Proposal and Statement of Qualifications

ALTERNATIVES TO THE REMOVAL OF IRRIGATION WATER: FEASIBILITY STUDY

Prepared for
** TASK FORCE II **

REPRESENTATIVES OF: BACA, BENT, CROWLEY, KIOWA, OTERO, AND PROWERS COUNTIES, LA JUNTA, COLORADO

By
Arkansas Valley Water Consultants
A Professional Consortium
480 Holly Sugar Building
2 North Cascade Avenue
Colorado Springs, CO 80903-1623
May 26, 1992

Mr. Bob Knight  
Task Force II  
PO Box 511  
La Junta, Colorado 81050

RE: FEASIBILITY STUDY: PROPOSAL AND STATEMENT OF QUALIFICATIONS

Dear Mr. Knight:

The interdisciplinary team, denoted the Arkansas Valley Water Consultants, is pleased to submit our proposal for professional services entitled:

ALTERNATIVES TO THE REMOVAL OF IRRIGATION WATER:  
ARKANSAS RIVER VALLEY, COLORADO

The professional consortium integrates the expertise of the following Colorado organizations:

Kevin B. Pratt, Water Attorney and Project Manager  
Gronning Engineering Company  
Milliken Research Group, Inc.  
Milenski Ag Consulting Service

The team will provide a comprehensive and focused approach to the problem of defining alternatives to export of water from Arkansas Valley agriculture. We look forward to discussing the proposal in detail with Task Force II during the selection process. Please call if you have questions about our proposal.

Sincerely,

Kevin B. Pratt, Esq.  
Project Manager  
Arkansas Valley Water Consultants
Proposal and Statement of Qualifications

ALTERNATIVES TO THE REMOVAL OF IRRIGATION WATER: FEASIBILITY STUDY

Prepared for:

Task Force II

Representatives of Baca, Crowley, Kiowa, Otero and Prowers Counties La Junta, CO

Prepared by:

Arkansas Valley Water Consultants

A Professional Consortium
480 Holly Sugar Building
2 North Cascade Avenue
Colorado Springs, CO 80903-1623

May 29, 1992
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PURPOSE AND SCOPE

The Arkansas Valley of Colorado has for many years been in a state of change with regard to its water resource base. The last two decades have seen an acceleration of this change; there is movement of water out of agricultural use and exported from the basin. This water is then permanently lost for agricultural uses. The purpose of this study is to assess alternatives to out-of-basin water export and dry-up of valley farms. This will be accomplished through the formation of a water management district or similar entity to influence change and exert some control over the valley water resources. Feasibility of alternative management entities will be addressed as to:

- Legal feasibility and statutory requirements
- Fiscal structure, debt service and funding sources
- Political and popular support
- Economic and environmental consequences
- Technical evaluation of water resource assets
- Evaluation of water resource management alternatives

The geographic scope of the study will be focused on the Southeastern Colorado region of Baca, Bent, Kiowa, Otero, and Prowers counties. Development will proceed from an assessment of the sources of water and the existing water management agencies in the entire Arkansas Valley system. The analysis will utilize existing and on-going studies to the maximum extent possible. The work product will be a final report and presentation which will include recommendations for action.

The following sections include the details of our project approach, a description of the project team, project organization, and experience with similar work. The project plan is further defined by a project cost breakdown and a preliminary schedule.
PROJECT APPROACH

Review of Existing Studies and Assessment of Current Conditions

The initial work consists of gathering and review of available information. Information about the Arkansas Valley of Colorado is considerable.

Examples are:  
* Kansas/Colorado lawsuit  
* U.S. Bureau of Reclamation and U.S. Geologic Survey data  
* Southeast Colorado Conservancy District data  
* CSU, and CU studies of the Arkansas River Basin  
* Kiowa County/Great Plains Study  
* Other agency and local data sources

In addition Gronning Engineering Company as a result of its work on behalf of the State of Colorado in the Kansas/Colorado lawsuit and its development of a mainstream Arkansas River model from Leadville to John Martin Reservoir has detailed information concerning historical irrigation water diversion and usage. Additionally, team members are generally familiar with water usage practices as a result of many years of study and field observation. Gronning Engineering Company has previously developed straight line diagrams for Water Districts 17 and 67 which are utilized by the Division Engineer's Office (Appendix B). As a result the data acquisition will be performed in a focused and efficient manner.

Development of Area Water Authority/District Alternatives

Alternatives for water management and water marketing organizational structures will come from several sources:

a) Water Conservancy District  
b) Economic Development Corporation  
c) Special District (Water District or multi-purpose district)  
d) Intergovernmental Agreement  
e) Water authority  
f) County wide water system  
g) Irrigation district  
h) Existing districts and municipal entities within the state of Colorado.  
i) Experience in other western states with special water management and marketing. Mechanisms such as the Snake River Water Bank in Idaho and California water banks of 1977 and 1991 will be included.
The boundaries of an entity will be determined by the common interests of the citizens within the boundaries, the financial needs of the entity, and legal requirements. We will further investigate any legal prohibitions or limitations on overlapping of the entity with existing entities or districts. We will also outline the financial implications of different boundaries with respect to tax revenues.

Options for possible future additional investigations would include:

a) the possibilities of a municipality based district for potable municipal and industrial water supply through a metropolitan water district, or

b) the creation of a new type of district (perhaps a "water management district") with the necessary and appropriate powers and limitations to meet the specific needs of the 6 county group, and drafting of proposed legislation to accomplish the authorization of that district.

Membership in the entity generally is not necessarily constrained by the legal framework selected. Most entities can allow "associate" members even if formal membership is disallowed. In some contexts membership implies control for governance purposes. In other contexts it does not. The purposes of the entity and political reality must determine the preferred membership structure, and if the preferred membership is permitted. Membership can be used to build public support and consensus on public issues. However, an entity seeking too broad a membership can find it has admitted strong factions which vie for control with loud and acrimonious values.

The governance of the entity is key to the effectiveness of the entity to be formed. Political concerns drive the governance, but again the legal framework must allow the preferred governance. In some legal frameworks, the governing body must be elected, in others the governing body is appointed by other governmental bodies or the courts. Also, in some frameworks, representation is required by geographic units such as counties. Such a distribution of representation may be inappropriate if, for example, the entity is making water management decisions with respect to certain irrigators or certain ditches. We will review the legal requirements to assure that the selected entity will meet the identified objectives of the entity and the political needs of the membership and governing body of the entity.

**Acquisition and Preliminary Valuation of Water Resource Assets**

The water rights associated with irrigation in the lower Arkansas Valley have various legal components which make valuation and the management of those rights extremely complex. For instance, an irrigator may hold shares which represent direct flow rights, storage rights, storage space rights, exchange rights, winter storage rights, Fryingpan-Arkansas supply, as well as tributary wells and decreed and un-decreed seepage supplies.

Valuation must consider the nature of water rights, as well as the useability of those rights under the legal and administrative regime which includes the Rules and Regulations for wells, the Pueblo Winter Storage Program, and the Arkansas River Compact, and 1980 Operating Plan for John Martin Reservoir. Limitations on use must also be considered and evaluated, including the Reclamation Reform Act provisions regulating the Fryingpan Arkansas water and the various conservation reserve program and set-aside programs. Single ownership of land by an entity has definite Reclamation Reform Act implications which must be considered.
The preliminary valuation study will include an analysis of diversion records for all rights to be valued. The reliability of the yield, water right seniority, locations, and market demand will be utilized to develop a preliminary value of the water rights. Water rights to be preliminarily valued will include the Fort Lyon Canal system, Amity Canal system and other representative rights on the mainstream Arkansas.

The appropriate legal mechanisms for obtaining development rights will be researched, as well as other limited rights such as easements, and life estate remainders, which could be obtained. These limited rights could be better choices for acquisition than water rights because they are:

- less expensive to acquire
- more acceptable to sellers
- more gradual in the change of ownership
- more flexible for water management purposes
- tax advantages
- more acceptable to funding sources

Operational, Economic and Environmental Impact Issues

Any change in water usage may directly affect the legal rights of other individual farmers under the lateral or ditch. Feasible proposals must respect the legal rights of others including those of the State of Kansas embodied in the Arkansas River Compact. While some ditch company bylaws include protections for persons desiring to continue to irrigate, a purchase or management proposal must comply with those bylaws, and must be fair to irrigators in any event. The alternative or alternatives recommended by the group will be reviewed for legal impacts on affected ditch companies, Kansas, and other water users.

Impacts of importance could include:

- increased seepage
- loss of head
- increased operation and maintenance
- loss of storage opportunity
- loss of operational flexibility
- loss of water supply
- greater transit losses
- legal liability on the part of a ditch such as the Ft. Lyon which carries water to Great Plains under agreements with the Amity Company.

