



**Bureau of Reclamation  
POWER RESOURCES OFFICE**

# Business Plan

January 2003

Revised June 27, 2003

# EXECUTIVE SUMMARY

## ***Our Mission***

We provide cooperative leadership for Reclamation's Power Program.

## ***Our Core Values***

- Trust
- Integrity
- Respect
- Accountability
- Excellence
- Good Communication

## ***Our Vision***

A cohesive power community that positions Reclamation's Power Program to meet today's and tomorrow's challenges.

## ***The Key Initiatives That Will Achieve Our Vision***

1. Enhance the security, reliability and long-term viability of Reclamation's power facilities.
2. Strategically position Reclamation's Power Program for the future by identifying emerging issues and trends and develop corporate responses.
3. Enhance the core capability of Reclamation's power personnel.
4. Develop a cohesive power community by improving individual and organizational relationships.

# MANAGER'S MESSAGE



Our office works in a dynamic and fast-paced environment. To help us keep up with this environment and continue to provide quality products and services to our customers, we developed a business plan which we update on a periodic basis. This Plan integrates all facets of our organization and provides a roadmap for us to follow over the next two years.

The construction of our Business Plan uses many information sources. Customer and staff input is used to answer the following questions:

- Where are we now?
- Where do we want to go?
- How will we get there?

In the development of our business plan, we look at both internal and external issues facing our organization and then define our core values. These factors are used to construct a purpose statement and develop a clear vision for the future. To help achieve this vision, we articulate a number of key initiatives and action items.

Customer input is an important factor in the development of the Business Plan. Many of our customers, including Power Marketing Authorities (PMA's) and Reclamation Areas and Regions, are looking for us to provide leadership in defining the impact of power deregulation on Reclamation's operations. Many customers look upon us to be the voice of and the visionary for Reclamation's Power Program. Many of the Regions are also looking for us to provide policy and procedure leadership. This input and others not only effectively gauges how we are creating value for our customers but also how we can guide our organization to serve the best interests of all.

In our Business Plan, we analyze the power industry in which we operate. We define how deregulation within this industry will affect Reclamation's Power Program. We provide an overview of some of our accomplishments over the past few years as well as products and services we provide to our customers. We describe our internal operations as well as its costs.

Because we operate in a fast-paced, dynamic environment, we will revisit our Business Plan annually. We will measure progress towards our objectives and readjust strategy to meet the changing needs of all of our customers.

Deborah M. Linke  
Manager, Power Resources Office

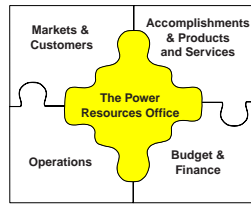
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# 1. THE POWER RESOURCES OFFICE



## 1.1. *Our Mission*

We provide cooperative leadership for Reclamation's Power Program.

## 1.2. *Our Core Values*

- Trust
- Integrity
- Respect
- Accountability
- Excellence
- Good Communication

## 1.3. *Our Vision*

A cohesive power community that positions Reclamation's Power Program to meet today's and tomorrow's challenges.

## 1.4. *The Key Initiatives That Will Achieve Our Vision*

Four key initiatives were developed to define the overall activities necessary to achieve our vision. While other initiatives were identified, these were determined to be the most important. Specific action items were then identified to accomplish the key initiatives. These initiatives and action items are certainly non-exhaustive; we will continue to do non-identified functions well.

### 1.4.1. Key Initiative I

Enhance the security, reliability and long-term viability of Reclamation's power facilities. Specific action items that will support this key initiative include:

- Provide corporate leadership on Reclamation's compliance with legal, regulatory and policy requirements.

- Complete Power Handbook
- Develop guidance as North American Electric Standards Board and NERC business and reliability standards are promulgated
- Identify needed Power Program Policy and related Directives and Standards and develop a work plan for each identified policy.
  - Revise Power Review of Operation and Maintenance Directive and Standard, Guidebook and checksheets
  - Revise Incident Reporting Directive and Standards, complete guidebook
  - Complete and issue Conduct of Operations FIST
  - Complete and issue Conduct of Power Maintenance FIST
  - Complete and issue Management of Power Facilities FIST
  - Assist in completing the power related sections of the Reclamation Safety and Health Standards
  - Evaluate need for further guidance on Hazardous Energy Control Program with Power Marketing Administrations and Regions
- Enhance the physical and cyber security of Reclamation power facilities
  - Participate on the Security Advisory Team
  - Develop Incident Response guidelines for power incidents
  - Develop recovery templates for power facilities capturing lessons learned on prior incidents
  - Develop a list of GSA schedule contracts in cooperation with the Corps of Engineers for security and recovery equipment and services
  - Develop guidance for emergency planning for power facilities
  - Develop Preventive Maintenance Templates on security and fire detection
  - Provide technical support
- Support Power O&M Reviews by coordinating the program, updating guidance, publishing CFR reports and tracking follow up on recommendations.
  - Complete CFR recommendations assigned to Power Resources Office
  - Develop Preventive Maintenance templates
  - Charter and provide first-year leadership to Powerplant Users Group for MAXIMO
  - Prepare Annual Report for PROM program
- Improve scheduled and planned outage times. First step is to investigate industry practices on scheduling
- With industry partners develop risk-based policies and approaches to Condition Assessments, Service Life Extension and required FASAB reporting of Deferred Maintenance.
  - Develop standard sets of tiered tests and observations
  - Validate existing tools on a pilot project
  - Develop tracking tools in Maximo

- Using a simplified approach compile information for first year and analyze
- Enhance WECC Reliability Related Security
  - Complete Western Electricity Coordinating Council Reliability Management System activities and reporting
  - Complete the NERC Self Certification for 2003
  - Monitor and implement changes to WECC RMS and NERC Compliance programs as required
  - Develop operating procedures as new practices emerge
  - Develop accurate database of equipment settings and ratings
  - Develop FIST Manual Abnormal Operating Procedures Technical Guidelines and establish training through presentations and the EPTC simulator
  - and provide training
  - Document and value emergency grid support
- Support and update the Incident Investigation Process to make it part of Reclamation culture
  - Follow up on outstanding recommendations
  - Develop a guidebook and deliver training on reporting
  - Empower employees to report incidents
  - Establish a relay users group
  - Review relay schemes and settings
- Provide Electrical and Mechanical Program Consultations
  - Continue to provide call-in technical support to field offices on electrical and mechanical equipment and systems to allow plant managers to better operate and maintain facilities
  - Continue to provide and maintain test and maintenance equipment and associated software to support power operations and maintenance needs
  - Continue to provide core technical expertise to advise Reclamation management on operations and maintenance policy
- Develop and publish FIST Volumes and Power Equipment Bulletins
  - Revised FIST 5-9-Safe Handling Procedures for SF6 Equipment
  - Revised FIST 3-1, Testing Solid Insulation of Electrical Equipment
  - Revised FIST 2-5 Turbine Repair
  - Revise FIST 5-1 Personal Protective Grounding
  - New FIST on Infrared Scanning and Analysis
  - New FIST on Transformer Deluge Systems
  - New Conduct of Power Operations FIST



- New Abnormal Operating Technical Guidelines FIST
- New Management of Power Operations FIST
- New Conduct of Power Maintenance FIST
- New SCADA FIST on operation, maintenance, testing and security
- Revise FIST 1-2, Operations and Maintenance Improvement Program
- Revise FIST 1-3, Reports and Records.
- New FIST on Transformer Diagnostics
- New Generator Cleaning and Drying FIST
- New PEB on Lubricant Testing
- New PEB on VSP Laser Alignment System
- New PEB on application of composite versus porcelain insulators
- New PEB on surge suppression on Protection Circuits
- New PEB on Generator Core Tightening
- New PEB on Pressure Relief Valve Testing
- New PEB on Starting Limitations of Large Motors
- Publish updated benchmarking data and explore ways to make it visible in plant and in organization
  - Develop safety benchmarking
  - Develop an extended/scheduled outage benchmark
  - Review availability calculation for consistency
  - Develop out of service cost data
- Continue corporate performance enhancement activities
  - Develop a “Best of Class” award for power plants

