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Report to the Chairman, Subcommittee on Water and Power, Committee on Resources, House of Representatives

May 1999

RURAL WATER PROJECTS

Identifying the Benefits of the Proposed Lewis and Clark Project

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Resources, Community, and
Economic Development Division

B-282187

May 28, 1999

The Honorable John T. Doolittle
Chairman, Subcommittee on Water and Power
Committee on Resources
House of Representatives

Dear Mr. Chairman:

This report responds to your July 22, 1998, request regarding legislation that would authorize the construction of and funding for the Lewis and Clark Rural Water Project. The purpose of the proposed project is to provide a water supply for cities and rural areas in southeastern South Dakota, northwestern Iowa, and southwestern Minnesota to address the dual problems of inadequate quantities of water and poor quality of water. The cost of the project is estimated to be $282.9 million (in 1993 dollars). While a specific estimate of the project's costs was developed, no definitive estimate of the value of its benefits was developed. As a result, you requested that we conduct an economic evaluation focusing on the direct economic benefits that could come from constructing such a system. The focus of the evaluation was to determine the relative benefits to local water users, cities and communities, the respective states, and the federal government. You expressed interest in using this information to provide guidance on allocating the respective cost shares for the participants. To determine the relative benefits, we obtained information on the following questions: (1) What benefits could derive from the Lewis and Clark project? (2) Who could receive these benefits? (3) How are these benefits valued?

Results in Brief

The potential benefits from the Lewis and Clark project generally fall into three categories: (1) societal benefits, such as the improved health, safety, and lifestyle of residents; (2) economic benefits, such as an increase in the value of the national or regional goods and services produced because of the project (for example, increases in hog production); and (3) fiscal benefits, such as higher tax revenues because of increased economic activity or increases in the value of taxed properties.

Local water users such as households and businesses would be the major beneficiaries of the Lewis and Clark project. They would benefit from lower water-related expenditures and costs as well as higher income because of increases in local economic activity and transfers of economic

activity into the Lewis and Clark service area from outside the region. These transfers could include moving slaughterhouses or food processing plants from other states or counties. Concerning fiscal benefits, local and state governments would be the principal recipients of any net increases in sales and income tax revenues that would result from increases in economic activity. Counties and school districts could benefit if there were increases in property taxes. Conversely, the federal government would realize little fiscal benefit from the Lewis and Clark project. However, the federal government could realize nonfinancial benefits by making progress toward the objectives of improving the lifestyle of rural residents, investing in the development of the infrastructure of rural America, and ensuring compliance with federal drinking water standards.

The benefits from municipal and industrial water projects are difficult to value. Specifically, societal benefits cannot be monetarily measured with reasonable accuracy. Economic benefits are difficult to measure because of the difficulty in attributing increases in economic activity directly to changes in the quantity and quality of water. At the national level, there would be little change in net economic activity, but transfers of economic activity into the Lewis and Clark service area could result in increased regional economic activity. For a given water district, the cost of its reasonable alternative to constructing a particular water project, such as drilling additional water wells or replacing a water treatment plant, can produce an approximation of the value of the project's economic benefits so long as the alternative yields the same quantity and quality of water. For the water districts that would be served by the Lewis and Clark project, we estimated that the sum of the alternative costs that would be avoided if the Lewis and Clark project was built to be between about $71 million and $81 million in 1998 dollars. These figures should be considered the minimum value of the economic benefits to the area served because few of the alternatives would produce the same quality of water as the Lewis and Clark project and because two of the water districts in the area that have reasonable alternatives to the project did not estimate the cost of their alternatives.

Background

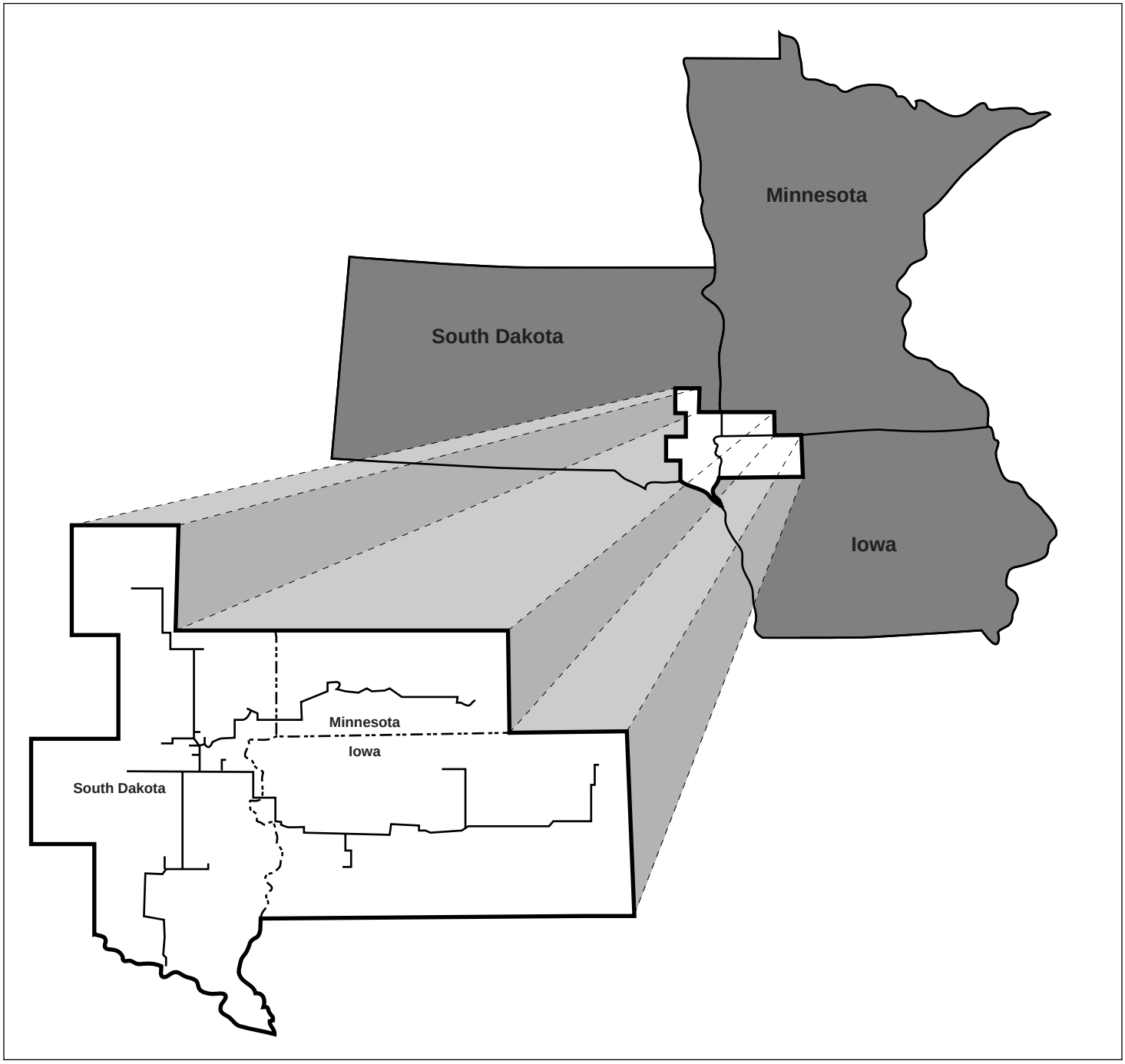
The 300,000 people in 14 counties near the junction of South Dakota, Iowa, and Minnesota use groundwater as their principal municipal and industrial water source. The 100,000 urban residents of Sioux Falls, the largest city in the area, obtain water from the city's municipal water system, while rural residents of the area obtain water primarily from smaller rural water districts. A number of rural residents obtain their own water from private