Water has traditionally supported an agricultural economy in the lower Arkansas valley. Recently, the Governor’s appointment of the Lower Arkansas Valley Commission to study the implementation of a John Martin permanent pool and Great Plains state park, and growing interest by environmental groups in the ecology and wildlife of the area suggest that agricultural water use will share its resource with recreation and wildlife in coming years.

Recreational and environmental groups will demand more input into governmental decision making and resource allocation, and will compete with agriculture for water in some circumstances. However, recreation and environmental groups bring significant funding and political power which can assist local water management, water conservation, and economic development initiatives if harnessed
properly. It may be important to include recreational and environmental groups as participants in the entity to be formed, but local control must not be sacrificed in the process. Again, the legal framework chosen should accommodate these concerns and opportunities.

Recommendation of Water Resource Management Alternatives

Irrigated agriculture has historically used and managed most of the water resources in the six county area. To support agriculture, towns were established and a local economy developed. The threat of removal of water and the loss of a portion of the agricultural base of the region has caused Task Force II to seek recommendations on how the six county group can assist both its agricultural, rural citizens and its townspeople so that together they can persist and thrive. Water is the key to the future.

The recommendations to Task Force II will synthesize the research described above with the diverse, extensive expertise and experience of AVWC team members.

The recommendations will recognize the need for:

- A solid legal organization
- Financial feasibility and funding
- Consistency with water rights hydrology and law
- Beneficial economic impact
- Political and operational obtainability

The recommendation will not be theoretical or academic, but rather will seek to offer proposals which can be implemented by Task Force II.

Conclusions, Recommendations and Work Product

Results of analysis should be summarized into a format for presentation to a diverse readership. The study report will contain such a summary. Recommendations will include proposed actions and any needs for follow-up research. After initial review of the study results, twenty-five (25) copies of the study will be forwarded to the client.
PROJECT TEAM

Interdisciplinary Approach

An inter-disciplinary team is a group of professionals with different skills who work together toward a common project with a blending of functions and mutual support.

The Task Force II project will require the diverse professional skills offered by this team approach because the study topic is complex and not highly defined. The team approach has a good success rate of producing a comprehensive yet focused work product which is useful to a client with diverse interests such as Task Force II. The team also provides an economical, flexible and accessible organizational structure.

Project Management and Client Contact

Project Management will be directed by Kevin Pratt to assure that all participants proceed in a focused and coordinated manner and on schedule. The Arkansas Valley Water Consultants is a group of experienced, non-academic professionals with superior expertise in their respective areas. The group is organized to assure maximum effectiveness without redundancy. The group has experience in accomplishing tasks and recommending practical and effective courses of action.

The AVWC will meet initially with Task Force II to review and customize this feasibility study to assure proper prioritization of the study tasks. The AVWC recognizes that other ongoing studies by the Department of Natural Resources, Water Conservation Board, and perhaps others make it important to work closely with Task Force II to avoid duplication of effort by other agencies.

Monthly, and before preparation of the final recommendations and report, the AVWC will meet with Task Force II, or its representatives, to discuss the preliminary results and to receive direction on which areas should receive the most attention in the final report and presentation.

The AVWC will submit final reports to Task Force II and make a detailed presentation by all study participants. Extensive explanation of the study, results, and recommendations will be given, and questions will be welcomed.

Brief written reports of progress will accompany the monthly billings. Contact for data and client input shall be on an as needed basis as the work progresses.

Team Members

Kevin B. Pratt, J.D. -- Mr. Pratt is an attorney emphasizing water and water quality law. Most of his work over the past 12 years has been in the Arkansas River basin. He will act as project manager and legal counsel on this study.

Lloyd J. Gronning, P.E. -- Mr. Gronning is a professional engineer specializing in water resources planning and management. As principal of Gronning Engineering Company he will be responsible for the technical, water management, and water valuation portions of the study. Mr. Gronning has significant experience in the Arkansas River Basin and significant experience in the valuation and acquisition of agricultural water by municipalities. He has been qualified as an expert witness in Water Resources Engineering and in the Valuation of Water Rights. John R. Clark, P.E., a water resources
analyst, and John N. Winchester, a water resources engineer, will assist Mr. Gronning in the data gathering, water inventory, and impact assessment portions of the work.

Dr. J. Gordon Milliken, P.E., is a principal of Milliken Research Group, Inc. and research economist. He will assess water markets, water marketing strategies, and economic impacts which may result from implementation of the alternative water management entities.

Bill Milenski is an experienced agricultural and real estate appraiser and a long-time resident of the Arkansas Valley. He will manage data gathering activities and provide liaison to local farming and financial interests within the study area.

More detailed information about team members is provided in Appendix A.
RELEVANT EXPERIENCE

Provided below is a list of projects that are similar to this project as outlined by Task Force II. As you will note from this outline of relevant experience, the water consortium's project experience spans all facets required to ensure a successful project completion. This includes experience in legal issues, water resource engineering and valuation, economic studies, and appraisals. The talents of all task force members are brought together under the management of Kevin Pratt in order to develop a successfully integrated team approach required for this project.

The relevant experience of each firm and individual is outlined below.

Kevin Pratt

Mr. Pratt is an attorney specializing in water and water quality law, counseling government and serving a wide range of water users such as ranchers, ditch companies, lenders, and developers. He has worked with a wide variety of water and environmental regulation issues, including the impacts of water transfers, interstate river compacts, cooperative water management, water conservation, endangered species, wetlands, water treatment and drinking water quality, and sewage treatment. Most of his work has been in the Arkansas River basin.

He has acted as counsel for the Southeastern Colorado Water Conservancy District, Moffat County, the St. Charles Mesa Water District, Fort Lyon Ownership of water (FLOW), Newsham Hybrids (USA), City of Yuma, Arizona and the State of Colorado. He was lead counsel for applicants on the Pueblo Reservoir Winter Storage Program, and for objectors on the transfer of Rocky Ford Ditch (RIG) water to Aurora. He was an active participant in the Fort Lyon transfer, Las Animas transfer, Amity Great Plains transfer, and Kansas v. Colorado cases.

The lead counsel, Mr. Pratt has managed several teams. He will be responsible for management of the project, contact with the client, budget and schedule control, and coordination of the study report document. He will also conduct the legal investigation of water resource management entities.

Gronning Engineering Company

Gronning Engineering Company specializes in water resources, planning, management, and development and has provided professional engineering services since 1984 to municipal, industrial, commercial, and agricultural clients. GEC offers a comprehensive range of engineering services including water resources engineering, groundwater, hydrology, civil engineering design and management consulting services.

GEC has specific experience in assisting municipal clients in the acquisition and transfer of agricultural water rights. This experience includes assisting the City of Thornton on the transfer of agricultural water rights from ten ranches in South Park which yields approximately 8,000 acre-feet to the City of Thornton; assisting the City of Colorado Springs in the acquisition and transfer of the controlling interest of the Colorado Canal Company which yield approximately 17,500 acre-feet of water rights to the City of Colorado Springs. Numerous other water right evaluations and analyses have been made for private individuals for smaller parcels.
Mr. Gronning has had previous experience as a Water Resource Engineer, Manager of Planning and Research and Utilities Director for the City of Thornton, Colorado. A primary portion of his duties included acquisition of agricultural water rights for the City's utility system. He was responsible for prioritization of water to be purchased, negotiations, contract matters and served as a member of the board of directors of numerous irrigation companies in which the city had major interests. Mr. Gronning purchased approximately $30M of water rights during the period 1978 - 1980 as Water Resource Engineer for the city. These water rights included major interests in Farmers' Highline Canal and Reservoir Company, Farmers' Reservoir and Irrigation Company, Colorado Agricultural Ditch Company, Eastlake Reservoir Company, Mandalay Irrigation Company, Burlington Ditch Company, Wellington Reservoir Company and the purchase of water rights on seven major South Park ranches.

Similar projects are outlined below:

City of Thornton Water Acquisitions - Water acquisitions previously described were performed by Mr. Gronning during his tenure as water resource engineer, manager of planning and research, and utilities director for the City of Thornton. These efforts resulted in the acquisitions which are presently being used to supply water requirements to the City of Thornton, a suburb of Denver. Purchases were negotiated by purchase contract with the sellers. Purchase contracts were approved by the City of Thornton Utilities Board and City Council and the water was then transferred to municipal use by the City of Thornton Utilities Department.