#### **1.4.2. Key Initiative II**

Strategically position Reclamation’s Power Program for the future by identifying emerging issues and trends and develop corporate responses. Specific action items that will support this key initiative include:

- Explore Standard Market Design proposal and its impact on Reclamation
- Participate in North American Electricity Standards Board development of business practices
- Participate on North American Electric Reliability Council Standards Advisory Committee processes to develop reliability practices
- Assist in identifying opportunities for customer funding
  - Work with power customers, Corps and Western to develop framework
  - Develop a target for customer financing

- Best position Reclamation hydropower and recognize Reclamation contribution to system services
  - Develop costs for providing system support ancillary services
- Provide representation and corporate perspective during Regional Transmission Organization formation
- Continue to provide heads up information on energy issues and standard marketing design, standards and rules changes
- Complete and publish the Power Resource Office Business Plan
- Develop and coordinate Reclamation's implementation of the National Energy Plan
  - Develop screening tool for turbine runner replacements and generator rewinds
  - Track accomplishments
  - Evaluate tools for optimization of hydropower within system legal constraints
- Investigate green credits and green certification for applicability for Reclamation Hydropower
- Continue to identify opportunities to use engineering solutions to meet multi-purpose and environmental demands on our projects
  - Assess potential of on-line diagnostics and on-line condition monitoring
  - Identify needed changes in Reclamation's power equipment required to comply with new market requirements
- Actively define Reclamation's roles in relation to and act upon key energy initiatives, proposed legislation, and reliability council initiatives

#### **1.4.3. Key Initiative III**

Enhance the core capability of Reclamation's power personnel. Specific action items that will support this key initiative include:

- Implement policies for Reclamation's power Operations & Maintenance (O&M) career development and training initiative
- Develop a corporate strategy for training, developing and maintaining the skills of our power staff
  - Publish a power personnel succession analysis every two years
  - Establish a training benchmark for power personnel
  - Develop Power Operations, Electrical and Mechanical Training Modules and accredit them for college credit
- Identify opportunities for facility best practices exchange program throughout Reclamation
- Develop a power pilot based on the Power Workforce Analysis
  - Pay banding

- Repayment of student loans
- Mentoring
- Continue to present the Power Leadership Course
- Develop and hold the Power O&M Workshop
- Hold a Power Reviewers Workshop
- Continue to strengthen the Power Resources Office core capabilities
  - Complete annual Individual Development Plans (IDP's) for our staff
  - Implement Individual Career Plans (ICP's) for our staff
  - Facilitate details among office for power personnel
  - Strengthen our culture by instituting mission and values

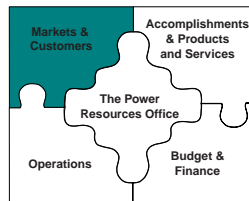
#### **1.4.4. Key Initiative IV**

Develop a cohesive power community by improving individual and organizational relationships. Specific action items that will support this key initiative include:

- Continue partnership efforts with Western Area and Bonneville Power Marketing Administrations
- Enhance our relationship with the U.S. Corps of Engineers and other hydropower operators to identify and discuss best practices
- Establish a relationship with Tennessee Valley Authority – specifically Norris labs and research capabilities and Power Service Shop's capabilities, in addition to exchanging Best Practices with TVA's hydro power program experts`
- Enhance our ongoing power O&M partnership with Hydro Quebec
- Provide regular accomplishment reports for Regional Power Managers to share with Area Managers and Plant Personnel
- Gather feedback annually to determine power community needs and develop initiatives around those needs.
- Continued use of website to share information and accomplishments
- Provide weekly contributions to the Commissioner's update
- Coordinate with the TSC to provide needed technical information and assistance to Reclamation's hydroelectric facilities
- Implement Commissioner's assignments
- Continue the process to provide PRO expenditure forecasts and reporting expenditures
- Meet with Power Managers quarterly, conduct telephone conference calls as needed.
- Communicate Power Program successes through the Internet and the quarterly Power Program Newsletter
- Upon revision, distribute the Business Plan to all customers and post it on the Internet
- Periodic visits to regional and area power offices by PRO manager

- Continue work with Electric Utility Cost Group and Canadian Electric Association Hydraulic Power Life Improvement Group
- Evaluate partnership opportunities with EPRI on hydro-research, operations and maintenance practices, and optimization.
- Continue to share Reclamation's power program successes through participation in the International Energy Agency Hydropower Agreement and the International Hydropower Association

## 2. MARKETS & CUSTOMERS



### 2.1. *Current Market Environment*

Hydropower plays an important part in the U.S. electric power industry. In 2001, hydropower, including pumped storage, provided approximately 6 percent of U.S. electrical production (See Figure 1). Even though total energy produced by hydropower continues to grow, total energy produced by other power sources such as fossil fuel has increased at a faster rate.

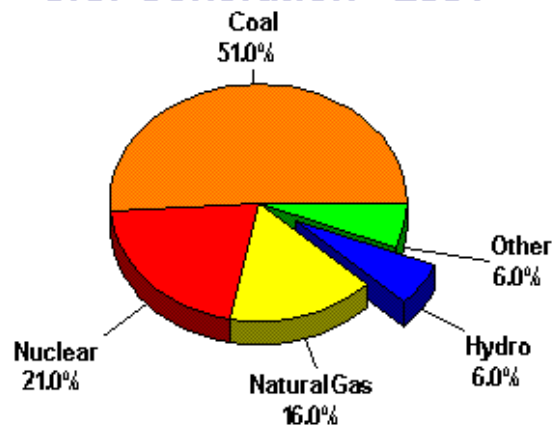
The power produced at Reclamation's facilities is generally used to assist in the delivery of water. Power Marketing Administrations (PMA's) market the power produced that is surplus to Reclamation's needs for delivery of project water. The two PMA's that sell surplus power generated by Reclamation are the Bonneville Power Administration (BPA) and the Western Area Power Administration (Western). PMA's sell the power at the lowest possible rates consistent with sound business practice. Preference for this surplus power is given to municipalities and other power distributors.

The electric power industry is currently being deregulated. This deregulation will impact Reclamation's operations. The transition is one from a vertically integrated, regulated, and monopolistic structure to one that is more competitive and dynamic. Deregulation allows industry players to compete in providing power services by allowing these players to set their own prices. As this happens, competition occurs, which can lead to pricing, reliability and maintenance issues for Reclamation's power facilities. The message from the PMA's is to do the right things to recover costs and improve the performance of Federal generation as a cost effective business decision in this fast changing environment.

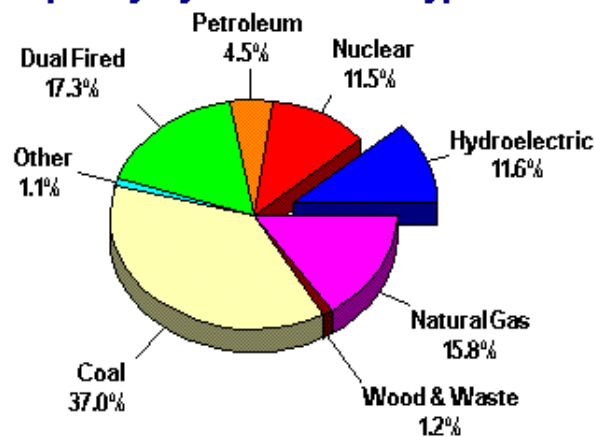
### 2.2. *Future Market Trends*

Today, U.S. hydropower assets represent over 98,900 MW of installed capacity. Hydropower supplies about 11.6 percent of the electrical generating capacity of the United States but, primarily due to drought, produced only 6 percent of the generation in 2001. Coal-fired steam generation continues to be the number-one source of electricity in the United States (see Figure 2).

