

# **1. Introduction, Authorization and Purpose**

## **1.1. Introduction and Purpose of Report**

The Lewis and Clark Rural Water System was formed in 1990 to provide clean and plentiful water to people for whom safe, reliable drinking water has never been a reliable commodity. Regional water problems include shallow wells and aquifers prone to contamination, compliance with new Federal drinking water standards, and insufficient resources to meet increasing water demand due to population growth and economic expansion.

The Lewis and Clark Rural Water System has proposed a project to develop a groundwater supply adjacent to the Missouri River and a water treatment facility in southeast South Dakota near Vermillion. Treated water will be piped to member municipalities and rural water systems. When complete, the project will provide safe, reliable drinking water to approximately 200,000 people in South Dakota, Minnesota, and Iowa. The Lewis and Clark Rural Water System represents a unique regional approach by the three states to address common problems with area water resources in a more effective and cost-efficient way than each state could do alone. This supplemental water supply will allow the Water Service Area to maintain the existing quality of life and will sustain the present rate of growth in the Water Service Area.

The purpose of this Final Engineering Report is to provide an engineering and environmental analysis of the proposed improvements associated with the proposed Lewis and Clark Rural Water System. This Final Engineering Report expands upon the results, conclusions and recommendations of the *Feasibility Level Evaluation of a Missouri River Regional Water Supply for South Dakota, Iowa and Minnesota*, (Banner Associates, Inc., CH2M Hill, and Mariah Associates, Inc., September, 1993). This study is hereinafter referred to as the “1993 Feasibility Study”. The 1993 Feasibility Study documented domestic water needs of the project’s member systems, evaluation of alternatives, feasibility evaluation of the proposed water system, a water conservation program summary, and an environmental report. The 1993 Feasibility Study served as the basis for the authorizing legislation for the proposed project.

## **1.2. Authorization**

The Lewis and Clark Rural Water System Act was signed into law (Public Law 106-246) by the President on July 13, 2000. The Lewis and Clark Rural Water System Act authorized \$213,887,700

(1993 costs, subject to cost indexing) in the form of a Federal grant for planning and construction of the project. Local and State project sponsors will provide the remaining funds necessary to complete construction of the \$272,800,000 project (1993 costs, subject to cost indexing).

Furthermore, Lewis and Clark Rural Water System, Inc. (Lewis & Clark) and the Department of Interior–Bureau of Reclamation (Reclamation) entered into Cooperative Agreement No. 01-FC-60-1519 on June 29, 2001. The purpose of the Cooperative Agreement is to provide appropriated Federal funds, administrative and technical oversight, and other activities necessary to complete the planning, environmental and cultural resource compliance, and final design and specifications for construction of the water supply system. It also sets forth the roles and responsibilities of Lewis & Clark and Reclamation with respect to the planning and construction of the project.

This Final Engineering Report (and the plan for the water conservation program) is prepared and submitted in accordance with the requirements of the Lewis and Clark Rural Water System Act and the Cooperative Agreement. This Final Engineering Report is subject to review and approval by Reclamation and is substantially in accordance with the 1993 Feasibility Study. It is understood that this Final Engineering Report may, from time to time, be amended and supplemented as necessary.

Lewis & Clark selected Banner Associates, Inc. of Brookings, South Dakota to prepare this Final Engineering Report and draft Environmental Assessment. This report was prepared under an engineering services agreement dated September 28, 2000. Banner assembled a Design Team including itself, HDR Engineering, Inc. of Sioux Falls, South Dakota and TRC Mariah Associates Inc. of Laramie, Wyoming. HDR was responsible for evaluation of the groundwater collection and the water treatment systems. TRC Mariah was responsible for environmental review of the project, preparation of a National Environmental Policy Act (NEPA) documents, cultural resources file search and other related environmental evaluation and documentation.

### **1.3. Background of Project**

On April 18, 1990, various communities and rural water systems from southeastern South Dakota met to formally organize the Southeastern South Dakota Water Supply System, Inc., the predecessor of Lewis & Clark. The Lewis and Clark Rural Water System was organized to serve as a wholesale water system that sells water to participating municipal and rural water systems. Lewis & Clark's member systems would use this new source of water to replace or supplement existing sources of supply.