CLIENT: City of Thornton Utilities Department
9500 Civic Center Drive
Thornton, CO 80229
Mr. Wesley Brown, Past Utility Board Chairman
(303) 452-2744

City of Colorado Springs/Colorado Canal Water Rights Acquisition - Represented the purchaser, the City of Colorado Springs, in the acquisition, transfer, and yield evaluation of the Colorado Canal Company water rights. The Colorado Canal Company is an irrigation project diverting water from the Arkansas River for both direct flow irrigation and storage. Colorado Springs acquired approximately 17,500 acre-feet of consumptive use water for use within its system through this purchase.

CLIENT: City of Colorado Springs Water Division
PO Box 1103
Colorado Springs, CO 80947
Phillip H. Tollefson
(719) 444-2430

Arkansas Basin Model Project - Anticipating the continued growth in water demand by Colorado Springs, the City Water Department authorized GEC to project alternative methods to ability to store and deliver raw water.

The work included looking at adjusting allocation principles of the Fryingpan-Arkansas Project to increase storage potential of transmountain water, the exchanging of transmountain effluent on
the Arkansas to maximize the water's reuse and therefore minimize the required development of new water, and the potential increases in exchange yield provided by a building a small storage reservoir able to regulate wastewater originating from transmountain sources.

Gronning Engineering Company extended a Bureau of Reclamation model and ran it to simulate variations of the operating rules and principles, and to determine the effects of different scenarios on both the city and downstream users.

CLIENT: City of Colorado Springs Water Division
PO Box 1103
Colorado Springs, CO 80947
Phillip H. Tollefson
(719) 444-2430

Temporary Water Transfers For Urban Water Supply During Drought - Dr. John Clark researched the concept of temporary water transfers from agricultural to urban water supplies in dry years. This included a drought water supply plan utilizing a water right option agreement (WROA) which provides for the temporary transfer.

The drought water supply plan would be submitted to the State Engineer's Office (SEO) for review and approval under existing Colorado Statutes.

Methodologies for estimating transfer costs, option costs, and ownership costs of water rights were developed. Key factors in the WROA are determining when the water is needed and notification of the intent to exercise the option. Locally based water supply forecasting and water monitoring schemes were recommended to support the implementation of the temporary water transfer.

The WROA has three components: 1) the transfer plan, 2) the financial plan, and 3) the contract document. Results of the analysis of alternatives dry-year supply scenarios suggest that the WROA can be superior in terms of cost, reliability, and operational flexibility to both water-right purchases and construction of additional reservoir storage.

Milliken Research Group

Milliken Research Group has for over twenty years has undertaken a variety of research studies relating to water resource development. The multi-disciplinary research has been connected within the MRG organization since its founding as Milliken/Chapman Research, Inc. in January 1986. Earlier from 1968 to 1985 these MRG professionals constituted the water resources research staff of the Denver Research Institute, University of Denver. Much of their experience was gained on institute research projects. Their work has included several water policy research studies on such topics as the analysis of socio and economic and environmental impacts of water resource proposals. Representative projects of the Milliken Research Group are outlined below:

Assessing Economic Benefits and Allocating Costs of Nebraska Water Development Project - The study analyzed existing methods for determining economic benefits of large water development projects for allocating costs among these projects among various groups and beneficiaries. The study included an evaluation of each existing method of determining fish, wildlife, outdoor
recreation, and tourism benefits of water development projects to assess its applicability and suitability for use in the state of Nebraska. The study team developed a new method that met the evaluation criteria better than other methods examined.

CLIENT: Nebraska Natural Resources Commission

Water Supply Policies and City of Denver/Suburban Relationships - Policy analysis and study by Milliken Research Group defined the economical, social, and institutional political impacts that may result from each of four general policies on water service to suburban areas during the next twenty-five years. The relationship between water service and urban growth is analyzed as was the question of effectiveness and desirability of using suburban water service constraints as a technique for growth management.

CLIENT: Denver Board of Water Commissioners


CLIENT: Bureau of Reclamation

Metropolitan Water Supply and Planning Analysis - Milliken Research Group presented a methodology for planning a least-cost water supply that will meet future water demands in the metropolitan area where water resources are limited. The study discussed several alternative water strategies including some that are non-traditional including wastewater reuse. The methodology is demonstrated in the specific semi-arid metropolitan area of Denver, Colorado. The project was completed in the period 1974 - 1981.

SPONSOR: U.S. Environmental Protection Agency

Alternative Regional Economic Development Programs - Milliken Research Group is a part of an inter-disciplinary team which conducted an economic base and development analysis of the San Miguel Basin in Western Colorado which included an analysis of the impacts of water resource development on the three major economic sectors: Agriculture, recreation and tourism, and construction. Growth multipliers were calculated. Alternative growth approaches based on an analysis of the basin economy were also developed including an identification of the social, economic, and environmental impacts.

SPONSOR: Four Corners Regional Commission

Milenski Ag Consulting Service

The Milenski Ag Consulting Service is operated by Bill Milenski and has completed numerous agricultural and residential appraisals in the study area. Bill Milenski has completed over 300 commercial agricultural appraisals in the lower Arkansas Valley of which approximately 60 to 70 percent are of irrigated farms. He has developed a good working knowledge of the area's water
supply over twenty years experience in this profession. In addition, he was a member of Task Force I and co-chaired the revegetation committee and he has extensive knowledge of both the Arkansas River system and the Fryingpan-Arkansas project.

Representative clients of Mr. Bill Milenski are shown as follows:

ROCKY FORD NATIONAL BANK
201 North Main Street
Rocky Ford, Colorado 81067
H. Kenny Crosswhite, President
(719) 384-5141

EMPIRE STATE BANK
301 North Main Street
Rocky Ford, Colorado 81067
Dennis Kreps, Vice President
(719) 384-7821

ROCKY FORD FEDERAL SAVINGS & LOAN
801 Swink Avenue
Rocky Ford, Colorado 81067
Keith Waggoner, Executive Vice President
(719) 254-7642

FARMERS HOME ADMINISTRATION
200 South Tenth Street
Rocky Ford, Colorado 81067
Andrew Lobato, County Supervisor
(719) 254-7616

ARK VALLEY INDUSTRIAL BANK
405 Colorado Avenue
La Junta, Colorado 81050
Gregg Mullins, President
(719) 384-7753

LA JUNTA STATE BANK & TRUST CO.
124 Colorado Avenue
La Junta, Colorado 81050
Alfred Kreps, Executive Vice President
(719) 384-5901

SCOTT R. FONCANNON, ATTORNEY AT LAW
512 North Main Street
Rocky Ford, Colorado 81067
(719) 254-7443
PROJECT SCHEDULE AND COST

The project schedule and cost are shown on the attached figure and table. As can be seen and as was described in the project scope, it is our plan to approach the project through the utilization of distinct tasks with specific milestone dates and progress reporting. We are anticipating that the overall project will require approximately 16 weeks from notice to proceed. Over the course of this time we will have meetings on at least a monthly basis to discuss progress with Task Force II and receive input as to the project approach and findings.

Also enclosed is the project cost for the areas outlined in our scope of services. As can be seen we are proposing to complete the project at a not to exceed cost of $82,545. Also shown are the estimated hours by task for each of the firms in the providing services for Task Force II. Also shown are the hourly rates for the individuals that would be involved in this project. We are anticipating that we will be billing Task Force II on a monthly basis and receive payment within 30 days.

In the initial project meeting which is shown in Task 1 we would be pleased to discuss the project schedule and man-power allocation and would be able to refine it if desired in order to more closely meet the goals and objectives of the Task Force.
PROJECT SCHEDULE

TASK

1. DATA ACQUISITION
2. LEGAL ANALYSIS
3. PRELIM WATER RIGHTS EVALUATION
4. FUNDING MECHANISMS
5. ECONOMIC/ENVIRONMENTAL IMPACTS
6. SUMMARIZE FINDINGS
7. PREPARE CONCLUSIONS
8. FINAL REPORT

WEEKS FROM NOTICE TO PROCEED

△ CLIENT PROGRESS REPORT
▼ INITIAL PROJECT MEETING AND FINAL CLIENT PRESENTATION
FEASIBILITY STUDY: ALTERNATIVES FOR IRRIGATION WATER MANAGEMENT
ARKANSAS VALLEY WATER CONSULTANT

