# COLORADO RIVER BASIN SALINITY CONTROL PROGRAM

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# REPORT TO CONGRESS ON THE BUREAU OF RECLAMATION BASINWIDE PROGRAM

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**Submitted Pursuant to**
**Public Law 104-20**
**An Act to Amend the Colorado River Basin Salinity Control Act of 1974**

**United States Department of the Interior**
**Bureau of Reclamation**
**February 1996**

**MISSION STATEMENTS**

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering wise use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. Administration.

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The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

**COLORADO RIVER BASIN**
**SALINITY CONTROL**
**PROGRAM**

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# SUMMARY

This report is submitted pursuant to Public Law (P.L.) 104-20 of July 28, 1995, an act to amend the Colorado River Basin Salinity Control Act (Act) of 1974. This amendment requires the Secretary of the Interior to submit a planning report to the appropriate committees of Congress concerning the new, basinwide approach to salinity control established by section 202(a)(6) of the Act.

The Bureau of Reclamation (Reclamation) is committed to pursuing efficient new methods of controlling salinity. In a review of the Colorado River Basin Salinity Control Program (Audit Report No. 93-I-810 dated March 1993), the Inspector General found that the unit-specific authorities provided by earlier legislation (P.L. 93-320 and P.L. 98-569) limited the opportunities for Reclamation to implement cost-effective salinity control.

The Inspector General recommended Reclamation seek legislation to broaden its authorities to allow more alternatives to be added to the mix of projects eligible for implementation. Reclamation accepted the recommendation and thoroughly reevaluated its role in the salinity control program in 1994. Later in 1994, Reclamation and the Colorado River Basin States (Wyoming, Utah, Colorado, California, Nevada, New Mexico, Arizona) developed legislation to implement the Inspector General's recommendations. This legislation was enacted and signed into law on July 28, 1995. Pursuant to P.L. 104-20, this report summarizes Reclamation's plans for implementing its new basinwide salinity control program.

As an alternative to adopting new regulations, Reclamation plans to administer the program through existing procurement techniques and established regulations. Reclamation will solicit proposals and award funding through a "Request for Proposals" (RFP) process. An example RFP is attached to this report.

Essentially, the RFP would request proposals from the public and private sector that would control salinity. The proposals would be ranked, based on their cost to prevent salt from entering the river system. The ranking would also consider risk factors that might affect the project's performance.

Cost effectiveness will be computed on a cost-per-ton basis and include all potential costs to the program. Risk factors will evaluate performance risks to the program and be used to adjust the ranking of projects.

The proposals will be ranked by a ranking committee. Members of the committee will be selected to avoid any conflict of interest that would bias their choices. The ranking committee members will individually and

collectively evaluate and rank the proposals. The ranking committee representatives from the Federal Government and the Colorado River Basin States (Wyoming, Utah, Colorado, California, Nevada, New Mexico, and Arizona)..

Finally, Reclamation will attempt to negotiate the final terms of an agreement with the highest ranked proponents. This agreement may be a grant, cooperative agreement, or formal contract depending upon the circumstances and judgment of the contracting officer. Negotiations may be terminated if the final terms are not acceptable to Reclamation.

Reclamation will conduct a limited test of the ranking portion of the process and award fiscal year (FY) 1996 funds. Funding commitments under this test will be limited to available FY 1996 funds. No commitments will be made for out-year funding until the full RFP process is completed later in 1996. Small projects will be selected from alternatives ready to implement and that can be completed within the FY 1996 time frame. This test will be used to refine ranking procedures included in the RFP. As appropriate, supplemental guidance for implementing the program will be included in future RFP's or in the progress reports to Congress required by P.L. 93-320.

# COLORADO RIVER BASIN

# INTRODUCTION

The total annual salt loading to the Colorado River is about 9 million tons per year, causing problems for municipal, industrial, and agricultural water users in the Lower Colorado River Basin (Lower Basin) where salinity is the highest. About half of the present salt concentration in the river can be attributed to natural sources, while the remainder is human-induced. Human activities that increase salinity are primarily water resource development projects, which either deplete fresh water inflows or increase saline return flows or both. In their 1988 report entitled *Estimating Economic Impacts of Salinity of the Colorado River Basin*, the Milliken Chapman Research Group estimated total salinity damages in the United States portion of the Lower Basin at $311 million annually, based on the 1976-85 average level of salinity. Salinities are relatively low during this period because of dilution caused by extraordinarily high runoff in the early 1980's. Since that time, salinity has returned to more normal levels. The economic impact model developed by the research group estimates that Lower Basin damages are now approaching $1 billion per year.

Although unquantified, damages in the Republic of Mexico can be severe. Because of its location at the end of the river, salinity levels in the water entering Mexico are among the highest in the Colorado River Basin. Salinity control in the United States also improves the salinity of water entering Mexico. This benefit has not been estimated but is thought to be significant.

## LEGISLATIVE HISTORY

In June 1974, Congress enacted the Colorado River Basin Salinity Control Act (Act), Public Law (P.L.) 93-320, which directed the Secretary of the Interior (Secretary) to proceed with a program to enhance and protect the quality of water available in the Colorado River for use in the United States and the Republic of Mexico.

Title I of the Act addressed the United States' commitment to Mexico. It authorized the construction of the Yuma Desalting Plant to enable the United States to comply with its obligations under the agreement with Mexico dated August 30, 1973 (Minute No. 242 of the International Boundary and Water Commission, United States and Mexico) and the Mexican Water Treaty of February 3, 1944. The Yuma Desalting Plant is designed to control the quality of irrigation drainage which flows into the river between Imperial Dam (the last major diversion point in the United States) and Morelos Dam (Mexico's diversion point).

Title II of the Act created a salinity control program for water quality improvement in the United States. It directed the Secretary to expedite the completion of planning reports of 12 salinity control units and to proceed with construction of the Paradox Valley, Grand Valley, Crystal Geyser, and Las Vegas Wash Units.

In October 1984, the President signed Public Law 98-569, which amended the Act of 1974. It directed the Secretary of Agriculture to establish a voluntary onfarm cooperative salinity control program within the U.S. Department of Agriculture (USDA). The USDA program provided cost sharing of onfarm improvements consistent with the degree of onsite and offsite downstream benefits determined for the project area. The Federal cost shares are not to exceed 70 percent unless approved by the Secretary of Agriculture. The new authority also requires that 30 percent of the Federal cost be repaid from the Upper Colorado River Basin (Upper Basin) and Lower Basin water development funds, derived from a surcharge on the sale of hydropower generated at Bureau of Reclamation (Reclamation) dams.

For the Department of the Interior, the 1984 amendments (P.L. 98-569) modified Interior's program for salinity control in several respects. Principal among these were:

- Authorization to construct Stage I of the Lower Gunnison Basin Unit and, as part of the Dolores Project, the McElmo Creek Unit

- Deauthorization of the Crystal Geyser Unit

- Direction to the Bureau of Land Management (BLM) to develop a comprehensive program to minimize the salt contributed from BLM administered public lands

- Direction to the Secretary to give preference to alternatives that reduce salinity at the least cost per unit of salinity reduction

- Authorization for joint feasibility studies with industrial water users as part of ongoing Saline Water Use and Disposal Opportunities activities

- Authorization for the Secretary to contract with non-Federal entities to organize, construct, operate, maintain, and replace authorized salinity control facilities

- Requirement for concurrent replacement of incidental fish and wildlife values foregone as salinity control units are constructed

- Requirement to comply with procedural and substantive State water law

- Authorization for advance planning studies on Sinbad Valley

The 1984 amendments raised the level of repayment to 30 percent of the costs. The reimbursable portion of the units authorized by the 1984 amendments are to be repaid either during the year the expenditures are made or over time with interest. By comparison, 25 percent of the construction costs of units authorized by the 1974 Act are to be repaid from the basin funds over 50 years without interest.

The original Colorado River Basin Salinity Control Program authorization is now more than 20 years old, and the 1984 amendments are more than 10 years old. Authorized portions of the original salinity program are nearing completion, and Reclamation is quickly approaching the 1974 appropriation ceiling. The 1974 authorized ceiling (indexed) is approximately $301 million. Reclamation spending through fiscal year 1994 was $273 mil-lion, leaving a remaining ceiling of only approximately $28 million. Completion of ongoing contracts, construction cooperative agreements, and wildlife habitat replacement will consume the remaining construction ceiling by about 1998.

The Act of 1974 authorized significantly more construction than could be completed under the construction appropriation ceiling authorized for the program. Furthermore, the 1984 amendments authorized more work but did not authorize additional ceiling. Initially, it was thought that the McElmo Creek features would be part of the Dolores Project ceiling and that unused ceiling from the Las Vegas Wash Unit would be sufficient to fund the Lower Gunnison Basin Unit. Subsequent solicitor's opinions recommended assessing the cost of the McElmo Creek salinity features against the salinity control construction appropriation ceiling, effectively reducing the amount of construction that could be completed on the Lower Gunnison Basin Unit.

The Act directed the Secretary to give preference to those portions of the units that reduce salinity at the least cost per unit of salinity reduction. While construction of additional cost-effective portions of the authorized program was possible, insufficient ceiling remained to begin the east side lateral portion of the Lower Gunnison Basin Unit under the 1974 ceiling limits.

Reclamation has gained from its experience with the Colorado River Basin Salinity Control Program and has identified new and innovative opportunities to control salinity,

including cooperative efforts with USDA, BLM, and private interests, which are very cost effective. However, these opportunities could not be implemented under the 1974 Act or the 1984 amendments. The Inspector General's recent audit report titled *Implementation of the Colorado River Basin Salinity Control Program, Bureau of Reclamation, Report No. 93-I-810, March 1993* (IG Report), confirmed this problem. The report notes that the Act directed that "the Secretary shall give preference to . . . implementing practices which reduce salinity at the least cost per unit of salinity reduction." The IG Report concluded that Reclamation's unit-specific authorization process impedes implementing the most cost-effective measures by restricting the salinity control program to specific authorized units. For example, proposed salinity control projects in the Price-San Rafael Rivers, San Juan River, and Uinta Basin areas are all more cost effective than the McElmo Creek Unit; yet, because authorization was lacking, none of those projects have been implemented.

The IG Report recommended Reclamation seek changes in Title II of the Act to simplify the process for obtaining congressional approval of new, cost-effective salinity control projects. Specifically, the IG Report recommended a basinwide, programmatic construction authority so that the most cost-effective alternatives for salinity control can be implemented in a timely manner, similar to those provided to USDA in the 1984 amendments, wherein USDA was granted programmatic planning and construction authority.

Reclamation agreed with the IG Report and decided to explore innovative ideas that would improve the effectiveness of its program and take advantage of opportunities that were not envisioned 20 years ago. With reauthorization necessary to provide continued funding for its program, this was an appropriate time to reassess the direction of the salinity control program to incorporate technological advances and new ideas to improve the its effectiveness. Consequently, in March 1994, in the hope of strengthening the salinity control program through public involvement, Reclamation initiated a public review of the Colorado River Basin Salinity Control Program. The goals of this outreach program were to thoroughly reexamine and reassess the program and its authorities, to gather a broad range of new ideas to combine with lessons gained from past experiences, to formulate new guidelines and methodology, and to draft new salinity control legislation that would allow the salinity control program to effectively continue into the next century.