**Figure 1  
U.S. Generation - 2001**



**Figure 2  
U.S. Capacity by Generation Type - 2001**



Electricity deregulation will continue to shape the power industry and Reclamation's Power Program. While some new generation is being constructed, the uncertainty of a de-regulated environment continues to discourage private investments to refurbish and modernize plants, add new generation, and particularly to build new transmission lines. Deregulation will continue to progress on a state-by-state basis as the U.S. becomes a collection of electricity markets in various stages of liberalization.

The Federal Energy Regulatory Commission (FERC) is presently exploring the concept of a Standard Market Design and is advocating the development of a seamless Western Interconnection market and transmission system. At present, there are three Regional Transmission Organizations (RTOs) proposed or in place in the west. The Seams Interface Work Group has been tasked with resolving differences among these RTOs.

### 2.3. Market Impact of Deregulation

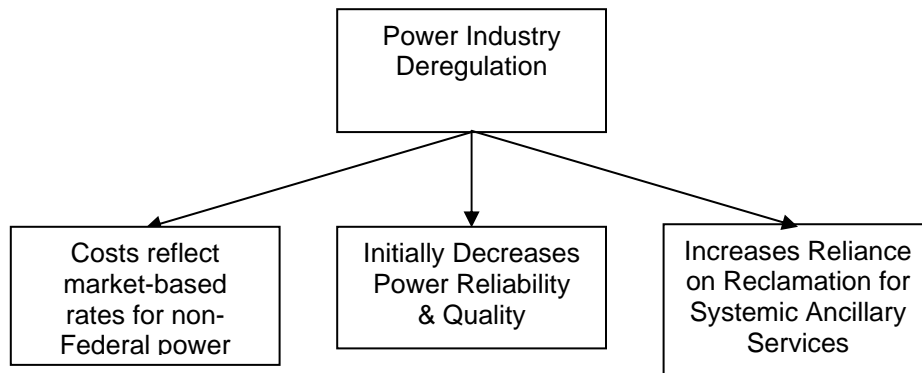
Reclamation's hydroelectric operations are going to continue to be greatly impacted by deregulation of the power industry. To understand how this environment will impact Reclamation's operations, it is important to understand how power generators are affected.

In the new deregulated power structure, power prices are based on supply and demand. Because of this, power merchants and grid operators are attempting to do two things:

1. Attempt to operate the most efficient plants possible
2. Capture this cost efficiency and pass this benefit onto customers in the form of lower prices

More specifically, the deregulated environment will affect Reclamation's power program on three fronts:

**Figure 3**  
**The Impact of Power Industry Deregulation on Reclamation**

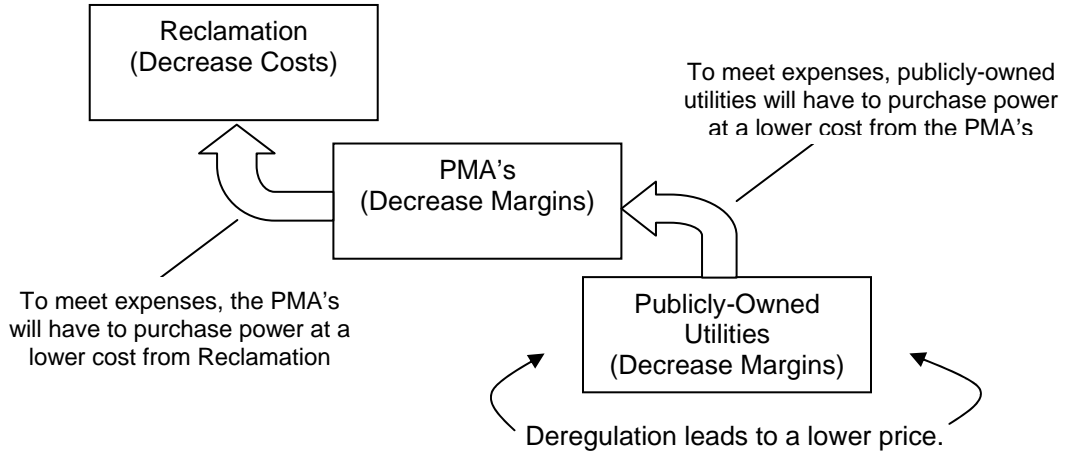


Deregulation within the power industry will compel Reclamation to perform more efficiently, improve its power reliability and quality, and increase the confidence of its customers.

#### 2.3.1. Cost

The biggest impact of deregulation on Reclamation's Power Program is the need to deliver full value for our projects and the PMA customers in all aspects of Reclamation's program (power, irrigation, flood control, recreation, fish and wildlife). As Federal power is marketed on a cost-to-produce basis, it is necessary that we operate in a cost effective, environmentally sensitive way, consistent with the statutory authorities of Reclamation and the PMA's. The pressure is on to do the right thing at the right time to produce the greatest value for the cost. This will include strategies such as condition based maintenance, just in time capital investments, and rehabilitation work to maintain the viability of our assets and to keep our units productive and competitive in the future.

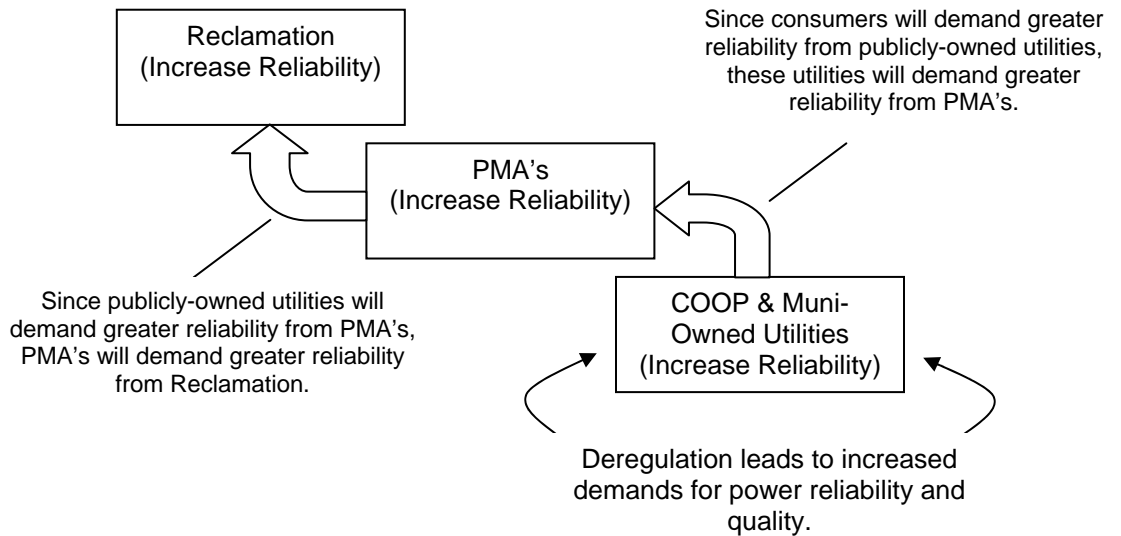
**Figure 4**  
**Deregulation & the Cost of Generating Power**



**2.3.2. Power Reliability & Quality**

Deregulation allows customers to choose their power supplier. A factor that influences customers' choice of power supplier besides price is reliability and quality. The California market failure and the impacts on the consumer are causing customers to demand a higher level of reliability from publicly-owned utilities. This reliability factor trickles back to PMA's and ultimately to Reclamation. Therefore, Reclamation's power plants will have to maintain power quality and reliability of their units by increasing their availability factor, decreasing forced outages, and decreasing scheduled outages. Reclamation will also continue to optimize hydro generation while maintaining other water priorities and responsibilities.

**Figure 5**  
**Deregulation & Power Reliability and Quality**





### **2.3.3. Increasing Reliance on Reclamation for Systemic Services**

An additional impact of deregulation on Reclamation results from the lack of investment in new and upgraded generation. System reserve margins are dropping as population in the West is increasing. As the system and grid are stressed, neighboring utilities are turning to Reclamation generation to assure system reliability and stability. This results in additional wear and tear on Reclamation generation facilities. Reclamation will continue to be a competitive generator of power in the new deregulated market only if the maintenance and replacement of power facilities is approached in a disciplined manner.