<table>
<thead>
<tr>
<th>Task Description</th>
<th>RFP Section</th>
<th>Kevin Pratt Proj Mgr</th>
<th>Gronning Engineering Company(*)</th>
<th>Milliken Research Group</th>
<th>Milenski Ag Consulting Service</th>
<th>Direct Costs</th>
<th>Totals</th>
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<tbody>
<tr>
<td>1 Gather data; describe the study area</td>
<td>I.AB</td>
<td>8</td>
<td>24</td>
<td>0</td>
<td>16</td>
<td>$200</td>
<td>$3,720</td>
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<tr>
<td>2 Research and define the legal water resource entities; assess the primary characteristics.</td>
<td>V.,VI(p)</td>
<td>65</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>$0</td>
<td>$6,855</td>
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<tr>
<td>3 Inventory, description, preliminary valuation of water resource assets.</td>
<td>II.B</td>
<td>65</td>
<td>440</td>
<td>0</td>
<td>16</td>
<td>$0</td>
<td>$30,055</td>
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<td>4 Evaluate funding mechanisms, debt service, water market strategies, tax considerations, and reclamation reform act provisions.</td>
<td>II.ACD</td>
<td>18</td>
<td>24</td>
<td>80</td>
<td>4</td>
<td>$0</td>
<td>$9,870</td>
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<tr>
<td>5 Assess the likely beneficial and adverse legal, economic and environmental impacts of entities.</td>
<td>IV.AB</td>
<td>0</td>
<td>20</td>
<td>60</td>
<td>8</td>
<td>$0</td>
<td>$6,560</td>
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<tr>
<td>6 Summarize and present findings of the preceding tasks.</td>
<td>VI(p)</td>
<td></td>
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<td>7 Prepare comprehensive conclusions; formulate recommendations.</td>
<td>[IV.B]</td>
<td>8</td>
<td>80</td>
<td>15</td>
<td>4</td>
<td>$0</td>
<td>$6,005</td>
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<tr>
<td>8 Prepare written report w/references; prepare presentation to client.</td>
<td></td>
<td>16</td>
<td>68</td>
<td>15</td>
<td>0</td>
<td>$0</td>
<td>$6,945</td>
</tr>
<tr>
<td>9 Project administration: management; meetings/travel</td>
<td></td>
<td>23</td>
<td>24</td>
<td>8</td>
<td>8</td>
<td>$2,050</td>
<td>$7,195</td>
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Totals of hours 211 764 186 56

Hours and cost data:
Hourly rate ($/hr)(*) $95 $95to$35 $75 $50

Estimated cost $20,045 $43,200 $13,950 $2,800 $2,250 $82,245 $82,245

(*) Estimate reflects management, engineering, and clerical task assignments.
APPENDIX A

RESUMES
PROFESSIONAL FOCUS:
Counseling and litigation in water law 50%, governmental and commercial matters 25%, and environmental law 25%.

EXPERIENCE:
Since 1980: Counseling, negotiation, litigation and trial in state, federal and administrative proceedings in water, environmental, governmental and complex commercial matters.
Participation in numerous water transfer cases, including many where effects on water users, local communities, and river management were considered.
Representation of governmental districts on organizational, tax, management, revenue, governance, operational and inter-governmental issues.
Evaluation of impacts from water transfers, such as endangered species, water quality, revegetation, ditch maintenance, recreational uses, and operational expenses.
Currently counsel to the St. Charles Mesa Water District, Fort Lyon Ownership of Water, Inc. (FLOW) and numerous other water users in the Arkansas River basin.

EDUCATION:
J.D., 1975, U. Texas at Austin, top 25%

ADMITTED TO PRACTICE:
Texas (1975); Colorado (1979)
ARTICLES

**Wild and Scenic Rivers Designations.** Colorado Lawyer May 1991

**Arkansas River Winter Storage Program.** Howard Holme and Tommy Thomson, co-authors. American Water Works Association Annual Conference Proceedings 1989

**Mitigating Third Party Effects.** American Water Works Journal Mar 1988

**A Water Transfer Case Study of Third Party Impacts and Strategies.** University of Denver Water Marketing 1987 Conference Proceedings Nov 1987

**Conditions in a Water Rights Augmentation Plan or Change Case.** Colorado Lawyer Nov 1984

SPEECHES

**A Colorado Case Study in Incorporating the Public Interest** Western Governors’ Association and Western States Water Council Seminar on Western Water Management in an Era of Change Oct 1991

**Not So Wild and Scenic Rivers - The Problems with the Wild and Scenic Rivers Act.** Colorado Water Congress Annual Convention, Jan 1991

**Agricultural Water Transfers.** Northern Colorado Water Conservancy District Spring Water Users Meeting Apr 1989

**Water Transfer Impacts.** University of Denver Water Marketing 1987 Conference Oct 1987
SUBJECT MATTER EXPERIENCE

WATER AND WATER QUALITY:

- All aspects: tributary, non-tributary, and designated groundwater; surface water
- Water rights of all types, diligence, changes, exchanges, augmentation plans; as applicant and objector
- Bureau of Reclamation contracts, operation and authorizations
- Corps of Engineers Flood modeling and bank stabilization
- Districts and authorities; formation, operation and inclusion of lands
- Easements and condemnation
- Encumbrance of water
- Interstate compacts - Arkansas River, Colorado River and tributaries
- Legislative lobbying - federal, state and local
- Seepage and reuse
- State Engineer permitting
- Transit losses
- Title to water rights and water contracts
- Water transfer impacts
- Water supply sufficiency evaluations
- All aspects of permitting and regulation
- Discharge permits
- EPA standards
- Instream and lake requirements
- Integration of regulations under Senate Bill 181
- Non-point source and hydrologic modification issues
- Quality monitoring
- Safe drinking water standards
- Salinity
- Sediment damage
- Standards and classifications
- 208 Plans

ENVIRONMENTAL:

- Federal and state permits, water impacts, liability and cleanup
  (see above for water quality matters)
- BLM permits
- Corps of Engineers’ 404 permits - wetlands, bank erosion, road crossings
- Forest service permits and FLPMA permits
- Endangered species - fish, plants and birds, settlement of jeopardy opinions and negotiation of management plans
- Environmental Impact Statements/ Environmental Assessments
- Flood plain boundaries
- Point discharge requirements
- Reclamation reform act acreage limitations
- Swampbuster requirements
TRIALS

Amity - Water transfer of 50,000 ac. ft. from Great Plains Reservoirs to John Martin Reservoir. Requested conditions be imposed. Successful.

Fort Lyon - Water transfer of 44,000 ac. ft. to winter storage purposes, and transfer of 5,000 ac. ft. to John Martin. Reduced requested transfer by 4,000 ac. ft. and imposed conditions. Successful.

Wheel Ranch - Water transfer of small ditch under Pueblo Reservoir to golf course use. Substantially reduced the transferable consumptive use. Successful.

Resource Investment Group - Water transfer of 8200 ac. ft. of agricultural water to Aurora. Substantially reduced transferable consumptive use and imposed conditions. Ultimately settled. Successful.

RIG - Aurora - Contempt of decree provisions for revegetation and measuring devices. Imposed additional revegetation conditions. Successful.

Public Service Company - Transfer of Las Animas ditch water from Southeast plant site to Pueblo. Case dismissed after cross examination of Public Service Company witnesses. Successful.

Water Quality Implementation - State Engineer’s rulemaking on implementation of water quality standards in certain water proceedings. Requested changes in rules. Successful.

MAJOR NEGOTIATED SETTLEMENT

Winter Storage Program - Negotiation of decree for storage of thirteen major ditches’ water during the winter period. In addition, thirty five parties entered the case or were involved in the negotiated settlement. The transfer affected approximately 140,000 ac. ft. and impacted interstate water compact obligations and federal operations of two major reservoirs. Successful.
APPEALS

GRONNING ENGINEERING COMPANY
Lloyd J. Gronning, P.E.
President

Education:

Master of Business Administration
University of Denver

Master of Science in Civil Engineering
Specializing in Water Resources Planning and Management
Colorado State University

Bachelor of Science in Civil Engineering
University of Notre Dame

Registration:

Professional Engineer
Colorado, Wyoming, and New Mexico

Gronning Engineering Company:

Mr. Gronning has overall management responsibilities for all projects of Gronning Engineering Company. As President his primary duty is to ensure that projects will be completed on time, within budget, and meeting clients needs. As a result, Mr. Gronning's primary duties are project management and client relations. His technical specialty is in water resources planning, management and development and he utilizes his extensive experience in the public and private sectors to efficiently direct projects and represent clients. Mr. Gronning has experience testifying before government and regulatory bodies, in state district courts, water courts, federal court and has been qualified as an Expert Witness in Water Rights Engineering, Water Resources Planning, Development of Municipal Water Supplies, Water Quality and Water Treatment Engineering, Operation of Water Exchanges, Accounting and Record Keeping for Municipal Water Systems, and Valuation of Water Rights.