wells. Good-quality water, however, is in short supply in this area. Shallow aquifers, a major source of water in the area, often hold insufficient quantities of water for expanding populations and economic activity, and quantities can be limited during times of drought. Also, the groundwater commonly obtained from these shallow aquifers is vulnerable to contamination from nitrates and pesticides from the intense agriculture that is the main economic activity of the area. Groundwater is often plentiful in deeper aquifers, but it is highly mineralized and, thus, requires expensive treatment.

Because of the insufficient quantities of good-quality water, 22 water districts within the area in 1990 formed what became known as the Lewis and Clark Rural Water System. The Congress provided funding to the water system for a feasibility study to identify alternative sources of drinking water. This water is not intended to be used for irrigation but would be used for drinking and for other domestic activities such as laundry, fire fighting, and lawn watering. Engineering firms under contract with the Lewis and Clark Rural Water System recommended the diversion of up to 23.5 million gallons daily of Missouri River water to be treated and dispersed through an extensive pipeline system in the tristate area. This diversion project became known as the Lewis and Clark project.

The proposed Lewis and Clark project will consist of a diversion system, water treatment plant, and distribution system that will account for about $231.5 million (or 82 percent) of the project's expenditures. The recommended diversion system consists of a series of wells that will pump water through gravel and sand adjacent to and beneath the Missouri River near Vermillion, South Dakota. A nearby plant will treat this water. A distribution system consisting of about 400 miles of pipeline, five ground storage reservoirs, and nine pump stations will then deliver water to serve connection facilities within each of the 22 member districts (see fig. 1). Engineering costs will amount to about $25.4 million (9 percent) of the project's expenditures, while legal costs, administrative costs, easements, and land acquisitions will total about $13.9 million (5 percent). The remaining $12.1 million (4 percent) will consist of environmental expenditures: $2 million (in 1993 dollars) will be spent to mitigate environmental damage caused by the construction of Lewis and Clark, and another $10.1 million (in 1993 dollars) is suggested for environmental enhancements of wetlands.

Figure 1: Map of the Proposed Lewis and Clark Rural Water Project



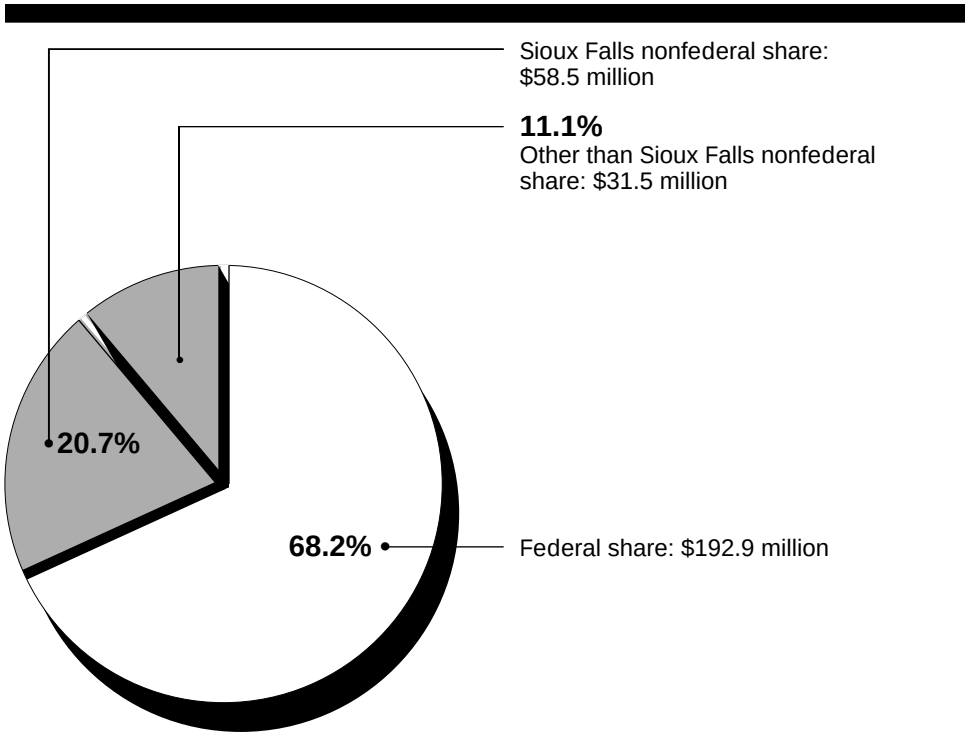
As we reported in May 1998, the construction of the proposed Lewis and Clark project does not qualify for federal funding–through either outright grants or repayable loans–under any of the established federal water programs.[1] For example, the inclusion of Sioux Falls' 100,000 residents in the Lewis and Clark project excludes outright grants from the U.S. Department of Agriculture because the Department does not fund water projects in communities with populations exceeding 10,000. Although the Bureau of Reclamation and the Environmental Protection Agency provide repayable loans to fund 100 percent and 80 percent, respectively, of water projects, an ability-to-pay study found that the water districts in the Lewis and Clark service area would be unable to repay these loans because the cost would exceed their resources.