Reclamation considered three alternatives for the future of the Colorado River Salinity Control Program (specific to Title II):

- Request additional appropriation ceiling to continue the program
- Request new authorities to improve cost effectiveness
- Discontinue the program after expenditures allowed under the 1974 ceiling limitations have been made

Based on the comments received, the public, the Colorado River Basin Salinity Control Forum, and the Colorado River Basin Salinity Control Advisory Council supported

reauthorizing the program to improve cost effectiveness by providing basinwide, programmatic construction authority.
The 1995 amendments (P.L. 104-20) to the Act of 1974 authorize:

- A basinwide salinity control program that the Secretary, acting through Reclamation, shall implement. The Secretary may carry out the purposes of this paragraph directly or may make grants, enter into contracts, memoranda of agreement, commitments for grants, cooperative agreements, or advances of funds to non-Federal entities under such terms and conditions as the Secretary may require. Such a pro-gram shall consist of cost-effective measures and associated works to reduce salinity from saline springs, leaking wells, irrigation sources, industrial sources, erosion of public and private land, or other sources that the Secretary considers appropriate. This program shall provide for mitigation of incidental fish and wildlife values that are lost as a result of the measures.

- A planning report, to be submitted by the Secretary to the appropriate committees of Congress, on the program established by the Act. The Secretary may not expend funds for any implementation measure under the program established under this legislation until after 30 days, beginning on the date that the Secretary submits such report.

- In addition to the amounts previously authorized to be appropriated, $75,000,000 is authorized to be appropriated for subsection 202(a), including constructing the works described in paragraph 202(a)(6) and carrying out the measures described in such paragraph.

Reclamation proposed that appropriate procedures be developed to lend consistency and fairness to implementation of its basinwide salinity control program. Accordingly, Reclamation has developed procedures, included in this report as the "Implementation Plan." This plan, among other things, clarifies the process and general parameters within which Reclamation will consider salinity control proposals, methods of proposal evaluation, grants or other funding mechanisms for entities to participate in salinity control activities, and the nature of Federal salinity control initiatives.

# IMPLEMENTATION PLAN

## Issue Identification

The first step in developing the new format for the salinity control program was to identify the issues and problems Reclamation faced in implementing the original program. Reclamation started with the public review of the program in 1994. The comments received confirmed the Inspector General's finding that Reclamation was restricted by its unit-specific authorities and that more cost-effective alternatives could be implemented if Reclamation's authorities were broadened to allow a more flexible approach to where, how, and by whom salinity control can be implemented.

From this review, Reclamation proposed legislation to authorize a goal-oriented program for the entire basin in lieu of the site-specific authorizations provided by past legislation. The goal of this basinwide authority is to allow Reclamation greater flexibility to pursue cost-effective alternatives.

The issues identified in the public review and to be addressed in implementing the program include:

- Continue to allow federally financed projects. These are projects that may be designed and constructed by local entities but are funded directly by Reclamation, either by grant or cooperative agreement.

- Encourage non-federally financed projects. These are privately financed projects for which Reclamation would pay a fee for each ton removed, as it is removed.

- Pursue creative financing options, such as grants and construction cooperative agreements by individuals, groups, companies, State, or other Federal agencies.

- Establish fair ranking criteria and uniform determination of cost and effectiveness.

- Ensure ranking is consistent between different areas and among technologies.

- Account for ranking according to risk and uncertainties in performance (both cost and tons).

- Protect against poor operation and maintenance of capital improvements (or include as a risk factor).

- Meet environmental commitments, including wildlife replacement requirements.

## Broadening the Competitive Base

The authorities provided by the 1995 amendments (P.L. 104-20) should allow Reclamation to improve the salinity control program's effectiveness by expanding the range of salinity control alternatives into new areas and new methods.

The original program pioneered two key concepts. The salinity program was one of the first nonpoint source control programs in the country. The second pioneering concept was to employ a basinwide approach to water quality improvement. The 1974 Act authorized what were then the most likely areas for salinity control within the Colorado River Basin (Basin). However, experience has proven that unforeseen opportunities will continue to be found in the future that could improve the program's effectiveness. Reclamation needs to have the flexibility and authority to pursue these opportunities as they arise—wherever that may be in the Basin.

Within most project areas, a range of opportunities usually exist—some cost effective, others not. Experience in implementing the salinity control program has shown that canal and lateral lining can be cost effective, but it is highly variable. Differences in geology and salt loading can drastically affect costs and effectiveness. For example, more than 20 increments were evaluated in the Grand Valley Unit, of which fewer than 10 of the best were sufficiently cost effective to actually implement.

Reclamation was directed by the 1984 amendments to implement cost-effective solutions but was limited to the areas and methods specifically authorized for implementation by the 1974 Act and 1984 amendments. Within each of the authorized units, only the most cost-effective portions of each unit have been implemented; but not all of the potential alternatives were authorized by the 1974 Act or the 1984 amendments.

With the basinwide authority provided by P.L. 104-20 in the 1995 amendments, Reclamation can now, through direct competition, implement a much wider range of alternatives throughout the entire Colorado River Basin. Reclamation will no longer be limited to the five relatively small areas authorized by earlier legislation nor by the methods specified by the legislation. Broadening the methods and areas of competition should improve the effectiveness of the salinity control program.

## Development of Ranking Procedures

Until more thorough studies were completed in the early 1990's, the value of salinity control was not fully quantified. Early attempts in the 1970's roughly estimated the value at about $50 per ton, but this early estimate was acknowledged to have missed large classes of impacts. Even now, the economic impacts to the Republic of Mexico have not been quantified and,

thus, were not included in the benefit valuation. We now estimate the value of salinity control in the United States portion of the Basin at $340 per ton.

Out of necessity, early program managers had to develop a way to rank projects that accounted for this uncertainty in the benefit. Because the dollar benefits are directly related to the tons controlled, program managers ranked projects based on the cost to control a ton of salt. Thus, cost effectiveness—the cost to control a ton of salt—became the standard used by all agencies to rank the effectiveness of their projects. It was understood that although the benefits of a ton of salt removal were not precisely known at the time, they would be the same from project to project. For the most part, a ton removed from any one project in the Upper Basin has the same benefit in the Lower Basin.

Cost effectiveness can be directly related to a benefit/cost ratio where the cost is the cost to prevent each ton of salt from entering the river and the benefit is the value of each ton of salinity controlled. The current estimate for the benefit of salinity control is $340 per ton[1], while the cost of salinity control has ranged between $5 per ton and $138 per ton[2]. Reclamation's average cost has been $70 per ton. Thus, the benefit/cost ratio is nearly $5 in benefits for each dollar spent on salinity control.

Reclamation's basinwide approach to salinity control was authorized by P.L. 104-20 and will continue to use cost effectiveness (dollars per ton) as its main criteria for ranking projects and alternatives. Since actual implementation costs and effectiveness may vary significantly, sometimes to the advantage or disadvantage of the basinwide program, these risks will be considered in ranking projects.

## Ranking Process and Criteria

Reclamation's basinwide program will be administered through existing contracting techniques and regulations rather than adopting new regulations. Reclamation will solicit proposals through a formal "Request for Proposals" (RFP) process. The major advantage of the RFP process is that it allows the ranking criteria and mix of projects removing salt from the river to evolve as we continue to gain experience in implementing the basinwide program. Supplemental guidance on the program will be included in the RFP process as needed.

Proposals would be requested, ranked, and scheduled for implementation. Projects that Reclamation studied will be included in the ranking, but private alternatives based on these projects may also be submitted under the RFP process.

A preliminary schedule for the first RFP is shown on the following page in figure 1. Projects will be scheduled for implementation several years in advance so that project sponsors and cooperating agencies may adequately coordinate and fund their portion of

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[1] Based on Milliken Chapman Research Group report and model, Estimating Economic Impacts of Salinity of the Colorado River, February 1988, indexed to current dollar values.

[2] Based on total costs and tons reported by GAO, Information on Salinity Control Projects in the Colorado River Basin, GAP/RCEP-95-58, March 1995.

the project. Some projects may require Reclamation, USDA, one or more states, and local water districts to closely coordinate their activities.

The RFP's will include and require proposals to address the ranking criteria. Proposals will be ranked by a composite score in at least two main categories:

- Cost effectiveness - cost per ton of salt removal

- Performance risk factors - both cost and effectiveness in removing tons

Cost effectiveness will be computed on a cost-per-ton basis and includes all potential costs paid by the basinwide program. Cost sharing by other entities for mutual benefit is encouraged where it reduces the cost paid by the basinwide program. Cost sharing directly improves a proposal's ranking by lowering its cost and improving the project's cost effectiveness. Risk factors will evaluate monetary risks and uncertainties of the project's salt load reduction potential. In addition to these criteria, all proposals will have to fit within the budget constraints imposed by Congress and Reclamation.

The proposals will be ranked by a ranking committee. Committee members will be selected to avoid any conflict of interest that would bias their choices. The ranking committee members will individually and collectively evaluate and rank the technical proposals. The ranking committee will be made up of representatives from Reclamation and the Colorado River Basin States (Basin States) (Wyoming, Utah, Colorado, California, Nevada, New Mexico, and Arizona).

## Cost Effectiveness

Cost effectiveness (the cost to control each ton of salt) is the salinity control program's primary criteria for ranking its implementation priorities. In implementing its new basinwide program, Reclamation will adjust the ranking (not cost effectiveness) to consider a variety of risk factors. These will include the uncertainty in the project's actual performance.

Cost effectiveness is defined as the program's cost per ton of salt prevented from entering the river system or removed from the river system. Conceptually, cost effectiveness (cost per ton) is analogous to determining the cost per mile to own and operate a car. That computation combines the annual cost of loan payments with the annual operating expenses (gas, maintenance, etc.) and divides this by the miles traveled each year.

The key to understanding this approach is to appreciate that even though the Government may not necessarily borrow money to construct facilities, the program evaluates all projects as if the money is borrowed from a lending institution and repaid in annual installments. This process yields an annual cost to match the annual salt removal, or cost per ton. This economic evaluation principle is required by the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*, March 1983. It also lends consistency in the comparison of federally financed projects to non-federally financed alternatives proposed by those who must borrow funds.

**Computing Cost Effectiveness for Non-federally Financed Projects**.— Typically, the fee paid by the program per ton of salinity control is the project's cost effectiveness. If the fee per ton varies through time, the costs must be averaged (time-valued) by capitalizing the costs and then annualizing them to get a time-valued average cost. Both capitalization and annualization use the same interest rates used in all projects (currently about 8 percent). This process accounts for the time value of money. An arithmetic average of the nominal payments does not properly account for this value. For example, two projects with the same arithmetic average could have two completely different payment patterns. A proposal with high payments upfront is not as economically desirable as one that delays costs to the program. Time-valuing the privately financed proposals adjusts them to be fully comparable to the upfront funding and time-valuing of federally financed alternatives.

**Computing Cost Effectiveness for Federally Financed Projects**.— Cost effectiveness is computed in three steps by:

*Step 1*

*Annualize the One-Time Costs:* The capital costs of the project are converted to annual costs by amortizing the capital costs much like the cost of a house that is mortgaged to find the monthly payments; but in this case, the payment (or annual cost) is an annual value. The costs are amortized over the expected life of the project at the current planning interest rate (currently about 8 percent).

The costs should include all one-time capital *costs* to the program for technical assistance, education, overhead, wildlife replacement, other mitigation, design, construction, and other construction-related costs. This does not include costs paid by non-Federal entities or other Federal programs cost sharing in the improvements for their own purposes.

*Step 2*

*Adding the Annual Costs to the Annualized Costs:* This includes all costs charged to the program on an annual basis. These may include the *cost* of annual technical assistance, monitoring, education, wildlife replacement operation and maintenance (O&M), facility O&M, or payments for privatized salinity control. O&M costs should not include costs paid by non-Federal entities or other Federal programs cost sharing in the operation for their own purposes.

*Step 3*

*Dividing the Total Annual and Annualized Costs by the Average Tons Removed Per Year:* The salt load reduction is expressed as an annual value to match the annualized costs. The result is dollars per year/tons per year or dollars per ton. The salt load reduction is not the highest possible reduction expected but is an

average annual value. If fluctuations or potential shortfalls occur, these should be considered in the risk portion of the ranking process.

