested from participants and should be available within 7 to 10 days of the meeting. O'Brien & Gere will review the water demands for reasonableness. Don Hassall will coordinate receipt and distribution of this information.
2. The BWSC Participants agreed that this project is intended to provide an auxiliary supply of water and not replacement resources for existing treatment capacities or systems. The study assumes that current levels of production will be maintained and that the new supply will meet new water demands. The new supply is not intended to interfere with existing contract relationships for Participants. The BWSC has drafted text and is working with the Legislature to revise rules governing new connections to new water transmission mains. Currently, the PSC requires that municipalities allow a "tap-on" although KDOW has supported not allowing a "tap-on". Bulk sales contracts with BWSC versus other municipalities could be established as buy-sell customers and legislation would allow no other connections. Text related to new connections to water transmission mains is included in the October 23, 2002 meeting minutes.
3. Water supply options that are not stand-alone (i.e., capable of meeting the total projected need through the planning period) should be retained in the alternatives analysis of the study and considered in combination with other alternatives.
4. O'Brien & Gere should confirm with the USACE that the availability of supply in the Kentucky River that exists today would be maintained through the planning period.
5. KDOW will be determining how much water in the Kentucky River can be relied upon. The USACE also needs to comment on their objectives for the Kentucky River. KRA has identified that they want to be a partner in maintaining the Kentucky River structures. O'Brien & Gere should comment on how each alternative meets the BWSC's mission statement.
6. O'Brien & Gere and Don Hassall will meet with KDOW, KRA, Ky PSC and USACE. O'Brien & Gere will prepare a memorandum to the meeting participants to outline the objectives for each meeting and provide

summaries of each meeting for distribution among the BWSC members and the project library. Discussions with KRA should be held with the Executive Director. Don Hassall agreed to keep KIA apprised of the project status. Participants suggested that a meeting with KIA be deferred until the interim findings are available. A decision on when to meet with KIA will be made at the next BWSC meeting.

7. O'Brien & Gere should include an assessment of potential delays such as legal, legislative, etc. for each alternative and include the assessment in the recommendations.
8. O'Brien & Gere requested that the library at the offices of the BGADD be updated within one to two weeks in order to complete the review of previous water supply studies. Key findings from the previous studies will be documented and distributed to the BWSC for comments.
9. O'Brien & Gere requested that the BWSC begin considering weighting criteria to be used for screening water supply alternatives. The evaluation criteria includes speed of implementation (3-5 years), consistency with long-term goals, non-interruptible, reliability, and environmental. The criteria will be developed prior to screening process, tentatively at the next Workshop.
10. For this study, drought management is estimated at 15% based on an assumption of an acceptable residential impact.
11. KRA will consider options for the Kentucky River at the December 11, 2002 meeting based on the project scope alternatives developed by the USACE.
12. The "No Action" alternative should be included in the alternatives analysis.
13. One approach to be considered for addressing the peaking issue is to use the grid as the baseload supply and have the individual municipalities meet their individual peaking requirements.

Financial Alternatives

1. KAWC requests that reimbursement be considered for use of existing facilities that benefit the BWSC.
2. The financial model can be used to assess several levels of grant funding.
3. BWSC Participants will compile a list of other utilities that serve regional systems and these utilities should be included in a comparison survey. This list will be provided to O'Brien & Gere by e-mail within one week.
4. The BWSC Participants asked that O'Brien & Gere solicit input from PSC and request examples of regional approaches.

Communications/Public Outreach

1. BWSC will take the lead on this task and O'Brien & Gere will provide assistance.

Public Comment

The meeting was opened for public comment. The following items were presented

1. A representative from HMB Engineers identified that the information for the Greater Fleming project is available for review.
2. A request was made that BWSC information should be readily available for public review.
3. Water rates should be established such that the small, non-peaking user is not penalized.
4. Baseload demand versus peaking off of the grid needs to be addressed in the study. If we don't select the Kentucky River supply, the capital investments that could be used for the Kentucky River could be directed elsewhere and the supply may not be available in the future.
5. There is a concern that allowing developers to connect to the transmission mains could be in conflict with Planned Growth since the development will be occurring outside the designated growth areas.
6. This project can be used to improve conservation education with customers.
7. Supportive comments were made regarding the importance of this endeavor and an endorsement was added to indicate the BWSC is on the right track .

Members of the public were encouraged to submit written input prior to the scheduled workshops for incorporation into the preparatory materials for such meetings. The power point presentation amended per

discussions in Workshop #1 are available via e-mail request of Don Hassall at BGADD. The presentation will be made a part of the Project Library. Future workshops will be noticed through local newspapers as well as invitations to individuals and entities on the BGADD mailing list for BWSC activities. Don Hassall was again identified as the primary contact for members of the public desiring to provide input to the study effort.

Future Meetings

- Workshop No. 2 will be held in the first week in January in Georgetown. Date to be determined.
- Workshop No. 3 will be held on February in Frankfort. Tentative date is the third week of February.

Attachments:

1. List of Attendees
2. Microsoft PowerPoint Presentation

BGADD
Bluegrass Area Development District

Bluegrass Water Supply Consortium

Water System Regionalization Feasibility Study

Kickoff Meeting

November 11, 2002

CDP Carter Dixon Partners · O'Brien & Gere Engineers, Inc. · MapSync

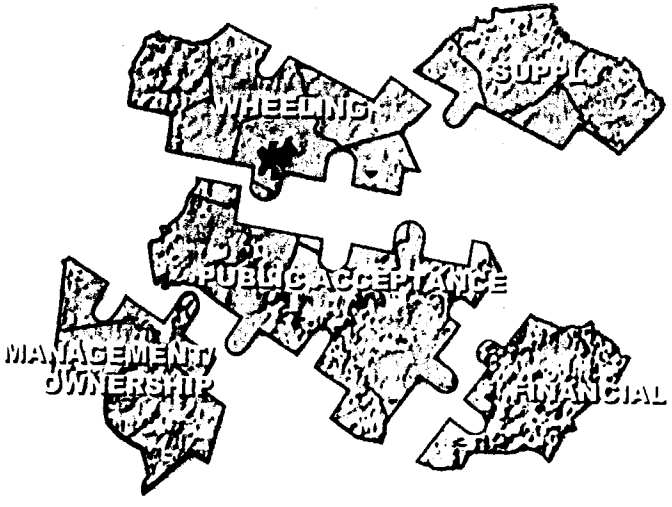
BWSC Participants

- Berea College Utilities
- Cynthiana, City of
- Frankfort Water Plant Board
- Georgetown Municipal Water/Sewer Service
- Harrodsburg, City of
- Kentucky American Water Company
- Lancaster, City of
- Lawrenceburg, City of
- Lexington-Fayette
- Mt. Sterling Water & Sewer Commission
- Nicholasville Utilities
- Paris, City of
- Shelbyville Water & Sewer Commission
- Versailles, City of
- Wilmore, City of
- Winchester Municipal Utilities

BGADD/BWSC Objectives

- Implementing a Management/Ownership approach which is fair and flexible
- Tapping highly reliable sources of supply
  - To be available within 3 to 5 years
- Optimizing regional water supplies through a grid network
- A financial plan that is affordable, and fairly apportions costs
- Effectively communicating the process and findings

Solving the Bluegrass Area Water Supply Puzzle



Kickoff Meeting Objectives

- Establish Working Relationships
- Review Critical Issues & Potential Obstacles
- Briefing and input
  - Scope of Study
  - Project Approach
  - Changes since proposal developed
- Identify data needs/collect data
- Tailor study approach as needed

Key Issues Management/Ownership

Issue:

- Potential purchase of KAWC by City

Concern:

- Impact on schedule and management/ownership options

Policy Suggestion:

- Identify management/ownership approach(es) that fit <u>both</u> municipal or private ownership of Lexington Water System

Key Issues Management/Ownership

Issue: Balancing Municipal and Private Sector Goals

Municipal Utilities Goals:

- Ample water supply
- Tax exempt debt
- Grant eligibility
- Maintain local utility ownership/autonomy

Private Utility Goals:

- Ample water supply
- Return for investors
- Control over future investments

<u>Other Key Issues?</u>

Organizational Alternatives - Briefing by Legal Counsel

- New traditional public agency under existing Kentucky revised statutes
  - Regional Water Commission (KRS 74.430)
  - Interlocal Cooperation Agreement (KR5 65.210)
  - Instrumentality of Governmental agencies
- New public agency requiring special legislation
- Existing public agency such as KRA, KIA

Organizational Alternatives - Briefing by Legal Counsel

(cont)

- Non-public agency
  - Non Profit Corporation (KRS Chapter 273)
  - Contractual Agreement (Contract Law)
  - Partnership (KRS Chapter 362)
  - Unincorporated Association (Misc. Laws & Cases)
- Other Alternatives?
- Primary Focus?

ORGANIZATIONAL ALTERNATIVES MATRIX

Organizational Alternatives	Advantages	Disadvantages
New Traditional Public Agency under Existing Kentucky Revised Statutes	▪ Viewed as Public Agency ▪ Minimizes need for new legislation	▪ Does not provide customized approach
Instrumentality of Governmental Agencies	▪ Viewed as Public Agency ▪ Minimize need for new legislation	▪ Novel use of this approach ▪ May be subject to PSC
New Public Agency Requiring Special Legislation	▪ Allows customized approach to charter, membership, voting rights, oversight, etc.	May require more time to create
Existing Public Agency such as KRA, KIA	Use existing organization	▪ Each existing organization already has a specific mission ▪ New mission may present conflicts ▪ Less local control
Non-Public Agency (Non-Profit Corporation)	▪ Broad Powers ▪ Flexible Purposes	▪ May not be viewed as "regional" approach ▪ Not a public agency —no tax exempt debt —less public acceptance —subject to PSC

Operational Alternatives

Operational Alternatives Matrix		
Operational Alternative	Advantages	Disadvantages
~~1. Coordinating Function Only~~	~~• Poses no threat to independence of individual utilities~~ ~~• Could be established quickly~~	~~• Limited enforcement ability~~ ~~• Uncertain ability to finance~~
2. Ownership of Entire System	• Financing ability • Economies of scale • Contract with localities to operate segments of system	• Loss of local independence
3. Lease Existing Segments from Current Owners/Construct Needed Links	• Economy of operation • Act as system manager • Contract with localities to operate segments of system	• Loss of local control
4. Ownership of New Regional Facilities/ Current Owners Retain Existing Segments ("Wholesale" Type Approach)	• Retains independence of individual utilities • Financing ability • Economy of scale • Could also contract with localities to operate segments of system.	

Management / Ownership

Workshop 1 Kick-off Meeting
- Key Issues Review
- Briefing by Attorney
- Organizational Alternatives
- Brainstorming
- Preliminary List of Options

Organizational Benchmarking Survey

Workshop 2 Benchmarking Previous Studies
- Review Benchmarking Findings
- Screen Options

Draft Recommendations

Workshop 3 Select Approaches
- Select Org. Approach
- Form Work Group to draft Charter

Proposed Organizational Plan

Workshop 4 Screen Technical Alternatives
- Report back by Consortium Members
- Confirm Org. Approach
- Report by Charter Work Group
  - Charter Outline

Preliminary Draft Charter

Workshop 5 Decisions
- Review Draft Charter

Final Draft Charter

Workshop 6 Conclusions
- Approve Draft Charter
- Brainstorm Future Actions

Source of Supply

- It starts with good demand estimates
  - Immediate need for projections
  - Methodology review

BWSC Supply Options

- Preliminary List:
  - Regional BWSC owned or locally owned WTP's on the Kentucky River
  - Louisville Water Co. (Pipeline)
  - BWSC owned Water Treatment Plant (WTP) on Pool #3 of the Kentucky River
  - Cincinnati Water Co. (Pipeline)
  - Northern Kentucky Water District (Pipeline)
  - Surface or Groundwater Supplies from BWSC owned WTP at or near Ohio River
  - Greater Fleming Regional Water Commission (Pipeline)
  - BWSC owned WTP on Cave Run Lake
  - BWSC owned WTP on Herrington Lake
  - BWSC owned WTP on Lake Cumberland
  - No action
- Others

Source of Supply

Initial Information Needs

- Safe yield and available allocation of the supplies
- Raw and finished water quality
- Status on Raising Dam/Lock #10
- Access to data in all 80+ alternatives

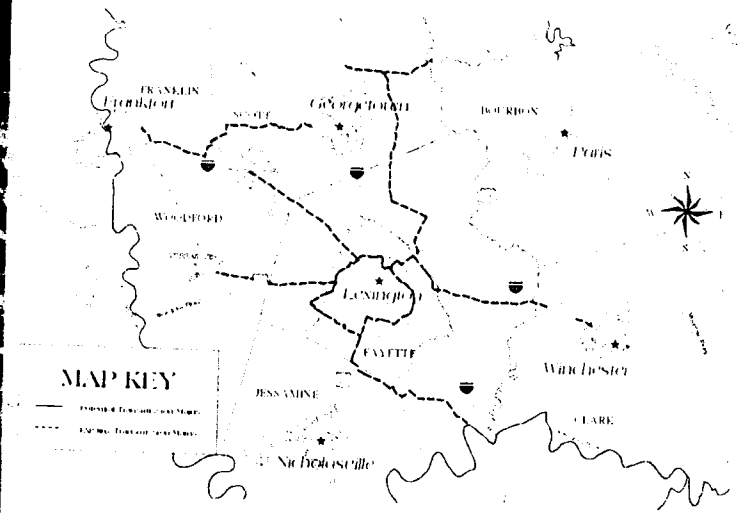
Source of Supply
Draft Evaluation Criteria

- Non-Interruptable/Reliable
- Adequate Capacity
- Raw/Finished Water Quality
- Cost
- Implementability / Risk of Delays
  - ✓ permitable
  - ✓ public acceptance
  - ✓ property acquisition
- Flexibility
  - ✓ phased implementation

Other Criteria?

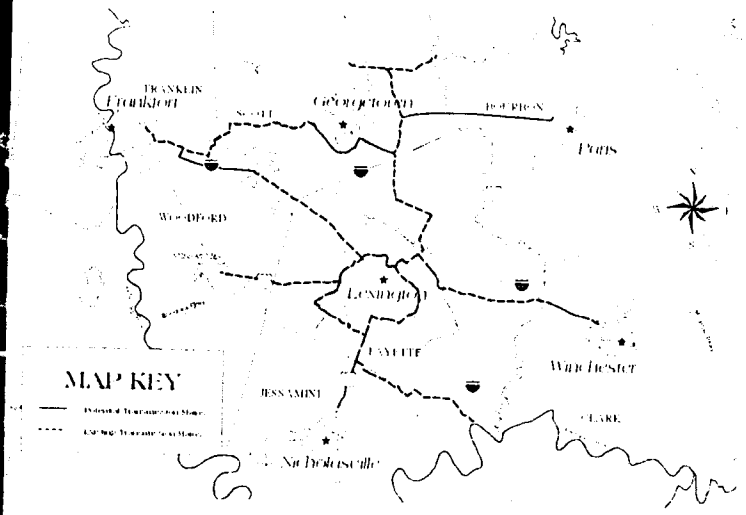
Wheeling

Grid Network



Wheeling

Grid Network



Wheeling

Benefits of Wheeling

Immediate

- Peak day attenuation
- Optimize use of existing sources
- Grant funding

Long Term

- Economy of scale
  - ✓ new supply and treatment
- Reliability of multiple sources
- Easier to phase regional growth

Source of Supply/Wheeling

Source of Supply/Wheeling

Workshop 1 Kick-off Meeting

- Goals & Policies
- Establish Information Collection Program
- Review Project Quality Assurance Plan

TM# 1 Prior Investigations and Water Demands

Initial Meeting with Permitting Agencies

Workshop 2 Benchmarking Previous Studies

- Review TM #1
- Confirm Demand Projections

TM # 2a Source of Supply Options - Identification

TM # 3a Peaking Analysis/Grid Concept

Workshop 3 Select Approaches

- Review TM #2a and TM #3a
- Confirm Supply Options
- Confirm impact of wheeling on Peak Day Demand

TM # 2b Source of Supply Options
- Safe Yields
- Physical Components

TM # 3b Wheeling Concepts
- Hydraulic Model

Workshop 4 Screen Technical Alternatives

- Screening of Supply Options
- Confirm Wheeling Components

TM # 2c Source of Supply Alternatives Evaluation
- Costs

TM # 3c Wheeling Concepts
- Costs

Workshop 5 Decisions

- Select Supply Option
- Select Wheeling Components

Draft Report & Executive Summary

Workshop 6 Conclusions

- Approve Report
- Brainstorm Future Actions

Financing Alternatives - Key Issues

ALTERNATIVE	EXAMPLE
"Take or Pay"	Massachusetts Water Resources Authority
Parallel financing agency	New York City Municipal Water Financing Agency
Transfer of existing assets	Boston Water & Sewer Commission
Equitable servitude	Denver Water Board / NJ Water Supply Authority
Investor-owned utility, plus KIA loans for municipal participants	Louisville Water Company
Others?	

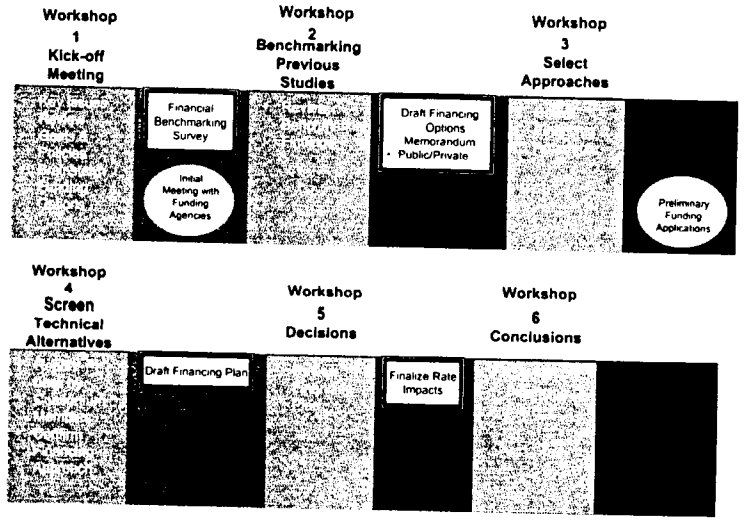
Other Issues

- Allocation of operating and capital costs among members
- Wholesale vs. retail levels of service
- IRS Private Purpose rules
- Private Utility / Rate of return on rate base
- Simple vs Complex financing arrangements

Examples of Simplicity

- Common unit cost for new facilities
- Take or pay for committed capacity
- No capital reimbursement for wheeling through existing pipelines
- Private Utility – return on investment via equitable servitude
- Regional Agency – tax exempt debt by financing only municipal obligations *("private purpose limitation")*

Financial



Communications/Public Outreach Key Issues

- Local community support
- State legislature support
- Environmental permits

Communications/Public Outreach A Team Approach

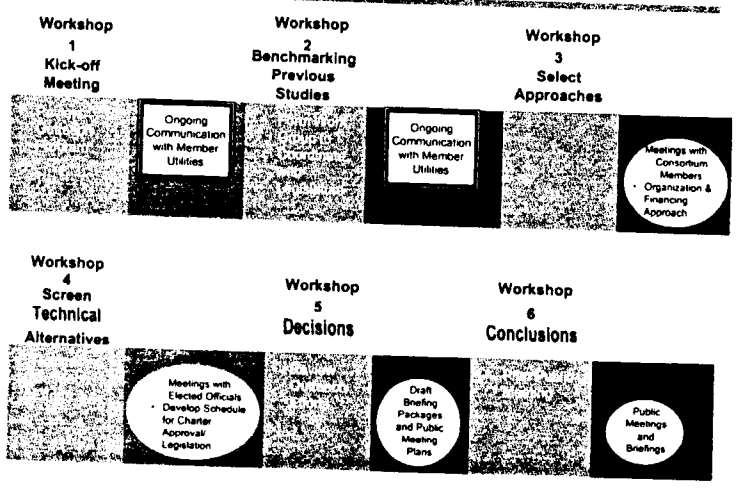
BGADD
- Frequent newsletter to communicate progress
- Media Point of Contact

BWSC
- Liaison with member organizations

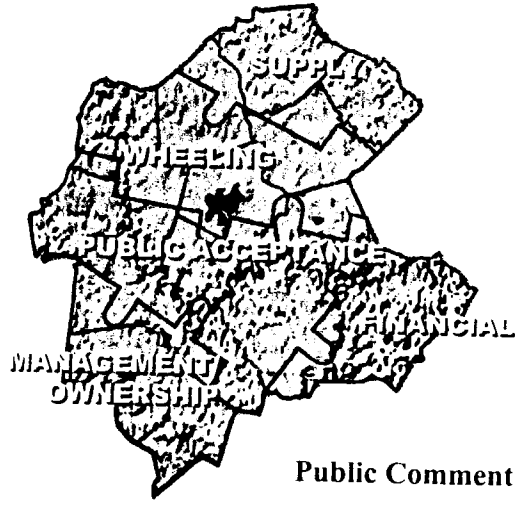
OB&G Team
- Technical support
- Presentations & Briefings

Joint Participation
- "Public Friendly" meetings
- Key public meetings and briefings

Public Outreach



Solving the Bluegrass Area Water Supply Puzzle



Public Comment Period

Workshop No. 2 – Benchmarking/ Data Collection

Bluegrass Water Supply Consortium
Workshop Number 2
Benchmarking/Previous Studies
January 8, 2003
DRAFT AGENDA

9:00 Welcome and Introductions

- Review of Minutes from November 11, 2002 Kickoff Meeting
- Summary of activities since last meeting

Objectives for this Workshop

9:15 Source of Supply/Demand/Data
- Confirm demand projections/data needs
  - Variations in projection methodology
- Compare demands to existing supplies
- Peak day demand analysis
- Review KDOW input on supply "interruptibility"
- Review other Agency input:
  - Corp of Engineers
  - Kentucky River Authority
- Information Collection
  - Sources
  - Grid for wheeling
- Other?

11:00 Source of Supply /Preliminary discussion of options
- Source Options Status Review
- Planned Agency Meetings
- Draft Evaluation Criteria
  - Finalize criteria
  - Develop weighting factors

Action items /approach for developing Technical Memorandum

11:45 Break

1:00 Wheeling
- Study Approach
- Information Needs

1:15 Management and Financial Alternatives
- Benchmarking Study Findings
- Initial screening of organizational options
  - Discussion of management options
  - Discussion of financing options (capital costs, operating costs)
  - Other Issues
- Initial Meetings with Funding Agencies
- Work Group Formation for interaction with State Legislature

2:40 Communications/Public Outreach
- Roles & Responsibilities
- Near Term Actions

2:50 Upcoming meetings
Workshop No. 3
Workshop No. 4
Public Meeting No. 2
Other

3:00 Public Comment Period (Maximum 60 minutes)

Wrap Up
- Next Meeting
- Action Item Summary
- Feedback on Workshop No. 2
  - Format
  - Content

Summary BWSC Workshop #2
January 8, 2003
Scott County Health Department
300 East Washington Street
Georgetown, KY

Attendees: BWSC Participants

Attachments: Revised Microsoft PowerPoint Presentation was distributed to BWSC participants.

Introduction

The Bluegrass Water Supply Consortium held Workshop #2 on January 8, 2003 to discuss the status of the work performed on the Water System Regionalization Feasibility Study. The workshop was organized according to the following topics:

- Source of supply
- Wheeling of water
- Management and financial alternatives
- Communication/Public outreach
- Upcoming meetings
- Public comments

A brief summary of the key discussions for each of these areas follows.

Source of Supply

This portion of the presentation identified the current and future water demands and the adequacy of existing supplies which defines the current and projected supply deficits.

Adequate Capacity

Further discussions with Leon Smothers of the Kentucky DOW (KDOW) about the definition of inter-basin transfers and consumptive approach may be needed to resolve a comment made during the presentation.

In "bracketing" the demand numbers, the 58 mgd minimum and 95 mgd maximum may each be reduced to incorporate risk tolerance, diversity and conservation. KAWC will stand by their water demand planning projections which reflect reductions in water use during drought conditions. Conceptually, the BWSC members identified in previous work sessions that a 15% reduction in maximum day demands for the six members was reasonable. Participants remarked that a 15% reduction equated to odd-even watering. Each member utility will need to decide how to establish their projected need. Many participants may be forced to baseload from the grid because of take-or-pay contracts. The driving factor for participants will be the cost for connection to the grid versus the minimum flow requirement. Participants will need the cost for the grid connection in order to perform their individual assessments of options other than the grid connection. OBG will investigate a cost-curve approach to define costs at the minimum and maximum demand levels. Although the study shows a planning period through 2020 some communities may elect to look beyond 2020.

The 38 mgd deficit between maximum day demands in 2020 and the current permit "ceiling" is the "absolute floor" in terms of water needs. The deficit in water treatment plant capacity is about the same amount. There was some discussion about defining a range of demand and developing economic evaluations for alternatives for supply within that range in order to seek the optimum value (i.e., the most water for the dollar) and to identify "steps" in the cost and capacity for different plans. This approach might result in an unacceptable amount of evaluation for a large number of alternatives and must be considered further when more specific project information is available.

KDOW withdrawal permit values will be used and relied upon to define interruptibility. The permits are not consistent in terms of the stepdown rates to the floor level. The BWSC participants agreed that it is reasonable to use the current permits for the Kentucky River withdrawals.

Raw/Finished Water Quality

A basic premise in the study is that the finished water from the alternatives will meet current and anticipated regulatory requirements. This criterion should address monitoring costs for the finished water. Total Dissolved Solids may be an issue with some industrial users.

Cost

KRA funding allowances (including allowances for new out-of-basin sources that do not currently incur KRA fees) need to be included in the costs for alternatives. OBG should set up the data files such that the KRA fees can be easily removed at a later date. This approach is part of ensuring that the costs of preserving the river as reliable source are met.

Fatal Flaws

After much discussion, the following clarification was made regarding the fatal flaw criteria. Alternative plans will be developed for evaluation and comparison. Every plan will include the establishment of a piped transmission grid to move water among the members. Alternatives may be made up of one or many projects - the smallest project must produce at least 10 mgd of "new water". One screening criterion for the plans will be that they should accomplish some demonstrated relief from the demand deficit within 3 - 5 years. The fatal flaw analysis will be conducted in Frankfort on February 17-18.

The weighting criteria matrix will be completed at Workshop #3. It was decided that individual considerations and weighting may be done, but the final numbers will be established in a group format with decisions made by consensus.

Action Items

- Demand numbers must be solidified by the BWSC members before Workshop # 3. A final draft of the spreadsheet will be sent by e-mail to members. Revisions must be returned to Don Hassall by February 1, 2003. The e-mail will also seek guidance on a reduction for maximum day use that might be reasonable. Members should consider a value or percentage that would be reasonable for their respective systems and respond by February 1st along with the spreadsheet response.

- OBG will investigate a cost-curve approach to define costs at the minimum and maximum demand levels.

- OBG will revise and redistribute the tables and graphs for water demands and supplies upon receipt of the information from the BWSC participants.

- OBG will revise the footnotes in the demand weighting criteria matrix to reflect changes that were made in the definitions for the criteria.

- OBG will contact Vicky Ray at DOW to discuss water quality.

Wheeling

John Steinmetz reported that development of the spoke and hub model is underway and they are currently awaiting a copy of the KAWC model.

Management and Financial Alternatives

Ed Donahue and Damon Talley presented information gathered in a benchmarking effort by OBG.

Vicki Ray, KDOW Drinking Branch Manger, suggested that the Water Commission Statute be tweaked to better serve Kentucky and for potential use by BWSC.

It was strongly suggested by the BGADD that public policy makers from the BWSC member communities be urged to become more involved as the study progresses to facilitate implementation of a selected plan.

Action Items

- It was decided that some funding agency contacts should be made to begin research into possible financial strategies. BGADD will lead the effort to bring BWSC members into contact with KIA and Congressman Fletcher for the purpose of such discussions.

- BWSC members should review the benchmarking matrix. OBG should revise the matrix and complete the benchmarking memorandum, but should not initiate further work on the organizational structure until later in the study.

Communications/Public Outreach

Participants agreed to defer a meeting of the Work Group to address legislative issues.

It is assumed that the participants are keeping their elected officials apprised of the BWSC's meetings and decisions. A number of BWSC participants are available to make presentation to elected officials for other participants.

Action Items

- Discussion occurred regarding the timing of an upcoming direct mailing and an Open House Public Meeting that are part of the BWSC Communication Plan. It was decided that the availability of information on the alternative plans under consideration would be an important factor in determining the best time schedule an open house. An assessment will be made at the next Workshop and plans and schedules for these public communications will be determined at that time.

Upcoming Meetings

Workshop #3 will be held February 17th and 18th in Frankfort.

Public Open House #2 will be scheduled in Workshop #3 and the Technical Committee will manage the logistics for that meeting as before.

Public Comment Period

Comments or question were addressed to the BWSC and OBG by the following individuals. A tape recording was made of this part of the Workshop to preserve the record and can be accessed at the BGADD offices in Lexington, Ky.

Dr. Jack Shepherd - Georgetown
Bill Grier - Lexington
Jim Rebman - Lexington
Vicki Ray - Frankfort - KDOW Drinking Branch Manager
Chetan Talwalker - Lexington
Paul Brooks - Lexington

Bluegrass Water Supply Consortium

Public Workshop #2

January 8, 2003

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Clyde P. Baldwin		Baldwin PE@aol.com	Frankfort Plant Board
Dave Pearce	859 498 0166		Mt. Sterling Water & Sewer
Jack W. Shepherd	863-4651		Georgetown Dentist
Vicki Pettus	573-0210	Vicki.Pettus@mail.state.ky.us	KIA
Dan Carey	257-5500	carey@kgs.uky.edu	KGS
Bart Miller	873-2245		City of Versailles
Jim Richmann	258-3175	Jim R@CFUCB.com	Lexington
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Bluegrass Water Supply Consortium

Public Workshop #2

January 8, 2003

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David Carter	78 6277		MapSync
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George Lusby	863-7850	—	Scott Co. Judge Executive
Michael L. Wright	" "	—	Deputy " "

Bluegrass Water Supply Consortium

Public Workshop #2

January 8, 2003

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Joy Tovis	803-7823		GMWSS
Billy Jenkins	"		" "
LARRY HAZLETT	839-5372		CITY Lawrenceburg
Bjnk Sullivan	875 5501		Frankfort Plant Board
VERNON AZEVEDO	859-744-5434		WINCHESTER MUNICIPAL UTILITIES
Tim CALKINS	859 885-9473		City of Nicholasville
John STEINMETZ	859 264-7500		CDP ENGINEERS
Kevin Crump	859-987-2118		city of Paris
Bob Cusher	859 987-2110		City of Paris
Vickie Sewell	502-875-8701	VSewell@dcr.net	Franklin Co. Fiscal Ct.
Mark Thompson	859-753-3464		Nat'l Water Works
JAMES RICE	502-564-3940		Ky. PSC

Bluegrass Water Supply Consortium

Public Workshop #2

January 8, 2003

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Bill Grier	859-223-1285	Bgrier@Insight.BB	—
Melissa McAlister	859-257-1299	mlmcal2@uky.edu	Ky. Water Research Institute
David Hamilton	502-564-2866	David.Hamilton@mail.state.ky.us	Kentucky River Authority
Lance Williams	859-278-5412	lwilliams@hkbellsouth	HKB
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John T. Hoffman	868-9719		" "
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Tony Hanover	502-583-7020	tony.hanover@pch.strand.com	PEIL Engineers Lou Ky 40202
DAVID CARLSTEDT	859-858-4251	Wcarlstedt@aol.com	CITY OF WILMORE

Bluegrass Water Supply Consortium
Public Workshop #2
January 8, 2003

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Stephen Fowler	859-623-2323		Richmond Utilities
Bob Amato			KY PSC
J.R. Williamson	867-3705		Sc. H Co. Gov't.
George Rest			O'Brien + Gere
~~Thomas Dumm~~			~~O'Brien + Gere~~
Ed Donahue			O'Brien + Gere
Tim Kraus			O'Brien + Gere
SHAWN DYER	859-219-1366		CONGRESSMAN FLETCHER
Jane Brown	(502) 695-9800	jbrown@hmbconsultants.com	HMB Engineers
GARY LARIMORE	270.843.2291	g.larimore@krwa.org	Ky Rural Water Association
Carolyn Oldfield	(502) 863-6010 ext. 4		Thoroughbred RC+D / 401 E. Washington St Georgetown, KY 40324
Ed Neal	502-564-3410		DOW -
Andy Mead	859 231-3319	amead@herald-leader.com	Herald-Leader

Bluegrass Water Supply Consortium
Public Workshop #2
January 8, 2003

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Devon Hankins	502-564-8100 x559	devon.hankins@lrc.ky.us	LRC
Leon Smothers	502-564-3410	leon.smothers@mail.state.ky.us	Manager, Water Resources, Division of Water
HERBBIE BANNISTER	502 875 4501	HBANNISTER@FEWPB.COM	PLANT BOARD (FRANKFORT)
Jas Sekhon	859-269-8021		Bluegrass ~~[illegible]~~ Exec Dir.
Luttrell C. James	863-5578		self
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Thomas Dumm	301-620-7086	DUMMTG@OTB.com	OTB
LINDA BEIDWELL			
Jim McClanahan	863-7850	Judge's Office	Scott Co. Magistrate
Bob Riddle			GMWSS
Mary Jane Warner			East Ky Power

BGADD
Bluegrass Area Development District

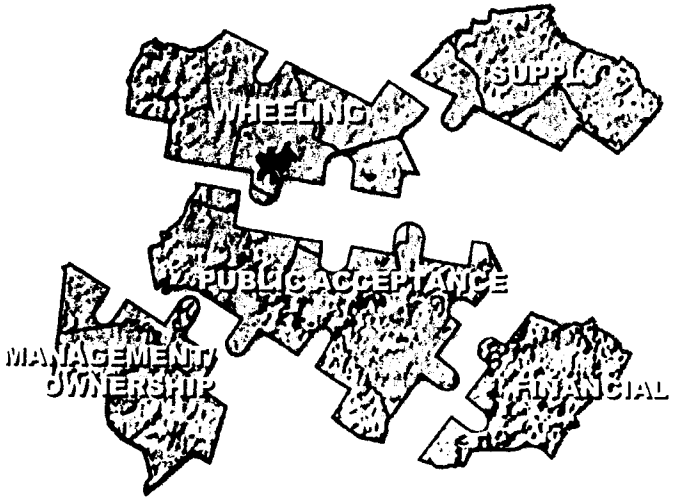
Bluegrass Water Supply Consortium

Water System Regionalization Feasibility Study

Workshop No. 2
Benchmarking/Data Collection
January 8, 2003

CDP Carter Dixon Partners | O'Brien & Gere Engineers, Inc | MapSync

Solving the Bluegrass Area Water Supply Puzzle



BGADD/BWSC Objectives

- Implementing a Management/Ownership approach which is fair and flexible
- Tapping highly reliable sources of supply
  - To be available within 3 to 5 years
- Optimizing regional water supplies through a grid network
- A financial plan that is affordable, and fairly apportions costs
- Effectively communicating the process and findings

Workshop No. 2 Objectives

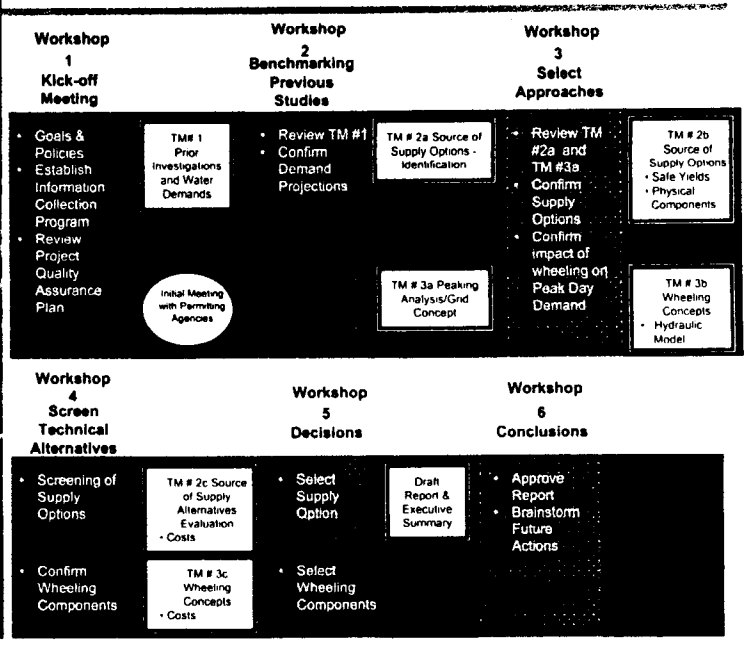
- Briefing
  - Agency Meetings/Data Collection & Review
  - Benchmarking Survey
- Solicit Input on:
  - Demand Projection
  - Source of Water Supply Evaluation Criteria
  - Decision Making Process
  - Organizational Options
  - Strategic Issues
  - Scheduling Near Term Meetings

Recent Activities

- Agency Meetings
  - US Army COE/KRA 12/11/02
  - Ky Division of Water 12/12/02
  - Ky River Authority 12/16/02
- Data Collection and Review
- Organizational/Financial Benchmarking Survey
- Proposed Decision Making Strategy

Source of Supply/Wheeling

Source of Supply/Wheeling



Source of Supply

KRA / Army COE Meetings

- KRA supports raising Dam 10 by 4 to 6 feet
  - reduces storage deficit by 1.0 to 1.6 BG
  - cellular dam along upstream face of existing dam/ no lock
  - total cost $24 million, State share is 20% plus land costs
- Dam 10 target completion date is 2008
  - assumes no significant environmental or permitting problems

Source of Supply

KRA / Army COE Meetings (continued)

- Raising Dam 9 also being considered
  - similar approach and cost
  - no funding identified
  - no schedule

Source of Supply

KRA / Army COE Meetings (continued)

- KRA will contract for a new dynamic river model
  - about a year or more away
  - may be used by KDOW for future withdrawal permits
- KRA understands benefit (reliability) of second major source of water supply

Source of Supply

KDOW Meeting

Permits based on:

- 7Q10 to protect aquatic life/ Ky River Studies allowed lower pass-by flows
- Valve operating plan
- Harza's hydrologic model
- Restricted demand
  - Minimum essential usage below the 7Q10 threshold

New Permits will require:

- Updated environmental study

Source of Supply

KDOW Meeting (Continued)

Out-of-Basin transfers and other considerations:

- provided the user controls the transfer
- treated effluent handled like out-of-basin transfer
- user can withdraw (negative consumptive use) what they put in

Source of Supply

How Average and Peak Demand Projections Are Typically Used:

Water Storage Components	Average Day	Drought Demand	Maximum Day	Maximum Hour/Fire Flow
Source of Supply • With Storage	✓			
Source of Supply • Run-of-River or Groundwater			✓	
Source of Supply • KY River Pools 4-14		?		
Water Treatment Plant			✓	
Pumping & Transmission			✓	✓
Finished Water Storage				✓
Distribution				✓

Source of Supply

Projected Supply Deficits for KY River Users (2020)

- **Maximum Day Permit Deficit** = 155 mgd demand - 117 mgd permitted withdrawal = **38 mgd (KAWC = 63%)**
- **Worst-case Drought Deficit** = 155 mgd demand - 60 mgd permitted drought withdrawal = **95 mgd (KAWC = 55%)**
- **Hybrid Drought Deficit** = 118 mgd hybrid maximum day demand - 60 mgd permitted drought withdrawal = **58 mgd (KAWC = 50%)**

Source of Supply

Projected Supply Deficits for BWSC (2020)

- **Maximum Day Permit Deficit** = 181 mgd demand - XX mgd permitted withdrawal = XX **mgd**
- **Worst-case Drought Deficit** = 181 mgd demand - XX mgd permitted drought withdrawal = XX **mgd**
- **Hybrid Drought Deficit** = 142 mgd hybrid maximum day demand - XX mgd permitted drought withdrawal = XX **mgd**

Source of Supply

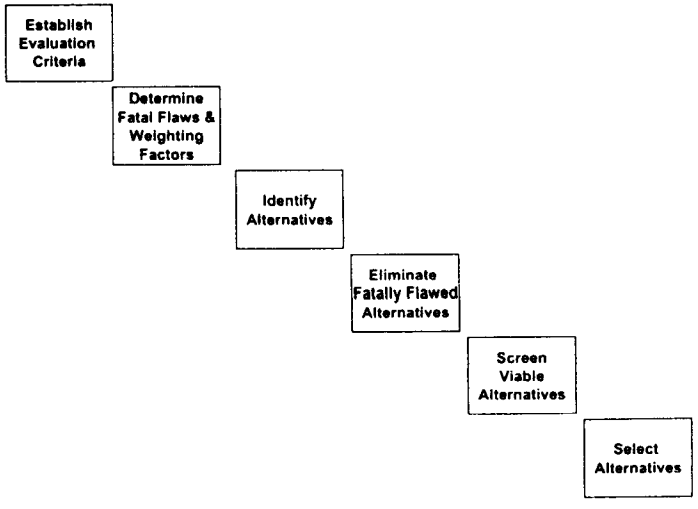
Key Issues
Quantity Needs

Issue:

- How to determine the quantity needs, given these strategic issues:
  - Address both drought deficit and non-drought deficit
  - Demand Projections...use KAWC drought peak factor?
  - Interruptibility...use minimum permitted withdrawal?
  - Planning Period...2020 is a short window...consider it as a minimum?

Source of Supply

Water Supply Selection Process



Source of Supply

Key Issues
Decision Process

Issue:

- How to consider BWSC input in evaluating Water Supply Alternatives?

Options (In order of increasing BWSC input):

- Agree on Evaluation Criteria
- ***Input*** on Evaluation Criteria ***Weighting***
- ***Consensus*** on Evaluation Criteria ***Weighting***
- ***Input*** on Water Supply Alternative ***Selection***
- ***Consensus*** on Water Supply Alternative ***Selection***

Source of Supply

Key Issues
Decision Process

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Options (In order of increasing BWSC input):

- Agree on Evaluation Criteria
- ***Input*** on Evaluation Criteria ***Weighting***
- ***Consensus*** on Evaluation Criteria ***Weighting***
- ***Input*** on Water Supply Alternative ***Selection***
- ***Consensus*** on Water Supply Alternative ***Selection***

Source of Supply

Source of Supply
Draft Evaluation Criteria

- Adequate Capacity
  - ✓ non-interruptible/reliable
- Raw/Finished Water Quality
- Cost
- Implementability / Risk of Delays
  - ✓ permittable
  - ✓ public acceptance
  - ✓ property acquisition
  - ✓ constructable
- Flexibility
  - ✓ phased implementation

Other Criteria?

Source of Supply

Evaluation Criteria

Adequate Capacity - Reliable quantity of raw water and finished water to meet projected demands through the planning period. This criterion addresses interruptibility of sources of supply.

Source of Supply

Evaluation Criteria

Raw/Finished Water Quality - Raw and finished water quality that meets existing water quality requirements, and can readily achieve future anticipated regulations. This criterion may also address water quality preferences such as superior raw water quality, finished water taste, and potential "grid" issues such as impact from mixing multiple supplies.

Source of Supply

Evaluation Criteria

Cost - The present worth cost for proposed raw and finished water improvements, including capital, operating and maintenance costs. This cost could include allowance for additional KRA funding for out-of-basin transfers.

Source of Supply

Evaluation Criteria

Implementability - The relative ease of implementing the proposed improvements in time to meet projected demands. This criterion considers the potential that regulatory permitting, public acceptance, property acquisition, or constructability issues could delay implementation.

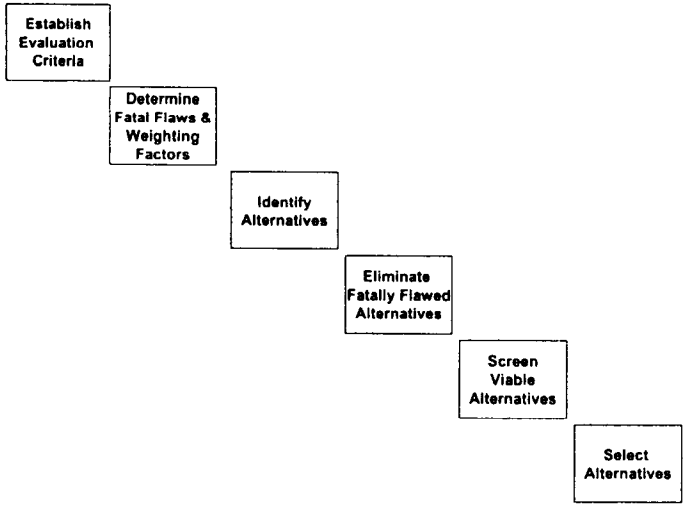
Source of Supply

Evaluation Criteria

Flexibility/Expandability - The ability to phase implementation and spread the cost over time, while still meeting projected demands. This criterion addresses ability to expand beyond the planning period and the entrance/exit of BWSC members.

Source of Supply

Water Supply Selection Process



Source of Supply

Potential Fatal Flaws

- Adequate Capacity
  - **Less than 10 mgd**
- Raw/Finished Water Quality - none likely
- Cost - none likely
- Implementability / Risk of Delays
  - **Delays beyond *3-5* years?**
- Flexibility - none likely

Other Criteria?

Source of Supply

Weighting Factors

Issue:

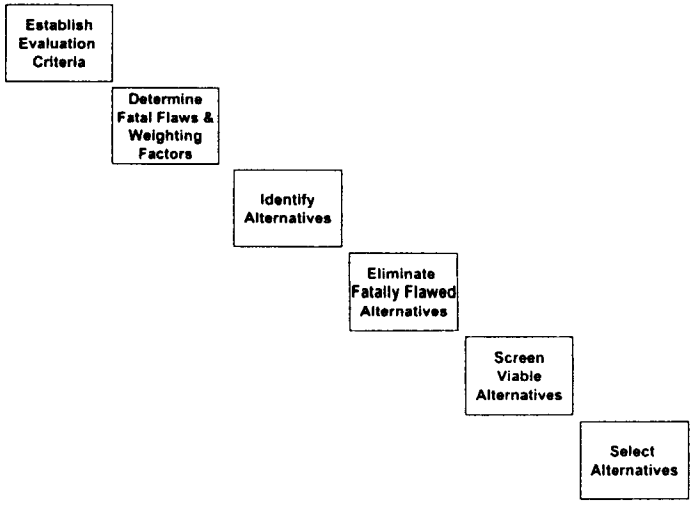
- How to consider BWSC input in evaluating Water Supply Alternatives?

Options (In order of increasing BWSC input):

- Agree on Evaluation Criteria
- ***Input*** on Evaluation Criteria ***Weighting***
- ***Consensus*** on Evaluation Criteria ***Weighting***
  - pair wise comparison technique
- ***Input*** on Water Supply Alternative ***Selection***
- ***Consensus*** on Water Supply Alternative ***Selection***

Source of Supply

Water Supply Selection Process



Source of Supply

Screening / Selection Process

Issue:

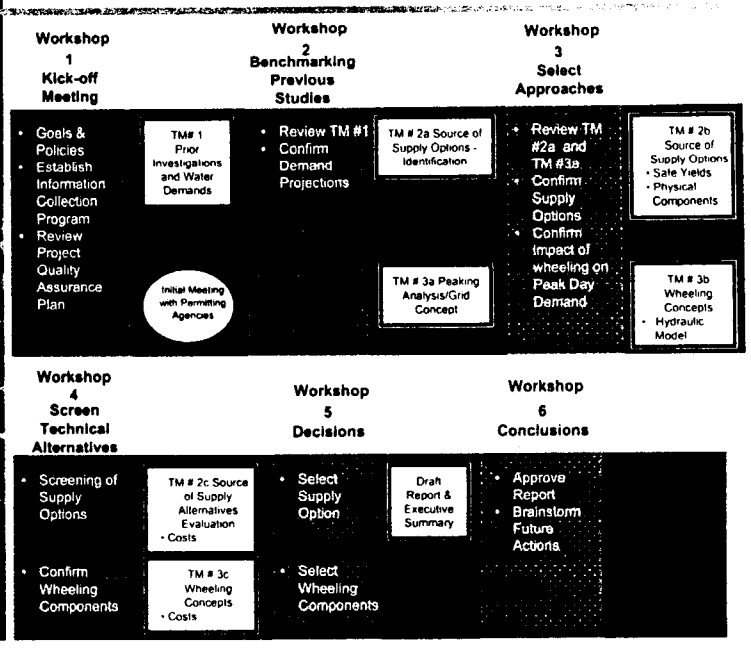
- How to consider BWSC input in evaluating Water Supply Alternatives?