## ***2.4. Customers and Customer Relations***

Ensuring that the PRO and all of Reclamation's hydroelectric operations provide the highest quality service to the American public, requires close coordination with and commitment to all of its customers, both internal and external. These customers include:

### **2.4.1. Bureau of Reclamation**

- Commissioner's Office
- Office of Policy
- Technical Service Center
- Regional Offices
- Area Offices

### **2.4.2. Federal Agencies**

- Department of Energy
- Bonneville Power Administration
- Western Area Power Administration
- Energy Information Administration
- Federal Energy Regulatory Commission
- U.S. Army Corps of Engineers
- Office of Management and Budget
- Bureau of Indian Affairs
- Fish and Wildlife Service
- National Park Service

### **2.4.3. Electric Utilities**

- Independent Power Producers
- Investor Owned Utilities
- Public Power Utilities

#### **2.4.4. Reliability and Standards Councils**

- North American Electric Reliability Council
- Western Electricity Coordinating Council
- North American Energy Standards Board

#### **2.4.5. Industry Partners and Professional Societies**

- American Society of Civil Engineers (ASCE)
- Institute of Electrical and Electronic Engineers (IEEE)
- American Public Power Association (APPA)
- National Hydropower Association (NHA)
- Canadian Electricity Association (CEA)
- Electric Utility Cost Group (EUCG)
- International Hydropower Association (IHA)
- International Energy Agency (IEA)

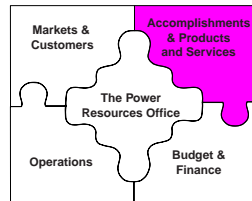
The PRO will serve these entities in accordance with Reclamation's principles of customer service:

- We will always treat our customers with courtesy and respect.
- We will promptly answer our customers' questions with accurate, objective information.
- We will resolve our customers' needs through single-point contact whenever possible – our customers will not receive the “run-around.”
- We will provide educational information to our customers about the resources we manage, their use, and the laws and regulations governing their use.
- We will use language that our customers can easily understand.
- We will ask for and consider our customers' ideas about agency plans, programs, and services.
- We will promptly respond to our customers' suggestions, concerns, and complaints.

In the new deregulated power environment, we plan to work closely with Reclamation Areas and Regions and PMA's in a continuing assessment of the role of Reclamation's hydroelectric operations, and developing appropriate strategies that will allow Reclamation to serve the power needs of all of its customers.

Our customer service activity will continue to be a dynamic, continuous process that promotes awareness of energy issues, opportunities, and accomplishments of individual tasks.

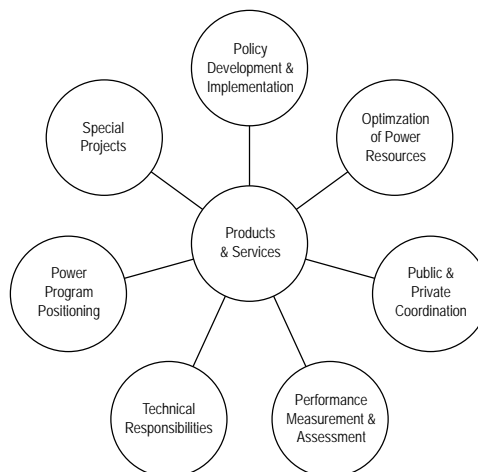
### 3. ACCOMPLISHMENTS & PRODUCTS AND SERVICES



We have accomplished many things over the previous few years. Some highlights include the:

- Completion of a thorough review of Reclamation power activities and development of initiatives to improve our performance
- Implementation of benchmarking activities
- Implementation of some of the activities and recommendations of the Commissioner's Power O&M Team Report
- Formation of a close partnership with the PMA's to manage Federal hydropower resources
- Development of an Internet home page which provides a strong interface with the public
- Formation of a group which will develop a strategy to promote hydropower worldwide
- Representation of the United States hydroelectric power program to the international power community

In addition to these accomplishments, we continue to offer our customers a wide range of products and services. These products and services fall within seven areas:



### **3.1. *Policy Development and Implementation***

Our mission states that we provide leadership for Reclamation's Power Program. We provide leadership in the development and implementation of Power Program policy. We:

- Develop and guide Reclamation's energy initiatives in support of national energy programs
- Define broad Power Program standards and objectives
- Institute and monitor program standards

### **3.2. *Optimization of Power Resources***

We also provide expertise in the development and continuous improvement of Reclamation's hydroelectric assets while maintaining the environment. More specifically, we:

- Review long-term staffing availability of Operations personnel
- Provide counsel in the development of Power Program personnel
- Perform hydropower project planning
- Perform power system modeling and optimization studies
- Perform studies on pumped storage, low head hydropower, and solar and wind applications and their integration
- Study and evaluate new and emerging technologies such as high-voltage generators
- Apply advance computer technologies and decision support systems in the hydropower field
- Develop guidelines for operations

### **3.3. *Public and Private Coordination***

We coordinate all power policy and information with both public and private entities. We:

- Assist the regions with power-related contracts, memorandums of agreement, and cooperative studies
- Provide policy and coordination on project use power
- Coordinate activities between the Commissioner's Office and the field in the area of lease of power privilege
- Coordinate and maintain replacement documents

- Coordinate all Federal Energy Regulatory Commission (FERC) responsibilities with Reclamation's operations
- Establish general power contracting and FERC licensing
- Coordinate technology transfers with the industry and the public

### **3.4. Performance Measurement and Assessment**

Our office serves as a central repository for information on Reclamation's Power Program. We gather, maintain, analyze, and disseminate all Power Program statistics. More specifically, we:

- Perform Power Program audits
- Perform power, environmental, economic, and financial evaluations
- Provide benchmarking and other performance measuring indicators
- Provide O&M financial data
- Provide oversight and funding in maintaining the core program and meeting reporting requirements of the Power Review of Operation and Maintenance Program
- Provide oversight and funding in maintaining the core program and meeting reporting requirements of the Power Operation and Maintenance (O&M) Incident Evaluation and Reporting Program
- Coordinate and implement the activities and recommendations of the *Commissioner's Power O&M Team Report*
- Participate with the Electric Utility Cost Group in developing the Hydroelectric Productivity Database
- Respond to information requests by Reclamation Offices, FERC, Government Information Agency, Western Systems Coordinating Council (WSCC), industry publications, and the general public
- Pursue related marketing research

### **3.5. Technical Responsibilities**

Many times, we meet the needs of our customers that require specific technical expertise not available in our office. To meet these needs, our office contracts with the TSC. We work with the TSC to provide consistent and cost-effective technical services in the following areas:

- Electrical and mechanical maintenance advice
- Assistance, inspections, and analysis of equipment condition
- Assessment of generator winding insulation
- Facility review of O&M

- FERC mandated penstock inspection
- Development and maintenance of Facilities Instruction, Standards, and Techniques (FIST) Volumes
- Power system reliability and stability studies
- Excitation and governor system alignment
- Doble contract administration
- Development and presentation of maintenance training
- Power O&M workshop coordination
- Mechanical equipment database maintenance

A more detailed explanation of the services provided by the TSC can be seen in Appendix A.