The objective of the program is to maintain the Colorado River Basin water quality standards. To be effective at meeting this goal, salinity control projects must be located above all three of the gauging stations used to monitor compliance with the standards. The most upstream gauge is located just below Hoover Dam on the Nevada/Arizona border.

**Cost Indexing**.—If the planned costs for proposed projects are not in current dollar values, they will need to be indexed to one consistent level (usually January 1 of the preceding year).

**Minor Replacement Costs**.—Replacement costs are those expenditures needed for hardware replacement that occur during the normal life of a project. For example, sprinkler heads need to be replaced regularly to maintain a center pivot's efficiency. In general, Reclamation does not wish to commit to pay for these types of items because of the long-term uncertainties involved with appropriating funds. This type of item should be replaced at the owner's expense (considered cost sharing). In non-federally financed projects, all of the project costs should be included in the fees paid by the Government, including all operating, maintenance, and replacement costs.

**Major Replacement Costs**.—This is the replacement cost of the entire facility. For example, a canal lining may last 50 years before it needs to be replaced. Replacement costs for these facilities need not be included if they are accounted for by amortizing over the facility's useful life. For example, if a canal is lined and has a useful life of 50 years, the project should be amortized over the project's 50-year life.

**Interest During Construction (IDC)**.—This is interest that accrues between the time funds are expended and the project comes online (begins to control salinity). Most improvements reduce salinity in about the same year they are constructed and need not consider IDC. If the proposal requires the program to pay IDC, the costs should be included in the cost-effectiveness computation.

**Cost Sharing**.—If cost sharing reduces the program's cost, then it directly improves the project's cost effectiveness (the measure of the program's effectiveness). Cost sharing by other entities reflects the value they place on the incidental benefit they may derive from the program. For example, a farmer may choose to cost share in irrigation efficiency improvements if it improves the farm's productivity. The competitive nature of the RFP ranking process should reward those willing to buy down the program's cost.

## Thresholds

Considering the magnitude of salinity control needed and the availability of staff to administer the basinwide program, review proposals, and validate the results, a minimum project size of 1,000 tons per year is recommended. The recommended minimum project duration is 10 years. These minimums may be adjusted in future RFP's as Reclamation gains experience in implementing the new basinwide program.

Reclamation's salt load reduction goals, budget, and authorized appropriation ceiling anticipate that salinity control can be implemented at an average cost to the program of $50 per ton. Future projects will be implemented on a competitive basis and it is expected that a significant reduction in salt loading can be accomplished for less than $50 per ton. Based on Reclamation's current understanding of salinity control opportunities, we believe that proposals more than $100 per ton are not likely to be very competitive.

## Performance Risks

The Salinity Control Act of 1974 directs that cost effectiveness (least cost per ton of salinity control) be a prime criteria for ranking and selecting projects. However, it is rare that the actual performance of a project can be estimated precisely. Some methods of salinity control are more variable than others in their implementation. Under certain circumstances, accepting some risk may reduce the program's costs. The ranking needs to consider that the most cost-effective proposals often have a degree of performance risk and decide whether this risk is acceptable.

Performance risk evaluation will be used to adjust the proposal ranking to consider the reliability of the cost and salt load reduction estimates used in the cost-effectiveness computations. The evaluation will include:

- **Investment security** - Upfront funding or high initial payments for projects may add to the program's exposure to cost overruns, failures, and defaults. Proposals where the program pays as salt is produced or as facilities are completed, inspected, and placed into operation greatly reduce this risk. All proponents will be required to limit (cap) the program's costs through performance bonds or other guarantees.

  Otherwise the lack of detailed plans, geological surveys, cost estimates, adequate contingencies, environmental compliance documents, detailed fish and wildlife mitigation plans, or State and local permitting, zoning, and water rights would increase the potential costs to the program and severely downrate the proposal's cost- effectiveness ranking.

- **Cost escalation** - In the case of privately financed projects that are reimbursed annually, broad based inflation adjustments may add a small degree of risk. Highly volatile indexes may add a higher degree of risk.

- **Methods used to predict salt load reduction** - For example, industrial use or desalting of a known quantity and concentration of brine would normally have few

risks associated with this category of performance risk, as long as the waste stream was handled correctly. Irrigation projects and other nonpoint source projects, where the regional salt loading is directly measured, computer modeled, and allocated to each of the different sources, will have somewhat more risk in this category depending upon the accuracy of the regional salt loading measurement. Projects that relied on only one measurement (like soil salinity), which are not corroborated through other independent methods or measurements, would have the highest risk.

- **Project life** - The project life is used in the amortization of the project's capital costs and cost-effectiveness computation. Overly optimistic estimates of project life bias the cost-effectiveness computation. The life expectancy of new technologies are generally less reliable than older, "time-tested" technologies. Also, some technologies tend to have more risk than others. Deep well injection has a relatively high risk because of the uncertainties involved in estimating the well's receiving capacity and life. Pipelines tend to be more reliable than open ditches which are exposed to the local weather.

- **Operation and maintenance** - Some proposals may be more or less susceptible to poor O&M practices. To minimize this risk factor, applicants may offer "robust" solutions that require relatively little maintenance. For example, buried irrigation laterals require little attention, while open concrete ditches are more prone to weathering and require annual maintenance to remain fully effective.

  The ranking team will consider the risk that the Government's capital investments may be lost from poor maintenance. In the past, Reclamation has provided supplemental, annual O&M funding to maintain certain projects. Reclamation has found this difficult to fund and administer. If essential to the continued performance of the project, the program will consider (or may require) funding an O&M trust to cost share the maintenance of capital improvements and safeguard the program's investment. If funded by the program, this cost would be included in the proposal's cost-effectiveness computation.

- **Management** - Generally, projects that rely on a high degree of management to maintain their efficiency will be downgraded unless there is reason to believe it is sustainable. Highly automated systems that are simple to operate will reduce this risk. For example, automatic sprinkler shutoffs would improve management risks.

- **Measurable or verifiable results** - Projects in which the salt load reduction can be independently verified add a degree of certainty to the proposal. For example, interception of saline springs is a highly verifiable method (both water volume and concentration can be directly measured). Irrigation delivery system improvements are somewhat more difficult to measure, but shallow monitoring wells next to the lined canal can confirm the absence of seepage, and drainwater can be used to measure concentration. Onfarm deep percolation reductions may vary significantly from farm-to-farm and from year-to-year. Statistical sampling may be required.

- **Other factors** - Any factors that might reduce the expected performance and degrade the actual (realized) cost effectiveness of the project.

Although the details of each proposal will be evaluated for performance risk, the following practices would typically rank from lowest risk to highest risk:

- Industrial processes that interrupt brine source, treat the brine, produce a measured (weighed) product, and bill the program. Payments are made annually as salt is produced (or controlled). Measurement of salt is very accurate and only influenced by moisture

content, scale accuracy, or laboratory analysis errors. If the program only pays for salt as it is produced and weighed, there is no risk from poor maintenance or management.

- Physical improvements, such as canal and lateral lining that are least subject to "management" risk but are subject to hydrosalinity monitoring and allocation errors. In the Grand Valley Unit, canal and lateral lining has proven to be very effective at eliminating seepage. Some uncertainty remains from the regional salt loading estimate and its allocation. For example, in the Grand Valley Unit, the U.S. Geological Survey (USGS) estimated the regional salt pickup to be between 480,000 to 680,000 tons per year. Cost effectiveness should be based on the average regional salt pickup. In the case of the Grand Valley Unit, this was 580,000 tons per year, equalizing the upside and downside risk caused by the uncertainty of the regional salt pickup estimate.

- Physical improvements, such as sprinkler systems or automated irrigation systems that are less prone to "management" risk. These types of improvements are subject to uncertainty in the actual management of the system as well as the regional salt loading estimate and its allocation between sources.

- Irrigation management. These types of improvements are highly sensitive to the degree of irrigation management and are much less reliable than automated improvements. These practices are easily abandoned and require continued technical assistance to sustain in the field. Irrigation management can be effective if its initial costs are low and the technical assistance is provided through the project's life to sustain its benefits.

## Other Environmental Factors

The Act requires the replacement of incidental fish and wildlife habitat values foregone by the program. The cost to the program of this mitigation is typically included in the cost of the project and used in computing cost effectiveness. Any costs paid by the project sponsor or source other than the program will not be included in the project's costs nor included in the cost-effectiveness computation.

Consideration for other environmental factors (nonsalinity) will be included in the ranking process. Typically, the cost of fish and wildlife mitigation required by the Act would be paid by the program and included in the cost-effectiveness computation. However, if the costs are borne by other entities or programs, such costs would be removed from the project's cost to the program, improving its cost effectiveness. Contributions for other purposes could be treated in a similar manner. For example, in the Ashley Valley proposal, the State of Utah, the Environmental Protection Agency, and the Department of the Interior's Irrigation Drainage Water Quality Program could join with Reclamation's basinwide program to share in the project's cost to the mutual benefit of all interests.

Other incidental benefits due to the program can be expected, but it would be unfair to our cost-sharing partners to give them much priority in the ranking if their costs are significantly higher than other alternatives. Incidental benefits will directly affect the ranking if other interests (or programs) share in the cost of the project. Cost sharing would buy down the salinity program's costs, improving project's cost effectiveness and, ultimately, its position in the ranking. On the other hand, negative impacts to the general public will be considered in the ranking if they are determined to have a significant impact.

## Special Requirements for Non-Federally Financed Projects

Section 208 of the Salinity Control Act of 1974 was amended by P.L. 104-20 to authorize the appropriation of an additional $75,000,000 for the construction of the federally financed improvements described in section 202(a). This ceiling will be used to fund capital improvements (federally financed construction) throughout the Basin over the next decade.

Section 202(a)(6) of P.L. 104-20 also authorizes a new class of salinity control projects where non-Federal entities may put up the cost of constructing facilities (primarily through private loans or bonds). The Government would then pay to remove salt for a fee (as the source is desalted). The payments would be made from Reclamation's O&M appropriations through a long-term agreement.

Capital for non-federally financed projects may come from private, local, or State governments or some other non-Federal source. Project proposals would be ranked in the proposed RFP process along with all other alternatives available to the program. If found to be competitive in the RFP process, the program would negotiate an agreement to pay a fee per ton of salt removed in periodic installments. Some non-federally financed projects may require their capital costs be amortized over periods of up to 30 years. Most agreements of this type will need to ensure that the program will continue to meet its future payment obligations through the full term of the agreement or face termination penalties to repay the sponsor's interests in the project.

To provide a degree of fiscal review over the execution of these long-term agreements, non-federally financed projects will be reported to Congress and the Colorado River Basin Salinity Control Advisory Council (Advisory Council). The Secretary will not expend funds until 90 days after the date the Secretary submits such report to Congress and to the Advisory Council. The agreements negotiated under the RFP process would include language making them subject to revocation without penalty to the Government before the expiration of the 90-day period. Small projects with annual payments of $100,000 or less and a duration of 10 years or less would be exempt from this procedure.

## Special Requirements for Projects Normally Implemented by "Other Agencies"

The 1984 amendments to the Act (P.L. 98-569) authorized USDA and BLM to participate in the salinity control program. Although integrated with Reclamation's work, both of these agencies have their own authorities to implement their respective programs. The Colorado River Basin Salinity Control Program relies heavily on these agencies' continued participation.

Although any proposal may be evaluated under Reclamation's ranking procedures, some proposals recommended for implementation *may not* be funded by Reclamation if they fall within the bounds of some other agency's authorities. For example, the USDA Salinity Control Program is responsible for onfarm irrigation improvements and rangeland improvements on private lands. BLM is responsible for the rangeland management program on BLM lands. EPA and the Basin States administer a pollution discharge permitting program that sets point source discharge standards for salinity and provides financial assistance for publicly owned treatment works.