Population growth and industrial development in the 23 cities, towns and rural water systems of southeastern South Dakota, southwestern Minnesota and northwestern Iowa that are members of Lewis & Clark have increased demands on water resources in the tri-state area.<sup>1</sup> Shallow aquifers that provide most of the water supply are being used to the point that they are no longer capable of meeting regional needs and have become more susceptible to surface contamination and drought. At the same time, changes in regulations governing drinking water have significantly added to treatment requirements, and a greater awareness of water quality issues has reduced sources that are suitable for use as a public supply.

The 23 water utility members of Lewis & Clark have signed Commitment Agreements<sup>1</sup> with Lewis & Clark, and the proposed water supply system will serve approximately 200,000 people in seven counties of southeast South Dakota, two counties of southwest Minnesota and six counties of northwest Iowa. The water source for Lewis & Clark is the Missouri River alluvial aquifer near Vermillion, South Dakota. The raw water will be diverted, treated and distributed through a network of pipelines, pump stations and storage reservoirs to service connections with each of the 16 municipalities and seven rural water systems that are members of Lewis & Clark.

#### **1.4. Water Service Area and Member Systems**

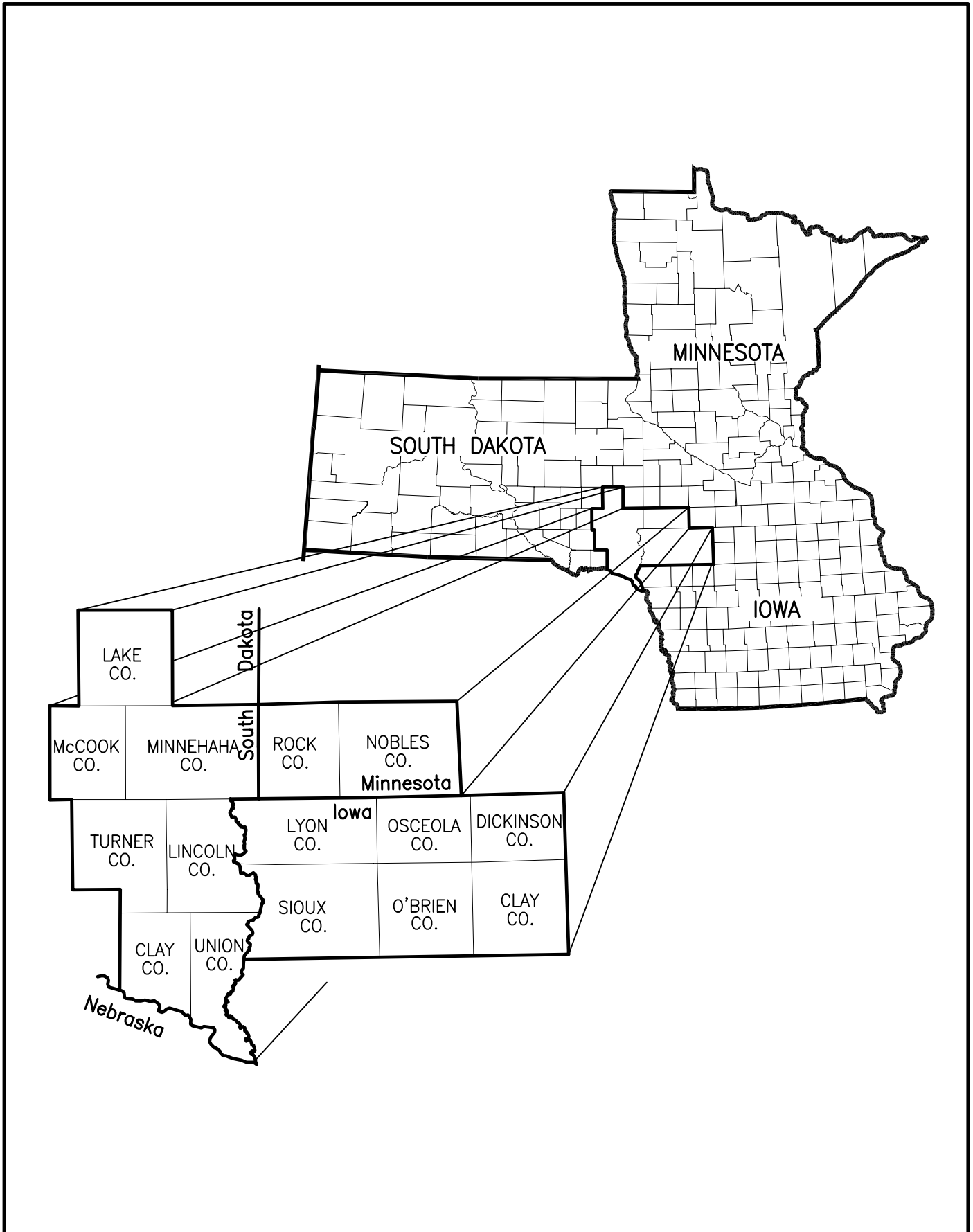
The Lewis and Clark Rural Water System will address concerns regarding the low quality, contamination vulnerability, and insufficient supply of existing drinking water sources for its members. The extent of the Water Service Area is shown on Figure 1.4-1. The term “Water Service Area”, as defined in the Lewis and Clark Rural Water System Act, includes the following counties:

- ? Lake, McCook, Minnehaha, Turner, Lincoln, Clay and Union, in southeastern South Dakota;
- ? Rock and Nobles, in southwestern Minnesota; and
- ? Lyon, Sioux, Osceola, O’Brien, Dickinson and Clay, in northwestern Iowa.

The project is directed by an organization of 16 member municipalities<sup>1</sup> and seven rural water systems in the tri-state area. Lewis & Clark members include the following municipalities and rural water systems listed in Table 1.4-1.

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<sup>1</sup> At the time of this report, Lewis & Clark and Rock Rapids Municipal Utilities were in the final process of negotiating a Commitment Agreement for Rock Rapids to become a member of Lewis & Clark. Rock Rapids should attain membership status by June 2002. For the remainder of this FER, Rock Rapids is included as a member system of the Lewis and Clark Rural Water System. Twenty-two systems were the original members; the addition of Rock Rapids will increase membership to 23 systems.



<b>Banner Associates, Inc.</b> <b>HDR Engineering, Inc.</b> <b>TRC Mariah Associates, Inc.</b>	<b>FINAL ENGINEERING REPORT</b>	<b>FIGURE 1.4-1</b>
	<b>LEWIS AND CLARK RURAL WATER SYSTEM</b>	<b>WATER SERVICE AREA</b>

Table 1.4-1  
Lewis & Clark Membership

South Dakota	Iowa	Minnesota
Beresford	Boyden	Luverne
Centerville	Hull	Worthington
Harrisburg	Sheldon	Rock County RWS
Lennox	Sibley	Lincoln - Pipestone RWS
Madison	Sioux Center	
Parker	Clay Regional RWS	
Sioux Falls	Rural Water No. 1	
Tea	Rock Rapids <sup>1</sup>	
Lincoln County RWS		
Minnehaha Community Water Corporation		
South Lincoln RWS		

<sup>1</sup> At the time of this report, Lewis & Clark and Rock Rapids Municipal Utilities were in the final process of negotiating a Commitment Agreement for Rock Rapids to become a member of Lewis & Clark.

Lewis & Clark's membership includes 16 member municipalities and seven rural water systems in the tri-state Water Service Area. Several of these systems, particularly the rural water systems provide water to smaller rural communities. Some of the rural water systems have subsystems that supply these communities and they may or may not be supplied water from Lewis & Clark. Some member systems have connections to provide emergency supplies to other water systems. Table 1.4-2 (on the following page) provides a listing of these "secondary" supplies.