Consequently, the Lewis and Clark project's sponsors are requesting legislation that would authorize a federal grant to cover construction. The proposed legislation provides a formula for the federal and nonfederal sharing of the costs of this construction. With the exception of the city of Sioux Falls, the federal government would fund 80 percent of the project's planning and construction costs, and nonfederal interests would fund the remaining 20 percent. For the city of Sioux Falls, the federal government and nonfederal interests would each provide 50 percent "of the incremental cost to the city of participation in the project."

"Incremental cost" is not defined in the proposed legislation, and there is more than one way to interpret those words. For purposes of this report, we read the "incremental cost" that would be subject to 50/50 federal funding to be Sioux Falls' proportionate share of the project's capital costs based on its water demand as cited in the project's feasibility study. This proportionate share is 42.6 percent of the $282.9 million project's total cost less a small amount (about $8.5 million), which we interpret the federal government would pay for environmental enhancements. Hence, we estimate cost shares as follows: the federal government would be responsible for $192.9 million; Sioux Falls' nonfederal cost share would be $58.5 million; and the other than Sioux Falls' nonfederal cost share would be $31.5 million. These amounts represent 68.2, 20.7, and 11.1 percent, respectively, as displayed in figure 2.

[1]See Rural Water Projects: Federal Assistance Criteria (GAO/RCED-98-204R, May 29, 1998).

Figure 2: Allocation Among the Participants of the Lewis and Clark Project's Costs (in 1993 Dollars)



The Bureau of Reclamation concurred that our interpretation of incremental costs is reasonable but pointed out that other interpretations may exist. According to the Executive Director of the Lewis and Clark Rural Water System, for example, the project's sponsors interpret the wording in the proposed legislation,"incremental cost to the city of participation in the project," as the amount of savings if Sioux Falls was dropped from the project. That is, the sponsors equate incremental cost to an estimated savings from downsizing the pipelines, treatment plant, and wells to account for water that no longer would be delivered to Sioux Falls. According to the Executive Director, the same engineering firm that designed the Lewis and Clark project estimated that this savings would be $55.2 million, and the nonfederal cost share for Sioux Falls would be 50 percent of this amount, or $27.6 million.

Although the Bureau of Reclamation provided technical assistance and oversight to the Lewis and Clark project, the project was never advanced

for authorization by the Bureau and does not meet the Bureau's funding criterion of having water users repay 100 percent of the costs of projects. Hence, the Bureau opposes the use of its appropriations to fund the construction of the Lewis and Clark project. Although the Bureau did not conduct a cost-benefit study, as it would for a Bureau-sponsored project, the Bureau did conduct studies, at the request of the project's sponsors, to determine the willingness and ability of the water users to pay the additional costs for water from the project. Willingness-to-pay is regarded by economists as one alternative method for estimating the economic benefits from these types of projects.

Nature of the Benefits of the Lewis and Clark Rural Water Project

The benefits associated with a rural municipal and industrial water project such as the Lewis and Clark project are a result of increases in both the quantity and quality of water. These benefits can generally be categorized as (1) societal benefits, (2) economic benefits, and (3) fiscal benefits. The societal benefits include improvements in the health, safety, and lifestyle of residents served by the project. Health improvements could result from the Lewis and Clark project because of the improved quality of the water. For example, the Environmental Protection Agency's research reveals that a reduction in sulfate concentration in a community's drinking water could result in fewer gastrointestinal illnesses and reductions in nitrate concentrations in drinking water could result in fewer infants being at risk of serious illness or death. The project could improve safety in the region by making more water available for fighting fires in the smaller communities. Lifestyle improvements could result from more water being available for landscaping or from a better quality of water being available for drinking, bathing, and washing clothes. The societal benefits also include contributing to the federal government's efforts to pursue its goal of furthering economic development in rural America.

The economic benefits are increases in the economic value of the national or regional output of the goods and services produced as a result of increases in the quantity or quality of water. The Lewis and Clark project could have an impact on hog and cattle production, milk production, and other agricultural products made from soybeans, corn, and eggs that are processed by local plants. For example, farmers have reported increased weight gains in hogs when rural areas have switched to water having lower sulfates and hardness. Similarly, dairy farmers have attributed increased milk yields to better quality water. Although the water from the Lewis and Clark project will not be used for irrigation, community officials stated that an increased availability of water could provide opportunities

for economic development of industries whose processes require large amounts of water, such as ethanol plants and food processing plants, in the Lewis and Clark service area. In addition, the improved quality of the water would increase the longevity of water heaters, water softeners, and other appliances by reducing mineral deposits and thereby saving residents repair and replacement costs.