Options (In order of increasing BWSC input):

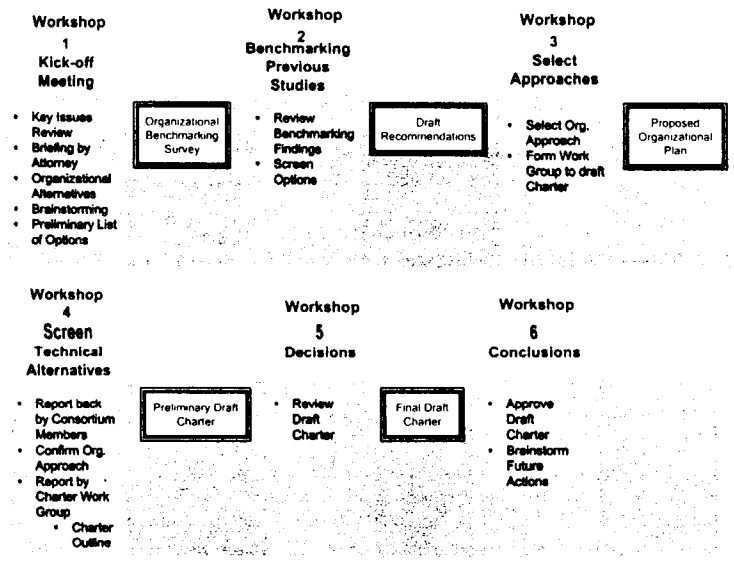
- Agree on Evaluation Criteria
- ***Input*** on Evaluation Criteria ***Weighting***
- ***Consensus*** on Evaluation Criteria ***Weighting***
- ***Input*** on Water Supply Alternative ***Selection***
- ***Consensus*** on Water Supply Alternative ***Selection***
  - each alternative scored by all members?

Source of Supply/Wheeling

Source of Supply/Wheeling



Management / Ownership



Organizational Priorities

- Maximum Local Control
- Eligibility for Tax-Exempt Debt
- Maximum Eligibility for State/Federal Funds
  - Grants
  - Low Interest Loans
- Minimum Regulation by External Parties
  - PSC
  - Other Kentucky Agencies
  - Feds

Desirable Organizational Structure Attributes

- Flexibility
- Simplicity
- Public Acceptability
- Adjustability

Organizational Alternatives

- New traditional public agency under existing Kentucky Revised Statutes
  - Regional Water Commission
    - KRS 74.430
    - KRS 74.420 - KRS 74.520
  - Interlocal Cooperation Agreement (KRS 65.210)
  - Instrumentality of Governmental agencies
- New public agency requiring special legislation
- Existing public agency such as KRA, KIA

Organizational Alternatives

(cont)

- Non-public agency
  - Non-Profit Corporation (KRS Chapter 273)
  - Contractual Agreement (Contract Law)
  - Partnership (KRS Chapter 362)
  - Unincorporated Association (Misc. Laws & Cases)
- Other Alternatives

ORGANIZATIONAL ALTERNATIVES MATRIX

Organizational Alternatives	Advantages	Disadvantages
New Traditional Public Agency under Existing Kentucky Revised Statutes	• Viewed as Public Agency • Minimizes need for new legislation	• Does not provide customized approach
Instrumentality of Governmental Agencies	• Viewed as Public Agency • Minimize need for new legislation	• Novel use of this approach • May be subject to PSC
New Public Agency Requiring Special Legislation	• Allows customized approach to charter, membership, voting rights, oversight, etc.	• May require more time to create
Existing Public Agency such as KRA, KIA	• Use existing organization	• Each existing organization already has a specific mission • New mission may present conflicts • Less local control
Non-Public Agency (Non-Profit Corporation)	• Broad Powers • Flexible Purposes	• May not be viewed as "regional" approach • Not a public agency —no tax exempt debt —less public acceptance —subject to PSC

"Best" Features Identified

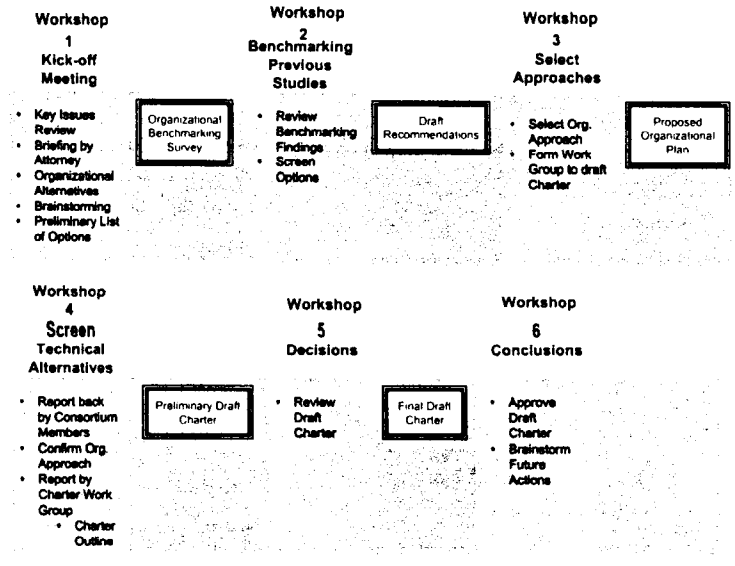
- Board of Directors
  - Independent
  - Fair Representation for all Members
  - Continuity
  - Policy Level/No Micro-Management
- Regional Agency Owns the Infrastructure
- Rates
  - Set By Board
  - Uniform (Wholesale) Rates
  - Regular Review and Revision

"Best" Features Identified

(cont)

- Financing
  - Revenue Bonds
  - Grant Eligibility
- Advisory Board
  - Larger Agencies
- Strong Management Teams

Management / Ownership



Political/ Public Outreach

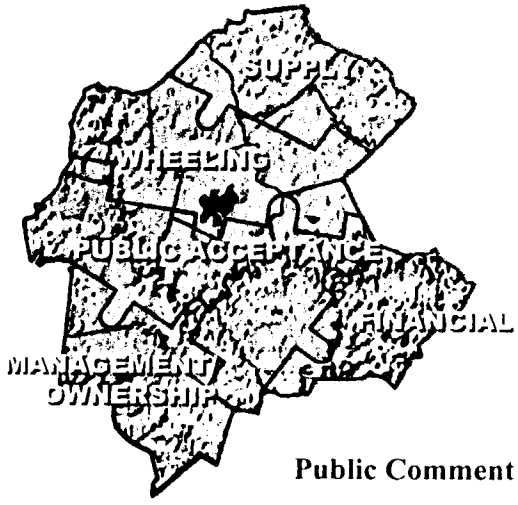
Communications/Public Outreach Key Issues

- When should we form a work group to address legislative issues?
- Should BWSC representatives brief their elected officials/management?
- Others?

Communications/Public Outreach Near Term Schedule

- Workshop No. 3 ***Identifying Alternatives/Options*** (February 18, 2003)
- Workshop No. 4 ***Screen Technical Approaches*** (May 1st ?)
- Public Meeting No. 2 (? weeks after Workshop No. 4)

Solving the Bluegrass Area Water Supply Puzzle



Public Comment Period

Workshop No. 3 – Identifying Options/ Preliminary Screening

Bluegrass Water Supply Consortium
Workshop Number 3
Identifying Options/Preliminary Screening
March 14, 2003
AGENDA

9:00 AM Welcome and Introductions

- Review of Minutes from January 8, 2003; Workshop No. 2
- Summary of activities since last meeting
- Objectives for this Workshop

9:15 Confirming Demand Data/Required Supply

- Revised demand data (based on feedback since last meeting)
- "Bookends" for additional supply
  - Kentucky River Supplies
  - All Consortium Members
- Peak day demand analysis

9:45 Wheeling

10:15 Screening Process
Confirm evaluation criteria

- Confirm weighting factors
- Review screening process
  - Fatal flaw screening
  - Future screening
  -

10:50 Public Comment Period (Maximum 15 minutes)

11:05 Identifying Source of Supply Options

- Sources of information
- List of source supply options
  - Grouping of similar options
    - Description of each option or "similar grouping" of options

Noon Lunch Break

1:15 PM Identifying Source of Supply Options-(continued from morning)

- Feedback on source of supply options
  - Identify missing options
  - Clarification to descriptions
- Confirm list of source of supply options for "Fatal Flaw Screening"
- Preliminary Screening-identification of near term and longer term options
  - Refine definition of near term "3-5 year" option
  - Categorization of options into near term and longer term groups
  - Screen near term options based on capacity
  - Confirm list of remaining near term options
  - Discussion on longer term options
  - Decision process review

2:50 Public Comment Period (Maximum 20 minutes)/ 10 Minute Break

3:20 Organizational Options
  - Review benchmarking report
  - Identify 2-3 preferred options
  - Review applicability of preferred organizational options to remaining source of supply options
  - Work Group Formation for interaction with State Legislature?

3:50 Communications/Public Outreach
- Roles & Responsibilities
- Near Term Actions
  - Informational Mailing?

4:10 Upcoming meetings
Workshop No. 4
Public Meeting No. 2
Other

4:20 Public Comment Period (Maximum 20 minutes)

4:40 Wrap Up
- Next Meeting
- Action Item Summary
- Feedback on Workshop No. 3 and Suggestions for Workshop No. 4
  - Format
  - Content

Summary BWSC Workshop #3
March 14, 2003
Buffalo Trace Distillery Conference Center
1001 Wilkinson Boulevard
Frankfort, KY

Attendees: BWSC Participants

Attachments: Revised Microsoft PowerPoint Presentation was distributed to BWSC participants.

Introduction

The Bluegrass Water Supply Consortium held Workshop #3 on March 14, 2003 to discuss the status of the work performed on the Water System Regionalization Feasibility Study. The workshop was organized according to the following topics:

- Water demands/supply
- Wheeling of water
- Screening process for water supply sources
- Identification of water supply sources
- Management and organizational options
- Communication/Public outreach
- Upcoming meetings
- Public comments

A brief summary of the key discussions for each of these areas follows.

Water Demands/Supply

This portion of the presentation identified the current and future water demands and the adequacy of existing supplies which defines the current and projected supply deficits.

Adequate Capacity

The projected deficits in water supply are based on the current permits for the KY River users. KDOW withdrawal permit values will be used and relied upon to define interuptibility. The permits are not all consistent in terms of the stepdown (tiered) rates to the floor level.

Some of the KY River users have tiered permits based on flow conditions in the river while others do not have tiered permits. BWSC participants indicated that KY River users that do not yet have tiered permits may receive tiered permits from KDOW in the future when the permits are renewed. This action would impact (increase) the projected water supply deficit.

For 2020, the 36 mgd deficit between unrestricted maximum day demands in 2020 and the current permit "ceiling" is the "low bookend" in terms of water needs. The 102 mgd drought deficit between the unrestricted maximum day demands in 2020 and the permit "floor" is the " high bookend".

BWSC members agreed with the methodology and results of the peaking analysis. BWSC requested that OBG identify the potential savings associated with the 11 mgd reduction in the 2020 water demand resulting from use of the grid and non-coincident peaking. Except for KAWC which uses approximately a 26% reduction of the unrestricted maximum day demand, the remaining BWSC members agreed that a 15% reduction in their unrestricted 2020 maximum day demands was appropriate. This "hybrid" drought deficit is 67 mgd and represents the difference between restricted 2020 maximum day water demands and the permit "floor". OBG and the BWSC members agreed that 2020 is a short planning period for a major water supply study. The study should also identify which options look best beyond 2020. However, BGADD has no longer-term population or demand projections available. For the demand projections beyond 2020, it was agreed to add 20 mgd per decade as the basis for defining demands beyond 2020.

The net result is a near term (2020) "hybrid" need for 67 mgd of additional supplies, and a longer term target of 100 mgd or more.

Cost

Concept level costs will be developed for the components that make up each alternative. Emphasis will be placed on differential costs for the alternatives.

KRA funding allowances (including allowances for new out-of-basin sources that do not currently incur KRA fees) will be included in the costs for alternatives. OBG should set up the data files such that the KRA fees can be easily removed at a later date. This approach is part of ensuring that the costs of preserving the river as reliable source are met.

Wheeling

John Steinmetz reported that development of the grid network model is essentially complete and includes piping 12 inches in diameter and larger. The above demand projections will now be used to analyze the grid alternatives.

Screening Process for Water Supply Sources

BWSC members recognize that alternatives may be made up of one or many projects and they agreed that the smallest project must produce at least 10 mgd of "new water". One screening criterion for the plans will be that they should accomplish some demonstrated relief from the demand deficit within 3 - 5 years. The timeline would start when the alternative is selected.

BWSC members agreed with the weighting established by the Technical Group for the evaluation criteria.

BWSC member agreed that OBG and the Technical Group (with input form the entire BWSC) would do separate and independent evaluations of the alternatives and this information would be presented at Workshop No. 4.

Identification of Water Supply Sources

- BWSC members noted that the Scott County Reservoir will be located in the northwest portion of the County and will be complete in 2004.
- Construction of pumped storage reservoir along the Kentucky River would be added to the list of options. This alternative includes "skimming" high flows from the KY River and storing the water for use during drought conditions.
- OBG will discuss use of the existing reservoirs with the US Army Corps of Engineers.
- Wastewater treatment through wetlands should be added to the list of alternatives.
- High Bridge Dam replaces Dams 8, 9, and 10 on the KY River.
- Include Dam 9 on the KY River as a near-term option. The studies for Dam 9 are as complete as Dam 10. Show Dam 10 as near term.
- Rain barrels/cisterns should be added to the list of water supply alternatives.
- OBG should check with Boone Florence on supply capacity and, if necessary, initiate discussions with Cincinnati.
- OBG should confirm whether pumpback flow from lower pools on the KY River can be used.

Management and Organizational Options

Ed Donahue and Damon Talley presented information on management and organizational options. The results of the benchmarking study were presented. Damon identified that it is premature at this stage to determine the makeup of the organization. BWSC members agreed that Ed and Damon should initiate a Task Force with the Technical Group, for the purpose of developing a draft organization charter. The draft charter would be flexible for use with any of the alternative legal structures.

Communications/Public Outreach

Participants were encouraged to keep their elected officials apprised of the BWSC's meetings and decisions. A number of BWSC participants are available to make presentation to elected officials for other participants.

Upcoming Meetings

Workshop No. 4 will be held in May in Nicholasville. Public Meeting No. 2 will be scheduled about 4 weeks later.

Public Comment Period

Comments or question were addressed to the BWSC and OBG. A tape recording was made of this part of the Workshop to preserve the record and can be accessed at the BGADD offices in Lexington, Ky.

BGADD

Bluegrass Area Development District

Bluegrass Water Supply Consortium

Water System Regionalization Feasibility Study

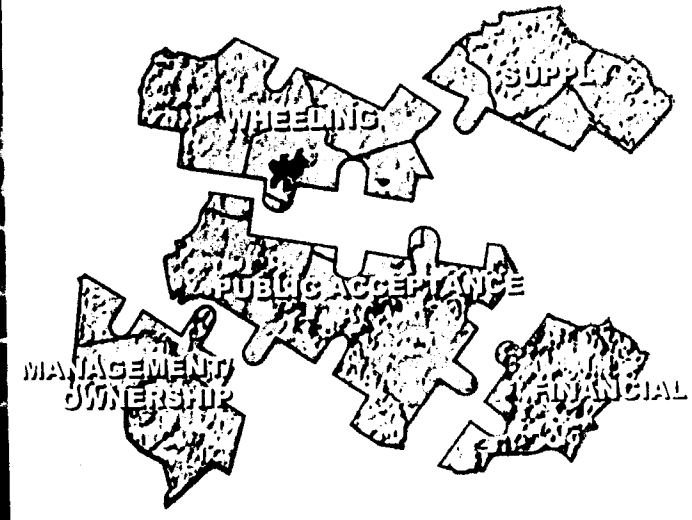
Workshop No. 3
Identifying Options/Preliminary Screening
March 14, 2003

CDP Carter Dixon Partners

O'Brien & Gere Engineers, Inc.

MapSync

Solving the Bluegrass Area Water Supply Puzzle



BGADD/BWSC Objectives

- Implementing a Management/Ownership approach which is fair and flexible
- Tapping highly reliable sources of supply
  - To be available within 3 to 5 years
- Optimizing regional water supplies through a grid network
- A financial plan that is affordable, and fairly apportions costs
- Effectively communicating the process and findings

Workshop No. 3 Objectives

- Briefing:
  - Agency discussions
  - Revised demand projections
  - Peak day demand analysis
  - Wheeling
  - Revised source of water supply evaluation criteria
  - Source of supply options

Workshop No. 3 Objectives

- Solicit input on:
  - Desired quantity of water from grid
  - Fatally-flawed water supply options
  - Future screening process for water supply options
  - Grid system ownership
  - Organizational options
  - Scheduling near term meetings

Recent Activities

- Agency Discussions
  - Ky Div. of Water, Drinking Water Branch 1/23/03
  - USGS 1/23/03
- Data Collection and Review - Source of Supply Options
- Organizational/Financial Benchmarking Draft report

KDOW - Drinking Water Branch

Primary Discussion Focus:

- Distribution system water quality
  - Disinfection by-products (***DBP's***)
- Responsibility for distribution water quality in a grid system
  - Consecutive systems

Conclusion:

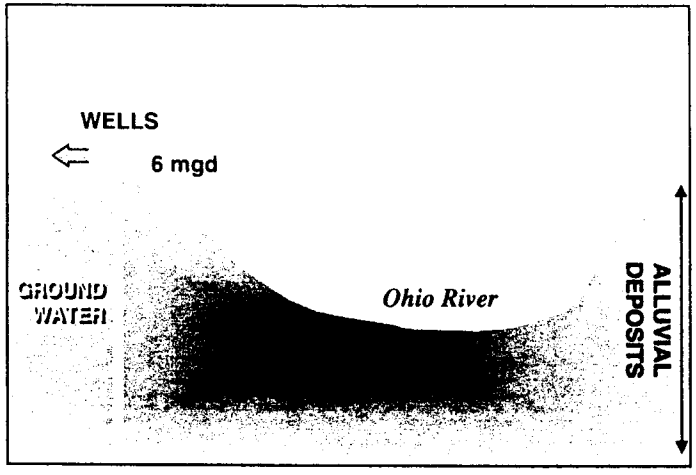
- Study should identify whether source decision is likely to impact ability to meet DBP limits
- BWSC/KDOW should address responsibility for distribution water quality (in future?)

USGS Discussion

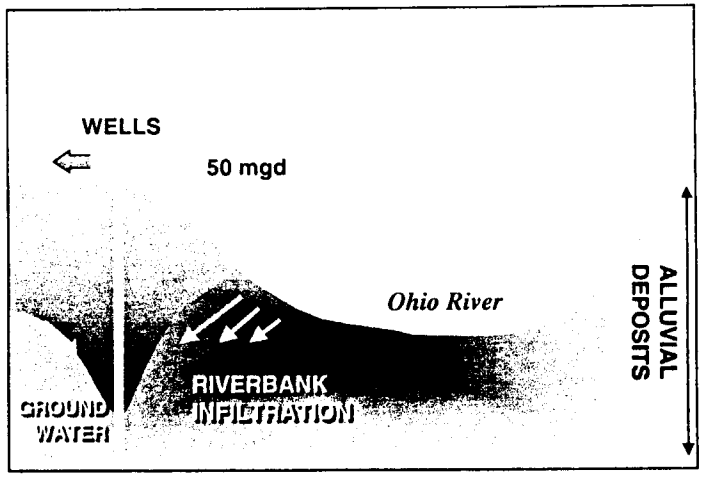
USGS provided helpful information:

- Riverbank aquifers
- Hydrologic (stream) data
- Wealth of experience

Ground Water



Riverbank Infiltration



How Average and Peak Demand Projections Are Typically Used:

Water Components	Average Day	Drought Demand	Maximum Day	Maximum Hour/Fire Flow
Source of Supply • With Storage	✓			
Source of Supply • Run-of-River or Groundwater			✓	
Source of Supply • KY River Pools 4-14		?		
Water Treatment Plant			✓	
Pumping & Transmission			✓	✓
Finished Water Storage				✓
Distribution				✓

Projected Supply Deficits for BWSC (2020)

- **Maximum Day Permit Deficit** = 169 mgd demand - 133 mgd permitted withdrawal = **36 mgd**
- **Worst-case Drought Deficit** = 169 mgd demand - 67 mgd permitted drought withdrawal = **102 mgd**
- **Hybrid Drought Deficit** = 134 mgd hybrid maximum day demand - 67 mgd permitted drought withdrawal = 67 **mgd**

Source of Supply

Key Issues
Quantity Needs

Issue: ***(Answers from Workshop No. 2)***

How to determine the quantity needs, given these strategic issues:

- Address both drought deficit and non-drought deficit
  - ***Yes***
- Demand Projections…**use KAWC drought peak factor and 15% conservation reduction for others**.
- Interruptibility…use minimum permitted withdrawal?
  - ***Yes***
- Planning Period…2020 is a short window…consider it as a minimum? ***Yes***

Source of Supply

Key Issues
Quantity Needs

Issue:

- Confirm desired quantity
  - Potential to want ***more*** or ***less*** ? BWSC members agreed to current projections with intent to facilitate future growth beyond 2020.

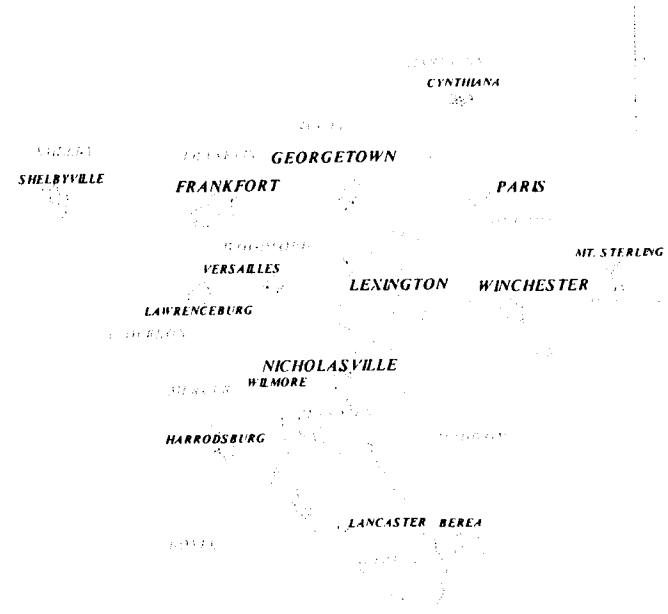
Source of Supply

Peak Day Demand Analysis

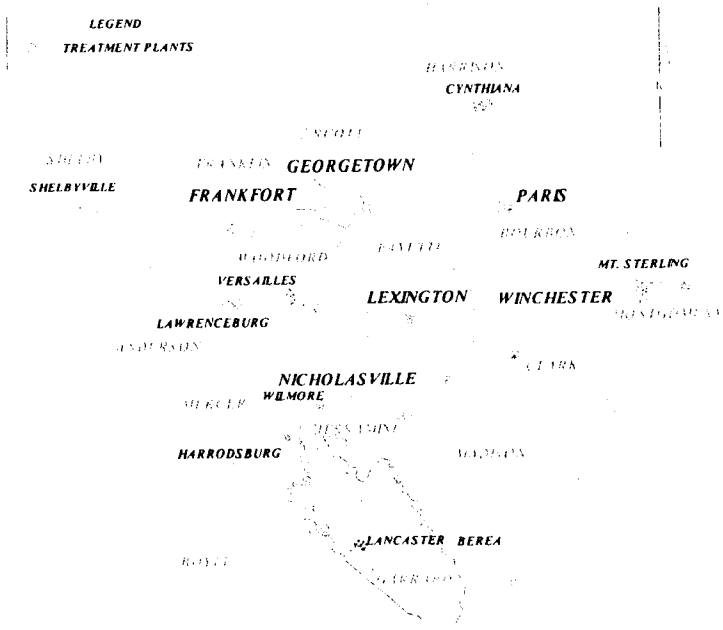
Findings and Conclusions:

- Grid system will attenuate peaks
  - Reduce 2020 maximum day demand by 11 mgd (168 mgd individual historical peaks to 157 mgd aggregated coincident peaks)
- Bluegrass Area peaks are sustained, multiple day events
  - BWSC should plan on using maximum day water demand

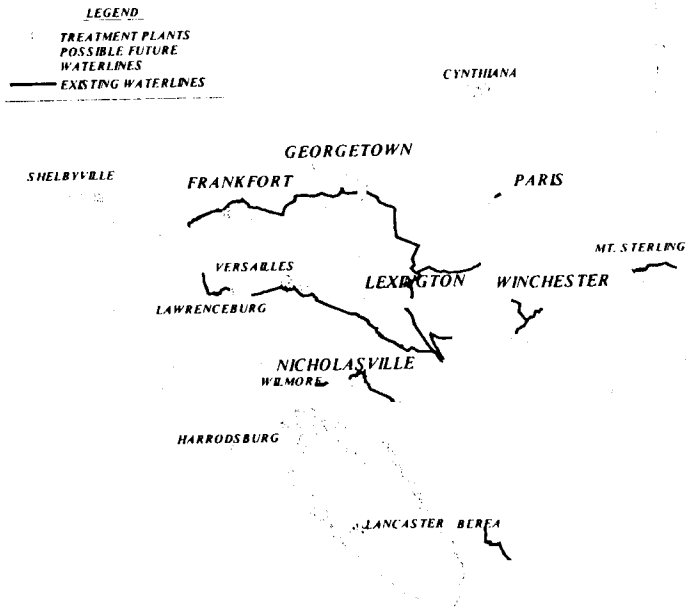
Wheeling



Wheeling

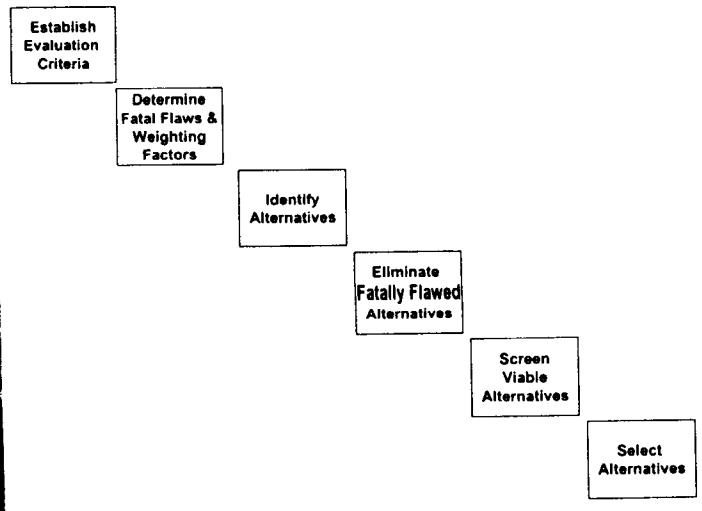


Wheeling



Source of Supply

Water Supply Selection Process



Source of Supply

Key Issues
Decision Process

Issue:

- How to consider BWSC input in evaluating Water Supply Alternatives?

Options (In order of increasing BWSC input):

- Agree on Evaluation Criteria
- ***Input*** on Evaluation Criteria ***Weighting***
- ***Consensus*** on Evaluation Criteria ***Weighting***
- ***Input*** on Water Supply Alternative ***Selection***
- ***Consensus*** on Water Supply Alternative ***Selection***

Source of Supply
Draft Evaluation Criteria

- Adequate Capacity
  - ✓ non-interruptible/reliable
- Raw/Finished Water Quality
- Cost
- Implementability / Risk of Delays
  - ✓ permittable
  - ✓ public acceptance
  - ✓ property acquisition
  - ✓ constructable
- Flexibility
  - ✓ phased implementation

Evaluation Criteria

Adequate Capacity - Reliable quantity of raw water and finished water to meet projected demands through the planning period. This criterion addresses interruptibility of sources of supply.

Evaluation Criteria

Raw/Finished Water Quality - Raw and finished water quality that meets existing water quality requirements, and can readily achieve future anticipated regulations. This criterion may also address water quality preferences such as superior raw water quality, finished water taste, and potential "grid" issues such as impact from mixing multiple supplies.

Evaluation Criteria

Cost - The present worth cost for proposed raw and finished water improvements, including capital, operating and maintenance costs. This cost could include allowance for additional KRA funding for out-of-basin transfers.

Source of Supply

Evaluation Criteria

Implementability - The relative ease of implementing the proposed improvements in time to meet projected demands. This criterion considers the potential that regulatory permitting (including environmental considerations), public acceptance, property acquisition, or constructability issues could delay implementation.

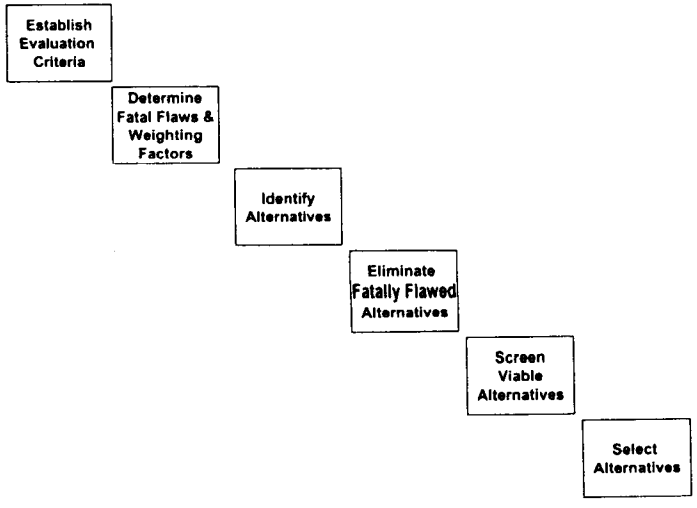
Source of Supply

Evaluation Criteria

Flexibility/Expandability - The ability to phase implementation and spread the cost over time, while still meeting projected demands. This criterion addresses ability to expand beyond the planning period and the entrance/exit of BWSC members.

Source of Supply

Water Supply Selection Process



Source of Supply

Weighting Factors

Issue:

- How to consider BWSC input in evaluating Water Supply Alternatives?

Options (In order of increasing BWSC input):

- Agree on Evaluation Criteria
- ***Input*** on Evaluation Criteria ***Weighting***
- ***Consensus*** on Evaluation Criteria ***Weighting***
  - pair wise comparison technique
- ***Input*** on Water Supply Alternative ***Selection***
- ***Consensus*** on Water Supply Alternative ***Selection***

Source of Supply

Potential Fatal Flaws

- Adequate Capacity
  - **Less than 10 mgd**
- Raw/Finished Water Quality - none likely
- Cost - none likely
- Implementability / Risk of Delays
  - **Delays beyond *3-5* years *"meaningful progress"***
- Flexibility - none likely

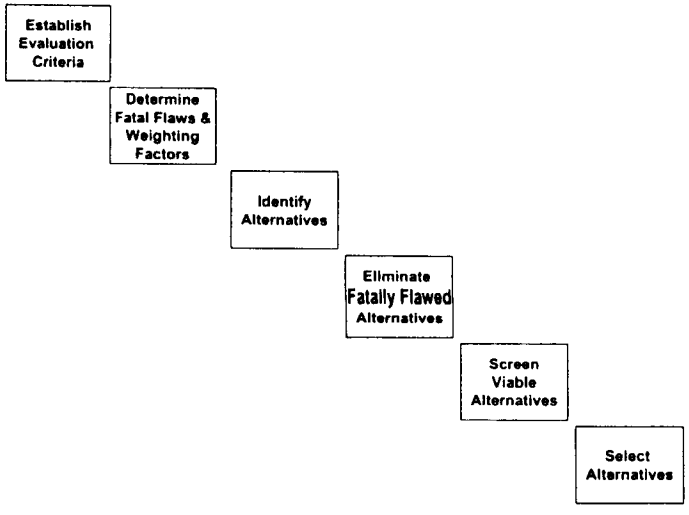
Source of Supply

Potential Fatal Flaws

- Implementability / Risk of Delays
  - **Delays beyond *3-5* years? *"meaningful progress"***
    - Ability to secure approvals/required permits within 2 years
    - Ability to design, construct, and put in service within an additional 3-4 years

Source of Supply

Water Supply Selection Process



Source of Supply

Developing Cost Estimates (Workshops 4 & 5)

- Concept Level Costs
  - Typical unit costs
    - dams, reservoirs, intakes
    - wells
    - water treatment plants
    - pumping stations
    - pipelines
  - Compare with previously reported costs

Developing Cost Estimates (Workshops 4 & 5) - *Continued*

- Concept Level Costs - *Continued*
  - Differential operating costs
    - water purchase
    - water treatment
    - pumping (power)
  - Spreadsheet model for "sensitivity testing"
    - present worth, 20 years, 3% "real interest"

Screening Near Term Alternatives (Workshop 4)

- Matrix summary of evaluation criteria:
  - Quantity
  - Water Quality
  - Cost
  - Implementability
  - Ability to Phase
- Score using weighting factors

Screening Near Term Alternatives (Workshop 5)

- ***Continued***
  - Select top options for more detailed study:
    - Pre-negotiation for water purchases
    - Preliminary routing for pipelines
    - Regulatory agency discussions
    - Hydraulic analysis of grid

Screening / Selection Process

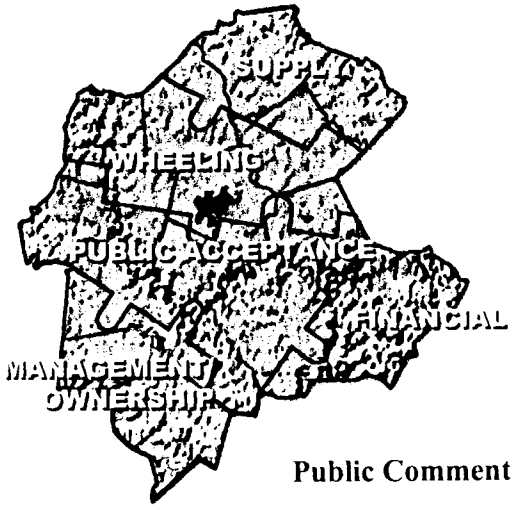
Issue:

- How to consider BWSC input in evaluating Water Supply Alternatives?

Options (In order of increasing BWSC input):

- Agree on Evaluation Criteria
- ***Input*** on Evaluation Criteria ***Weighting***
- ***Consensus*** on Evaluation Criteria ***Weighting***
- ***Input*** on Water Supply Alternative ***Selection***
- ***Consensus*** on Water Supply Alternative ***Selection***
  - each alternative scored by all members?

Solving the Bluegrass Area Water Supply Puzzle



Public Comment Period

Source of Supply Options

- Ohio River
- Kentucky River
- Existing Reservoirs
- New Reservoirs
- Groundwater

Source of Supply Options

- Ohio River
  - Purchase finished water options
    - Cincinnati Water Works
    - Boone Florence Water Commission
    - Louisville Water Company
    - Northern KY Water District

Source of Supply Options

- Ohio River
  - Raw water options
    - New WTP at Maysville/Dover
    - New WTP at Warsaw
    - Raw water withdrawals with treatment in central KY

Source of Supply Options

- Kentucky River
  - Raise Dams 9, 11, 12, and 14
  - Raise Dam 10
  - New Dams 10A or 12A
  - High Bridge Dam
  - Pumpback from lower pools (3 or below) to upper pools (4 or above)
  - Dredge KY River
  - New WTP at Pool 3 or lower

Source of Supply Options

- Existing Reservoirs
  - Buckhorn Lake
  - Cave Run Lake Diversion
  - New WTP at Cave Run Lake
  - Lake Cumberland Diversion
  - New WTP at Lake Cumberland
  - Herrington Lake
  - New WTP at Herrington Lake
  - Scott County Reservoir

Source of Supply Options

- New Reservoirs
  - Station Camp Creek
  - Sturgeon Creek
  - Lower Devils Creek
  - Four Mile Creek
  - Upper Howard Creek
  - Contrary Creek
  - Eagle Lake
  - Eagle Creek Lake

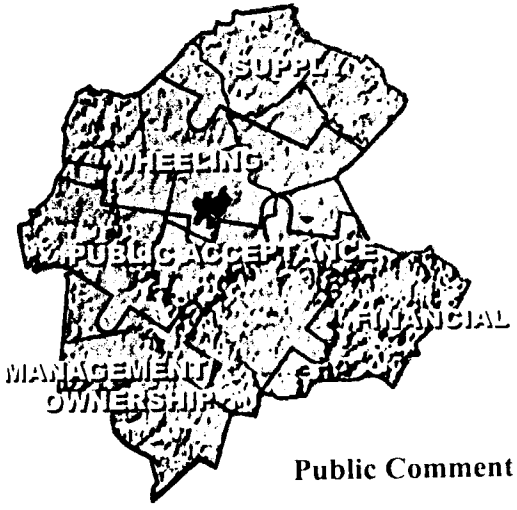
Source of Supply Options

- New Reservoirs (continued)
  - Boonesville Reservoir
  - Muddy Creek Dam
  - Walkers Creek Dam
  - Jackson County Reservoir

Source of Supply Options

- Groundwater
  - Aquifer near Carrollton
    - Purchase water from Carrollton or CCWD#1
    - BWSC well system
  - Aquifer near Maysville
    - Purchase water from Greater Fleming
    - BWSC well system
  - Indiana wells across Ohio River from Louisville
  - Groundwater other than along Ohio River

Solving the Bluegrass Area Water Supply Puzzle



Public Comment Period

Organizational Priorities

- Maximum Local Control
- Eligibility for Tax-Exempt Debt
- Maximum Eligibility for State/Federal Funds
  - Grants
  - Low Interest Loans
- Minimum Regulation by External Parties
  - PSC
  - Other Kentucky Agencies
  - Feds

Desirable Organizational Structure Attributes

- Flexibility
- Simplicity
- Public Acceptability
- Adjustability

Organizational Alternatives

- New traditional public agency under existing Kentucky Revised Statutes
  - Regional Water Commission
    - KRS 74.430
    - KRS 74.420 - KRS 74.520
  - Interlocal Cooperation Agreement (KRS 65.210)
  - Instrumentality of Governmental agencies
- New public agency requiring special legislation
- Existing public agency such as KRA, KIA

Organizational Alternatives

(cont)

- Non-public agency
  - Non-Profit Corporation (KRS Chapter 273)
  - Contractual Agreement (Contract Law)
  - Partnership (KRS Chapter 362)
  - Unincorporated Association (Misc. Laws & Cases)
- Other Alternatives

ORGANIZATIONAL ALTERNATIVES MATRIX

Organizational Alternatives	Advantages	Disadvantages
New Traditional Public Agency under Existing Kentucky Revised Statutes	• Viewed as Public Agency • Minimizes need for new legislation	• Does not provide customized approach
Instrumentality of Governmental Agencies	• Viewed as Public Agency • Minimize need for new legislation	• Novel use of this approach • May be subject to PSC
New Public Agency Requiring Special Legislation	• Allows customized approach to charter, membership, voting rights, oversight, etc.	• May require more time to create
Existing Public Agency such as KRA, KIA	• Use existing organization	• Each existing organization already has a specific mission • New mission may present conflicts • Less local control
Non-Public Agency (Non-Profit Corporation)	• Broad Powers • Flexible Purposes	• May not be viewed as "regional" approach • Not a public agency —no tax exempt debt —less public acceptance —subject to PSC

"Best" Features Identified

- Board of Directors
  - Independent
  - Fair Representation for all Members
  - Continuity
  - Policy Level/No Micro-Management
- Regional Agency Owns the Infrastructure
- Rates
  - Set By Board
  - Uniform (Wholesale) Rates
  - Regular Review and Revision

"Best" Features Identified

(cont)

- Financing
  - Revenue Bonds
  - Grant Eligibility
- Advisory Board
  - Larger Agencies
- Strong Management Teams

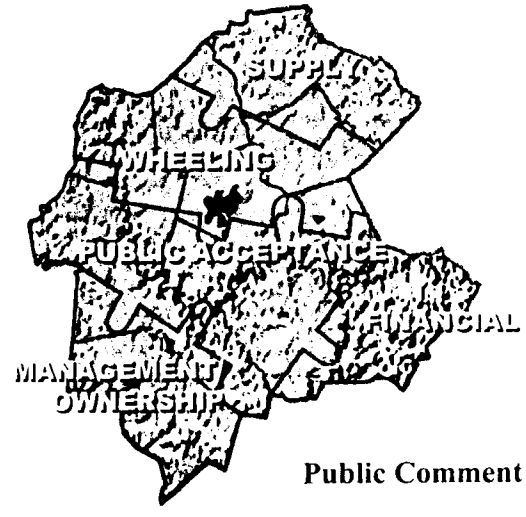
Communications/Public Outreach Key Issues

- When should we form a work group to address legislative issues?
- Should BWSC representatives brief their elected officials/management?
- Others?

Communications/Public Outreach Near Term Schedule

- Informational Mailing
- Workshop No. 4 ***Screen Technical Approaches*** (mid-May)
- Public Meeting No. 2 (4 weeks after Workshop No. 4)

Solving the Bluegrass Area Water Supply Puzzle



Public Comment Period

Workshop No. 4 – Screening Technical Alternatives

Bluegrass Water Supply Consortium
Workshop Number 4
Screening Technical Alternatives
May 28, 2003
AGENDA

9:00 AM Welcome and Introductions

- Review of Minutes from March 14, 2003; Workshop No. 3
- Summary of activities since last meeting
- Objectives for this Workshop

9:15 Review Demand Data/Required Supply

- Additional supply- during drought and during non-drought events

9:20 Wheeling
- Basic Grid Components
- Primary connection points to grid
- Results of preliminary modeling

9:50 Review Screening Process
- Overview
- Evaluation criteria and weighting factors
- Today's focus-Preliminary screening
- Future steps

10:00 Preliminary screening - Source of Supply Options

- List of source of supply options
- Complete the screening-identification of near term and longer term options
  - Definition of near term "3-5 year" option
  - Categorization of options into near term and longer term groups
  - Complete the screening of near term options based on capacity
  - Confirm list of remaining near term options

10:30 Optimizing Use of the Kentucky River
- "Baseline" Kentucky River components
- "Negative Consumptive Use"-as a near term component
- Net required near term source of supply
- Other near term and long term Kentucky River alternatives

10:45 Public Comment Period (Maximum 15 minutes)

11:00 Preliminary Screening Results

- Initial meeting with potential providers of finished water
- Tech Group scoring
- Consultant scoring
- Discussion

Noon Lunch Break

1:15 Preliminary Screening Results (Continued)
- Discussion
- Finalize screening results
- Next steps

2:15 Public Comment Period (Maximum 15 minutes)

2:30 Break (15 minutes)

2:45 Organizational Options
- Review organizational outline
- Framework for charter
- Working Group formation and future plans

3:15 Communications/Public Outreach
- Roles & Responsibilities
- Near Term Actions

3:30 Upcoming meetings
- Workshop No. 5
- Public Meeting No. 2
- Other

3;45 Public Comment Period (Maximum 15 minutes)

4:00 Wrap Up
- Next Meeting
- Action Item Summary
- Feedback on Workshop No. 4 and Suggestions for Workshop No. 5

Summary BWSC Workshop #4
May 28, 2003
Lone Oak Country Club
Nicholasville, KY

Attendees: BWSC Participants

Attachments: Revised Microsoft PowerPoint Presentation was distributed to BWSC participants.

Introduction

The Bluegrass Water Supply Consortium held Workshop #4 on May 28, 2003 to discuss the status of the work performed on the Water System Regionalization Feasibility Study. The workshop was organized according to the following topics:

- Revised water demand data/required supply
- Wheeling of water
- Review screening process for water supply sources
- Preliminary screening - source of supply options
- Optimizing use of the Kentucky River
- Preliminary screening results
- Organizational options
- Communication/Public outreach
- Upcoming meetings

A brief summary of the key discussions for each of these areas follows.

Revised water demand data/required supply

This portion of the presentation addressed the projected supply deficits for BWCS through 2020.

The projected deficits in water supply are based on the current permits for the KY River users and the projected 2020 water demands. For 2020, there is a 36 mgd deficit between unrestricted maximum day demands in 2020 and the current permit "ceiling". A 102 mgd drought deficit is projected between the unrestricted maximum day demands in 2020 and the permit "floor". A "hybrid" drought deficit is 67 mgd and represents the difference

between restricted 2020 maximum day water demands and the permit "floor". The 67 mgd drought deficit represents the 2020 water supply target.

Wheeling of water

CDP presented the basic configuration of the grid network and described the hydraulic modeling work performed to-date on the wheeling aspects. Versailles identified that there is an existing 18-inch connection between Versailles and the KAWC system that was constructed around 1985 and is not shown on the figures. For the final analysis, CDP will modify the grid to reflect this piping. CDP identified that piping for the future grid network was developed based on delivery of roughly 46 mgd of new source water to various connection points around the grid. CDP reinforced a basic assumption which was that the analyses were based on the existing infrastructure (i.e., no service to customers "outside" of the grid). Sequencing of the construction of the components of the grid network was not defined as part of the analyses.

O'Brien & Gere requested that KDOW generate a list of issues that may impact the wheeling of water (e.g., mixing disinfectants, responsibility for monitoring and control of water quality within the grid, etc.). The Technical Group requested that O'Brien & Gere meet with KDOW to identify issues and be prepared to address these issues at the next Technical Group meeting or at Workshop #5.

Review screening process for water supply sources

The evaluation criteria and the screening process were reviewed. A flowchart showing the screening process for the water supply alternatives was reviewed and included the following steps:

- A fatal flaw analysis was performed for 40 alternatives using adequacy of capacity (greater than 10 mgd) and implementability (delays beyond 3-5 years) to identify fatally flawed alternatives that were eliminated.
- A near-term/long-term analysis was conducted to obtain 16 near-term alternatives and the remaining long-term alternatives were not carried forward for further investigation.
- Preliminary screening of 10 near-term alternatives (6 additional near-term alternatives were eliminated prior to Workshop #4) was performed in Workshop #4 and the preferred and baseline alternatives were to be separated from the other remaining alternatives in Workshop #4.

Preliminary screening – source of supply options

The near-term alternatives carried forward from the fatal flaw analysis conducted in Workshop #3 were reviewed. A number of discussions were held with the USACOE

regarding the potential for use of existing reservoirs in the near term. The feedback from these discussions was:

- Buckhorn Lake and Carr Creek have inadequate unused capacity (greater than 10 mgd).
- Cave Run Lake may be capable of providing 10 mgd, but larger amounts are unlikely.
- Lake Cumberland is hindered due to interbasin transfer and potential impacts to hydropower. This source could be a possible long-term option.
- Herrington Lake appears to have inadequate unused capacity, further discussions may occur.
- Scott County Reservoir has inadequate unused capacity.

Two "baseline" alternatives were identified that are considered to be part of the water supply regardless of the alternative selected. The baseline alternatives included: negative consumptive use (water credit) utilizing Frankfort's WTP which equates to an assumed 12 mgd increase in supply during a drought and raising of Dam 10 which equates to an assumed 10 mgd increase in supply during a drought. The baseline alternatives provide 22 mgd of assumed increase in supply during a drought which reduces the 67 mgd target in 2020 to 45 mgd.

Initial meetings with potential wholesale providers were held on May 12 and 13 to identify the primary components of the supply alternatives. Potential providers included: Greater Fleming, Louisville Water Company, Northern Kentucky Water District, Carrollton Utilities/Carroll County Water District #1, and Cincinnati Water Works. All five are interested in selling finished water, have near term supplies of 10 mgd to 67 mgd available, and use either Ohio River or river bank aquifers along the Ohio River.

A near-term/long-term analysis was conducted for 16 alternatives and long-term alternatives were not carried forward for further investigation. Prior to Workshop #4, the Technical Group eliminated six of the 16 near term alternatives.

Optimizing use of the Kentucky River

O'Brien & Gere held a number of discussions with KDOW prior to the workshop regarding potential changes in permitting of water withdrawals from the KY River, specifically "negative consumptive use". During the public comment period at Workshop #4, Bill Caldwell with KDOW identified that KDOW refers to negative consumptive use as "water source credit". Work on this negative consumptive use or water source credit issue predates the BWSC effort. Bill Caldwell strongly encouraged that the environmental studies that were funded by KAWC approximately 12 years ago be expanded and updated. KAWC identified that this environmental work cost roughly $500,000 when it was performed 12 years ago. KDOW indicated that the study may cover a longer reach of the river, but it is possible that the level of detail could be limited. Permit regulations are being developed at this time to address the negative consumptive use. Water use credits would not be issued by KDOW until the environmental studies were completed. BWSC members requested confirmation

from KDOW that this is a significant study and that no entity has been identified to pay for it. KDOW confirmed that they do not have funding to pay for it.

BWSC members identified that based on comments from KDOW there will be an impact on the baseline assumption (cost and timing). O'Brien & Gere requested that the BWSC have discussion with KDOW in the near future to define the scope of the environmental study including the anticipated cost and schedule. BWSC members inquired whether a meeting with the Secretary of Resources would be beneficial for the purpose of getting a solid resolution. BWSC members agreed that instead of or at least along with a possible meeting, BWSC's commitments should be provided in writing. BWSC members identified that there is a potential that the outcome of the study could be that the permitted withdrawal limits could be effectively reduced. O'Brien & Gere requested that regardless of the potential outcome of the need for the environmental study or the findings from the study, the BWSC needs to push for resolution of the permit process from KDOW and move forward with selection of a supply source.

Preliminary screening results

A group of ten alternatives were included in the scoring by the Technical Group. The Technical Group scored the alternatives prior to the workshop and the results of the scoring were presented at Workshop #4. Two of the ten alternatives were eliminated based on low scores: purchase of finished water from Northern Kentucky Water District and conveying raw water from the Ohio River into central Kentucky for treatment. The remaining eight alternatives that will be carried forward for further study include:

- Purchase Water from Cincinnati Water Works
- Purchase Water from Cincinnati Water Works (alternate pipeline route)
- Purchase Water from Louisville Water Company
- Ohio River Withdrawals and WTP at Maysville/Dover
- Ohio River Withdrawals and WTP at Warsaw
- New WTP at Kentucky River Pool 3 or lower
- Purchase Water from Carrollton/CCWD#1
- Purchase Water from Greater Fleming

Organizational options

Ed Donahue and Damon Talley presented information on management and organizational options. Four options exist for the organizational structure of the BWSC and a key aspect will be the ability to issue tax-exempt debt. The BWSC is in general agreement on the purpose of the group, geographical service area, membership, responsibilities, and services offered.