Prior Experience:

Mr. Gronning has prior experience in both the public and the private sector. He previously served as Utilities Director for the City of Thornton, Colorado. As the Chief Administrative Officer for the Thornton Utilities Department, he was responsible for a $15,000,000 annual budget and 100 employees. During this time he developed a comprehensive five-year operations, capital expenditure, and financial plan, negotiated a complex debt restructuring plan, a major water rights exchange contract, directed water resource acquisitions and development plans and also held responsible positions in regional water development groups and in mutual irrigation companies.

Other prior experience included that as a project engineer responsible for water and wastewater facility planning, engineering, legal coordination, financial feasibility, environmental assessment, and project coordination with the state and federal regulatory agencies. As a design engineer and resident inspector, he was responsible for design and field inspection of water and sewer lines, water and wastewater treatment facilities, wells, roads, and earth-filled dams.

Representative Projects:

Civil Design

TOWAOC CANAL REACH 3 AND TOWAOC LATERALS -- Principal-in-Charge for the design of 19 miles of canal, 15 major hydraulic structures, 33 miles of pressure laterals and 45 farm deliveries for the US Bureau of Reclamation. Estimated construction cost is $40M.
LAKE MEREDITH EXPANSION STUDY -- Directed the development of expansion studies and a boundary survey for Lake Meredith. Determined potential high water line and developed boundary surveys for the company’s existing land ownership.

COLORADO CANAL CAPITAL IMPROVEMENTS STUDY -- Directed the development of the improvement plan for the Colorado Canal system which includes the reconstruction of existing structures in order to improve the efficiency of the diversion of 756 cfs through 60 miles of canal and storage in two reservoirs with a capacity of approximately 50,000 acre-feet.

COLORADO CANAL MEASURING DEVICES -- Directed the development of planning, engineering, for construction of two canal flow-measuring structures utilizing long-crested weirs to measure flows ranging from 3 to 500 cfs. Structures have been successfully completed and are operational for the Canal Company.

BURLETON DITCH HYDRAULIC STUDY -- Directed the study of a section of the Burlington Ditch for a land developer, recommended plans for moving the ditch, enclosing it or bridging it in order to assist in the development of a property which was bisected by the ditch.

SODA CREEK Siltation STUDY -- Performed a reconnaissance level review and engineering analysis of rapid siltation problems which were occurring at Soda Creek Reservoir. Identified cause of siltation and made recommendations for clean-up by client.

ROCK CREEK RANCH -- Performed engineering studies to determine the water and wastewater utility requirements for the 6,000 unit multiple-use Rock Creek Ranch located in Boulder County, Colorado. Analyzed water requirements and recommended water acquisitions, developed raw water transmission and treatment scenarios, recommended water transmission and storage requirements, determined wastewater projections and recommended alternative wastewater treatment scenarios.

TROUT CREEK WILDLIFE HABITAT -- Directed the planning and design for construction of a wildlife habitat on the Trout Creek Ranch. Habitat includes the construction of a 10-acre pond for fishing and water fowl.

FOUNTAIN CREEK GAGING STATION -- Directed the site location, preliminary design, multi-jurisdictional approval and design of a flow-measuring structure for the City of Colorado Springs on Lower Fountain Creek.

EASTERN FREMONT COUNTY 201 FACILITIES PLANT -- At M&I Consulting Engineers served as Project Engineer developing a 201 Facilities Plan for the Eastern Fremont County Sanitation District. Work included development of an infiltration/inflow analysis, alternative treatment system evaluation, preliminary design, economic and financial analyses. Recommendations developed in the 201 Facilities Plan were implemented including the creation of the multi-jurisdictional Eastern Fremont County Sanitation District, construction of a major wastewater interceptor and treatment facility for the County.

Water Rights

COLORADO CANAL WATER RIGHTS TRANSFER -- Represented the purchaser, the City of Colorado Springs, in the acquisition and transfer and yield evaluation of its Colorado Canal water rights. Colorado Canal consists of a integrated project diverting water from the Arkansas River for both direct flow irrigation and storage. Colorado Springs has successfully completed this water rights acquisition of approximately 17,500 acre-feet of consumptive use water for use within its system.

ARKANSAS RIVER EXCHANGE PLAN -- Directed interdisciplinary studies for the development of a water rights exchange on the Arkansas River by the City of Colorado Springs. Work included analysis of the City's water rights, transmountain yields and return flows, analysis of the hydrology and water rights regime of the Arkansas River and key tributaries, determination of water quality effects, and development of a plan.
for administration. Directed development of technical analysis and negotiations with thirty-four objectors. Presented expert testimony in water court. A decree for this plan has been successfully obtained by the City of Colorado Springs where it received the absolute right to increase through the exchange its water supply by over 20,000 acre-feet and received conditional decrees for an additional 70,000 acre-feet of water rights.

CITY OF THORNTON SOUTH PARK WATER RIGHTS PROJECT -- Mr. Gronning directed the engineering analyses and water court preparation for nine separate ranches in South Park, Colorado for the City of Thornton. A result of this project is the development of an additional 8,000 acre-feet of consumptive water supply for use by the City.

Specific transfers for the City of Thornton include the following:

- **TROUT CREEK AND PLATTE-ANSLEY RANCH WATER RIGHTS TRANSFERS** -- transfer of over 3,800 acre-feet per year of water rights from agricultural to municipal use from two ranches located in Park County, Colorado.

- **SIBLEY RANCH WATER RIGHTS TRANSFER** -- transfer of over 700 acre-feet per year of water rights from the Schattinger Ranch in Park County, Colorado.

- **SCHATTINGER RANCH WATER RIGHTS TRANSFER** -- transfer of approximately 600 acre-feet per year of water rights from the Schattinger Ranch in Park County, Colorado.

- **ROCKER 7 RANCH WATER RIGHTS TRANSFER** -- transfer of approximately 200 acre-feet per year of water rights from the Rocker 7 Ranch in Park County, Colorado.

- **TETER AND JOHNSTON RANCH WATER RIGHTS ANALYSES** -- transfer of approximately 1,200 acre-feet of water from approximately 1,500 irrigated acres in Park County, Colorado.

- **FURMAN AND MICHIGAN CREEK RANCH WATER RIGHTS ANALYSES** -- engineering analyses to quantify historical stream depletions on approximately 2,000 irrigated acres in Park County, Colorado.

TWO FORKS RESERVOIR SIZING AND ANALYSIS -- Project Manager for studies of Denver suburban municipalities water rights relative to determining the suburban municipal storage requirements in the 1.2 million acre-feet proposed Two Forks Reservoir. Project calculated yields with and without the reservoir storage through a long-term study period including a multiple drought year scenario.

CITY OF AURORA, COLLARD AND BLACK MOUNTAIN RANCH WATER ANALYSES -- directed analyses of historical water use on approximately 1,300 irrigated acres in Park County, Colorado.

RICHARD AND MARILYN CURRY RANCH WATER RIGHTS ANALYSIS -- directed the evaluation of the historical operation and crop water consumption on the Curry Ranch located on Sheep Creek near Kremmling, Colorado.

FRONT RANGE RESOURCES PARTNERS, WATER RIGHTS EVALUATIONS -- directed the engineering analyses and evaluated agricultural water rights and reservoirs in the William Fork and Blue River Basins in Colorado.

STILLWATER RESOURCES INDIAN MOUNTAIN RANCH WATER RIGHTS ANALYSIS -- directed analyses of potential water rights yields from a water rights transfer decree from the Tarryall Creek Basin in Park County, Colorado.
BURLINGTON/WELLINGTON TRANSFER -- Directed engineering studies for the development of a transfer of water rights in the Burlington Ditch Company and Wellington Reservoir Company for the City of Thornton. Work to date has consisted of development of engineering studies and assistance with application in the water court. The transfer of this case is pending.

SIERRA CLUB VS. BLOCK -- Assisted the Mountain States Legal Foundation who intervened aligned with the defendant, Secretary of Agriculture, Block, regarding the development of water supplies in wilderness areas. Analyzed the potential for water supply development in each of the existing or proposed wilderness areas within the State of Colorado and made recommendations to the Mountain States Legal Foundation as to the impacts of the Sierra Club's law suit on potential water development plans.

WILLIAMS FORK WATER RIGHTS -- Developed an acquisition analysis of water rights of Lewis Ranch, Skylark Ranch and Sylvan Reservoir for the exchange of the water rights with the Denver Water Board for water commitments to a suburban water provider. Work consisted of analysis of the water rights, development of the water supply exchange with the Water Board and presentation of the plan to suburban water interests and the Denver Water Board.