### 1.5. Summary of the Scope of this Report

The Lewis and Clark Rural Water System Act, Section 4103(d) states:

"The Secretary [of Interior] shall not obligate funds for the construction of the water supply project until –

- (1) the requirements of the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.) are met; and
- (2) a final engineering report and a plan for a water conservation program are prepared and submitted to the Congress not less than 90 days before the commencement of construction of the water supply project."

Table 1.4-2  
Member System Connections to Other Systems

Member Sytem	Sales (or Potential Sales) of Supply To	Nature of Supply
Beresford, SD	Clay RWS, SD	Emergency connection
Centerville, SD	None	
Harrisburg, SD	None	
Lennox, SD	None	
Madison, SD	None	
Parker, SD	None	
Sioux Falls, SD	Lincoln County RWS, Norton-Froelich	Bulk connection
Tea, SD	None	
Lincoln County RWS, SD	Tea, Harrisburg	Bulk connection
MCWC, SD	Dell Rapids, Baltic, Hartford, Humboldt, Crooks, Colman, Garretson	Bulk connection
	Renner, Lyons, Rowena, Sherman, Ellis	Individual connections
South Lincoln RWS, SD	Alcester, Chancellor	Bulk connection
Luverne, MN	None	
Worthington, MN	None	
Rock County RWS, MN	Magnolia, Steen, Hills	Bulk connection
	Kanaranzi	Individual connections
Lincoln-Pipestone RWS, MN	Holland, Kenneth, Woodstock, Trosky, Hardwick, Ihlen, Hatfield, Leota	Bulk connection
Boyden, IA	None	
Hull, IA <sup>1</sup>	None	
Sheldon, IA	None	
Sibley, IA <sup>2</sup>	None	
Sioux Center, IA	None	
Clay Regional RWS, IA	Royal, Webb, Dickens, Fostoria, Gruver	Bulk connection
	Greenville, Rossie	Individual connections
	Linn Grove	Emergency connection
Rural Water No. 1, IA	Hospers, Granville	Bulk connection
	Sioux Center	Emergency connection
Rock Rapids, IA	None	

<sup>1</sup> Hull has a water purchase agreement with Rock Valley RWS.

<sup>2</sup> Sibley has a water purchase agreement with Osceola County RWS.

This Final Engineering Report (and the plan for the Water Conservation Program) is prepared to comply with requirement (2) above. Separate documents entitled *Environmental Assessment for the Lewis and Clark Rural Water System, South Dakota, Minnesota and Iowa* and *Biological Assessment, Lewis and Clark Rural Water System, South Dakota, Minnesota and Iowa*, prepared by TRC Mariah Associates Inc. for the Bureau of Reclamation, have been prepared to comply with requirement (1).

This Final Engineering Report was prepared under an engineering services agreement between Banner Associates, Inc. and Lewis & Clark. In summary, the scope of services to be performed by the Design Team under the engineering agreement includes the following tasks:

- ⌚ Task Series 100 – Project Administration: Coordination efforts and communications between the Design Team, Lewis & Clark, and various Federal and state agencies.
- ⌚ Task Series 200 – Water Demands: Meeting with all members; reviewing and summarizing their water needs; determine required point of delivery and pressure.
- ⌚ Task Series 300 – Hydrogeologic Investigation/Well Field: Evaluation of potential groundwater sources; exploratory test hole drilling; drilling and developing of a production test pumping well; water quality sampling; and evaluation and summary of test results.
- ⌚ Task Series 400 – Water Treatment Process: Review and listing of applicable rules and regulations; evaluation of alternate water treatment and disinfection technologies; and evaluation of member blending issues.
- ⌚ Task Series 500 – Transmission/Distribution Piping: Sizing and hydraulic evaluation of pipelines; pipeline material evaluation; and pipeline route selection.
- ⌚ Task Series 600 – Pumping and Storage: Sizing and hydraulic evaluation of pump stations and water storage reservoirs; material and equipment evaluation; and location selection.
- ⌚ Task Series 700 – Permitting/Environmental/Cultural Resources: Coordination with various state and Federal agencies; development of permitting and regulatory requirements for the project; cultural resources file search; wetlands delineation; and preparation of a draft Environmental Assessment (EA).
- ⌚ Task Series 800 – Plan for the Water Conservation Program: Identify guidelines and requirements of state and Federal agencies; summarize water conservation programs currently used by Lewis & Clark members; and develop guidelines and requirements for a water conservation program for the Lewis and Clark Rural Water System.
- ⌚ Task Series 900 – Additional Services: Other such services as may be required by Lewis & Clark. One of the major additional services included evaluation of water demands by prospective new members.