Regarding take or pay contracts, a comment was made by a BWSC participant that budgets are tight in some months such as January, February, and March due to fixed costs and low production. Consultant team noted that while this was a realistic concern a similar problem would exist if the utilities added capacity on the own (without BWSC).

Ed Donahue restated that a ground rule should be that the BWSC contracts and arrangements do not jeopardize existing contracts.

Meeting participants requested clarification on the issue of charging for wheeling. Ed Donahue offered the opinion that this should not be included. KAWC requested that OBG provide information to the BWSC to address the wheeling questions.

Damon Talley reviewed the list of options for the organizational structure and the requirements for each option.

Communications/Public Outreach

It is assumed that the participants are keeping their elected officials apprised of the BWSC's meetings and decisions.

Upcoming Meetings

Workshop No. 5 will be held July 23 in Winchester and the Tech Group will meet on July 22. Public Meeting No. 2 will be deferred until the alternatives analysis is more defined and may be eliminated due to excellent public participation and input at the workshops. The BWSC Tech Group will meet on June 9 to further define the cost basis for the wholesale water purchase contracts.

Public Comment Period

Comments or question were addressed to the BWSC and O'Brien & Gere. A tape recording was made of this part of the Workshop to preserve the record and can be accessed at the BGADD offices in Lexington, Ky.

Bluegrass Water Supply Consortium

Public Workshop #4

May 28, 2003

9:00 a.m. – 5:00 p.m.

Name	Phone	E-mail	Organization/Address
Don Hassall	(859) 269-8021	dhassall@bgadd.com	Bluegrass ADD
Tim Kraus	502 561-3414	krausto@obg.com	O'Brien & Gere
Bob Riddle	502-863-7823	rriddle@chfiscal.com	GMWSC
Linda Bradwell	859 268-6573	bradwell@kaux.com	KAWC
Paul Schwinger	859 258-3428	paulc@lfucg.com	LFUCG
Wayne Waddell	859-258-3400	WAYNEW2@LFUCG.COM	LFUCG - 200 E. Main Lex. 40507
Beth Sullivan	502 352 4436	bsullivan@fcgpb.com	Frankfort Plant Bd
Kevin Crump	859-987-2118	parisutil@kyk.net	City of Paris 525 High St 40361
DAMON TALLEY	270-358-3187	drtalley@kih.net	BWSC
John Steinmetz	859-264-7500	JOHNS@CDPENGINEERS.COM	CDP ENGINEERS
Ed Donahue	410-766-9101	[illegible]	MFSG

Bluegrass Water Supply Consortium

Public Workshop #4

May 28, 2003

9:00 a.m. – 5:00 p.m.

Name	Phone	E-mail	Organization/Address
Bill Grier	223-1285	Bgrier@msgpt.com	Self
Chris Wells	502-875-5863	chris@kaca.org	RCAP
Don Dampier	502-863-9378		KRWW
Clay Kelly	502-583-7020	clay.kelly@peh.strand.com	PEH Eng. / Strand Assoc
Dave Carlstedt	859-858-3344	DCarlstedt@aol.com	City of Wilmore
Bill Averell	502-564-3410	william.averell@mail.state.ky.us	Division of Water
Lisa Hackney	223-5694	fhackney@msi-ky.com	MSE
Todd Littlefield	502 564 8100	TODD.LITTLEFIELD@LRC.STATE.KY.US	LEGISLATIVE RESEARCH COMM
Jane Brown	(502) 695-9800	jbrown@hmbconsultants.com	HMB Engineers
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Lindell Ormsbee	859-257-6325	lormsbee@engr.uky.edu	UK-KWRI
Lance E Williams	859-228-5412	lwilliams@hkbell.com	H.K.B. Consulting Engineers Inc.

Bluegrass Water Supply Consortium

Public Workshop #4

May 28, 2003

9:00 a.m. – 5:00 p.m.

Name	Phone	E-mail	Organization/Address
Bill VARBLE	859 232 4078	VARBLE@LEXMARK.com	LEXMARK
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David Edward Spears	502-896-3452	david.spears@law.state.ky.us	Atty Gen.
Brian Trangott	859-806-7743	Brian.Trangott@lrc.state.ky.us	Maj Wtp Borrows
Michael Unthank	502-493-1932	munthank@usgs.gov	USGS
Lisa C. Taylor	502 564-394	LISA.C.TAYLOR@MAIL.STATE.KY.US	PSC
Melissa McAlister	(859) 257-1299	mlmcal2@uky.edu	KWRI (UK)
GARY LARIMORE	270 843 2291	g.larimore@krwa1.org	KRWA
Alison Dunn	(859) 294-5155	alison_dunn@shieldmv.com	Shield Env. Assocs.
Ed Neal	502 564 3410	Ed.Neal@mail.state.ky.us	DOW

Bluegrass Water Supply Consortium

Public Workshop #4

May 28, 2003

9:00 a.m. – 5:00 p.m.

Name	Phone	E-mail	Organization/Address
Julie W. Roney	502/564-3410	Julie.Roney@mail.state.ky.us	KY DOW/DWB
Solitha Dhaman	" "	Solitha.Dhaman " "	" " " "
Virgie Wells	859/234/7153		Cynthiana Mayor
Earl Simpson	859/792/2170	simpsonf@lancasterky.org	City of Lancaster
Earl Miller			City of Versailles
Michael Eirich	(859)985-3772	michael_eirich@berea.edu	Berea College Utilities
Clyde Mellowan	859 734-7159	Cynwtp@setel.com	Cynthiana water works
DAVE PEARCE	859 498 0166		Mt. STERLING WATER & SEWER
John P. Martin	859 - 885-1121	JOHN_MARTIN@nicholasville.org	City of Nicholasville
Gregory S. Hobson	859 - 885-6974	wtp@qx.net	City of Nicholasville
George Rest	301 - 332 - 7557	Restgb@obg.com	O'Brien & Gere
JACK SHEPHERD	502-863-3344		GEORGETOWN DENTIST

Bluegrass Water Supply Consortium

Public Workshop #4

May 28, 2003

9:00 a.m. – 5:00 p.m.

Name	Phone	E-mail	Organization/Address
Mary-Jane Warner	859-744-4812	mjc@ekpc.com	4775 Lexington Rd. Winchester Ky 40391
Vernon Azevedo	859-744-5434	VAzevedo@WMUtilities.com	WMU PO Box 4177 Winchester Ky 40392-4177
Cheryl Goodman	859 269 8021	cgoodman@bglife.com	Bluegrass ADD
Bill Caldwell	502-564-3410	bill.caldwell@mail.state.ky.us	KY DOW, Frankfort
Thomas Dumm	301-731-1160	DUMMTE@ORL.com	O'Brien & Gere
Kevin Atkins	224-8280	kevin_atkins@mcconnell.senate.gov	Sen McConnell
Jim Reimann	258-3175	LFUCG PLANNING	200 E. Main Lex 40507
Gene Fouts	502 633 7240	~~Shelbyville~~	Shelbyville Municipal
Karla Olson Teasley	(502) 569-3692	kteasley@lwcky.com	550 South 3rd St. Louisville, KY 40202
Warner Caines	(502) 223-3401	wcaines@fewpb.com	Frankfort Electric & Water Plant Board

Bluegrass Water Supply Consortium

Public Workshop #4

May 28, 2003

9:00 a.m. – 5:00 p.m.

Name	Phone	E-mail	Organization/Address
Terry Roach	(502) 732-7055	taroach@bellsouth.net	Carrollton Utilities
Tom Calkins	885-9473	tom_calkins@nicholasville.org	City of Nicholasville
Jim Smith	(502) 569-3687	JSMITH@LWCKY.com	City of Louisville
Jao Sekhon	(859) 269-8021		Bluegrass ADD
Vicki Pitts	502 573 0260		KIA

BGADD
Bluegrass Area Development District

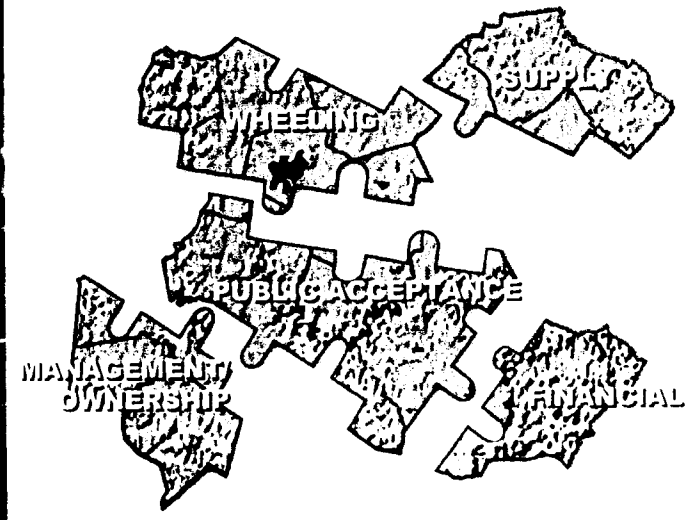
Bluegrass Water Supply Consortium

Water System Regionalization Feasibility Study

Workshop No. 4
Screening Technical Alternatives
May 28, 2003

CDP CARTER · DIXON · PARTNERS
O'BRIEN & GERE ENGINEERS, INC.
MapSync

Solving the Bluegrass Area Water Supply Puzzle



BGADD/BWSC Objectives

- Implementing a Management/Ownership approach which is fair and flexible
- Tapping highly reliable sources of supply
  - To be available within 3 to 5 years
- Optimizing regional water supplies through a grid network
- A financial plan that is affordable, and fairly apportions costs
- Effectively communicating the process and findings

Workshop No. 4 Objectives

- Briefing:
  - Recent activities
  - Wheeling results to date
  - Discussions with potential water providers
  - Source of supply options

Workshop No. 4 Objectives

- Solicit input on:
  - Preliminary screening results
  - Future screening process for water supply options
  - Organizational outline/charter

Recent Activities

- Agency Discussions
  - Ky Div. of Water, Water Supply Planning Branch
    - potential changes in permitting...negative consumptive use
  - US ACOE
    - investigated potential to use existing COE reservoirs
- Data Collection and Review - Source of Supply Options
  - Initial meeting with potential providers of finished water - May 12 & 13, 2003
  - Developed primary components of supply alternatives
- Organizational outline/framework for charter

Source of Supply

Projected Supply Deficits for BWSC ....*through 2020*

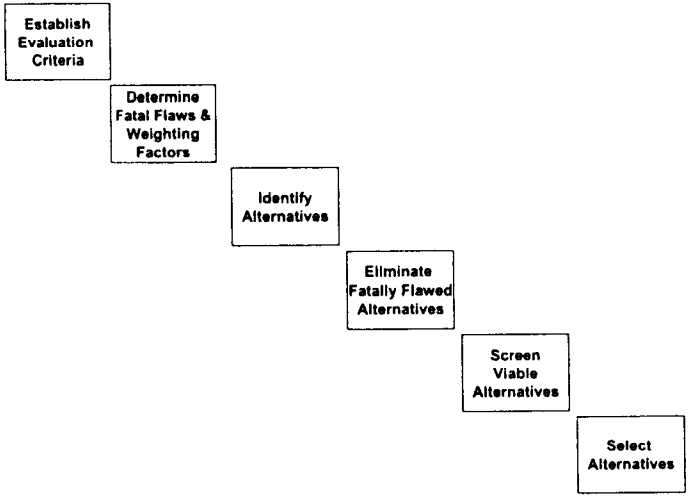
- **Maximum Day Permit Deficit** = 169 mgd demand - 133 mgd permitted withdrawal = **36 mgd** (***this is also the WTP capacity deficit***)
- **Worst-case Drought Deficit** = 169 mgd demand - 67 mgd permitted drought withdrawal = 102 mgd
- **Hybrid Drought Deficit** = 134 mgd hybrid maximum day demand - 67 mgd permitted drought withdrawal = **67 mgd** ***(this is our 2020 supply target)***

Source of Supply

Projected Supply Deficits for BWSC ....*Beyond 2020*

- **Add about 2 mgd/year**

Water Supply Selection Process



Source of Supply Evaluation Criteria

- Adequate Capacity
  - ✓ non-interruptible/reliable
- Raw/Finished Water Quality
- Cost
- Implementability / Risk of Delays
  - ✓ permittable
  - ✓ public acceptance
  - ✓ property acquisition
  - ✓ constructable
- Flexibility
  - ✓ phased implementation

Evaluation Criteria

Adequate Capacity - Reliable quantity of raw water and finished water to meet projected demands through the planning period. This criterion addresses interruptibility of sources of supply.

Evaluation Criteria

Raw/Finished Water Quality - Raw and finished water quality that meets existing water quality requirements, and can readily achieve future anticipated regulations. This criterion may also address water quality preferences such as superior raw water quality, finished water taste, and potential "grid" issues such as impact from mixing multiple supplies.

Source of Supply

Evaluation Criteria

Cost - The present worth cost for proposed raw and finished water improvements, including capital, operating and maintenance costs. This cost could include allowance for additional KRA funding for out-of-basin transfers.

Source of Supply

Evaluation Criteria

Implementability - The relative ease of implementing the proposed improvements in time to meet projected demands. This criterion considers the potential that regulatory permitting (including environmental considerations), public acceptance, property acquisition, or constructability issues could delay implementation.

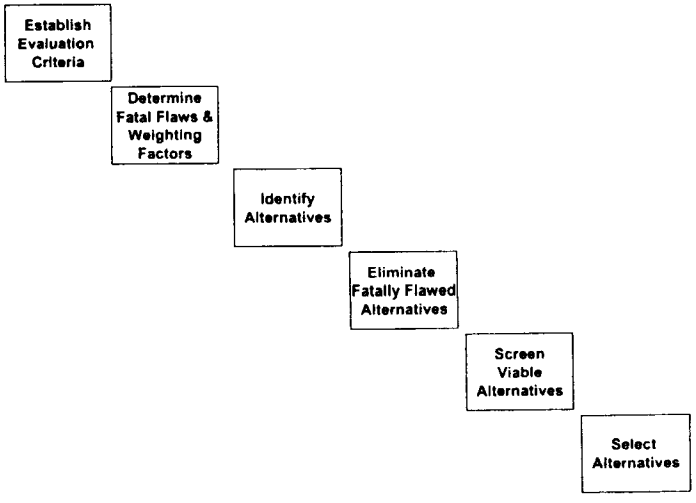
Source of Supply

Evaluation Criteria

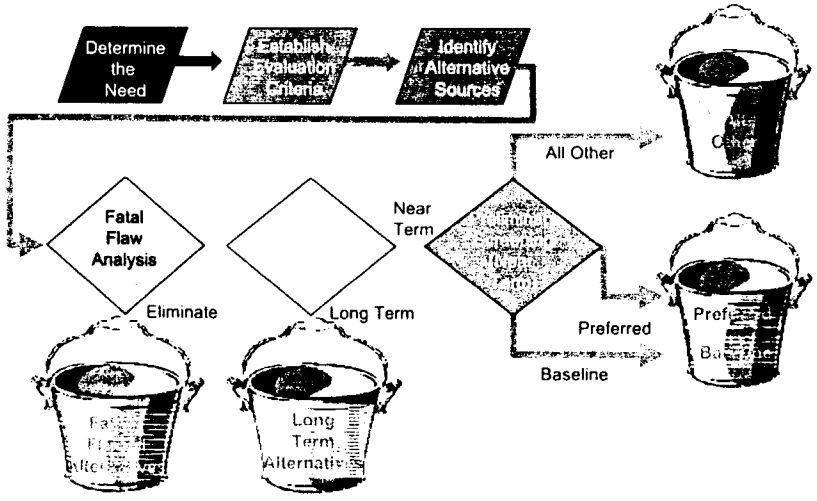
Flexibility/Expandability - The ability to phase implementation and spread the cost over time, while still meeting projected demands. This criterion addresses ability to expand beyond the planning period and the entrance/exit of BWSC members.

Source of Supply

Water Supply Selection Process



Selecting Additional Sources of Supply



Source of Supply

Potential Fatal Flaws/Long Term Screening

- Adequate Capacity
  - **Less than 10 mgd**
- Raw/Finished Water Quality - none likely
- Cost - none likely
- Implementability / Risk of Delays
  - **Delays beyond *3-5* years *"meaningful progress"***
- Flexibility - none likely

Source of Supply

Potential Fatal Flaws/Long Term Screening

- Implementability / Risk of Delays
  - **Delays beyond *3-5* years? *"meaningful progress"***
    - Ability to secure approvals/required permits within 2 years
    - Ability to design, construct, and put in service within an additional 3-4 years

Source of Supply

Source of Supply Options

Group	Number
Ohio River	**7**
Kentucky River	**8**
Existing Reservoirs	**7**
New Reservoirs	**12**
Groundwater	**6**
Total	**40**

Near Term Potential ***16***

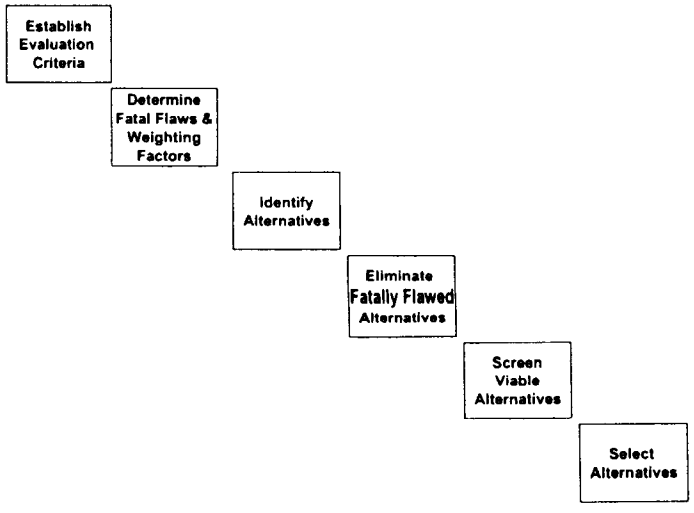
Screening Near Term Alternatives (Today)

- Matrix summary of evaluation criteria:
  - Adequate Quantity
  - Water Quality
  - Cost (Preliminary)
  - Implementability
  - Ability to Phase/Expand
- Score using weighting factors

Screening Near Term Alternatives (Today)

- ***Continued***
  - Select top options for more detailed study:
    - Pre-negotiation for water purchases
    - Concept layout/ preliminary routing
    - Regulatory agency discussions
    - Hydraulic analysis of grid

Water Supply Selection Process



Source of Supply Options

Group	Number
Ohio River	7
Kentucky River	8
Existing Reservoirs	7
New Reservoirs	12
Groundwater	6
Total	40

Near Term Potential ***16***

Source of Supply Option Update

- Existing Reservoirs
  - Buckhorn Lake ~ *ACOE Louisville District*
    - Inadequate unused capacity /fatally flawed
  - Carr Creek~*ACOE Louisville District*
    - Inadequate unused capacity/long term if raised
  - Cave Run Lake Diversion ~*ACOE Louisville District*
    - 10 mgd may be possible, but larger amounts unlikely.

Source of Supply Option Update

- Existing Reservoirs (Continued)
  - Lake Cumberland Diversion~ *ACOE Nashville District*
    - inter-basin transfer/impact on hydro-power/possible long term option
  - Herrington Lake~*LG&E hydro-power*
    - inadequate unused capacity in drought
  - Scott County Reservoir
    - inadequate unused capacity

Source of Supply Option Update

- Conclusion:
  - *Continue to screen using the list of 16 near term options*

Optimizing Use of the Kentucky River

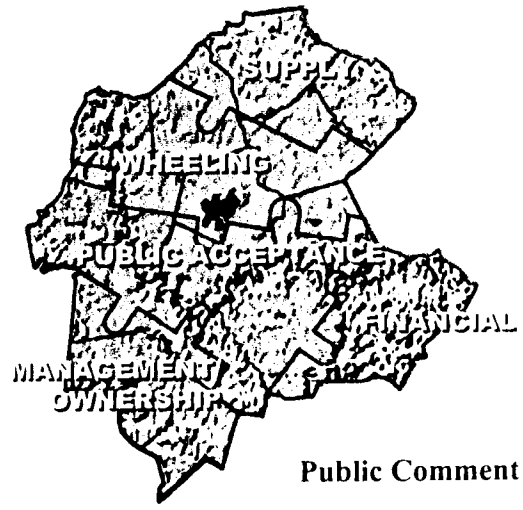
- Baseline Alternatives ~ Assumed part of region's future water supply
  - Negative consumptive use (*water credit)* and utilize Frankfort's WTP....add 12 mgd during drought at no cost.
  - Raising Dam 10
    - Proceed with 4-6 foot higher dam....10 mgd assumed increase during drought.
  - *Total 22 mgd assumed increase from Baseline Alternatives during drought.*
    - *Note: KDOW indicated potential that water credit may be linked to additional environmental studies.*

Source of Supply

Optimizing Use of the Kentucky River

- Net required near term source of supply:
  - During drought 67 mgd - 22 mgd = ***45 mgd (or 57 mgd if water credit not available)***
- Other near term Kentucky River alternatives
  - Pool 3 WTP
  - Pump-back from lower pool
  - Additional negative consumptive use
- Long term Kentucky River alternatives
  - Raising Dam 9, High Bridge Dam, etc.

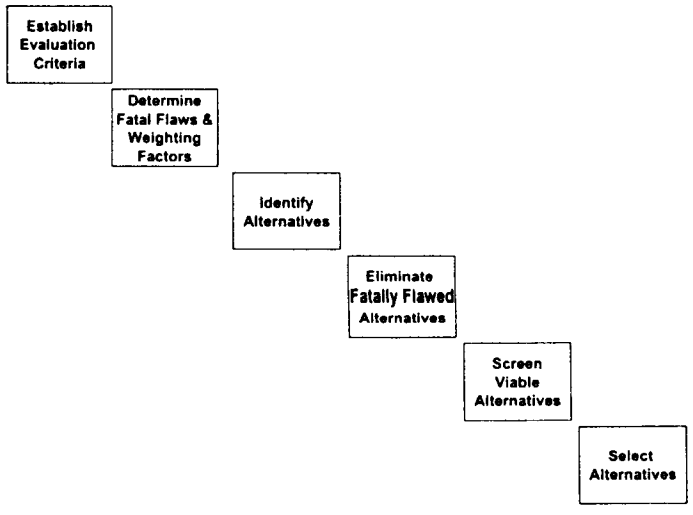
Solving the Bluegrass Area Water Supply Puzzle



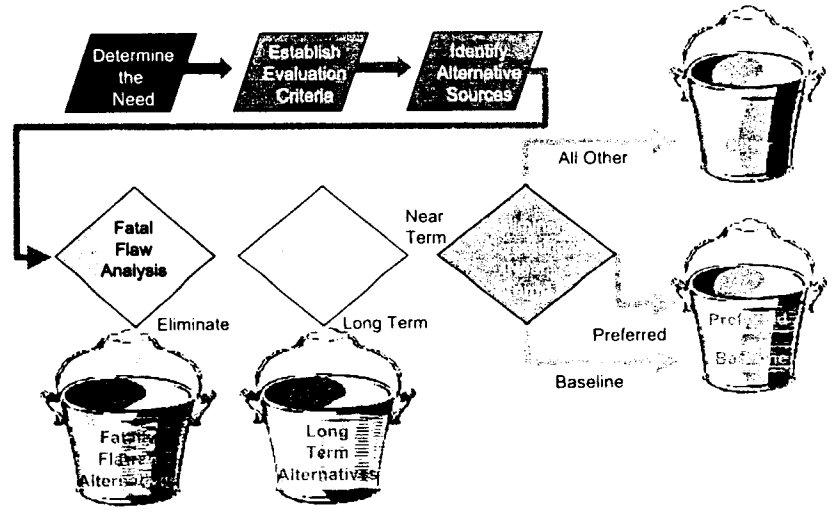
Public Comment Period

Source of Supply

Water Supply Selection Process



Selecting Additional Sources of Supply



Discussions with potential water providers

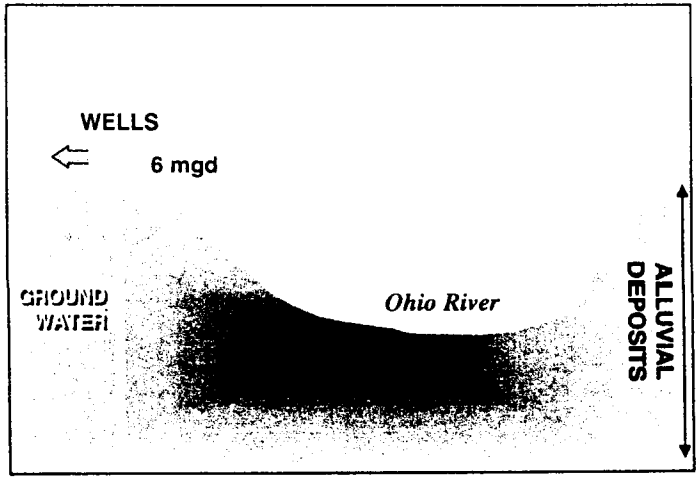
- Initial meeting May 12-13, 2003:
  - Greater Fleming Regional Water Commission
  - Louisville Water Company
  - Northern Kentucky Water District
  - Carrollton Utilities/ Carroll County WD No. 1
  - Cincinnati Water Works

Discussions with potential water providers

- Initial findings:
  - Greater Fleming Regional Water Commission
    - minimum 10-15 mgd available, BWSC would enhance treatment
    - source is groundwater from along bank of Ohio River
  - Louisville Water Company
    - 25 mgd currently available, full 67 mgd possible
    - source is/will be highly treated Ohio River/riverbank aquifer water

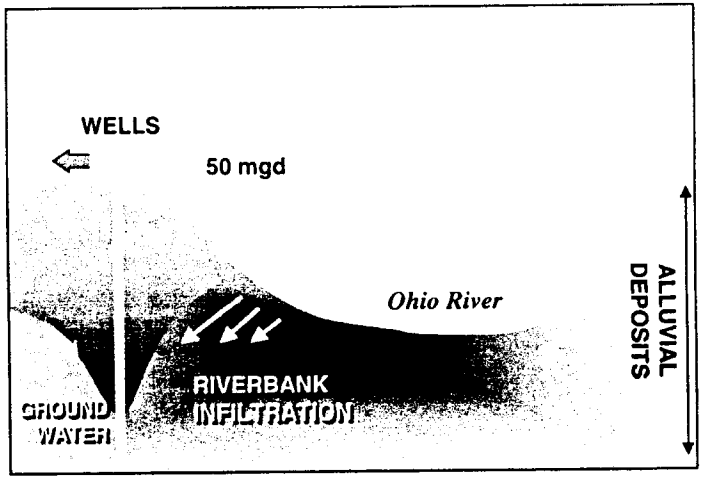
Source of Supply

Ground Water



Source of Supply

Riverbank Infiltration



Discussions with potential water providers

- Initial findings (continued):
  - Northern Kentucky Water District
    - minimum 10-15 mgd available, full 67 mgd possible
    - source is treated Ohio River water
  - Carrollton Utilities/ Carroll County WD No. 1
    - full 67 mgd possible, BWSC would enhance treatment
    - source is groundwater from along bank of Ohio River

Discussions with potential water providers

- Initial findings (continued):
  - Cincinnati Water Works
    - minimum 10-15 mgd currently available via Boone Florence Regional Water Commission, full 67 mgd possible
    - source is highly treated Ohio River water

Discussions with potential water providers

- Summary:
  - All five interested in selling finished water and have availability in near term
  - Available supply ranges from about 10-15 mgd to the full 67 mgd
  - All use either Ohio River or river bank aquifers/groundwater from along the Ohio River
  - Finished water quality is/would be very good

Decision- making

- Tech Group Screening Results
- Additional Scoring?
- Are there any other critical factors?
  - Reliability: All Kentucky River vs. multiple sources
  - Large vs. small provider
  - Independent (fully controlled supply) vs. long term purchase contract.

Solving the Bluegrass Area Water Supply Puzzle

Public Comment Period

Organizational Structure

- Legal Form of Organization
- Purpose of Entity
- Geographic Service Area
- Authority / Powers
- Independence

Services Provided

- Potable / Non-Potable Water
- Wholesale vs. Retail
- Availability of Supply
- Reliability of Supply
- Water Quality

Finances

- Issuance of Debt
- Operating Revenues
- Revenue Sources
- Guarantees
- "Take or Pay" Contracts
- Long-Term vs. Short-Term Contracts
- Rate Approval Process

Management Philosophy

- Lowest Life Cycle Cost
- Lowest Rates Over Time
- Use of Reserves
- Compensation Policy
- Key Personnel
- Procurement Philosophy

Governance

- Board of Directors
- Policy Advisory Board
- Conflicts of Interest

Membership

- Definition of Members vs. Customers
- Identity of Initial Members
- Addition of Members
- Removal / Withdrawal of Members

Political/ Public Outreach

Communications/Public Outreach Key Issues

- Work group is addressing legislative issues.
- BWSC representatives must brief their elected officials/management.
- Others?

Communications/Public Outreach Near Term Schedule

- Workshop No. 5 ***Decisions*** (July 23, 2003)

Solving the Bluegrass Area Water Supply Puzzle

Public Comment Period

Workshop No. 5 – Decisions

Bluegrass Water Supply Consortium
Workshop Number 5
Decisions
July 23, 2003
AGENDA

9:00 AM Welcome and Introductions

- Review of minutes from May 28, 2003; Workshop No. 4
- Objectives for this Workshop
- Summary of activities since last meeting

9:15 Future Organization

- Desired attributes of new organization
- Organizational options
- Legal issues
- Selecting the basic structure
- Framework for charter
- "Take or Pay" concept/impact on membership
- Working Group tasks and future plans

10:30 Water Quality/Grid Issues

- Disinfection by-products
- Hardness and corrosion control
- Grid water quality monitoring
- Recommendations for future work
- KDOW comments

11:15 *Public Comment Period – Organization and Water Quality (Maximum 15 minutes)*

11:30 Wheeling Update

- Basic Grid Components
- Primary connection points to grid
- Additional modeling

11:45 Review Screening Process- Source of Supply Alternatives

- Overview
- Evaluation criteria and weighting factors
- Optimizing use of the Kentucky River
  - "Baseline" Kentucky River components
  - "Water Credits"-as a near term component
  - Net required near term source of supply
- Today's focus- Second stage screening of preferred near term alternatives

Noon Lunch Break

1:15 PM Water Purchase Alternatives

- Requests for Proposals (RFP's)
- Responses
- Future steps to finalize purchase options

1:35 Source of Supply Alternatives- Cost Estimates

- Capital Costs- Basis and key assumptions
- Operating Costs- Basis and key assumptions
- Present Worth Analysis
- Cost Comparison
- Other cost issues:
  - Unit cost to purchasers

2:15 Source of Supply Alternatives- Second-stage screening

- Updates to source of supply matrix
- Pair-wise comparisons
  - Tech Group scoring
  - Consultant scoring
  - Discussion
- Recommendations
  - Future steps

3:15 *Public Comment Period - Source of Supply (Maximum 15 minutes)*

3:30 Break (15 minutes)

3:45 Communications/Public Outreach

- Confirming Participants/Intent to Purchase from Grid
- Roles & Responsibilities
- Near Term Actions

4:00 Upcoming meetings

- Agency Briefing No. 2
- Public Meeting No. 2
- Final Workshop (No. 6)

4:15 *Public Comment Period (Maximum 15 minutes)*

4:30 Wrap Up

- Action Item Summary
- Feedback on Workshop No. 5 and Suggestions for Workshop No. 6

Summary BWSC Workshop #5
July 23, 2003
Clarke County Cooperative Extension Service Building
Winchester, KY

Attendees: BWSC Participants

Attachments: Revised Microsoft PowerPoint Presentation was distributed to BWSC participants.

Introduction

The Bluegrass Water Supply Consortium held Workshop #5 on July 23, 2003 to discuss the status of the work performed on the Water System Regionalization Feasibility Study. The workshop was organized according to the following topics:

- Future organization
- Water quality/grid issues
- Wheeling update
- Review screening process - source of supply alternatives
- Water purchase alternatives
- Source of supply alternatives - cost estimates
- Source of supply alternatives - second-stage screening
- Communication/public outreach
- Upcoming meetings

A brief summary of the key discussions for each of these areas follows.

Future organization

Damon Talley reviewed the "best" features of the organizational structure and the organizational alternatives. Three "traditional" organizational alternatives were described:

1. Regional Water Commission (KRS 74.420 - KRS 74.520)
2. Interlocal Cooperative Agreement (KRS 65.210)
3. Instrumentality of Governmental Agencies (KRS Chapter 58)

Two additional organizational options requiring special legislation were also presented. The options with the best features that were carried forward for more detailed evaluation were: Regional Water Commission and Chapter 58 Governmental Agency. A comparison of these two options was performed using 30 evaluation criteria. Of the 30 criteria, the following seven criteria were considered critical to an organizational structure:

- Autonomous
- No Liability for Member Utilities
- Ease of Creation
- Speed of Creation
- Issue Revenue Bonds
- Eligible for Grants
- Eligible for Low Interest Loans

Based on the comparison of organizational options, it was concluded that a Regional Water Commission was the preferred organizational structure.

Damon recommended that BWSC become BWSC, Inc. and serve as an umbrella organization in which BWSC, Inc. members would not be required or be committed to a particular take-or-pay contract. The creation and membership of the Regional Water Commission under Chapter 74 would continue. Some entities could join directly and immediately into the Regional Water Commission (Chapter 74 organization) and others could maintain involvement through BWSC, Inc.

Water quality/grid issues

George Rest presented the potential water quality issues associated with the grid network:

- Disinfection by-products. The most critical water quality issue associated with the grid is the potential for formation of disinfection by-products (DBPs) and disinfection techniques used by BWSC members (i.e., chlorine vs. chloramine). A graphic showing the current disinfectants being used by BWSC members showed that chloramines are being used by the larger interior BWSC members and chlorine is typically being used by the smaller utilities on the periphery of the grid. Service to the peripheral customers would likely be via a one-way connection; thus, maintaining use of chlorine would not be an issue for these utilities.
- Hardness and corrosion control. BWSC required that potential suppliers using groundwater include softening in their proposals. An evaluation of the mixing of different corrosion inhibitors/pH approaches can be performed after completion of the Feasibility Study.
- Grid water quality monitoring. The concerns related to grid include responsibility for and monitoring of the water quality. BWSC will be responsible for the water quality delivered to the wholesale customer. Each individual retailer would be responsible for the water quality delivered to its customers.

Julie Roney from KDOW acknowledged that the meeting held on July 21 with O'Brien & Gere was productive and agreed that water quality issues associated with the grid network could be resolved.

Wheeling update

John Steinmetz presented the results of the model work that has been completed to-date. The goal of the grid modeling was to obtain relative pipeline sizes and costs for the grid network. Seven alternative supply connections to the grid were modeled to assess the sensitivity of the grid network to feeds from different locations:

- Alt 1 from the west (e.g., Louisville Water Company).
- Alt 2 from the northwest (e.g., Carrolton area).
- Alt 3 from north (e.g., Northern KY Water District/Cincinnati Water Works).
- Alt 4 from northeast (e.g., Fleming County)
- Alt 5 from the east (Winchester area).
- Alt 6 from south (Nicholasville area).
- Alt 7 from west and northeast (two supply sources in combination).

The findings indicate that the cost for the grid network is generally not sensitive to the connection point for the source of supply.

Review screening process – source of supply alternatives

The evaluation criteria and the screening process were reviewed. A flowchart showing the screening process for the water supply alternatives was reviewed and included the following steps:

- A fatal flaw analysis was performed for 40 alternatives using adequacy of capacity (greater than 10 mgd) and implementability (delays beyond 3-5 years) to identify fatally flawed alternatives that were eliminated.
- A near-term/long-term analysis was conducted to obtain 16 near-term alternatives and the remaining long-term alternatives were not carried forward for further investigation.
- Preliminary screening of 10 near-term alternatives (6 additional near-term alternatives were eliminated prior to Workshop #4) was performed in Workshop #4 and the preferred and baseline alternatives were to be separated from the other remaining alternatives in Workshop #4.

The projected deficits in water supply are based on the current permits for the KY River users and the projected 2020 water demands. For 2020, there is a 36 mgd deficit between unrestricted maximum day demands in 2020 and the current permit "ceiling". A 102 mgd drought deficit is projected between the unrestricted maximum day demands in 2020 and

the permit "floor". A "hybrid" drought deficit is 67 mgd and represents the difference between restricted 2020 maximum day water demands and the permit "floor". The 67 mgd drought deficit represents the 2020 water supply target.

Two "baseline" alternatives were identified that are considered to be part of the water supply regardless of the alternative selected. The baseline alternatives included: negative consumptive use (water credit) utilizing Frankfort's WTP which equates to an assumed 12 mgd increase in supply during a drought and raising of Dam 10 which equates to an assumed 10 mgd increase in supply during a drought. The baseline alternatives provide 22 mgd of assumed increase in supply during a drought which reduces the 67 mgd target in 2020 to 45 mgd.

A meeting with KDOW personnel was held on July 21 to assess how much water is available in Pool 3 during normal and drought conditions. George Rest provided an overview of the KDOW meeting and a summary of the June 22 letter from Jeff Pratt at KDOW. The letter indicated that the baseline withdrawal plus the water credit suggest a floor value of between 35 and 45 mgd for Pool 3 (25 to 35 mgd for water credits and 10 mgd for minimum necessary use). The 45 mgd projected need included a reduction of 12 mgd for water credits. Consequently, the baseline withdrawal plus the water credit would likely be reduced by 12 mgd which suggests a floor value of between 23 and 33 mgd for Pool 3. Consequently, BWSC should not rely on Pool 3 as a stand-alone supply source for meeting the 45 mgd projected need in 2020.

O'Brien & Gere modified the original Kentucky River Pool 3 alternative to include a raw water intake and pumping station and raw water transmission main to the Ohio River. KDOW personnel indicated that the Ohio River is probably the only "uninterruptible" supply source in Kentucky.

Water purchase alternatives

BWSC issued a Request for Proposals (RFP) to interested water suppliers on June 13 and received proposals on July 9-10. The RFP identified the need for a 45 mgd source of potable water. Proposals were received from: Greater Fleming Regional Water Commission, Louisville Water Company, Carroll County Regional Water Commission, and Cincinnati Water Works. All four providers were interested in selling water. Available supply ranges from about 15 mgd to 67 mgd. All four providers use either the Ohio River or river bank aquifers/ground water along the Ohio River.

Source of supply alternatives – cost estimates

Spreadsheets and figures showing the capital, annual and present worth costs for the alternatives were described. The annual cost per MGD of capacity was presented.

Source of supply alternatives – second-stage screening

Eight water supply alternatives were carried forward from Workshop No. 4 for further study:

- Purchase Water from Louisville Water Company
- Purchase Water from Cincinnati Water Works (via Boone Florence)
- Purchase Water from Cincinnati Water Works (via Bracken County)
- Purchase Water from Carrollton/CCWD#1
- Purchase Water from Greater Fleming Regional Water Commission
- Kentucky River Pool 3 WTP
- Ohio River Withdrawals and WTP at Maysville/Dover
- Ohio River Withdrawals and WTP at Warsaw

Based on a meeting with KDOW on July 21, OBG modified the Kentucky River Pool 3 WTP option to include a raw water intake and pumping station at the Ohio River and a raw water pipeline from the Ohio River to the Pool 3 WTP.

George Rest explained the pairwise comparison approach and the results:

1. Kentucky River Pool 3
2. BWSC Ohio River WTP options
3. LWCo purchase
4. Cincinnati purchase (new WTP)

The sensitivity of the pairwise comparison to cost was addressed. O'Brien & Gere reduced the annual purchase for the water providers by 30% to assess the potential impact on the ranking of alternatives. Compared with the ranking provided above, the revised ranking was as follows:

1. Kentucky River Pool 3
2. LWCo purchase
3. Cincinnati purchase (new WTP)
4. BWSC Ohio River WTP options

BWSC proposed that the Kentucky River Pool 3 alternative and the BWSC WTP at the Ohio River be carried forward along with any water providers interested in submitting a revised proposal. Water providers interested in submitting a revised proposal were requested to provide a notice of intent to submit a revised proposal by July 25. If BWSC received a notification, interested providers would have until August 8 to submit a revised proposal.

Communications/public outreach

It is assumed that the participants are keeping their elected officials apprised of the BWSC's meetings and decisions.

Upcoming meetings

Workshop No. 6 will be held October 13 at BGADD. Public Meeting No. 2 will be held on September 22.

Public Comment Period

Comments or question were addressed to the BWSC and O'Brien & Gere. A tape recording was made of this part of the Workshop to preserve the record and can be accessed at the BGADD offices in Lexington, Kentucky.

Bluegrass Water Supply Consortium

Public Workshop #5

July 23, 2003

9:00 a.m. – 5:00 p.m.

Name	Phone	E-mail	Organization/Address
Dan Hassell	(859) 219-8021	dhassell@bgtfc.com	Bluegrass ADD
Mary Jane Waenek	(859) 744-4512	mj@ekpc.com	4758 Lexington Rd. Winchester
Tom Calkins	(859) 885-9473	tom-calkins@nicholasville.org	City of Nicholasville 601 N. Main St. Nich., KY 40356
John P Martin	(859) 885-1121	JOHN_MARTIN@NICHOLASVILLE.ORG	✓ ✓ ✓ ✓ ✓ ✓
DAVID PEARCE	859 498 0166		MT. STERLING WATER & SEWER 300 E. MAIN ST.
JOHN STEINMETZ	859 - 264 - 7500	JOHNS@CDPENGINEERS.COM	CDP ENGINEERS
Michael Eirich	859/985-3772	michael_eirich@berea.edu	Berea College Utilities CPO 2207, Berea, KY 40404
Clyde Gillum	(859) 234-7159	clyn wtp@setel.com	P.O. Box 67 Cynthiana, KY 41031
Thomas Dumm	(301) 731-1160	DUMMTE@OBG.COM	18310 CORPORATE DRIVE Landover, MD 20785
Cheryl Goodman	(859) 269-8021		Bluegrass ADD
Jennifer Sparks	859-744-5434	Jennifers@wmutilities.com	WMU

Bluegrass Water Supply Consortium

Public Workshop #5

July 23, 2003

9:00 a.m. – 5:00 p.m.

Name	Phone	E-mail	Organization/Address
Wayne Waddell	859-258-3400	WAYNEW2@LFUCG.COM	LFUCG PUBLIC WORKS
Tim Kraus	502 561-3414	kroustw@obg.com	O'Brien & Gere
Ed Donahue	410.266.9101	EDWARD.DONAHUE@MFSGLLC.com	MUNICIPAL & FINANCIAL SERVICES GROUP
Donna M. Powell	(859) 792-2707	dmpowell44@aol.com	Lancaster City Council
Millard Rose	859-792-2170	MRR@Kih.net	Lancaster Water Utility
Virgie F. Wells	859-234-7153		Mayor, Cynthiana
Vernon Azevedo	859-744-5434	VAzevedo@WMUtilities.com	Winchester Municipal Utilities
Bart Miller	859-873-2245		City of Versailles
Vicki Pettus	502 573 0260	VICKI.PETTUS@mail.state.ky.us	KIA 375 Versaille Frankfort
Julie Roney	502 564-3410	Julie.Roney@mail.state.ky.us	KY DOW/Drinking Water
C Lewis Dixon	859 264-7500	ldixon@cdpengineers.com	CDP Engineers, Inc.
D. Clay Kelly	502-583-7020	clay.kelly@peh.strand.com	Strand Assoc. / PEH Engineers

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Bluegrass Water Supply Consortium

Public Workshop #5

July 23, 2003

9:00 a.m. – 5:00 p.m.

Name	Phone	E-mail	Organization/Address
~~Jennifer Sp~~			
Crystal Hisle	744-5434	crystalh@wmutilities.com	WMU
Janice Eldridge	744-5434	janicee@wmutilities.com	WMU
Randa Wells	744-5434		WMU
Penny L. Laurence	744-5434		WMU
Michael J. Flynn	744-5434		WMU
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Linda Bridwell	859-268-6373	bridwell@kawc.com	KAWC
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Paul Schomburg	859 258 3208	paulas@thug.com	LFUCG

Bluegrass Water Supply Consortium

Public Workshop #5

July 23, 2003

9:00 a.m. – 5:00 p.m.

Name	Phone	E-mail	Organization/Address
Gene Foute	502 633 2840		Shelbyville Municipal Water Co
Cecilia Yeiser	859-744-5916		WMU
Margaret Shanks	502 564-3410		DOW
Paul A Brooks	859 258-3220		LFUCG Council.
Bob Ware	502-839-4621		Ky River Authority
Stephen Nestor	564-2866		70 Wilkinson Blvd.-Frankfort
Steve Porter	502-695-2300		BRIGHTON ENGINEERING
Coleman Dallas Cox	(859) 986-9031	smudcdc@aol.com	Southern Madison Water Dist.
Melissa McAlister	859-257-1299	mlmcal2@uky.edu	KWRI
Mike Bethurem	859-997-3780		KLC
Jim Smith	502 569-3487		
Neall B. Tyler	502-315-6892		U.S. Corps of Engineers, Louisville KY.

Bluegrass Water Supply Consortium

Public Workshop #5

July 23, 2003

9:00 a.m. – 5:00 p.m.

Name	Phone	E-mail	Organization/Address
JACK SHEPHERD	502-863-4651		DENTIST
Chris Bauer	513-591-7910		Gr. Cinti Water Works
Ed Neal	502-564-3410		DOW -
PAUL TOMES	513 591-7895		Greater Cinti Water Works
CLYDE P. BALDWIN	502-695-2545		Citizen
Ward Cairn	502-223-3401		FRANKFORT PLANT BOARD
Chris Wells	~~859~~ 502-875-5863		Rural Community Assistance Program
Bill R. Osborne	502 732 7055		Carrollton Utilities
Terry Roach	" "		" "
Roger Churchill	859 223-3755		Quest Engineers, Inc
JOHN HORNE	859-885-9441		HORNE ENGR, INC
Bill Grier			
Bob Blankenship	502 695 9800		HMB ENGRS

Bluegrass Water Supply Consortium

Public Workshop #5

July 23, 2003

9:00 a.m. – 5:00 p.m.

Name	Phone	E-mail	Organization/Address
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John Blackford	859 885-5660		Jessamine South Elkhorn Water Dist
Jim Kipp	859-257-1299	kipp@uky.edu	KWRRI
GARY LARIMORE	270 843 2291	g.larimore@krwa.org	KRWA
DAVE BARBERIE	859 258 3500		LFUCG
Stephen Fowler	859.623.2323	sfowler@richmondutilities.com	Richmond Utilities
Solitha Dhaiman	502 564 3410		Drinking Water Branch
Jim LeTcher	859-588-5340	jletcher@kih.net	Bluegrass Fin. Services, LLC
Earl Coffey	859-238-1200	ecoffey@ci.danville.ky.us	City of Danville
Shelley Roberts	258-3784	sroberts@lfucg.com	LFUCG-DEEM

Bluegrass Water Supply Consortium

Public Workshop #5

July 23, 2003

9:00 a.m. – 5:00 p.m.

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Ed Burdman	859.744.7821	eburdman@winchesterky.com	City of Winc
Richard Harris	859 578-5458	rharr@nkywater.org	Northern Ky Water Dist
Brian Traugott	859-806-7743	brian.traugott@lrc.state.ky.us	Rep Barrows office
FRED GOINS	502-875-8751	fgoins@der.net	FRANKLIN COUNTY FISCAL COURT
RON LOVAN	859-578-9898	RLOVAN@NKYWATER.ORG	N. KY WATER DIST.
Andy Mead	859 231-3219	amead@kyrenl.lexlaw.com	Herald Leader
David Spears	502-696-5457	david.spears@law.state.ky.us	Attorney General
Phil Yenick	859 744 5627	industrial@winchesterky.com	WINCHESTER INDUSTRIAL AUTHORITY
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Bluegrass Water Supply Consortium

Public Workshop #5

July 23, 2003

9:00 a.m. – 5:00 p.m.

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Eddie Ray	859-223-8000	Ed.Ray@Tetratech.com	Tetratech Inc
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David Hamilton	502-564-2866		KRA
Jamie Vinson	859-744-3123	jvinson@winchestersun.com	The Winchester Sun
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Nick Rowe	859-268-6373	nrowe@kawc.com	KY-American Water Co.
Pete Gibbons	502-561-3414	gibbonpj@obg.com	O'Brien & Gere

Bluegrass Water Supply Consortium

Public Workshop #5

July 23, 2003

9:00 a.m. – 5:00 p.m.