BLUE RIVER WATER RIGHTS -- Directed water right studies to analyze the yield of the Spring Creek Ranch, Eagle Pass Ranch, and Hoagland Reservoir within the Blue River Basin of Colorado. Negotiated terms and conditions to protect the potential transfer of these water rights to future municipal uses.

Groundwater

LA PAZ COUNTY, ARIZONA -- directed the quantification of in-place and physically recoverable ground-water resources in the northern half of the Ranegrass Plain, a large structural basin in southwestern Arizona. Quantifications were derived from a mathematical ground-water model developed by GEC. Based on results of computer modeling, the client was advised that in-place and physically recoverable ground-water resources in the basin were less than originally forecasted by other engineers. Due to GEC's recommendations, the client decided against investing in a major ground-water development project in the basin, which proved to be a long-range financial advantage.

REGIONAL GROUNDWATER APPRAISAL -- Directed the development of a regional nontributary groundwater appraisal for the Metropolitan Water Providers. This work consisted of an analysis of the probable effects of development of a major nontributary water development scenario on existing wells of the Denver Metropolitan suburban water interests.

GROUNDWATER DEVELOPMENT AUGMENTATION AND EXCHANGE PLANS-COLORADO SPRINGS -- Directed the development of irrigation return flow studies for the City of Colorado Springs. Work has included development of a lawn water lysimeter program, including the design and installation of over ninety lawn water lysimeters randomly located to develop a statistically representative sample of irrigation water use of Colorado Springs, development of a monitoring and data collection program, development of a two-dimensional finite difference groundwater model utilizing the USGS McDonald-Harbough model and development of plans for obtaining decrees for both a surface exchange for the return flows as well as credits for augmenting both present and future groundwater development.

UPPER BLACK SQUIRREL CREEK DESIGNATED GROUNDWATER BASIN -- Performed studies of the impact of a major groundwater development for the Upper Black Squirrel Creek Designated Groundwater Basin. Studies included modeling of the impact of a major groundwater development in the Basin and the probable impact on the regional groundwater availability and water table for the Basin's management district.

IRRIGATION RETURN FLOW STUDY, COLORADO SPRINGS -- Directed the development of irrigation return flow studies for the City of Colorado Springs, which work has included development of a lawn water lysimeter program, including the design and installation of a statistically representative sample of irrigation water use of Colorado Springs, development of a monitoring and data collection program, development of a two-dimensional finite difference groundwater model utilizing the USGS McDonald-Harbough model and development of plans for obtaining decrees for both a surface exchange for the return flows as well as credits for augmenting both present and future groundwater development.
Lloyd J. Gronning, P.E.
President
Page 5

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Management Consulting

METROPOLITAN WATER RATE STUDY -- Assisted Metropolitan Denver Water Authority in the review and analysis of a Metropolitan Water Rate Study performed by the Denver Water Department. Represented the Authority in the development of the rate study and presented alternatives for rate development to the Denver Water Board.

WATER SYSTEMS APPRAISAL -- Directed the appraisal of two small rural water systems for potential purchase as a part of a plan for extending municipal water service outside the boundaries of the Denver Suburban water utility.

Professional Affiliations:

American Academy of Environmental Engineers Diplomat - Water Supply/Wastewater Certification
American Consulting Engineers Council
American Society of Civil Engineers, Fellow
American Water Works Association
       (Past Chairman 1990-1991, Rocky Mountain Section)
Colorado Water Congress
International Water Supply Association
United States Committee on Irrigation and Drainage
United States Committee on Large Dams
Society for International Development
Water Pollution Control Federation

Publications:


"The Thornton Water System, A Look to the Future," presented at the 1980 Regional Convention of the Rocky Mountain Section, AWWA.


John R. Clark, P.E.
Project Manager

Education:

Ph.D. in Civil Engineering
Colorado State University
Master of Science in Civil Engineering
University of Oklahoma
Bachelor of Science in Civil Engineering
University of Colorado
Bachelor of Science in Business Management
University of Colorado

Registration:

Professional Engineer
Colorado

Gronning Engineering Company:

As Project Manager, directs engineering projects in the Water Resources Planning and Design, performs technical and economic appraisals of water rights; water-supply studies, and design and operations analyses of complex, integrated water resource systems. Performs hydrologic studies including watershed analysis, reservoir siting and sizing, storm water drainage and drought severity-frequency analyses. Develops and programs mathematical models to simulate river basins, irrigation systems, municipal raw water networks, reservoir operations, water exchanges, and water right accounting. Testifies in water court as an expert witness for water resources matters.

Manages design projects relating to design of water and sewer systems, site grading and drainage, canals, dams, hydroelectric plants and raw water facilities. Prepares and supervises development of contract drawings and project manuals for competitive bidding.

Prior Experience:

Consulting, student and sponsored research - June 1989 to May 1992
Colorado Water Resources Research Institute
City of Aurora, Utilities Department
R.C. Heath Construction Co., Fort Collins

Colorado State University - August 1987 to May 1989
Department of Industrial Sciences:
Instructor in construction management

Shiloh Inc. Technical Consultants - January 1982 to August 1987
Fort Collins, Colorado
Vice President and Principle: Civil and municipal work
John R. Clark, P.E.
Project Manager
Page 2

M & I Consulting Engineers - October 1975 to December 1981
Fort Collins, Colorado
Project engineer and project manager
Emphasis on water/wastewater projects of all kinds

Lounsbury and Associates, Consultants - 1971 to 1974
Anchorage, Alaska

U.S. Navy - 1966 to 1971
Lieutenant, Civil Engineer Corps (Seabees)

Representative Projects:

WATER TRANSMISSION LINES AND PLANT IMPROVEMENTS -- Project Engineer and Resident
Engineer for $1.2 M project for City of Canon City, Colorado.

WATER DISTRIBUTION SYSTEM AND TRANSMISSION LINES; WATER TREATMENT PLANT (5 mgd)
for $4.33 million (Federal grants) project for City of Rocky Ford, Colorado.

WASTEWATER TREATMENT PLANT -- Design Engineer for $5.0 million project for Upper Eagle Valley
Sanitation District, Avon, Colorado.

PAVING IMPROVEMENTS (UNDER HUD GRANT); NORTH SIDE CURB AND GUTTER
IMPROVEMENTS; NORTH SIDE RELIEF STORM DRAINAGE IMPROVEMENTS -- Project Engineer for
$337,000 project for City of Rocky Ford, Colorado.

Professional Affiliations:

American Society of Civil Engineers, Fellow; Officer, Water Resources Group, Colorado Section
American Water Resources Association Member
American Association of Cost Engineers Member
American Society for Engineering Education Member

Publications:

"Environmental Assessment of Construction Activities" unpublished Master thesis, University of
Oklahoma, 1975.

"Cost Estimating, Scheduling and Civil Engineering" for the national Forum on Civil Engineering
Education, American Society of Civil Engineers, Las Vegas, April 1990.

"Practical Specifications for Project Scheduling," Cost Engineering, Journal of the American Association
of Cost Engineers, June 1990.

Resources Research Institute, Fort Collins, November 1990.


John N. Winchester
Water Resources Engineer

Education:

Master of Science in Civil Engineering
   Specializing in Hydraulics
   Colorado State University

Bachelor of Science in Watershed Sciences
   Colorado State University

Gronning Engineering Company:

Mr. Winchester performs technical appraisals of water rights, water-supply studies, and design and operations analyses of complex, integrated water resource systems. Performs hydrologic studies including watershed yield analysis, reservoir siting and sizing, storm water drainage and drought severity-frequency analyses. Develops and programs computerized models to simulate river basins, irrigation systems, municipal raw water networks, reservoir operations, water exchanges, and water right accounting.

Mr. Winchester has performed hydraulic design for open channel and closed conduit flow. Constructed detailed engineering studies relating to surface and groundwater hydrology. Administrator for company microcomputers. He has written and used computer programs for finding hydraulic conditions, including normal and critical depth, water surface elevations and backwater curves.

Prior Experience:

Performed field water and sediment discharge measurements. Measured water quality and did lab work for suspended sediment, total dissolved solids (TDS), dissolved oxygen, pH, soil and fecal coliform counts. Soil, plant, bovine blood and fecal sampling.

Project Experience:

FRYINGPAN-ARKANSAS RIVER BASIN OPERATIONS STUDY, CO -- Provided services to convert data to a matching computerized format, and developed to models for the project. To evaluate project operations and alternatives for raw water storage for the City of Colorado Springs. He verified results confirming they were identical to those completed by USBR on Cyber by conducting calibration runs using a 1966-1985 data set. A subroutine to include agricultural uses and to provide an exchange accounting method. A complete 58-year record was made in a shorter time period that significantly reduced the cost to the City than if the entire data set had been recreated. Also, the GEC daily flow exchange model to include area downstream.

