

Statement of  
Lloyd A. Duscha, U.S. Army Corps of Engineers (retired), and  
Member, Committee on Organizing to Manage Construction and Infrastructure  
in the 21 st Century Bureau of Reclamation

Board on Infrastructure and the Constructed Environment  
Division on Engineering and Physical Sciences  
National Research Council

before the

Subcommittee on Water and Power  
Committee on Resources  
U.S. House of Representatives

April 5, 2006

Good afternoon, Mr. Chairman and members of the Committee. My name is Lloyd Duscha. I am retired from the U.S. Army Corps of Engineers, and I served on the National Research Council committee that authored the report *Managing Construction and Infrastructure in the 21 st Century Bureau of Reclamation*. The report was requested by the Department of Interior. The National Research Council is the operating arm of the National Academy of Sciences, National Academy of Engineering, and the Institute of Medicine of the National Academies, chartered by Congress in 1863 to advise the government on matters of science and technology. It is a pleasure to be here to discuss our report on this important topic.

#### General Summation

The study committee was comprised of 12 experts from the public and private sectors and academia assembled for the purpose of advising the Bureau of Reclamation and the department on the “appropriate organizational, management, and resource configurations to meet its construction, maintenance, and infrastructure requirements for its missions of the 21st century.” To accomplish its task, the study committee met as a whole four times from February to August 2005 and conducted small-group site visits to offices and projects in each of the five Reclamation regions. We received briefings from and had discussions with Reclamation staff, its customers, and other stakeholders. We also spoke with representatives of organizations with missions similar to Reclamation’s including the U.S. Army Corps of Engineers, the Tennessee Valley Authority, and the California Department of Water Resources.

In recent years, Reclamation’s focus and workload have shifted from building dams, power plants, and other infrastructure to operating, maintaining, repairing, and modernizing them, from constructing dams to evaluating dam safety and mitigating the risk of potential failure, and to addressing environmental issues. At the same time, growth in the Western states has spurred demand for water and power. Reclamation will be challenged to find ways to manage water and power so that it can meet future demands. The Department of Interior and Bureau of Reclamation have recognized this challenge for the twenty-first century and the need for the bureau to make the transition from construction to resources management. Its mission continues to be the effective management of power and water resources in ways that protect the health, safety, and welfare of the American public and that are environmentally and economically sound. Achieving these objectives is a dynamic, complex, and uncertain matter.

The study committee observed that Reclamation’s five regions have different organizational structures, capabilities, and workloads. In general, the regions appeared to be functioning well in the face of challenges typical to this type of endeavor. Staff morale and loyalty to Reclamation’s mission are commendable. Nevertheless, Reclamation, like most federal agencies, is challenged by changing requirements and the need to maintain its core competencies.

Each of the five regions is responsible for sustaining a significant portfolio of facilities. Examples of excellence were evident. However, in general, the regions need to evaluate their inventory of assets and manage them more aggressively over the life cycle, and to engage in constructive relationships with customers and stakeholders. If Reclamation wants to demonstrate consistency throughout the organization under its style of decentralized management, clear, detailed policy directives and standards are needed to enable all elements to implement a uniform, structured approach. A delicate balance needs to be maintained so as not to impede decentralized units from demonstrating initiative and increasing their capabilities. At the same time, we emphasize that Reclamation, as the owner, has the responsibility to ensure that its facilities are planned, designed, constructed, and managed with a level of quality that is consistent throughout the organization.

We believe that Reclamation will continue to require centralized technical services, research, and oversight to support the local management of resources; however, the study committee also sees a need to evaluate the size and organizational structure of the central units to ensure that services are delivered efficiently and at a reasonable cost to Reclamation customers. Both the organization and quantity of services provided at the central, regional, and area offices are affected by how services that are not inherently government functions are outsourced.

The study committee recognizes that organizations can and do take on a variety of structures with varying degrees of success. Some will function successfully despite their structure, while others will falter even as they deploy the best of theoretical forms. The internal culture and history of an organization play a significant role in determining the appropriate structure and the ultimate outcome. We believe that the organizational structure of Reclamation is basically appropriate for its customer-driven mission to deliver power and water. Nevertheless, we also believe that there are opportunities to improve the construction and management of its facilities and infrastructure, as well as the management, development, and protection of water and related resources in an environmentally sound manner.