The fiscal benefits are net increases in government revenues that result from an increase in economic activity. Proposed construction projects such as the Lewis and Clark project would have an impact on fiscal revenues. Should the Lewis and Clark project be built, increased sales tax revenues could result from an increase in economic activity, and increased income tax revenues could result from the higher earnings associated with this economic growth, particularly in the agricultural sector. Increases in the quantity and quality of water could lead to increases in property values, which in turn could increase property tax revenues. However, the net fiscal benefit to the various levels of government would depend also on the impact of the project on various government expenditures, including increases in infrastructure spending or increases in government outlays to meet increased demands for government services.

Beneficiaries of the Lewis and Clark Rural Water Project

The local water users, such as households and businesses, would receive most of the benefits from the Lewis and Clark project. Thus, the project's 22 member districts would not benefit directly because, as nonprofit water providers, they function as their customers' agents in obtaining water and deliver water to users at or near cost. The benefits accruing to local water users could include (1) higher personal income resulting from the increase in economic activity; (2) decreased costs for replacing water heaters, maintaining water softeners, and servicing other appliances; and (3) societal benefits, such as improved health and lifestyles.

State and local governments would benefit primarily from the increases in tax revenues resulting from an anticipated increase in the production and sales of goods and services. State and local governments could also benefit from increased sales and income taxes generated from the construction activities of the Lewis and Clark project. County governments and school districts could be the beneficiaries of increased property tax revenues.

The federal government would realize only minimal financial benefits from the Lewis and Clark project. Increases in federal income tax revenues resulting from increased economic activity attributable to the project

would likely be minimal. However, the project would benefit the federal government to the extent that it will be a means of achieving such objectives as meeting federal drinking water standards, improving the quality of rural life, and investing in the infrastructure of rural America.

How Benefits From the Lewis and Clark Rural Water Project Are Valued

The societal benefits, such as meeting federal drinking water standards, improvements in health and lifestyle, and investing in the development of the infrastructure of rural America, cannot be measured monetarily with reasonable accuracy. For example, water experts we interviewed stated that improved public health is a major benefit, but the benefit is difficult to measure. Improvements in health were also cited by district representatives as a major benefit of the Lewis and Clark project. However, neither the reduction in illnesses nor the subsequent reduction in health care costs that might be attributable to better quality water can be valued with precision.

Similarly, it is not possible to accurately assign a monetary value to an improved lifestyle attributed to better-tasting water. However, the Congress has recognized the long-standing need to improve the quality of water in rural America. For example, the Rural Utility Service, through its water and wastewater loan and grant program, has helped fund almost 17,000 water and sewer projects serving more than 12,500 rural communities in the last 30 years. Also, the objective of the Environmental Protection Agency's Drinking Water State Revolving Loan Fund program is to ensure that the nation's drinking water supplies remain safe and affordable.[2]

The economic benefits of water projects such as the Lewis and Clark project are, for the most part, difficult to quantify because of the difficulty in attributing with any precision an increase in economic activity directly to an increase in water. Water is rarely the sole factor responsible for economic change, but water can facilitate economic expansion. For example, hog farmers are unlikely to decide to raise more hogs based solely on the availability of better quality water. Instead, they are also likely to consider the cost of feed, the amount of available space in their

[2]The Safe Drinking Water Act Amendments of 1996 (P.L. 104-182, sec. 130) authorized a Drinking Water State Revolving Loan Fund to help public water systems finance the infrastructure needed to achieve or maintain compliance with the act's requirements and to promote public health protection objectives. Section 1452 authorizes the Administrator of the Environmental Protection Agency to make grants to states to capitalize drinking water state revolving loan funds, which in turn can provide low-cost loans and other types of assistance to eligible water systems.

sheds, and the market demand as reflected in the price paid for their product by slaughterhouses.

Despite the difficulty of measuring the economic benefits, increases in the value of the output of goods and services resulting from the Lewis and Clark project can be viewed from either the national or regional perspective. Although both perspectives are measures of changes in the value of goods and services produced, the regional benefits could be significantly different from the national benefits because regional benefits capture the transfer of economic activity into the project's service area from outside the region. Regional transfers will result in no net national benefits.

At the national level, we believe the increases in the value of goods and services due to the Lewis and Clark project would be minimal. Increases in the output of goods and services do not necessarily result in an increase in their value. For example, hog production, one of the major industries in the tristate area, was initially expected to increase locally because of the anticipated improvements in the quantity and quality of water. However, production exceeded the demand of slaughterhouses in 1998, resulting in plummeting prices. The hog price in December 1998 was $14.70 per 100 pounds, down from an average price of $52.90 in 1997. Additional production would probably only lower prices further and would not necessarily increase the total value of hog production nationally. Because of this decline in hog prices, smaller family farms are selling hogs at a loss. Similarly, the December 1998 beef cattle price of $55.80 per 100 pounds was down from an average price of $63.10 in 1997, resulting in lower incomes.

From the regional perspective, however, the economic benefits of water projects are greater. The regional benefits reflect not only the increase in value of the goods and services produced in the region but also the regional economy's gain from transfers of industries into the area. For example, local planners expect that on completion of the Lewis and Clark project, food processing and ethanol plants may relocate to their region.

Because of the difficulty of identifying and directly attributing changes in economic activity to the quantity and quality of water, analysts have developed other methods that, for the most part, can approximate the value of benefits accruing from a water project. One method, called a willingness-to-pay study, surveys water users and asks them how much they are willing to pay for an increase in the quality and quantity of their

water. The Bureau of Reclamation analyzed a survey conducted by the Lewis and Clark project's sponsors in 1992 and estimated that residents in the project's service area were only willing to pay an additional $3.34 million per year to ensure a safe and reliable future water supply. Over the 40-year life expectancy of the Lewis and Clark project, this amounts to about $87 million in 1998 dollars.[3] As a result, the Bureau concluded that from a purely economic standpoint, the Lewis and Clark project does not pay for itself since the cost of the proposed project is $282.9 million. However, if the project is required to meet future water quality standards or solve reliability problems that must be dealt with regardless of cost, the Bureau concluded that the Lewis and Clark project may be the most cost-effective way to reach such goals. Moreover, economists that we contacted said that figures reported by respondents in willingness-to-pay studies may underestimate total benefits because respondents may fear that their water bills would be increased by the amounts they report.