# DEVELOPING SALINITY CONTROL TARGETS

## Compliance with the Salinity Standards

The water quality (salinity) standards for the Basin have been established at three locations in the Lower Colorado River Basin where water quality affects end users of the water. The standards call for maintenance of flow-weighted average annual salinity concentrations (numeric criteria) in the lower mainstem of the Colorado River and a Plan of Implementation for future controls.

The water quality standards are based on the *Water Quality Standards for Salinity, Including Numeric Criteria and Plan of Implementation for Salinity Control, Colorado River System*, prepared by the Colorado River Basin Salinity Control Forum (Forum), June 1975. This document was submitted by each of the Basin States and approved by the Environmental Protection Agency. In summary, the report states:

> The numeric criteria for the Colorado River System are to be established at levels corresponding to the flow-weighted average annual concentrations in the lower mainstem during calendar year 1972.
>
> The flow-weighted average annual salinity for the year 1972 was used. These values were determined by the Bureau of Reclamation from daily flow and salinity data collected by the U.S. Geological Survey and the Bureau of Reclamation. Based on this analysis, the numeric criteria are 723 milligrams per liter (mg/L) below Hoover Dam, 747 mg/L below Parker Dam, and 879 mg/L at Imperial Dam.
>
> It should be recognized that the river system is subject to highly variable annual flow. The frequency, duration, and availability of carryover storage greatly affect the salinity of the lower mainstem; and, therefore, it is probable that salinity levels will exceed the numeric criteria in some years and be well below the criteria in others. However, under the above assumptions, the average salinity will be maintained at or below 1972 levels.
>
> Periodic increases above the criteria as a result of reservoir conditions or periods of below normal long-time average annual river flow also will be in conformance with the regulation. With satisfactory reservoir conditions and when river flows return to the long-time average annual flow or above, concentrations are expected to be at or below the criteria level.
>
> The Federal regulations provide for temporary increases above the 1972 levels if control measures are included in the plan. Should water development projects that deplete fresh water inflows or add to saline

return flows be completed before control measures, temporary increases above the criteria could result, and these will be in conformance with the regulation. With completion of control projects now in the plan or those to be added subsequently, salinity would return to or below the criteria level.

The goal of the Colorado River Basin Salinity Control Program is to maintain the flow-weighted average annual salinity at or below the numeric criteria of the salinity standards. The salinity control program is not, however, intended to counteract the salinity fluctuations that are a result of highly variable flows caused by climatic conditions, precipitation, snowmelt, and other natural factors. Therefore, to evaluate the effectiveness of the salinity control program, water quality data are adjusted using a computer model to normalize the data so that they reflect average hydrologic conditions.

Figure 2 compares the normalized salinity to the numeric criteria at Imperial Dam. This is a computer generated comparison which removes hydrologic variations from the observed salinity. Reclamation first runs a computer model of the river to confirm that the model is accurately re-creating historic salinity levels observed in the river system. Next, the entire range of flows (1906-present) is run for a particular year (or level of water development). This produces a flow-weighted average annual salinity for that particular year. This average is then compared to the numeric criteria of the standards.

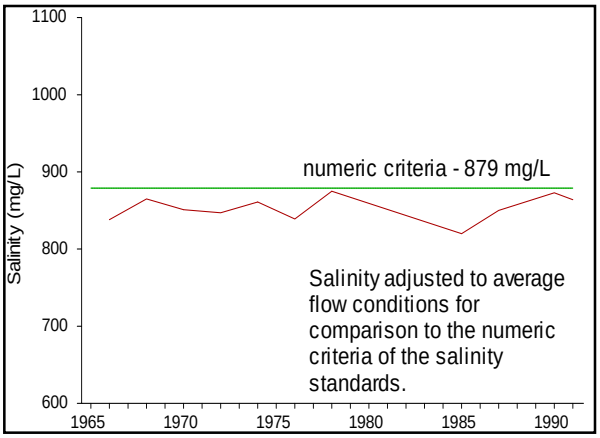


Figure 2.—Normalized or "flow-adjusted "salinity at Imperial Dam.

Reclamation updates this evaluation periodically to assess whether current salinity control projects are sufficient to meet the numeric criteria of the salinity standards. Figure 2 summarizes the results of this analysis over the past 25 years. The figure shows that the numeric criteria of the standards have been consistently met. The salinity control program has offset the effects of future water development in compliance with the standards.

## Salt Load Reduction Goals

In cooperation with the Basin States, future salinity control needs are evaluated and updated every 3 years by Reclamation and reported in the Forum's report entitled *Triennial Review of the Water Quality Standards for Salinity, Colorado River System*. The targets are used by the agencies participating in the salinity control program to schedule expenditures for salinity control measures and to evaluate the effectiveness of this plan to maintain the salinity standards in the future.

Future salinity levels are computed using the Colorado River Simulation System, a model Reclamation developed to predict the impact of water use on the Colorado River System. Water use projections are updated and adjusted biennially. The amount of salinity control recommended for implementation is adjusted to match the projected need.

Table 1 summarizes the projected salt load reduction targets, subtracts the salinity control work completed through 1995, and displays the balance of salinity control needed to meet the standards. Salt load reduction targets are shown to increase because of projected water development. The last column shows the amount of funding needed to implement the entire salinity control program by all three implementing agencies and assumes that salinity control can be implemented at an average cost of $50 per ton of salinity control.

Table 1.—Basinwide salinity reduction targets and funding requirements to maintain the water quality standards for the Colorado River—combined goals and funding requirements for BLM, Reclamation, and USDA programs[1]

| Years | Total reduction target (tons per year) | Additional removal required for each 5-year period (tons per year) | Total annual expenditure needed to meet targets ($) |
|---|---|---|---|
| Present | 517,000 | - | - |
| 1996-2000 | 697,000 | 180,000 | 22,500,000 |
| 2001-2005 | 843,000 | 146,000 | 18,250,000 |
| 2005-2010 | 1,104,000 | 261,000 | 32,625,000 |

[1] These requirements and the water quality standards are re-evaluated and updated every 3 years as required by the Clean Water Act. The amount of salinity control needed will vary based on actual and predicted changes in water use and the amount of salinity control previously implemented.

As seen by the results of the analysis, annual expenditures for the entire salinity control program (including the Reclamation, USDA, and BLM programs) must be consistently maintained at $22.5 million per year between 1996 and 2000 to prevent salinity increases and ensure maintenance of the numeric criteria established within the Water Quality Standards for the Colorado River Basin.

# CONCLUSIONS AND RECOMMENDATIONS

This report is submitted pursuant to Public Law 104-20 of July 28, 1995, an act to amend the Colorado River Basin Salinity Control Act of 1974. This amendment requires the Secretary of the Interior to submit a planning report to the appropriate committees of Congress concerning the new, basinwide approach to salinity control established by section 202(a)(6) of the Act. Reclamation may not expend funds until the expiration of a 30-day period beginning on the date the Secretary of the Interior submits such report. This report is intended to meet that requirement.

Reclamation plans to administer its basinwide program established by P.L. 104-20 through existing procurement techniques and established regulations. As an alternative to adopting new regulations, Reclamation will solicit proposals and award funding through a formal RFP process. This is a competitive, negotiated procurement process with established rules and regulations. A conceptual example of an RFP is appended to this report.

Essentially, the RFP would request proposals from the public and private sector to control salinity. The proposals would be ranked based on their cost to prevent salt from entering the river system. The ranking would also consider risk factors that might affect the project's performance.

Cost effectiveness will be computed on a cost-per-ton basis and include all potential costs to the program. Risk factors will evaluate performance risks to the program and be used to adjust the ranking of projects.

The proposals will be ranked by a ranking committee. Committee members will be selected to avoid any conflict of interest that would bias their choices. The ranking committee members will individually and collectively evaluate and rank the proposals. The ranking committee will include representatives from the Federal Government and the Basin States.

Finally, Reclamation will attempt to negotiate the final terms of an agreement with the highest ranked proponents. This agreement may be a grant, cooperative agreement, or formal contract depending upon the circumstances and judgment of the contracting officer. Negotiations may be terminated if the final terms are not acceptable to Reclamation.

Reclamation will conduct a limited test of the ranking portion of the process and award fiscal year 1996 funds to sponsors of projects that are ready for implementation. Funding commitments under this test will be limited to those funds available in FY 1996. No commitments will be made for out-year funding until the full RFP process is completed later in 1996. Small projects will be selected from alternatives that are ready for implementation and can be completed within the 1996 timeframe. This test will be used to refine ranking procedures included in the RFP. As appropriate, supplemental guidance for implementing the basinwide program will be included in future RPF's or in the biennial progress reports to Congress required by the original Act (P.L. 93-320).

# APPENDIXES

# APPENDIX A
# BASIN FUND REPAYMENT CAPACITY

## Introduction

Colorado River Basin Salinity Control Program targets and costs have been identified that would allow the program to continue to meet the water quality standards. Assuming that a $22.5-million-per-year program is funded (this includes both U.S. Department of Agriculture (USDA) and U.S. Department of the Interior expenditures), section 205 of the Colorado River Basin Salinity Control Act of 1974 (Act) requires power users within the Colorado River Basin States (Basin States) (Wyoming, Utah, Colorado, California, Nevada, New Mexico, Arizona) to repay 30 percent of the program's costs in the year following the Government's expenditure (or pay interest on the balance owed). This appendix analyzes the repayment obligations and the Lower Basin Fund's repayment capability.

All of the salinity control program's costs are first appropriated by Congress and then reimbursed under the terms in section 205 of the Act. Funds for reimbursement are collected through a surcharge on power generated at Bureau of Reclamation (Reclamation) facilities. These monies are deposited in funds held in two separate trusts by Reclamation (commonly called the Upper Basin Fund and Lower Basin Development Fund). The surcharge in the Upper Colorado River Basin (Upper Basin) is adjusted periodically to match the Upper Basin's repayment needs by adjusting the energy costs to power users. The surcharge in the Lower Colorado River Basin (Lower Basin) is fixed by law at 2-1/2 mils. Since the Lower Basin Development Fund's revenues are limited, both repayment obligations and the Lower Basin Development Fund's capability to repay are analyzed (see table following page A-2). The analysis shows that sufficient revenues will accrue to the Lower Basin Development Fund to repay the costs of the salinity control program.

## Cost Allocations and Repayment

The reimbursable portion paid by the power users varies from 25 percent for projects authorized by the 1974 Act to 30 percent for those projects authorized in subsequent amendments. The costs are further allocated between the Upper and Lower Basin with 15 percent of the costs allocated to the Upper Basin and 85 percent to the Lower Basin. Although this allocation is reviewed annually by the Colorado River Basin Salinity Control Advisory Council (Advisory Council), it has not been changed in its 20-year history.

**Paradox, Las Vegas Wash, and Grand Valley Units**.—For units authorized under the original 1974 Act, 25 percent of the costs are repayable. Construction costs are

repaid over the life of the facilities without interest (up to 50 years). Operation and maintenance (O&M) costs are repaid (in full) in the year following the expenditure.

**Lower Gunnison, McElmo Creek, and Reclamation's Basinwide Salinity Control Program**.—For these units authorized under the 1984 and 1995 amendments, 30 percent of the costs are repayable. The Lower Basin Development Fund repays (in full) the year following the expenditure for construction and O&M. The Upper Basin Fund repays construction costs with interest and O&M costs in the year following the expenditure.