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SHAWN DYER	859-585-2347	SHAWN.DYER@MAIL.HOUSE.GOV	REP. FLETCHER
[illegible] Denton	859-233 3171		—
Karla Olsen Tearley	(502) 569-3692	ktearley@lwcky.com	Louisville Water Co.
Michael Unthank	502-493-1922	munthank@usgs.gov	USGS
Bill Brewer	859 276-3333	2050 Regency Road Lexington, Ky 40503	Bill Brewer
JOSEPH DAVID	" 258-3176	josephd@lfucg.com	LFUCG 200 E. MAIN ST.
Mayor Dodd Dixon			City of Winchester

BGADD
Bluegrass Area Development District

Bluegrass Water Supply Consortium

Water System Regionalization Feasibility Study

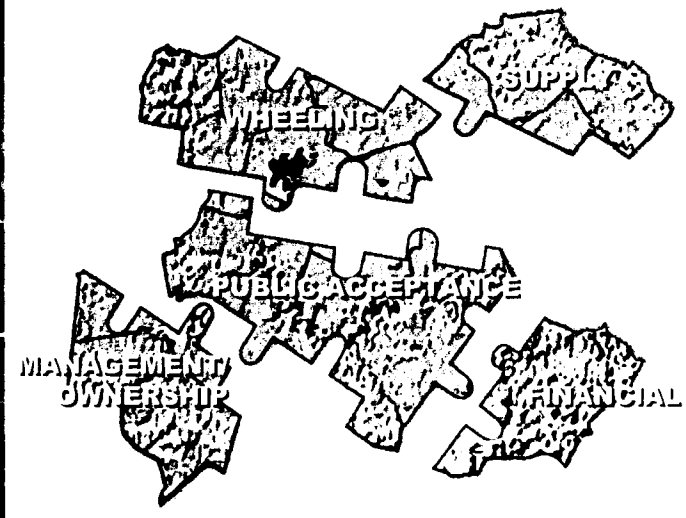
Workshop No. 5
Decisions
July 23, 2003

CDP CARTER DIXON PARTNERS

O'BRIEN & GERE ENGINEERS, INC.

MapSync

Solving the Bluegrass Area Water Supply Puzzle



BGADD/BWSC Objectives

- Implementing a Management/Ownership approach which is fair and flexible
- Tapping highly reliable sources of supply
  - To be available within 3 to 5 years
- Optimizing regional water supplies through a grid network
- A financial plan that is affordable, and fairly apportions costs
- Effectively communicating the process and findings

Workshop No. 5 Objectives

- Briefing:
  - Recent activities
  - KDOW discussions
  - Legal opinion/organization options
  - Proposals from potential water providers
  - Second stage screening of supply options

Workshop No. 5 Objectives

- Solicit input on:
  - Selecting the organizational structure
  - Proposed water quality approach
  - Preferred water supply alternatives
  - Participation as "Take-or-Pay" member
  - Future steps to conclude Feasibility Study
  - Maintaining momentum

Recent Activities

- Agency Discussions
  - Multi -Agency Meeting June 9, 2003
    - KYDEP, KRA, KIA, EDA, RDA
      - communication
      - request for cooperation/support
  - Kentucky Div. of Water, July 21,2003
    - Drinking Water Branch
      - grid water quality
      - grid regulation
    - Watershed Management Branch
      - Pool 3 withdrawal permit
      - water credits

Recent Activities

- Potential water providers
  - Issued Request for Proposals on June 13, 2003
  - Received proposals July 9-10, 2003
- Completed cost analysis

Organizational Priorities

- Maximum Local Control
- Eligibility for Tax-Exempt Debt
- Maximum Eligibility for State/Federal Funds
  - Grants
  - Low Interest Loans
- Minimum Regulation by External Parties
  - PSC
  - Other Kentucky Agencies
  - Feds

Desirable Organizational Structure Attributes

- Flexibility
- Simplicity
- Public Acceptability
- Adjustability

"Best" Features Identified

- Board of Directors
  - Independent
  - Fair Representation for all Members
  - Continuity
  - Policy Level/No Micro-Management
- Regional Agency Owns the Infrastructure
- Rates
  - Set By Board
  - Uniform (Wholesale) Rates
  - Regular Review and Revision

"Best" Features Identified

(cont)

- Financing
  - Revenue Bonds
  - Grant Eligibility
- Advisory Board
  - Larger Agencies
- Strong Management Teams

Organizational Alternatives

- New traditional public agency under existing Kentucky Revised Statutes
  - Regional Water Commission (KRS 74.420 - KRS 74.520)
  - Interlocal Cooperation Agreement (KRS 65.210)
  - Instrumentality of Governmental agencies KRS Chapter 58)
- New public agency requiring special legislation
- Existing public agency such as KRA, KIA

Organizational Alternatives

(cont)

- Non-public agency
  - Non-Profit Corporation (KRS Chapter 273)
  - Contractual Agreement (Contract Law)
  - Partnership (KRS Chapter 362)
  - Unincorporated Association (Misc. Laws & Cases)
- Other Alternatives

Comparison of Organizational Options

Evaluation Criteria		Scoring (0-5)	
		Chapter 58 Governmental Agency	Regional Water Commission
1.	Autonomous	4	5
2.	No Liability for Member Utilities	5	5
3.	Ease of Creation	5	5
4.	Speed of Creation	5	5
5.	Issue Revenue Bonds	5	5
6.	Eligible for Grants	5	5
7.	Eligible for Low Interest Loans	5	5
8.	Acceptance by Public	3	4
9.	Acceptance by Regulators	1	5
10.	Membership Eligibility		
	* City Owned Utilities	5	5
	* Non-Profit Utilities	0	5
	* Investor Owned Utilities	0	0
	* LFUCG	5	5
11.	Expansion of Membership	5	5

Comparison of Organizational Options (Cont.)

Evaluation Criteria		Scoring (0-5)	
		Chapter 58 Governmental Agency	Regional Water Commission
12.	Withdrawal from Membership	5	5
13.	One Member, One Vote	1	5
14.	Board Membership		
	* Appointment	3	2
	* Compensation	1	5
	* Continuity	5	5
	* Independence	3	3
	* Professionalism	1	1
15.	Exempt from PSC	0	5
16.	Rate Oversight	0	5
17.	Own & Operate WTP	5	5
18.	Purchase Water from Others	5	5
19.	Own and Operate Grid	5	5
20.	Wholesale Water	5	5
21.	Retail Water	Yes	No
22.	Must Sell Water to Non-Members	Yes	No

Comparison of Organizational Options (Cont.)

Evaluation Criteria		Scoring (0-5)	
		Chapter 58 Governmental Agency	Regional Water Commission
23.	Acquire Existing Infrastructure	5	5
24.	Uniform Wholesale Rate	2	5
25.	No Threat to Existing Utilities	2	4
26.	Eminent Domain	5	5
27.	Adjustability	4	1
28.	Flexibility (Purpose)	5	1
29.	Implementability (Risk of Delays)	1	5
30.	Simplicity	3	4
31.			
32.			
33.			
34.			
35.			
TOTALS		119	150

Water Quality/Grid Issues

- Chlorine Residual/Disinfection By-Products (***DBP's***)
  - Issues:
    - Future DBP limits have caused some members to switch to a chloramine residual
    - Mixing free chlorine and chloramine residuals can cause taste and odor problems
    - Is grid concept fatally flawed?

Water Quality/Grid Issues

- Chlorine Residual/Disinfection By-Products (***DBP's***)
  - Issues:
    - Future DBP limits has caused some members to switch to a chloramine residual
    - Mixing free chlorine and chloramine residuals can cause taste and odor problems
    - Is grid concept fatally flawed? **No!**

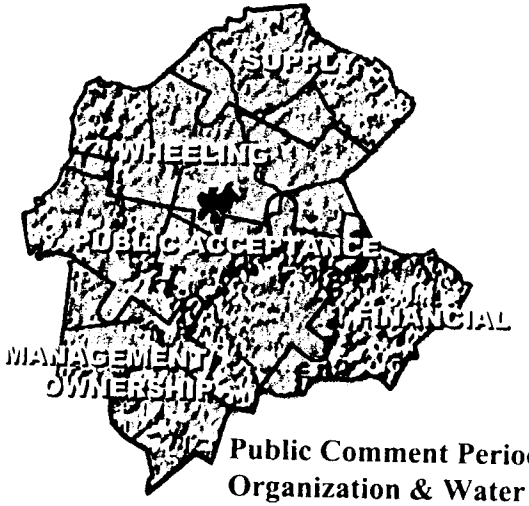
Water Quality/Grid Issues

- Hardness and corrosion control
  - Issues:
    - BWSC required groundwater suppliers to soften.
    - Mixing of different corrosion inhibitors/pH approaches requires careful evaluation.
      - this can performed after the Feasibility Study.

Water Quality/Grid Issues

- Grid Water Quality Monitoring
  - Issues:
    - Who is responsible for distribution water quality?
      - Each producer
    - What is BWSC's role?
      - Quality of water delivered to its wholesale customers and consecutive systems
      - Potential role as overall advisor for grid water quality.

Solving the Bluegrass Area Water Supply Puzzle



Public Comment Period
Organization & Water Quality

Kentucky River Permitting

- Pool 3 withdrawal permit issues:
  - How much water is available at Pool 3 in a drought?
    - Limited by lowest 7 day flow in river, with 10 year frequency (*7Q10 flow condition*)
      - depends on valve operating plan and environmental studies
      - *probably less water available during drought than we hoped, until storage deficit is solved!*

Kentucky River Permitting

- Water Credits (for return flows):
  - must verify that return flows reach the main stem of Kentucky River
  - proposed policy would provide credits for about 90% of verifiable return flows.
  - Water credit *not* linked to environmental studies
  - KDOW anticipates credits for about 25 mgd at/above Pool 3.
  - Draft policy soon, in-place in about 10 months.

Source of Supply

Projected Supply Deficits for BWSC ....*through 2020*

- **Maximum Day Permit Deficit** = 169 mgd demand - 133 mgd permitted withdrawal = **36 mgd** (***this is also the WTP capacity deficit***)
- **Worst-case Drought Deficit** = 169 mgd demand - 67 mgd permitted drought withdrawal = 102 mgd
- **Hybrid Drought Deficit** = 134 mgd hybrid maximum day demand - 67 mgd permitted drought withdrawal = **67 mgd** ***(this is our 2020 supply target)***

Source of Supply

Projected Supply Deficits for BWSC ....*Beyond 2020*

- **Add about 2 mgd/year**

Source of Supply

Optimizing Use of the Kentucky River

- Baseline Alternatives ~ Assumed part of region's future water supply
  - Water credit (negative consumptive use) and utilize Frankfort's WTP....add 12 mgd during drought at no cost.
  - Raising Dam 10
    - Proceed with 4-6 foot higher dam....10 mgd assumed increase during drought.
  - *Total 22 mgd assumed increase from Baseline Alternatives during drought.*

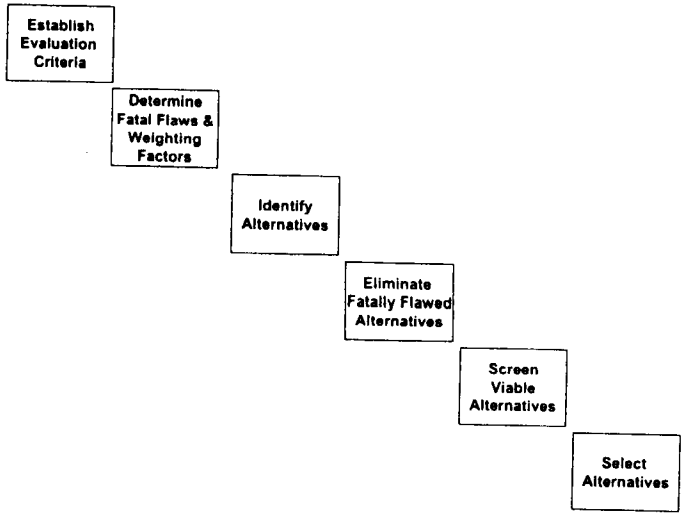
Source of Supply

Optimizing Use of the Kentucky River

- Net required near term source of supply:
  - During drought 67 mgd - 22 mgd = ***45 mgd***
- Long term Kentucky River alternatives
  - Raising Dam 9, High Bridge Dam, etc.

Source of Supply

Water Supply Selection Process



Source of Supply Evaluation Criteria

- Adequate Capacity
  - ✓ non-interruptible/reliable
- Raw/Finished Water Quality
- Cost
- Implementability / Risk of Delays
  - ✓ permittable
  - ✓ public acceptance
  - ✓ property acquisition
  - ✓ constructable
- Flexibility
  - ✓ phased implementation

Evaluation Criteria

Adequate Capacity - Reliable quantity of raw water and finished water to meet projected demands through the planning period. This criterion addresses interruptibility of sources of supply.

Evaluation Criteria

Raw/Finished Water Quality - Raw and finished water quality that meets existing water quality requirements, and can readily achieve future anticipated regulations. This criterion may also address water quality preferences such as superior raw water quality, finished water taste, and potential "grid" issues such as impact from mixing multiple supplies.

Evaluation Criteria

Cost - The present worth cost for proposed raw and finished water improvements, including capital, operating and maintenance costs. This cost could include allowance for additional KRA funding for out-of-basin transfers.

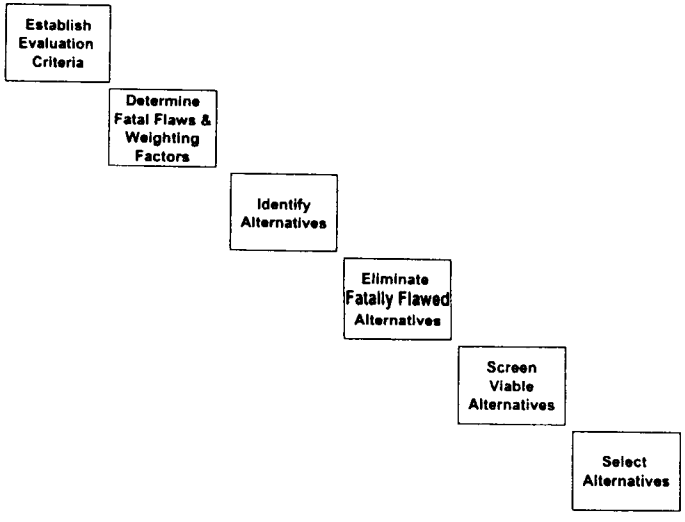
Evaluation Criteria

Implementability - The relative ease of implementing the proposed improvements in time to meet projected demands. This criterion considers the potential that regulatory permitting (including environmental considerations), public acceptance, property acquisition, or constructability issues could delay implementation.

Evaluation Criteria

Flexibility/Expandability - The ability to phase implementation and spread the cost over time, while still meeting projected demands. This criterion addresses ability to expand beyond the planning period and the entrance/exit of BWSC members.

Water Supply Selection Process

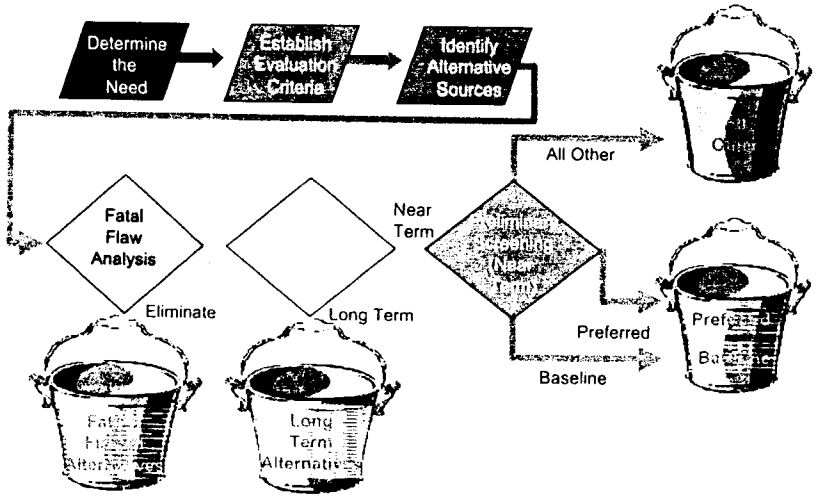


Source of Supply Options

Group	Number
Ohio River	7
Kentucky River	8
Existing Reservoirs	7
New Reservoirs	12
Groundwater	6
Total	40

Near Term Potential *16*

Selecting Additional Sources of Supply



Preferred Water Supply Options

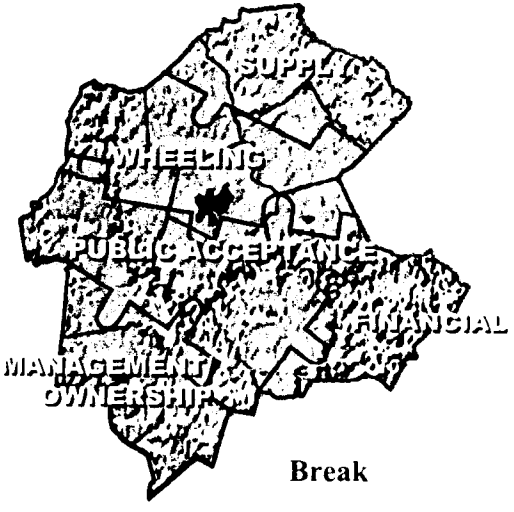
- Pipeline/purchase finished water:
  - Louisville Water Company
  - Cincinnati via Boone Florence Regional Water Commission
  - Cincinnati via Bracken County
  - Carrollton Utilities/ Carroll County WD No. 1
  - Greater Fleming Regional Water Commission
- Kentucky River~ New WTP at Pool 3
- Ohio River
  - New WTP at Maysville/Dover
  - New WTP at Warsaw

Source of Supply

Second Screening of Near Term Alternatives (Today)

- Matrix summary of evaluation criteria:
  - Adequate Quantity
  - Water Quality
  - Cost
  - Implementability
  - Ability to Phase/Expand
- Score using pairwise comparison with weighting factors

Solving the Bluegrass Area Water Supply Puzzle



Break

Proposals from potential water providers

- Requested 45 mgd, if available.
- Excellent proposals received from all four:
  - Greater Fleming Regional Water Commission
  - Louisville Water Company
  - Proposed Carroll County Regional Water Commission (Carrollton Utilities/ Carroll County WD No. 1)
  - Greater Cincinnati Water Works

Proposals from potential water providers (continued)

- Greater Fleming Regional Water Commission
  - would provide 15 mgd near Blue Lick State Park
  - GFRWC would soften.
  - source is groundwater from along bank of Ohio River

Proposals from potential water providers (continued)

- Louisville Water Company
  - would provide 45 mgd in Shelby County
  - additional capacity could be provided
  - source is/will be highly treated Ohio River/riverbank aquifer water
  - open to negotiation on use of spare capacity

Proposals from potential water providers (continued)

- Proposed Carroll County Regional Water Commission
  - proposed organization moving forward quickly
  - full 67 mgd possible
  - CCRWC would soften
  - source is groundwater from along bank of Ohio River

Proposals from potential water providers (continued)

- Cincinnati Water Works via Boone Florence
  - about 10 mgd currently available via Boone Florence
  - about 10 mgd may also be currently available from No. Ky Water District
  - source is highly treated Ohio River water
  - full 67 mgd possible , but existing WTP/transmission system must be expanded
  - may be cheaper to build new WTP in Kentucky

Proposals from potential water providers (continued)

- Cincinnati Water Works via Bracken County
  - source is highly treated Ohio River water
  - full 67 mgd possible , but existing WTP/transmission system must be expanded
  - may be cheaper to build new WTP

Proposals from potential water providers (continued)

- Summary:
  - All four interested in selling finished water and have described their approach(es)
  - Available supply ranges from about 15 mgd to the full 67 mgd
  - All use either Ohio River or river bank aquifers/groundwater from along the Ohio River
  - Finished water quality is/would be very good

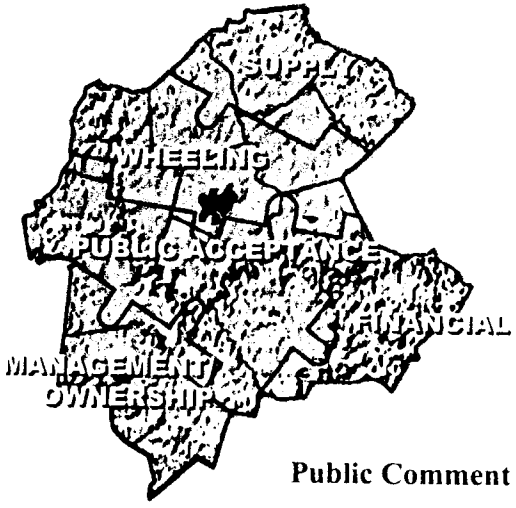
Source of Supply Alternatives

Show me the money!

Source of Supply Alternatives

- Second stage screening process
  - Pair-wise comparison technique
  - Weighting as previously determined

Solving the Bluegrass Area Water Supply Puzzle



Public Comment Period

Source of Supply Alternatives

- Second stage screening process
  - Pair-wise comparison technique
  - Weighting as previously determined
  - Discussion
  - ***Conclusion***

Political/ Public Outreach

Communications/Public Outreach Key Issues

- Work group will outreach to Agencies and legislators.
  - Explore grant opportunities
- BWSC representatives must brief their elected officials/management.
- Others?

Communications/Public Outreach Near Term Schedule

- Draft Report - early September
- Public Meeting No. 2 - September 22, 2003
- Workshop No. 6 ***Conclusions*** -October 13, 2003

Action Items

- Continue discussions with *Louisville Water Co.* regarding *cost of water*
- Continue discussions with KDOW about *Kentucky River Pool 3 Supplemented with Ohio River*
- Start to assess critical paths for implementation
- Verify each members desired "take or pay" capacity
- *Maintain momentum!*

Solving the Bluegrass Area Water Supply Puzzle

Public Comment Period

Workshop No. 6 – Conclusions

Bluegrass Water Supply Consortium
Workshop Number 6
Conclusions
October 13, 2003
AGENDA

9:00 AM Welcome and Introductions

- Review of minutes from July 23, 2003; Workshop No. 5
- Objectives for this Workshop
- Summary of activities since last meeting

9:15 Source of Supply Alternatives

- Overview
- Evaluation criteria and weighting factors
- Optimizing use of the Kentucky River
  - "Baseline" Kentucky River components
  - "Water Credits"- as a near-term component
  - Net required near-term source of supply
- Today's focus- Third stage screening of preferred near-term alternatives
  - Louisville Water Co.'s revised proposal
  - Updated cost analysis
    - impact of interest rates, present worth period, and size of additional supply
  - Updated pair-wise comparison
- Conclusions

10:00 Wheeling Update

- Update on Grid
- Grid water quality

10:30 *Public Comment Period – Source of Supply and Grid System (Maximum 15 minutes)*

10:45 Roll Call Vote on Source of Supply Recommendation

11:00 Future Organization

- Regional water commission decision- Key Features
- Policy Guidance
- Types of customers
- Next steps

11:30 Financial Considerations

- Summary of Financial Considerations
- Resolutions of Intent to Enter into an Agreement to Purchase Finished Water
  - Cost scenario examples
  - Responses from Tech Group
- Informal poll, who is interested in purchasing water?

Noon *Public Comment Period – Future Organization and Finances (Maximum 15 minutes)*

12:15 Lunch Break

1:30 What's Next?

- Brainstorming Session – What are our future challenges?
- Report
- Non-binding resolutions
- Formation of Regional Water Commission
- Detailed Planning
  - preliminary engineering/permitting
  - identify immediate improvements
- Grant applications
- Financial planning, preliminary rate setting and wholesale agreements
- Other ideas?

3:00 Communications/Public Outreach

- Written comments welcome
- Distribution of Report and Executive Summaries
- Confirming participant's intent to purchase from grid
- Support for council presentations
- Agency/elected official briefings
- Other near-term actions

3:15 *Public Comment Period (Maximum 15 minutes)*

3:30 Wrap-up

- Action Item Summary
- Feedback on Workshop No. 6
- Thank You!

Summary BWSC Workshop #6
October 13, 2003
Phoenix Building
Lexington, KY

Attendees: BWSC Participants

Attachments: Revised Microsoft PowerPoint Presentation was distributed to BWSC participants.

Introduction

The Bluegrass Water Supply Consortium held Workshop #6 on October 13, 2003 to discuss the status of the work performed on the Water System Regionalization Feasibility Study. The workshop was organized according to the following topics:

- Source of Supply Alternatives
- Wheeling Update
- Roll Call Vote on Source of Supply Recommendation
- Future Organization
- Financial Considerations
- Next Steps
- Communication/Public Outreach

A brief summary of the key discussions for each of these areas follows.

Source of Supply Alternatives

O'Brien & Gere added to the objectives of the study the BWSC mission statement which addresses optimization of the Kentucky River. BWSC members stated that they wanted to move forward quickly and fairly apportion costs and that they strongly support this study.

O'Brien & Gere described the components of the Kentucky River Pool 3 alternative: water supply intake at Kentucky River Pool 3, raw water transmission main between water supply intake on the Kentucky River and water treatment plant, water treatment plant near Kentucky River Pool 3, raw water intake on the Ohio River between Warsaw and Carrollton, raw water transmission main between water supply intake on Ohio River and water treatment plant neat Pool 3, and finished water transmission mains connecting to the grid at Georgetown or Frankfort.

One of key objectives of Workshop 6 was to conduct the third screening of the remaining water supply alternatives. Of the original five potential wholesale water suppliers, only Louisville Water Company submitted a revised proposal. Louisville Water Company's revised proposal was approximately 45% lower than their initial proposal. Using this revised cost, Louisville Water Company's present worth proposal is 11-14% less than the Kentucky River Pool 3 alternative. However, these revised costs did not change the pairwise ranking of the alternatives (i.e., Kentucky River Pool 3 is ranked first and Louisville Water Company Purchase Water alternative is ranked second).

O'Brien & Gere presented the sensitivity analysis of the costs for the alternatives using 30 mgd versus 45 mgd of supply and alternative interest rates. Conclusion was that the Kentucky River Pool 3 alternative remained in first place. The reason the cost does not have a more significant impact on the ranking is because the Kentucky River Pool 3 alternative has a high ranking among the other criteria. The Consultant Team's recommendation is to adopt the Kentucky River Pool 3 alternative.

Danville requested that BWSC members leave the window of opportunity open for Danville to sell water to BWSC members in the future. Danville draws water from Herrington Lake which has a substantial volume of water. Danville is working with Kentucky Utilities and identified that the availability of water from Herrington Lake will not be decided within the next four weeks. Danville requested that a narrative discussion of Danville's interest in selling water to the BWSC members be included in the feasibility study report. Danville requested that they be considered as a potential water supply option in the future. BWSC members requested that Danville provide written documentation of the decision on the availability of water to the BWSC and the Consultant Team.

Public comment: Is there enough water supply included in the plan to address future growth of the BWSC members? The raw water pipeline to the Ohio River provides virtually an uninterruptible supply of water to the region. O'Brien & Gere identified that each of the options that remain (even all eight) have the flexibility to allow for future growth. The key question will be how much money should be invested into the initial project.

Wheeling Update

CDP developed a KYPIPE model of the water systems and proposed BWSC grid network. CDP presented the water system grid concept and benefits of the grid. O'Brien & Gere discussed water quality and the grid network (disinfection methods).

The following questions were posed regarding wheeling:

- Were pumping stations included in the model? Pumping stations were included in the BWSC grid network and the number of pumping stations affect the sizing of the pipes in the grid network.

- What was the basis for the peak day attenuation associated with the grid network? An 11 mgd reduction in the peak day demand of the BWSC members occurs due to the interconnections provided by the grid network. Production data was obtained from each of the BWSC members for the period of July 25 through August 14, 2002. The 11 mgd reduction was computed by identifying the peak day demand for Kentucky American Water Company (August 5, 2002), computing the total water demand for BWSC members on August 5, 2002 and comparing the total water demand of the BWSC members on August 5, 2002 with the sum of the individual peak days of the BWSC members occurring during the week prior to or following August 5, 2002.

Roll Call Vote on Source of Supply Recommendation

Recommendation: The Consultant Team recommended the Kentucky River Pool 3 water supply alternative and needs to write a report that includes definitive recommendations. The decision-making process used in the feasibility study included an open workshop environment and the Consultant Team requests clarity from BWSC regarding endorsement of the Pool 3 water supply alternative. To conclude the study, BWSC wants to drive a stake in the ground with one water supply option that will work and proceed forward from the study phase to the design and construction phases.

The roll call vote on the Kentucky River Pool 3 water supply alternative was as follows:

- Yes – BGADD, Frankfort, Georgetown, KAWC, LFUCG, Nicholasville, Winchester, Berea, Cynthiana, Danville, Lancaster, Lawrenceburg, Mt. Sterling, Paris, Shelbyville, and Versailles
- Absent – Harrodsburg and Wilmore
- Abstain - Richmond

Future Organization

Compared with other water commissions in Kentucky, this water commission will be unique in that the supply will augment existing water supplies rather than be the sole source of supply.

The words "water commission" must be in the title of the organization. By a show of hands, BWSC members approved the name "Bluegrass Water Supply Commission".

The following questions were posed regarding organization:

- Can the minimum qualifications be specified for the Commissioners? No.
- Are Commissioners required to live in the area they serve? Yes.
- Can LFUCG be a member or have a representative? No. LFUCG cannot be a member.
- How is membership decided? BWSC representatives can become members by immediately signing up for a water contract. Later signup will not automatically guarantee membership. The Commission can invite members to join at a later date.

- How does the Commission get funds to pay back the bonds? Utilities will generate funds from water sales.
- Can PSC force BWSC to supply water to a utility? No. In addition, the Commission is not a utility so the Commission is not allowed to provide retail sales.

Financial Considerations

The financial aspects of the letter of commitment to purchase were discussed. The fee identified on the letter of intent to purchase was about $450,000 per mgd of committed capacity per year. Will a party interested only in selling water to the grid be required to pay the minimum take-or-pay amount of $450,000? The Consortium or Commission will need to decide how to handle this issue.

Next Steps

O'Brien & Gere presented a schedule showing the timing major tasks that need to be completed to "have water come out of the spigot". The schedule for completion was 2009/2010.

The following future challenges and near-term schedule items were identified:

1. Pursue non-binding letters of intent or (response of intent) from all Consortium members. Within the letter of intent, extend an offer to meet with the communities to answer questions so that they are comfortable with decisions. BWSC requested that all members respond to the letter of intent by mid-December. Don Hassall asked that representatives that do not intend to purchase water should state their intentions now. The letter of intent to purchase does not guarantee participation or membership in the Commission. The Consultant Team can finalize the costs for the water supply system in mid-December after the responses are received and the initial responders are asked to reaffirm their commitments. The draft report will be presented to the Tech Group in early November and the final report will be completed in mid-December. The final report will be provided in a format that facilitates distribution and BGADD will advise on format.
2. BGADD to include a request from member communities to ask what assistance they might need to make a non-binding commitment.
3. BWSC should identify how many utilities need engineering and financial support to make decisions regarding participation in the Commission.
4. Formation of Bluegrass Water Supply Commission. Regarding the schedule, Damon Talley identified the need to reduce the duration for formation of the Commission in order to secure grant funding. Commission formation and contracts should be established within one year.
5. Expedite grant applications for non-construction items such as master planning, facility planning. Retroactive grants are not desirable (i.e., the Commission should be formed and then the grants should be requested).
6. Determine membership criteria for the BWSC.

7. Communication with LFUCG to determine involvement in BWSC. This is critical, as the formation of the BWSC will be driven by the county with the largest population.
8. KDOW dialogue to formalize commitment (water credits, Pool 3 permitting, Ohio River permitting, river crossing issues, continuing progress on grid/water quality issue).
9. Communication with KRA. Items could include Lock & Dam 10 and other dam projects, as well as clarification of ownership of the dams.
10. Outreach with PSC to explain merits of report and possibly answer questions that may arise from report. PSC opened a case on the water supply deficit. Case is on hold pending the outcome of this report. PSC will review report to make determination whether the recommendation will meet the needs for population of central Kentucky. Issues may also include how much of the cost KAWC can include in their rates.
11. Wholesale contracts.
12. Efforts to scope the master planning activities and other near term activities.
13. Funding for near term work. Don Hassall summarized that possible costs for this project may range from $100M - $200M. Question or challenge to the Consortium is to recognize the timing for grant funding for moving the project ahead and to realize we should not lose sight or priority of next efforts.
14. Public outreach through "sheer force".

The Tech Group will address the issues identified in the brainstorming session of the presentation.

Communication/Public Outreach

Comments received from the Public Meeting were presented and copies of these comments were made available to the meeting participants.

Bluegrass Water Supply Consortium
Workshop #6
Monday, October 13, 2003

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Bluegrass Water Supply Consortium
Workshop #6
Monday, October 13, 2003

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Bluegrass Water Supply Consortium
Workshop #6
Monday, October 13, 2003

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Bluegrass Water Supply Consortium
Workshop #6
Monday, October 13, 2003

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Bluegrass Water Supply Consortium
Workshop #6
Monday, October 13, 2003

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Bluegrass Water Supply Consortium
Workshop #6
Monday, October 13, 2003

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6.	Ryan Owens	City of Danville	
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11.	TO		
12.			

BGADD
Bluegrass Area Development District

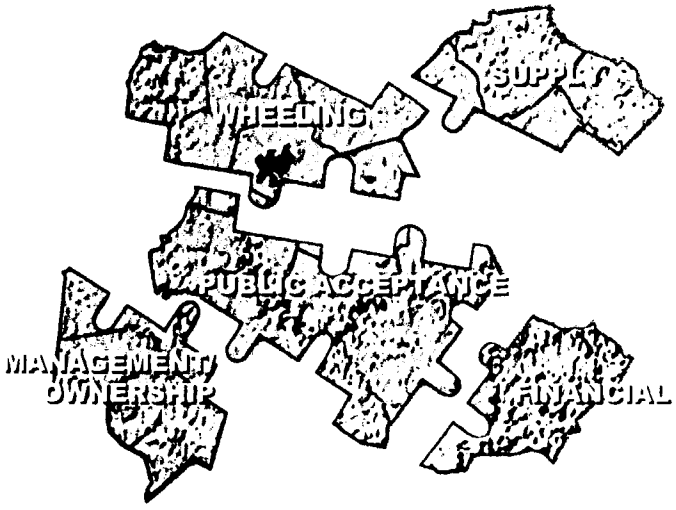
Bluegrass Water Supply Consortium

Water System Regionalization Feasibility Study

Workshop No. 6
Conclusions
October 13, 2003

CDP Carter Dixon Partners · O'Brien & Gere Engineers, Inc. · MapSync

Solving the Bluegrass Area Water Supply Puzzle



BWSC Participants

- Berea College Utilities
- Cynthiana, City of
- Danville, City of
- Frankfort Water Plant Board
- Georgetown Municipal Water/Sewer Service
- Harrodsburg, City of
- Kentucky American Water Company
- Lancaster, City of
- Lawrenceburg, City of
- Lexington-Fayette
- Mt. Sterling Water & Sewer Commission
- Nicholasville Utilities
- Paris, City of
- Richmond, City of
- Shelbyville Water & Sewer Commission
- Versailles, City of
- Wilmore, City of
- Winchester Municipal Utilities

BGADD/BWSC Objectives

- Implementing a Management/Ownership approach which is fair and flexible
- Tapping highly reliable sources of supply
  - To be available within 3 to 5 years
- Optimizing regional water supplies through a grid network
- A financial plan that is affordable, and fairly apportions costs
- Effectively communicating the process and findings

BWSC Mission Statement

The Bluegrass Water Supply Consortium will ensure the delivery of an adequate supply of potable water under any conditions to the customers of member entities. We will maximize the utilization of the Kentucky River as a raw water source, maintain reasonable rates, and provide adequate water quality.

Workshop No. 6 Objectives

- Briefing:
  - Recent activities
  - Revised proposal from Louisville Water Co.
  - Third stage screening of supply options
  - Initial commitments from Tech Group

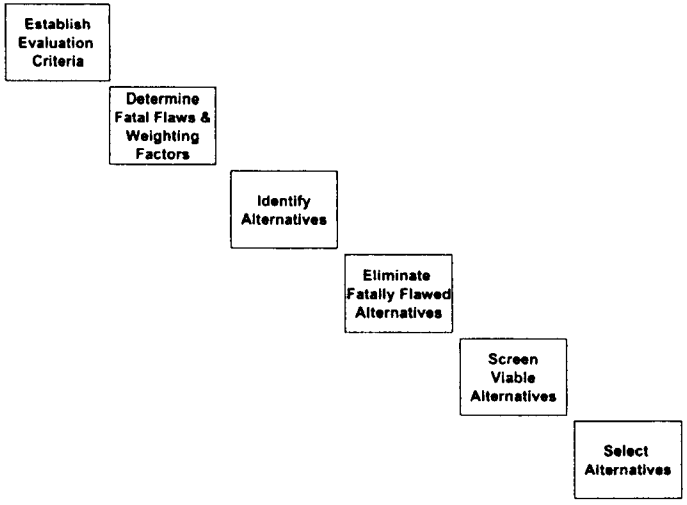
Workshop No. 6 Objectives

- Solicit input on:
  - Preferred water supply alternative
  - Your participation as future "Take-or-Pay" customer
  - Steps to conclude Feasibility Study
  - Maintaining momentum/Next steps

Recent Activities

- Received revised proposal from Louisville Water Co.
- Updated cost analysis and pair-wise comparison
- Briefing for elected officials - August 21, 2003
- Briefing for State Agencies - August 21, 2003
- Letter to Tech Group requesting intent to purchase capacity
- Public Meeting - September 22, 2003

Water Supply Selection Process



Source of Supply Evaluation Criteria & Weighting

- Adequate Capacity 18%
  - ✓ non-interruptible/reliable
- Raw/Finished Water Quality 8%
- Cost 27%
- Implementability / Risk of Delays 27%
  - ✓ permittable
  - ✓ public acceptance
  - ✓ property acquisition
  - ✓ constructable
- Flexibility 20%
  - ✓ phased implementation

Projected Supply Deficits for BWSC *....through 2020*

- **Maximum Day Permit Deficit** = 169 mgd demand - 133 mgd permitted withdrawal = **36 mgd** (***this is also the WTP capacity deficit***)
- **Worst-case Drought Deficit** = 169 mgd demand - 67 mgd permitted drought withdrawal = 102 mgd
- **Hybrid Drought Deficit** = 134 mgd hybrid maximum day demand - 67 mgd permitted drought withdrawal = **67 mgd** ***(this is our 2020 supply target)***

Projected Supply Deficits for BWSC *....Beyond 2020*

- **Add about 2 mgd/year**

Source of Supply

Optimizing Use of the Kentucky River

- Baseline Alternatives ~ Assumed part of region's future water supply
  - Water credit - utilize existing lower pool intakes, (Frankfort's WTP)....add 12 mgd during drought.
  - Raising Dam 10
    - Proceed with 4-6 foot higher dam....10 mgd assumed increase during drought.
  - *Total 22 mgd assumed increase from Baseline Alternatives during drought.*

Source of Supply

Optimizing Use of the Kentucky River

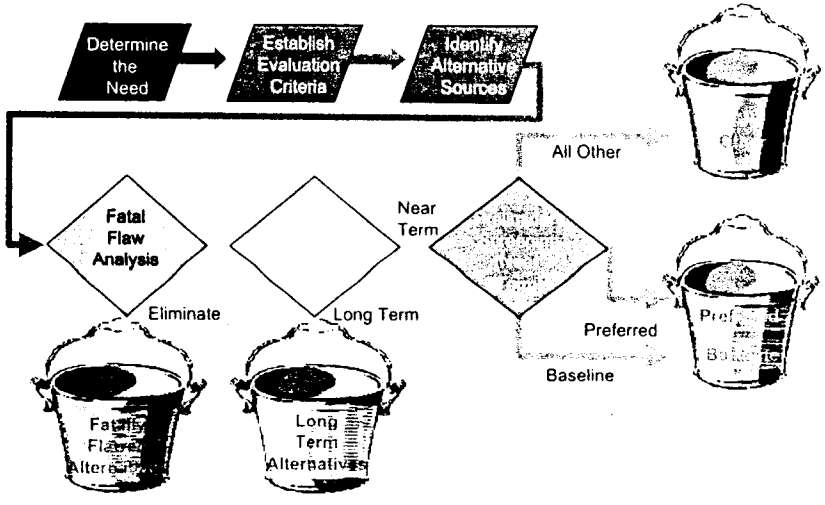
- Net required near term source of supply:
  - During drought 67 mgd - 22 mgd = ***45 mgd***
- Long term Kentucky River alternatives
  - Raising Dam 9, High Bridge Dam, etc.

Source of Supply

Source of Supply Options

Group	Number
Ohio River	7
Kentucky River	8
Existing Reservoirs	7
New Reservoirs	12
Groundwater	6
Total	40
Near Term Potential	***16***

Selecting Additional Sources of Supply



Preferred Water Supply Options

- Pipeline/purchase finished water:
  - Louisville Water Company
  - Cincinnati via Boone Florence Regional Water Commission
  - Cincinnati via Bracken County
  - Carrollton Utilities/ Carroll County WD No. 1
  - Greater Fleming Regional Water Commission
- Kentucky River~ New WTP at Pool 3 Supplemented with Ohio River Raw Water
- Ohio River ~ New WTP at Maysville/Dover/ Warsaw

Third Screening of Near Term Alternatives (Today)

- Louisville Water Co.'s revised proposal
- Updated cost analysis
  - interest rates
  - present worth period
  - size of additional supply
- Updated pair-wise comparison
- Conclusions

Source of Supply Alternatives

Show me the money!

Alternate to Purchase Water from Louisville Water Company

- Louisville Water Co.'s revised proposal is 45% lower than their initial proposal
- Present worth of LWC alternate is 11-14% lower than Pool 3 with Supplemental Raw Water from Ohio River
  - lowest cost alternate
- 2nd ranked alternate based on updated pair-wise comparison

Conclusion

Pool 3 with Supplemental Raw Water from Ohio River is highest rated overall

- Ranked 1st or 2nd in every category
  - ✓ Adequate Capacity - 2nd
  - ✓ Raw/Finished Water Quality - 1st (tied)
  - ✓ Cost - 2nd
  - ✓ Implementability / Risk of Delays - 1st
  - ✓ Flexibility - 1st

Consultant Team's Recommendation:

Adopt the Pool 3 Alternate, with Supplemental Raw Water from Ohio River

Vote on the Source of Supply Recommendation

A <u>Yes vote</u> accepts the Consultant Team's Recommendation to Adopt the Pool 3 Alternate, with Supplemental Raw Water from Ohio River

Benefits of Wheeling

Immediate

- Peak day attenuation
- Optimize use of existing sources
  - Grid allows rapid implementation of water credits
- Grant funding

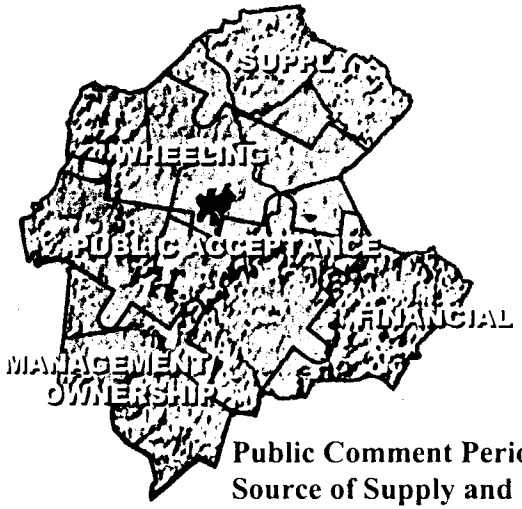
Long Term

- Economy of scale
  - ✓ new supply and treatment
- Reliability of multiple sources
- Easier to phase regional growth

Water Quality/Grid Issues

- Regional Grid must follow up on:
  - Chlorine Residual/Disinfection By-Products
    - Mixing free chlorine and chloramine residuals can cause taste and odor problems
  - Corrosion inhibitors
    - Mixing of different corrosion inhibitors/pH approaches requires careful evaluation
  - Grid Water Quality Monitoring
    - Assure clear responsibility for distribution water quality

Solving the Bluegrass Area Water Supply Puzzle



Public Comment Period
Source of Supply and Wheeling

Source of Supply

Vote on the Source of Supply Recommendation

A Yes vote accepts the Consultant Team's Recommendation to Adopt the Pool 3 Alternate, with Supplemental Raw Water from Ohio River

Result:Consultant's recommendation accepted

15 yes
2 absent
1 abstain

Questions and Answers

1. What is a Regional Water Commission?

- Distinct Legal Entity
- Public Corporation
- Public Agency
- See KRS 74.420 to 74.520

Questions and Answers

2. Are there any other Regional Water Commissions in Kentucky?

Yes

- Beech Fork Water Commission
- Boone-Florence Water Commission
- Cave Run Water Commission
- Greater Fleming County Regional Water Commission
- Logan/Todd Regional Water Commission

Questions and Answers

3. What will be the name of the Regional Water Commission?

- Bluegrass Water Commission
- Bluegrass Regional Water Commission
- **Bluegrass Water Supply Commission**
  - **Selected**

Do you have a suggested name?

Questions and Answers

4. Will the meetings of the Regional Water Commission be open to the public?

Yes

- See KRS 61.805 to 61.884

Questions and Answers

5. What will be the governing body of the Regional Water Commission?

- Board of Commissioners

Questions and Answers

6. Who selects the Commissioners that will govern the Regional Water Commission?

- Each member organization
- Commissioners Serve 4 Year Term
- Commissioners May Succeed Themselves

Questions and Answers

7. Will each member of the Regional Water Commission have a vote?

Yes

- Equal Voice

Questions and Answers

8. Will the Regional Water Commission be eligible for grants and low interest loans?

Yes

Questions and Answers

9. Can the Regional Water Commission borrow money or issue revenue bonds in its own name or must it depend upon its members to raise the necessary funds?

- Can Borrow Money
- Can Issue Tax Exempt Bonds

Questions and Answers

10. Will the utilities who are members of the Regional Water Commission be liable for the debts and obligations of the Regional Water Commission?

No

Questions and Answers

11. Can a utility purchase water from the Regional Water Commission if the utility is not a member of the Regional Water Commission?

Yes, provided the Commission agrees to sell that utility water.

Questions and Answers

12. Who will set the rate that the Regional Water Commission will charge?

- Board of Commissioners

Questions and Answers

13. Will the Regional Water Commission be subject to jurisdiction by the Kentucky Public Service Commission ("PSC")?

No

Questions and Answers

14. Can a Regional Water Commission sell water to retail customers?

No

Questions and Answers

15. Can a Regional Water Commission "take over" a water utility?

No

Questions and Answers

16. Can the Regional Water Commission provide wastewater collection or treatment services?

No

If you need additional information, please contact:

Damon R. Talley

PO Box 150

Hodgenville, KY 42748-0150

270-358-3187

drtalley@alltel.net

Financial Reasons to Build A Regional Water Supply

- Economies of Scale
- Better Financing Terms
- Lower Unit Operating Costs
- Efficiencies

How to Pay for a New Regional Water Supply

- Maximum Use of Grants and Other External Funding
- "Take or Pay" Contracts from Members
- Sale of Surplus Water
- Sale of Backup ("Reliability") Water Guarantees
- Issuance of Long-Term Debt

Financial Impact on Present Water Providers

- No Competition /Wholesale Only
- Non-Profit Organization
- Uniform Rate
- Determination of Final Cost of Water
- Impact on Water Rates /Bill of Each Utility

Letter of Intent to Purchase

Proposed Conditions

- BWSC to construct water system up to wholesale meter connection
- Minimum 1 mgd commitment to get grid connection
- BWSC may build spare capacity
  - It will be more expensive to buy into this capacity later
- Fees will be approximately:
  - $400,000-$500,000 per mgd of committed capacity per year
  - Above fee includes 200,000 gpd for each 1 mgd of capacity
  - Additional water at about $.60 - $.90 per 1,000 gallons

Example #1
Purchase full 1 mgd every day

Approximate Annual Cost

1 mgd of capacity @ $450,000 = $450,000
(includes 200,000 gpd of water)

Additional 800,000 gpd @ $0.75/1,000 gal.= $219,000

Total annual cost $669,000

Equivalent Cost per 1,000 gallons

$669,000 /1mgd / 365 days/year = $1.83/1,000gal.

Example #2
Purchase minimum 200,000 gallons every day

Approximate Annual Cost

1 mgd of capacity @ $450,000 = $450,000
(includes 200,000 gpd of water)

Additional water = No cost

Total annual cost = $450,000

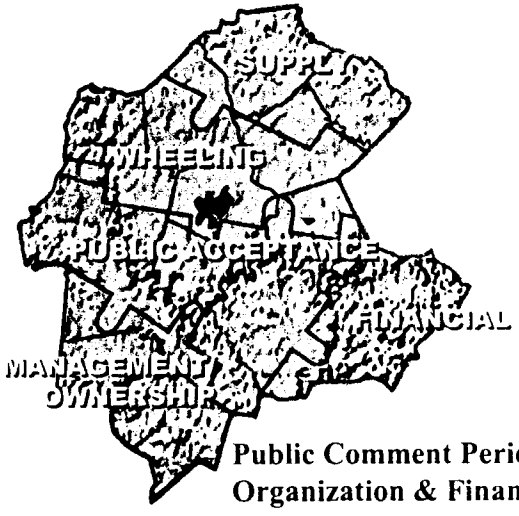
Equivalent Cost per 1,000 gallons

$450,000 /200,000 gpd / 365 days/year = $6.16/1,000gal.