Another method used by economists in estimating the value of a water project's benefits is estimating the cost of reasonable alternatives that would be avoided if the project is built. In other words, how much the beneficiaries are willing to pay for an alternative water system provides an estimate of the value they would place on the benefits they expect to receive from the increase in the quality and quantity of their water. At the water district level, this cost represents the value of the project's benefits to all water users in the district, including households, farms, and businesses. This method can approximate the value of benefits if the alternative will produce the same quantity and quality of water as the proposed project.

To that end, we asked the 22 individual water districts to identify and estimate the cost of reasonable alternatives that would be avoided if the Lewis and Clark project is built. Reasonable alternatives for the water districts in the project's service area include drilling additional wells, modifying or building treatment plants, and purchasing water from other water districts. A summary of these alternatives and their individual costs appears in appendix I.

We estimate that the sum of these alternative costs for Lewis and Clark members ranges between about $71 million and $81 million in 1998 dollars. However, these figures should be considered minimum values because many alternatives would not produce the same quality of water as

[3]Discounted at 3 percent.

the Lewis and Clark project and because two districts did not estimate the cost of their alternatives. In addition, only 5 of 16 alternatives that would require large capital investments were based on detailed written cost estimates or engineering studies, so several of the verbal estimates we obtained may lack accuracy. It should be noted that for many of the districts, the proportionate nonfederal share of the Lewis and Clark project adjusted to 1998 dollars would be less than the cost of their reasonable alternatives because the federal government would assume most of the costs. A notable exception is the Sioux Falls component whose nonfederal proportionate share of about $64 million (in 1998 dollars) is more than double the cost of its alternative (in 1998 dollars).

The net fiscal benefits attributable to the Lewis and Clark project would depend largely on changes in the economic activity in the region as well as on changes in the governments' outlays for services and infrastructure. The Bureau of Reclamation estimated the tax revenue increases expected from the construction activities of the Lewis and Clark project to be about $16.5 million in 1992 dollars. Its estimate included the excise, fuel, sales, and income taxes expected to be collected by South Dakota, Iowa, and Minnesota from the contractors and laborers. However, the estimate did not include increases in tax revenues anticipated from an increase in regional economic activity.

Agency Comments

We provided a copy of a draft of this report to the Lewis and Clark project's representatives and the Bureau of Reclamation for their review and comments. We met with Bureau officials, including the Manager of the Bureau's Dakotas Area Office. In general, the Bureau agreed with the findings in our report but clarified certain issues involving its participation in the Lewis and Clark project. For example, the Bureau stressed that it does not advocate any specific interpretation of the "incremental cost to the city of Sioux Falls" for allocating the project's construction costs and emphasized the importance of clarifying the language in the proposed legislation if the Congress decides to fund this project. The Bureau also emphasized that the project is not being advanced for authorization by the Bureau. The Bureau explained that planning studies were primarily funded from nonfederal sources and that the Congress appropriated funds into the Bureau's General Investigative Program for oversight and technical assistance to the project's sponsors. The Bureau also clarified the willingness-to-pay study, explaining that the $3.34 million cited in the study represents an annual amount that households are willing to pay, not a total over the life of the project. Hence, the annual amounts over the

40-year life of the project, according to Bureau representatives, should be discounted to present value and summed. We revised the report in response to these comments and made other minor technical corrections as appropriate.

The Director of the Lewis and Clark Rural Water System commented on behalf of the water system. The Director disagreed with our interpretation of the "incremental cost to the city of Sioux Falls" being based on water usage. Instead, the Director interprets Sioux Falls' incremental cost to be the difference between the cost of the project built with a water supply for Sioux Falls and the cost of the project built without Sioux Falls. The Director also wrote that by mentioning lawn watering, car washing, and fire fighting, our representation of societal benefits "trivializes" the need for a safe and reliable drinking water source. The Director also disagreed that the Lewis and Clark project could result in higher personal incomes or in the transfer of economic activity into the Lewis and Clark service area from other areas. This report presents both our interpretation of Sioux Falls' cost share and the Lewis and Clark Water System's interpretation. With regard to the comments on how the water would be used and changes in personal income, the report includes analysis to support our findings, and we made no changes to the report. The Director's comments and our responses appear in appendix II.

We performed our review from August 1998 through April 1999 in accordance with generally accepted government auditing standards. Our scope and methodology are discussed in appendix III.

We will provide copies of this report to the member districts of the Lewis and Clark project. We will also make copies available to others on request. If you or your staff have any questions, please call me at (202) 512-3841. Major contributors to this report are listed in appendix IV.

Sincerely yours,

Susan D. Kladiva
Associate Director, Energy,
Resources, and Science Issues

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Alternatives Avoided by the Lewis and Clark Project

In determining the cost of reasonable alternatives to the Lewis and Clark project, we contacted representatives of the 22 member water districts and asked what courses of action they would take if the Lewis and Clark project is not built. Specifically, we asked them how they would obtain the same amount and quality of water to which they had committed from the Lewis and Clark project. We requested that their responses be alternatives that would be economically feasible and, hence, likely to be implemented.

Representatives of the water districts reported that they would drill additional wells, update or build treatment plants, obtain water from nearby water districts, or engage in a combination of these alternatives. Thirteen districts had plans that involved drilling additional water wells. Seven said their plans included building or updating treatment plants, and five had investigated obtaining water from nearby districts.[4] One district reported that its only alternative would be to adopt stringent water conservation, while two districts said they had no alternatives to the Lewis and Clark project. To determine the cost of these alternatives, we asked representatives for their written estimates and supporting documentation, including cost proposals and engineering studies. Sixteen of the 22 member districts reported alternatives involving significant capital expansions, such as drilling more wells, updating treatment plants, or building extensive water lines. Only 5 of these 16 districts had detailed written cost estimates. Eight of the 16 member districts reported rough estimates of their costs, one gave us information that we could use to estimate its alternative cost (because it was comparable to other members' alternatives), and 2 of the 16 member districts could not supply enough information to estimate the cost of their alternatives.