### **3.6. *Power Program Positioning***

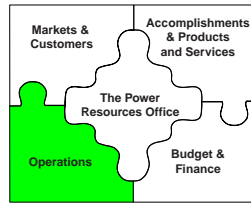
The PRO *positions* Reclamation's Power Program in the minds of all of its customers. To effectively position the Power Program, we:

- Represent Reclamation on a variety of energy-related committees and utility organizations
- Represent Reclamation at a number of conferences including WaterPower and HydroVision
- Work with Reclamation's Washington Office to effectively communicate the Power Program's goals and performance
- Developed and maintain an Internet site: [www.usbr.gov/power](http://www.usbr.gov/power)

### **3.7. *Special Projects***

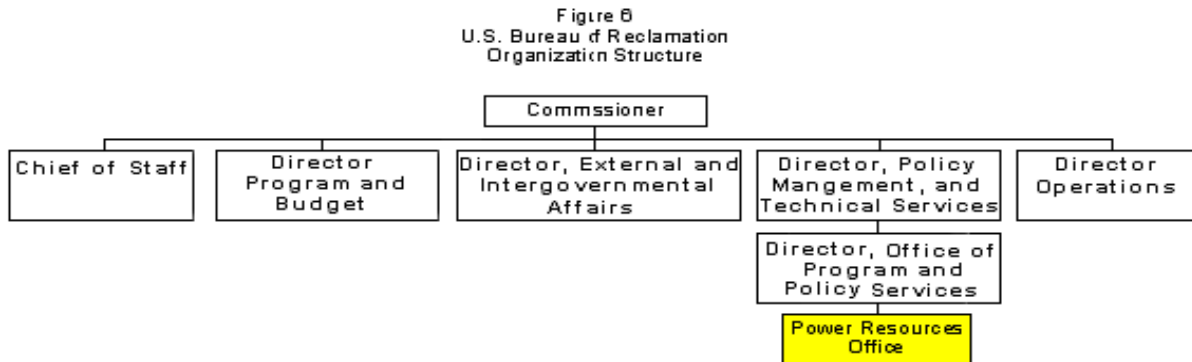
Providing leadership for Reclamation's Power Program places our office in the position to respond to changes in the environment. Reclamation operates in a dynamic environment, as confirmed by the state of deregulation. We have positioned ourselves in such a way to effectively respond to new challenges, whether technical, environmental, social, or economic.

## 4. OPERATIONS



### 4.1. Organization

As mentioned before, our organization is part of the Office of Policy, which reports to the Director, Policy, Management, and Technical Services. The TSC is an organization separate from the PRO, which also reports to the Director, Policy, Management, and Technical Services. Our office and the TSC can be seen on the organization chart below.



### 4.2. Staffing

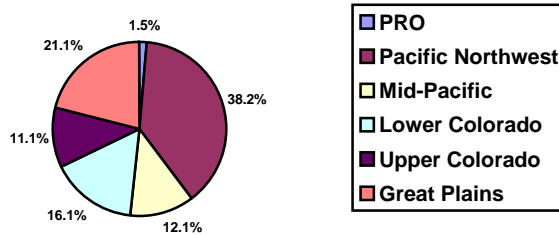
Our office is a matrix organization currently consisting of 10 people. The current staff includes:

- Manager
- Three policy analysts
- Program analyst
- Statistical support analyst
- Two general engineers
- Public utility specialist
- Secretary

All staff reports directly to the Manager who reports to the Director of the Office of Program and Policy Services. Biographies and individual responsibilities of our staff can be seen in Appendix B.

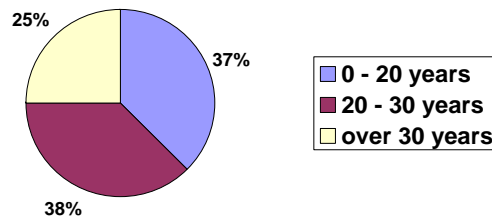
Currently, our staff comprises less than two percent of all Reclamation-wide power personnel (see Figure 7).

**Figure 7  
Reclamation Power Personnel**



Our staff consists of senior personnel with vast experience. The average hydropower experience of our employees is more than 20 years (see Figure 8). This experience is a valuable resource for our customers to draw upon.

**Figure 8  
PRO Staff Experience**



To better meet the changing needs of the power environment, our office has provided training to its employees. Reclamation cannot just rely on experience alone to advance its Power Program. We spend approximately \$5000 annually on staff training, which provides approximately 30 hours of annual training for each of our employees.

We continue to be a catalyst for the *Quality of Work Life Initiative* put forward by the Department of the Interior. Our staff continues to demonstrate enthusiasm for their work by providing world-class service to our customers.

#### **4.3. Project Management System**

Our office manages many responsibilities. A PRO staff member spearheads many projects. This employee is in essence a manager overseeing a project. Meeting customer objectives, providing quality services, and controlling schedule and costs requires a strong *project manager*. Each of the PRO's project managers has necessary authority to successfully complete a project. In addition, each person is also held accountable for the overall execution of a project. This person reviews the project objectives and prepares the overall project work plan, schedule, and budget.



Each *project manager* is our representative for a project and, as such, keeps the customer, management, and other necessary contacts informed in a timely manner of the status, accomplishments, and problems of a project.

#### **4.4. PRO Support**

As mentioned before, our office relies upon supporting resources from the TSC. The majority of services contracted by the PRO are provided by Infrastructure Services (D-8400). Groups within Infrastructure Services primarily used include:

- Electrical Systems (D-8440)
- Hydroelectric Research and Technical Services (D-8450)

The Electrical Systems Group has 12 employees who provide O&M electrical engineering services including power system studies, protective relaying recommendations, settings, and support for Reclamation's WECC obligations. They also provide drawings and technical specifications for the following:

- Electrical substations and switchyards
- Wood and steel pole transmission lines
- High-voltage solid dielectric, oil-filled, and gas-filled power cable systems
- Outdoor electrical distribution systems
- Power transformers
- Real time automation and supervisory control and data acquisition systems
- Voice and data communications systems

The Hydroelectric Research and Technical Services Group has 26 employees who provide O&M, electrical, and mechanical technical services to support Reclamation's specialized needs and programs. The group provides technical advice, assistance diagnostics, analysis, troubleshooting, failure analysis, inspection, program consultation, testing, and unique in-house design and support services in the following areas:

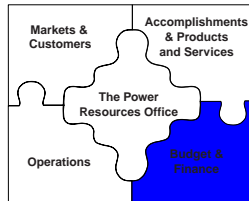
- Power apparatus
- Electronics
- Electrical insulation systems including rotating machinery and cable systems
- Excitation systems and speed governor systems including related power system stability and controls
- Automatic generation control, water and power scheduling, and plant SCADA systems
- Mechanical components of hydroelectric generators including bearings, turbine runners, wicket gates, and servomotors, etc.
- Penstocks, outlet works, and associated gates and valves

An extensive laboratory and research facility enables this group to support project needs in an efficient and cost effective manner. This group is involved in or manages more than 12 programs to support Reclamation power facilities. The group also maintains Reclamation's power system stability and is responsible for major portions of Reclamation's power system and water resource management research programs.

More detailed explanations of TSC support can be seen in Appendix A.

Providing leadership for Reclamation's Power Program also requires technical support from other public and private organizations. We use contract support from many public agencies such as Argonne National Laboratory, Bonneville Power Administration, Western Area Power Administration, Department of Energy, and U.S. Corps of Engineers. We also sustain relationships with internationally recognized hydropower companies.

## 5. BUDGET & FINANCE



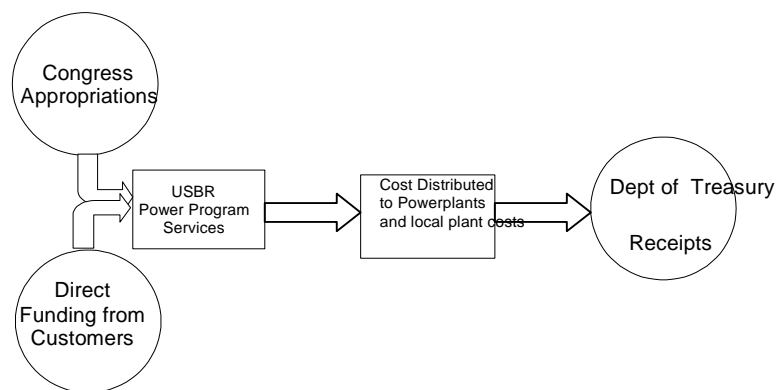
### 5.1. Power Sales within Reclamation

#### 5.1.1. Revenue from Power

Reclamation generates nearly \$1 billion in power revenues annually. The power produced by Reclamation is marketed by PMA's at the lowest possible rates consistent with sound business principles. Reclamation is not permitted to make a profit on the power that is sold. All revenues derived from the sale of power are based on the production costs and repayment of capital investments assigned to power.