Tech Group Commitments to Date

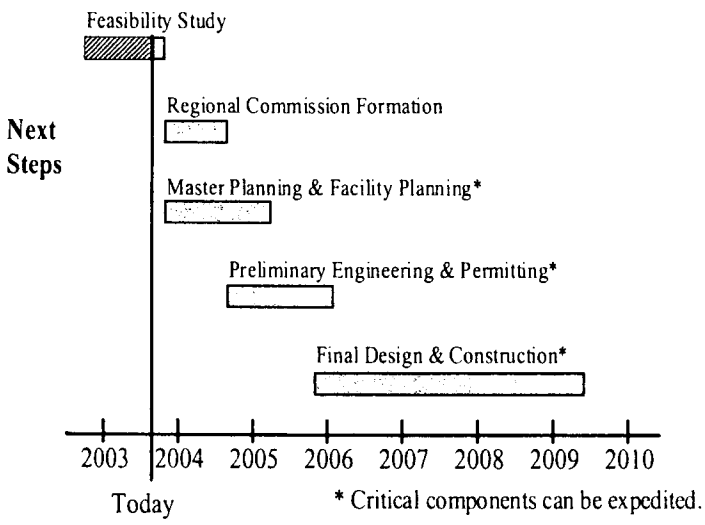
Utility	Capacity Commitment
KAWC	22 mgd
Winchester	3 mgd
Nicholasville	1 mgd
Georgetown	0.255 mgd
Subtotal	26.255 mgd
Frankfort	TBD
All other BWSC Members	TBD

Solving the Bluegrass Area Water Supply Puzzle



Public Comment Period
Organization & Financial

Bluegrass Regional Water Supply



Brainstorming Session

What are our near-term challenges?

- The time it takes to form the Commission
- Expediting grant applications
- Decision making support to potential participants
- Membership criteria
- Communication with LFUCG
- KDOW (e.g., water credits, Pool 3 permitting, Ohio River permitting, grid water quality, etc.)
- KRA dialogue (e.g., dam upgrades and ownership)
- PSC outreach (satisfaction of supply deficit)
- Wholesale Contracts
- Scope definition for master planning
- Funding for near-term work
- Public outreach

What's Next?

Report
- Draft early November
- Final in December

Non-binding resolutions of intent to commit to capacity
- Requests out soon

Formation of Regional Water Commission
- Time critical to many action items

Detailed Planning
- Preliminary engineering/permitting
- Immediate grid improvements

Grant applications

Financial planning, preliminary rate setting and wholesale agreements

Political/ Public Outreach

Communication To-Date

- A unique open process
  - six public workshops and two "open houses"
- Newsletters/mailers
- Agency briefings and technical meetings
- Extensive press coverage
- Updates by Consortium members to their Councils/Boards
- Presentations to civic group meetings

Communications/Public Outreach Key Issues

- Work group will continue outreach to Agencies and legislators
  - Explore grant opportunities
- BWSC representatives must brief their elected officials/management

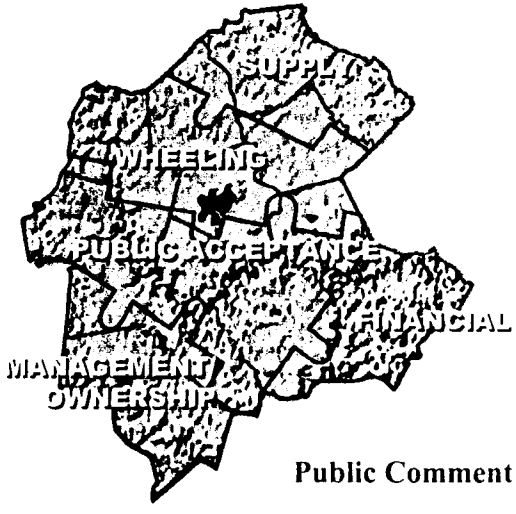
Communications/Public Outreach Near Term Schedule

- Written comments welcome on any issue in the study
  - Due by October 27, 2003
- Draft Report - early November
- Final Report - December

BGADD/BWSC Objectives Met!

- Implementing a Management/Ownership approach which is fair and flexible ✓
- Tapping highly reliable sources of supply ✓
  - To be available within 3 to 5 years
- Optimizing regional water supplies through a grid network ✓
- A financial plan that is affordable, and fairly apportions costs ✓
- Effectively communicating the process and findings ✓

Solving the Bluegrass Area Water Supply Puzzle



Public Comment Period

Solving the Bluegrass Area Water Supply Puzzle

Thank You!

Meeting Minutes for June 9, 2003 (Conference with State and Federal Policy and Program Staff, Frankfort, KY)

Contents

- **Minutes and presentation slides**

BWSC SUMMIT MEETING
July 9, 2003

Name	Representing
Vickie Pettus	Kentucky Infrastructure Authority (KIA)
Bob Logan	Dept Environmental Protection
Jeff Pratt	KY Division of Water
Bob Hunter	Econ. Dev. Adm.
Vernon C. Brown	Rural Development
Roger Recktenwald	KIA
Paul Schoninger	Lexington Fayette Urban County Gov't
Dave Barberie	LFUCG
Wayne Waddell	LFUCG
Mary Jane Warner	Kentucky River Authority/BWSC
Tom Calkins	City of Nicholasville
Mayor John Martin	City of Nicholasville
Bob Riddle	Georgetown Water and Sewer
J. H. Sullivan	Frankfort Plant Board
Linda Bridewell	KY-American Water Company
Vernon Azevedo	Winchester Municipal Utilities
Don Hassall	Bluegrass Area Development District
Ventra Mapp	Department for Local Government
Jeff Hanna	Department for Local Government
George Rest	O'Brien & Gere
Tomas Dumm	O'Brien & Gere

Conference with State & Federal Policy and Program Staff
June 9, 2003
Capital Plaza Tower Conference Room
Frankfort, KY

Attendees:

- Bob Logan - Commissioner of the Department for Environmental Protection
- Jeff Pratt - Director of the Kentucky Division of Water
- Steve Reeder - Executive Director of the Kentucky River Authority
- Dr. Don Haney - Chairman of the Kentucky River Authority
- Vernon Brown - USDA Rural Development
- Bob Hunter - Kentucky's Economic Development Representative for the US Department of Commerce's Economic Development Administration
- Ventra Mapp - Chief of the Division of Community Development for the Kentucky Department for Local Government
- Jeff Hanna - Public Facilities HUD CDBG team leader for Kentucky Department for Local Government
- Roger Recktenwald - Executive Director of Kentucky Infrastructure Authority (KIA)
- Vicki Pettus - KIA
- Paul Schoninger - LFUCG
- Dave Barberie - LFUCG
- Wayne Waddell - LFUCG
- Mary Jane Warner - KRA/BWSC
- Tom Calkins - City of Nicholasville
- John Martin - City of Nicholasville
- Bob Riddle - Georgetown Water & Sewer
- J. H. Sullivan - Frankfort Plant Board
- Linda Bridwell - KY-American Water Co.
- Vernon Azevedo - Winchester Municipal Utilities
- Don Hassall - Bluegrass Area Development District
- George Rest - O'Brien & Gere
- Thomas Dumm - O'Brien & Gere

Introduction

The Bluegrass Water Supply Consortium held a conference with State and Federal Policy and Program Staff on June 9, 2003 to inform the policy and program representatives of the work performed to-date on the Water System Regionalization Feasibility Study. The conference was organized according to the following topics:

- Welcome & Introductions
- Presentation of the status of the Water System Regionalization Feasibility Study
- Comments and Questions
- Recommendations

A brief summary of the key discussions for each of these areas follows.

Welcome & Introductions

Meeting participants introduced themselves and identified their associated organization. Don Hassall identified that the sole purpose of the meeting was to provide information on the status of the work performed to-date on the water system regionalization feasibility study and to answer questions from the policy and program representatives. This water study is of critical importance to the region because it addresses the water supply shortfalls highlighted in drought of 1999 and it involves 16 utilities that serve roughly 700,000 residents in central Kentucky.

Presentation of the status of the Water System Regionalization Feasibility Study

George Rest provided a 20 minute overview of the work performed to-date on the water system regionalization feasibility study. Topics covered included: study objectives, projected supply deficits, sources of supply, water supply selection process, water supply options, organizational alternatives, and financing approach.

Comments and Questions

- Bob Logan identified that the BWSC must be prepared to answer questions related to a more holistic viewpoint (e.g., wasteload assimilation capacity of the streams that will receive the discharge from the areas served by the water supply).
- George Rest emphasized that maintaining the existing dams on the Kentucky River is of critical importance because of it serves as the current water supply source for many of the utilities in the Lexington region. For this study, the projected deficits for the Lexington region were based on the assumption that

the existing supplies on the Kentucky River would be maintained. Dr. Don Haney stated that maintenance of the dams by KRA or the USACOE is a given.

- Dr. Don Haney asked about the feasibility of implementing the near-term projects within the five-year timeframe. George Rest identified five years appears to be realistic for implementation of the near-term alternatives because a majority the projects are long pipelines.
- Steve Reeder identified that Dam 9 rehabilitation is entirely State funded and is on the same schedule as the Dam 10 rehabilitation. Dam 10 is considered to be a baseline alternative which reduces the overall supply deficit by an assumed 10 mgd. Rather than further reduce the near-term water supply need by also including the potential additional supply from Dam 9 as a baseline alternative, O'Brien & Gere will take a somewhat more conservative approach and continue to consider Dam 9 as a long-term alternative to meet demands beyond 2020.

Recommendations

Don Hassall and Vernon Azevedo reiterated the importance of this water study and requested that the policy and program representatives support this effort by identifying potential obstacles and solutions that could assist in gaining approval for the recommended plan. It was suggested that the meeting participants meet again after Workshop 5 and prior to the public meeting.

BGADD
Bluegrass Area Development District

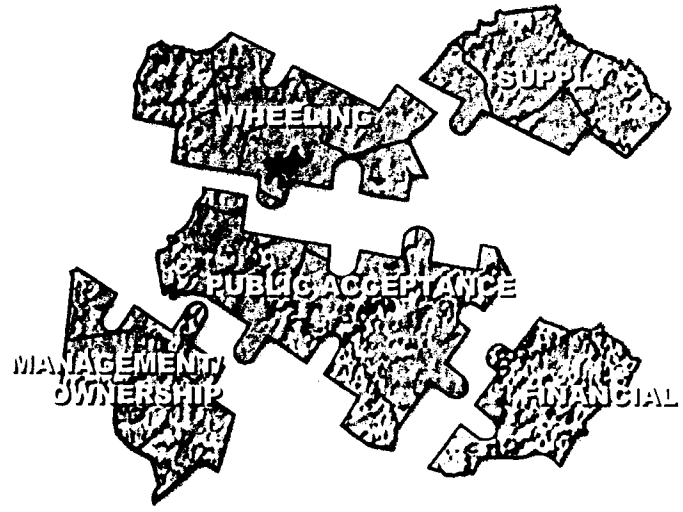
Bluegrass Water Supply Consortium

Water System Regionalization Feasibility Study

Project Status Briefing
June 9, 2003

CDP CARTER DIXON PARTNERS · O'BRIEN & GERE ENGINEERS, INC · MapSync

Solving the Bluegrass Area Water Supply Puzzle



BWSC Participants

- Berea College Utilities
- Cynthiana, City of
- Danville, City of
- Frankfort Water Plant Board
- Georgetown Municipal Water/Sewer Service
- Harrodsburg, City of
- Kentucky American Water Company
- Lancaster, City of
- Lawrenceburg, City of
- Lexington-Fayette
- Mt. Sterling Water & Sewer Commission
- Nicholasville Utilities
- Paris, City of
- Shelbyville Water & Sewer Commission
- Versailles, City of
- Wilmore, City of
- Winchester Municipal Utilities

BGADD/BWSC Objectives

- Implementing a Management/Ownership approach which is fair and flexible
- Tapping highly reliable sources of supply
  - To be available within 3 to 5 years
- Optimizing regional water supplies through a grid network
- A financial plan that is affordable, and fairly apportions costs
- Effectively communicating the process and findings

Briefing Objectives

- Review Goals and Objectives
- Project Status
- Identify areas of needed cooperation

Source of Supply

Projected Supply Deficits for BWSC ....*through 2020*

- **Maximum Day Permit Deficit** = 169 mgd demand - 133 mgd permitted withdrawal = **36 mgd** (***this is also the WTP capacity deficit***)
- **Worst-case Drought Deficit** = 169 mgd demand - 67 mgd permitted drought withdrawal = 102 mgd
- **Hybrid Drought Deficit** = 134 mgd hybrid maximum day demand - 67 mgd permitted drought withdrawal = **67 mgd** ***(this is our 2020 supply target)***

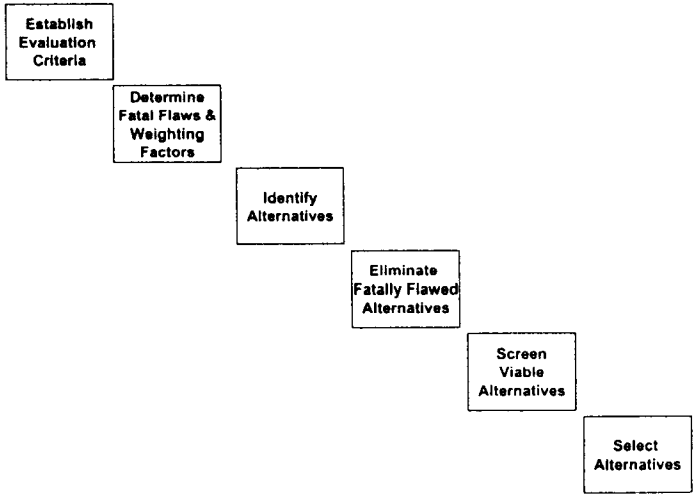
Source of Supply

Projected Supply Deficits for BWSC ....*Beyond 2020*

- **Add about 2 mgd/year**

Source of Supply

Water Supply Selection Process



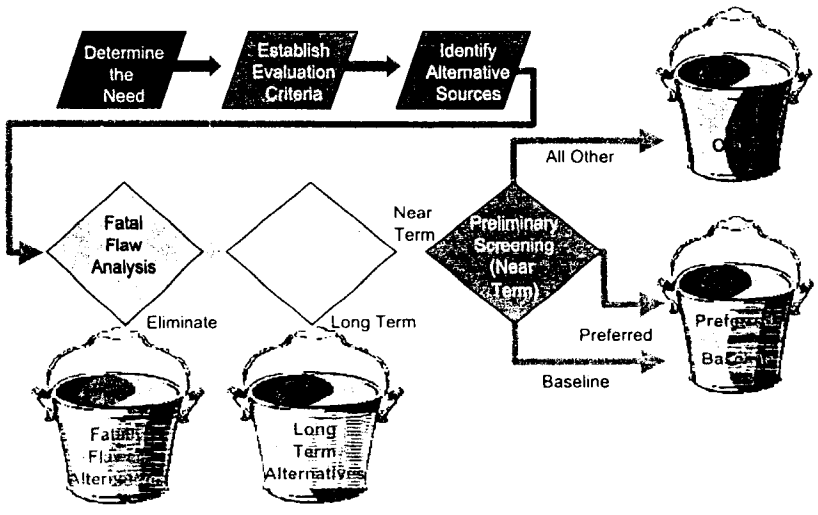
Source of Supply Evaluation Criteria

- Adequate Capacity
  - ✓ non-interruptible/reliable
- Raw/Finished Water Quality
- Cost
- Implementability / Risk of Delays
  - ✓ permittable
  - ✓ public acceptance
  - ✓ property acquisition
  - ✓ constructable
- Flexibility
  - ✓ phased implementation

Source of Supply Options

Group	Number
Ohio River	7
Kentucky River	8
Existing Reservoirs	7
New Reservoirs	12
Groundwater	6
Total	40
Near Term Potential	***16***

Selecting Additional Sources of Supply



Baseline Alternative Concept

- Baseline Alternatives ~ Assumed part of region's future water supply, *and optimize use of the Kentucky River*
  - Negative consumptive use (*water credit)* and utilize Frankfort's WTP....add 12 mgd during drought at no cost.
  - Raising Dam 10
    - Proceed with 4-6 foot higher dam....10 mgd assumed increase during drought.
  - *Total 22 mgd assumed increase from Baseline Alternatives during drought.*
    - *Note: KDOW indicated potential that water credit may be linked to additional environmental studies.*

Baseline Alternative Concept

- Net required near term source of supply:
  - During drought 67 mgd - 22 mgd = ***45 mgd (or 57 mgd if water credit not available)***

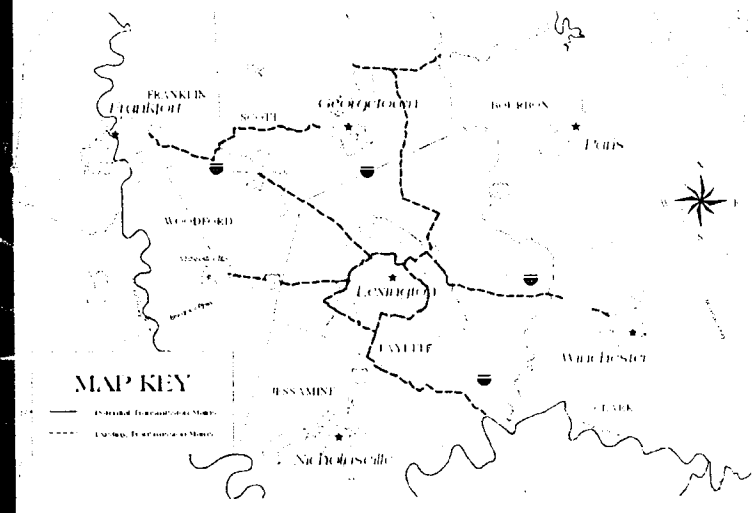
Preferred Water Supply Options

- Pipeline/purchase finished water:
  - Louisville Water Company
  - Cincinnati via Boone Florence Regional Water Commission
  - Cincinnati via Bracken County
  - Carrollton Utilities/ Carroll County WD No. 1
  - Greater Fleming Regional Water Commission
- Kentucky River~ New WTP at Pool 3
- Ohio River
  - New WTP at Maysville/Dover
  - New WTP at Warsaw

What's Next on Supply?

- Pre-negotiation for water purchases
- Concept layout/ preliminary routing
- Regulatory agency discussions
  - withdrawals
  - consumptive use credit
  - finished water quality in grid system
- Refine Cost Estimates
- Final Selection

Grid Network



Wheeling

Benefits of Wheeling

Immediate

- Peak day attenuation
- Optimize use of existing sources
- Grant funding

Long Term

- Economy of scale
  - ✓ new supply and treatment
- Reliability of multiple sources
- Easier to phase regional growth

Organizational Alternatives

- New traditional public agency under existing Kentucky revised statutes
  - Regional Water Commission (KRS 74.430)
  - Instrumentality of Governmental agencies
- New public agency requiring special legislation

Financial

Simple Financial Approach

- Wholesale service only
- Common unit cost for new facilities
- Take or pay for committed capacity
- Tax Exempt Status (Meet IRS Private Purpose rules)
- Secure grant funding to maximize regionalization

Political/ Public Outreach

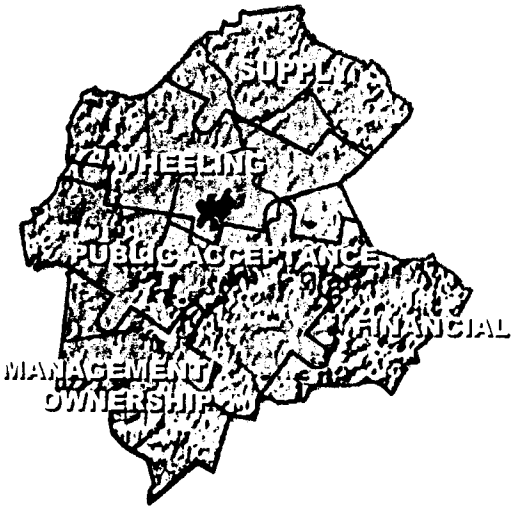
Communications/Public Outreach Near Term Schedule

- Workshop No. 5 ***Decisions*** (July 23, 2003)
- Public Meeting ~August, 2003
- Final Workshop ~ September, 2003
- Work group is addressing legislative issues.
- BWSC representatives briefing their elected officials/management.

Areas of Needed Cooperation

- KDOW- Kentucky River withdrawals:
  - Water credits (without linkage to unfunded studies)
  - Withdrawal permit at Pool 3 (if requested)
- KDOW- Water Quality
  - Clear and timely direction on grid regulation/consecutive systems
  - Support to continue working out grid regulation and water quality concerns ***after*** the Regionalization Study
- KRA, ACOE, others
  - Expedite raising of Dam 10
  - Maintain all other dams to secure River supplies

Solving the Bluegrass Area Water Supply Puzzle



Meeting Minutes for August 21, 2003 (Briefing for Elected Officials in Lexington, KY and State Agencies in Frankfort, KY)

Contents

- **Minutes and presentation slides**

Attendance Roster

Bluegrass Water Supply Consortium Session

9:30 a.m., Thursday, August 21, 2003

	Name	Representing
1.	Don Hassell	Bluegrass ADD
2.	Ryan Owens	City of Danville
3.	Rep Lynne Napier	Lancaster, Berea, Richmond,
4.	Donna Powell	Lancaster
5.	Virgie F Willis	Cynthiana
6.	Clyde Gillian	Cynthiana
7.	Michael Finch	Berea College Utilities
8.	[illegible]	Shelby County Judges Office
9.	Mike Bellamen	KLC
10.	[illegible]	Frankfort Plant Board
11.	Herbie Bannister	Frankfort Plant Board
12.	Bill [illegible]	Sen. Bunning
13.	Kathy Hamilton	Sen. McConnell
14.	Bob Riddle	CMWSS
15.	John P. Martin	City of Nicholasville
16.	[illegible]	City of Paris
17.	Bob Usher	City of Paris
18.	Linda Bradwell	KAWC

	Name	Representing
19.	[illegible]	FPB
20.	Tom Calkins	City of Nicholasville
21.	RJ Palmer	28th Senate Dist.
22.	John Steinmetz	CDP Engrs
23.	Jas Sekhon	Bluegrass ADD
24.	MARY JANE WARNER	EKPC
25.	Brian Traugott	Joe Barrows
26.	SHAWN DYER	CONGRESSMAN FLETCHER
27.	Teresa Barton	Franklin Co J/E
28.	Bart Miller	City of Versailles
29.	[illegible]	" "
30.	Teresa Isaac	Mayor Lex
31.	TIM KRAUS	O'Brien & Gere Engineers
32.	Wayne Wassell	LFUCG
33.	Joe D. Gormley	Woodform
34.	George Rest	O'Brien + Gere Engrs
35.	Thomas Dumm	" " "
36.	Carolyn Belcher	H 72 - State Rep
37.	Derrick Graham	H 57 - State Rep
38.	DAVE BARBERIE	LFUCG
39.	VERNON AZEVEDO	Winchester Municipal Utilities
40.	Cheryl Goodman	Bluegrass ADD
41.	Michael F Wright	Scott Co.
42.		
43.		

From: Thomas Dumm
Re: 8/21 Meeting
File: 30507/3_memos/82103mtgmnts.doc
Date: October 6, 2003

cc:

A meeting with the Bluegrass Water Supply Consortium (BWSC) Tech Group and Legislators was held on August 21, 2003.

The following is a summary of the pertinent discussions.

Legislator's meeting at BGADD (9:30 AM)

OBG presented the status of the study and answered questions. Legislators recommended that BWSC bundle packages into $5 million appropriations.

Agency briefing at KIA (2:15 PM)

Meeting participants: Pettus (KIA), Wilburn (KIA), Haney (KRA), Pratt (KDOW), and List (KNREPC). Hassall (BGADD), Sullivan (Frankfort), Waddell (LFUCG), Warner (KRA), Azevedo (Winchester), Bridwell (KAWC), Calkins and Mayor Martin (Nicholasville), Rest (OBG), Dumm (OBG), Steinmetz (CDP).

- OBG presented a progress update on the water supply study. Question were asked about the status of Herrington Lake. Going east toward Warsaw was considered more desirable from a regionalization perspective. Need to define why it is in the best interest to do this project – economics of scale.
- Need a pipeline to the Ohio River for future grid expansion.
- What is the schedule? Need to have the project in place in 5 years. Could get Frankfort and Georgetown using the water credits in 3 years.
- Need to develop a concept schedule (timeline) for implementation. KDOW will continue to support.

BGADD
Bluegrass Area Development District

Bluegrass Water Supply Consortium

Water System Regionalization Feasibility Study

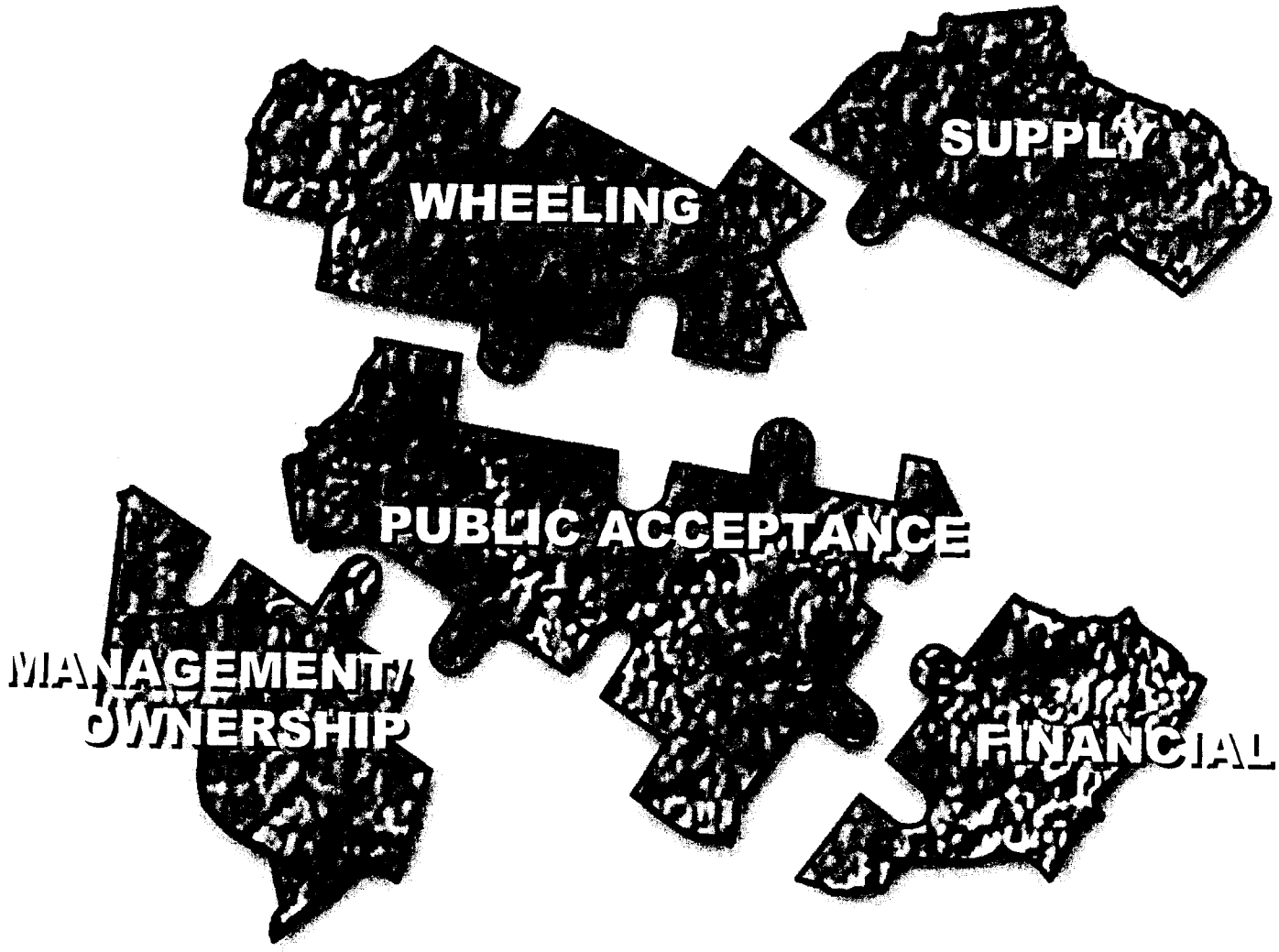
Project Status Briefing
August 21, 2003

CDP ENGINEERS, INC.
CARTER DIXON PARTNERS

O'BRIEN & GERE ENGINEERS, INC.

MapSync

Solving the Bluegrass Area Water Supply Puzzle



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- Effectively communicating the process and findings

Briefing Objectives

- Review Goals and Objectives
- Project Status
- What we need from You!

BGADD/BWSC Objectives

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Organizational Alternatives

- New traditional public agency under existing Kentucky revised statutes
  - Regional Water Commission (KRS 74.430)
  - Instrumentality of Governmental agencies (KRS Chapter 58)
- New public agency requiring special legislation

Organizational Alternatives

- New traditional public agency under existing Kentucky revised statutes
  - **Regional Water Commission (KRS 74.430)**
    - **Selected at Workshop No. 5**
  - Instrumentality of Governmental agencies (KRS Chapter 58)
- New public agency requiring special legislation

BGADD/BWSC Objectives

- Implementing a Management/Ownership approach which is fair and flexible
- ***Tapping highly reliable sources of supply***
  - ***To be available within 3 to 5 years***
- ***Optimizing regional water supplies through a grid network***
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Projected Supply Deficits for BWSC ....*through 2020*

- **Maximum Day Permit Deficit** = 169 mgd demand - 133 mgd permitted withdrawal = **36 mgd (*this is also the WTP capacity deficit*)**

- **Worst-case Drought Deficit** = 169 mgd demand - 67 mgd permitted drought withdrawal = 102 mgd

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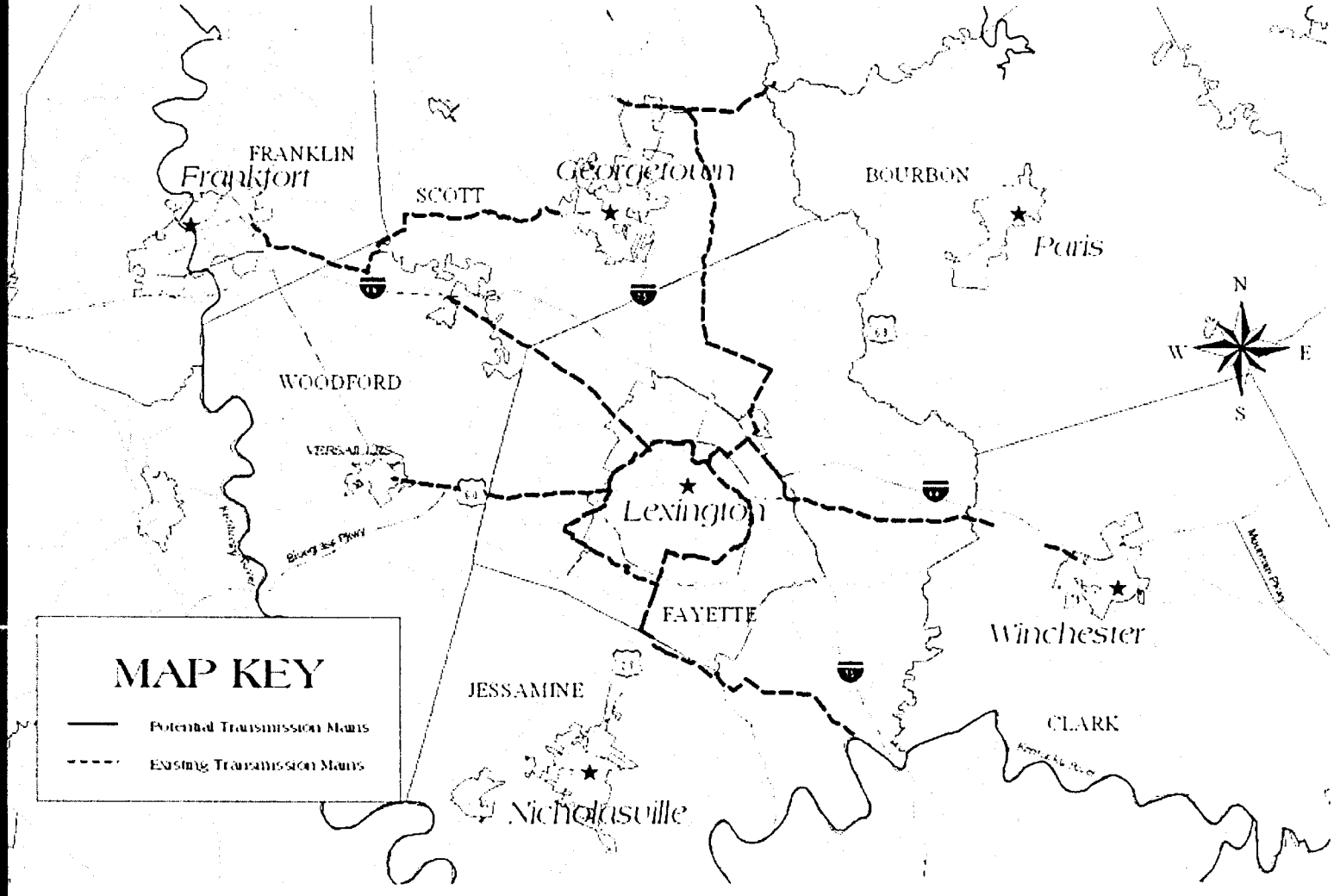
Projected Supply Deficits for BWSC ....*Beyond 2020*

- **Add about 2 mgd/year**

Grid Network



Benefits of Wheeling

Immediate

- Peak day attenuation
- Optimize use of existing sources
- Grant funding

Long Term

- Economy of scale
  - ✓ new supply and treatment
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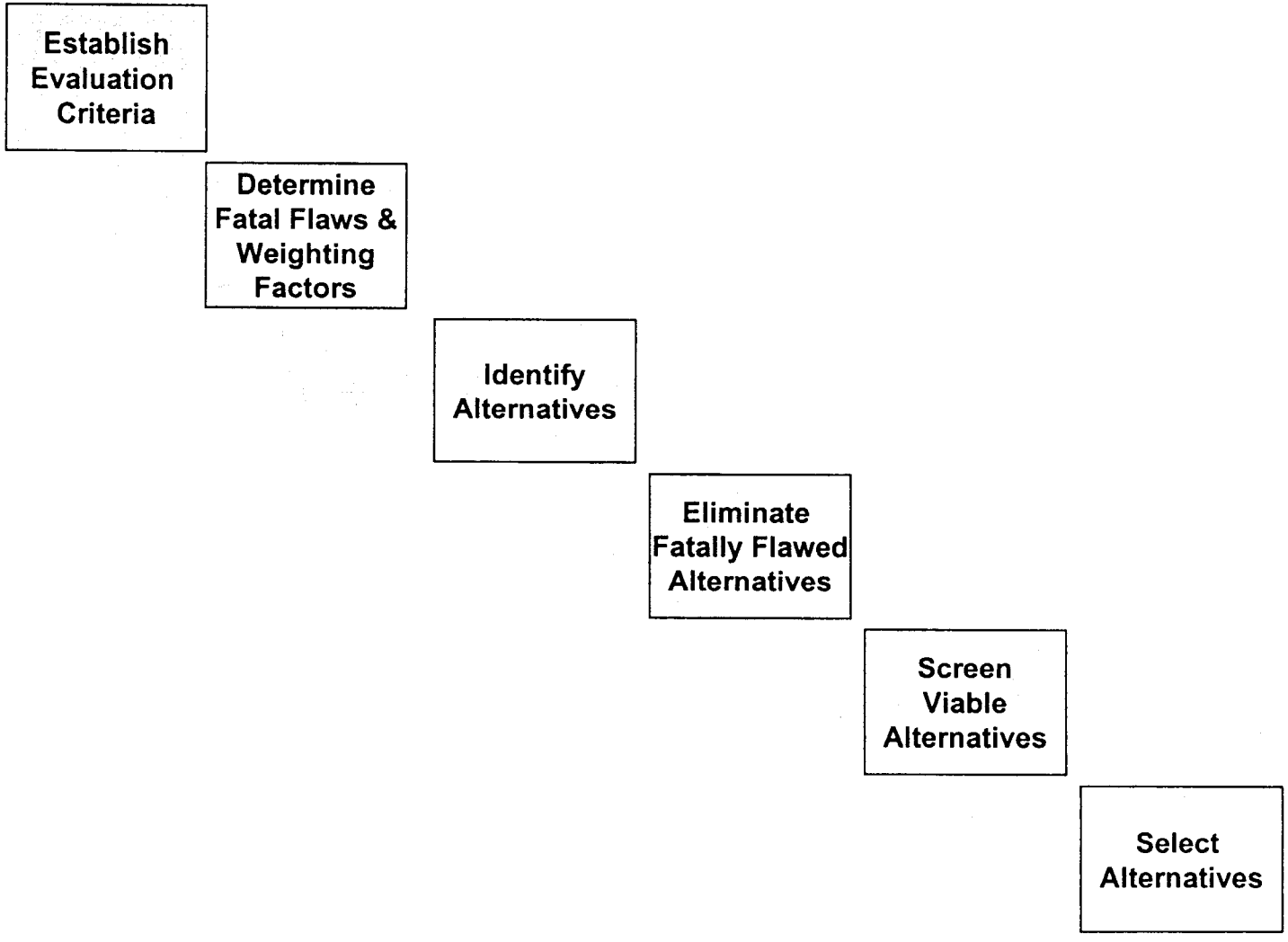
Water Supply Selection Process



Source of Supply Evaluation Criteria

- Adequate Capacity
  - ✓ non-interruptible/reliable
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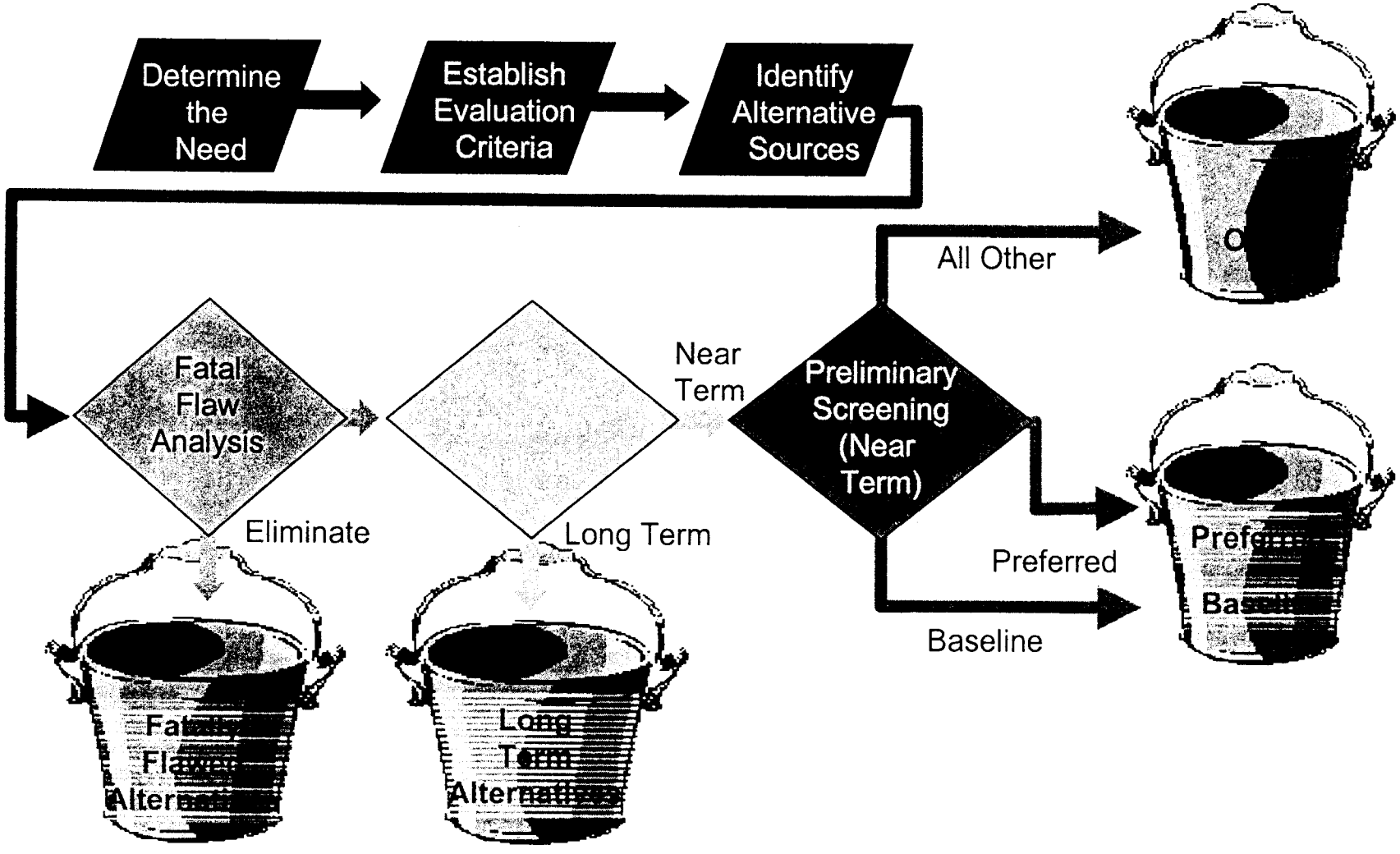
- Implementability / Risk of Delays
  - ✓ permittable
  - ✓ public acceptance
  - ✓ property acquisition
  - ✓ constructable
- Flexibility
  - ✓ phased implementation
  - ✓ expandable in future

Source of Supply Options

Group	Number
Ohio River	7
Kentucky River	8
Existing Reservoirs	7
New Reservoirs	12
Groundwater	6
Total	40

Near Term Potential ***16***

Selecting Additional Sources of Supply



Baseline Alternative Concept

- Baseline Alternatives ~ Assumed part of region's future water supply, **and optimize use of the Kentucky River**
  - **Water credit** and utilize Frankfort's WTP....add 12 mgd during drought at no cost.
  - Raising Dam 10
    - Proceed with 4-6 foot higher dam....10 mgd assumed increase during drought.
  - **Total 22 mgd assumed increase from Baseline Alternatives during drought.**

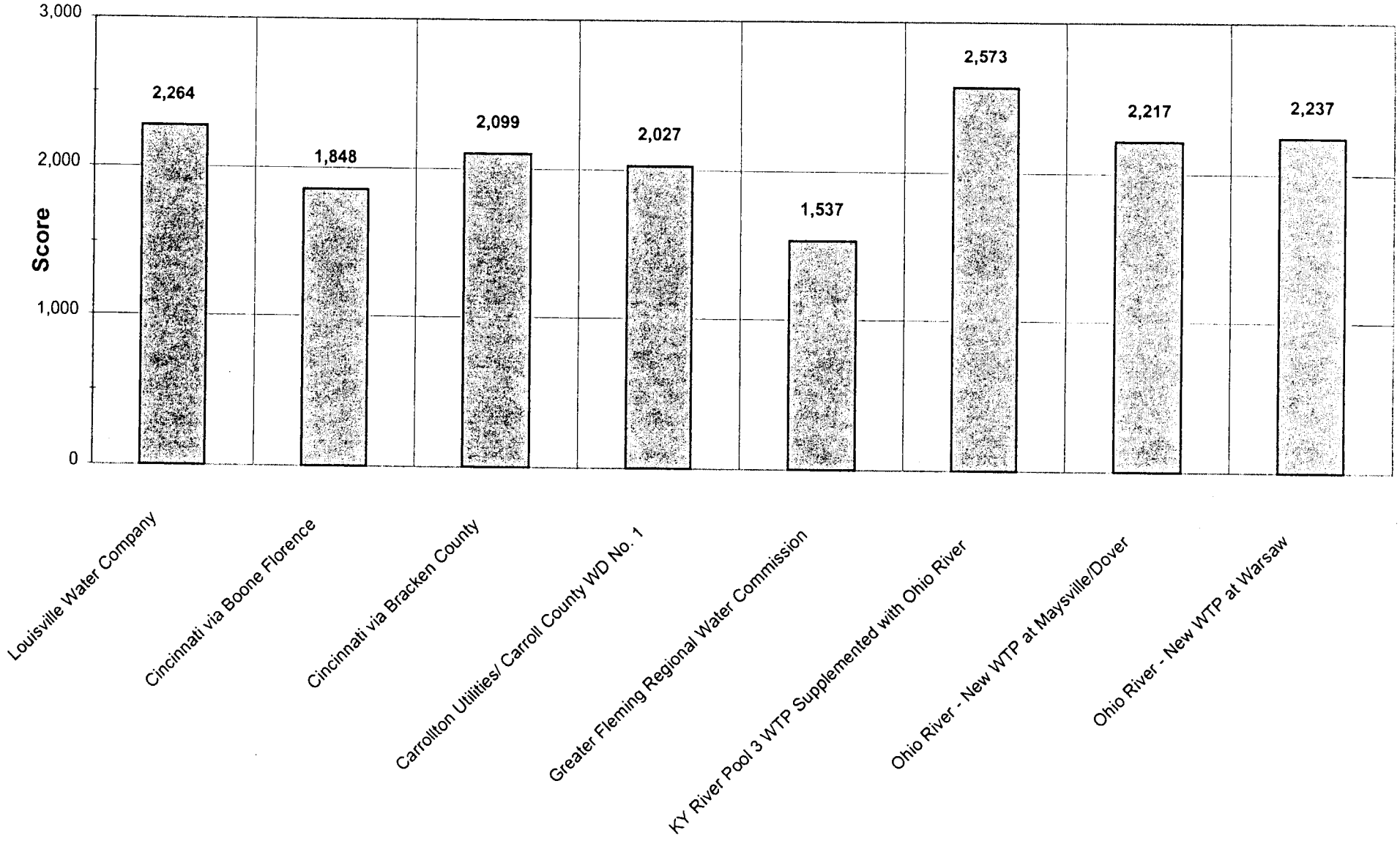
Baseline Alternative Concept

- Net required near term source of supply:
  - During drought 67 mgd - 22 mgd = ***45 mgd***

Preferred Water Supply Options

- Pipeline/purchase finished water:
  - Louisville Water Company
  - Cincinnati via Boone Florence Regional Water Commission
  - Cincinnati via Bracken County
  - Carrollton Utilities/ Carroll County WD No. 1
  - Greater Fleming Regional Water Commission
- Kentucky River~ New WTP at Pool 3 supplemented by Ohio River
- Ohio River
  - New WTP at Maysville/Dover
  - New WTP at Warsaw

Results of Tech Group Pairwise Comparison
(Highest Scores are Most Preferred)



Water Supply Alternative

BGADD/BWSC Objectives

- Implementing a Management/Ownership approach which is fair and flexible
- Tapping highly reliable sources of supply
  - To be available within 3 to 5 years
- Optimizing regional water supplies through a grid network
- **A financial plan that is affordable, and fairly apportions costs**
- Effectively communicating the process and findings

Simple Financial Approach

- Wholesale service only
- Common unit cost for new facilities
- "Take or pay" for committed capacity
- Tax Exempt Status (Meet IRS Private Purpose rules)
- Secure grant funding to maximize regionalization

Financial Impacts

- Regional Economic Vitality
- Grid network provides
  - economy of scale
  - enhanced reliabilty
- Grants will improve affordability

BGADD/BWSC Objectives

- Implementing a Management/Ownership approach which is fair and flexible
- Tapping highly reliable sources of supply
  - To be available within 3 to 5 years
- Optimizing regional water supplies through a grid network
- A financial plan that is affordable, and fairly apportions costs
- **Effectively communicating the process and findings**

Communication to Date

- A unique open process
  - five public workshops and one public meeting
- Newsletters/mailers
- Agency briefings and technical meetings
- Extensive press coverage
- Updates by Consortium members to their Councils/Boards

Communications/Public Outreach Near Term Schedule

- Second briefing to Agencies - Today
- Public Meeting - September 22, 2003
- Final Workshop - October 13, 2003
- BWSC representatives briefing their elected officials/management
  - Resolutions to commit to water purchases

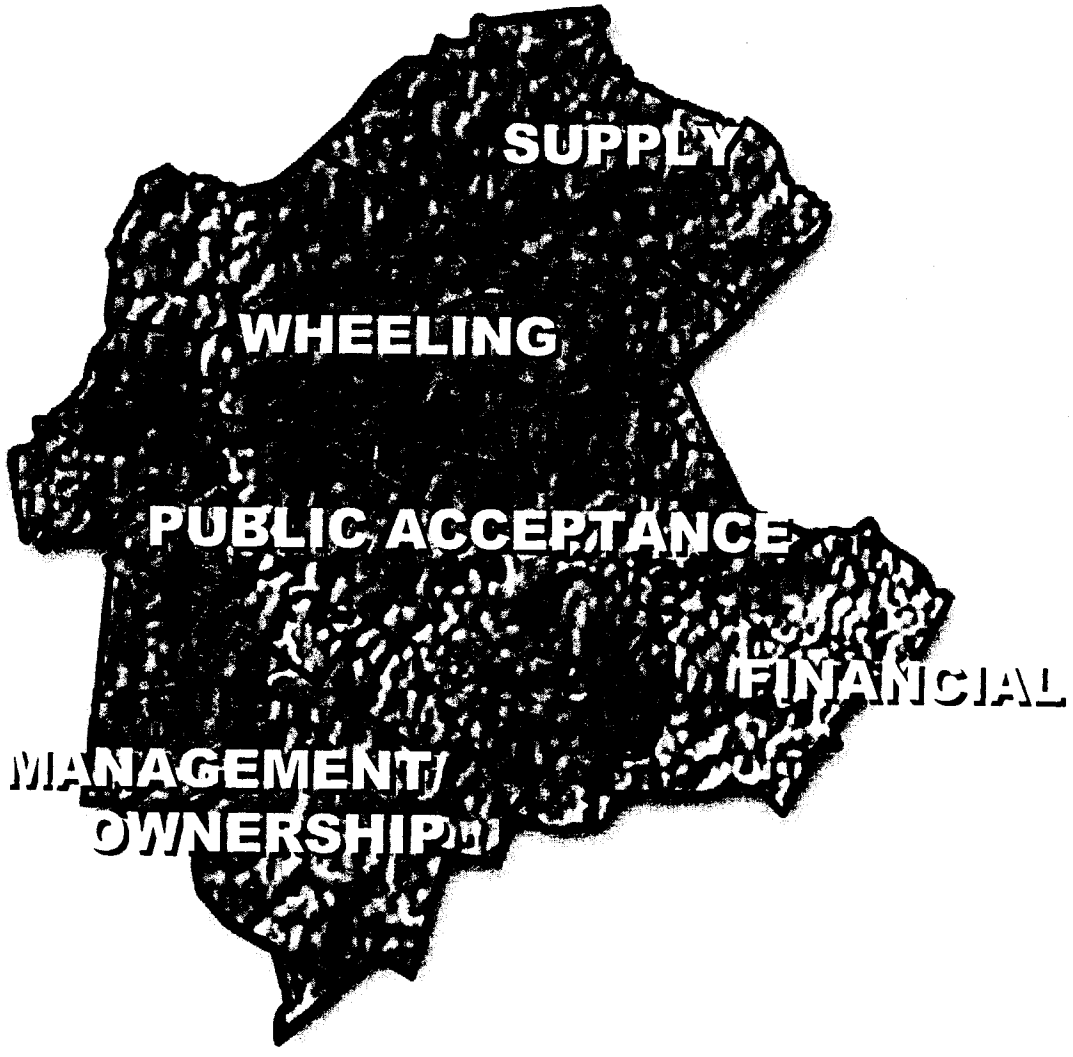
Areas of Recent Cooperation

- KDOW- Kentucky River withdrawals:
  - Water credits- intent is more clear
  - Potential Withdrawal permits (if requested) at Pool 3 and Ohio River
- KDOW- Water Quality
  - Timely direction on grid regulation/consecutive systems
  - Support to continue working out grid regulation and water quality concerns after the Regionalization Study
- KRA, USACOE, others
  - Expedite raising of Dam 10
  - Continued commitment to maintain all other dams and to pursue long term Kentucky River supplies

What we need from you!

