<table>
<thead>
<tr>
<th>Agenda Item</th>
<th>Hydropower Economics</th>
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</thead>
<tbody>
<tr>
<td><strong>Action Requested</strong></td>
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<tr>
<td>✓ Information item only. We will answer questions but no action is requested.</td>
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<tr>
<td><strong>Presenter</strong></td>
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<tr>
<td>Brad Warren, Manager, CRSP Management Center, Western Area Power Administration</td>
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<td><strong>Previous Action Taken</strong></td>
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<td>N/A</td>
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<td><strong>Relevant Science</strong></td>
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<td>N/A</td>
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<tr>
<td><strong>Background Information</strong></td>
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<td>The presentation will cover the following outline:</td>
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<tr>
<td><strong>Basin Fund</strong></td>
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<tr>
<td>▪ Law, policy, and decision-making that affect management of the Basin Fund.</td>
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<td>▪ Is it possible for the Basin Fund to default? If so, what happens to the various programs funded by the Basin Fund?</td>
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<td>▪ What happens to the Basin Fund once the dam, transmission lines, etc. are repaid?</td>
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<td>▪ Actual or projected sources of income for the Basin Fund in WY2007 and 2008.</td>
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<td>▪ Are all revenues generated by CRSP facilities deposited in the Basin Fund?</td>
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<td>▪ Actual or projected expenditures for the Basin Fund in WY2007 and 2008.</td>
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<tr>
<td><strong>WAPA’s rates/contracts</strong></td>
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<tr>
<td>▪ How WAPA contracts for power (distinguish between capacity, energy and composite rate).</td>
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<td>▪ How season and time of day affect rates charged by WAPA.</td>
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<tr>
<td>▪ How the CRSP generating facilities fit into the electrical needs of customers.</td>
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<tr>
<td>▪ How Glen Canyon power production fits into the CRSP system.</td>
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<tr>
<td>▪ Overview of CRSP customers – where do they serve, who do they serve.</td>
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<td>▪ How do the rates charged by WAPA for power from Glen Canyon Dam compare to the cost of power on the open market?</td>
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<tr>
<td>▪ How do WAPA rates affect the retail prices charged by CRSP customers?</td>
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<td><strong>Costs of the 2008 BHBF</strong></td>
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<td>▪ Actual or projected costs of the 1996, 2004, and 2008 BHBF attributed to water routed through the bypass tubes v. replacement power costs v. other costs.</td>
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<tr>
<td>▪ Which costs are reimbursable and which are non-reimbursable.</td>
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COLORADO RIVER STORAGE PROJECT
Hydropower and the Basin Fund

BRADLEY WARREN
Manager,
Colorado River Storage Project
Western Area Power Administration
What Western is

- Western is an agency of the U.S. Department of Energy
- Established in 1977 by transfer of Power Marketing functions from USBR
- One of four Power Marketing Administrations covering most of U.S.
What Western does

- Markets Hydroelectric Generation - 10,564 MW from 55 power plants
- Delivers power over a 16,819 mi. high voltage transmission system
- Delivers to 643 wholesale customers in a 15 state service area
Electrical Terms

- MegaWatt (MW): 1 million watts or the power required to light 10,000 100 watt light bulbs simultaneously.
- One MegaWatt hour (MWh): energy consumed to light 10,000 light bulbs for 1 hour or 1 light bulb for 10,000 hrs.
CRSP Mainstem Power Facilities

- Glen Canyon – 1,356 MW
- Flaming Gorge – 152 MW
- Aspinall Units
  - Blue Mesa – 60 MW
  - Morrow Point – 156 MW
  - Crystal – 29 MW
Other SLCA/IP Generation Resources

- Fontenelle (WY) – 10 MW
- Elephant Butte (NM) - 28 MW
- Upper Molina (CO) - 9 MW
- Lower Molina (CO) - 5 MW
- McPhee - (CO) 1 MW
- Towaoc - (CO) 11 MW
CRSP Electrical Customers

- Rural Electric Coops
- Municipal Utility Systems
- Native American tribes (53)
- Federal facilities
- State Institutions (such as universities)
- Irrigation districts
Federal Marketing of SLCA/IP Power