Revenues for power sold are paid to the Department of Treasury after covering Reclamation costs. Figure 9 illustrates the power cash flow. Power revenues have paid a significant portion of the cost to build, operate, and maintain Reclamation's powerplants. The revenues cover not only powerplant costs, but also irrigation aid and salinity control costs as well.

**Figure 9**  
**Power Cash Flow**



### **5.1.2. Sale of Power**

Preference in the sale of power is given to municipalities and other public power distributors. The total amount of contractible power available is determined by the installed capacity at powerplants, forecasting load patterns of specific marketing areas, system losses, water operations and depletions, and the historical streamflow hydrology. When requests from qualified purchasers exceed the amount of available firm power, allocations are made based on an apportionment process.

## **5.2. *Fund Sources***

Our office receives funding from three sources:

- Congressional appropriations
- Direct funding from customers
- Working capital

Congressional appropriations have two components: the Power Program Services (PPS) appropriation under the Water and Related Resources, Energy Resources Management appropriation and from the Policy and Administration (P&A) appropriation for the Office of Policy. The funds for PPS are given directly for operations of Reclamation's Power Program and all these costs are recovered in the PMA rates. The funds appropriated for Policy and Administration are given to the Office of Policy to help fund our office. Funding from this source has decreased significantly over the last several years while the budget for the PPS has increased steadily over the last few years.

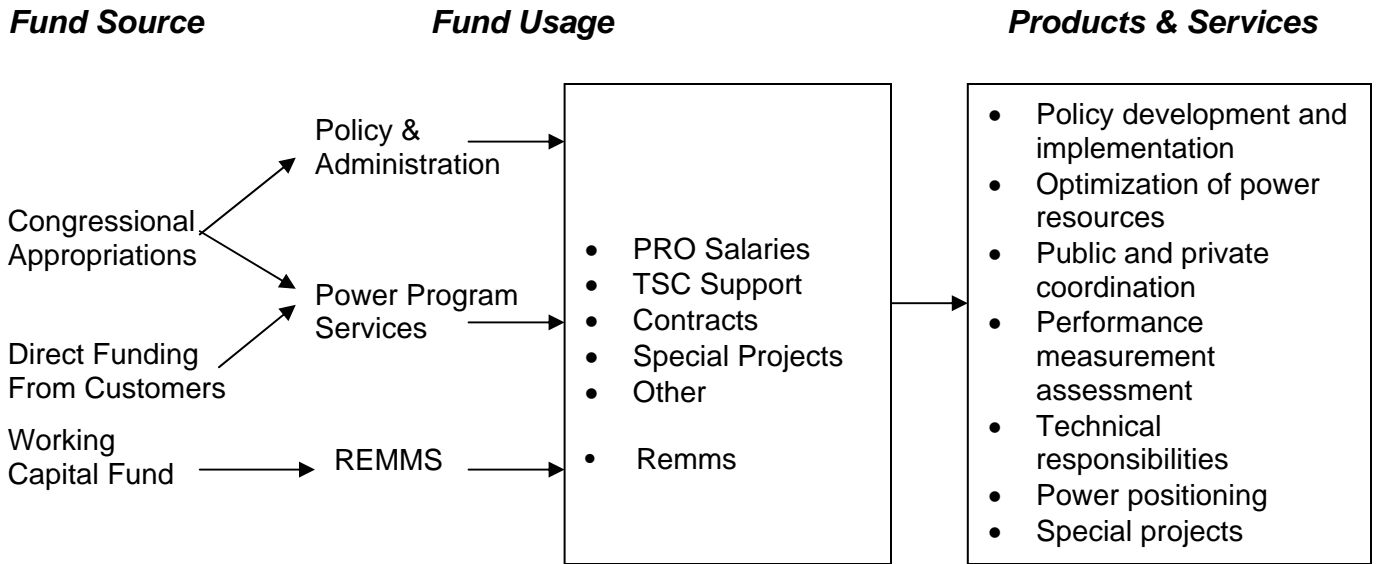
Our budget is projected five years in advance to accommodate contractual agreements with our customers and the PMA's rate setting procedures. The appropriations budgets along with customer revenue targets are submitted to Reclamation's Budget Review Committee two years in advance. The Budget Review Committee approves or adjusts the total program before submittal to Congress. Funds are released for each fiscal year, which runs from October 1<sup>st</sup> through September 30<sup>th</sup>.

Since 1998, Reclamation has made an increased effort to include Power Program expenditures in the price of power. Doing this better reflects Reclamation's costs. Reclamation has entered into agreements with its power customers to fund power costs in other areas of the system. Funding agreements have been successfully negotiated for the projects at Boulder Canyon, Central Valley, Parker-Davis, and Grand Coulee. The Pacific Northwest Region has recently entered into an agreement with BPA to fund operations and maintenance costs based on BPA's ability to raise capital.

A portion of the budget also comes from a Working Capital Fund. This budget money is used for maintenance and support for the Reclamation Enterprise Maintenance Management System (REMMS).

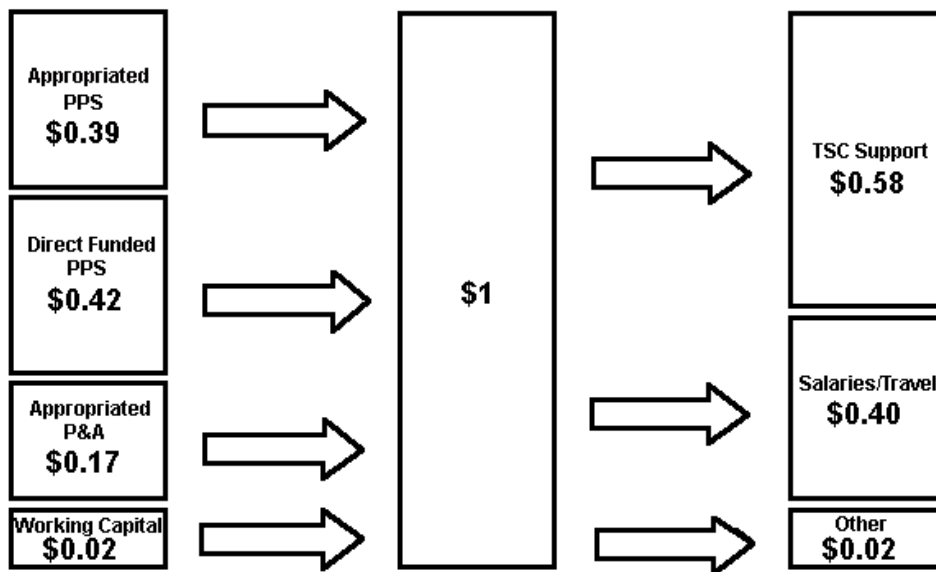
The sources of funds and how they are used is depicted in Figure 10.

**Figure 10  
Power Resource Office Finance**



The amount of funding received from each source varies over time. Figure 11 illustrates where each PRO dollar comes from and where it goes.

**Figure 11  
The 2003 PRO Dollar**



### **5.3. Fund Usage**

A major portion of our budget goes towards salaries. We are dedicated to providing the best products and services to our customers. In 2002, salaries constituted 42 percent of expenditures.

An additional major use of our funds is for TSC assistance. We sponsor many of the studies and analyses conducted by the TSC. Each year we discuss and prioritize upcoming Power Program needs with the TSC. The Power Operations and Maintenance (O&M) Workshop held every 18 months for regional power staff is funded by PPS and coordinated by staff in the PRO and TSC.