- Engagement
  - Expand partnership among stakeholders
- Suggestions
- Support
  - Continuing cooperation
- Help in securing grants/financial support

Solving the Bluegrass Area Water Supply Puzzle



Action Items

- Continue discussions with *Louisville Water Co.* regarding *cost of water*
- Continue discussions with KDOW about *Kentucky River Pool 3 Supplemented with Ohio River*
- Start to assess critical paths for implementation
- Verify each members desired "take or pay" capacity
- **Maintain momentum!**

Communications/Public Outreach Near Term Schedule

- Briefings to Elected Officials - Today
- Public Meeting - September 22, 2003
- Final Workshop - October 13, 2003
- BWSC representatives briefing their elected officials/management
  - Resolutions to commit to water purchases

What we need from you!

- Engagement
- Suggestions
- Support
  - and KDOW's continued cooperation
- Help in securing grants/financial support

Financial Impacts-Without Grants

- Increased BWSC Utilities revenue needs
  - about 1/4 to 1/3 on average
  - some much higher, depending on quantity needed
- Capacity Cost- $400,000-$500,000 per mgd
- Effective purchase price-
  - from $1.75/1,000 gal. (fully use capacity)
  - to $6.00/1,000 gal.(minimum purchase)

News Articles

project, the cost must be borne by the users. The amount by which your local utility rates will increase will be a local decision and be partially based upon the amount of water purchased from the BWSC grid.

What is the timeframe for implementation of BWSC's efforts?

BWSC's goal is to have the initial study effort complete in September 2002. To avoid the potential curtailment of water supply when the next drought occurs, BWSC expects to implement the recommendations of the consultant following completion of the study.

Why will this approach work when others haven't?

BWSC has broad support for implementing a truly regional approach to the water supply problems facing central Kentucky. This support comes from the utilities, government agencies, and regulatory agencies. The regional approach ensures water system availability to every participating entity. Regionalization promotes local autonomy and local decision-making for water utilities and at the same time develops public-private partnerships in order that all participating entities can benefit from the obvious economies of scale. Regionalization is simply the best answer to central Kentucky's treated water needs.

Who should I contact for more information?

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Assistant Executive Director
Bluegrass Area Development District
699 Perimeter Dr.
Lexington, KY 40517
859-269-8021

Bluegrass Water Supply Consortium
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699 Perimeter Drive
Lexington, KY 40517

QUESTIONS AND ANSWERS ABOUT THE

BLUEGRASS WATER SUPPLY CONSORTIUM

JULY 2001

What is the Bluegrass Water Supply Consor

The Bluegrass Water Supply Consortium (BWSC) is an alliance of government agencies and water utilities -- both public and private -- that have been working together for the past 24 months to address the potable (treated) water needs of central Kentucky. The entities involved include the Lexington Fayette Urban County Government, the Kentucky American Water Company, the Winchester Municipal Utilities, the Georgetown Water and Sewer Service, the Frankfort Water and Electric Plant Board, the Shelbyville Municipal Water and Sewer Commission, and the cities of Nicholasville, Harrodsburg, Versailles, Lawrenceburg and Wilmore. The Kentucky River Authority, the Kentucky Division of Water, and the Kentucky Infrastructure Authority have also been involved in the deliberations of BWSC.

Why was BWSC formed?

The 1999 drought made it clear that a shortage of treated water is a serious and growing regional problem. The region's water utilities decided they could best address this problem as a group. BWSC was formed when the region's water utilities united to seek the most effective solution for all water users in the region.

How does BWSC plan to address the potable water needs of central Kentucky?

BWSC's goal is to expand treated water supplies and to construct a grid of waterlines across central Kentucky connecting the participating water utilities. Through the grid, BWSC plans to "wheel" or move the water to meet the needs of the member water utilities and their customers.

How is the approach of BWSC different than others pi ed to date?

Previous plans to address the potable water needs of various communities have not addressed the problem on a regional basis. BWSC's plan is a regional approach -- one by which all of the area's stakeholders will benefit. Regionalization is promoted by state and federal government and regulatory agencies as the means to ensure that everyone has access to safe, clean, and plentiful drinking water. Regionalization offers system reliability that cannot be met by individual planning efforts.

Isn't drinking water supply the charge and responsibility of the Kentucky River Authority?

No. The Kentucky River Authority (KRA) is charged with management of the Kentucky River and raw water supply in the Kentucky River drainage basin. BWSC is focusing on treated water management. The efforts of BWSC complement the efforts of KRA.

If implemented, does BWSC plan to abandon the Kentucky River as a source of water supply?

No. The Kentucky River will remain the primary source of supply for water utilities that now rely on the river. BWSC's approach is to augment current potable water supplies and treatment systems to ensure water availability during a drought.

What will be the source of water for BWSC? Is BWSC considering a water treatment plant on the Kentucky River or a treated water pipeline to an Ohio River Source?

BWSC is retaining a team of nationally recognized consultants with expertise in management, finance, and e ering to analyze alternatives and make recommendations. One question to be answered is the source of supply for the gridded water system. Both options will be considered.

How will BWSC manage and oversee the implementation of a regional water supply plan?

We expect to call on this team of consultants to also identify best management practices and an appropriate business structure to achieve cost-effective solutions for providing increased treated water supply to central Kentucky.

Where is BWSC obtaining the money to fund this effort?

Congress, through the efforts of the Hon. Ernie Fletcher, Representative of the 6th District, appropriated $300,000 to study the regionalization concepts proposed by BWSC. A local match of $200,000 is expected from the Kentucky Infrastructure Authority. Approximately $35,000 from the participating entities will provide the balance of the funds.

Will BWSC attempt to replace the local water utilities?

No. The local utilities with their treatment facilities and their water distribution systems are integral to the success of the BWSC concept and will remain separate. BWSC intends to augment the treated water supplies of those participating utilities.

If my local utility participates with BWSC, will our water rates increase?

Yes. As with any utility improvements

A Publication of the Bluegrass Area Development District

ADD-VANTAGE

Potable Water Supply Planning Effort Explained at Public Meeting

The Bluegrass Water Supply Consortium's effort to plan for an enhanced supply of potable water and for a water system grid to connect area water utilities is off and running. More than 200 people attended an August 6 meeting at the Henry Clay High School Cafeteria to learn the who, what, where, and how of the water planning effort which is now commencing.

Bluegrass Water Supply Consortium participants include Berea College Utilities, Bluegrass ADD, Frankfort Electric and Water Plant Board, Georgetown Municipal Water and Sewer Service, Harrodsburg, Lawrenceburg, Lexington-Fayette, Kentucky-American Water Company, Nicholasville Combined Utilities, Mt. Sterling Water and Sewer Commission, Paris, Shelbyville Water and Sewer Commission, Versailles, Wilmore, and Winchester Municipal Utilities. A speakers' bureau has been formed to furnish speakers to city and county governments, to civic clubs, and others—in an effort to explain what is being undertaken and why. A subsequent meeting for the general public is planned for early 2003. Study completion by late Spring 2003 is likely.

The planning effort is being financed in part by an EPA grant of $290,400 and by a Kentucky Infrastructure Authority grant of $245,000. For more information, contact Don Hassall at the ADD.

Volume 26, Number 4, August/Septemember 2002

Bluegrass Area Regional Water Effort Makes National News

The ADD, working with area water utilities and others, makes up the 15 member Bluegrass Water Supply Consortium. The Consortium's plans to address the region's drinking water supply problem cooperatively received national attention when the August 6 edition of ***USA Today*** took notice. Just as Bluegrass ADD has always promoted, "Working together works."

Volume 26, Number 4, August/Septemember 2002

City Hears About Water Group

Harrodsburg Herald
10/24/02

By Rosalind Turner
Herald Staff Writer

The merits of participating in a water consortium headed the agenda Tuesday night at the Harrodsburg City Commission meeting.

Don Hassell from the Bluegrass Area Development District gave an overview, which included the benefits of participating in the Bluegrass Water Supply Consortium.

Hassell noted that water accumulation averages for 2002 would not show the drought conditions because of the significant rainfall during the last five weeks. However, he reminded the commission of the dry months experienced during the summer.

"It takes less of a drought to cause problems than it did 10 years ago," he noted.

Hassell reviewed a Bluegrass Regional Water Supply Study by O'Brien and Gere Engineers Consulting Team and five study components to be used in decision making:

- Water Supply Alternatives - Selecting the sources of water supply
- Wheeling - How to move the water throughout the region
- Management/Ownership Alternatives - Who will own and operate the new regional supply facilities
- Financial Considerations - Cost and impact on customer bills
- Communication and Public Outreach - Communication among the BWSC members and the public.

The city's financial involvement to date is $1,000, which is basically the city's membership fee. This is the "modest" amount asked of participating communities at this time. Hassell said the total amount of the project is unknown, but his ball park estimate is between $100 million and $200 million. He said the project also will involve federal and state grants.

He said it is a large ticket item, but stressed its merits especially in the years ahead.

"You have to have infrastructure," he said. "You have to have it, you just do it."

Hassell did not ask for any action from the city commission.

LEXINGTON HERALD-LEADER
NOVEMBER 12, 2002

Pipeline grid considered for supplemental water

CONSULTANT MEETS WITH UTILITY REPRESENTATIVES

By Andy Mead
HERALD-LEADER STAFF WRITER

The river is high, the ground saturated, but representatives of Central Kentucky's water utilities spent most of yesterday planning for the next drought.

Members of the Bluegrass Water Supply Consortium envision a future in which the region is connected by a grid of pipes carrying water that could be counted on even when the skies produce no rain for weeks on end.

Just where that water might come from is one of several issues that will be addressed in the next several months by the Maryland firm of O'Brien & Gere Engineers, which has been hired to come up with a plan for the consortium.

Yesterday was the first of six public workshops between the consultant and the utilities. As expected, it produced a lot more questions than answers.

■ What will be the source of an "uninterruptible supply" that could drought-proof the region?

The consultants will look at pipelines to bring treated water from Louisville or Cincinnati, from the fledgling Fleming County Regional Water Commission, which plans to sink wells into an Ohio River aquifer in Lewis County, or from a new consortium-owned treatment plant on the Ken-

See WATER, B2

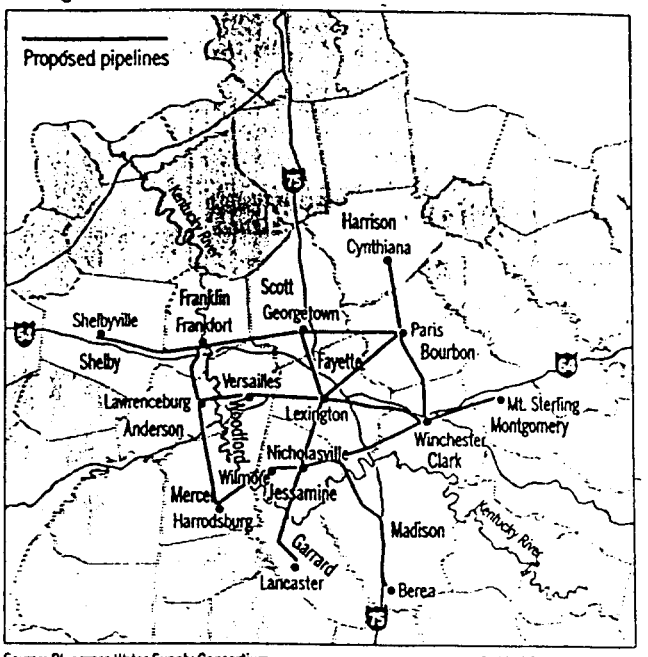
WATER SUPPLY CONSORTIUM

For more information on the Bluegrass Water Supply Consortium, contact Don Hassall 269-8021 or dhassall@bglife.com.

The consortium consists of the Lexington-Fayette Urban County Government; Kentucky-American Water Co.; Nicholasville Utilities; Winchester Municipal Utilities; Georgetown Municipal Water and Sewer Service; Frankfort Electric and Water Plant Board; Shelbyville Municipal Water and Sewer Commission; Mount Sterling Water and Sewer Commission; Berea College Utilities; and the cities of Harrodsburg, Versailles, Paris, Lawrenceburg, Lancaster, Cynthiana and Wilmore.

Envisioning a grid

Here's what the Bluegrass Water Supply Consortium's grid might look like someday. No precise routes have been determined, but this shows how the system of pipes could connect water utilities in the region. A source of water for the grid has not been determined.



Source: Bluegrass Water Supply Consortium

CAMILLE WEBER | STAFF

WATER | Group formed during 1999 drought

From Page B1

tucky or Ohio Rivers, or on Herrington Lake, Cave Run Lake or Lake Cumberland.

■ Will the grid just sit there until a drought happens?

No, utilities would have to agree to take some water every day. The grid also could be used for emergencies, such as a Kentucky River dam failure or a loss of power in, for example, Nicholasville.

■ Would development sprout up along the lines of the grid?

Probably not. There was discussion yesterday about structuring the consortium's rules in such a way that that couldn't happen.

■ Who would run the consortium?

A better question is, how would the member utilities with different priorities and goals run it?

One of the consultant's tasks is to come up with a management model that would suit Kentucky-American Water Co., a private company that is by far the largest member of the group, and much smaller municipal utilities, as well as cities as large as Lexington and as small as Wilmore.

The consultant also will devise a plan that will work if Kentucky-American is acquired by Lexington.

The consortium formed during the drought of 1999.

Don Hassall, of Bluegrass Area Development District, which is coordinating the consortium, said at least part of the grid should be in place in another three to five years.

Reach Andy Mead at 231-3319, 1-800-950-6397, Ext. 3319, or amead@herald-leader.com.

Water systems in Bluegrass may link together

By ANNABEL GIRARD
Staff Writer

A group of central Kentucky water companies, including Lancaster and Harrodsburg, have begun the process of developing a way to share water in times of drought and emergencies.

The goal is to have a grid of pipelines that can deliver water to all of the water systems in the consortium. The water could be used during drought, during other periods of high usage, or when a system had problems.

Getting to this point has been a slow process. The Bluegrass Water Supply Consortium was created in 1999 to find a way for the water companies to deal with severe droughts. Nearly all of the companies in the consortium draw water from the Kentucky River.

> "If we have a problem now, what will it be like then if we do nothing?"
>
> **Don Hassall, Bluegrass ADD**

The consortium is under the umbrella of Bluegrass Area Development District; however, two of the participants, Shelbyville and Mount Sterling are not in the district.

Don Hassall of Bluegrass ADD said finding a viable source of water is a necessity. During the 1999 drought, there were concerns about the amount of water that would be available. Hassall said it is a problem that won't go away, despite this fall's abundant rain.

"Within 20 years, the population of this area will grow by 204,000," Hassall said. "If we have a problem now, what will it be like then if we do nothing."

Water officials met Monday in Lexington with the consulting firm that will put together the final plan for providing additional water. O'Brien & Gere Engineers, based in Maryland, primarily

See WATER, on A8

WATER, from front

sought information to begin putting together the best plan.

Several options are being considered for a water source, including a treatment plant on Herrington Lake. Danville currently is the only water system drawing water from the lake.

Basically the plan will cover two choices: buying water that is already treated or building a treatment plant.

For treated water, a pipeline from Cincinnati, Greater Fleming or Louisville water companies will be considered during the planning stage.

In addition to a treatment plant on Herrington Lake, treatment plants are being looked at on the Ohio River or on aquifers near Maysville, Cave Run and Lake Cumberland.

During the years it has been meeting, the consortium has worked out some central principles of any joint sharing of water.

Local systems would be able to maintain local control of operations.

This addresses a concern from many of the cities that did not want the Public Service Commission to have more oversight of their operations, especially dealing with rate structure.

Also expressed was the desire to allow local boards or governments to control local systems, not some larger group.

The grid of water pipes that would allow systems to share water is considered a short-term solution.

Planning also needs to be done to handle increased water demands over a 20-30 year period.

Some of the planning may depend on what plans the U.S. Corps of Engineers comes up with for increasing the storage capacity behind the dams on the Kentucky River.

Those plans are expected to be presented Thursday during a meeting at Boonesboro, with the Kentucky River Authority considering the proposals at its Dec. 11 meeting in Frankfort.

One of the issues raised Monday came from Fred Simpson, superintendent of the Lancaster water system.

He wants to be sure customers that now buy from Lancaster won't be able to turn to the consortium and purchase water directly from it. "This creates as many risks as benefits," he said.

Water systems build to handle expected demand based on projected customer needs. Lancaster plans to expand its system to handle additional growth; however, the revenues that will pay for the expansion are based on current customers.

Hassall said existing contracts should provide the needed protection.

One of the problems that will have to be ironed out by the consortium is the nature of ownership, since there are municipal and private systems involved and in some cases there are different regulations for the two.

The goal is to have each water system keep its own identity and control operations, but be part of a group that owns and operates the auxiliary system envisoned by the consortium.

If a treatment plant is built, provisions for operating the plant will have to be made.

One suggestion was having an existing system handle operations under a contract with the consortium.

George Rest with O'Brien & Gore said the final plan should be worked out in five more meetings.

DANVILLE ADVOCATE
11/17/02

HERALD-LEADER 11/21/02

Bluegrass water woes

Best solution could come from regional effort

Although it seems as if the search has gone on forever, a solution to water shortages in Central Kentucky is still up in the air.

A regional consortium of water utilities is studying new options, expanding the list to include wells in Lewis County, a regional treatment plant, pipelines to various sources and other pipelines to connect Central Kentucky cities, in addition to improvements to the Kentucky River dams.

Some old ground is being covered yet again.

While these studies take time and money, chances are better that a more comprehensive solution could emerge from this exploratory process, and that makes this effort a marked improvement over the last attempt.

A few years ago, Kentucky-American Water Co. wanted to go it alone and build a pipeline to Louisville to transport treated water purchased from that city.

But critics of the proposal, including us, found that the expense exceeded the benefit, compared to the option of improving the dams on the Kentucky River.

In addition, while the pipeline would have benefited Kentucky-American, it did nothing to address the deteriorating condition of the river dams or the extensive water supply and treatment problems throughout the region.

Under considerable pressure, Kentucky-American agreed to mothball its plan.

Through a painstaking and time-consuming process, utilities in Central Kentucky are now working together to identify issues and study a variety of solutions. Seeing water issues through a regional lens is only logical. While each utility has its unique problems, they also have many in common. That outlook has to sustain the consortium as it sorts through the options.

public meetings will provide a forum for citizen input and other interested party input and an opportunity to ask questions of BWSC's participating utilities and our consultant. The speaker's bureau will be a vehicle to communicate BWSC's message to local governments, civic groups, and chambers of commerce.

Why will this approach work when others have failed?

BWSC has broad support for implementing a truly regional solution to the potable water supply problems facing central Kentucky. This support comes from the utilities, government agencies, and regulatory agencies. The regional approach ensures water system reliability for every participating entity. Regionalization promotes local autonomy and local decision-making for water utilities and at the same time promotes public private partnerships in order that all participating entities can avail themselves of economies of scale. Regional cooperation is simply the best answer to central Kentucky's potable water needs.

Who should I contact for more information?

Don Hassall, P.E.
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Got Water?

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Lexington, KY 40517

QUESTIONS AND ANSWERS ABOUT THE BLUEGRASS WATER SUPPLY CONSORTIUM

November 2002

What is the B. grass Water Supply Consortium?

The Bluegrass Water Supply Consortium (BWSC) is an alliance of government agencies and water utilities -- both public and private -- that have been working together for the past 36 months to address the potable (treated) water needs of central Kentucky. The entities involved include the Lexington-Fayette Urban County Government, the Kentucky American Water Company, the Winchester Municipal Utilities, the Georgetown Municipal Water and Sewer Service, the Frankfort Electric and Water Plant Board, the Shelbyville Municipal Water and Sewer Commission, the Mt. Sterling Water and Sewer Commission, Berea College Utilities, the cities of Nicholasville, Harrodsburg, Versailles, Paris, Cynthiana, Lancaster, Lawrenceburg and Wilmore. Working with BWSC are the Kentucky River Authority, the Kentucky Division of Water, the Kentucky Infrastructure Authority, the Kentucky Public Service Commission, and the UnitedStates Environmental Protect Agency.

Why was BWSC formed?

The 1999 drought made it clear that a shortage of treated water is a serious and growing regional problem. The region's water utilities decided they could best address this problem as a group. BWSC was formed when the region's water utilities united to seek the most effective solution for all water users in the region.

How does BWSC plan to address the potable water needs of central Kentucky?

BWSC's goal is to construct a grid of waterlines across central Kentucky connecting the partic. ng water utilities. Through the grid, BWSC plans to move treated water from point(s) of availability to point(s) of need. BWSC does not plan to replace existing potable water treatment plants that rely upon the Kentucky River as a source, but rather to augment those supplies with water from the transmission grid.

How is the approach of BWSC different than others proposed to date?

Previous plans to address the potable water needs of various communities have not addressed the problem on a regional basis. BWSC's plan is a regional approach -- one by which all of the area's stakeholders will benefit. Participating utilities will maintain their autonomy. Existing treatment facilities and distribution systems will remain in operation. Regionalization offers system reliability that cannot be met by individual planning efforts.

Isn't drinking water supply the charge and responsibility of the Kentucky River Authority?

No. The Kentucky River Authority (KRA) is charged with management of the Kentucky River. KRA's emphasis is on the Kentucky River as a supply of raw water for central Kentucky. BWSC is focusing on the treated water issue. The efforts of BWSC complement the efforts of KRA.

If implemented, does BWSC plan to abandon the Kentucky River as a source of water supply?

No. The Kentucky River will remain the primary source of supply for water utilities that now rely upon the river for this purpose. BWSC's approach is to augment current potable water supplies to ensure water availability during periods of drought.

What will be the source of water for BWSC? Is BWSC considering a water treatment plant on the Kentucky River or a pipeline to an Ohio River Source?

BWSC has retained O'Brien and Gere Engineers, a nationally recognized consultant with expertise in management, finance, and engineering to assist in thedecision-making process. One of the questions to be answered is the source of supply for the gridded water system.

Where is BWSC obtaining the money to fund this effort?

Congress, through the efforts of the Hon. Ernie Fletcher, Representative of the 6th District, authorized $300,000 to study the regionalization concepts proposed by BWSC. The Kentucky Infrastructure Authority has approved a matching grant of $245,000. Approximately $45,000 from the participating entities will provide the balance of the funds.

What is the timeframe for implementation of BWSC's efforts?

BWSC's goal is to have the initial study effort complete in the Summer 2003. From this study, BWSC expects to implement the consultant's recommendations to avoid the potential curtailment of water supply when, not if, another drought occurs.

How can I be informed of the study efforts? Will there be an opportunity for citizen input?

BWSC has developed a communication plan that includes a series of public meetings and a speaker's bureau. The

Water Consortium Schedules Second Public Workshop

Even though it has been less than two months since the official start of the Bluegrass Water Supply Consortium's search for answers to the region's water supply dilemma, the Consortium's second workshop has already been scheduled. The second public workshop will be held on Wednesday, January 8, beginning at 9 a.m. in the conference room of the recently completed Scott County Health Department Building at 300 East Washington Street in Georgetown.

The Consortium seeks a supplemental supply of potable water for much of the Central Kentucky region. In addition, the Consortium's goal is the establishment of a grid of water lines that will connect participating water utilities and will be able to transport water from the point(s) of availability to the point(s) of water need.

Water Supply Consortium participants include the Lexington-Fayette Urban County Government; Kentucky-American Water Company; Nicholasville Utilities; Winchester Municipal Utilities; Georgetown Municipal Water and Sewer Service; Frankfort Electric and Water Plant Board; Shelbyville Municipal Water and Sewer Commission; Mount Sterling Water and Sewer Commission; Berea College Utilities; and the cities of Harrodsburg, Versailles, Paris, Lawrenceburg, Lancaster, Cynthiana, and Wilmore.

For more information on the Bluegrass Water Supply Consortium, contact Don Hassall at (859) 269-8021 or dhassall@bglife.com

Bluegrass Water Supply Consortium Holds Initial Public Workshop

More than 50 persons were on hand in the ADD's Conference Room on November 11 for the kickoff public workshop of the Bluegrass Water Supply Consortium. The Consortium seeks to determine the most feasible, affordable, and environmentally friendly solution to the Central Kentucky water supply deficit and to move toward at least a partial implementation of the selected project within three to five years. Also sought is the physical linking of the water systems of participating water utilities so that water can be more readily conveyed from the point(s) of availability to the point(s) of water need. Such a water line grid would prove valuable not only in times of drought but also during floods and other natural or man-made disasters.

Water Supply Consortium participants include the Lexington-Fayette Urban County Government; Kentucky-American Water Company; Nicholasville Utilities; Winchester Municipal Utilities; Georgetown Municipal Water and Sewer Service; Frankfort Electric and Water Plant Board; Shelbyville Municipal Water and Sewer Commission; Mount Sterling Water and Sewer Commission; Berea College Utilities; and the cities of Harrodsburg, Versailles, Paris, Lawrenceburg, Lancaster, Cynthiana, and Wilmore.

For more information on the Bluegrass Water Supply Consortium, contact Don Hassall at (859) 269-8021 or dhassall@bglife.com

Consortium mulls grid for area's water needs

DOUBTS SPROUT THAT GROUP CAN MEET GOAL

By Andy Mead
HERALD-LEADER STAFF WRITER

GEORGETOWN — After attention-grabbing droughts in 1988 and 1999, everyone knows Central Kentucky occasionally runs short of water.

Doing something about it is a different matter.

The latest player on the water supply stage is the Blue Grass Water Supply Consortium, a group of 15 utilities and Lexington city officials that held a daylong workshop yesterday.

It's an ambitious goal: To make more treated water available in three to five years, and eventually, tie the region's towns together with a grid of pipes that can move water where it is needed.

But there were doubts expressed about whether the group can meet that goal.

"I don't know of a project we're looking at that can be completed in three to five years," said Linda Bridwell, the director of engineering for Kentucky-American Water Co.

See WATER, B2

HERALD LEADER

1/9/03

From Page B1

But Bridwell, whose company tried for 10 years to build a pipeline to bring treated Ohio River water from Louisville, also said "We can't keep sitting here saying we can do something in eight to 10 years."

There also are questions about how the consortium's goals mesh with those of the Kentucky River Authority, a state agency.

The river authority is working on raising Kentucky River dams so they hold more water. But the first dam won't be raised for at least five years and it is unclear how that fits with the consortium's plans.

State Rep. Joe Barrows, D-Versailles, says legislators who voted to create the river authority envisioned it being in charge of virtually everything that involved the river.

"I don't think they are held in that esteem," said Barrows, who didn't attend yesterday's workshop because the General Assembly was meeting in Frankfort.

He said he is considering legislation that would clarify the river authority's position.

Don Hassall, a regional planning official who is coordinating the water supply consortium, said the group communicates well with the river authority.

"I don't think we're at cross purposes," he said.

Steven Reeder, the river authority's executive director, attended yesterday's workshop.

He said the consortium "told us they have no plans to do anything contrary to what we're doing."

Reach Andy Mead at (859) 231-3319, at 1-800-950-6397, Ext. 3319, or amead@herald-leader.com.

Bluegrass Water Supply Consortium Holds Second Public Workshop; Plans Workshop 3

The meeting room was big, but the group of attendees was even bigger. The Bluegrass Water Supply Consortium held Public Workshop No. 2 in the Community Room of the new Scott County Health Department on Wednesday, January 8. It was a SRO crowd for a while as the Consortium's consultant team met with and worked with representatives of the 15 water utilities, Lexington-Fayette, the Bluegrass ADD, and Consortium's facilitator and member Mary Jane Warner.

Discussed at this second workshop were benchmarking and prior studies. The study effort is separated into five major components which are:

- Water Supply Alternatives
- Wheeling, i.e., moving water from the point(s) of availability to the point(s) of need
- Management/Ownership
- Financial considerations, i.e., cost and the impact upon customer water bills
- Communication and Public Outreach

Although the workshop is primarily an opportunity for the consultant team to meet with and develop a dialog with Consortium participants, an opportunity was permitted for others to comment in the late afternoon session.

Workshop No. 3 is planned for Monday afternoon, February 17, and all day Tuesday, February 18, at the Frankfort Electric and Water Plant Board's Louisville Road facilities at the reservoir (across US 60 from the Juniper Hills Golf Course). Interested persons are encouraged to contact Don Hassall at the ADD to obtain a copy of the workshop agenda or for a location map that better identifies the workshop location.

Bluegrass Area state legislators are particularly invited to attend this or any of the workshops so as to become better informed concerning the cooperative effort to develop a dependable supply of drinking water for the region during drought or other times of emergency.

ADD-VANTAGE Vol. 27, No. 1, February/March 2003

A Publication of the Bluegrass Area Development District

ADD-VANTAGE

Bluegrass Water Supply Consortium Efforts Reach Regional and Statewide Audience

Word about the progress of the Bluegrass Water Supply Consortium is getting around. In mid-January, reports were made to the Lexington-Fayette Urban County Council and to the Bluegrass Water Management Planning Council. On February 12, Don Hassall, Bluegrass ADD's liaison to the Consortium, brought a similar report to the Management Conference of the Kentucky Rural Water Association in a statewide meeting in Bowling Green.

Overtures have also been made by the Water Consortium to the Kentucky Public Service Commission, the Kentucky River Authority, the Kentucky Infrastructure Authority, the Kentucky Division of Water, the Kentucky Natural Resources and Environmental Protection Cabinet, the Kentucky Department for Local Government, the US Army Corps of Engineers, the UK Water Resources Research Institute, and the US Geologic Survey. Efforts are being made at every turn to broaden the Consortium's base and to involve public policymakers and other interested persons as well.

Water utilities and others that are official Consortium participants are

Lexington-Fayette UCG – Public Works Commissioner	Wayne Waddell
	Paul Schoninger
	David Barberie
Winchester Municipal Utilities	Vernon Azevedo
Nicholasville Combined Utilities	Tom Calkins
Frankfort Water Plant Board	Bunk Sullivan
Georgetown Municipal Water and Sewer Service	Bob Riddle
At-Large	Mary Jane Warner
Bluegrass ADD	Don Hassall
City of Paris	Kevin Crump
City of Versailles	Bart Miller
	Bruce Southworth
City of Wilmore	Dave Carlstedt
City of Harrodsburg	Mayor Lonnie Campbell
City of Lawrenceburg	Mayor Bobby Sparrow
	Larry Hazlett
City of Cynthiana	Mayor Virgie Wells
	Commissioner Tommy Clayton
Berea College Utilities	Mike Eirich
City of Lancaster	Fred Simpson
Shelbyville Water and Sewer Commission	Gene Fouts
Mt. Sterling Water and Sewer Commission	Dave Pearce

continued on p.3

The Bluegrass Water Supply Consortium's consultant team is headed by George Rest of the Landover, Maryland engineering firm of O'Brien & Gere. For more information, contact Don Hassall at the ADD.

Bluegrass Water Supply Consortium Holds Third Public Workshop

The Great Ice Storm of 2003 rang down the curtain on the Bluegrass Water Supply Consortium's attempt to hold its third public workshop in mid-February. The lack of electric power and the widespread and massive storm debris caused a necessary postponement of that planned day and a half workshop in Frankfort.

The Consortium quickly rescheduled its workshop and more moderate weather greeted the workshop when it finally took place on March 14. More than 60 attendees were on hand as the Consortium participants interacted with their Maryland consultant team leader. The Consortium has nearly completed a listing of water supply alternatives, has approved a weighting and evaluation tool to apply to possible projects, has decided upon a minimum size building block of approximately 10 million gallons per day for any given water supply project, and has concluded that it will consider only project concepts for which significant progress is likely in a reasonably short window of three to five years. In the actions taken at the March 14 workshop, the Consortium developed yardsticks by which to declare (soon) that certain proposals are fatally flawed.

Work continues on the concept of wheeling the water, i.e., the development of a gridded system of water lines by which to convey potable water from the point(s) of availability to the points(s) of need. Also progressing is the effort to define the organizational structure of a proposed project's implementation and operation. The potential year 2020 water deficit was defined and water system peaking factors were discussed.

Consortium participants include Kentucky-American Water Company, Winchester Municipal Utilities, Frankfort Water and Electric Plant Board, Georgetown Municipal Water and Sewer Service, Nicholasville Utilities, Lexington-Fayette, Berea College Utilities, the Shelbyville Water and Sewer Commission, the Mt. Sterling Water and Sewer Commission, the cities of Paris, Lancaster, Cynthiana, Wilmore, Lawrenceburg, Harrodsburg, Versailles, Danville, Mary Jane Warner, and Bluegrass ADD.

For more information on the goals and activities of the Bluegrass Water Supply Consortium, contact Don Hassall of the ADD.

Bluegrass Water Supply Consortium Briefs Area Mayors, Judges-executive

In conjunction with the Bluegrass ADD Board's April 23 Annual Meeting, the Bluegrass Water Supply Consortium offered to Bluegrass Area mayors and judges-executive an hour-long session to explain the who, what, why, how, and when of the Consortium's present efforts to define a short-term solution to the region's water supply deficit and to physically link participating water utilities with a grid of water pipelines that is capable of moving water from the point(s) of availability to the point(s) of need.

Approximately 45 persons attended this informative session to hear Winchester Municipal Utilities Manager Vernon Azevedo discuss the ongoing work of the Water Consortium and to respond to questions. With Danville's recent move to join the Consortium, there are now 16 participating water utilities in 15 Central Kentucky counties.

The Consortium members are available to make similar presentations to city councils, city commissions, fiscal courts, and others in the Bluegrass Area. To schedule such a local presentation on this critically important topic, contact Don Hassall at the ADD office.

Bluegrass Water Supply Consortium Conducts Workshop 4

While seemingly few activities move forward on time and within budget, the potable water supply planning effort of the Bluegrass Water Supply Consortium is both on schedule and within budget. The Consortium, which operates under the umbrella of the Bluegrass Area Development District, conducted the fourth of six planned public workshops in Nicholasville on May 28.

Sixty-two persons were present as consultant team leader George Rest (representing O'Brien and Gere Engineers of Landover, Maryland) presided over a discussion of screening the various alternatives for solving the region's water supply deficit. Five evaluation factors were utilized in the screening. The five were:

- Adequate quantity of water
- Raw and finished water quality
- Cost
- Implementability/risk of delays, and
- Flexibility

The alternatives were separated into two broad categories—short-term and long-term. Because of the urgency of the water supply situation, the Consortium expects to concentrate on water supply alternatives that would seem to offer the promise of short-term relief. Short-term was defined as an alternative or a combination of alternatives that are implementable within three to five years.

The primary goal of Workshop No. 4 was to brief the Consortium participants and to further refine the list of supply alternatives so that more detailed investigations can move forward. A status report was presented on the conceptual development of the pipe grid/network that would link the Water Consortium participants to enable the *wheeling* of water throughout the region. Workshop No. 4 also addressed the framework of the future water supply organization and described the next steps in the Study.

The date of Workshop No. 5 has been announced to be Wednesday, July 23, at a Winchester site yet to be selected. For more information on Consortium issues, contact Don Hassall at the ADD.

Public Outreach

The BWSC has developed a communications plan that includes a series of public work sessions and meetings. Since November 2002, four of the six scheduled public work sessions have been held. The next public work session is scheduled for July 23, 2003 in Winchester, KY. The first public meeting was held in August 2002 and the second public meeting is tentatively scheduled for August 2003. These public work sessions and meetings provide a forum for citizens and other interested parties to provide their input into the decision-making process, as well as an opportunity to ask questions of BWSC's participating utilities and our consultant. Please come to these public work sessions and meetings to find out about and discuss the water system regionalization study.

Watch for more information in your mail.

The effects of the BWSC's water system regionalization study will be far reaching, so get involved.

For more information on the study, please call:
Don Hassall, P.E.
Assistant Executive Director
Bluegrass Area Development District
859-269-8021
dhassall@bglife.com

Bluegrass Water Supply Consortium
C/O Bluegrass Area Development District
699 Perimeter Drive
Lexington, KY 40517

Bluegrass Water Supply Consortium

Status Report on the Water System Regionalization Feasibility Study

July 2003

Status Report on the Water System Regionalization Feasibility Study

Introduction

The Bluegrass Water Supply Consortium (BWSC) is an alliance of government agencies and water utilities – both public and private – that have been working together for nearly four years to address the potable (treated) water needs of central Kentucky. The entities involved include: Lexington-Fayette Urban County Government; Kentucky-American Water Company; Winchester Municipal Utilities; Georgetown Municipal Water and Sewer Service; Frankfort Electric and Water Plant Board; ~~Richmond Utilities~~; Shelbyville Municipal Water and Sewer Commission; Mt. Sterling Water and Sewer Commission; Berea College Utilities; and the cities of Cynthiana, Danville, Harrodsburg, Lancaster, Lawrenceburg, Nicholasville, Paris, Versailles, and Wilmore. The BWSC has also been working with the Kentucky River Authority, Kentucky Division of Water, and Kentucky Infrastructure Authority.

A feasibility study has been underway since October 2002 to evaluate regional solutions to meet the future water needs of central Kentucky. An important milestone has been reached in this study -- the number of water supply alternatives has been reduced significantly and a preferred alternative will be identified in the near future.

Each of the major components of the Water System Regionalization Feasibility Study is described in the following sections.

Water Supply Alternatives

The BWSC's approach in the current study is to identify new supplies that augment current water supplies. Water demands for each participating utility were projected through 2020. Existing supply, treatment and distribution systems will remain in operation. Based on projected water demands and existing supplies, a total of 67 million gallons per day of additional water is needed during a critical drought to meet the needs of the BWSC members through 2020. The water supply needed in 2020 may be reduced from 67 million gallons per day to 45 million gallons per day by taking into account the near-term supplies that will be available from the Kentucky River (baseline alternatives). Over 40 water supply alternatives were identified and evaluated using the following criteria: capacity, water quality, cost, implementability/risk of delay, and flexibility. Eight remaining options will be evaluated further:

- Purchase water from Cincinnati Water Works, via Boone Florence Regional Water Commission
- Purchase water from Cincinnati Water Works via Bracken County
- Purchase water from Louisville Water Company
- Ohio River water withdrawals and water treatment plant at Maysville/Dover
- Ohio River withdrawals and water treatment plant at Warsaw
- New water treatment plant at Kentucky River Pool No. 3
- Purchase water from proposed Carroll County Regional Water Commission
- Purchase water from Greater Fleming Regional Water Commission

A recommendation involving one or more of these alternatives will be identified in the near future.

Wheeling of Water

BWSC is proposing to construct a grid network of waterlines across central Kentucky to connect the participating water utilities. Through the grid, BWSC plans to move treated water from points of availability to points of need -- wheeling. A conceptual layout for the grid network has been developed for each of the water supply alternatives.

Organizational Alternatives

A new organization will need to be formed to oversee management and operation of the proposed waterworks facilities. A benchmarking survey was performed early in the current study to identify and evaluate management and ownership alternatives for the participating utilities. Organizational and management issues that are being addressed include: organizational structure, services to be provided, financing, management philosophy, and membership.

Financial

The future organization will need to be financially sound and the current study is focusing on a number of issues, including: issuance of debt, operating revenues, revenue sources, long-term vs. short-term contracts, and the rate approval process. The study will estimate the cost for the BWSC members to the additional water supply.

Lexington Herald-Leader
July 20, 2003

Prospect of river pipeline returns

REJECTED ALREADY, IDEA IS REVIVED BY WATER PLANNERS

By Andy Mead
HERALD-LEADER STAFF WRITER

Four years after Lexington officials rejected the idea of piping Ohio River water into Central Kentucky, several pipelines are again under consideration.

The Bluegrass Water Supply Consortium, a group of water utilities spread over 15 counties, is considering eight alternatives to augment the region's sometimes inadequate water supply.

Seven involve pipelines that would bring water from the Ohio or from aquifers near the river. The eighth would pull water from the Kentucky River downstream from Frankfort.

The consortium, which has commissioned the latest in a long line of water-supply studies, hopes to narrow its list to three in a meeting Wednesday in Winchester.

"Our time for mulling this thing over and for delaying it and putting it back is just gone; our safety margin's been cut to a knife's edge," said Don Hassall of the Bluegrass Area Development District, which is coordinating the effort.

Both Kentucky-American Water Co. and the city of Lexington are members of the consortium, but the city's effort to take the company through condemnation is separate from the water supply questions, Hassall said.

"The issue we're working on will belong to whoever owns the water company," he said.

The Kentucky River is the region's main source of water and will remain so, Hassall said. Although the Kentucky has more water in any given year than the region could possibly use, there are times when drought shrinks the flow to dangerous levels.

Low flows forced watering restrictions in 1988 and 1999, each time setting in motion efforts to augment the supply.

See PIPELINES, A14

"The people involved in making the decisions are not the communities."

Chetan Talwalkar, a leader in the group Neighbors Opposing Pipeline Extravagance

PIPELINES | Any project likely to be publicly owned

From Page A1

Supporters of the consortium, which was formed in 1999, say whatever it comes up with is likely to generate more public support than Kentucky-American Water Co.'s ill-fated plan to bring treated Ohio River water in from Louisville.

Roger Recktenwald of the Kentucky Infrastructure Authority, which helps get funding for local public works projects, said that's because Kentucky-American's proposal was seen as a private company looking out for its own best interest with a plan that could have led to more growth and development.

Whatever the consortium comes up with probably will be publicly owned, he said, with each member of the consortium making its own development decisions.

"This is truly community-based planning at its best," Recktenwald said.

But critics of the consortium say it is ignoring a plan agreed on in 1999 to solve periodic water shortages by raising Kentucky River dams so that they hold more water.

"The people involved in making the decisions are not the communities — it's the water managers," said Chetan Talwalkar, a leader of a group called Neighbors Opposing Pipeline Extravagance (NOPE).

Talwalkar points to a 1996 study by the University of Kentucky's Water Resources Institute that said storing more water in the Kentucky River was more economical than bringing in Ohio River water.

Indell Ormsbee, the primary author of that study, said last week that he doesn't know enough about the consortium's plans to comment on them.

But he noted that the Kentucky River Authority, a state agency, is proceeding with plans to raise at least two existing dams.

Stephen Reeder, the river authority's executive director, said his agency doesn't have an official opinion on what the consortium is working on, but is "flexible to whatever changes might come up."

He said, however, that if the consortium decides to build a new treatment plant on the Kentucky River, it should first present the plan to the authority. Because the authority is financed by fees paid by utilities and others that draw water from the Kentucky River, he also is worried that bringing in Ohio River water could mean lost revenues.

Hassall pointed out that it is not yet a sure thing that the Kentucky River dams can be raised. And if they are, he said, that will take until at least 2008.

That's outside the date the consortium has set for making what it calls significant progress toward getting more water into the region.

"We're hoping to have something moving along at a rapid clip in three to five years," Hassall said "That's not to say we'll get it done by then, but if you don't set a timetable, you'll never get anything done."

The consortium also wants to lay a grid of pipelines across the region to connect the various towns.

Parts of that grid already exist, including a Kentucky-American pipeline that runs from Lexington to Georgetown, and another pipe between Frankfort and Georgetown.

The grid to move water among towns and the pipeline to bring in water wouldn't be reserved just for times of drought.

Members of the consortium

- Lexington-Fayette Urban County Government
- Kentucky-American Water Co.
- Winchester Municipal Utilities
- Georgetown Municipal Water and Sewer Service
- Frankfort Electric and Water Plant Board
- Shelbyville Municipal Water and Sewer Commission
- Mount Sterling Water and Sewer Commission
- Berea College Utilities

And the cities of:

- Cynthiana
- Danville
- Harrodsburg
- Lancaster
- Lawrenceburg
- Nicholasville
- Paris
- Versailles
- Wilmore

Utilities would have to agree to take some water every day. The grid also could be used for emergencies, such as a Kentucky River dam failure or a loss of power in, for example, Nicholasville.

The consortium has hired an engineering firm, O'Brien and Gere of Landover, Md., to come up with a plan. The cost: $590,000. That includes a $300,000 federal grant, a matching $245,000 from the Kentucky Infrastructure Authority and $45,000 from consortium members. Besides recommending a source of additional water, the consultants also are expected to come up with ideas about how to finance the recommendation, and who would own the pipes or treatment plants.

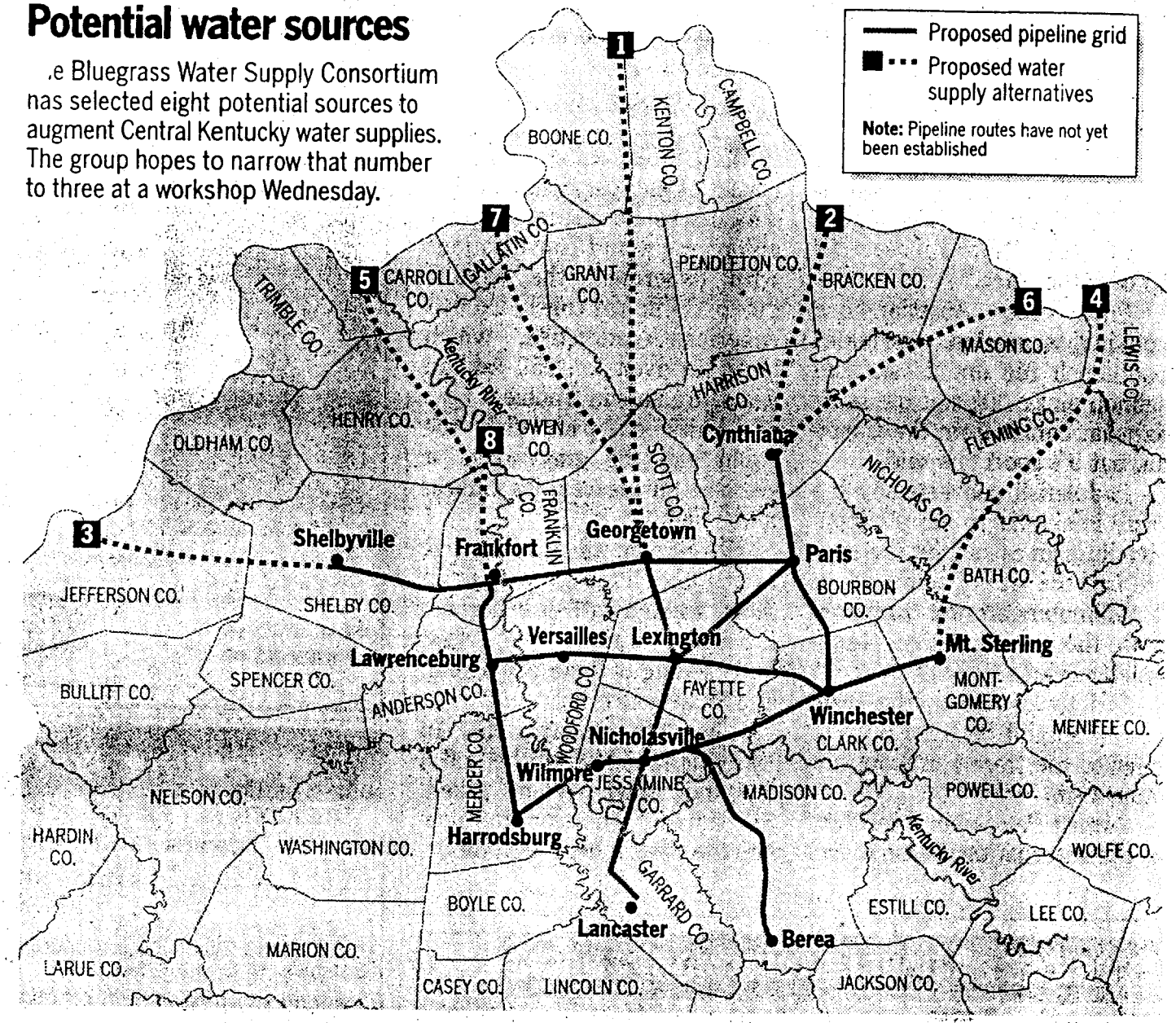
The study is expected to be completed in late summer, Hassall said. The consultants have met with consortium members in a series of workshops.