**USDA Salinity Control Program**.—For USDA units authorized under the 1984 amendments, 30 percent of the construction costs are repayable. The Lower Basin Development Fund repays (in full) the year following the expenditure. The Upper Basin Fund repays construction costs with interest.
Note: For this analysis, it was assumed that about 50 percent of the appropriations for USDA are for technical assistance and are nonreimbursable. The remaining 50 percent of the costs are for construction cost sharing and are 30-percent reimbursable.

**Bureau of Land Management (BLM) Salinity Control Activities**.—The Salinity Control Act does not require nor authorize cost sharing or repayment for BLM activities.

***Insert Repayment Schedule***

# APPENDIX B
# SALINITY CONTROL OPPORTUNITIES

Over the course of years, the Bureau of Reclamation (Reclamation) and other Federal agencies have conducted studies to locate the numerous sources of salinity in the Colorado River Basin and to develop control strategies. The following section briefly summarizes many of these studies and describes examples of past salinity control efforts. Although some aspects of these projects were originally found to be infeasible, they may become cost effective through local cost sharing, private construction, or other innovative approaches. These illustrative examples in no way are meant to limit or restrict either the location or methods that might be proposed for funding under Reclamation's basinwide salinity control program.

Public Law 104-20 authorizes cost-effective measures and associated works to reduce salinity from saline springs, leaking wells, irrigation sources, industrial sources, erosion of public and private land, or other sources that the Secretary of the Interior (Secretary) considers appropriate.

## Ashley Valley Wastewater Treatment Lagoons

The Ashley Valley Wastewater Treatment System is a significant source of salt loading and selenium to Ashley Creek and the Green River, a tributary of the Colorado River. The system treats sewage for Vernal, Utah, and surrounding areas. A set of sewage lagoons were constructed on a Mancos Shale bench in the late 1970's to service the area. The lagoons leaked badly, and most of the effluent emerges as saline and seleniferous seeps adjacent to Ashley Creek. These seeps flow about 2.5 cubic feet per second (cfs) and contribute approximately 9,000 tons per year of salt and more than 2,000 pounds per year of selenium to Ashley Creek. While adequately treating the sewage, the leaking lagoons have themselves become a source of salt, selenium, and other trace elements that are toxic and presently threaten the endangered razorback sucker. Attempts to seal these lagoons have failed.

The lagoon system was overbuilt to handle projected growth that has not occurred. During the energy crisis of the late 1970's, it appeared that oil, oil shale, and tar sands development was going to significantly increase the population. This increased population has not developed, and there is no local payment capacity to rebuild this system.

An interagency committee consisting of the State of Utah, Environmental Protection Agency, Reclamation, U.S. Fish and Wildlife Service, U.S. Geological Survey (USGS), and the Ashley Valley Waste Water Treatment District are attempting to resolve this and other irrigation-related salt and selenium issues which also threaten the razorback sucker.

If salinity control joined this consortium and contributed $30 per ton toward the project, the rest of the group could probably fund the remaining $6 to $7 million required for a fix. The salinity control portion would be approximately $3.4 million. The total fix would benefit numerous water users and the razorback sucker both locally and throughout the Colorado River Basin.

## Big Sandy River Unit

The Big Sandy River study area is located near Farson and Eden in Sweetwater County in southwestern Wyoming. The study was specifically directed toward reducing salt pickup from seeps and springs along a 26-mile reach of the Big Sandy River west of Eden, Wyoming.

Investigations indicated that seeps, which surface in the Bone Draw and Big Bend areas, produce saline water at a rate of about 27 cfs. The salinity varies from 1,000 to 6,000 milligrams per liter (mg/L) along the Big Sandy River, with a total annual contribution of more than 164,000 tons of salt. Indications are that salt is picked up by water contacting the shale of the Green River Formation beneath the surface and eventually seeping into the river. Irrigation was identified as a significant source contributor to the water recharging the springs.

Reclamation evaluated ways to intercept and use the saline springs for industrial processes. In the irrigated area, Reclamation studied off-farm solutions, such as selective lining of canals and laterals; however, previous selective lining programs were shown to have been effective; only low seepage rates were found. Studies conducted in cooperation with the U.S. Department of Agriculture (USDA) indicated that control of onfarm irrigation is the most cost-effective alternative for controlling salinity from the Big Sandy Unit. USDA is implementing their plan.

## Blue Springs

The Blue Springs study area was located on the Little Colorado River within the Navajo Hopi Indian Reservation in north-central Arizona. The springs contribute an average of 160,000 acre-feet per year with an average salinity of 2,500 mg/L and a total salt load of about 550,000 tons per year.

The lower portion of the Little Colorado River flows through a meandering canyon that is about a mile wide and a half mile deep. The walls of this rugged gorge are a series of nearly vertical cliffs of massive limestone and sandstone separated by steep slopes or benches of shale, siltstone, or thin bedded sandstone. The bottom can be reached near Blue Springs only by a rugged foot trail from the rim or by helicopter. The springs originate from ground water which moves into the area from the east and south and emerges as springflow where the canyon has penetrated the Redwall and Mauve limestones below the regional water table. There are many spring openings along two relatively well-defined reaches. A full scale feasibility study of the project is not planned

due to the high capital cost of building the project and the historical and religious value of the area to the Hopi Indians.

## Dirty Devil River Unit

The Dirty Devil River study area was located in Emery and Wayne Counties in southern Utah. The study area included the Muddy Creek, the Fremont and Dirty Devil Rivers, and the tributaries of Muddy Creek, Hanksville Salt Wash, and Emery South Salt Wash. The Dirty Devil River drainage contributes approximately 150,000 tons of salt each year to the Colorado River. The Muddy Creek tributary contributes an average of 86,000 tons of salt annually. No significant sources of salt or potential alternatives were identified on the Fremont River or its tributaries. Approximately 28 percent of the Muddy Creek salt load (24,200 tons per year) comes from springs in Hanksville Salt Wash and Emery South Salt Wash.

Reclamation evaluated reducing the salinity of the Dirty Devil and Colorado Rivers by collecting saline spring water in Hanksville Salt Wash and Emery South Salt Wash and disposing of it by deep well injection. This means of disposal would reduce the salt contribution to the Colorado River by 20,900 tons annually. The unit was thought not to be cost effective.

## Glenwood-Dotsero Springs Unit

Glenwood-Dotsero Springs is located along the Colorado River in Eagle, Garfield, and Mesa Counties in west-central Colorado. The springs are located near the town of Glenwood Springs and the rural community of Dotsero. The combined annual discharge of the springs is 25,000 acre-feet of water which contain about 440,000 tons of salt. About half of the salt contribution comes from 20 surface springs; the remainder enters as seeps and underwater springs within the river channel.

Reclamation started its planning investigations in 1980. The most cost- effective plan at the time consisted of collecting both surface and subsurface salt water at Dotsero and transporting the salt water in a gravity flow pres-sure line to Glenwood Springs where additional surface and subsurface salt water would be collected and added to the Dotsero salt water. The water would then be piped to evaporation ponds at the Colorado-Utah border. At $126 per ton, this plan could not compete with alternatives available in other units. Plans were deferred until a more cost-effective alternative, possibly an industrial use, could be found. A planning report concluding the evaporation pond alternative was completed in February 1986.

**Privatization Alternative.**—A desalting firm is investigating the feasibility of a straight desalting alternative which does not include a powerplant. The potential costs of the straight desalting alternative will be much higher due to the loss of the inexpensive heat source and the revenues from the powerplant. With passage of Public Law (P.L.)

104-20 in 1995, private companies are now authorized to compete for funding in Reclamation's basinwide program.

## Grand Valley Unit

The Grand Valley Unit is located in west-central Colorado along the Colorado River near Grand Junction. The unit was authorized for construction by the Act of 1974 (P.L. 93-320). P.L. 98-569, enacted in 1984, amended Title II provisions of that act and authorized the USDA Salinity Control Program.

The purpose of the Grand Valley Unit is to reduce the estimated 580,000 tons per year of salt added to the Colorado River from the valley asa result of conveyance system seepage and agricultural practices.

Studies indicate that salt loading to the Colorado River in the Grand Valley occurs when conveyance system seepage and irrigation return flows pass through highly saline soils and the underlying Mancos Shale Formation. By reducing the amount of ground water percolating through these saline soils, salt loading to the Colorado River would be reduced.

Reclamation is conducting a conveyance systems improvement program as a cost-effective method of reducing off-farm seepage and salt loading. USDA is implementing onfarm improvements, including upgrading irrigation systems through cost assistance and improving irrigation management to reduce deep percolation from farm operations.

## La Verkin Springs

La Verkin Springs is located on the Virgin River in southwestern Utah. The springs flow at a rate of 11.5 cfs with a salinity of 9,650 mg/L. The springs contribute an estimated 109,000 tons per year of salt to the Colorado River. Reclamation has evaluated several alternatives but has not yet found a feasible method of salinity control.

## Lower Gunnison Basin Unit

The Lower Gunnison Basin Unit is located in west-central Colorado in Delta and Montrose Counties. The unit was authorized for investigation by the Act of 1974 (P.L. 93-320). Portions of the unit were later authorized for construction in 1984 by an amendment to the Act, P.L. 98-569.

An estimated 360,000 tons of salt is added to the Colorado River from the Uncompahgre Project, a Reclamation irrigation project built in the early 1900's. Studies indicate that salt loading occurs when irrigation conveyance system seepage and irrigation return flows pass through highly saline soils and the underlying Mancos Shale Formation. By

reducing the amount of ground water percolating through these saline soils, salt loading to the Colorado River would be reduced.

With Reclamation funding, the water districts have completed the winter water facilities. Reclamation has completed plans for local improvements to the irrigation delivery systems. Onfarm improvements, including upgrading irrigation systems and improving irrigation management, are being implemented by USDA.

In 1992, a study was completed on ways to reduce the cost of the canal and lateral lining program through cooperative construction agreements, cost sharing, and redesign of the delivery system to reduce canal and lateral lengths. Piping the laterals would be very cost effective, about $70 per ton. Construction of the lateral system is scheduled to begin after the winter water portion of the unit is completed in 1995, if funds are available. Construction of the canal system has been deferred due to its relatively high cost and poor cost effectiveness.

## Lower Gunnison Basin, North Fork

The Lower Gunnison Basin, North Fork is located in Delta and Ouray Counties of west-central Colorado. The study included irrigated areas on the North Fork of the Gunnison River, along the Uncompahgre River south of Colona, Colorado, and north and east of the city of Delta along the Gunnison River. (That portion of the Lower Gunnison Basin Unit served by the Uncompahgre Project has been investigated in a separate study.)

Reclamation studied off-farm salinity contributions from saline springs and seepage from unlined canals and laterals. Areas north of Delta and southeast of Hotchkiss contribute large amounts of salt. The total off-farm salt contribution from the North Fork area was estimated to be approximately 148,000 tons per year.

Emphasis was placed on identifying and quantifying off-farm sources of salinity and formulating alternative solutions to diminish the salt loading to the river system. Preliminary findings indicated that selective lining of canals and laterals and winter water replacement might be viable; however, a more detailed study showed the cost of these improvements prohibitively high at the time of the study.

## Lower Virgin River

This unit is located along the lower Virgin River in northeastern Clark County, Nevada, and northwestern Mohave County, Arizona. The unit includes natural saline springs averaging 2,900 mg/L near Littlefield, Arizona, and 3,500 acres of irrigated land along the Virgin River between the springs and Lake Mead.

Investigations by Reclamation began in 1972 as the Littlefield Springs Unit. The initial approach was to study a series of saline springs along the river at Littlefield Springs near the USGS gauge, "Virgin River at Littlefield, Arizona." The object of that investigation was to determine the best method of collecting and disposing of the water and returning the freshwater to the river or disposing of the saline water from the springs by

evaporation. This project was strenuously opposed locally because the springs are the only reliable water supply for irrigation at Mesquite, Bunkerville, and Riverside, Nevada, during the summer.