## Conclusions and Recommendations

A number of important factors, realities, and issues have major impacts on Reclamation's ability to respond quickly and effectively to the many diverse pressures and rapid changes occurring today. Equally important are the capabilities that are needed within Reclamation to deal effectively with the challenges posed by these impacts. Although the core of Reclamation's basic mission remains much the same—to deliver water and to generate power in 17 western states—how that mission is carried out is constrained by and must be responsive to several realities:

- *Environmental factors.* The environmental revolution of the last decades of the twentieth century imposed new requirements to protect ecosystems and mitigate the impact of development on fish and wildlife. Engineers and builders must be both environmental experts and water resource experts.
- *American Indian water rights and rural water needs.* American Indian water agreements and growing demands to provide adequate supplies of good quality water to small rural communities place new demands on the regulation of river flow and storage and distribution systems.
- *Urbanization.* Land is being taken out of agricultural production in many areas of the West and being developed for industrial, commercial, and residential purposes.
- *Increasing budget constraints.* Reclamation's budget has been effectively shrinking for many years, even as the needs have increased.
- *Broader set of stakeholders.* Water users of all types—farmers, power distributors, consumers, homeowners, environmentalists, Indian tribes, and virtually everyone else who uses water and power in the 17 western states—are impacted by and pay in some way for what the bureau does.
- *Aging workforce.* Reclamation's skilled and experienced personnel will be retiring in large numbers over the next 5 to 15 years.
- *Aging infrastructure.* Most of Reclamation's major dams, reservoirs, hydroelectric plants, and irrigation systems are 50 or more years old.
- *Shift from design and construction to operations and maintenance.* Operations and maintenance (O&M) activities will form a major part of the workload.
- *Title transfer.* Transferring ownership of government-owned facilities to nonfederal agencies and the private sector, while reducing Reclamation's O&M workload, introduces budgetary and oversight issues that may necessitate new business models.
- *Water user operation of government-owned facilities.* Reclamation has turned over and will undoubtedly continue to turn over some of its facilities to water user groups, often local water districts, for operation, maintenance and—sometimes—rehabilitation and new construction.
- *New modes of augmenting the water supply.* In the absence of significant climate change or major technological breakthroughs, water resources will remain constant, while demand can be anticipated to increase.
- *Increase in the number of small projects.* Although demand for large new projects will remain low, it is likely that demand for small water storage, irrigation, and distribution projects will increase.

In view of the preceding constraints, the study committee made several recommendations for Reclamation to develop the appropriate organizational, managerial, and resource configurations to meet its construction, maintenance, and infrastructure requirements for its twenty-first century missions. I should point out that our recommendations were purposely general in nature. The study committee believed that the specifics could be best developed internally where more detailed knowledge resides. Such an approach also enables those affected to play a role in establishing ownership and developing loyalty to the plan.

### Centralized Policy and Decentralized Operations

To optimize the benefits of decentralization, Reclamation should promulgate policy guidance, directives, standards, and how-to documents that are consistent with the current workload. The commissioner should expedite the preparation of

such documents, their distribution, and instructions for their consistent implementation. Reclamation's operations should remain decentralized and guided and restrained by policy but empowered at each level by authority commensurate with assigned responsibility to respond to customer and stakeholder needs. Policies, procedures, and standards should be developed centrally and implemented locally. The design groups in area and project offices should be consolidated in regional offices or regional technical groups to create a critical mass that will allow optimizing technical competencies and provide efficient service. Technical skills in the area offices should focus on data collection, facility inspection and evaluation, and routine operations and maintenance (O&M).

### Technical Service Center and Reclamation Laboratory and Research Activities

The commissioner should undertake an in-depth review and analysis of the Technical Service Center (TSC) to identify the needed core technical competencies, the number of technical personnel, and how the TSC should be structured for maximum efficiency to support the high-level and complex technical needs of Reclamation and its customers. The proper size and composition of the TSC are dependent on multiple factors, some interrelated:

- Forecasted workload,
- Type of work anticipated,
- Definition of activities deemed to be inherently governmental,
- Situations where outsourcing may not be practical,
- Particular expertise needed to fulfill the government's oversight and liability roles,
- Personnel turnover factors that could affect the retention of expertise, and
- The need to maintain institutional capability.

This assessment and analysis should be undertaken by Reclamation's management and reviewed by an independent panel of experts, including stakeholders.

The workforce should be sized to maintain the critical core competencies and technical leadership, and to increase outsourcing of much of the engineering and laboratory testing work. Alternative means should be explored for funding the staff and operating costs necessary for maintaining core TSC competencies, thereby reducing the engineering service costs reimbursable by customers.

Reclamation's Research Office and TSC laboratory facilities should be analyzed to determine which specific research and testing capabilities are required now, and in the future; which of capabilities can be found in other government organizations, academic institutions, or the private sector; which physical components should be retained; and which kinds of staffing are necessary. The assessment should recognize that too great a reliance on outside organizations can deplete an effective engineering capability that, once lost, is not likely to be regained. In making this assessment Reclamation should take into account duplication of facilities at other government agencies, opportunities for collaboration, and the possibility for broader application of numerical modeling of complex problems and systems. Because many of the same factors that influence the optimum size and configuration of the TSC engineering services also apply to the research activities and laboratories, Reclamation should consider coordinating the reviews of these two functions.