Wednesday's meeting is the fifth of six. Its title: "Decision Making."

Reach Andy Mead at (859) 231-3319, at 1-800-950-6397, Ext. 3319, or amead@herald-leader.com.

Potential water sources

.e Bluegrass Water Supply Consortium nas selected eight potential sources to augment Central Kentucky water supplies. The group hopes to narrow that number to three at a workshop Wednesday.



1. Purchase treated water from Cincinnati Water Works (via Boone-Florence Water Commission)
2. Purchase treated water from Cincinnati Water Works (via eastern route through Bracken County)
3. Purchase treated water from Louisville Water Co.
4. Purchase treated water from Greater Fleming Regional Water Commission (from aquifer in western Lewis County)
5. Purchase treated water from proposed Carroll County Regional Water Commission (from aquifer in Carrollton)
6. New treatment plant on Ohio River at Maysville/Dover
7. New treatment plant on Ohio River at Warsaw
8. New treatment plant on pool three of Kentucky River

SOURCE: BLUEGRASS WATER SUPPLY CONSORTIUM

CRAIG JOHNSON | STAFF

Water pipelines eyed for Central Kentucky

One idea links area with the Ohio River to curtail shortages

Associated Press

LEXINGTON, Ky. — A water-utility group is considering new pipelines to help prevent water shortages in Central Kentucky.

The Bluegrass Water Supply Consortium, a group of water utilities spread over 15 counties, is discussing several new pipelines to augment the region's sometimes inadequate water supply.

This comes four years after Lexington officials rejected the idea of piping Ohio River water into the area.

The consortium is considering seven pipelines that would bring water from the Ohio or from aquifers near the river. The group also is discussing a pipeline that would pull water from the Kentucky River downstream from Frankfort.

The consortium, which has commissioned the latest in a long line of water-supply studies, hopes to narrow its list to three this week.

"Our time for mulling this thing over and for delaying it and putting it back is just gone; our safety margin's been cut to a knife's edge," said Don Hassall of the Bluegrass Area Development District, which is coordinating the effort.

The Kentucky River, Central Kentucky's main water supply, has more water in any given year than the region could possibly use.

Sometimes, however, drought shrinks the flow to dangerous levels. In 1988 and 1999, low flows forced watering restrictions on the region and set in motion efforts to augment the water supply.

Supporters of the consortium, which was formed in 1999, say that whatever the group decides will likely receive more public support than Kentucky-American Water Co.'s ill-fated plan to bring treated Ohio River water in from Louisville.

Roger Recktenwald of the Kentucky Infrastructure Authority, which helps obtain funding for local public works projects, said Kentucky-American's proposal was seen as a private company looking out for its own best interest. Whatever the consortium comes up with probably will be publicly owned, he said, with each member of the consortium making its own development decisions.

Critics of the consortium say it is ignoring a plan agreed on in 1999 to solve periodic water shortages by raising Kentucky River dams so that they could hold more water.

The consortium will hold its next meeting Wednesday in Winchester.

Hybrid plan for water ranks No. 1

IDEA IS NEW PLANT AT FRANKFORT, TAPPING OHIO RIVER IN DROUGHTS

By Andy Mead
HERALD-LEADER STAFF WRITER

WINCHESTER — As water supply ideas go, it's a hybrid, with a little of this, a little of that.

It's a plant that would sit on the bank of the Kentucky River north of Frankfort, treating water that would be piped to towns around Central Kentucky.

And during the droughts that come every decade or so and shrink the Kentucky's flows to dangerous levels, a pipeline would bring in raw water from the Ohio River to be treated and distributed.

When a committee of the Bluegrass Water Supply Consortium sat down to consider ways to augment the region's water supply, the hybrid floated to the top.

The irony is that, after dozens of options have been considered over the last several decades to

See WATER, A6

WATER | New plan is cheapest by far

From Page A1

solve the area's water supply problem, this one was conceived in its present form just this week.

It came into being after the state Division of Water said Monday that a plant in Pool 3 of the Kentucky would be allowed to withdraw plenty of water from the river — except during droughts, said George Rest, a consultant to the consortium.

The idea to then also bring in water from the Ohio, considered an inexhaustible source, was presented to the consortium committee Tuesday.

Considering a number of factors, such as cost, flexibility and public acceptance, the consortium's technical committee gave the Pool 3 plant option the highest ranking among eight alternatives it was considering.

The plant ranked the lowest on cost — about $350,000 a year for each million gallons of water a day. And committee members also liked other things about it, including that it fulfilled the consortium's mission to use the Kentucky River as much as possible.

"The consensus of the tech group was that it has a little bit more going for it besides cost," Rest said.

The next-highest rankings went to two proposals to build a new treatment plant on the Ohio River (each ranked so similarly that the proposals were lumped together as a second option), followed by a pipeline to bring treated Ohio River water from Louisville.

Yesterday, the full consortium agreed with the committee's rankings. But it decided to give Louisville and other potential treated water sellers three more weeks to come up with lower water prices.

The prices would have to be significantly better: When Rest refigured the rankings with a 30 percent price cut from Louisville, Cincinnati and the other sellers, the hybrid plant still ranked highest.

A pipeline from Louisville was touted through most of the 1990s by Kentucky-American Water Co., the private company that provides water for Lexington and parts of surrounding counties.

But the pipeline idea proved to be unpopular. It was abandoned after Lexington's Urban County Council decided in 1999 that it favored a plan to raise Kentucky River dams to store more water.

The Kentucky River Authority, a state agency separate from the water-supply consortium, is working on raising dams.

The consortium is a group of 16 water utilities spread over 15 counties.

It has no official standing, but yesterday it decided it wants to form a regional water commission that would have official standing as a public agency.

Not all utilities in the consortium would join the commission. Those that did would have to agree to buy a certain amount of water each year.

Having a regional source of water could save communities from having to build new treatment plants, advocates say, and would provide enough water to get through droughts.

"The downside of not joining is, you won't have water when you need it," said Don Hassall of the Bluegrass Area Development District, which is coordinating the consortium.

Damon Talley, a Hodgenville attorney advising the consortium, said his research showed that forming a regional water commission was the best way for the consortium to get something done.

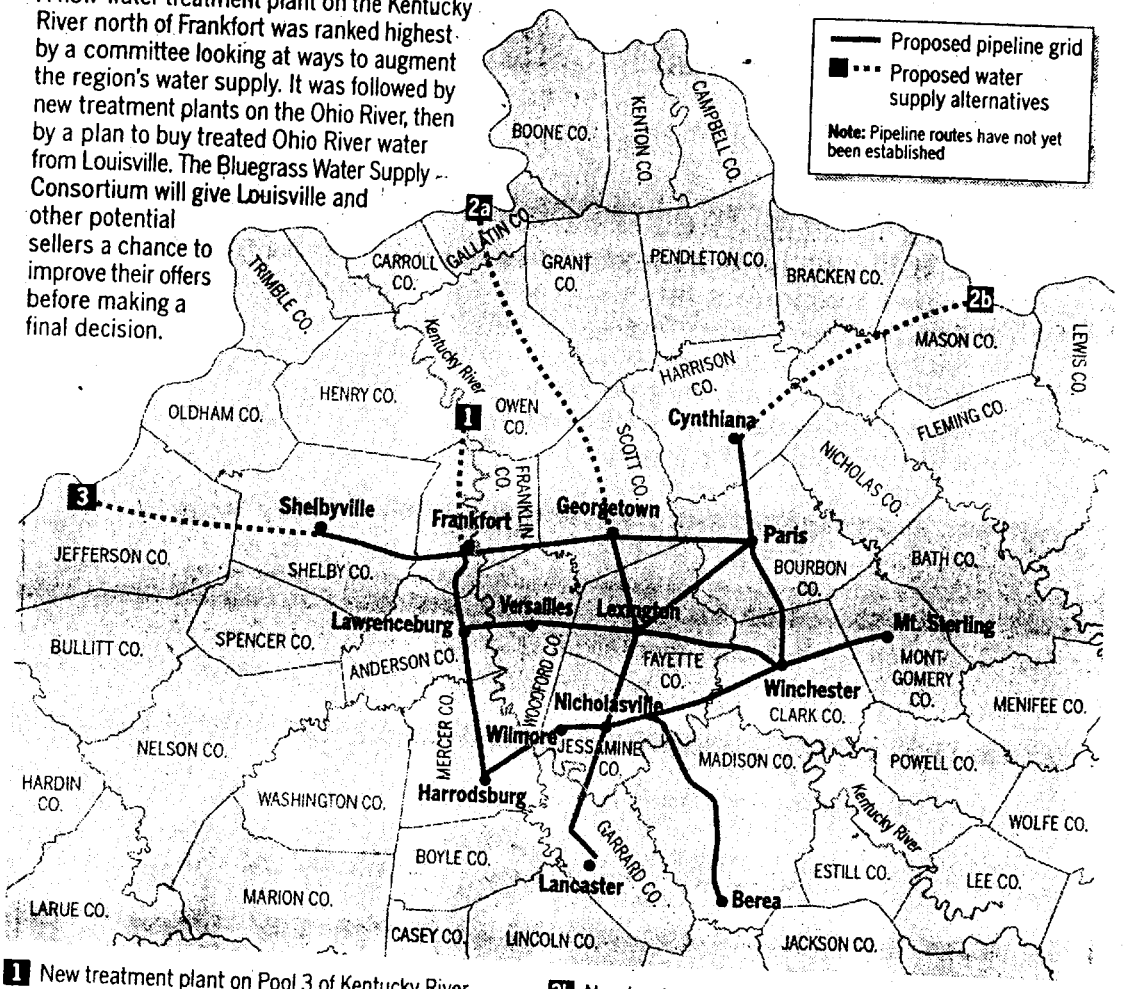
But the law that authorizes water commissions does not allow private utilities to join. That means that Kentucky-American, by far the largest water utility in the region, could not be a member.

The commission and Kentucky-American would have to create a public-private partnership, Talley said.

By law, Lexington, the largest city in the region, is eligible to join the commission.

Narrowing the list

A new water treatment plant on the Kentucky River north of Frankfort was ranked highest by a committee looking at ways to augment the region's water supply. It was followed by new treatment plants on the Ohio River, then by a plan to buy treated Ohio River water from Louisville. The Bluegrass Water Supply Consortium will give Louisville and other potential sellers a chance to improve their offers before making a final decision.



1 New treatment plant on Pool 3 of Kentucky River

2a New treatment plant on Ohio River at Warsaw

2b New treatment plant on Ohio River at Maysville/Dover

3 Purchase treated water from Louisville Water Co.

SOURCE: BLUEGRASS WATER SUPPLY CONSORTIUM

CRAIG JOHNSON | STAFF

But it is uncertain whether Lexington's membership is feasible, since it probably would not buy water from it as other members would be required to do.

"That's the $64,000 question," Talley said.

The consortium plans to hold a public meeting on the proposals Sept. 22, and a final meeting to select one of the alternatives Oct. 13.

Its goal is to make what it calls significant progress toward having more water flowing into the region in the next three to five years.

Reach Andy Mead at (859) 231-3319, at 1-800-950-6397, Ext. 3319, or amead@herald-leader.com.

JESSAMINE JOURNAL 7/24/03

Water consortium considering single supply source, pipelines

By Zoya Tereshkova

On the hottest summer days, Nicholasville uses more than 80 percent of its water treatment plant capacity.

That's not a good sign, and some solutions need to be found soon, said Tom Calkins, Nicholasville's utilities director.

One of the ways to prevent a future water shortage is to keep investing money into the city's water treatment plant, which was upgraded only five years ago.

Another is to continue working with the Bluegrass Water Supply Consortium, which Nicholasville joined at the time when the group was started in 1999, and find a solution that would work and save money for everybody.

"Having enough water for people and businesses to use is a continues struggle we face, and working together with other water suppliers, joining our efforts might be the best answer," Calkins said.

Dave Carlstedt, Wilmore's utilities director, said that even though Wilmore has a new water treatment plant and probably won't experience any water shortage anytime soon, it's still in the town's best interest to be part of the consortium.

"We're fine now, but in 20 years, as the population grows, we would need more water," he said. "It seems that sharing resources with other cities is a more economical and reliable way than trying to solve your problems on your own."

Sharing resources and helping each other in times of need is the idea that brought together a group of water utilities spread over 15 counties. Besides Nicholasville and Wilmore, the consortium includes Danville, Harrodsburg, Lancaster, Lawrenceburg, Paris, Versailles, Cynthiana, and also water companies or municipal water departments in Lexington, Winchester, Georgetown, Frankfort, Shelbyville, Mount Sterling and Berea.

For the first three years, members of the alliance gathered information and shared ideas.

A year ago, due to a $300,000 federal grant and matching state grant, they hired an engineering firm to do a study that would help figure out what's the best way of solving the water supply problem. As the study moves ahead, the consortium narrows down the list of ideas and refines those that are still being considered.

Don Hassall, assistant executive director of the Bluegrass Area Development District, said one feature that all proposed plans have is a network of pipelines that will connect all the members of the consortium.

"A grid of waterlines will connect all the participating water utilities," Hassall said. "Through the grid, the consortium plans to move treated water from points of availability to points of need."

Every city will only connect with its immediate neighbors, and all will tie their water lines together, so existing resources will be fully used, he said.

While there is no disagreement on how to distribute the water among the participants, it is still unclear what water sources the consortium will decide to use.

The alternatives include purchasing water from Cincinnati, Louisville, Carrollton or Fleming County, and building a jointly used water treatment plant on the Ohio River near Maysville or on the Kentucky River near Frankfort.

Calkins explained that the need for additional water is only one reason for working together.

"Another is that we need a redundancy of supply, meaning that we need alternative water supplies," he said.

Now Nicholasville gets its water from the Kentucky River's Pool 8, and it's the weakest of the river's 14 pools, Calkins said.

He said that some of the dams on Kentucky River were constructed over 100 years ago to allow for commercial traffic.

"We can't be totally dependent, with our community getting bigger and bigger, on a dam made over a century ago," he said.

Another reason to be part of the consortium, Calkins said, is that Nicholasville as well as other cities, will be able to save a lot of money in a long run.

"It will help us achieve economics of scale," he said. "Whatever we do in the future, if we do it together, it will ensure us the lowest rates."

If all of the Bluegrass water suppliers join their efforts, they can build a first class facility at the lowest possible cost, he said.

John Horne of Nicholasville, consulting engineer for the Jessamine-South Elkhorn Water District, said that combining efforts is the most economical way.

"Utilizing the consortium ideas would result in a much more efficient way of using the public's money," he said.

Carlstedt said it's getting harder and harder for small towns to get grants for improving water utilities.

"There is a big push toward regionalized water infrastructure," he said. "We'll be better off together even in terms of getting federal money to improve our facilities."

On Wednesday, Bluegrass Water Supply Consortium held a day-long workshop to narrowed the list of water supply alternatives from eight to three. By the time The Jessamine Journal went to press, the decision had not yet been made. It will take another

see WATER on page A6

A3: WATER

few months to come up with a final plan of action.

Carlstedt explained that besides deciding on where water will be coming from, there are other issues to be seriously studied.

"Even though everything about the project will be driven by the needs of the consortium, there will be tricky parts," he said.

> *"Even though everything about the project will be driven by the needs of the consortium, there will be tricky parts."*
>
> — Dave Carlstedt, Wilmore Utilities director

He said that it might be difficult to decide who will get pipes first, who will pay for the construction, how the exchange and distribution will be organized and so on.

"There will be organizational, management and ownership issues, and we haven't even begun to touch problems like that," he said.

Carlstedt said that with all the efforts the members of the consortium put into the project, they are still "many months away from anyone getting a single drop of water."

However, they are on a right track.

"I don't know of any alternative to the consortium that would promise comparable results," he said.

Neal Cassity, Jessamine County Judge-Executive, said that he has no doubts that Nicholasville and Wilmore would greatly benefit from working together with other consortium members on solving their water supply problems.

"Working together is a good way to protect our communities," he said.

(Sun photo by James Mann)

Julie Roney, with the state Division of Water, Frankfort, spoke to the members of the Bluegrass Water Supply Consortium Wednesday about legislation pending in the state general assembly which could affect the panel's efforts. The consortium is seeking ways to increase the water supply to central Kentucky during water shortage years.

Central Kentucky could face water shortages unless a panel of regional utilities can find ways to establish an adequate water supply. Without a plan, it could be ...

H_2Oh, no!

Winchester Sun
July 24, 2003

By JAMIE VINSON
Sun Staff Writer

"We need to move forward with this."

Those words were uttered time and again by members of the Bluegrass Water Supply Consortium Wednesday as they studied ways to resolve central Kentucky's lack of an adequate and dependable water supply.

The group, which held a public workshop at the Clark County Extension Office, narrowed a list of eight potential water supply alternatives to two top choices.

The concern

After several years of study, 16 central Kentucky water utilities within a 15-county area, including the Winchester Municipal Utilities Co., banded together last year and joined the Lexington-Fayette and Bluegrass Area Development District to form the BWSC. The consortium has been looking into the treated water needs of central Kentucky for some time and is concerned about water supply — especially during drought season due to the region's growing population, which currently stands at about 700,000 and is expected to reach 1 million by 2030.

The consortium has estimated 67 million gallons per day of additional water would be needed during a critical drought to meet the needs of BWSC members through 2020. However, it estimates that figure could be reduced to 45 million gallons per day by using near-term supplies available from the Kentucky River.

The alternatives

In October 2002 the consortium hired O'Brien & Gere, a consulting firm based in Landover, Md., to conduct a feasibility study to evaluate regional solutions to the problem. Don Hassall, assistant executive director of the Bluegrass Area Development District, said O'Brien & Gere landed the job because it has national experience studying water supply.

The study, which is now about two-thirds complete, originally identified more than 40 water supply alternatives. Now narrowed to eight, four of the alternatives would require the purchase of water either from Cincinnati Water Works, the Louisville Water Company, the Carroll County Regional Water Commission or the Greater Fleming Regional Water Commission.

"We were really pleased with the four proposals to purchase water," George Rest, a consultant for O'Brien & Gere, told BWSC members. "We found out a lot more than we asked for."

The other alternatives call for Ohio River water withdrawals and water treatment plants to be built either in the Maysville/Dover area or Warsaw, or building a new plant on the Kentucky River north of Frankfort and withdrawing as much from Pool 3 as the Kentucky Division of Water permits. The treatment plant also could be supplemented with Ohio River water, an inexhaustible source, in times of drought.

Selecting the best alternative

The consulting firm compared each water supply alternative and scored each based on several criteria, including capacity, water quality, cost, implementability/risk of delay and flexibility. The Kentucky River Pool No. 3, supplemented with the Ohio River option, ranked highest and the Ohio River water withdrawals second. The Ohio River water withdrawal alternatives were combined as one because they essentially provide for the same, just at different locations.

The Kentucky River Pool No. 3 option ranked lowest in cost — about $350,000 or so would be required each year for each million gallons of water used a day. This option also would utilize the Kentucky River, easing concerns from consortium members worried about selecting an alternative out of state that could take away from business in Kentucky.

"When we're all finished analyzing the data, it seemed to tell us the right answers for the most part — that the preferred cost choice was the Kentucky River Pool No. 3 alternative supplemented with the Ohio River," Rest said.

Issue of fairness

Although the consortium agreed to move forward with two top alternatives, Rest suggested it continue discussions with the Louisville Water Company, which said its original cost estimate could be significantly decreased due to spare capacity.

Jane Brown of HMB Professionals, Frankfort, asked if other potential water suppliers also might be able to reduce their costs. A sensitivity test conducted by the consulting firm recalculated the cost rankings at a 30 percent reduction; still, the Kentucky River Pool No. 3 option ranked highest.

"We need to bring closure to this," WMU General Manager Vernon Azevedo told the consortium, suggesting that to be fair the BWSC allow any of the companies who wish

See WATER, A3

(Sun photos by James Mann)

George Rest, back to camera, senior vice president with O'Brien & Gere Engineering, Landover, Md., addresses the Bluegrass Water Supply Consortium at the Clark County Cooperative Extension Service Building, Fortune Drive.

•Water

Continued from page A1

to resubmit proposals with better prices to notify the Bluegrass Area Development District they wish to do so no later than 4:30 p.m. Friday. He also suggested the new proposals be turned in no later than 4:30 p.m. Aug. 8.

Litigation

Any decisions the consortium made Wednesday were not binding as the data the consulting firm presented was preliminary, according to attorney Damon Talley, who practices in Hodgenville and is providing the BWSC legal advice.

He also said the consortium needs to become a legal, recognized public entity before it can accomplish what it wants to do.

The consortium is looking to do that by forming a regional water commission that members of the BWSC could join. Each year, water utilities that joined would have to purchase water from a grid network of waterlines the ter supplies during drought seasons.

BWSC members also say purchasing from the grid could eliminate the necessity to build new water treatment plants. A layout for a grid network has been developed for each of the water supply alternatives.

The grid structure, formalizing the BWSC as a public organization, costs, etc., are all part of the O'Brien & Gere's comprehensive study; a complete draft of the firm's final report is expected in early September. A public meeting to discuss the proposals has been scheduled Sept. 22. Five of six public workshops have been held; the final workshop is set for Oct. 13 in which one of the eight alternative water supplies will be selected for implementation.

Kentucky.com

Posted on Thu, Jul. 24, 2003

Hybrid plan for water ranks No. 1

IDEA IS NEW PLANT AT FRANKFORT, TAPPING OHIO RIVER IN DROUGHTS

By Andy Mead
HERALD-LEADER STAFF WRITER

WINCHESTER - As water supply ideas go, it's a hybrid, with a little of this, a little of that.

It's a plant that would sit on the bank of the Kentucky River north of Frankfort, treating water that would be piped to towns around Central Kentucky.

And during the droughts that come every decade or so and shrink the Kentucky's flows to dangerous levels, a pipeline would bring in raw water from the Ohio River to be treated and distributed.

When a committee of the Bluegrass Water Supply Consortium sat down to consider ways to augment the region's water supply, the hybrid floated to the top.

The irony is that, after dozens of options have been considered over the last several decades to solve the area's water supply problem, this one was conceived in its present form just this week.

It came into being after the state Division of Water said Monday that a plant in Pool 3 of the Kentucky would be allowed to withdraw plenty of water from the river -- except during droughts, said George Rest, a consultant to the consortium.

The idea to then also bring in water from the Ohio, considered an inexhaustible source, was presented to the consortium committee Tuesday.

Considering a number of factors, such as cost, flexibility and public acceptance, the consortium's technical committee gave the Pool 3 plant option the highest ranking among eight alternatives it was considering.

The plant ranked the lowest on cost -- about $350,000 a year for each million gallons of water a day. And committee members also liked other things about it, including that it fulfilled the consortium's mission to use the Kentucky River as much as possible.

"The consensus of the tech group was that it has a little bit more going for it besides cost," Rest said.

The next-highest rankings went to two proposals to build a new treatment plant on the Ohio River (each ranked so similarly that the proposals were lumped together as a second option), followed by a pipeline to bring treated Ohio River water from Louisville.

Yesterday, the full consortium agreed with the committee's rankings. But it decided to give Louisville and other potential treated water sellers three more weeks to come up with lower water prices.

The prices would have to be significantly better: When Rest refigured the rankings with a 30 percent price cut from Louis-ville, Cincinnati and the other sellers, the hybrid plant still ranked highest.

A pipeline from Louisville was touted through most of the 1990s by Kentucky-American Water Co., the private company that provides water for Lexington and parts of surrounding counties.

But the pipeline idea proved to be unpopular. It was abandoned after Lexington's Urban County Council decided in 1999 that it favored a plan to raise Kentucky River dams to store more water.

The Kentucky River Authority, a state agency separate from the water-supply consortium, is working on raising dams.

The consortium is a group of 16 water utilities spread over 15 counties.

It has no official standing, but yesterday it decided it wants to form a regional water commission that would have official standing as a public agency.

Not all utilities in the consortium would join the commission. Those that did would have to agree to buy a certain amount of water each year.

Having a regional source of water could save communities from having to build new treatment plants, advocates say, and would provide enough water to get through droughts.

"The downside of not joining is, you won't have water when you need it," said Don Hassall of the Bluegrass Area Development District, which is coordinating the consortium.

Damon Talley, a Hodgenville attorney advising the consortium, said his research showed that forming a regional water commission was the best way for the consortium to get something done.

But the law that authorizes water commissions does not allow private utilities to join. That means that Kentucky-American, by far the largest water utility in the region, could not be a member.

The commission and Kentucky-American would have to create a public-private partnership, Talley said.

By law, Lexington, the largest city in the region, is eligible to join the commission. But it is uncertain whether Lexington's membership is feasible, since it probably would not buy water from it as other members would be required to do.

"That's the $64,000 question," Talley said.

Public Meeting

The consortium plans to hold a public meeting on the proposals Sept. 22, and a final meeting to select one of the alternatives Oct. 13.

Workshop #6

Its goal is to make what it calls significant progress toward having more water flowing into the region in the next three to five years.

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JESSAMINE JOURNAL

7/31/03

Pipeline plan backed by water consortium

By Zoya Tereshkova

The idea of getting water through a large, shared treatment plant on the Kentucky River emerged as the preferred alternative by representatives of the Bluegrass Water Supply Consortium at its workshop last Wednesday.

"I'm sure that's the best for Jessamine County and for the whole region," said Tom Calkins, Nicholasville's utilities director and one of the founders of the consortium.

If the idea gets final approval, the plant will be built in Pool 3 of the Kentucky River, just north of Frankfort, and the treated water will be piped to Nicholasville, Wilmore and other towns around Central Kentucky.

To ensure an adequate water supply in times when the water level in the Kentucky River is low, a 20-mile-long water line would also be built to connect the plant to the

A1: WATER

Ohio River.

The Bluegrass Water Supply Consortium is a group of water utilities spread over 15 counties. It was started in 1999 with the idea that ensuring safe and adequate water supply should be a joint effort.

Over the last year, the consortium has looked at dozens of proposals and finally narrowed its choices down to eight. At the last meeting, it was supposed to choose three. The representatives ranked their references. Besides the plant in Pool 3, other proposals still on the active list are water treatment plants on the Ohio River, near either Maysville or Warsaw, and purchasing water from Louisville and delivering it through a new commonly shared water line.

Calkins explained that while the decision about narrowing the list has been made, other water suppliers have asked for another chance for their proposals to be considered.

"They thought we were speaking in generalities. They didn't realize we needed hard and fast numbers," he said.

The water suppliers that still want to be considered were given three weeks from last Wednesday to resubmit their proposals. The consortium's technical committee will look at them and make their recommendations before the public meeting scheduled for Sept. 22. The final meeting to select one of the alternatives will take place Oct. 13.

A Publication of the Bluegrass Area Development District

ADD-VANTAGE

Regional Water Supply Effort Advances

The Bluegrass Water Supply Consortium in which the ADD has played a leadership role is nearing the completion of its regional water supply study. Some decisions were made at the Consortium's July 23 public workshop in Winchester and other decisions are near. Reviewing in some depth eight different source of water supply options, the Water Consortium has ranked the eight according to a formula that includes not only ***cost*** but also ***adequate capacity, raw/finished water quality, implementability, and flexibility***.

Although there is a possibility of a reordering of the relative scoring of the eight up until late August, the highest scoring proposal on July 23 involves the concept of the construction—probably in northern Franklin County—of a new water treatment plant adjacent to the Kentucky River's Pool 3. The Pool 3 source of raw water would be supplemented during very dry times with Ohio River water conveyed by a new pumped raw water pipeline from the Ohio River—probably from near Warsaw. A pipeline grid would be constructed to link participating water utilities in order that drinking water might be moved from the point(s) of availability to the point(s) of need.

On July 23, a two-week window was given to four potential sellers of treated water (the Louisville Water Company, the Greater Cincinnati Water Works, the proposed Carroll County Regional Water Commission, and the Greater Fleming Regional Water Commission to allow each to reexamine its July proposal to see if a more attractive offer to the Consortium might be able to be extended.

In addition, the Consortium acted on July 23 to recommend that a regional water commission be created soon under the authority granted by KRS Chapter 74. The regional water commission would have legal standing and would have the ability to borrow money, accept grants, exercise the right of imminent domain, and otherwise act as the implementing and the owning entity of such a water wholesaling operation. Also aired was the apparent need to develop an umbrella organization, perhaps a not-for-profit corporation, which could and would involve **all** retail water customers of the proposed regional water commission. The umbrella organization could/would be in a position to offer advice and guidance to the regional water commission which itself would likely have a lesser number of seats on its board.

The ADD's future involvement would likely include efforts to inform and to engage local elected officials and water utility managers, state and federal elected officials, state and federal agency representatives, and the public at large. The ADD would also serve as a project advocate.

For more information, contact Don Hassall or Jas Sekhon at the ADD.

LEXINGTON HERALD-LEADER
WWW.KENTUCKY.COM

SUNDAY
SEPTEMBER 21, 2003

OUR WATER SUPPLY

Options for easing droughts approach the decision stage

By Andy Mead
HERALD-LEADER STAFF WRITER

What do we do when the rain doesn't come?

The question has ebbed and flowed over the decades, picking up urgency when droughts threatened — most recently in 1988 and 1999 — and lagging when rain returned.

Now a group of water utilities in 15 Central Kentucky counties, working through a summer of frequent downpours, says it is closing in on a solution to the region's periodic parchings.

The Bluegrass Water Supply Consortium will lay out details at a public meeting in Lexington Monday evening.

A final decision could come ct month.

Here's how the race for a solution is shaping up:

See WATER, A11

■ The front-running option is a new water treatment plant on the Kentucky River in Pool 3, north of Frankfort.

There's more water in that downstream portion of the river than in places closer to Lexington.

And, for the droughts that are sure to return, the plant would be attached to a pipe that could bring in raw water from the Ohio River.

This "hybrid" solution was developed in July, when the utilities learned that state water regulators would restrict withdrawals from Pool 3 during severe droughts.

A Virginia consultant hired by the consortium estimates that the 40-year, present-day cost (what it would cost in 003 dollars to get water for 40 ears) is $330 million.

■ In second place (recently bumped up from third because of a price cut) is an idea Kentucky-American Water Co. promoted through the 1990s: A pipeline to bring in treated Ohio River water from the Louisville Water Co.

The pipeline idea drew such public opposition that Lexington's Urban County Council rejected the plan in 1999, saying it favored a plan to store more water in the Kentucky River.

A major change from 1999 is that the pipeline currently being considered would be owned by a public agency, not Kentucky-American, a private company.

The consultant's 40-year cost estimate: $293 million.

That makes the Louisville pipeline cheaper than the Kentucky River Pool 3 treatment plant estimate, but money isn't the only consideration.

Before they got down to dollars, consortium members decided that things like flexibility and the ability to put the option in place also would weigh heavily.

Several aspects of the pipeline proposal hold it back, including lack of control over future expansions and its possible public acceptance problem.

"Do we want to chase something that has so much negative baggage?" asks Don Hassall of the Bluegrass Area Development District, which helped organize the consortium in 1999.

■ Coming in third is a new treatment plant somewhere along the Ohio that would pump treated water back to Central Kentucky.

Its 40-year cost is estimated at $343 million.

When the consortium's technical committee rated the options on a weighted scale, the Pool 3 option scored 2,573 points.

The Louisville pipeline had 2,264 points, and the new Ohio River plant was close behind at 2,237.

Among the things the consortium is looking for at Monday's meeting is feedback about its scoring system.

"Because it is coming in very, very close, we're going to be listening very closely to the public on that," Hassall said.

A leader of the group that formed to oppose the Louisville pipeline says the consortium was right to consider factors other than cost in its ranking because estimates can be wrong.

"It's entirely appropriate to not put all the weight on what someone thinks the price might be," said Chetan Talwalkar, one of the organizers of Neighbors Opposing Pipeline Extravagance (NOPE).

No matter which option the consortium chooses, Central Kentucky will continue to get the majority of its water from existing treatment plants along the Kentucky River.

And the condition of the aging dams that hold back pools along the river is the most important water supply issue facing the region, Talwalkar said.

Responsibility for maintaining the dams lies with the Kentucky River Authority, a state agency that gets money from water utilities that draw water from the river.

Of the options being considered by the consortium, Talwalkar said he favors Pool 3. That's because it would increase revenues to the authority, while a strictly Ohio River solution would decrease them.

Any of the three options is likely to increase water bills for many people across the region by about 25 percent, Hassall said.

If each utility tried to find its own water supply solution, he said, the cost probably would be higher.

No matter which option is chosen, the plan is for it to link to a grid of pipes that would connect participating utilities.

The cost of that grid now is estimated at $60 million, but that is likely to go down because not all the utilities that are now part of the consortium will agree to stay when it comes time to put up money.

IF YOU GO

Bluegrass Water Supply Consortium

When: 6 to 9 p.m. Monday

Where: The cafeteria of Lexington's Henry Clay High School, 2100 Fontaine Road

On the agenda: The meeting will have an "open house" format, with information available at several displays around the room. People may come and go as they choose and talk one-on-one or in groups. The meeting is an update of water supply options. It is not about whether Lexington should own Kentucky-American Water Co.

WHAT'S NEXT?

The consortium has scheduled a last workshop for Oct. 13; meanwhile, local governments will be weighing their options.

WHO'S ON THE CONSORTIUM?

A list of the participants.

Details, A11

WATER | Three possibilities are ready for public scrutiny

From Page A1

Utilities would have to specify how much water they would need in a drought, then agree to buy a percentage of that even in the wettest years.

The consortium probably will form a regional water authority to own and operate whatever option it chooses. The authority would sell water wholesale to utilities, but couldn't compete with them by offering retail sales.

Kentucky-American Water Co., the largest water utility in the region, won't be allowed to become a member because it is a private company.

But Linda Bridwell, the company's director of engineering, expects to have a contractual agreement that "would essentially make Kentucky-American a member without being a voting member."

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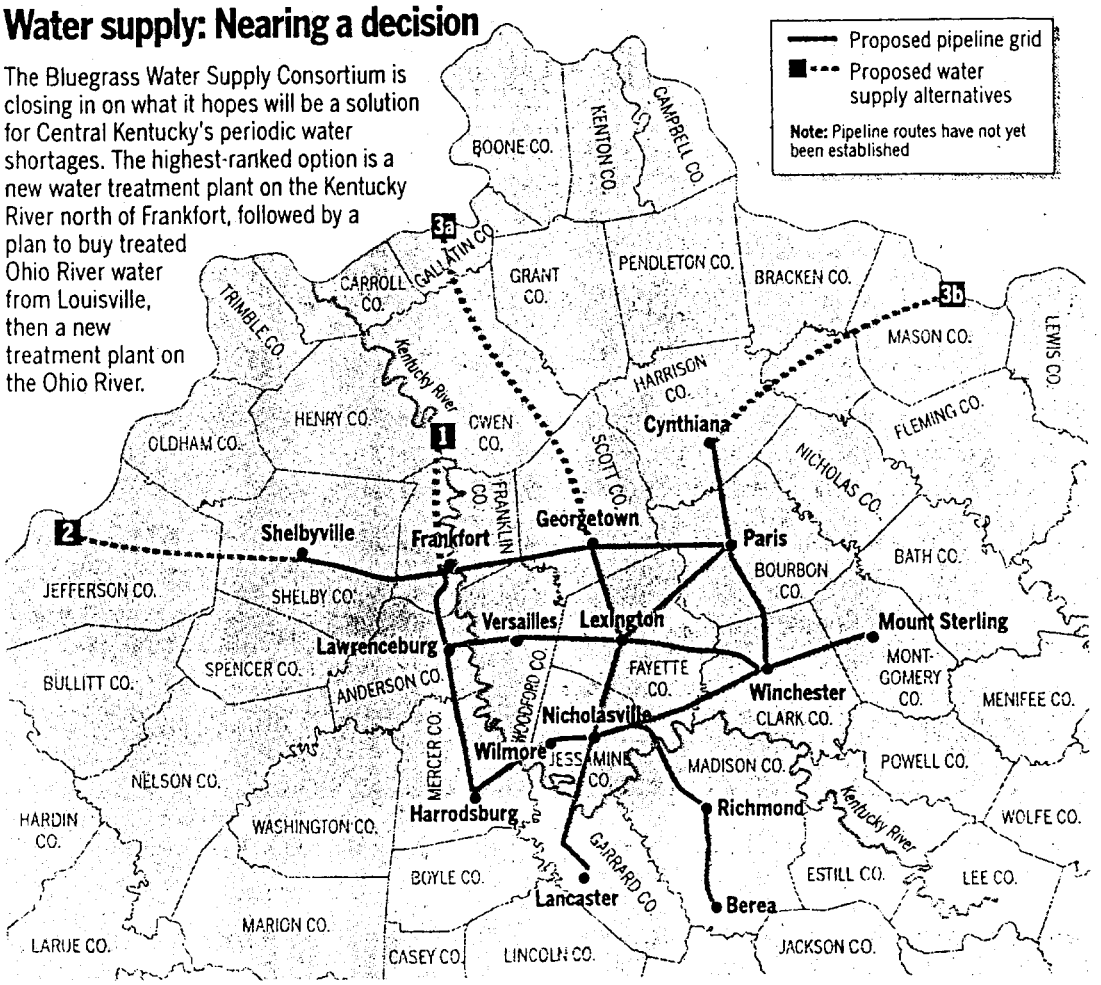
Water supply: Nearing a decision

The Bluegrass Water Supply Consortium is closing in on what it hopes will be a solution for Central Kentucky's periodic water shortages. The highest-ranked option is a new water treatment plant on the Kentucky River north of Frankfort, followed by a plan to buy treated Ohio River water from Louisville, then a new treatment plant on the Ohio River.



1 New treatment plant on Pool 3 of Kentucky River
2 Purchase treated water from Louisville Water Co.
3a New treatment plant on Ohio River at Warsaw
3b New treatment plant on Ohio River at Maysville/Dover

SOURCE: BLUEGRASS WATER SUPPLY CONSORTIUM

CRAIG JOHNSON | STAFF

What's next?

After gathering comments at Monday's public meeting, the Bluegrass Water Supply Consortium will hold the last of a series of workshops on Oct. 13.

It begins at 9:30 a.m. on the third floor of the Phoenix Building (the former Kentucky Utilities building), 101 East Vine Street in Lexington.

A decision on how to get more water could be made then. A consultant's report detailing that decision will follow later.

Meanwhile, local governments are being asked to decide whether they will put up money to hook their utilities to a grid of pipes.

The consortium wants to have a substantial portion of the water supply solution in place in three to five years.

Supply Consortium participants

Lexington-Fayette Urban County Government, Winchester Municipal Utilities, Kentucky-American Water Co., Nicholasville Combined Utilities, Frankfort Water and Electric Plant Board, Georgetown Municipal Water and Sewer Service, Berea College Utilities, Mount Sterling Water and Sewer Commission, City of Cynthiana Utilities, City of Paris Utilities, City of Wilmore Utilities, City of Versailles Utilities, City of Lawrenceburg Utilities, Shelbyville Water and Sewer Commission, City of Harrodsburg, City of Danville Utilities, City of Lancaster Utilities, City of Richmond Utilities, Bluegrass Area Development District.

Frankfort State-Journal
September 23, 2003

Regional water weighed

By BETH CRACE
State Journal Staff Writer

LEXINGTON – On Monday, the public got a chance to take a closer look at three options under consideration to link Central Kentucky's water supplies.

Citizens gathered at Henry Clay High School where they could speak with members of the Bluegrass Water Supply Consortium and learn more about its concept for water regionalization.

The group is a non-governmental body composed of 16 water utilities around Central Kentucky, including the Frankfort Electric and Water Plant Board.

In July, the consortium unveiled what it considers to be the three most viable options, giving top ranking to a proposal for a new water treatment plant north of Frankfort

In times of drought, an Ohio River pipeline would bring in raw water to be treated and distributed to the area. The plant would sit on the bank of the Kentucky River north of Frankfort, treating water that would be piped to towns around Central Kentucky.

Other proposals include a new treatment plant on the Ohio River at

Water supply

(Continued from Page A1)

Warsaw in Bracken County or at Maysvile in Mason County, and to purchase treated water from the Louisville Water Company.

Consortium members hail the effort as the first attempt at finding a regional solution to water supply needs. They point to an earlier proposal by Kentucky American to construct a pipeline from Louisville using water from the Ohio River, which never came into being.

"I guess the biggest question we're getting is how's this different from other efforts," said Linda Bridwell, director of engineering for Kentucky American. "We're pretty excited about this. We think it's going to be a solution that goes forward."

"I think the thing that impressed me most was how the entire group came together to be productive," said Mike Dudgeon, a member of the plant board.

The concept hinges on constructing a grid system throughout the area which would pump water to areas in need. Participating utilities would purchase water from the consortium at wholesale, and then re-sell the water to customers.

But it's a touchy subject for some, particularly those who've been worried about other proposals to expand the area's water supply. Currently, the Kentucky River Authority is planning to raise Lock and Dams 9 and 10 by replacing Lock and Dam 8 to store 4.8 billion gallons of water in case of drought.

That idea has raised concerns from property owners near Lock and Dam 8, who wonder if their property will be flooded when the dam is raised.

"People in the lowlands have to give it all," said Obra D. Collins, of Richmond, who said he doesn't support using the Kentucky River as the main water source.

Consortium members argue something has to be done to address the area's water deficit, saying that by the year 2020 the Bluegrass region could have a 67 million gallon water deficit for entities in the Kentucky River basin.

Bunk Sullivan, the plant board's representative on the consortium, said a new treatment plant and grid system would have an impact on customers' pocketbooks. Water rates will rise, Sullivan said, but that largely depends on the utility.

For example, said Edward Donahue, president of Municipal and Financial Services Group in Annapolis, Md., a utility in need of a new treatment plant could opt to purchase all its water from the consortium. By comparison, their rates would be higher than a group which only purchased water in times of emergency.

In the long run the consortium views regionalization as the most cost-effective method. Donahue said it's cheaper to build one bigger plant than a group of smaller water plants throughout the region.

The timeline for the project is three to five years, Sullivan said, after the consortium determines which option it will use.

Monday's meeting marked the consortium's sixth workshop and gave the public a chance to discuss and learn more details of the water regionalization concept. The last workshop will be held next month.

The first workshop last year drew nearly 200 people, according to Don Hassall, assistant executive director of the Bluegrass Area Development District. Hassall said a rainy summer had put a damper on public desire to cure a problem created by drought.

Though the Henry Clay cafeteria was bustling with people an hour into the event, at least one person wished for a bigger turnout.

"I thought there should be more because this is a regional problem. If you don't come then you shouldn't complain," said Paul Brooke, the District 11 councilman in Lexington. "This is a regional problem — not a Lexington problem."

LEXINGTON HERALD-LEADER SUNDAY, SEPTEMBER 28, 2003

EDITORIAL

Cooperation key to regional water supply

Consortium's ideas better for area than water company's pipeline idea

Raise a glass and toast the Bluegrass Water Supply Consortium. In existence for three years, it has taken the phrase "think regionally" to heart.

Whether the 16 water utilities in the group will act regionally to solve their mutual problems is still up in the air. The options laid out by the consortium make a strong case for why they should.

Rather than five, 10 or all 16 water utilities going every which way, the consortium is encouraging them to coordinate to a greater extent than ever before.

An example is an interconnected grid of water lines. The consortium has narrowed to three a long list of possible solutions to water shortages and treatment problems. All three plans have in common the grid, which allows the utilities to share water.

This would provide each utility some outside backup supply in the event of an emergency, or even for more routine use.

Important details about how the grid would be built and operated have not been worked out, but the concept is a good one.

All three plans also take into account the big picture. By seeing beyond geographical boundaries, the consortium has tried to address as many of the utilities' various needs as possible. Some systems have run short on supply during droughts while others have more than enough. The same is true for treatment capacity. Evening out these imbalances is best done regionally.

At the least, the consortium's regionwide assessment and planning have been a valuable exercise in forming bonds. Cooperation across county and city lines will be the linchpin if any plan is going to win approval and funding to go forward.

One of the big failings of the Kentucky-American Water Co.'s push a few years ago to build a pipeline to Louisville and buy treated Ohio River water was that it disregarded regionwide supply problems and might have actually made them worse by diverting attention and resources away from the Kentucky River.

Getting more water to Fayette County during a drought should certainly be a priority, but Kentucky-American wanted to go it alone.

While the company's pipeline plan would have served its corporate goals of territorial expansion and larger profits, it ignored a threat far more dangerous than drought-induced temporary water cutbacks — the deterioration of Kentucky River dams.

Since the river is the single source for Lexington and much of Central Kentucky, the collapse of a dam would be a disaster worse than an electricity blackout.

That's one reason, among others, that the municipal utilities and the Urban County Council didn't support Kentucky-American's plan and why it was shelved.

The pipeline to Louisville plan being considered by the consortium is an improvement because it would be sized to meet the region's needs. In addition, the pipe would be owned by an agency formed by the utilities, not Kentucky-American, giving the public control over its use.

The consortium's proposal to tap the Kentucky River north of Frankfort and build a large treatment plant there is the leading contender of the three plans.

One of its strong advantages is that it would help pay for improvements and repairs to the dams, which is essential to securing the water supply.

Which plan will be the best for the region is still to be determined, and depends in part on how many utilities are willing to sign on.

But what this process has shown is that cooperation can lead to better results.

16

LEXINGTON HERALD-LEADER

SUNDAY, OCTOBER 12, 2003

Consortium to vote on water plans

Consultant expected to recommend 'hybrid'

GOAL: AMPLE SUPPLY DURING DROUGHTS

By Andy Mead
HERALD-LEADER STAFF WRITER

Kentucky-American Water Co. spent much of the 1990s trying to win approval for a pipeline to bring treated Ohio River water to Lexington from Louisville.

But on Monday morning, company representative Linda Bridwell expects to cast a vote for a rival proposal — a new treatment plant on the Kentucky River in Pool 3, north of Frankfort.

"Kentucky-American is committed to building a solution to the water supply problem," she said, noting that the Pool 3 plant is likely to outrank the Louisville pipeline when a consultant makes his recommendation to the Bluegrass Water Supply Consortium.

The ranking was based on a weighted scale members of the consortium came up with before they began considering alternatives to augment water supplies.

In the final analysis, the Louisville pipeline was estimated to be somewhat less expensive.

The consultant estimates that the 40-year, present-day cost (what it would cost in 2003 dollars to get water for 40 years) of the Pool 3 plant is $330 million. The comparative cost of the Louisville pipeline is $293 million.

But consortium members said they also wanted to consider flexibility and the ability to put the option in place. Several aspects of the pipeline proposal hold it back, including lack of control over future expansions and its possible public acceptance problem.

The Ohio River is considered an inexhaustible supply of water, and the Pool 3 proposal recognizes that.

It is called the hybrid solution because it would be connected to a pipe that could bring in raw water from the Ohio River if the flow in the Kentucky got low.

Building new plants on the Ohio near Maysville or Warsaw

See WATER, B2

WATER | Regional commission would run plant

From Page B1

made the consortium's short list, but ended up being the most expensive and lowest-rated options.

The consortium — 17 utilities in 15 Central Kentucky counties — was formed during the drought of 1999.

Last November, it began a series of six workshops aimed at ending the water shortages that periodically plague the region. Monday's workshop, the last, is titled "Conclusions."

What is likely to come out of it is the vote on augmenting the water supply, an informal poll on which utilities are interested in purchasing water, and a discussion on how to go about forming a regional water commission. The idea is that the commission will own the new treatment plant (if that is the ultimate choice) and a grid of pipes that will carry water from town to town.

The grid also would carry water from towns that have excess treatment capacity to towns that don't have enough. If there was a toxic spill near one town's water intake pipe, or an equipment breakdown, the grid could come to the rescue.

"To be able to interconnect, to move water from where it is to where it's needed, is the key to the whole process," said Vernon Azevedo, general manager of Winchester Municipal Utilities.

People in Winchester and the parts of Clark County that the city supplies use more than 5.5 million gallons of water a day. The city's treatment plant capacity is 6 million gallons a day.

With demand pushing against supply, it would seem to be time to think about plant expansion — or connecting to the grid. "Our goal is to avoid the high cost of upgrading our own facilities," Azevedo said.

Winchester is not alone. Other utilities in the region — including Kentucky-American — have supply or treatment deficits, or both.

The consortium's plan to fix the problem is expected to increase rates by about 25 percent. But supporters say that is cheaper than a lot of individual fixes.

At this point, all the consortium's plans are general.

No decision has been made on where a new Kentucky River plant would be located, for example, or how large it would be.

Don Hassall of the Bluegrass Area Development District, which is coordinating the consortium's efforts, said he doesn't expect all the members to join the new water commission when it comes time to formally sign up.