Outside contracts are an additional use of our funds. We are responsible for conducting power studies and holding seminars and workshops for the Power Program staff. Some of the activities these expenditures facilitated include:

- Security study
- Y2K embedded microchip
- Strategic plan
- Development of work plans for power optimization initiatives

# APPENDIX A

## ***Power Program Services Provided by the Technical Services Center (TSC)***

Our office manages PPS that require specific technical expertise not available in our staff. To provide these needed services, we contract with the TSC via service agreement. The TSC works under the programmatic direction and oversight of our office but generally provides the services directly to facility, area, and regional power personnel.

The majority of the services contracted to the TSC are provided by the Hydroelectric Research and Technical Services Group (D-8450), with the remaining services provided by the Electric Systems Group (D-8440). Sometimes the needed services are "subcontracted" to other TSC groups when workload requires.

Contracted Power Program Services include:

### **Electrical & Mechanical Program Services**

The TSC is Reclamation's corporate provider of technical advice and assistance O&M of electrical and mechanical equipment and systems. Although extensive or on-site assistance is funded through direct charge agreements, general O&M engineering expertise is provided under Electrical and Mechanical Program Services. This includes providing guidance, review, research, coordination, investigation, advice, and assistance from a corporate point of view. Services provided include objective analysis that was acquired via coordination with other utilities and professional societies. Other services include maintaining equipment and associated software. At present, the FIST Program is funded totally by PPS.

### **FIST Volumes**

FIST (Facilities Instruction, Standards, and Techniques) Volumes are Reclamation's key technical references for power operations and electrical and mechanical maintenance. FIST Volumes comprise 75 total volumes covering the areas of operations (11), mechanical maintenance (9), electrical maintenance (30), general maintenance (12), and safety (13). The Hydroelectric Research and Technical Services Group (D-8450) creates and maintains these volumes. FIST work includes the development of new volumes and revision of existing volumes to meet current technology, practices, and procedures. FIST work also includes printing, publication, and transmittal. Much of the recent FIST work includes publishing volumes on the Internet for easier access.

## **Electrical and Mechanical Maintenance Reviews of Power Facilities**

Periodic reviews of maintenance programs at Reclamation power facilities ensure a more effective Power Program by identifying and correcting potential problem areas, refining maintenance techniques, and transferring corporate maintenance knowledge. Although individual reviews are accomplished through direct charge, management of the overall Program is accomplished by TSC via PPS. Services provided include planning and coordination of the review program with multiple regional and the Office of Policy. We recently facilitated a review of this program. New policies and guidelines are pending approval of Reclamation's Policy Team and the Commissioner.

## **Thermographic (Infrared) Maintenance**

Assessing equipment condition is essential to effective maintenance. Outages are reduced or eliminated with accurate condition assessment as preventive maintenance gives way to condition-based maintenance. Consistent application of thermographic scanning of electrical and mechanical equipment brings Reclamation into alignment with industry standards. Although individual scans are accomplished by direct charge, developing and maintaining the program is accomplished via PPS. Originally funded as an Enterprise Fund initiative and continued under Electrical Program Services in FY98, O&M of this program is continued under separate line item beginning in FY99. Products and services include a manual on infrared scanning, acquisition and maintenance of thermographic equipment and software, technical advice and assistance, and coordination with the thermographic maintenance community.

## **Power System Reliability & Stability/Governor & Excitation Alignment**

Reclamation powerplants play a key role in ensuring the reliability and stability of the Nation's electric power system. Accomplishing this requires that generator controls (speed governors, voltage regulators/excitors, and power system stabilizers) are performing correctly. The TSC conducts governor and excitation alignment programs verifying proper system functioning. Power system simulations can provide insight into the proper tuning of these controllers from a system-wide perspective. The TSC performs model verification, power system load flow, dynamic simulation, and fault studies in cooperation with other utilities and the WSCC to determine the impact of Reclamation's controllers on the interconnected power system. In addition, the TSC maintains the power system database for Reclamation equipment. Other non-site-specific portions of this work include: test equipment development, procurement, and maintenance; test procedure development; analysis of industry practices and literature; and interaction with the WSCC.



### **Doble Contract and Technical Services**

Although the Reclamation-wide Doble contract is not funded through PPS, the PRO sponsors this program as a vital part of maintaining the reliability of electrical equipment. TSC provides management of the contract including annual contract administration duties, triennial planning/preparation/execution of the contract renewal, tracking accessories, and managing cost distribution. Technical services include planning and scheduling annual training, providing technical advice and assistance to field users, reviewing test results, maintaining contact with Doble Engineering Company.

### **Power O&M Workshop**

The Reclamation Power O&M Workshop is held approximately every 18 months and provides a unique and important opportunity for power staff to share knowledge. Although hosted by regions on a rotating basis, centralized coordination and administration is provided by the TSC. Services include planning and scheduling, obtaining approval from Washington, coordinating with the host region, developing and publishing the agenda and other documents, and assisting with onsite administration.

### **Maintenance Training**

Maintenance training is essential for an effective Power Program. Some of this training is "Reclamation-specific" and best developed in a corporate center. Examples of training provided on a direct charge basis include mechanical maintenance (testing, alignment, and balancing); DC ramp testing; and electrical maintenance.

### **FERC Mandated Penstock Inspection**

Reclamation must comply with FERC requirements for penstock and pressure conduit safety inspections, testing, analyses, and documentation. Compliance will ensure safe, effective, and reliable power generation. Through FY98, PPS directed the development of the processes and equipment, "beta tested" the program, and guided initial maintenance setup of the program. Beginning in FY99, the program is directly funded.

## **Mechanical Database**

Effective maintenance of mechanical equipment requires access to accurate equipment data. The mechanical equipment database provides equipment parameters and adjustment data. PPS developed and maintains the database. The database will be accessible via the Reclamation Intranet to personnel in the future.

## **Insulation Maintenance**

Generator, large-motor, and high-voltage cable insulation condition assessment and maintenance are essential components of Reclamation's Power O&M Program. Insulation integrity must be ensured to keep power generating units on line. The Insulation Maintenance Program provides guidance on Reclamation's philosophy, processes, procedures, tools, and techniques for assessing insulation integrity and maintenance. PPS sponsors this program to ensure that Reclamation's insulation assessment and maintenance procedures are uniform, effective, and state-of-the-art.

## APPENDIX B

### ***Power Resource Office Staff***

#### **DEBORAH M. LINKE, *Manager***

Ms. Linke has 31 years of service in electrical power systems and an extensive knowledge of the hydroelectric power field. She has a broad range of experience in power business procedures, power marketing and rates, power policy coordination, environmental assessment and information systems. Ms. Linke participated on the Management Committee of the Power Management Laboratory. She has been recognized for her leadership and facilitation skills.

#### **MITCHELL SAMUELIAN, *General Engineer***

Mr. Samuelian has worked in the power generation field for 25 years. Mitchell previously served as Deputy Facility Manager of the Glen Canyon Field Division. Prior to that he served in several hydroelectric related positions with the US Army Corps of Engineers and also has experience with nuclear generating facilities. His present responsibilities include Reclamation's agency wide training, asset management, de-regulation and operational issues as well as the Power O&M Review Program.

#### **ERIN FORAKER, *General Engineer***

Ms. Foraker has 9 years of experience in the electric power industry. Her background contains experience in unit rehabilitations, plant optimization, turbines, and other various mechanical components. Ms. Foraker writes power program policies and maintains relationships with various governmental agencies. She is currently an officer for the ASME Hydro Power Technical Committee.

#### **KARL WUNDERLICH, *Public Utilities Specialist***

Mr. Wunderlich brings experience in natural resource and environmental economics and public policy. He served as an economist in Power Marketing with Western Area Power Administration for six years where he designed and reviewed power rates, analyzed project repayment data, and was a contributor to several environmental impact statements. Prior to coming to the Office of Power Resources, Karl was Senior Research Associate at the Wirth Chair in Environmental and Community Development Policy at the University of Colorado at Denver. He has also provided consulting in rural economic development, has been an adjunct instructor in economics, public finance, and environmental policy, and has published research in a broad range of subjects including community-based land protection organizations, urban water supply reliability, rural recreation enterprises, and immigration.