## Lyman-West Green River

This area is located in southwestern Wyoming and northeastern Utah in the drainages of the Blacks Fork, Hams Fork, and Henry Fork Creeks. Soils within the area are generally shallow with underlying marine shales. The three drainages contribute an estimated 658,000 tons per year. It is thought that an improvement in irrigation efficiency should reduce salinity in these drainages. An estimated 97,000 acres of land are irrigated in the project area. The USDA Soil Conservation Service prepared a reconnaissance level report in 1991 which identified the potential for 195,000 tons of salinity control at $40 per ton.

## Mancos Valley

The Mancos Valley Unit is a 9,200-acre irrigated area along the Mancos River, a tributary to the San Juan River. The report, *Irrigation Improvements for Mancos Valley*, was completed by USDA in 1985. The recommended plan includes 3,200 acres of sprinkler systems and other water management/salinity control treatment on about 5,500 total acres. About 17 miles of canal and lateral lining would combine many old earthen laterals. Total salt load reductions are estimated to be 8,800 tons per year with about 7,700 tons resulting from lateral improvements. About 57 land-owners and 15 lateral companies or groups of landowners would be involved. No implementation actions have been taken.

## McElmo Creek Unit

The McElmo Creek basin is located in southwestern Colorado and covers approximately 720 square miles. About 150 square miles of the basin, mostly in the east, are agricultural land. Early studies show that salt loading results from both irrigation and diffuse sources, with irrigation being the main contributor.

The McElmo Creek Unit was authorized for construction by P.L. 98-596 in October 1984 as part of the Dolores Project, a participating project of the Colorado River Storage Project which is under construction. Included are seepage control from the Towaoc-Highline Canal, Rocky Ford laterals, Lone Pine lateral, and the Upper Hermana lateral. Most of the project facilities have been constructed.

Implementation of the USDA program has been underway in this area since 1990. The major salinity reduction practices being installed are side-roll sprinkler systems, underground pipelines, and gated pipe. A fully coordinated implementation effort is underway, so design and installation of the laterals by Reclamation complement the onfarm irrigation systems. Joint planning actions with Reclamation have made it possible to install gravity pressure sprinkler systems on an additional 9,000 acres.

## Nonpoint Source Control

Management of nonpoint sources to control salt loading from rangelands has been investigated through State and Federal cooperative efforts in Utah and Colorado. The Utah study was completed in 1991; and in Colorado, results of the study were released in 1992. In both States, all watersheds draining into the Colorado River Basin were studied to estimate contributions of salt from nonpoint sources and to determine the potential for treatment. The watersheds with the highest priority for treatment have been identified in each State.

## Paradox Valley Unit

The Paradox Valley Unit was authorized for investigation and construction by the Act of 1974, P.L. 93-320. The unit is located in southwestern Colorado along the Dolores River in the Paradox Valley, formed by a collapsed salt dome. Ground water in the valley comes into contact with the top of the salt formation where it becomes nearly saturated with sodium chloride. Salinities have been measured in excess of 250,000 mg/L, by far the most concentrated source of salt in the Colorado River Basin. Ground water then surfaces in the Dolores River. Studies conducted by Reclamation show the river picks up more than 205,000 tons of salt annually as it passes through the Paradox Valley.

Reclamation has completed construction of a series of wells on both sides of the Dolores River to intercept the brine before it reaches the river. The brine will be mixed with fresh water to prevent scaling and injected into a 16,000-foot-deep disposal well. The facility should be capable of 128,000 tons per year of salt disposal.

## Price-San Rafael Rivers Unit

The Price-San Rafael Rivers Unit is located in east-central Utah, 120 miles southeast of Salt Lake City, encompassing Carbon and Emery Counties. Agriculture and energy development (primarily coal mining) make up the principal economic base in the area. Both the Price and San Rafael Rivers drain into the Colorado River via the Green River.

Salinity contributed to the Colorado River from the Price and San Rafael River Basins occurs principally as a result of the dissolution of soluble salts in the soil and substrata. Return flows from irrigation and runoff from precipitation transport salts to natural drains and eventually into the streams and rivers. An estimated 430,000 tons per year of salt reach the Colorado River from these two river basins. Of this amount, approximately 60 percent is attributed to agriculture.

The recommended plan combines the Reclamation and USDA programs of irrigation improvements. Water pressure developed by piped laterals would be used to run sprinkler irrigation systems. The plan would also eliminate winter water from the canal system by installing a rural domestic water distribution system. This would be similar to the winter water program in the Lower Gunnison Basin Unit.

## San Juan River Unit

The study area includes the entire 23,000-square-mile watershed from its headwaters in south-central Colorado to its mouth at Lake Powell. The drainage contributes approximately 1 million tons of salt annually to the Colorado River Basin. Early reconnaissance shows significant salt loading in the river between Shiprock, New Mexico, and the Four Corners area. At Bluff, Utah, the annual flow of 2,047,000 acre-feet of water contains 1,165,000 tons of salt. About 18 percent of this salt loading occurs between Shiprock and Bluff, but only 7 percent of the water is added in this reach.

The Hammond Project, Navajo Indian Irrigation Project (NIIP), and the Hogback Irrigation Project (also a Navajo Indian project) are the principal irrigation sources of salt in the San Juan River Basin. Reclamation proposes to reduce seepage losses to the main canal system by lining the canal with either concrete or membrane linings. These improvements would eliminate seepage into the saline formations beneath the canals, reducing salinity. Reclamation has focused its planning efforts in the San Juan River Unit by preparing a planning report/environmental assessment for the Hammond area. A final report and finding of no significant impact was completed in 1994.

Preliminary review of data available in the Hogback Project area show heavy salt loading, but the mechanisms are just beginning to be explored. Ground water accruing to the San Juan alluvium in this vicinity has salinity concentrations of more than 15,000 mg/L. Other salt sources may include abandoned gas or oil wells, blowdown water from powerplants, and wastewater from a petroleum refinery. Reclamation and USGS are cooperatively investigating this area to identify sources of salt and potential salinity control opportunities.

Recent water quality data has shown that NIIP irrigated area ground-water return flows are surfacing in Gallegos and Ojo Amarillo Washes, tributaries to the San Juan River. These return flows have salinities of about 3,000 mg/L and are typical of irrigation return flows. This water could be collected for disposal or industrial use alternatives. These sources of salt will be evaluated for treatment in future studies.

Salinity investigations were completed by USDA in the San Juan River Basin east of the Hogback. It was determined that a USDA onfarm salinity control program is not feasible in this area. In 1992, investigations were initiated in the San Juan River Basin west of the Hogback to determine if an onfarm program was feasible. The study area lies within the boundaries of the Navajo Indian Nation. This study was completed in 1993. The report recommended that further study be done in the area.

## Sinbad Valley Unit

The Sinbad Valley Unit is located in western Colorado, south of the town of Gateway. Salt Creek drains Sinbad Valley and has been identified by the Bureau of Land Management (BLM) as a point source of saline ground water contributing an estimated 5,000 to 8,000 tons of salt per year to the Colorado River System. Saline ground-water discharges from the Paradox member of the Hermosa Formation into the alluvium in Salt Creek through a series of springs and seeps near the mouth of the Sinbad Valley.

## Uinta Basin Unit

The Uinta Basin is located in northeastern Utah. The area includes portions of Duchesne and Uinta Counties and is situated between the Uinta Mountains on the north and the Tavaputs Plateau on the south. The principal communities within the area are Duchesne, Roosevelt, and Vernal. Most of the salt pickup from the unit area is from the dissolution of salts from the soil and subsurface materials, principally from soils of marine origin which underlie most of the Uinta Basin. Seepage from conveyance systems and deep percolation resulting from irrigation are the primary processes that dissolve salts from the soils and shales and convey the salts through the ground-water system to natural drainages and ultimately to the Colorado River. The Uinta Basin contributes an estimated 450,000 tons of salt per year to the Colorado River.

Reclamation's study evaluated several alternatives. These included lining irrigation canals and laterals to reduce seepage losses, deep-well injection, evaporation ponds, desalination, coal-slurry pipelines, powerplant cooling, and land retirement. Reclamation's plan recommends selective canal and lateral improvements to reduce seepage losses and associated salt pickup.

The USDA Uinta Basin Salinity Control Plan was prepared in 1979 and amended in 1987 to include off-farm lateral improvements. In 1992, the plan was expanded to bring in 20,000 acres of adjoining irrigated lands which were not included in the original plan. The total salt-load reduction goal for this area is 106,800 tons per year.

## Virgin Valley

This area is located where the Virgin River flows through the States of Arizona, Nevada, and Utah. The area consists of about 5,000 acres of irrigated land owned by 50 individuals and involves four irrigation companies or districts. It was estimated that salt loading could be reduced from this area by about 37,200 tons per year with improvements to canals, laterals, and onfarm irrigation systems.

# APPENDIX C
# "CONCEPTUAL" REQUEST FOR PROPOSALS

**Note:** This is a working draft of the "Request for Proposals" which will be finalized and released after the *Report to Congress on the Bureau of Reclamation Basinwide Program* has laid before Congress for 30 days as required by Public Law (P.L.) 104-20.

# SECTION A
# DESCRIPTION OF SERVICES

## A.1 Purpose and Description of Services

The Bureau of Reclamation (Reclamation) wishes to evaluate proposals for reducing salinity contributions to the Colorado River. Such proposals shall consist of measures (and associated works, if any) to reduce salinity contributions originating from saline springs, leaking wells, irrigation sources, municipal and industrial sources, erosion of public and private land, de-icing salts, or other sources and the mitigation of incidental fish and wildlife values that are lost as a result of the measures and associated works and shall comply with all applicable laws and regulations.

As part of this process, Reclamation will be considering proposals to plan, design, construct and operate, or otherwise implement salinity projects to control 180,000 tons of salt per year. Proposals will be evaluated and selected through the competitive, negotiated process herein described.

## A.2 Problem and Need to be Addressed by Proposals

Total annual salt loading to the Colorado River is approximately 9 million tons per year. About one-half of the present salt load can be attributed to natural sources, such as erosion of lands and saline springs. The remainder of the salt load is human-induced, originating from irrigation practices and municipal and industrial sources. Damages resulting from this salt loading and the concentrating effects due to the consumptive use of water are estimated to be approximately $1 billion annually. These impacts accrue mainly to municipal, industrial, and agricultural water users in the Lower Colorado River Basin.

In June 1974, Congress enacted the Colorado River Basin Salinity Control Act (Act), P.L. 93-320, which directed the Secretary to proceed with a pro-gram to enhance and protect the quality of water avail-able in the Colorado River for use in the United States and the Republic of Mexico. In October 1984, Congress amended the original act by passing P.L. 98-569. Previously authorized portions of the program are nearing

completion, and Reclamation is approaching the indexed 1974 appropriation ceiling of $301 million.

In response to this need, Congress has authorized the expenditure of an additional $75 million for salinity control projects in the Colorado River Basin. This legislation, P.L. 104-20, authorizes the Secretary, acting through Reclamation, to implement a basinwide salinity control program. The Secretary may carry out the purposes of this legislation directly, or make grants, enter into contracts, memoranda of agreement, commitments for grants, cooperative agreements, or advances of funds to non-Federal entities under such terms and conditions as the Secretary may require. Throughout the remainder of this document, the generic term "agreement" is used to describe the agreement mechanism. The appropriate agreement mechanism will be determined on a case-by-case basis; i.e., memorandum of agreement, grant, cooperative agreement, or contract.

## A.3 Overview of Solicitation/Development Process

Reclamation has published a notice in the *Commerce Business Daily* and other sources to solicit proposals for reducing salinity contributions to the Colorado River. Respondents to the notice are being sent this Request for Proposals (RFP).