A utility would have to reserve a certain amount of water, and agree to take perhaps 20 percent of that amount every day, he said.

When a clearer idea emerges on how much water will be needed, and which towns want to take part, details can be worked out on how big a plant would be needed and where the pipes would run.

Kentucky-American, which is a private company, could not be part of the water commission. But it is by far the largest water utility in the region, and would have a partnership agreement.

"We hope to have the organization up and going very quickly, maybe early in 2004," Bridwell said. "And with that, we can start moving forward with getting some solutions designed and maybe start turning some dirt."

Reach Andy Mead at (859) 231-3319; 1-800-950-6397, Ext. 3319; or amead@herald-leader.com.

Bluegrass Water Supply Consortium

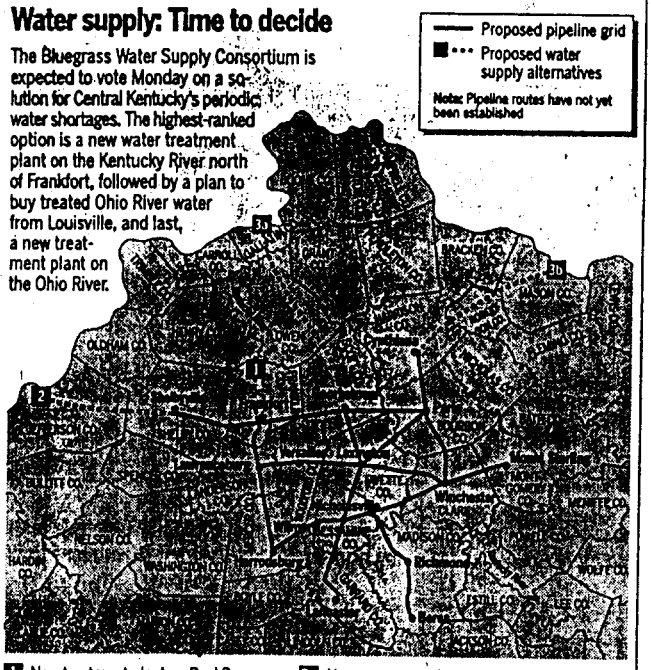
The last of the Bluegrass Water Supply Consortium workshops begins at 9 a.m. Monday on the third floor of the Phoenix Building (the former Kentucky Utilities building), 101 East Vine Street in Lexington.

Supply Consortium participants are:

Lexington-Fayette Urban County Government, Winchester Municipal Utilities, Kentucky-American Water Co., Nicholasville Combined Utilities, Frankfort Water and Electric Plant Board, Georgetown Municipal Water and Sewer Service, Berea College Utilities, Mount Sterling Water and Sewer Commission, City of Cynthiana Utilities, City of Paris Utilities, City of Wilmore Utilities, City of Versailles Utilities, City of Lawrenceburg Utilities, Shelbyville Water and Sewer Commission, City of Harrodsburg, City of Danville Utilities, City of Lancaster Utilities, City of Richmond Utilities, and Bluegrass Area Development District.

Water supply: Time to decide

The Bluegrass Water Supply Consortium is expected to vote Monday on a solution for Central Kentucky's periodic water shortages. The highest-ranked option is a new water treatment plant on the Kentucky River north of Frankfort, followed by a plan to buy treated Ohio River water from Louisville, and last, a new treatment plant on the Ohio River.



1 New treatment plant on Pool 3 of Kentucky River

2 Purchase treated water from Louisville Water Co.

3a New treatment plant on Ohio River at Warsaw

3b New treatment plant on Ohio River at Maysville/Dover

SOURCE: BLUEGRASS WATER SUPPLY CONSORTIUM

CRAIG JOHNSON | STAFF

LEXINGTON HERALD-LEADER

OCTOBER 14, 2003 | TUESDAY

Hybrid water supply plan gets OK

NEXT ON CONSORTIUM'S AGENDA: WHERE'S MONEY COMING FROM?

By Andy Mead
HERALD-LEADER STAFF WRITER

They had just come up with a plan to solve Central Kentucky's periodic water supply problems, but no one was declaring victory.

"This is not victory. Victory is turning the valve," said Don Hassall, who for nearly four years has coordinated the efforts of a group called the Bluegrass Water Supply Consortium.

The consortium — 17 water utilities and the Lexington city government — yesterday approved a plan to build a new treatment plant on Pool 3 of the Kentucky River north of Frankfort.

The treated water would go into a grid of pipes connecting towns around the region. On those rare occasions that the flow in the Kentucky was too low, raw Ohio River water would be pumped in for treatment.

This would all be owned and administered by a new agency to be called the Bluegrass Water Supply Commission.

See WATER, A5

WATER | Grid, treatment plant could be done by middle of 2009, consultant says

From Page A1

The price tag: An estimated $330 million, which could ultimately inflate water bills by about 25 percent.

A Maryland consultant hired by the consortium estimated that the grid and the treatment plant could be completed by the middle of 2009.

Parts of it, including segments of the grid, could be in place much sooner.

The plan, called the Pool 3 or hybrid option, drew no serious opposition.

None of the consortium members voted against it (there were two absences, one abstention) and no one from the public spoke against it.

Chetan Talwalkar, an activist in water issues who had been critical of the consortium in the past, found yesterday's vote to his liking.

"I am a little bit at a loss for words because for the first time in 12 years I am cautiously optimistic," he said.

If it comes to fruition, the hybrid option could eliminate the threat of droughts that wreak social and economic havoc on the region.

But Hassall and others who have watched the process for years pointed out that planning water supply solutions doesn't necessarily mean anyone gets more water.

An immediate problem, Hassall said, is finding money to turn PowerPoint presentations into pipes and treatment equipment.

"There is money to be spent before we sell the first gallon of water," he said.

The consortium started with $590,000 (including a $300,000 federal grant, a matching $245,000 from the Kentucky Infrastructure Authority and $45,000 from consortium members).

That has been used to pay for the consultant that helped sort through 40 options and come up with the hybrid.

Hassall estimated it might take an additional $500,000 to get it to the point of selling water.

"We're looking at a project that costs in the multiples of hundreds of millions of dollars," he said. "We should not let something that costs half a million slow us down."

Hassall said someone might come up with the money, and mentioned that Kentucky-American Water Co. is the largest utility in the region.

Linda Bridwell, who represents Kentucky-American on the consortium, said later that keeping up the momentum means that "some kind of financial arrangement" might be worked out. But she said any utility that is serious about water supply should also contribute.

If it comes to fruition, the hybrid option could eliminate the threat of droughts that wreak social and economic havoc on the region.

The consortium has no formal organization, but next year at least some of its members are expected to form the water commission.

Those who join will reserve a certain amount of water they will need in times of drought, and will have to agree to take 20 percent of that amount. If a town wants to reserve 1 million gallons a day, for example, it would have to take 200,000 gallons every day.

Already Kentucky-American, Winchester, Frankfort, Nicholasville and Georgetown have sent non-binding letters of intent to buy water.

Others will get letters late this week asking whether they are interested.

Some will say no.

Lawrenceburg, for example, is adding to its current treatment capacity, and raising rates accordingly.

It could still run short of water in a severe drought, but Mayor Bobby Sparrow said officials are reluctant to join the new water commission if that means another rate increase.

Reach Andy Mead at (859) 231-3319, at 1-800-950-6397, Ext. 3319, or amead@herald-leader.com.

Lexington Herald-Leader
October 16, 2003

EDITORIAL

All in the same boat

Regional plan best way to increase water supply

A consortium of Central Kentucky water systems has chosen the best plan to boost the supply of water in the entire region.

Some, if not eventually all, of the systems would be connected by a grid of pipes so they could share water. One of the least-used pools on the Kentucky River, north of Frankfort, would be tapped to increase the raw water supply, and a regionally sized plant built there to treat it.

Further into the future is a pipeline north to the Ohio River that would provide another source of supply.

Besides making better use of the stored water already available in the Kentucky, some of the benefits of the regional plan are financial, such as economies of scale and the efficient use of facilities.

It can also move forward in tandem with plans by the Kentucky River Authority to renovate the aging dams and raise some of them, depending on demand.

Apart from developing a plan to get more water where it's needed when it's needed, the consortium sees itself as a vehicle to educate elected officials and the general public about the value of the regional approach. This is crucial because mayors, city councils and ratepayers have to be on board.

All this is going to cost money — the current estimate is $330 million — so the public should prepare for higher water bills and make plans to cut consumption over the long run.

But the fact is, the need to increase supply is undeniable. Each city could go it alone and end up spending even more by not joining with their counterparts in the region.

Winchester Sun

Tuesday, October 28, 2003

Bluegrass Water Supply recognized

2003 Vision Award given

By Sun Staff

The Bluegrass Water Supply Consortium has been awarded a 2003 Vision Award from Bluegrass Tomorrow for regional cooperation for its efforts to plan for the future of central Kentucky's water supply.

The Winchester Municipal Utilities Co. is a member of the Bluegrass Alliance, which is composed of 17 utilities and Lexington. Vernon Azevedo, general manager of WMU and one of the forces behind the consortium, said it began with the drought of 1999.

"A group of city-owned utilities began looking at a regional approach to resolving the water supply issue," he said. "That has grown into what it is today with 17 utilities in 15 counties.

"... I'm happy to hear it (the award). I've said many times there's not been a stronger regional effort that what we've done with water to date."

The consortium consists of WMU, Berea College Utilities, City of Cynthiana Utilities, City of Danville Utilities, City of Harrodsburg Utilities, City of Lancaster Utilities, City of Lawrenceburg Utilities, City of Nicholasville Utilities, City of Paris Utilities, City of Versailles Utilities, City of Wilmore Utilities, Frankfort Water and Electric Plant Board, Georgetown Water and Sewer Services, Kentucky American Water Co., Lexington-Fayette County Urban Government, Mt. Sterling Water and Sewer Commission, Richmond Utilities and Shelbyville Water and Sewer Committee.

Bluegrass Tomorrow annually recognizes people, businesses and communities for smart growth and planning around Kentucky. This year, the group recognized those activities that focused on growing downtowns and preserving greenspaces.

Winners will be recognized at the annual Celebrate Vision Party at 7 p.m. on Nov. 8 in the Victorian Square in Downtown Lexington. Tickets are available by calling (859) 977-3792.

A Publication of the Bluegrass Area Development District

BLUEGRASS ADD-VANTAGE

Regional Water Supply Planning Effort Concluding; Next Steps being Planned

The Bluegrass Water Supply Consortium's yearlong effort to develop an action plan to deal with both the present and the future water supply deficit in many Central Kentucky counties is concluding. The executive summary of the effort is now available from the ADD for distribution to interested persons. *Letters of intent* to reserve potable water capacity in the regional effort have been received from all five of the initial members of the effort—the Kentucky-American Water Company, the Frankfort Electric and Water Plant Board, the City of Nicholasville, the Georgetown Municipal Water and Sewer Service, and the Winchester Municipal Utilities. Twelve outer ring cities/water utilities were also a part of the planning effort. A decision from each of those twelve to reserve capacity in the regional system or to decline to reserve capacity is expected before

Christmas. Once there is a good understanding as to which water utilities seek to remain as a part of the regional effort, the Consortium's consultant will seek to finalize decisions relating to the size and first cost of the new regional water treatment plant as well as the extent and the cost of the pipeline grid that would link the participating water utilities.

At the same time, the Consortium will likely seek to change its form of governance to match the statutory requirements of Chapter 74 of the Kentucky Revised Statutes. Planned is the creation of a *regional water commission*. To maintain some measure of the name recognition that has been achieved over the last four years, the Bluegrass Water Supply Consortium will change only the last word in its name as it seeks formal creation as the ***Bluegrass Water Supply Commission***. From area water utilities, *letters of intent* to participate have already been received totaling 30 million gallons per day of reserved potable water capacity.

Those who participated in the initial planning effort include Berea College Utilities, Bluegrass ADD, Cynthiana, Danville, Frankfort Water Plant Board, Georgetown Municipal Water and Sewer Service, Harrodsburg, Kentucky American Water, Lancaster, Lawrenceburg, Lexington-Fayette, Nicholasville, Mt. Sterling Water and Sewer Commission, Paris, Shelbyville Water and Sewer Commission, Richmond Utilities, Versailles, Wilmore, and Winchester Municipal Utilities.

The regional potable water effort will ***not*** stop with the development of the plan. There have been dozens of plans in the past that deal with this same issue. For the most part, those studies line bookshelves and gather dust. The Bluegrass Water Supply Consortium leadership team has vowed that that cannot and will not happen this time. The issue is just too critical. The cooperative effort seems to have developed widespread support and acceptance. Some participants in the initial planning effort will likely stand aside, but the remaining participants expect to move on with the process. Final scooping studies need to be developed—based upon those cities/water utilities that expect to stay within the cooperative framework to see the effort move to construction and implementation. Thorny issues are yet to be resolved. Where along Kentucky River Pool 3 would the water treatment plant be located? What about the auxiliary water line that would bring raw water from the Ohio River to the region—where will the water intake go, what would the line size be, what would the route be? What would be the route, the line sizing, and the order of construction of the sections of the water line grid that would link the participating water utilities? There are issues relative to *permitting* by the Kentucky Division of Water. There are issues to be resolved concerning compatibility of water disinfection techniques. There are issues involving what parts of existing water distribution/water transmission can be used as a part of the grid system that would link participating water utilities. There are issues of project phasing. On the time line, would some parts of the large project go ahead of other parts of the project? There are issues concerning governance. Who would serve on the board of commissioners of the soon-to-be created water commission? How would early preconstruction efforts be financed? These and a myriad of other issues have yet to be resolved.

However, the participants of today's Bluegrass Water Supply Consortium are committed to maintain momentum and to attempt

to strive toward the goal of having at least a portion of the project ***up and running*** within a three to five year period. The very vitality of the area economy depends upon it.

For more information concerning the Bluegrass Water Supply Consortium (or the Bluegrass Water Supply Commission as it is expected to be called by early 2004), contact Don Hassall of the ADD, Vernon Azevedo of Winchester Municipal Utilities, Tom Calkins of Nicholasville Utilities, Bunk Sullivan of the Frankfort Water Plant Board, Bob Riddle of the Georgetown Municipal Water and Sewer Service, or Linda Bridwell of Kentucky American Water.

Danville agrees to buy water from regional network

Agreement is non-binding, though. Danville is still interested in selling water from Herrington Lake.

By LIZ MAPLES
lizm@amnews.com

Danville will sign a preliminary agreement to buy 1 million gallons of water a day from a regional network.

The city would rather sell water, but officials agreed to sign the agreement so the city can continue negotiations with the network.

The Bluegrass Water Consortium, a group of water utilities, has changed its name to the Bluegrass Water Commission, which will be the body that actually builds and maintains the network of pipelines.

The city still faces a decision about whether to build another water treatment plant to comply with new federal water quality standards. If the plant is built, city commissioners would have to decide how big to build it.

Several options were discussed at a special meeting Tuesday:

- Remodel the existing plant.
- Remodel the existing plant, and buy water.
- Build a plant, and sell water.

BWC needed the "non-binding" agreement by Dec. 22, so it can make more accurate estimates about how much the water would cost.

City commissioners voted to sign the preliminary agreement to buy one million gallons a day for $400,000 to $500,000 a year.

"It's obvious that water is not going to get any cheaper than it is today, and it's obvious that it could be a big money maker for the city of Danville," Mayor John W.D. Bowling said.

The city will also tell the BWC that it is still interested in selling water to the networked cities.

Danville wants to sell water from Herrington Lake to the network, or to surrounding southern counties, such as Mercer, Lincoln and Casey.

However, the city has not discussed how much water it could draw from the lake with Kentucky Utilities, the electric company that controls the dam. A meeting between the city and KU is scheduled for Dec. 19.

Danville's consultants believe that after KU takes its water out of the lake for electricity generation, another 30 to 40 million gallons a day could be taken out with little effect on the lake. The city would, at most, treat 15 million gallons a day.

In the coming months, the city will decide whether to build another plant, and if it does, how large to build it. Danville's water demand has risen in the last decade from 3.5 million gallons a day to 4.5 MGD.

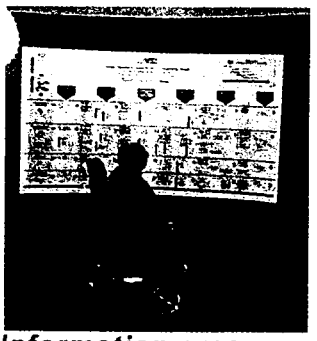
Waterworks

Kentucky Water Resources Research Institute at the University of Kentucky

Vol. 9, No. 2, 2003

Bluegrass Water Supply Consortium Proposes Treatment Plant

Adequate water supply is an issue of utmost importance throughout the world, and the Commonwealth is no exception. Seasonal shifts often create fluctuations in water levels, which can lead to abundance or scarcity of this important resource. To address this issue and develop long-term solutions to central Kentucky's water issues, a group of seventeen utilities, along with the Lexington-Fayette Urban County Government, came together to form the Bluegrass Water Supply Consortium (BGWSC).



Information was provided at a BGWSC public meeting in September

After two public meetings, five public workshops, and many other gatherings, the Consortium voted on October 13th to approve a plan aimed at maintaining adequate water supply in the region. Developed by a Maryland consultant engaged by the BGWSC, the plan calls for the building of a new treatment plant on Pool 3 of the Kentucky River. Located north of Frankfort, this plant would be managed by a new agency known as the Bluegrass Water Supply Commission and would release treated water into a new grid of pipes connecting towns in the region. Should the Kentucky River's flow drop below acceptable levels, raw water would be pulled in from the Ohio River, thus greatly reducing the impact of droughts in the Bluegrass. The entire project is estimated to cost approximately $330 million, a sum that could lead to an increase in water bills of approximately 25%.

Dan Hassall, assistant executive director of the Bluegrass Area Development District, has coordinated the Consortium's work since its inception and is optimistic about the project. He does caution, however, that "[t]here is money to be spent before we sell the first gallon of water." It is expected that Kentucky-American Water Co., the largest utility in the region, will assist with financing the project; however, Kentucky-American's representative to the Consortium, Linda Bridwell, has stated that all utilities concerned about their water supply should contribute.

In addition to the pipes and treatment equipment that must be purchased, the Commission itself must be formed. While the Consortium has no official structure, it is expected that some of its members will form the Commission. Members will be required to reserve specific amounts of water that they anticipate needing

A group discusses the proposal at a BGWSC open house

in drought situations; in non-drought situations, those members will be required to purchase a percentage of the drought reserve amount. For example, a 20% purchase requirement would entail the purchase of 200,000 gallons daily to ensure a reserve of one million gallons per day.

Several utilities and communities – including Kentucky-American, Winchester, Frankfort, Nicholasville, and Georgetown – already have submitted non-binding letters of intent to purchase water. Others, such as Lawrenceburg, have declined, citing customer concerns regarding rate increases as the primary factor.

Inside...

Bluegrass Water Consortium 1
Meet the Researcher: Cathleen Joyce Webb, Ph.D. 2
KWRRI Symposium Reminder: NIWR/USGS 104 Grants 3
America's Crumbling Infrastructure: Dam Rehabilitation 4
Funding Opps: KY NREPC Scholarships; NWRI Fellowship 5
From the Director 6

Lexington Herald-Leader

B2 TUESDAY JANUARY 6, 2004

TWO-RIVER PLAN

10 utilities want in on regional water system

By Andy Mead
HERALD-LEADER STAFF WRITER

Ten Central Kentucky utilities say they want to reserve capacity in a proposed regional water supply system.

That is better than the response expected by organizers of the Blue Grass Water Supply Consortium, said Don Hassall, a leader of the group.

The consortium started the new year by sending out executive summaries of a study, now concluding, that recommends building a new water treatment plant on the Kentucky River north of Frankfort.

After years of argument over whether to use the Kentucky River or the Ohio River to augment water supply, the new plant is called a hybrid. It would use Kentucky River water most of the time, but during severe droughts, raw Ohio River water would be piped in to be treated.

A grid of pipes would distribute treated water to towns that have agreed to join the effort.

Parts of the grid are likely to be the

See WATER, B2

Where utilities stand

■ Utilities that have sent non-binding letters saying they want to participate in a regional water supply plan:

Kentucky American Water.
Winchester Municipal Utilities.
Nicholasville Combined Utilities.
Frankfort Electric and Water Plant Board.
Georgetown Municipal Water and Sewer Service.
Mount Sterling Water and Sewer Commission.
The cities of Paris, Cynthiana, Lancaster and Danville.

■ Utilities that took part in meetings last year but have decided they no longer want to be involved:

Shelbyville.
Wilmore.
Versailles.
Lawrenceburg.
Harrodsburg.

■ Still undecided:

Richmond and Berea College, which is negotiating to sell its water system to the town of Berea.

WATER | Lexington undecided about role

From Page B1

first thing built, Hassall said.

The city of Lexington still has not decided what role it will play. Unlike other members of the consortium, it does not treat or sell water.

The consortium is an informal group of utilities that came together during a severe drought in 1999. It has spent $590,000 on a study (including a $300,000 federal grant, a matching $245,000 from the Kentucky Infrastructure Authority, and $45,000 from consortium members).

That paid for a consultant who helped sort through 40 options and came up with the hybrid.

Hassall has estimated it might take an additional $500,000 for engineering and planning studies to get it to the point of selling water. He is looking for new grants.

By spring, Hassall said, the consortium will evolve into a new government agency called the Blue Grass Water Supply Commission.

The commission's goal: to have the new treatment plant and grid system in place in the next three to five years.

Soon after the commission is formed, Hassall said, it will need firm commitments from utilities so the size of the treatment plant and routes for the grid can be determined. So far, it has only "non-binding letters of commitment" from the 10 that say they want to take part.

"You can't finalize even an estimate until you know who's in and who's out," Hassall said. "For instance: Richmond and Berea. If they're out, we're not running a pipeline south through Madison County. If they're in, we are."

The project could eventually cost about $200 million or more. That could mean that water bills in areas supplied by the commission could go up about 25 percent.

The alternative, a risk of running out of water whenever a drought hits, would be much worse, Hassall said.

"The thing people are beginning to realize," he said, "is that it's something that's needed.

"And putting it off is only going to make it worse."

Reach Andy Mead at (859) 231-3319 or 1-800-950-6397, Ext. 3319 or amead@herald-

Public Meetings

Contents

- **Public Meeting No. 1**
- **Public Meeting No. 2**

Attendance List

Bluegrass Water Supply Consortium Meeting #1

Tuesday, August 6, 2002
6:00 – 9:00 p.m.
Henry Clay High School
Lexington

	Name	Representing (optional)
1.	Sandy Shafer	citizen of Lexington
2.	Roger Recktenwald	KY Infrastructure Authority
3.	Wade Johnson	Burgess + Niple Ltd.
4.	Scott Wolf	Burgess & Niple, Ltd.
5.	Pat Hassall	
6.	Virgie F. Wells	Mayor, Cynthiana
7.	John Blackford	JSEW Dist
8.	Terry Hanover	PEH Engineers
9.	Jim Smith	Lexington Citizen
10.	Don Pratt	CITIZEN, UK
11.	Scott Kuhn	Straeffer Pump + Supply
12.	John Steinmetz	CDP ENGINEERS
13.	Chetan Talwalkar	
14.		
15.		
16.		
17.		
18.		

Attendance List

Bluegrass Water Supply Consortium Meeting #1

Tuesday, August 6, 2002
6:00 – 9:00 p.m.
Henry Clay High School
Lexington

Name	Representing (optional)
1. Jane Brown	HMB Engineers
2. Teresa Isaac	Fair Housing
3. David Hamilton	Kentucky River Authority
4. Jim E. Cornett	Mayor - Nicholasville
5. Nancy Cornett	City of Nicholasville
6. [illegible]	City of Nicholasville
7. Jason Walker	City of Versailles
8. Roger Wilson	City of Versailles
9. Bob Amato	KY PSC
10. Ron Wedding	Taxpayer
11. Mark Tucker	Taxpayer
12. Inga Godsey	Tax Payer
13. [illegible]	BGADD
14. Phil Crewe	taxpayer / citizen
15. WAYNE FOSTER	JESSCO EDA
16. ~~Tom Cattaro~~ ~~Boo Williams~~	~~JESSCO Mayor's Office~~
17.	
18.	

Attendance List

Bluegrass Water Supply Consortium Meeting #1

Tuesday, August 6, 2002
6:00 – 9:00 p.m.
Henry Clay High School
Lexington

	Name	Representing (optional)
1.	Bill McDonald	
2.	Bruce McEwen	
3.	Peter Goodman	Ky Division of Water
4.	Kathleen Hassall	
5.	Barry Hassall	
6.	Daniel Hassall	
7.	Joshua Hassall	
8.	Amy Wells	
9.	Mary Jane Warner	KRA
10.	Linda Briswell	KAWC
11.	Vernon Azevedo	WMU
12.	~~Tom Calkins~~	~~Nicholasville Utilities~~
13.	~~Bart Miller~~	~~City of Versailles~~
14.	Craig Avery	
15.	David Carlstedt	City of Wilmore
16.	~~Bob Pattie~~	~~GMWSS~~
17.	~~Jennifer Bierkman~~	~~LFUCG Div. of Planning~~
18.	Paul Schoninger	LFUCG Counsel Office

Attendance List

Bluegrass Water Supply Consortium Meeting #1

Tuesday, August 6, 2002
6:00 – 9:00 p.m.
Henry Clay High School
Lexington

Name	Representing (optional)
1. Rick Fletcher	Mt. Sterling Water / Sewer
2. Karen Simpson	LFUCG - Division of Community Development
3. Bill Grier	Self
4. John Blevins	BGADD
5. Jim Kipp	Kentucky Water Res Inst.
6. Lindell Ormsbee	" " "
7. Clayton Whitney	Myself
8. Richard W. Miller (Mike Miller)	Kentucky River Authority
9. Bill Caldwell	Kentucky Division of Water
10. Terry Ammerman	Congressman Ernie Fletcher
11. Dan Carey	KGS
12. Betty Nunnemer	
13. Jack Edmiston	Citizen
14. Karen Gerstle	Citizen - Jessamine Co.
15. Robert Norman	Harrodsburg Water
16. Walter Bottoms	" "
17. Bill Averill	Frankfort, Ky. - KDOW
18. Solithe Dharman	Div of Water Frankfort

Attendance List

Bluegrass Water Supply Consortium Meeting #1

Tuesday, August 6, 2002
6:00 – 9:00 p.m.
Henry Clay High School
Lexington

	Name	Representing (optional)
1.	Rick Wolf	PDR / Tetra Tech
2.	Chris Hoykel	
3.	Stephen Meador	KRA
4.	Leon Smothers	Division of Water
5.	Walter Martin	Public member
6.	Nick Comer	Preston - Osborne
7.	Brad Buckner	BGADD / BGWIA
8.	Tom Leith	Licking River Valley RC&D
9.	Herb Brown	Hdorcde - Mercer Inspired
~~10.~~	~~Angela Poe~~	Bluegrass PRIDE
11.	Wm Neal Cassity	Jess Co Judge Exec.
12.	Mike White	Studio Inc, Inc
13.	Bill Varble	Industrial water user
14.	Edward N Wilson	
15.	Josh Ayoron	BGADD
16.	Cheryl Goodman	BGADD
17.	Janet Cabaniss	
18.	Damon Snyder	

Attendance List

Bluegrass Water Supply Consortium Meeting #1

Tuesday, August 6, 2002
6:00 – 9:00 p.m.
Henry Clay High School
Lexington

Name	Representing (optional)
1. TOM CALKINS	CITY OF NICHOLASVILLE
2. Bart Miller	City of Versailles
3. Bob Riddle	Georgetown Water
4. CHARLIE McGINNIS	Mercer County Fiscal Court
5. Mike Bethurem	Berea College
6. J.H. Sullivan	Frankfort Plant Bd
7. George W. Wakim	Public Service Commission
8. Duson Foutz	Builder
9. Jas Sekhon	BGADD
10. MICHAEL DAVIS	PEH Engineers
11. RON VANOVER	CITY OF PARIS
12. George Rest	O'Brien & Gere Engineers
13. DAVID BROWN	BLUEGRASS ADD
14. FOSTER SCHERMAN, JR	Bluegrass Flow, Inc
15. Larry Hoffman	City of Lawrenceburg
16. PAUL A. BROOKS	LEXINGTON
17. Gary Chilton	City of Lawrenceburg, Ky
18. Charles R Denton	Lexington Ky

18

Attendance List

Bluegrass Water Supply Consortium Meeting #1

Tuesday, August 6, 2002
6:00 – 9:00 p.m.
Henry Clay High School
Lexington

	Name	Representing (optional)
1.	Jennifer Brockman	LFUCG - Division of Planning
2.	Vickie Sewell	Franklin County Fiscal Court
3.	DAMON TALLEY	BWSC
4.	George Woolwine	Quest Engineers, Inc
5.	Mr + Mrs. Billy Shryock	Lawrenceburg, KY.
6.	Phyllis Hasbrouck	interested citizen
7.	~~George Rost~~	
8.	Bill Brewer	Citizen
9.	Lewis Gardner	Citizen
10.	Bill Reeser	UK
11.	Phil Wood	American Consulting Engineers
12.	Steven Greseth	Black + Veatch
13.	HERBBIE BANNISTER	FRANKFORT PLANT BOARD
14.	WARNER GAINES	" " "
15.	Joe Henry	GRW
16.	JOHN HORNE	HET - JESSAMINE SEWD.
17.	MARK AYERS	USGS
18.	BRAD MONTGOMERY	GRW

Attendance List

Bluegrass Water Supply Consortium Meeting #1

Tuesday, August 6, 2002
6:00 – 9:00 p.m.
Henry Clay High School
Lexington

Name	Representing (optional)
1. Don Hassall	Bluegrass ADD
2. Carol Dean Walters	Mayor of Harrodsburg.
3. Roy Burgher	Winchester
4. Gregory Hobson	City of Nicholasville
5. Gene Foots	Shelbyville Water & Sewer
6. James Ray Long	Georgetown Municipal Water & Sewer
7. Janet Patton	City of Paris - Commissioner
8. Bob Wiseman	Lex - Fay Urb. Co. Gov't
9. James Ballentine	ACIPCO
10. Robert A Bowman	Frankfort Plant Board
11. Carl Waits	Jessamine Co Water District No 1
12. Chris Riddle	Frankfort Plant Bd
13. Randy Patrick	The Jessamine Journal
14. Sydney Poore	UK - student
15. Rep. Susan Westrom	79th District
16. Pam Miller	Urban Co. Gov't
17. Chuck Ellinger, Jr.	LFUCG candidate
18. Jim Redmann	LFUCG Planning

Attendance List

Bluegrass Water Supply Consortium Meeting #1

Tuesday, August 6, 2002
6:00 – 9:00 p.m.
Henry Clay High School
Lexington

	Name	Representing (optional)
1.	Brandi Johnson	
2.	Robert J. Sturdivant	Quest Eng. Inc.
3.	Joe Burns	Ky Rural Water Assn
4.	Allen Hedges	City of Paris Water Plant
5.	Ron McMaine	Howard K. Bell, CEI
6.	Greta Fields	Eastern Ky. resident
7.	James D. Cowen	(Consumer - Fayette Co)
8.	Henry Osman	" "
9.	Mike Ridenour	Lexington Chamber
10.	Tim Kraus	O'Brien & Gere Engineers
11.	Dave Pearce	Mt Sterling Water & Sewer
12.	William Ballard	East Clark Co Water Dist
13.	Bruce E. Williams	HKB Consulting Engrs.
14.	Jean Charron	Neighbor (40502)
15.	Michael Unthank	U.S. Geological Survey
Mr/Mrs 16.	NED BREATHITT	CITIZEN
17.	Laura Reidle	Citizen
18.	Ruth Wilt	Georgetown Municipal Water

Count as 2

Attendance List

Bluegrass Water Supply Consortium Meeting #1

Tuesday, August 6, 2002
6:00 – 9:00 p.m.
Henry Clay High School
Lexington

	Name	Representing (optional)
1.	Gary Williamson	City of Mt. Sterling
2.	Donald Haney	Ky River Authority
3.	C. Lewis Dixon	CDP Engineers Inc.
4.	Ken Roseman	CDP Engineers, Inc.
5.	Fred Simpson	City of Lancaster
6.	Lori Aberra	Herald-Leader
7.	Vicki Ray	KY DOW/DWB
8.	Ronald A. Newcomer	Science Teacher FCPS
9.	Clint Abbott	Central Associated Engineers
10.	Grant Page	Central Associated Eng.
11.	David Spenard David Edward Spenard	Office of the Attorney General
12.	H. DAVID GABBARD	himself
13.	CONNIE ALLEN	IMU
14.	Tom Green	CTI
15.	WARNER A. BROUGHMAN	
16.	Eric Christman	Self
17.	[illegible]	KEC
18.	[illegible]	City of Versailles

Summary of Written Comment Sheets
At August 6, 2002 BWSC Public Meeting No. 1

There exists a drinking water supply shortage in Central Kentucky.

	No.	%
1. Strongly agree	31	63
2. Somewhat agree	14	29
3. Somewhat disagree	2	4
4. Strongly disagree	2	4
5. Don't know	0	0
	49	100

I support a regional approach to solving the drinking water supply problem in Central Kentucky.

	No.	%
1. Strongly agree	41	84
2. Somewhat agree	8	16
3. Somewhat disagree	0	0
4. Strongly disagree	0	0
5. Don't know	0	0
	49	100

The Bluegrass Water Supply Consortium is on the right track in addressing the drinking water supply issues for Central Kentucky.

	No.	%
1. Strongly agree	29	59
2. Somewhat agree	14	29
3. Somewhat disagree	2	4
4. Strongly disagree	0	0
5. Don't know	4	8
	49	100

County of Residence:

Anderson	1	Montgomery	0
Bourbon	0	Scott	1
Clark	1	Shelby	2
Fayette	27	Woodford	0
Franklin	1	Harrison	2
Jessamine	9	Jefferson	4
Madison	0	Breathitt	1
Mercer	1		

- There is a solution out there that would keep the Kentucky River flowing even in the dryest of times. We could continue to use the Kentucky River as the main source of water and at the same time possibly reduce the flooding of the river in the winter and spring. You could have the best of both worlds. Obviously, there isn't enough room on this paper. ---Ron Wedding

- Keep up the good work! Let us solve our treated water supply shortage ASAP.

- Cost, Cost, Cost. Who Pays. ---Jim Rebmann

- I support the regional approach to this. I also support running a pipeline to Louisville and buying treated water to eliminate the filtration plants ultimately which would be the cheapest. ---Jack Edmiston, City Engineer, Lexington

- I think it's a good idea as long as RWE doesn't dominate it and it isn't used as a way to vastly expand development in the Bluegrass. All water systems should be publicly owned.

- Hurry

- I appreciate the problem being faced before it's an out-and-out disastrous situation. I'm concerned that "industry" and businesses that use dangerous chemicals could foul any system; so, I would hope there would be chemical restrictions and in some cases just not permitted. Also, unrestricted development without previous infrastructure is a real fright. ---James Osman

- Regional approach is very important to the survival of all the communities in the Bluegrass. I believe that we can live well and grow smart within the resources in our area. ---Chris Henkel

- How will these improvements be financed? How will the smaller water companies compete with the larger ones? Will costs of water be standardized across the system? Will the water companies merge in the future? Will individual water companies service policies be standardized? ---Henry Osman

- Video of 1999 drought was good. It should prompt discussions locally. I would like to hear more about raising the levels of the dams on the Kentucky River. ---Helen Shryock

- Keep up the good work! ---Bill Grier

- We must be focused and addressing water supply!!

- An idea decades behind its time ---John G. Horne

- Good start. Let's keep it moving forward.

- When the railroads were built in Eastern Kentucky, the rocks were dumped in the River, reducing its depth, and destroying pools and ripples. Has anyone considered a study to restore pool storage capacity in the headwaters/middle and north forks, etc. to improve our security, reduce flooding down river, etc. (This is information I heard from Mayor Bill Gorman of Hazard. The river is more shallow now—water just runs away instead of staying in the "pools".) ---Greta Fields, creek owner

- Problem has been around too long, it needs to be addressed. Growth in area is going to continue at a rapid pace. ---Carl Waits

- Not only do we need to adopt a regional approach, but need to educate the public in conservation measures as a way of life. Our grass does not need to be perfect! --- Phyllis Hasbrouck

- Keep up the great work!

- This makes too much sense not to do it. Keep up the good work!

- Right on! Let's attack the problem beginning now.

- Need to get started soon!

- You've discounted the Kentucky River. It is foolish both monetarily and politically to do so. ---Chetan Talwalkar **(See attached page of comments from Chetan Talwalkar)**

- Video was concise but informative.

- I received a lot of information. It was very informative.

Getting apples-to-apples cost comparisons is an extremely difficult job. Most recently that has been done by LFUCG in 1999, in a process mediated by the University of Kentucky's Water Resources Research Institute. Lindell Ormsbee and his staff at U.K. WRRI are an important resource. They should be closely consulted and should be part of the group that reviews the results of this study for validity and accuracy.

The difficulties you will encounter in getting an apples to apples comparison of the pipeline to Louisville include the following points:

1. Pipeline construction cost estimates offered by Kentucky-American only take you to the Jefferson County line. There is a significant amount of construction remaining to connect the pipeline to the Louisville Water Company. On the order of $10 million dollars, if Louisville Water Company's project description to the Kentucky Infrastructure Authority is any indication. This cost will be financed by Louisville Water Company, and included in the charge for water sold to Kentucky-American. Thus, the cost of constructing the pipeline in Jefferson County will appear as an operating expense to Kentucky-American, not a capital expense. You need to find a way to capture the cost of Jefferson County construction and financing.
2. Louisville Water Company is in the process of installing a large, expensive wellfield and other system improvements to comply with the Safe Drinking Water Act regulations. A portion of the cost of these improvements will be included in the price of water sold to Kentucky-American, again making a capital expense appear to be an operating expense on Kentucky-American's books. That cost, and any financing costs associated with it, must also be captured in your estimates.
3. The cost of crossing the Kentucky River has long been an unknown variable, since Kentucky-American has yet to say how, or where it will make such a crossing. To get an accurate cost estimate for the pipeline, and also an accurate estimate of when it can be completed, you will need to find an answer to this question that is supported by enough facts to be credible. To date all we have gotten is best guesses and secrecy from Kentucky-American.
4. The cost of Kentucky River improvements includes improvements that will need to be made regardless of whether the Louisville pipeline is built or not. The Kentucky River will continue to serve as our main source of water regardless of whether the pipeline is built or not. Therefore, these costs need to be either subtracted from the Kentucky River option, or they need to be added to the pipeline option to get an apples-to-apples comparison.
5. Kentucky regulations contain a mandatory service clause, which means that any utility capable of providing service must provide service when asked. This clause means that anyone might have the legal authority to tap into the pipeline when they needed to, making it difficult to reserve pipeline capacity for customers at this end of it. So we might be paying to build a pipeline that we'll never actually get to use when we most need it.
6. Litigation and eminent domain fights over the route of the Louisville pipeline remain, and must be accounted for in the construction timeline.

Finally, I want to express my strenuous objection to the exclusion of the Kentucky River option that has been shown to be the most cost effective for the community and the region. It is cost effective not only because it is cheapest, but also because it alone allows us to add the amount of storage we need as population growth is actually experienced, instead of building a big facility with a big price tag that will sit unused for a long period of time – perhaps forever if the expected population increase is delayed or doesn't come at all.

The Kentucky River option has been rejected because it is said to be too slow, but the main holdup is the shortage of money devoted to it. That lack of political commitment to the Kentucky River will be a mark of shame for the current governor, and for this Consortium unless the cost of repairing, replacing, and upgrading the Kentucky River locks and dams is included in this analysis. Without including these costs, you are assuming you're going to get something for nothing. You are making a water supply plan that leaves out the biggest player in regional water supply – the Kentucky River.

Incremental projects on the Kentucky River have already been shown to be the most cost-effective solution for the region. That alone warrants their inclusion in this study, and I urge you to do so.

In closing I want to reiterate the importance of having a study people can believe, of using getting comparable cost comparisons and realistic timelines that take into account the physical, political and economic geography of this region.

Attendance List

Bluegrass Water Supply Consortium Meeting #2

Monday, September 22, 2003
6:00 – 9:00 p.m.
Henry Clay High School
Lexington

Name	Representing (optional)
1. Don Hassall	Bluegrass ADD
2. PAUL A. BROOKS	LFUCG COUNCIL
3. Kevin Crump	city of Paris Combined Utilities
4. Linda Gorton	LFUCG Councilmember
5. Michael Dugeon	Frankfort Plant Board Member
6. RON HOUSEHOLDER	MADSYNC
7. Bob Joice	
8. Amy Baillie	Bluegrass ADD
9. Dan Niffenegger	—
10. Bill Grier	Ky River Authy
11. Andy Mead	Herald Leader
12. Earl Ogata	BGADD
13. Tom MARSHALL	UNATTACHED
14. David Carter	MadSync Co
15. WILLIAM A. BOWIE, JR.	LFUCG DIVISION OF ENGINEERING
16. Jane Brown	HMB Engineers
17. Edw. N. Wilson	Self
18. Solitha Dhaiman	DOW

Attendance List

Bluegrass Water Supply Consortium Meeting #2

Monday, September 22, 2003
6:00 – 9:00 p.m.
Henry Clay High School
Lexington

	Name	Representing (optional)
1.	Thomas Calkins	City of Nicholasville
2.	E.J. Donahue	Municipal & Financial Services Group
3.	David Ewen	Bluegrass ADD
4.	DAMON TALLEY	BWSC
5.	Joe Groves	
6.	JIM Marcum	
7.	Ken Roseman	CDP Engineers
8.	Michael Zirich	Berea College Utilities
9.	Ray Barry	
10.	William Bahr	East Clark Co Water Dist
11.	Johnny Ray Wiseman	" " " "
12.	Bob Smallwood	GRW Engineers
13.	Anna Gadinan Hoover	KWRRI
14.	Robert Norman	Harrodsburg Water
15.	Jason Casey	
16.	Steven Gresetn	Black & Veatch
17.	Martha K. Hall	
18.	Dan Shoemaker	Tetra Tech

Attendance List

Bluegrass Water Supply Consortium Meeting #2

Monday, September 22, 2003
6:00 – 9:00 p.m.
Henry Clay High School
Lexington

	Name	Representing (optional)
1.	Gregory Hobson	City of Nicholasville
2.	Burk Sullivan	Frankfort Plant Bd
3.	Bob Riddle	Georgetown Water
4.	John Steinmetz	CDP
5.	Ted Coughlin	City Of Danville
6.	Donna Powell	City of Lancaster
7.	Bobby Powell	Lancaster
8.	DAVE BARBOUR	LFUCG
9.	Bart Miller	City of Versailles
10.	WARNER CAINES	FRANKFORT PLANT BOARD
11.	John P. Martin	City of Nicholasville
12.	Louis Orfan	CDP Engineers
13.	HERBIE BANNISTER	Frankfort Plant Board
14.	Chris Riddle	Frankfort Plant Bd
15.	[illegible]	CITY OF VER.
16.	JACK EDMISTON	CITIZEN LEX.
17.	Warner A. Braughman	
18.	Mr & Mrs Dora Collins	Citizen;

Attendance List

Bluegrass Water Supply Consortium Meeting #2

Monday, September 22, 2003
6:00 – 9:00 p.m.
Henry Clay High School
Lexington

	Name	Representing (optional)
1.	Jack Morgan	BGADD
2.	Don Shaefer	Fayette Co Conservation Dist.
3.	Gordon Liddie	Winchester-Clark Co Info
4.	Helen Shryock	Lawrenceburg City Council
5.	Kathleen Rutledge	The Jessamine Journal (Jes. Co.)
6.	Clint & Debbie Griffith	Woodfield Homes, Inc.
7.	Jim Regmann	LFUCG Planning
8.	Jack Wilson	Citizen
9.	Brian Trangott	Rep Barrows office
10.	David Edward Spurrd	office of the Attorney General
11.	Bill Averell	Division of Water
12.	[illegible]	BGADD
13.	Larry Hoffert	Lawrenceburg
14.	John Bleiman	BGADD
15.	Audrey Lee	Lex Herald-Leader
16.	Barry Hassall	
17.	Vince Smith	Larsnell's Water Co
18.	Phyllis Hasbrook	Self

Attendance List

Bluegrass Water Supply Consortium Meeting #2

Monday, September 22, 2003
6:00 – 9:00 p.m.
Henry Clay High School
Lexington

	Name	Representing (optional)
1.	Fred Farris	East Clark Co. Water District
2.		
3.		
4.		
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16.		
17.		
18.		

Attendance List

Bluegrass Water Supply Consortium Meeting #2

Monday, September 22, 2003
6:00 – 9:00 p.m.
Henry Clay High School
Lexington

Name	Representing (optional)
1. VERNON AZEVEDO	WINCHESTER MUNICIPAL UTILITIES
2. Thomas Dumm	O'Brien & Gere
3. MARY JANE WAENEK	EKPC / BWSC
4. Paul Schoninger	LFUCG / Council Office
5. LINDA BRIDWELL	KAWC
6. KAREN MORAN	OBRIEN & GERE
7. Sandy Camargo	CDP ENGINEERS
8. WAYNE WADDELL	LFUCG – Public Works
9. JIM KIPP	KWRRI
10. John Patterson	Ky River citizens
11. Mary Ln Patterson	" " "
12. Warren Rogers	W. Rogers Company
13. Bill Farmer Sr.	LFUCG
14.	
15.	
16.	
17.	
18.	

BWSC Public Meeting #2
Attendee Input

Home County _____ Name(optional) _____

I support the decision to form a Regional Water Commission to provide supplemental finished water to the Bluegrass Region.

Agree _____ Disagree _____ No Opinion _____

Comments _____

I support the concept of a treated water grid to share water on a wholesale basis among communities in the Bluegrass Region.

Agree _____ Disagree _____ No Opinion _____

Comments _____

I support the process used to select additional water supplies for the region.

Agree _____ Disagree _____ No Opinion _____

Comments _____

Do you have a preference for one of the three remaining supply alternatives?

Yes _____ No _____

If so, what are your preferences and why? _____

_____

_____

_____

The public outreach and communication plan for this project has been effective.

Agree _____ Disagree _____ No Opinion _____

Comments _____

Please provide general comments below – use the back of this form for additional space.

_____

_____

_____

_____

_____

_____

BWSC Public Meeting #2 Attendee Input

I support the decision to form a Regional Water Commission to provide supplemental finished water to the Bluegrass Region.

Agree 40 Disagree 0 No Opinion 1

I support the concept of a treated water grid to share water on a wholesale basis among the communities in the Bluegrass Region.

Agree 41 Disagree 0 No Opinion 0

I support the process used to select additional water supplies for the region.

Agree 37 Disagree 0 No Opinion 4

Do you have a preference for on of the three remaining supply alternatives?

Yes 26 No 15

Preferences:

Pool 3 and Ohio River 2
KY River 2
Alternative #1 2
Lock 3 1
Louisville 1

Pool 3 9
KY River, Pool 3 3
Ohio River 1
Ky River, Ohio River 1
Ohio River from Louisville 1

The public outreach and communication plan for this project has been effective.

Agree 33 Disagree 1 No Opinion 5

Comments

It is a mistake to depend upon one water source. If every home had a cistern, this water could be collected and used to water lawns and plants, wash cars, water animals and in case of a city water supply failure everyone would have their own water supply.

- Lou King, PhD

I fully support the project and I believe the alternatives that have been developed have been well thought out – Robert Casher

Your grid network of pipes is good. This is the first time Central Kentucky has come together on a project. They need to do more regional planning. In conclusion, your plans make good sense and should be pursued with vigor. – Jack Edminston

It is essential to come to a conclusion of the plan and get into the implementation phase.

- Dan Niffeneggar

Once a decision is made, please immediately begin the design phase and quickly follow this effort with the construction phase. – Tom Calkins

Shall I assume that environmental impact studies will be done when construction is planned? – P. Hasbrouck

I believe that the condition of the existing dams on KY River must be considered & how to address the in deterioration (?) should be part of the plans. – Woodford County

BWSC is an excellent example of what professionals working for the greater good of the community can do. Thanks for the hard work and keep at it. – Junk (?) Wilson

Your committee has done a great job on this project – John P. Martin

It has been a good process by which the 17 utilities have worked together to explore water supply options, planning on a regional (cooperative) basis. They fear? high costs to put their regional system in place with federal and state grant funds extremely limited. The BWSC also should perhaps "phase" in parts of the proposed grid networks. I envision that it could possibly take nearly 20-25 years to complete this project. 2020 the proposed deadline may actually be the date first round grant and loan funds are committed and design, environmental impacts and ? authorizations are issued by Congress and administrative agencies participating. – Franklin County

I do know that the people of Lancaster need to be educated on this matter, otherwise they will just see it as something else to raise utility bills.
I have bought into the plan simply be being informed. I see it as insurance for the future, and I realize insurance always costs. – Donna M. Powell

I applaud the consortium members for their hard work and persistence to keep working through the process! – Linda Gorton

Working together with KRA-DOW is critical to implementing a good solution for treated water supply. – Clark County

Focus on the grid for preliminary or initial phases of implementation – Vernon Azavedo

Complete necessary grid work first, then Pool 3 plant – Bunk Sullivan

Participants were from the following counties:

Anderson
Bourbon
Clark
Fayette
Franklin
Garrard
Jessamine
Mercer
Scott
Shelby
Woodford