## **1.6. Value Engineering Evaluation**

The US Bureau of Reclamation (Reclamation) conducted a Value Engineering (VE) review of an initial draft (January 8, 2002) of the first five chapters of the Final Engineering Report. Chapters 1 through 5 include:

- ? Chapter 1 – Introduction, Authorization and Purpose;
- ? Chapter 2 – Summary of Project Water Demands;
- ? Chapter 3 – Proposed Facility Design Criteria and Requirements;
- ? Chapter 4 – Evaluation of Alternatives; and
- ? Chapter 5 – Proposed Project Facilities.

The VE review was held during the week of February 4 - 8, 2002 in Brookings, South Dakota. The purpose was to review the design criteria and proposed project components listed in the Final Engineering Report. The VE team included:

### Reclamation:

- ? Norman Hyndman, Team Leader
- ? Ted Hall, Assistant Team Leader
- ? Faye Streier, Natural Resource Specialist, and
- ? Harry Reemers, General Engineer

### State Agencies:

- ? David Ryan, South Dakota DENR
- ? Brian Noma, Minnesota Department of Health
- ? Iowa DNR was contacted and invited to participate, but elected not to participate in the VE Review

### Banner Associates, Inc.:

- ? Dennis Odens, Hydraulics and Pipeline Design
- ? Gregg Jorgenson, Water Treatment Plant Design

### HDR Engineering, Inc.:

- ? Ken Haney, Hydraulics and Pipeline Design
- ? Gary Fuller, Water Treatment Plant Design



Bartlett and West (independent consultant):

- ? Jerry Backes, Regional Water Systems Design

The VE Team developed ten proposals for consideration and evaluation by Lewis & Clark. Based on further evaluation of the ten VE proposals, four proposals were selected for further consideration and are incorporated into this Final Engineering Report, with modifications.

### **1.7. Acknowledgements**

Throughout the course of this report and previous studies, several participating agencies and other groups were involved and provided information, cooperation and guidance. Their input is gratefully acknowledged and appreciated. These participating agencies and other groups include:

Participating Members:

- ? Lewis and Clark Rural Water System Board of Directors, Committees and Staff
- ? Lewis and Clark Rural Water System member systems and their staff

Elected and Appointed Officials:

- ? Congressional delegations and staff from South Dakota, Minnesota and Iowa
- ? State Legislators from South Dakota, Minnesota and Iowa
- ? Mayors, Commissioners and Councils from Lewis & Clark's municipal memberships
- ? Officers and members of Lewis & Clark's rural water system memberships
- ? Elected and appointed County officials
- ? Elected and appointed Tribal officials

Federal Agencies:

- ? Bureau of Reclamation
- ? U.S. Army Corps of Engineers
- ? U.S. Fish & Wildlife Service
- ? National Park Service
- ? U.S. Geological Survey

State Agencies:

- ? South Dakota Department of Environment and Natural Resources
- ? South Dakota Department of Game, Fish & Parks
- ? South Dakota Department of Transportation

- ? South Dakota State Historical Society
- ? Iowa Department of Natural Resources – Environmental Protection Division
- ? Iowa Department of Natural Resources – Wildlife Division
- ? State Historical Society of Iowa
- ? Minnesota Department of Health
- ? Minnesota Department of Natural Resources
- ? Minnesota Historical Society

Others:

- ? Private landowners allowing access for project related activities
- ? VE Study Team