TOWAOC CANAL REACH 3 AND LATERALS, DOLORES PROJECT, CO -- Assisted in design of more than 50 irrigation canal cross drainage structures. This included culvert sizing, inlet and outlet erosion protection, determination of hydraulic conditions above, below and in the cross drainage, interceptor ditches, and final grade of the earthwork. Involved in sizing and placement of baffled outlets, riprap, and inlet and outlet structures. Provided geomorphologic study of buried siphon and pipeline drainage crossings, and hydraulic review of turnout structures.

CHURCH DITCH COMPANY, CO -- Performed survey work and necessary calculations to determine the backwater curve above several culverts. This water elevation was used in the siting of a new pedestrian bridge over the ditch.
Professional Affiliations:

American Society of Civil Engineers
American Water Resources Association
American Society of Photogrammetry and Remote Sensing
MILLIKEN RESEARCH GROUP
J. GORDON MILLIKEN, Senior Research Economist

B.S., Industrial Administration, Yale University
B.E., Civil Engineering, Yale University
M.S., Management and Statistics, University of Colorado
Ph.D., Business Administration (Management, Finance, and Economics), University of Colorado at Boulder

Dr. Milliken is a principal of Milliken Research Group, Inc., a firm specializing in economic and policy analysis. This firm succeeds a private research and consulting practice conducted by Dr. Milliken from 1972 to 1986.

From 1966 to 1986, Dr. Milliken also was Senior Research Economist at the Denver Research Institute, University of Denver, where his experience included research in water and natural resources policy, and socioeconomic and environmental impact. He was Manager of Business Research Group, and in the mid-1980's he served as Head of the Industrial Economics and Management Division of the Institute.

Over the last 23 years, Dr. Milliken has directed a series of policy research studies dealing with the economic impacts of water resources development, the supply and demand for water in semiarid regions, metropolitan water planning, water conservation and pricing to promote efficiency of use, public policy to promote optimum water use and reuse of water, public attitudes toward potable water reuse, environmental impacts, including salinity control, and impacts of western energy development on water use. During 1990, he directed a major study of air quality along the Colorado Front Range.

Dr. Milliken and his colleagues completed a major policy analysis study involving metropolitan water supply planning. The study, sponsored by the U.S. Environmental Protection Agency, presented and demonstrated a methodology for planning a water supply, at the least environmental and economic cost, that will meet future water demands in a metropolitan area where water resources are limited. The study discusses several alternative water strategies, including conservation, pricing, and reuse of wastewater, which can be used by policymakers to resolve the technological, economic, environmental, and social issues of municipal water supply. The study used actual data from the Denver, Colorado metropolitan area to demonstrate the methodology. The report was subsequently published, in condensed form, by the American Geophysical Union as a Water Resources Monograph.

He has coauthored three books: Metropolitan Water Management, Water and Energy in Colorado's Future, and Water and Arid Lands of the Western United States, and he has written over 100 research reports and journal articles on economic, engineering, and managerial topics. His natural resources policy research has been sponsored by the Department of the Interior (Office of Water Research and Technology, and Bureau of Reclamation), Environmental Protection Agency (Washington, D.C., and Region VIII), American Geophysical Union, Colorado Department of Natural Resources, Nebraska Natural Resources Commission, Colorado Energy Research Institute, Colorado Petroleum Association, Denver Water Department, National Water Resources Association, and World Resources Institute.

Milliken Research Group, Inc.
In 1984, the Secretary of the Interior appointed Dr. Milliken as a member of the Garrison Diversion Unit Commission to review the water needs of North Dakota. The Commission was authorized by the Congress to direct modifications in plans for the Garrison Diversion Unit, which were implemented by the Bureau of Reclamation.

During the 1984-87 period, Dr. Milliken served as an economic consultant to the El Paso [Texas] Water Utilities concerning an analysis of water supply alternatives. Subsequently, he was involved as an economic expert in the ongoing attempt to obtain New Mexico groundwater rights for El Paso. More recently, he served as a consultant to the Miami [Ohio] Conservancy District to establish a financial plan to allow investment in major physical facility repair and replacement for a District providing water resources management to the 17-county area of the Miami River Valley.

Dr. Milliken was a member of the faculty of the University of Denver's College of Engineering, where he taught graduate courses in engineering and R&D management. He also served as President of the University of Denver Senate. He previously taught in the College of Business and Administration of the University of Colorado, Boulder and Denver.

Dr. Milliken is a registered professional engineer in Colorado. He currently serves on the boards of directors of three special governmental districts which provide water supply, wastewater treatment, and park and recreation services to Denver's southern suburbs. He also serves on the Technical Advisory Committee of the Colorado Water Resources Research Institute. He has been for several years a member of the Academy of Management, American Water Works Association, and four professional honorary societies, and is listed in Who's Who in the World and Who's Who in America.
Representative Projects:

WATER ISSUES IN THE ARID LANDS OF THE UNITED STATES -- Commissioning of six case studies that examine traditional agricultural and urban water use patterns and practices and outline emerging conflicts and possible policy actions. One of the case studies, dealing with water management issues in the Denver, Colorado urban area, was prepared by Dr. J. Gordon Milliken of MRG. Other case studies involved municipal water issues on the South Coast Basin of California and in Tucson, Arizona; and agricultural water demand in the Central Valley of California, the High Plains of Texas, and the Upper Colorado River Basin.

CLIENT: World Resources Institute workshop in Tucson in February 1986 involving 53 participants; published by the Cambridge University Press.

STUDY OF METHODS FOR ASSESSING ECONOMIC BENEFITS AND ALLOCATING COSTS OF NEBRASKA WATER DEVELOPMENT PROJECTS -- MRG directed a research study intended to analyze existing methods for determining economic benefits (i.e., positive impacts) of large water development projects and for allocating costs of those projects among various groups of beneficiaries. The study included an evaluation of each existing method of determining fish, wildlife, outdoor recreation, and tourism benefits of water development projects to assess its applicability to, and suitability for use in, the State of Nebraska. The study team then developed a new method that met the evaluation criteria better than other methods examined. 1984 - 1985.

CLIENT: Nebraska Natural Resources Commission

WATER SUPPLY POLICIES AND CITY OF DENVER-SUBURBAN RELATIONSHIPS -- Policy analysis study by MRG defined the economic, social, and institutional/political impacts that may result from each of four general policies on water service to suburban areas during the next 25 years. The relationship between water service and urban growth was analyzed, as was the question of effectiveness and desirability of using suburban water service constraints as a technique for growth management.

CLIENT: Denver Board of Commissioners

POLICY ANALYSIS OF WATER CONSERVATION AND REUSE IN COLORADO -- MRG project involved preparation of two background studies for the State of Colorado’s comprehensive water policy plan, authorized by the Colorado General Assembly. The studies involved evaluating the effectiveness, monetary costs, and social/amenity impacts of various potential policies to reduce municipal water demand in Colorado. Such policies include conservation programs and devices, progressive or peak demand pricing, limitation of water service area, and recycling of municipal wastewater.

CLIENT: Colorado Department of Natural Resources

STUDIES ON THE ECONOMIC IMPACTS OF THE FEDERAL RECLAMATION PROGRAM -- MRG interdisciplinary team completed the third in a series of national economic impact studies conducted for the Bureau of Reclamation, 1971 - 1985. The team developed a macroeconomic methodology for estimating the annual generation of federal internal revenues and state and local taxes resulting from the direct and first-round indirect impacts of the Federal Reclamation Program. Impacts were traced from eight types of output: Bureau of Reclamation spending activity, agricultural water, municipal water, industrial water, hydroelectric power, recreation, fish and wildlife, and flood control.

CLIENT: U.S. Bureau of Reclamation

POLICY ANALYSIS OF COLORADO RIVER SALINITY -- MRG identified management and policy actions which could be taken by state and local government agencies within the seven states of the Colorado River Basin to reduce salinity in the Colorado River mainstream. The study, conducted in close cooperation with the Colorado River Basin Salinity Control Forum, analyzed state statutes, regulations
and policies, and identified actions or programs (e.g., relating to water resource management, agricultural land use, or municipal and industrial uses) which could, directly or indirectly, reduce salinity. These actions were analyzed for feasibility of adoption, based on costs, benefits, and difficulty of implementation.

CLIENT: U.S. Environmental Protection Agency

COST EFFECTIVENESS ANALYSIS OF WATER REUSE INCENTIVES -- MRG study team analyzed potential economic incentives that could stimulate planned reuse of water in the Colorado River Basin. Various financial and policy incentives to electric power utilities that would offset the greater costs of reusing low quality/saline cooling water are discussed. A cost-effectiveness analysis of each alternative economic incentive is presented and compared with structural salinity control measures to reduce Colorado River salinity.