For members that provided cost estimates, we interviewed representatives to ensure that all reasonable costs were included. Based on a recommendation from the engineering firm that designed the Lewis and Clark project, we assumed the life expectancy of the project to be 40 years, so we took steps to ensure that all member districts' alternatives would also last 40 years. Engineers suggested that piping, treatment plants, and pumphouses should last at least 40 years, but that shallow wells that tap surficial aquifers would not be expected to last this long. Because such wells often experience plugging from iron and manganese in the groundwater, their flow rates often diminish in time until they reach a point at which it is no longer practicable to operate them. An engineer working on the design of the Lewis and Clark project suggested that such wells would need to be replaced after 20 years, so we included additional

[4]The numbers in this example exceed 22 because some districts have a combination of alternatives.

costs for the replacement of these shallow wells. We assumed that replacement wells would be drilled in 20 years and then discounted their cost using a real interest rate that we assumed would be 3 percent. We did not modify cost estimates of deeper wells, such as those drilled in the Dakota Formation, because district representatives reported longer life expectancies for these wells.

All member districts that reported purchasing water from nearby water districts as an alternative to the Lewis and Clark project gave us price quotes for this water expressed in dollars per 1,000 gallons. To ensure comparability with the Lewis and Clark project, we assumed that such arrangements would last 40 years. Because of future uncertainties, we did not assume any changes in the price of this water over time. To calculate the value of the water, we assumed that water would be paid for monthly for 40 years and discounted these payments using a real interest rate that we assumed would be 3 percent.

We note that the quality and quantity of water that would be supplied by the alternatives would not necessarily be exactly comparable to that supplied by the Lewis and Clark project. For example, the Missouri River water supplied by the project should be of better quality than that obtained from shallow aquifers; in most instances, Missouri River water is lower in iron, manganese, sulfates, total dissolved solids, and hardness. The high cost of treatment often prohibits bringing the quality of groundwater up to that of Missouri River water. This river water is also less susceptible to surface contamination from nitrates and pesticides than water obtained from shallow aquifers. Some member districts' representatives reported that a single chemical spill or infiltration of agricultural wastes could shut down their entire wellfields. Of course, disaster scenarios involving contamination of Missouri River water are also conceivable. Also, the Lewis and Clark project would not be as susceptible to drought as the shallow aquifers in the tristate area are. Lastly, some of the studies of alternatives that recommended drilling additional wells did not contain sufficient geological information to guarantee that adequate groundwater would be present at the recommended locations of their wellfields. These reports suggested drilling test wells to determine the quantity of water in the underlying aquifers.

Each member district's alternative is summarized in table I.1. Because of the poorer quality of water that would be supplied by alternatives to the Lewis and Clark project and because two member districts that had

alternatives did not estimate their costs, the costs of these alternatives should be considered as a surrogate for the minimum benefit of the Lewis and Clark project. This minimum benefit ranges between about $71 million and $81 million.

Table I.1: Member Districts' Alternatives to the Lewis and Clark Rural Water Project Compared With the Project's Commitments

Member district	Average daily water use (gallons)	Lewis and Clark commitment (gallons/day)	Nonfederal proportionate share of Lewis and Clark (1998 dollars)[a]	Alternative to Lewis and Clark	Cost of alternative (1998 dollars)	Nature of cost estimate for alternative
Lincoln-Pipestone, Minnesota	3,000,000	300,000[b]	$769,000	None available	Not available	Not applicable
Rock County, Minnesota	583,000	300,000	769,000	Drill more shallow wells in Rock River Aquifer	$2,887,000	Written estimate prepared by district manager
Luverne, Minnesota	1,200,000	500,000	1,282,000	Drill additional shallow wells	388,000 to 1,388,000	Verbal estimate
Worthington, Minnesota	2,720,000	1,730,000	4,436,000	None available	Not available	Not applicable
Sheldon, Iowa	1,300,000	1,000,000	2,564,000	Drill more wells and update water lines	6,332,000 to 6,832,000	Written proposal prepared by engineering firm
Sibley, Iowa	400,000	650,000	1,667,000	Purchase additional water from Osceola Water District	2,556,000	GAO estimate based on water price supplied by district
Clay County, Iowa	750,000	1,000,000	2,564,000	Drill more wells and build joint treatment plant with Spencer, Iowa	3,102,000	Written estimate based on studies prepared by engineering firm
Rural Water District 1, Iowa	1,725,000	1,000,000	2,564,000	Drill more deep wells and upgrade treatment plant	Not estimated	Not applicable
Hull, Iowa	165,000	300,000	769,000	Join nearby district in its expansion and purchase 150,000 gallons/day	2,447,000	Written cost estimate supplied by nearby district and GAO estimate of value of water purchase
Sioux Center, Iowa	1,000,000	600,000	1,538,000	Drill wells west of town and build water line	560,000	Verbal estimate provided by city's utility department

(continued)

Member district	Average daily water use (gallons)	Lewis and Clark commitment (gallons/day)	Nonfederal proportionate share of Lewis and Clark (1998 dollars)[a]	Alternative to Lewis and Clark	Cost of alternative (1998 dollars)	Nature of cost estimate for alternative
Boyden, Iowa	55,000	100,000	256,000	Pump existing wells and eventually add new wells	Not estimated	Not applicable
Beresford, South Dakota	280,000	250,000	641,000	Replace treatment plant	2,000,000	GAO estimate based on data provided by water department
Centerville, South Dakota	200,000	220,000	564,000	Hook up to nearby rural water systems	4,412,000 to 5,012,000	Verbal estimate provided by city official
Harrisburg, South Dakota	70,000	250,000	641,000	Drill more wells, construct new treatment and softening plants	2,153,000	Verbal estimate supplied by utility department
Lennox, South Dakota	200,000	400,000	1,026,000	Drill more wells	1,021,000	Verbal estimate provided by water department
Madison, South Dakota	800,000	1,000,000	2,564,000	Build a new treatment plant	0 to 8,040,000	Detailed study prepared by engineering firm
Parker, South Dakota	150,000	490,000	1,256,000	Drill high-volume well and build water tower	278,000	Verbal estimate supplied by water department
Sioux Falls, South Dakota	15,678,000	10,000,000	64,101,000	Develop Wall Lake aquifer	30,000,000	Informal estimate by city
Tea, South Dakota	150,000	330,000	846,000	Purchase balance (180,000 gallons/day) from Lincoln Co.	2,331,000	GAO estimate based on data supplied by city
Lincoln County, South Dakota	533,000	900,000	2,308,000	Purchase shortfall (up to a maximum of 800,000 gallons/day) from Sioux Falls	2,762,000	GAO estimate based on data supplied by water district
Minnehaha, South Dakota	1,600,000	2,000,000	5,128,000	Implement stringent water conservation	Not applicable	Not applicable
South Lincoln, South Dakota	600,000	150,000	385,000	Drill three wells; build booster station, lines, and softening plant	7,650,000	Informal estimate supplied by water district
Total	**33,159,000**	**23,470,000**	**$98,638,000**	**—**	**$70,879,000 to $81,019,000**	**—**

(Table notes on next page)

[a]These proportionate shares in 1998 dollars are not equal to the proportionate shares shown in figure 1, which are in 1993 dollars.

[b]Lincoln-Pipestone has plans to increase its commitment to 1 million gallons per day.

Comments From the Lewis and Clark Rural Water System

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

LEWIS & CLARK
RURAL WATER SYSTEM, INC.
300 North Dakota Avenue, Suite 200A • Sioux Falls, SD 57104 • 605/336-8688 • Fax 605/336-8696

Pamela A. Bonrud
Executive Director

April 15, 1999

Susan Kladiva
Associate Director
Energy, Resources and Science Issues
General Accounting Office
Washington, D.C. 20548

Dear Ms. Kladiva:

Thank you for the opportunity to review and comment on the GAO's report in response to Chairman Doolittle's request regarding our authorizing legislation now pending before Congress. On behalf of the Lewis and Clark Rural Water System, I respectfully submit the following comments on the draft GAO report:

See comment 1.
Now on p. .

1. My first comment relates to the discussion of incremental cost evaluations described on page 5 of the report. Lewis and Clark strongly disagrees with your calculations of incremental cost. This is an issue that can have very different interpretations. We believe your discussion of the incremental cost issue should more accurately reflect our analysis and the full impact of incremental cost to the overall financial feasibility of the project.

   Sioux Falls' participation in Lewis and Clark affects the project's feasibility at many different levels. The removal of Sioux Falls from the system does not result in overall savings of $120 million, as your method of calculating incremental cost would imply. The total savings to the project, without Sioux Falls, are only $55.2 million. In other words, were Sioux Falls not included in the project, the overall cost would be reduced by $55.2 million, not $120 million. I am aware that GAO based its interpretation of incremental cost on figures provided by Lewis and Clark which indicate that the cost of Sioux Falls' portion of the project is $120 million. GAO did not however, consider that were Sioux Falls excluded, other costs to the system would still need to be incurred.

   The benefit of having Sioux Falls as a member of the project far outweighs the initial investment of building the system to meet the community's needs. Sioux Falls has a tremendous impact on keeping our operation and maintenance costs at a level that is affordable for the other twenty-one members of the system – approximately 75 cents per 1000 gallons of treated water. Without Sioux Falls,

those costs jump to $1.20 per 1000 gallons of treated water - a cost that can not be absorbed by many of the remaining membership.

I respectfully request that my comments be made a part of the report so that the reader can better understand how we approached the incremental cost issue and how it affects the overall cost share issue.

See comment 2.
Now on p.

2. On page 7, there is a discussion of the societal benefits that can result from the construction of Lewis and Clark. I am quite confused as to why there is a discussion relating the benefit of Lewis and Clark to lawn watering, washing cars, fire fighting, and washing clothes. These comments trivialize the need for Lewis and Clark in the tri-state area. Lewis and Clark is not being built to help us grow better lawns or to wash our cars. Nor is it entirely correct to say that there will be more water available for fire fighting. Our purpose in approaching Congress for assistance in building Lewis and Clark is so we can have a safe and dependable drinking water supply for our present and future needs. We have water supplies that have difficulties in meeting primary and secondary federal drinking water standards. For some of our smaller members, we will be their only source of drinking water.

We have been very conscientious in presenting the need for Lewis and Clark based on good water resource management – i.e., we are not wasting the resources we have, artificially creating a need for Lewis and Clark. This translates into very strict lawn watering restrictions by our membership and some of the lowest per capita water usage rates in the nation. We have gone so far as to include water conservation language as a part of our federal authorizing legislation. No where in GAO's report is that acknowledged. Describing societal benefits that do not accurately reflect the true need for Lewis and Clark does this project a disservice. I request that those statements be deleted from the final document.

See comment 3.
Now on p. _.

3. On page 9, GAO concludes that there will be an increase in personal income as a result of building Lewis and Clark. I recommend removal of reference to the Lewis and Clark project causing an increase in personal income, due to lack of solid and specific data offered to support that conclusion.

See comment 4.
Now on p. .

4. Page 10, GAO discusses economic benefits to the region resulting from Lewis and Clark. I am concerned with GAO's assertion that there will be a transfer of benefits from one region of the country to the tri-state area because of Lewis and Clark. We strongly disagree with GAO's assertion that other industries will relocate their sites of operation from another region to the tri-state area due to Lewis and Clark.

The availability of water from Lewis and Clark will not provide any guarantees in an economic sense. It will, however, make this region more competitive developing new business opportunities. The availability of water alone will not be the sole deciding factor for a business to locate in one area versus another. Many different factors influence that decision. However, the availability of good quality drinking water can assist us in marketing this area to future businesses. I wish to be clear

that it is not our intention or anyone else's in the area, to lure businesses away from other regions. If GAO has information or analysis that supports the assertion that businesses would relocate from other areas as a result of Lewis and Clark, it should be included. We suspect, however, that GAO was referring to new businesses locating in our area due to Lewis and Clark.

It is also important to note that some members of Lewis and Clark need water to maintain the industry they do have. Without Lewis and Clark, they risk losing jobs and good employers. Retaining the economic base that exists now is just as important to us as the potential to attract new business opportunities. We believe that this issue needs to be highlighted as well.

In closing, on behalf of the Lewis and Clark Board of Directors, I want to express our appreciation to GAO in working with us throughout this process. Rudy Payan and Ron Belak were easy to work with and very cooperative in their dealings with the project membership. Everyone who was contacted by Ron or Rudy spoke very highly of their professional demeanor and their willingness to explain the report process to them.

Again, thank you for the opportunity to review and comment on this draft report. We greatly appreciate having input into the report before it is published for public use. Please do not hesitate to contact me if you have any questions about our comments.

Sincerely,

Pamela A. Bonrud

Pamela A. Bonrud
Executive Director

Enclosure

The following are GAO's comments on the Lewis and Clark Rural Water System's letter dated April 15, 1999.

GAO's Comments

1. H.R. 297 and S. 244, which would authorize the construction of the Lewis and Clark project, contain budget and financing terms for the project. These terms refer to the project's feasibility study for clarification. With regards to the allocation of construction costs among participating water districts, the feasibility study allocates construction costs according to each member's proportionate share of water use. For example, Sioux Falls is estimated to use 42.6 percent of the average daily water, so the Sioux Falls component is allocated 42.6 percent of the construction costs, or about $120.5 million of the total $282.9 million construction budget. The feasibility study does not make reference to allocating costs based on a definition of incremental cost that involves the difference between constructing the project with a Sioux Falls component and constructing the project without a Sioux Falls component. Since we discussed both approaches in the draft report, we did not revise the report in response to this comment.

2. Our intent was not to trivialize the need for Lewis and Clark by citing lawn watering, car washing, clothes laundering, or fire fighting, but rather to provide a thorough discussion of the benefits of the proposed system. We believe all of these to be important activities, although not as important in sustaining life as the consumption of water, which we also discuss in this report. Nevertheless, human consumption of water only accounts for a small percentage of actual domestic water use. In addition, representatives from the city of Sheldon, Iowa, stressed that they need access to additional quantities of water for fire prevention—a critical safety issue for any community. H.R. 297 and S. 244 do indeed make funding for the Lewis and Clark project dependent on the development and implementation of a water conservation program, and it is also important to note that representatives of several water districts stressed their communities' watering restrictions during conversations with us. Therefore, we did not revise the report in response to this comment.

3. Personal incomes may rise because of an increase in economic activity associated with water projects in two ways. First, building the Lewis and Clark project would generate construction jobs. Second, representatives from Lewis and Clark's member districts reported that water from the project is needed to attract additional businesses. Because the project is expected to increase economic activity in the region and we expect that

the value added will remain in the region, we concluded that regional income will increase. We did not revise the report in response to this comment.

4. We agree with the Director's statement that the availability of water is not the sole factor considered by a business in deciding whether to locate in a region. In fact, our report addresses this point. However, if everything else is the same between regions, the quality and quantity of a regional water supply will give any region a competitive advantage in attracting industries, especially water-intensive industries. Representatives from Lewis and Clark also agreed that the project should attract businesses to the region. Even though the purpose of the project is not to lure businesses to the Lewis and Clark service area from other regions, new businesses may choose to locate in the Lewis and Clark service area because of the better quality of the water. However, the net national benefit would still be minimal. Therefore, we did not revise the report in response to this comment.

Scope and Methodology

To determine the nature of the benefits that would accrue from the Lewis and Clark project and to identify its beneficiaries, we obtained documents on the economy of the tristate area and interviewed Lewis and Clark project officials and business leaders in the area. We also interviewed water experts in government, academia, and industry and reviewed relevant publications on the benefits of water projects, including the "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies" published by the U.S. Water Resources Council. We gathered information on how water is currently used, limitations to its use, and how water will be used if the project is constructed. We reviewed information on the populations, incomes, businesses, and industries within the 14 counties and 3 states of the area to be served by the Lewis and Clark project. We also reviewed publications on groundwater resources of the tristate area published by the U.S. Geological Survey, the Minnesota Department of Natural Resources, the South Dakota Geological Survey, and the Iowa Department of Natural Resources.

To determine how the benefits of a municipal and industrial water project are valued, we reviewed economic literature, studies by the Bureau of Reclamation, and the guidelines of the U.S. Water Resources Council. When available, we obtained and examined written cost estimates and engineering studies on alternatives to constructing the Lewis and Clark project. We interviewed representatives, including public officials, engineers, and water superintendents, of all 22 member districts and made site visits to 17 of these districts to clarify cost data, tour well fields, examine treatment plants, and observe agribusiness. We also consulted with Banner and Associates, the principal engineering firm involved in the design of the Lewis and Clark project, for information on the life expectancy of water wells, treatment plants, pipelines, and hardware. We tabulated cost estimates and compared costs among the 22 districts to ensure that they were reasonable and in certain instances adjusted costs upwards to reflect the longer life expectancy of the Lewis and Clark project. Representatives of the member water districts told us that the alternatives cited are likely to be implemented if the Lewis and Clark project is not built. More specific information on our methodology for calculating cost alternatives is in appendix I.

Major Contributors to This Report

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