For budget reasons, this RFP generally seeks proposals for projects that can be planned, designed, and constructed, or otherwise implemented within 5 years. Proposals for larger projects should be planned in separable increments, if possible. Proposals that require more than 5 years to implement will be considered; however, construction projects may be required to recompete every 5 years in a competitive process to receive continued funding.

The offerors will have approximately 180 days to submit their proposals to Reclamation. Proposals will be evaluated and ranked under the criteria set forth in Section C by the ranking committee. The ranking committee will be composed of representatives of the Colorado River Basin States and Reclamation. The Contracting Officer will then determine which proposals are within the competitive range, based on the results of the initial evaluation and ranking. Offerors whose proposals are found to be in the competitive range will be notified and given an opportunity to improve the responsiveness of their proposals through a negotiation process. Offerors will then submit their best and final offers for final evaluation and ranking. Based on the final ranking, Reclamation will then award agreements to the highest ranked offerors within the 180,000-ton-per-year salinity control target.

Upon completion of successful negotiation and signing of the agreement, if not previously completed, the project sponsor will proceed with all the necessary planning and environmental analysis required to satisfy the National Environmental Policy Act (NEPA). Costs associated with these activities will be financed by the project sponsor. These costs may be reimbursed by Reclamation upon successful completion of NEPA compliance (i.e., issuance of a categorical exclusion, finding of no significant impact, or favorable record of decision) if required under the terms of the agreement. If the project sponsor's NEPA compliance costs are to be reimbursed by Reclamation, the estimated

cost of these activities will be included in the proposed costs for consideration in the cost-effectiveness evaluation.

Reclamation will serve as the lead Federal agency for NEPA compliance, with the project sponsor responsible for conducting technical studies and analyses. As lead Federal agency, Reclamation will be responsible for evaluating technical information and ensuring that environmental and socioeconomic concerns are addressed. In this capacity, Reclamation is solely responsible for determining the appropriate level of NEPA compliance, based upon the anticipated magnitude of potential project impacts; i.e., categorical exclusion check list, environmental assessment, or environmental impact statement. If as a result of the NEPA process, unforeseen mitigation costs are identified that affect the project's cost effectiveness, Reclamation reserves the right to terminate the agreement and to re-solicit proposals.

In the case of projects that do *not* require reimbursement of annual operation and maintenance expenses, no further review or approval by Congress is required following successful NEPA compliance, and the project sponsor will proceed with design and construction or otherwise implement the project under the terms and conditions of the agreement. In the case of projects that require a major commitment of resources to reimburse annual operation and maintenance expenses, Reclamation will submit the planning/NEPA report to Congress before committing to project funding or authorizing the project sponsor to proceed.

Reclamation may provide assistance to offerors in developing proposals and NEPA compliance activities when requested to do so by the project sponsor and it is in the best interest of the Government. Further, Reclamation assistance may be provided to the project sponsor in implementing the project when requested to do so and it is in the best interest of the Government. The estimated cost of this assistance shall be considered a project cost and shall be reflected in the cost-effectiveness evaluation when ranking proposals. Requests for assistance shall be made in writing to the Contracting Officer at the address identified in "Section D, Agreement Administration Data," along with supporting justification.

Reclamation may provide direct assistance to the project sponsor when the proposed project has other associated indirect benefits of Federal interest; i.e., other water quality or environmental benefits. The cost of this assistance will *not* be considered a project cost.

# SECTION B
# PROPOSAL PREPARATION

## B.1 Requirements, Instructions, and Conditions to Offerors

Each offeror should submit an original and __ copies of the proposal in accordance with the following provisions. Each proposal shall include a detailed overview and schedule for the proposed salinity control project addressing the evaluation criteria as listed in "Section C, Evaluation Criteria." Reference materials, supporting materials, and documentation are to be clearly identified by attachment number and appended to the back of the proposal. The overview and schedule shall be developed to a sufficient level of detail to provide for an objective evaluation of the proposal.

The proposal shall describe specifically and in the following order: (1) the proposed method to accomplish salt load reduction, (2) the plan and schedule for implementation, (3) the plan for project operation, (4) the estimated average annual salt load reduction, (5) the proposed method of reimbursement, (6) the specific items for which reimbursement will be sought, (7) cost-sharing terms and conditions, if any, (8) reimbursement schedule, (9) calculated cost effectiveness, (10) potential environmental and socioeconomic consequences, (11) the plan to mitigate for negative consequences, and (12) a plan to conduct a public involvement and information program.

It should be understood by the offeror that the proposal will be binding in developing the agreement. Therefore, the offeror shall develop the proposal to a sufficient level of detail to support the accompanying bid.

## B.2 Preparation of Offers

(a) Each offeror shall furnish the information required by the solicitation. The offeror shall sign the offer and print or type its name on each page. Erasures or other changes must be initialed by the person signing the offer. Offers signed by an agent shall be accompanied by evidence of that agent's authority, unless that evidence has been previously furnished to the issuing office.

(b) Offers for supplies or services other than those specified will not be considered unless authorized by the solicitation.

(c) Time, if stated as a number of days, herein and in the proposals, will include Saturdays, Sundays, and holidays.

## B.3 52.215-7 Unnecessarily Elaborate Proposals or Quotations

Unnecessarily elaborate brochures or other presentations beyond those sufficient to present a complete and effective response to this solicitation are not desired and may be construed as an indication of the offeror's or quoter's lack of cost consciousness. Elaborate art work, expensive paper and bindings, expensive visual and other presentation aids, or excessively long proposals are neither necessary nor wanted.

## B.4 52.215-8 Amendments to Solicitations

(a) If this solicitation is amended, then all terms and conditions that are not modified remain unchanged.

(b) Offerors shall acknowledge receipt of any amendment to this solicitation by identifying the amendment number and date in the space provided for this purpose on the form for submitting an offer.

## B.5 52.215-9 Submission of Offers

Offers shall be submitted in sealed envelopes or packages (1) addressed to the office specified in the solicitation and (2) showing the time specified for receipt, the solicitation number, and the name and address of the offeror.

## B.6 52.215-10 Late Submissions, Modifications, and Withdrawals of Proposals

(a) Any proposal received at the office designated in the solicitation after the exact time specified for receipt will not be considered unless it is received before award is made and it:

(1) Was sent by registered or certified mail not later than the fifth calendar day before the date specified for receipt of offers (e.g. an offer submitted in response to a solicitation requiring receipt of offers by the 20th of the month must have been mailed by the 15th).

(2) Was sent by mail and it is determined by the Reclamation that the late receipt was due solely to mishandling by the Government after receipt at the Government installation.

(b) Any modification of a proposal or quotation, except a modification resulting from the Contracting Officer's request for "best and final" offer, is subject to the same conditions as in subparagraphs (a)(1) and (2) above.

(c) A modification resulting from the Contracting Officer's request for "best and final" offer received after the time and date specified in the request is subject to the same conditions as in subparagraphs (a)(1) and (2) above.

(d) The only acceptable evidence to establish the date of mailing of a late proposal or modification sent either by registered or certified mail is the United States or Canadian Postal Service postmark on the wrapper or on the original receipt from the United States or Canadian Postal Service. If neither postmark shows a legible date, the proposal, quotation, or modification shall be processed as if mailed late. "Postmark" means a printed, stamped, or otherwise placed impression (exclusive of a postage meter machine impression) that is readily identifiable without further action as having been supplied and affixed by employees of the United States or Canadian Postal Service on the date of mailing. Therefore, offerors or quoters should request the postal clerks to place a hand cancellation bull's-eye postmark on both the receipt and the envelope or wrapper.

(e) The only acceptable evidence to establish the time of receipt at the Government installation is the time/date stamp of that installation on the proposal wrapper or other documentary evidence of receipt maintained by the installation.

(f) Notwithstanding paragraph (a) above, a late modification of an otherwise successful proposal that makes its terms more favorable to the Government will be considered at any time it is received and may be accepted.

(g) Proposals may be withdrawn by written notice received at any time before award. Proposals may be withdrawn in person by an offeror or an authorized representative, if the representative's identity is made known in writing and the representative signs a receipt for the proposal before award.

## B.7 52.215-12 Restriction on Disclosure and Use of Data

Offerors or quoters who include in their proposal or quotations data that they do not want disclosed to the public for any purpose except for evaluation purposes by Reclamation and the ranking committee, shall:

(a) Mark the title page with the following legend:

This proposal or quotation includes data that shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed—in whole or in part—for any purpose other than to evaluate this proposal or quotation. If, however, an agreement is awarded to this offeror or quoter as a result of—or in connection with—the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting agreement. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in sheets [insert numbers or other identification of sheets].

(b) Mark each sheet of data it wishes to restrict with the following legend: "Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal or quotation."

## B.8 52.215-4 Explanation to Prospective Offerors

Any prospective offeror desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must request it in writing soon enough to allow a reply to reach all prospective offerors before the submission of their offers. Oral explanations or instructions given before the award of the agreement will not be binding. Any information given to a prospective offeror concerning solicitation will be furnished promptly to all other prospective offerors as an amendment of the solicitation, if that information is necessary in submitting offers or if the lack of it would be prejudicial to any other prospective offerors.

## B.9 52.215-6 Contract Award

(a) Reclamation will award agreements resulting from this solicitation to the responsible offerors whose offers, conforming to the solicitation, will be most advantageous to the Government, cost or price and other factors specified elsewhere in this solicitation, considered.

(b) Reclamation may (1) reject any or all offers if such action is in the public interest, (2) accept other than the lowest offer, and (3) waive informalities and minor irregularities in offers received.

(c) Reclamation may award an agreement on the basis of initial offers received, without discussions. Therefore, each initial offer should contain the offeror's best terms from a cost or price and technical standpoint.

(d) Reclamation may accept any item or group of items of an offer, unless the offeror qualifies the offer by specific limitations. Reclamation reserves the right to make an award on any item for a quantity less than the quantity offered, at the unit cost or prices offered, unless the offeror specifies otherwise in the offer.

(e) A written award or acceptance of offer mailed or otherwise furnished to the successful offeror within the time for acceptance specified in the offer shall result in

a binding agreement without further action by either party. Before the offer's specified expiration time, Reclamation may accept an offer (or part of an offer, as provided in paragraph (d) above), whether or not there are negotiations after its receipt, unless a written notice of withdrawal is received before award. Negotiations conducted after receipt of an offer do not constitute a rejection or counteroffer by Reclamation.

(f) Neither financial data submitted with an offer, nor representations concerning facilities or financing, will form a part of the resulting agreement. However, if the resulting agreement contains a clause providing for price reduction for defective cost or pricing data, the agreement price will be subject to reduction if cost or pricing data furnished is incomplete, inaccurate, or not current.

## B.10 Retention/Disposition of Materials

Offers submitted in response to this proposal will not be returned but will be retained by the Government for official record purposes. Proposal material supplied to the offeror by Reclamation (including attachments and specifications) need not be returned to the procuring office but may be disposed of at the discretion of the offeror unless otherwise specifically directed.

## B.11 Submission of Offers

(a) Offers and modifications thereof shall be submitted to the address below by not later than __:__ p.m. MST, _____, 1996. Proposals shall be submitted in sealed envelopes or packages and clearly labeled "Salinity Control Program Proposal." Proposals shall show the time specified for receipt and the name and address of the offeror. Proposals shall be addressed to:

Bureau of Reclamation
Attention: UC-462
Mail Room 6107
125 South State Street
Salt Lake City UT 84138-1102

## B.12 52.215-15 Failure to Submit Offer

Recipients of this solicitation not responding with an offer should not return this solicitation, unless it specifies otherwise. Instead, they should advise the issuing office by letter or postcard whether they want to receive future solicitations for similar requirements. If a recipient does not submit an offer and does not notify the issuing office that future solicitations are desired, the recipient's name may be removed from the applicable mailing list.