#### **THOMAS RAWLINGS, *Statistical Support Analyst***

Mr. Rawlings has accumulated over 24 years of experience in hydropower and other related fields. Mr. Rawlings has experience in hydrology, hydraulics, field reviews, plan development, layout and design, cost estimating, economic and financial analysis, report preparation, operation oversight, and management. His major program responsibilities include power statistics, benchmarking, and FERC-related information.

**J. DENNIS SLOAN, *Policy Analyst***

Mr. Sloan, with over 36 years of service, brings a broad range of experience in power business procedures, power policy coordination, development and implementation of energy initiatives, coordination of O&M of water and power facilities. He also maintains working relationships with State and Federal agencies and the power utility communities. Mr. Sloan is skilled in the electrical maintenance of generators, switchyards, and associated powerplant equipment.

**DONNA DAUGHETY, *Program Analyst***

Ms. Daughety has over 25 years of Federal service. She has experience in power statistical analysis, report generation, survey techniques/applications, and benchmarking. She also has experience with project power. Ms. Daughety oversees the Power Program's relationship with PMA's and has experience with contract management. Ms. Daughety is also highly skilled in graphic design and print media.

**ROY N. ARNOLD, *Policy Analyst***

Mr. Arnold has over 24 years of Federal and military service. He has extensive experience in environmental compliance and in technical and policy issues related to water and power. He has researched and analyzed proposed utility deregulation legislation and potential impacts of deregulation generally on Federal power agencies. Mr. Arnold also has specific experience in project and strategic planning, report review and preparation.

**BANASRI SEN, *Policy Analyst***

Ms. Sen has over 12 years of Federal service and 6 years in academic institutions and brings a wide range of experience in research and analysis of technical and policy related issues in water and power. Ms. Sen has experience in environmental issues, drought policies, statistical data analysis, contract monitoring, and report preparation. Her current program involvement includes: power O&M, power policies, International Energy Agency (IEA) activities and Bureau of Reclamation's Power Program website management.

**JERLYN PETERSON, *Secretary***

Ms. Peterson has over 24 years experience in customer service and support services.

# Attachment A: Reclamation Facility Locations



**Reclamation's Power Facilities**

## Attachment B Reclamation Hydropower Facilities

Plant Name	Type of Plant	Number of units	Total Installed Capacity	Reclamation Region	State	Power Marketing Area
Administration			MW			
Alcova	Gen	2	41.4	Great Plains	Wyoming	Western
Anderson Ranch	Gen	2	40	Pacific Northwest	Idaho	BPA
Big Thompson	Gen	1	4.5	Great Plains	Colorado	Western
Black Canyon	Gen	2	10.2	Pacific Northwest	Idaho	BPA
Blue Mesa	Gen	2	86.4	Upper Colorado	Colorado	Western
Boise River Diversion	Gen	3	1.5	Pacific Northwest	Idaho	BPA
Boysen	Gen	2	15	Great Plains	Wyoming	Western
Buffalo Bill	Gen	3	18	Great Plains	Wyoming	Western
Canyon Ferry	Gen	3	50	Great Plains	Montana	MAPP
Chandler	Gen	2	12	Pacific Northwest	Washington	BPA
Crystal	Gen	1	28	Upper Colorado	Colorado	Western
Davis	Gen	5	240	Lower Colorado	Arizona	Western
Deer Creek	Gen	2	4.95	Upper Colorado	Utah	Western
Elephant Butte	Gen	3	27.945	Upper Colorado	New Mexico	Western
Estes	Gen	3	45	Great Plains	Colorado	Western
Flaming Gorge	Gen	3	151.95	Upper Colorado	Utah	Western
Flatiron 1 &2	Gen	2	86	Great Plains	Colorado	Western
Flatiron 3	P/G	1	8.5	Great Plains	Colorado	Western
Folsom	Gen	3	198.72	Mid-Pacific	California	Western
Fontenelle	Gen	1	10	Upper Colorado	Wyoming	Western
Fremont Canyon	Gen	2	66.8	Great Plains	Wyoming	Western
Glen Canyon	Gen	8	1296	Upper Colorado	Arizona	Western
Grand Coulee	Gen	27	6495	Pacific Northwest	Washington	BPA
Grand Coulee	P/G	6	314	Pacific Northwest	Washington	BPA
Green Mountain	Gen	2	26	Great Plains	Colorado	Western
Green Springs	Gen	1	17.29	Pacific Northwest	Oregon	BPA
Guernsey	Gen	2	6.4	Great Plains	Wyoming	Western
Heart Mountain	Gen	1	5	Great Plains	Wyoming	Western
Hoover	Gen	19	2078.8	Lower Colorado	Nevada – AZ	Western
Hungry Horse	Gen	4	428	Pacific Northwest	Montana	BPA
Judge Francis Carr	Gen	2	154.4	Mid-Pacific	California	Western
Keswick	Gen	3	117	Mid-Pacific	California	Western
Kortes	Gen	3	36	Great Plains	Wyoming	Western
Lewiston	Gen	1	0.35	Mid-Pacific	California	Western
Lower Molina	Gen	1	4.86	Upper Colorado	Colorado	Western
Marys Lake	Gen	1	8.1	Great Plains	Colorado	Western
McPhee	Gen	1	1.283	Upper Colorado	Colorado	Western
Minidoka	Gen	4	27.7	Pacific Northwest	Idaho	BPA
Morrow Point	Gen	2	173.334	Upper Colorado	Colorado	Western
Mt. Elbert	P/G	2	200	Upper Colorado	Colorado	Western
New Melones	Gen	2	300	Mid-Pacific	California	Western

## Attachment B - Continued Reclamation Hydropower Facilities

Plant Name	Type of Plant	Number of units	Total Installed Capacity	Reclamation Region	State	Power Marketing Area
<b>Administration</b>						
			<b>MW</b>			<b>Area</b>
Nimbus	Gen	2	13.5	Mid-Pacific	California	Western
O'Neill	P/G	6	25.2	Mid-Pacific	California	Western
Palisades	Gen	4	176.564	Pacific Northwest	Idaho	BPA
Parker	Gen	4	120	Lower Colorado	California	Western
Pilot Butte	Gen	2	1.6	Great Plains	Wyoming	Western
Pole Hill	Gen	1	38.2	Great Plains	Colorado	Western
Roza	Gen	1	12.937	Pacific Northwest	Washington	BPA
San Luis*	P/G	8	202	Mid-Pacific	California	Western
Seminole	Gen	3	51.75	Great Plains	Wyoming	Western
Shasta	Gen	7	629	Mid-Pacific	California	Western
Shoshone	Gen	1	3	Great Plains	Wyoming	Western
Spirit Mountain	Gen	1	4.5	Great Plains	Wyoming	Western
Spring Creek	Gen	2	180	Mid-Pacific	California	Western
Stampede	Gen	2	3.65	Mid-Pacific	California	Western
Towac	Gen	1	11.495	Upper Colorado	Colorado	Western
Trinity	Gen	2	140	Mid-Pacific	California	Western
Upper Molina	Gen	1	8.64	Upper Colorado	Colorado	Western
Yellowtail	Gen	4	250	Great Plains	Montana	Western

\* Federal Portion

## CONTACT FOR INFORMATION

As mentioned before, the development of our Business Plan is a continuous process. We look to you as our customers, to provide support for this process. Communication helps ensure that we provide products and services that best meet the needs of our customers.

If you have any questions or comments regarding our Business Plan, please contact:

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Manager, Power Resources Office  
Bureau of Reclamation  
P.O. Box 25007  
Denver, CO 80225-0007

Telephone: (303) 445-2923

Facsimile: (303) 445-6471

E-mail: [power@do.usbr.gov](mailto:power@do.usbr.gov)

Internet: <http://www.usbr.gov/power>



# MISSION STATEMENTS

## ***The Department of the Interior***

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 sound 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.

## ***The Bureau of Reclamation***

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.