### Outsourcing

Reclamation should establish an agency-wide policy on the appropriate types and proportions of work to be outsourced to the private sector. O&M and other functions at Reclamation-owned facilities, including field data collection, drilling operations, routine engineering, and environmental studies, should be more aggressively outsourced where objectively determined to be feasible and economically beneficial.

### Planning for Asset Sustainment

Benchmarking of water distribution and irrigation activities by Reclamation and its contractors should be a regular part of their ongoing activities. Because effective planning is the key to effective operations and maintenance, Reclamation should identify, adapt, and adopt good practices for inspections and O&M plan development for bureau-wide use. Those now in use by the Lower Colorado and Pacific Northwest regions would be good models. Reclamation should formulate comprehensive O&M plans as the basis for financial management and the development of fair and affordable repayment schedules. Reclamation should assist its customers in their efforts to address economic constraints by adopting repayment requirements that ease borrowing requirements and extend repayment periods.

### Project Management

Reclamation should establish a comprehensive set of directives for structured project management process for managing projects and stakeholder engagement from inception through completion and the beginning of O&M. Reclamation should also give high priority to completing and publishing cost estimating directives and resist pressures to submit projects for congressional authorization with incomplete project planning. Cost estimates that are submitted should be supported by a conceptual plan, environmental assessment, and design documents that are sufficiently complete to support the estimates.

Reclamation should establish a structured project review process to ensure effective oversight from inception through completion of construction and the beginning of O&M. The level of review should be consistent with the cost and inherent risk of the project. Oversight of large or high-risk projects should include the direct participation of the commissioner or his or her designated representative. The criteria for review procedures, processes, documentation, and expectations at each phase of the project need to be developed and applied to all projects, including those approved at the regional level.

A training program that incorporates current project management and stakeholder engagement tools should be developed and required for all personnel with project management responsibilities. In addition, project managers should have professional certification and experience commensurate with their responsibilities.

### Acquisition and Contracting

Reclamation should establish a procedure and a central repository for examples of contracting approaches and templates that could be applied to the wide array of contracts in use. This repository should be continually maintained and upgraded to allow staff to access lessons learned from use of these instruments.

### Relationships with Sponsors and Stakeholders

Making information readily available about processes and practices, both in general and for specific projects and activities, should be a Reclamation priority. Successful practices, such as those used in the Lower Colorado Dams Office, should be analyzed and the lessons learned should be transferred, where practical, throughout the bureau.

### Workforce and Human Resources

Reclamation should analyze the competencies required for its personnel to oversee and provide contract administration for outsourced activities. Training programs should ensure that those undertaking the functions of the contracting officer's technical representative are equipped to provide the appropriate oversight to ensure that Reclamation needs continue to be met by the contractor.

In light of the large number of retirements projected over the next few years and the potential loss of institutional memory inherent in these retirements, a formal review should be conducted to determine what level of core capability should be maintained to ensure that Reclamation remains an effective and informed buyer of contracted services. Reclamation should recruit, train, and nurture personnel who have the skills needed to manage processes involving technical capabilities as well as communications and collaborative processes. Collaborative competencies should be systematically related to job categories and the processes of hiring, training, evaluating the performance of, and promoting employees. Reclamation should facilitate development of the skills needed for succeeding at socially and politically complex tasks by adapting and adopting a small-wins approach to organizing employee efforts and taking advantage of the opportunities to celebrate and build on successes.

### Bureau of Reclamation Response

An important element in the study committee's ability to complete its assigned tasks was the support and participation of the bureau staff at all levels. The study committee appreciates the cooperation and support of Commissioner John Keys III and all of the Reclamation officials who assisted the committee in this review. Before completing our work, we became aware that the commissioner had directed the development of a detailed response to our recommendations. The NRC committee applauds this rapid and enthusiastic response. We are not in a position to provide a detailed analysis at this time, but it appears that Reclamation's response, *Managing for Excellence*, sets forth an action plan to address all of the issues identified in the NRC study. Many of the study committee's recommendations will require further analysis by Reclamation personnel, and changes that implement these initiatives may take considerable time. As noted in the NRC report, Reclamation should seek independent reviews of its assessments and organizational changes. Nevertheless, it appears that the Bureau, under strong leadership commitment, has made a good start.

This concludes my testimony. Thank you for the opportunity to discuss our report with you.