- Power is marketed by primarily by project (CRSP, Parker-Davis, Pick-Sloan, etc.)
- CRSP – MC determines long-term resource availability
- Applicants for power submit a demand “profile”
- Western makes marketing determinations based on a public process
- Allocations of Federal hydropower and contractual terms are determined
- Allocated as a single resource (not specific to each powerplant)
- Western enters into long-term contracts
SLCA/IP SHP Capacity Levels by Month

- kwh

<table>
<thead>
<tr>
<th>Month</th>
<th>Oct-08</th>
<th>Nov-08</th>
<th>Dec-08</th>
<th>Jan-09</th>
<th>Feb-09</th>
<th>Mar-09</th>
<th>Apr-09</th>
<th>May-09</th>
<th>Jun-09</th>
<th>Jul-09</th>
<th>Aug-09</th>
<th>Sep-09</th>
</tr>
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<tbody>
<tr>
<td>kwh</td>
<td>725,000</td>
<td>740,000</td>
<td>840,000</td>
<td>860,000</td>
<td>850,000</td>
<td>830,000</td>
<td>800,000</td>
<td>790,000</td>
<td>760,000</td>
<td>770,000</td>
<td>790,000</td>
<td>770,000</td>
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The graph shows the capacity levels of SLCA/IP SHP by month from October 2008 to September 2009.
Typical CRSP Weekly Generation Pattern

CRSP Generation After Glen Canyon ROD and Flaming Gorge BO
How SLCA/IP Customers Use Electrical Energy from CRSP

- CRSP power is not a customer’s sole resource
- Customers are allowed some flexibility in scheduling electrical energy from WAPA
- Customers schedule hourly to assist in meeting retail electrical demand. Hourly schedules are limited to:
  - A maximum amount per hour
  - A minimum amount per hour
  - A total amount of energy within a month
Typical SLCA/IP Customer Scheduling

- Customers use the energy scheduled derived from the “minimum take” requirement as a “base” resource.
- Customers use the flexibility to schedule electricity hourly according to demand – this is: “load following”.
- “load following” occurs up to the maximum capacity allowed under the contract.
Total Retail Demand & Generation "stack" for a Winter Day

- Baseload
- CRSP base
- Natural Gas Unit
- CRSP load following
- Peaking Unit

Hour of the day
SLCA/IP Firm Power Rates

Rates are set to recover:

- Annual O&M expenses for WAPA & USBR
- Annual expenses for purchased power and transmission
- Capital investment costs
- Interest on capital investment
- Cost sharing for the Colorado River Basin Salinity Control Program
- Costs assigned to irrigation for repayment that are beyond the irrigators’ ability to pay
- WAPA’s share of UC & SJ RIP capital costs
- State apportionment obligations
SLCA/IP Firm Power Rates

Rates are NOT set to recover:

- Glen Canyon Dam Adaptive Management Program expenses
- Upper Colorado River RIP O&M expenses
- San Juan Basin RIP O&M expenses
At what price?

- Cost based rates
- Hydropower is inexpensive to produce: there is no fuel cost
- Rates include repayment assistance to water development projects including State apportionment
- Retail rates of SLCA/IP electrical coop & irrigation customers are typically higher than in privately owned utility service areas
  - rural areas generally require larger investments in transmission and distribution lines per customer
SLCA/IP Rates (effective 10/1/08):

- $4.70 per KW-month for capacity
- $0.01106 per kWh for energy
  
or
- $0.02680 per kWh – composite rate
“...The Government of the United States markets power to serve the public interest, not to make a profit.”

— Stewart Udall
Basin Fund (Power Only)

- Established by the CRSP Act of 1956, Section 5
- The CRSP “checking account”
- Power Revenues from sales of capacity, energy, and transmission services
- Total Power Revenues of approximately $180M/yr
Basin Fund Expenses

- O&M expenses for WAPA & USBR
- Purchased power and transmission
- Capital investment repayment
- Interest on capital investment
- Cost sharing for the Colorado River Basin Salinity Control Program
- UC & SJ RIP costs
- Adaptive Management Program costs
Cash Flow Diagram

The Basin Fund
1. Receives all power revenues
2. Funds future O&M costs
3. Transfers P&I to General Fund
4. Funds non-reimbursable costs
5. Maintains contingency balance
Treasury Transfers

- Repaid approximately $1.3 Billion in principal and interest
  - $1.0 Billion of cash transfers to the General Fund
  - $395 Million constructively returned (non-reimbursable funds)
Questions?

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CRSP Manager
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(801) 524-6372