OVERCOMING OBSTACLES TO CONSUMPTIVE REUSE -- An MRG team identified and analyzed the severity of legal, institutional, political, and social obstacles to reuse in each of the seven Colorado River Basin states. Five cases studies on actual or potential reuse projects were presented. Various solutions to overcome barriers were analyzed for their potential feasibility, and strategies to promote greater reuse of water were presented.


METROPOLITAN WATER SUPPLY PLANNING ANALYSIS -- An MRG team presented a methodology for planning a least-cost water supply that will meet future water demands in a metropolitan area where water resources are limited. The study discusses several alternative water strategies, including some that are nontraditional--notably wastewater reuse--which can be used by policymakers to resolve the technological, economic, environmental, and social issues of municipal water supply 1974 - 1981. The methodology is demonstrated in a specific semiarid metropolitan area: Denver, Colorado.

CLIENT: U.S. Environmental Protection Agency

ECONOMIC IMPACTS OF WATER QUALITY -- MRG developed a comprehensive method of estimating present and future costs of salinity in water supply to various users of Colorado River supplies. Salinity, and its related characteristic, hardness, are know to cause specific types of damage to crop production, to household appliances and plumbing, to water distribution systems. In addition to replacing or refining data derived from earlier studies, the study also developed a methodology for estimating the costs of saline water to industrial users. Another new area of water quality-induced damages analyzed is that of costs imposed by regulation or policy in response to a perceived water quality problem. The physical costs created by saline water were arrayed into a computer model which extends to the year 2010. The computer model permits users to modify assumptions and parameters in forecasting future salinity damages. The study was conducted in close cooperation with the Colorado River Basin Salinity Control Forum.

CLIENT: U.S. Department of the Interior, Bureau of Reclamation

ANALYSIS OF THE RELATIONSHIP OF ENERGY DEVELOPMENT AND WATER USE IN COLORADO -- In a research project sponsored by the Colorado Energy Research Institute, MRG professionals analyzed the relationship of energy development and water use in Colorado from 1981 until the year 2000. The report summarizes information on Colorado's existing water and energy resources, and includes alternative scenarios of the state's future energy development. Other parts of the report describe impacts of various types of energy development on the quantity and quality of the State's water, indirect social and economic impacts of water reallocation, and resulting legal and institutional problems. Current policy options available to the State's policymakers are explored and the results of each policy are forecast to the end of the century.

CLIENT: Colorado Energy Research Institute
ASSESSMENT OF EFFECTS OF A PUBLIC EDUCATION PROGRAM ON ATTITUDES TOWARD POTABLE WASTEWATER REUSE -- MRG measured the degree of public awareness about potable wastewater reuse and analyzed the effects of information/education measure on public understanding and acceptance of potable use of wastewater that has been reclaimed to drinking water standards.

Two random sample surveys were conducted of users of water supplied by the Denver Water Department (in 1982 and 1985). The surveys queried respondents on general attitudes about water, sources of information, acceptance of various types of water reuse, and socio-demographics. A 72-member experimental panel was drawn from the 1982 respondents and subjected to various forms of educational treatments to measure shifts in attitudes toward wastewater reuse.

The analysis and survey results were incorporated into a program guide for municipal water system administrators for use in U.S. communities which will need to educate and inform their customers about reuse.


IMPACTS OF RESERVOIR RECREATION -- Three Bureau of Reclamation reservoirs in Colorado were studied, 20 years after their construction, to determine the economic and social impacts of the related recreational activities. The research involved questionnaires and personal interviews with visitors to Forest Service campgrounds in the Shadow Mountain National Recreation Area as well as Horsetooth Reservoir. From questionnaires, interviews, and land value analysis, substantial direct economic benefits were found in all reservoir areas, including increases in land values, increased tax revenues, increased retail sales and boat sales, increased expenditures for operation and maintenance of facilities, and the creation of jobs. 1968 - 1969.

CLIENT: U.S. Bureau of Reclamation

ENVIRONMENTAL IMPACTS OF WASTEWATER TREATMENT -- MRG directed the preparation of socioeconomic portions of four environmental assessments and impact statements in Colorado communities.

CLIENT AND REGION: Eco-Analysis, Inc. for Weld County, 1975
Weiner & Associates for Aspen, Pitkin County, 1976
Weiner & Associates for Pitkin County, 1976
Weiner & Associates for Steamboat Springs, 1976

ALTERNATIVE REGIONAL ECONOMIC DEVELOPMENT PROGRAMS -- MRG, as part of an interdisciplinary team, conducted an economic base and development analysis of the San Miguel Basin in western Colorado which included an analysis of the impacts of water resource development on three of the area's major economic sectors: agriculture, recreation and tourism, and construction. Growth multipliers were calculated. Alternative growth approaches based upon an analysis of the basin's economy were also developed, including an identification of the attendant economic, social, and environmental impacts. 1971.

CLIENT: Four Corners Regional Commission
MILENSKI AG CONSULTING SERVICES
Qualifications of Bill Milenski

November 1, 1987 to Current Date: Started Milenski Ag Consulting Service. The Service is designed to work with agricultural entities on a broad spectrum, including real estate appraisals, cash flow preparation, financial report preparation and analysis. The real estate appraisals have included residential, commercial, and agricultural properties. The common purpose has been to estimate the Market Value of the property. June, 1989 became Arbitrator for Crowley and Otero Counties concerning property tax disputes.

April 23, 1984 to October 15, 1987: Rocky Ford National Bank, Rocky Ford, Colorado, Assistant Vice-President and Agricultural Loan Officer; Responsibilities included improving the bank’s agricultural loan portfolio in size and quality through accurate and reliable real estate and chattel appraisals, farm inspections, credit analysis, documentation preparation, and loan servicing. Appraisals accepted by the office of Comptroller of the Currency and Farmers Home Administration for their Guaranteed Loan Program. The position was eliminated in a restructuring in which two positions were combined.


Candidate Member of the American Society of Farm Managers and Rural Appraisers and have successfully completed the following appraisal schools since 1987.

Fundamentals of Rural Appraisal A-10, ASFMRA, Texas, 1988
Report Writing Seminar, ADFMRA, Colorado, 1989
Principals of Rural Appraisal A-20, ADFMRA, Washington, 1989
Standards and Ethics A-12, ASFMRA, Kansas, 1991
Certification School A-45, ASFMRA, Kansas, 1991

The Assessment Appeals Seminar, Colorado Assessor’s Assn., 1991
Real Estate Appraisal Methods, G3, Appraisal Institute, 1991

Completed and passed the Colorado Board of Real Estate Appraisers Examination for Certified Appraisers on April 20, 1991.

Met all requirements set forth by the State of Colorado’s Board of Real Estate Appraisers for Certified Appraiser, License Number AC01315309 for the Calendar Year 1992.
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APPENDIX B

STRAIGHT LINE DIAGRAMS
DISTRICTS 17 & 67
Transfer Case No. 62 transferred to the Catlin Canal 22 cfs of the original Jones Ditch right of 44.3 cfs appropriated on 04/10/75. The same case transferred to the Las Animas Consolidated Ditch 22 cfs of the original Catlin Canal right of 248 cfs appropriated on 12/03/84. The Las Animas and the Catlin 04/10/75 rights are both subordinate to the Fort Lyon 04/15/84 priority.

Lake Meredith

LAKE MEREDITH OUTLET DITCH

Dye Reservoir
4,500af 10/10/1903
3,486af 09/03/1909

DYE RESERVOIR OUTLET DITCH

Horse Creek Reservoir
26,887af 01/25/1906
1,131af 06/12/1908

164.64 cfs 04/15/84
597.16 cfs 03/01/87
08/31/93

Holbrook Reservoir
4,247af 03/02/92
3,196af 09/15/1909

3.8 ft. 10° storage

Adobe Creek Reservoir
61,575af 1/25/1906
25,425af 12/29/1908

265,552af 08/01/96

To Great Plains Reservoir STEM
NOTES

SISSON - STUBBS DRICH
- The ditch diversion structure was destroyed in the 1965 flood. On May 12, 1969, by order of the State Engineer, a permit was granted to pump 7 cfs of the 18 cfs right from alternate or supplemental points along the river. In case W-3353, the remaining 11 cfs of the 12/01/91 right was conditionally transferred to wells. In case W-4534, the 7.2 cfs 12/01/95 right was transferred to wells.
By
Arkansas Valley Water Consultants
A Professional Consortium