## B.13 52.233-2 Service of Protest

(a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO) or the General Services Administration Board of Contract Appeals (GSBCA), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from the Bureau of Reclamation, Attention: Contracting Officer, 125 South State Street, Room 7229, Salt Lake City, Utah 84147.

(b) The copy of any protest shall be received in the office designated above on the same day a protest is filed with the GSBCA or within 1 day of filing a protest with the GAO.

# SECTION C
# EVALUATION CRITERIA

Cost-effectiveness (the cost to control each ton of salt) is Reclamation's primary criteria for ranking its implementation priorities. In implementing its new program, Reclamation will adjust the ranking (not cost effective-ness) to consider a variety of performance risk factors. These will include the uncertainty in both program costs and tonnage reductions.

In 1984, the Act was amended to direct the Secretary to give preference to units that reduce salinity at the least cost per unit of salinity reduction (or cost effectiveness). Cost effectiveness is defined as the salinity program's cost per ton to prevent salt from entering the Colorado River System. Conceptually, cost effectiveness is analogous to determining the cost per mile to own and operate a car. That computation combines the annual expenses (loan payments, gas, maintenance, etc.) and divides by the miles traveled each year. A key to understanding this approach is to appreciate that even though the Government may not necessarily borrow money to construct facilities, the Government evaluates all projects as if the money is borrowed from a loan institution and repaid in annual installments over the life of the project. This process yields an annual cost to match the annual salt removal, or cost per ton. This economic evaluation principle is required by the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*, March 1983. This analysis lends consistency in the comparison of non-federally financed alternatives (which must borrow funds) to federally financed projects.

## C.1 General

Each proposal will be evaluated using the following selection factors:

(a) Cost effectiveness, or the annual cost for each ton of salt load reduction, expressed in dollars per ton.

(b) Performance risk. Performance risk will evaluate the cost and effectiveness risks of the proposal.

## C.2 Cost Effectiveness

The objective of the salinity control program is to maintain the Colorado River Basin water quality standards. To be effective at meeting this goal, projects must be located above all three of the gauging stations used to monitor compliance with the standards. The most upstream gauge is located just below Hoover Dam on the Nevada/Arizona border.

Cost effectiveness shall be computed by the offeror in three steps by:

(a) Amortizing the capital costs associated with constructing or implementing the proposal. This includes all costs of planning, NEPA compliance, technical assistance, education, design, permitting, financing, construction, mitigation, overhead, and other one-time costs for which the offeror will seek reimbursement from the Government under the terms of the agreement. If applicable, the estimated cost of Government assistance shall also be included in the amortization of capital costs. The amortization will be computed over the useful life of the project using an interest rate of __ percent. Each proposal shall be developed to a sufficient level of detail to enable Reclamation to perform an independent evaluation of the amortization.

(b) Calculating the average annual costs associated with operating or implementing the proposal. This includes all annual costs of providing technical assistance, education, monitoring, facility operation and maintenance, mitigation operation and maintenance, and other annual or reoccurring costs for which the offeror will seek reimbursement from the Government under the terms of the agreement. Irregular or non-uniform annual costs shall first be capitalized to present worth costs and then amortized to uniform annual costs over the useful life of the project using an interest rate of __ percent. Replacement costs *should* be included as an annual operation and maintenance cost if these replacements are required to sustain salinity control benefits over the useful life of the project and reimbursement will be sought under the terms of the agreement. If applicable, the estimated cost of annual or recurring Government assistance shall also be included in the average annual cost calculation. Each proposal shall be developed to a sufficient level of detail to enable Reclamation to perform an independent evaluation of operation, maintenance, and replacement costs.

(c) Adding amortized capital costs and average annual costs and dividing this combined annual cost by the annual number of tons of salt load reduction, thereby determining the annual cost per ton of salt load reduction. If projected salt load reduction varies over the life of the project, the average annual salt load reduction should be used to determine the annual cost per ton of salt load reduction.

Each proposal shall be developed to a sufficient level of detail to perform an independent evaluation of project benefits; i.e., the annual number of tons of salt load reduction.

## C.3 Performance Risk

The Act directs that cost effectiveness (least cost per ton of salinity control) be a prime criteria for ranking and selecting projects. However, it is rare that the actual performance of a project can be estimated precisely. Some methods of salinity control are more variable than others in their implementation. Under certain circumstances, accepting some risk may reduce the program's costs. The ranking needs to consider that the most cost-effective proposals often have a degree of performance risk and whether this risk is acceptable.

Performance risk evaluation will be used to adjust the ranking of proposals to consider the reliability of the cost and salt load reduction estimates used in the cost-effectiveness computations. The evaluation will include:

- **Investment security** - Upfront funding or high initial payments for projects may add to the program's exposure to cost overruns, failures, and defaults. Proposals where the program pays as salt is produced or as facilities are completed, inspected, and placed into operation greatly reduce this risk.

  All proponents will be required to limit (cap) the program's costs through performance bonds or other guarantees. Otherwise, the lack of detailed plans, geological surveys, cost estimates, adequate contingencies, environmental compliance documents, detailed fish and wildlife mitigation plans, or state and local permitting, zoning, and water rights would increase the potential costs to the program and severely down rate the proposal's cost-effectiveness ranking.

- **Cost escalation** - In the case of privately financed projects that are reimbursed annually, broad-based inflation adjustments may add a small degree of risk. Highly volatile indexes may add a higher degree of risk.

- **Methods used to predict salt load reduction** - For example, industrial use or desalting of a known quantity and concentration of brine would normally have few risks associated with this category of performance risk, as long as the waste stream were handled correctly. Irrigation projects and other nonpoint source projects, where the regional salt loading is directly measured, computer modeled, and allocated to each of the different sources, will have somewhat more risk in this category, depending upon the accuracy of the regional salt loading measurement. Projects that rely on only one measurement (like soil salinity) that is not corroborated through other independent methods or measurements would have the highest risk.

- **Project life** - The project life is used in the amortization of the project's capital costs and cost-effectiveness computation. Overly optimistic estimates of project life bias the cost-effectiveness computation. The life expectancy of new technologies are generally less reliable than older, "time-tested" technologies. Also, some technologies tend to have more risk than others. Deep well injection has a relatively high risk due to the uncertainties involved in estimating the well's receiving capacity and life. Pipelines tend to be more reliable than open ditches that are exposed to the local weather.

- **Operation and maintenance (O&M)** - Some proposals may be more or less susceptible to poor O&M practices. To minimize this risk factor, sponsors may propose "robust" solutions that require relatively little maintenance. For example, buried irrigation laterals require little attention, while open concrete ditches are more prone to weathering and require annual maintenance to remain fully effective.
  The ranking team will consider the risk that the program's capital investments may be lost from poor maintenance. In the past, Reclamation has provided supplemental, annual O&M funding to maintain certain projects. Reclamation has found this difficult to fund and administer. If essential to the continued performance of the project, the program will consider (or may require) funding an O&M trust to cost share the maintenance of capital improvements and safeguard the program's investment. If funded by the program, this cost would be included in the proposal's cost-effectiveness computation.

- **Management** - Generally, projects that rely on a high degree of management to maintain their efficiency will be downgraded unless there is reason to believe it is sustainable. Highly automated systems that are simple to operate will reduce this risk. For example, automatic sprinkler shutoffs would improve management risk.

- **Measurable or verifiable results** - Projects for which the salt load reduction can be independently verified add a degree of certainty to the proposal. For example, interception of saline springs is a highly verifiable method (both water volume and concentration can be directly measured). Irrigation delivery system improvements are somewhat more difficult to measure, but shallow monitoring wells next to the lined canal can confirm the absence of seepage, and drainwater can be used to measure concentration. Onfarm deep percolation reductions may vary significantly from farm-to-farm and year-to-year. Statistical sampling may be required.

- **Other factors** - Any factors that might reduce the expected performance and degrade the actual (realized) cost effectiveness of the project.

Although the details of each proposal will be evaluated for performance risk, the following practices would typically rank from lowest risk to highest risk:

- Industrial processes that interrupt brine source, treat the brine, produce a measured (weighed) product, and bill the program. Payments are made annually as salt is produced (or controlled). Measurement of salt is very accurate and only influenced by moisture content, scale accuracy, or laboratory analysis errors. If the program only pays for salt as it is produced and weighed, there is no risk from poor maintenance or management.

- Physical improvements like canal and lateral lining which are least subject to "management" risk but are subject to hydrosalinity monitoring and allocation errors. In the Grand Valley Unit, canal and lateral lining has been proven to be very effective at eliminating seepage. Some uncertainty remains from the regional salt loading estimate and its allocation. For example, in the Grand Valley Unit, the regional salt pickup was estimated by the U.S. Geological Survey to be between 480,000 to 680,000 tons per year. Cost effectiveness

should be based on the average regional salt pickup. In the case of the Grand Valley Unit, this was 580,000 tons per year, equalizing the upside and downside risk caused by the uncertainty of the regional salt pickup estimate.

- Physical improvements like sprinkler systems or automated irrigation systems which are less prone to "management" risk. These types of improvements are subject to uncertainty in the actual management of the system as well as the regional salt loading estimate and its allocation between sources.

- Irrigation management. These types of improvements are highly sensitive to the degree of irrigation management and are much less reliable than automated improvements. These practices are easily abandoned and require continued technical assistance to sustain in the field. Irrigation management can be effective if its initial costs are low and the technical assistance is provided through the project's life to sustain its benefits.

## C.4 Negotiation

If discussions are necessary, the Contracting Officer (CO) will enter into such discussions with those offerors whose response to this RFP falls within the competitive range. The competitive range will be established by the CO after the initial evaluation of the proposals. The CO will determine which proposals are in the competitive range in accordance with the procedures set forth in Federal Acquisition Regulation 15.609. Following negotiations, proposals will be reevaluated, scored and ranked according to the criteria contained in sections C.2 and C.3 above.

## C.5 Notice of Possibility of Award Without Discussion

Offerors are cautioned to review carefully all terms, conditions, and specifications of the solicitation prior to submission of proposals. If the proposals received clearly demonstrate the existence of adequate competition, and, if acceptance of the most favorable initial proposal(s) without discussions would result in a fair and reasonable price for the work and represent the lowest overall cost to the program, then Reclamation reserves the right to accept initial proposals without discussion. Offerors are cautioned that each proposal should be prepared based on the most favorable technical terms that can be submitted, since acceptance of an initial offer by Reclamation will result in a legally binding agreement.

## C.6 Responsibility Survey

If an offer submitted in response to this solicitation is favorably considered and included in the competitive range, a Government survey team may contact the offeror's facility or other sources to determine its financial and technical ability to perform the work. Current financial statements and other data required to make these determinations shall be made available to the survey team.

## C.7 Award Determination

Proposals will be evaluated to determine those offers that are within the competitive range, considering technical and other factors stated in the solicitation. Negotiations may be conducted with all offerors whose proposals are determined to be technically acceptable or technically acceptable with modification and are included in the competitive range.

# SECTION D
# AGREEMENT ADMINISTRATION DATA

## D.1 Government Administration Personnel

The purchasing office representative responsible for overall administration of the agreement is:

Bureau of Reclamation
Attention: UC-462
125 South State Street
Mail Room 6107
Salt Lake City UT 84138-1102
Phone: (801) 524-6210 ext 2
Faxogram: (801) 524-5499

## D.2 Contractor Administration Personnel

Please designate a person who will be in charge of overall agreement administration:

Name:

Title:

Address:

City and State:

Telephone No.: