ENGINEERING AND OPERATIONS COMMITTEE

AGENDA FOR

JUNE 24, 2010

Gary Arant – Chair  Bill Knutson
Richard Smith, Vice Chair  Ralph McIntosh
Jim Bowersox  Ron Morrison
Trish Hannan  Vincent Mudd
Mike Hogan  Bud Pocklington
Jeremy Jungreis  Javier Saunders
Javier Saunders  Tom Wornham


2. Additions to agenda (Government Code Section 54954.2(b)).

3. Public comment – opportunities for members of the public to address the Committee on matters within the Committee’s jurisdiction.

4. Chair’s report.
   4-A Directors’ comments.

I. CONSENT CALENDAR

1. Change Orders to Barnard Construction Company Inc. for the Package 2 San Vicente Foundation Preparatory Work project. Wade Griffis
   Staff recommendation: Accept Change Order 8 for $344,498 and authorize the General Manager to execute Change Order 9 for up to $1,375,955 to revise unit price bid items to address field conditions encountered at the foundation excavations, increasing the construction contract to $28,228,579. (Action)

II. ACTION/DISCUSSION

   Staff recommendation: Authorize the General Manager to move forward with negotiation and execution of a power purchase agreement with Borrego Solar Systems, Inc. absent the language previously approved in accordance with Alternative #1. (Action)
III. INFORMATION

1. Presentation on Annual Aqueduct Operating Plan. John Galleher

IV. CLOSED SESSION

V. ADJOURNMENT

Doria F. Lore
Clerk of the Board

NOTE: This meeting is called as an Engineering & Operations Committee meeting. Because a quorum of the Board may be present, the meeting is also noticed as a Board meeting. Members of the Board who are not members of the Committee may participate in the meeting pursuant to Section 2.00.060(g) of the Authority Administrative Code (Revised). All items on the agenda, including information items, may be deliberated and become subject to action. All public documents provided to the committee or Board for this meeting including materials related to an item on this agenda and submitted to the Board of Directors within 72 hours prior to this meeting may be reviewed at the San Diego County Water Authority headquarters located at 4677 Overland Avenue, San Diego, CA 92123 at the reception desk during normal business hours.
June 16, 2010

Attention: Engineering and Operations Committee

Change Orders to Barnard Construction Company, Inc. for the Package 2 San Vicente Foundation Preparatory Work project. (Action)

Staff Recommendations
Accept Change Order 8 for $344,498 and authorize the General Manager to execute Change Order 9 for up to $1,375,955 to revise unit price bid items to address field conditions encountered at the foundation excavations, increasing the construction contract amount to $28,228,579

Alternatives
Do not accept the Change Order 8 and do not Authorize Change Order 9 and provide direction to staff relative to issues requiring resolution.

Fiscal impact
There are sufficient funds in the project budget and in the fiscal years 2010 and 2011 Capital Improvement Program appropriation to support these actions. The rate category for this project is storage.

Background
The San Vicente Dam will be raised a total of 117 feet, providing an additional 152,000 acre-feet of combined emergency and carryover storage for the region per the April 2008, Board certified Carryover Storage Project Environmental Impact Report.

The Dam Raise project is being implemented through seven construction packages to expedite the construction schedule, as well as to promote opportunities for small and minority-owned businesses. The following is the project’s implementation plan status:

- Package 1 - Test Quarry (Complete)
- Package 2 - Foundation Preparatory Work (In construction)
- Package 2B - Vegetation Cutting and Erosion Control (Complete)
- Package 3 - Roller Compacted Concrete Dams (RCC) and Appurtenant Facilities (In construction)
- Package 4 - Bypass Pipeline (In design)
- Package 5 - Marina Improvements (In design)
- Package 6 - Post Construction Habitat Restoration (In planning)

The Package 2 scope of work includes excavating and preparing the dam foundation for the subsequent Package 3 - RCC Dam Raise construction contract. The limits of work for Package 2 are shown in Figure 1. Package 2 foundation excavation work was separated from the Package 3 RCC dam raise construction contract to shorten the overall project schedule by several months because the foundation excavation was able to proceed concurrently while the Package 3 design was being completed. This minimized the risk of RCC installation being delayed and significantly increasing overall project costs should a differing site condition be encountered during foundation excavation.
Previous Board Actions: In March 2010, the Board accepted Change Orders 1 through 5 for $434,626 and authorized the General Manager to execute change orders for up to $2,324,000 to revise unit price bid items to address field conditions encountered at the foundation excavations, increasing the construction contract amount to $26,508,126.

Discussion
We are requesting the Board accept Change Order 8 for $344,498 executed by staff under the General Manager’s authority. The items were for a new differing site condition encountered near the right abutment of the base of the main dam foundation excavation, field modifications in the marina area, and administrative contract revisions. A full listing of contract modifications is attached as Table 1.

Differing site condition: Staff executed one modification to adjust the excavation unit price quantities for $610,675 for a new differing site condition discovered while excavating one of the last areas of the foundation. The project’s geotechnical investigation included drilling a number of holes (borings) in the proposed dam raise foundation area that exceeded industry standards for this type of project. The boring locations are shown in Figure 2, and only give actual underground conditions at the spot drilled. The designer, in concert with our Board of Senior Consultants’ review and California Division of Safety of Dam’s review and approval, estimated the excavation quantities necessary to develop an appropriate foundation for the dam raise by extrapolating subsurface ground conditions between these borings. Construction contract industry standards for foundation excavation include unit price quantities so that the owner only pays for the actual excavation performed by the contractor. This new differing site condition required additional excavation to reach competent rock beyond the estimated amount and is an isolated condition that was not identified in the geotechnical report as the nearest boring was 100 feet away. All foundation excavation work is expected to be completed by the middle of July and in time for the Package 3 contractor to begin his work.

This Change Order 8 only addressed the required additional excavation to remove the soft rock down to hard and competent rock. Additional quantity adjustments are needed to stabilize the area around the differing site condition and fill the depressions in to bring the foundation back to intended design elevations. These adjustments are described herein as part of Change Order 9 that follows.

Field modification: Staff executed one modification to adjust unit price quantities for $310,000 to address additional rock crushing, processing, and stockpiling of material for the marina that could only be estimated at time of bid. Other San Vicente Site construction contracts, such as the San Vicente Pump Station and Reservoir Interconnect Pipeline, had excess rock and soil from excavation operations required to build these projects. As part of Package 2, the contractor was required to crush, process, and stockpile excess material from these projects for use as fill at the future marina area. Because the timing was such that final quantities were not known at the time Package 2 was awarded; crushing, processing, and stockpiling the material was included in the contract as an unit price item so that the Water Authority only paid for actual work.
completed. The actual projected quantities will exceed the contract unit price quantity estimate, and this modification adjusts the unit price quantity accordingly.

**Administrative:** Staff executed seven modifications for a credit of $576,177 to return unused portions of contract allowance items including environmental mitigation and partnering, and contractor reimbursement for Water Authority off-site inspection costs for welded steel pipe and cofferdam fabrication.

As discussed above, Change Order 8, was executed by staff to adjust only the new differing site condition’s excavation unit price quantity while a solution to bring the over-excavated foundation back to design grade was developed by the designer and approved by DSOD. Board authorization is now needed for Change Order 9 for the General Manager to execute a change to unit price quantities for slope stabilization with rock netting, and shaping concrete to fill the excavated depressions, for up to $1,375,955. These required modifications have been approved by the designer and DSOD and will provide a smooth foundation ready to receive roller compacted concrete. The designer and DSOD agree the shaping concrete needs to be placed in Package 2, in order to avoid delays to Package 3, because the shaping concrete requires six months to cure before receiving roller compacted concrete.

The area that will require shaping concrete is shown in Photo 1. Estimated unit price quantities to address this differing site condition are summarized in Table 2. Acceptance of Change order 8 and approval of Change Order 9 will increase Barnard Construction’s contract total by $1,720,453 to $28,228,579.

The contractor is expected to complete the last section of the foundation excavation by the middle of July. Until the foundation is fully exposed, there is a chance that the unit price quantities could change. Any unused quantities will be credited back to the Water Authority once all work is complete and accepted by DSOD.

On this project, the small business participation is 2 percent. Minority and women owned business participation for this project is 2 percent. This information is provided for statistical purposes.

Prepared by: J. Wade Griffis, Lead Construction Administrator  
Reviewed by: Michael T. Stift, Director of Engineering  
Approved by: Frank Belock, Deputy General Manager

Attachments:  
Figure 1 - San Vicente Project General Location Map  
Figure 2 - Geotechnical Borings and Differing Site Condition Locations  
Photo 1 - Lower Right Abutment Differing Site Condition  
Table 1 - Summary of Construction Change Orders, Package 2 San Vicente Foundation Preparatory Work  
Table 2 - Unit Price Bid Item Revisions
San Vicente Dam Raise ESP & Carryover Storage Project

PROJECT:

San Diego County Water Authority
CAPITAL IMPROVEMENT PROGRAM

GENERAL LOCATION MAP

FIGURE 1

San Vicente Reservoir

Existing San Vicente Dam, Future Site for San Vicente Dam Raise ESP & Carryover Storage Project

Limits of Work

New Saddle Dam
Main Dam Geotechnical Borings

Lower Right Abutment Differing Site Condition

Figure 2
Additional Excavation Area

Main Dam
# TABLE 1
SUMMARY OF CONSTRUCTION CHANGE ORDERS
SAN VICENTE DAM RAISE PACKAGE 2 CONTRACT
SPECIFICATION 591

<table>
<thead>
<tr>
<th>Change Order</th>
<th>Item No.</th>
<th>Description</th>
<th>Amount</th>
<th>Milestone Time Extension</th>
<th>Contract Time Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Differing Site Condition-Potholing in marina area.</td>
<td>$7,411</td>
<td>0 days</td>
<td>0 days</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>Differing Site Condition-Backfill pothole trenches in marina area.</td>
<td>$1,117</td>
<td>0 days</td>
<td>0 days</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Outside Agency Requirement-Evaluate cofferdam design.</td>
<td>$81,895</td>
<td>14 days M 2 &amp; M 4</td>
<td>14 days</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>Design Modification-Provide an access manway to San Vicente Pipeline 1.</td>
<td>$20,220</td>
<td>0 days</td>
<td>0 days</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>Design Modification-Provide downstream control facility slope excavation modifications.</td>
<td>$80,025</td>
<td>2 days M 2 &amp; M 4</td>
<td>2 days</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Field Modification-Provide potholing at San Vicente Interconnect Pipeline.</td>
<td>$7,785</td>
<td>0 days</td>
<td>0 days</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>Field Modification-Delete cofferdam painting.</td>
<td>($218,000)</td>
<td>0 days</td>
<td>0 days</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>Field Modification-Modifications to material testing lab.</td>
<td>$39,000</td>
<td>0 days</td>
<td>0 days</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Design Modification-Provide additional marina underdrains.</td>
<td>$13,382</td>
<td>0 days</td>
<td>0 days</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>Administrative Modification - Extend Milestones 1, 2 and 4 for inclement weather.</td>
<td>$0</td>
<td>3 days M 1 9 days M 2 3 days M 4</td>
<td>3 days</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>Differing Site Condition-Extend Milestone for additional excavation quantities.</td>
<td>$0</td>
<td>32 days M 1</td>
<td>0 days</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Field Modification-Extend hydro-demolition work tied to Milestone 1.</td>
<td>$0</td>
<td>0 days</td>
<td>0 days</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>Design Modification-Increase spillway and foundation excavation.</td>
<td>$149,334</td>
<td>0 days</td>
<td>0 days</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>Differing Site Condition- Demolish San Vicente Pipelines 1 and 2 concrete encasement.</td>
<td>$7,457</td>
<td>0 days</td>
<td>0 days</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>Administrative Modification - Extend Milestone 2 for inclement weather.</td>
<td>$0</td>
<td>10 days M 2</td>
<td>0 days</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>Differing Site Condition – Place foundation shaping concrete at San Vicente Pipelines 1 and 2</td>
<td>$200,000</td>
<td>0 days</td>
<td>0 days</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>Design Modification – Extend encasement for San Vicente Pipelines 1 and 2.</td>
<td>$45,000</td>
<td>0 days</td>
<td>0 days</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Differing Site Condition - Place foundation shaping concrete at right abutment.</td>
<td>$235,600</td>
<td>0 days</td>
<td>0 days</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>Differing Site Condition - Place foundation shaping concrete at left abutment.</td>
<td>$307,450</td>
<td>0 days</td>
<td>0 days</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>Administrative Modification - Extend Milestone 2 for inclement weather.</td>
<td>$0</td>
<td>6 days to M2</td>
<td>0 days</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>Design Modification - Preliminary adjustment of</td>
<td>$1,780,950</td>
<td>0 days</td>
<td>0 days</td>
</tr>
<tr>
<td>Change Order</td>
<td>Description</td>
<td>Amount</td>
<td>Days to M2</td>
<td>Days</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>------------------------------------------------------------------------------</td>
<td>----------</td>
<td>-----------</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td>7 2</td>
<td>Administrative Modification - Extend Milestone 2 for inclement weather.</td>
<td>$0</td>
<td>1 day</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

**Change Orders 1-7 approved at March 25, 2010 Board Meeting**

- **Total Change Order Amount:** $2,758,626
- **Total time extension:** 19 days
- **Original Board authorized contract amount:** $23,749,500
- **New contract amount:** $26,508,126

**M = Milestone**

<table>
<thead>
<tr>
<th>Change Order</th>
<th>Description</th>
<th>Amount</th>
<th>Days</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 1</td>
<td>Design Modification - Revise unit price bid item quantities.</td>
<td>$920,675</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8 2</td>
<td>Administrative Modification – Credit unused allowance for environmental mitigation.</td>
<td>($125,000)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8 3</td>
<td>Administrative Modification - Credit unused allowance for blast event.</td>
<td>($23,200)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8 4</td>
<td>Administrative Modification - Credit unused allowance for partnering.</td>
<td>($35,000)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8 5</td>
<td>Administrative Modification - Provide concrete hydro-demo for Package #3 trial RCC placement.</td>
<td>$18,107</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8 6</td>
<td>Administrative Modification – Reimbursement for construction water usage.</td>
<td>($12,547)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8 7</td>
<td>Administrative Modification – Reimbursement for in-plant source inspection.</td>
<td>($309,011)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8 8</td>
<td>Administrative Modification – Delete San Vicente Reservoir interconnect pipeline encasement.</td>
<td>($25,915)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8 9</td>
<td>Administrative Modification – Credit unused San Vicente Pipeline 1&amp;2 foundation shaping concrete allowance.</td>
<td>($53,508)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8 10</td>
<td>Administrative Modification – Credit unused San Vicente Pipeline 1&amp;2 extension allowance.</td>
<td>($5,963)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8 11</td>
<td>Field Modification – Revised LLO pipe welding and testing requirements 108-inch credit.</td>
<td>($4,140)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Total change order amount through Change Order 8:** $3,103,124

- **Total time extension:** 19 days
- **Original Board authorized contract amount:** $23,749,500
- **New contract amount:** $26,852,624
TABLE 2 – Change Order 9
UNIT PRICE BID ITEM REVISIONS
SAN VICENTE DAM RAISE PACKAGE 2 CONTRACT
SPECIFICATION 591

<table>
<thead>
<tr>
<th>Construction Activity (units)</th>
<th>Contract Quantity</th>
<th>Completion Estimate</th>
<th>Additional Quantity</th>
<th>Additional Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stockpiled Processing and Crushing (CY)</td>
<td>190,000</td>
<td>206,000</td>
<td>20,000</td>
<td>$ 80,000</td>
</tr>
<tr>
<td>Excavate Raised Dam Foundation (CY)</td>
<td>84,000</td>
<td>90,000</td>
<td>6,000</td>
<td>$ 330,000</td>
</tr>
<tr>
<td>Clean Foundation (SY)</td>
<td>28,200</td>
<td>32,500</td>
<td>4,300</td>
<td>$ 64,500</td>
</tr>
<tr>
<td>Dental Excavation (CY)</td>
<td>2,200</td>
<td>2,600</td>
<td>400</td>
<td>$ 30,000</td>
</tr>
<tr>
<td>Dental Concrete Placement (CY)</td>
<td>1,847</td>
<td>3,600</td>
<td>1,753</td>
<td>$ 587,255</td>
</tr>
<tr>
<td>Rock Netting (SY)</td>
<td>4,500</td>
<td>5,500</td>
<td>1000</td>
<td>$ 95,000</td>
</tr>
<tr>
<td>Foundation Shaping Concrete LLOW (CY)</td>
<td>1270</td>
<td>1670</td>
<td>400</td>
<td>189,200</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>$1,375,955</strong></td>
</tr>
</tbody>
</table>
June 16, 2010

Attention: Engineering & Operations Committee

Power Purchase Agreement with Borrego Solar Systems, Inc. for three Solar Power Projects

Staff Recommendation
Authorize the General Manager to move forward with negotiation and execution of a power purchase agreement with Borrego Solar Systems, Inc. absent the language previously approved in accordance with Alternative #1.

Alternatives

1. The starting rate of the power purchase agreement (PPA) with a 1.75% escalator for the three sites is approximately $0.1400/kWh. The power purchase agreement will convey ownership of the Renewable Energy Credits (REC’s) to Borrego Solar, Inc.

2. Direct staff to reject all proposals for the installation of solar under a power purchase agreement concept and to pursue the design and installation of the proposed solar projects through a design-build process. The Water Authority will own the facilities and will be responsible for their operation and maintenance. The Water Authority will retain ownership of the Renewable Energy Credits (RECs).

3. Direct staff to reject all proposals and do not pursue the three solar projects.

Fiscal Impact
Alternative 1 will result in a reduction in energy costs to the Water Authority. Alternative 1 will result in a savings of approximately $1,741,783 over the 20 year term of the PPA. The savings are calculated based on an estimated 3% utility escalation rate over the term of the PPA. Alternative 1 will convey ownership of the renewable energy credits (RECs) to Borrego Solar. The current value of the RECs is approximately $0.011/kWh which is the cost of acquiring the RECs. At this point in time it is not possible to determine what the future value of RECs may be.

Background
Approval to complete negotiations and execute Power Purchase Agreements with Borrego Solar Systems, Inc. for the three solar power projects was received on February 25, 2010. Board approval included language to modify the staff recommendation. The modification inserted the following language “subject to an express contract term that the Water Authority will not pay a greater rate than it would have otherwise paid to San Diego Gas & Electric for the same quantity of energy”.

Discussion
Following Board approval, staff met with Borrego Solar to develop the appropriate contract language to incorporate the modification. Although Borrego Solar did not initially anticipate an issue with the commitment resulting from the inserted language, their investment partners rejected the financing of the project. To determine if this issue was unique to Borrego Solar, three companies who also submitted proposals were contacted with the same commitment language request. Each company talked to their various investment partners and each notified us that none of their investors would agree to a clause requiring a commitment to keep the kWh rate below the utility cost for the life of the agreement. The feedback received from the investment banks and other investors is that they are looking for guaranteed cash flows and return on investment yields and have very little appetite for risk with the uncertainty of current market conditions.

To ensure all options had been pursued, staff researched other power purchase agreements executed in the last few years. That research reflected two PPAs executed in 2005-2006 that included a rate commitment. One was a community college with California Solar Initiative (CSI) funding at level 2 of $0.39/kWh, almost double the CSI rate for the Water Authority projects, the other was Nellis Air Force base in Nevada. None of the PPAs executed by local agencies, including Helix Water District, Vista Irrigation District and the City of San Diego contain a similar commitment clause as being requested.

In addition to researching PPA clauses for rate commitments, additional discussions continued with Borrego Solar to explore all options to reduce both the price and the escalator payable under the contract. As a result of those discussions their proposal includes a starting rate for all sites of $0.1400/kWh with an escalator of 1.75% and includes an allowance for security cameras in the amount of $200,000. This proposal will result in a positive cash flow from the first year for each of the three sites and an accumulated savings of $1,741,783 over the term of the agreement. The accumulated savings is calculated using an annual estimated utility escalator of 3%. The historic rate escalation for SDG&E’s AL-TOU rate between 2003 and 2009 is an annual average of 3.5%. The increase from 2008 to 2009 was 10.6%.

Given the rejection by numerous investors to the commitment clause, and the revised rate with a 1.75% escalator that is less than SDG&E’s historical annual average escalation of 3.5%; it is recommended that the General Manager be authorized to move forward with negotiations and execution of a power purchase agreement with Borrego Solar Systems, Inc. absent the language modification previously approved.

Prepared by: Cheryll A. Stewart, Special Projects Manager
Approved by: Sandra L. Kerl, Deputy General Manager

Attachment: Board Memo dated February 17, 2010
February 17, 2010

Attention: Engineering & Operations Committee

Power Purchase Agreement with Borrego Solar Systems, Inc. for three Solar Power projects. (Action)

Staff Recommendation
Authorize the General Manager to complete negotiations and execute Power Purchase Agreements with Borrego Solar Systems, Inc. for three solar power projects in accordance with Alternative 1.

Alternatives
1. The starting rate of the power purchase agreement (PPA) with a 3% escalator for the three sites is approximately $0.1430/kWh. The power purchase agreement (PPA) will convey ownership of the Renewable Energy Credits (RECs) to Borrego Solar.

2. Ownership of the renewable energy credits will be maintained by the Water Authority. The power purchase agreement (PPA) for all three sites will have a starting rate of $0.1540/kWh and an escalator of 3%.

3. Direct staff to reject all proposals for the installation of solar under a power purchase agreement concept and to pursue the design and installation of the proposed solar projects through a design - build process. The Water Authority will own the facilities and will be responsible for their operation and maintenance. The Water Authority will retain ownership of the Renewable Energy Credits (RECs).

Fiscal Impact
Alternatives 1 and 2 will result in a reduction in energy costs to the Water Authority. Alternative 1 will result in a savings of approximately $1,713,085 over the 20 year term of the PPA and Alternative 2 will result in savings of approximately $938,000 over the 20 year term of the PPA. The savings are calculated based on an estimated 5% utility escalation rate over the term of the PPA. Although the PPA includes an annual escalation rate of 3%, at no time will the rate exceed the rate charged by the local electrical utility. Alternative 1 will convey ownership of the renewable energy credits (RECs) to Borrego Solar, while under Alternative 2 the Water Authority will maintain ownership of the (RECs). The difference between Alternative 1 and 2 is $0.011/kWh which is the cost of acquiring the RECs. At this point in time it is not possible to determine what the future value of RECs may be.
Background
In April 2009, following reinstatement of the federal solar tax credits, staff worked with member agencies to develop a Request for Proposal (RFP) for a cooperative solar procurement using the power purchase agreement concept. The Water Authority potential sites included the headquarters on Overland Avenue, the Escondido Operations & Maintenance facility, and the Twin Oaks Valley Water Treatment Plant. In addition, five member agencies, Fallbrook Public Utility District, Helix Water District, Olivenhain Municipal Water District, Padre Dam Municipal Water District, and Vista Irrigation District submitted potential sites for inclusion. As part of the response to the RFP each responder was required to perform and submit a preliminary feasibility study for each of the 15 sites. Proposals were received from five teams. Based on Borrego Solar’s overall experience with multiple types of solar support structures including roof, ground and carport, Sun Edison’s significant operations & maintenance experience and their client connect (monitoring) software; and the proposed pricing, the Borrego Solar/ Sun Edison team was chosen.

Following notification of their selection, the Borrego Solar/Sun Edison team performed a more thorough feasibility analysis including meetings and site walks with the Water Authority and with interested member agencies. The Water Authority, Helix Water District, and Vista Irrigation District, have each completed this phase and are finalizing panel layouts and pricing options.

Discussion
The Power Purchase Agreement is an alternative to the Water Authority building, owning, operating, and maintaining the system. It offers an opportunity to install solar without incurring capital cost for design and construction or assuming the responsibility and costs for system operation and maintenance. Through a power purchase agreement (PPA) Borrego Solar will be responsible for the financing, operation, and maintenance of the solar systems for the twenty year term. A power purchase agreement transfers the risk for system performance to the owner of the project which will be Borrego Solar. The Water Authority is responsible for the purchase of the power produced. This contractual arrangement allows Borrego Solar and its investment partners to take advantage of the 30% solar tax credit and other one time tax credits that are not available to the Water Authority. Borrego Solar of El Cajon will own and be responsible for the design and installation of the system. Sun Edison through contract with Borrego Solar will be responsible for the maintenance. The Water Authority will purchase the power generated according to a pre-set price structure for twenty years. In addition the PPA includes options at set intervals for the Water Authority to buy the systems at fair market value in accordance with IRS regulations. Following the twenty-year term of the agreement, the Water Authority has the option to negotiate an extension of the PPA, to purchase the facilities at fair market value, or to have the solar service provider, Borrego Solar, remove the solar facilities at no cost to the Water Authority.

The solar project recommended for installation at the Water Authority Headquarters facility on Overland Avenue will have a system size of 411.6KW AC and will consist of roof and parking structure mounted panels. The estimated construction cost for this facility is $3.1 million. The
construction estimate does not include the cost of design or annual maintenance. The project recommended for the Operations & Maintenance facility in Escondido will have a system size of 178.6 KW AC and consist of both roof and parking structure mounted panels and has an estimated construction cost of $1.3 million. The Twin Oaks Valley Water Treatment Plant is sized at 939.6 KW AC and consists of ground-mounted panels on the flow regulatory structure and clearwells and has an estimated cost to construct of $6.4 million.

In addition to the installation of the Sharp photovoltaic panels manufactured in Tennessee, additional equipment as shown on the attachment will be installed at the San Diego and Escondido facilities. Construction of the system provided an opportunity to simultaneously install conduit and wiring for security cameras, as a result the purchase and installation of security cameras for both San Diego and Escondido sites and slurry coat and restriping of the San Diego facility has been included in the project and in the PPA. In addition, the carport structures have been upgraded to light gauge steel structures with welded posts.

Public Affairs, Operation and Maintenance, other Water Authority and Borrego Solar staff made presentations on the project to the Twin Oaks Valley Working Group and the Twin Oaks Valley Community Sponsor Group in November and December 2009. One additional meeting is scheduled for February 17, 2010.

Prepared by: Cheryll A. Stewart, Special Projects Manager
Approved by: Sandra L. Kerl, Deputy General Manager

Attachment: SDCWA Project Pricing Summary
Site Maps (3)
   Escondido Office
   Kearny Mesa Headquarters
   Twin Oaks Valley Water Treatment Plant
Definitions
**ATTACHMENT 1**

**SDCWA Solar Project Pricing Summary**

<table>
<thead>
<tr>
<th>SDCWA Site Location</th>
<th>Borrego Solar Owns REC's</th>
<th>SDCWA Owns REC's</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PPA starting rate</td>
<td>year cash positive</td>
</tr>
<tr>
<td>SDCWA-ESC</td>
<td>4%</td>
<td>2</td>
</tr>
<tr>
<td>SDCWA-HQ</td>
<td>0.1590</td>
<td>$285,192.00</td>
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<tr>
<td>SDCWA-Twin Oaks</td>
<td>0.1310</td>
<td>$703,316.00</td>
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<tr>
<td>SDCWA -All Sites Totals</td>
<td>0.1320</td>
<td>day one</td>
</tr>
</tbody>
</table>

**Special Features added per site**

**SDCWA- HQ**
*Security camera's in secure parking lot (13)*
*Security gate's in secure parking lot (3)*
*Slurry coat secured parking lot*
*Re striping of secured parking lot*
*Future conduits stub-outs for Electric vehicles in secured parking lot*
*White Painted Carport*
*upgraded light gage structure steel carports (welded post)*

**SDCWA-ESC**
*Security camera's in secure parking lot (11)*
*Security gate's in secure parking lot (3)*
*White Painted Carport*
*upgraded light gage structure steel carports (welded post)*

**SDCWA-Twin Oaks**
*Black framed solar modules*
*Low level, black, SunLink solar racking system*

**Clarifications on Table**
*"year cash positive" is in reference to accumulative cash*
*"20 year accumulative cash" is for term of PPA only*
LEGEND
- Roof mounted solar panels.
- Solar panels mounted on parking structure roof.
- Building outline.
- S' setback off building's edge.
- Parking structure outline.
- Solar panel tilt direction.

LOW PROFILE S.S.S. - TOP VIEW
These are typical solar support structure layouts. The exact configuration of the S.S.S. on this site may vary based on the alignment of the surface features.

LOW PROFILE S.S.S. - BOTTOM VIEW

BUILDING INFORMATION
Building: 1
- Number of Modules: 490
- Array size: CEC
  - System Size: 98.6 KW
  - STC: 115.2 KW
  - Azimuth: 186°

NEW INVERTER LOCATION

EXISTING ELECTRIC ROOM A/C POC

NOT TO SCALE

INVERTER INFORMATION
- 235W SHARP Solar Panels
  - 14 Modules per String
  - Roof Mounted @ 20° tilt
  - Solar panels mounted flat on parking structure.
  - (All Parking Structures Tilted at 10°)

INVERTER INFORMATION
- (1) SATCON 375kW
- (1) SATCON 50kW

PARKING STRUCTURE INFORMATION

<table>
<thead>
<tr>
<th>Parking Structure</th>
<th>1</th>
<th>2</th>
<th>(2)</th>
<th>(3)</th>
<th>(3)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure Size</td>
<td>22'x65'</td>
<td>22'x40'</td>
<td>22'x40'</td>
<td>20'x15'</td>
<td>20'x15'</td>
<td>20'x15'</td>
</tr>
<tr>
<td>Square Footage</td>
<td>1,210 Sq.ft.</td>
<td>8,822 Sq.ft.</td>
<td>860 Sq.ft.</td>
<td>6,308 Sq.ft.</td>
<td>1,324 Sq.ft.</td>
<td></td>
</tr>
<tr>
<td>Number of Modules</td>
<td>56</td>
<td>362</td>
<td>42</td>
<td>306</td>
<td>56</td>
<td></td>
</tr>
<tr>
<td>Array size: CEC</td>
<td>11.4 KW</td>
<td>79.7 KW</td>
<td>8.5 KW</td>
<td>82.6 KW</td>
<td>11.4 KW</td>
<td></td>
</tr>
<tr>
<td>STC</td>
<td>13.2 KW</td>
<td>92.1 KW</td>
<td>9.9 KW</td>
<td>72.4 KW</td>
<td>13.2 KW</td>
<td></td>
</tr>
<tr>
<td>Azimuth</td>
<td>269°</td>
<td>269°</td>
<td>172°</td>
<td>179°</td>
<td>179°</td>
<td></td>
</tr>
<tr>
<td>Structure Type</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>
Total Site Information
Number of Modules = 4,844
System Size = 963.5 kW (AC CEC)
System Size = 1.1 MW (DC STC)

GROUND MOUNT INFORMATION
Area
Number of modules
Array size: CEC
Array size: STC
阵列倾角
SOLAR ARRAY INVERTERS

LEGEND
- Ground mounted solar panels.
- 20’ Clearance from Access Hatches
- Solar panel tilt direction.

NOT FOR CONSTRUCTION
FOR INFORMATION ONLY

230W SHARP Solar Panels
Ground Mounted @ 20° Tilt
1. **Power Purchase Agreement (PPA)**

   A Power Purchase Agreement (PPA) is a legal contract between an electricity generator and a power purchaser. The seller is typically an independent power producer. The PPA is often regarded as the central document in the development of independent electricity generating assets (power plants), and is a key to obtaining project financing.

   Under a PPA model, the PPA provider secures funding for the project, maintains and monitors the energy production and sells the electricity to the host at a contractual price for the term of the contract. The host has the option to purchase the generating assets (such as solar electric system) from the PPA provider at the end of the term, may renew the contract with different terms, or request that the equipment be removed.

   One of the key benefits of the PPA is that clearly defining the output of the generating assets (such as a solar electric system) and the credit of its associated revenue stream, a PPA can be used by the PPA Provider to raise financing.

   In the United States due to existence of the solar investment tax credit, the PPA relies on financing partners with a tax appetite who can benefit from the federal tax credit. Typically, the investors and the solar services provider create a special purpose entity that owns the solar equipment. The solar services provider finances, designs, installs, monitors and maintains the project. As a result the customer does not pay upfront costs for the installation of the equipment or the on-going maintenance, instead they pay only for the electricity the system generates.

2. **Renewable Energy Credit (REC)**

   Renewable Energy Certificates (RECs), also known as Green tags, Renewable Energy Credits or Tradable Renewable Certificates (TRCs), are tradable, non-tangible energy commodities in the United States that represent proof that 1 megawatt-hour (MWh) of electricity was generated from an eligible renewable energy source.
These certificates can be sold and traded or bartered, and the owner of the REC can claim to have purchased renewable energy. The energy associated with a REC is sold separately and is used by another party. The consumer of a REC receives only a certificate. RECs can incentivize carbon-neutral renewable energy by providing a production subsidy to electricity generated from renewable sources.

RECs are tracked through a certifying agency such as Western Renewable Energy Generation Information System (WREGIS). The certifying agency gives each REC a unique identification number to ensure that they do not get double counted.

There are two main markets in the United States for renewable energy certificates – compliance and voluntary markets. A compliance market such as exits in California in created by a policy called a Renewable Portfolio Standard. This policy requires electric companies to supply a set percentage of their electricity from renewable generators for a specified year. Electric utilities can demonstrate compliance with these requirements by purchasing RECs. A voluntary market is one in which customers choose to buy renewable power out of a desire to go green.
June 16, 2010

Attention: Engineering and Operations Committee

Annual Aqueduct Operating Plan. (Information)

Background
On September 1, 2005 the Board directed staff to work with the Member Agency General Managers and Operating Heads to develop an annual Aqueduct Operating Plan. The goal of the Aqueduct Operating Plan is to address estimated deliveries of treated and untreated water, aqueduct and treatment plant shutdowns, delivery priorities, energy production/consumption schedules, and more recently, reservoir storage summaries and storage opportunities for each fiscal year. This is the fifth Annual Aqueduct Operating Plan and covers the period from July 1, 2010 to June 30, 2011.

Discussion
The Aqueduct Operating Plan is used as a planning document to optimize the delivery, treatment, and storage of water in the Water Authority’s service area by means of coordination and communication between the member agencies, Metropolitan Water District, and the Water Authority.

The Aqueduct Operating Plan includes a summary of the Water Authority’s scheduled shutdowns that impact the delivery of treated and untreated water to the region, Water Authority pump station operating schedules, Member Agency major maintenance information, and the production and consumption of energy for the Water Authority’s hydroelectric facility, water treatment plant, and pump stations. The plan was developed based on information received from member agencies, historical delivery data, allocation information from MWD, constraints in the aqueduct system, and scheduled shutdowns.

Based on the FY 2011 Sales Forecast, average flows for the high-demand months of July through October are anticipated to range between 51 percent - 72 percent of the treated water capacity and 65 percent - 93 percent of the untreated water capacity of the Aqueduct system.

Power generation at the Rancho Peñasquitos Hydroelectric Facility in FY 2010 will achieve approximately 87 percent of the projected 25,000 Megawatt-hours (nearly $1,200,000 in revenue). The reduced generation was due to reduced Member Agency demand and the four shutdowns conducted this year. The projections for FY 2011 once again call for 25,000 Megawatt-hours of output, or approximately $1,300,000 in revenue. The Olivenhain Hodges Pumped Storage Facilities will also be operational in FY 2011.
Engineering and Operations Committee  
June 16, 2010  
Page 2 of 2

The plan shows, with effective communication and coordination, that there is sufficient capacity to deliver the region’s allocated supply while engaging in a robust program of inspection and maintenance.

Prepared by: David L. Dow, Ph.D., Water Resources Specialist  
Reviewed by: Gary Eaton, Director of Operations and Maintenance

Attachment:  
1. Draft Aqueduct Operating Plan
On the Cover

San Vicente Surge Tank overflow chute test

Twin Oaks Water Treatment Plant

Internal pipeline repair during shutdown

External pipeline repair/installation

Online Water Ordering System, flowchange switchboard

Horizontal pump-Olivenhain Pump Station

Filling the San Vicente Surge Tank

Constructing the P03/P04 Crossover, Jackson Drive (2006)
TABLE OF CONTENTS

Executive Summary ........................................................................................................................ 1
Water Supply ................................................................................................................................. 3
Untreated Water Distribution Priorities ......................................................................................... 7
San Diego County Water Authority Aqueduct Shutdowns ............................................................ 8
San Diego County Water Treatment Plant Shutdowns ................................................................. 11
Water Authority Aqueduct Energy Production/Consumption ...................................................... 13
Reservoirs and Storage Opportunities .......................................................................................... 17
Major Maintenance Activities ....................................................................................................... 21

FIGURES

Figure 1 - Aqueduct Operating Plan Summary Timeline FY 2011. .......................................... 1
Figure 2 - FY 2011 Projected Treated Water System utilization ............................................... 3
Figure 3 - FY 2011 Projected Untreated Water System utilization ........................................... 4
Figure 4 - FY 2010 Projected overall demands from AOP vs. actual deliveries ....................... 4
Figure 5 - FY 2010 AOP Treated Water demand vs. actual deliveries .................................... 5
Figure 6 - FY 2010 AOP Untreated Water demand vs. actual deliveries .................................. 5
Figure 7 - Untreated Water Delivery Priorities .................................................................. 7
Figure 8 - Water Authority FY 2011 Pipeline Shutdowns ......................................................... 9
Figure 9 - Scheduled Member Agency maintenance coordination ....................................... 11
Figure 10 - Rancho Hydro Revenues vs. Projections FY2010 ................................................ 15
Figure 11 - Location and Relative Capacities of San Diego County Reservoirs ..................... 17
Figure 12 - Reservoir Levels (% of Capacity) as of May 1, 2010 ........................................... 19
Figure 13 - Major Maintenance Activities for FY 2011 .......................................................... 21

TABLES

Table 1 - Rancho Hydro Revenues vs. Projections FY 2010 .................................................. 15
Table 2 – Storage/Capacity in Member Agency and Water Authority Reservoirs (AF) ....... 18
Executive Summary

The annual Aqueduct Operating Plan reflects on-going efforts to optimize the delivery, treatment, and storage of water in the San Diego region through coordination between member agency Operating Heads, Water Authority Staff, and the Metropolitan Water District of Southern California (MWD). Staff has updated the Aqueduct Operating Plan for Fiscal Year 2011 (FY 2011) to reflect anticipated operational opportunities and constraints, and evaluate our past years’ performance.

The Aqueduct Operating Plan complies with the interim untreated water distribution priorities and includes a summary of the Water Authority’s scheduled shutdowns that affect the delivery of water to the region (see Figure 1), Water Authority pump station operating schedules, and water treatment plant outages.

The plan was developed based on information received from Member Agencies, historical delivery/production data, allocated delivery volumes, constraints within the Aqueduct system, and scheduled shutdowns. Key items that affect the region for fiscal year 2011 include:

- Based on allocated supply and reduced demand resulting from both voluntary and mandatory conservation, system capacity should not be an issue during delivery of the region’s anticipated treated and untreated water allotments.
- Maximum treated water system utilization should be approximately 72 percent of treated aqueduct capacity in FY 2011.
- Maximum untreated water system utilization should be approximately 93 percent of untreated aqueduct capacity in FY 2011.
- There is one treated shutdown scheduled for FY 2011 (phase 1: 10 days, phase 2: 15 days).
- There are NO scheduled untreated water shutdowns during this fiscal year.

Figure 1 - Aqueduct Operating Plan Summary Timeline FY 2011.
With a second consecutive year of MWD allocations, and continuation of member agency water use restrictions, demand for both treated and untreated water for FY 2011 should not reach system capacity. It is expected that treated water deliveries for the high demand months of July through October 2010 will result in flows ranging from 71 percent to 51 percent of capacity (Figure 2). Likewise, untreated deliveries for the high demand months of July through October 2010 will result in flows between 93 percent and 65 percent of untreated aqueduct capacity (Figure 3).

**Figure 2**- FY 2011 Projected Treated Water System utilization (from FY 2011 Sales Forecast)
During FY 2010 total imported demands (both treated and untreated water) were less than the combined available supplies from: MWD’s M&I and IAWP allocations, Water Authority QSA supplies, and dry-year supply actions. While the distribution of actual demand follows historic trends, monthly demands were approximately 12% below FY 2010 AOP projections (see Figure 4).
The overall decrease in demand experienced throughout FY 2010 resulted in local treatment plants supplying a greater proportion of treated water to the region. Figure 6 illustrates the resulting higher flows of untreated water compared to historic trends (FY 2010 AOP Projection), while Figure 5 shows a general decrease in treated water demand when compared to the FY 2010 AOP Projection. Even with these shifts, system capacity was not an issue in FY 2010.

Figure 5 – FY 2010 AOP Treated Water demand vs. actual deliveries

Figure 6 – FY 2010 AOP Untreated Water demand vs. actual deliveries
Untreated Water Distribution Priorities

Through a series of discussions with member agency staff, key untreated operating concerns were identified and used to develop untreated water delivery priorities. These priorities are intended to provide a framework for Water Authority operators to deal with potential conflicts arising during high demand periods for untreated water deliveries. The Board adopted interim untreated water delivery priorities at the September 8, 2005 Board meeting. This plan complies with the interim untreated water distribution priorities and is shown in Figure 7.

Figure 7 - Untreated Water Delivery Priorities
**Water Authority Aqueduct Shutdowns**

The Water Authority conducts scheduled shutdowns of sections of pipeline for internal inspection, maintenance, and Capital Improvement Project (CIP) connections on an annual basis. These pipeline shutdowns are coordinated with the MWD, member agencies, and all Water Authority Departments. The schedule includes three years of shutdowns to allow for the proper planning of maintenance and CIP activities for both the Water Authority and its member agencies. This three-year schedule is updated each January to facilitate the compilation of the Annual Aqueduct Operating Plan. At that time, the following fiscal year’s (July to June) Aqueduct shutdown schedules are made available to member agency personnel for review and comment, prior to inclusion in the Annual Aqueduct Operating Plan.

For FY 2011, there is one planned shutdown (2 phases) affecting treated deliveries. A timeline and brief description of the shutdown follows.

---

**Figure 8 - Water Authority FY 2011 Pipeline Shutdowns**

**Treated Water Shutdown – Phase 1**

**January 4 to Jan 13, 2011**

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>Jan 4 - Jan 13</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>All treated water flows south of Black Mountain Vent will be terminated during this shutdown.</td>
</tr>
</tbody>
</table>
| **Purpose** | • Water Authority crews will perform an interior assessment on Pipeline 4 from STA 669+70 (Sweetwater Compound) to STA 860+00 (Gotham St).  
• Select portions of Pipeline 4 will be isolated during this shutdown.  
• The Twin Oaks Valley Water Treatment Plant (TOVWTP) will be impacted by this shutdown. |
| **Affects on MWD** | There will be a treated water flow reduction of approximately 60 CFS on Pipeline 4. The affects on MWD will depend on output from TOVWTP. It is anticipated that MWD impacts will be minimal. |
The following treated water connections will be out of service during this outage: HLX5, NCSB4 & 5, OTAY10, OTAY11, OTAY12 & 13, PD4, SD11, SD18, SD19 & 21.

<table>
<thead>
<tr>
<th>Member Agency Connections Affected</th>
<th>The Ramona Pipeline and the Miramar Pump Station 48 inch discharge pipeline will be off-line during this period.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 2</td>
<td>Jan 9 - 23</td>
</tr>
<tr>
<td>Description</td>
<td>Purpose</td>
</tr>
<tr>
<td>Affects on MWD</td>
<td>Member Agency Connections Affected</td>
</tr>
</tbody>
</table>
San Diego County Water Treatment Plant Shutdowns

In order to optimize the delivery, treatment, and storage of water in San Diego, a request was sent to the Member Agency Operating Heads to obtain schedules for treatment plant expansions, CIP tie-ins, and scheduled treatment plant maintenance. The goal of this request is to facilitate the production of one schedule that the member agencies can use to schedule their work at times that will have the least impact on the region. Responses from member agencies confirmed upcoming maintenance activities including those shown in Figure 9. A number of other maintenance projects were also identified, but they lacked firm schedules. These types of projects, as well as Treatment Plant Shutdown coordination, will be carried throughout the year as standing discussion items at the regularly scheduled Operating Head meetings.

![Figure 9 - Scheduled Member Agency maintenance coordination](image-url)
Water Authority Aqueduct Energy Production/Consumption

With the completion of the Lake Hodges Pump Storage Project, the Water Authority will be operating two power generation facilities during FY 2011. The Alvarado Hydroelectric Facility will remain non-operational until the relining of Pipelines 3 and 4 between Mission Trails Regional Park and the Alvarado Water Treatment Plant are complete, and facility repairs and renovations are undertaken. With the completion of the San Vicente Pump Station, the Water Authority will be operating five pump stations during FY 2011, along with the Twin Oaks Valley Water Treatment Plant. Following is a list of those facilities along with their anticipated operation schedules and costs:

- **Rancho Peñasquitos Hydroelectric Facility**
  - Projected months of operation: July 2010 to June 2011
  - Power generating capacity: 4.5 megawatts.
  - Estimated Power: 25,000 mega Watt (MW) hrs
  - Estimated Revenue: $1,300,000
  - Projected power consumption cost per month: $900
  - Total power consumption cost per year: $10,800

- **Lake Hodges Pump Storage Facility**
  - Projected months of operation: December 2010 to June 2011
  - Power generating capacity: 40 megawatts.
  - Estimated Power: Unknown (on call, based on SDG&E demands)
  - O&M fee paid by SDGE (during operation) per MW hour: $2
  - Annual capacity fee paid by SDGE (during standby): $2,800,000 (based on 90% availability)
  - Projected power consumption cost per month: $44,000
  - Total power consumption cost per year: $528,000
  - Projected cost for the year: $0 (Pumping is paid by “Generation Bank.” Yield pumping paid by the City of San Diego)

- **Alvarado Hydroelectric Facility**
  - Projected months of operation: Not in Service
  - Power generating capacity: 1.8 megawatts.
  - Estimated Power: 4,800 MW hrs
  - Estimated Revenue: $0
  - Projected power consumption and sundry charge cost per month: $450
  - Total power consumption cost per year: $5,400

- **Olivenhain Pump Station**
  - Projected months of operation: September and December of 2010, and February and April of 2011
  - Pumps (three available): One pump operation
  - Projected power consumption cost per month: $3,450
  - Projected pump cost per month: $43,350
  - Projected pump cost for the year: $173,400 (4 months pump operation)
  - Total power consumption cost per year: $214,800
Escondido Pump Station
- Projected months of operation: December 2010 through June 2011
- Pumps: Two pump operation
- Projected operational cost per month: $700
- Projected pump cost per month: $9,425
- Projected pump cost for the year: $60,000 (7 months pump operation)
- Total power consumption cost per year: $74,000

P2A Pump Station
- Projected months of operation: Used during emergencies and rare operational periods
- Pumps: Two pump operation
- Projected operational cost per month: $200
- Projected pump cost per month: $0 (no planned operation)
- Projected pump cost for the year: $0
- Total power consumption cost per year: $2,400

Miramar Pump Station
- Projected months of operation: July 2010 through June 2011
- Pumps: One pump operation
- Projected operational cost per month: $120
- Projected Water Authority pump cost per month: $0 (Energy cost for pumping paid by the City of San Diego)
- Projected Water Authority pump cost for the year: $0
- Total operational power consumption cost per year (excludes pumps): $1,440

San Vicente Pump Station
- Projected months of operation: Emergency drawdown of San Vicente Reservoir during SVDR project
- Pumps: One pump operation (3 available)
- Projected operational cost per month: $850 (October 2010 through June 2011 only)
- Projected pump cost per month: $0 (Energy cost for pumping paid by the SVDR project until Notice of Completion)
- Projected operational pump cost for the year: $0
- Total operational power consumption cost per year (excludes pumps): $7,650

Twin Oaks Valley Water Treatment Plant
- Projected months of operation: July 2010 to June 2011
- Projected operational cost per month (average): $120,484
- Total power consumption cost per year: $1,445,800

The total power consumption cost to operate the Rancho Peñasquitos and Alvarado Hydroelectric Facilities, the five pump stations, and Twin Oaks Valley WTP are estimated to be $1,762,290 for FY 2011. Additionally, power consumption at the Lake Hodges Pump Storage Facility is projected to be $528,000 annually; however, these costs will be offset by generation revenues.
During FY 2010, the Water Authority achieved approximately 87 percent of the operating goal of 25,000 MW hrs of energy production at the Rancho Peñasquitos Hydroelectric Facility. The shortfall of approximately 13 percent is the result of lower than projected untreated water demand from November through June and scheduled pipeline maintenance (Figure 10 and Table 1).

![Figure 10 - Rancho Hydro Revenues vs. Projections FY 2010](image-url)

Table 1 - Rancho Hydro Revenues vs. Projections FY 2010

<table>
<thead>
<tr>
<th></th>
<th>YTD Revenue Goal</th>
<th>YTD Revenue Earned</th>
<th>% Above or Below Goal</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jul</td>
<td>$119,858</td>
<td>$144,315</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Aug</td>
<td>$239,717</td>
<td>$278,545</td>
<td>16</td>
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<tr>
<td>Sep</td>
<td>$355,709</td>
<td>$393,118</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Oct</td>
<td>$475,567</td>
<td>$540,911</td>
<td>14</td>
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</tr>
<tr>
<td>Nov</td>
<td>$591,559</td>
<td>$616,908</td>
<td>4</td>
<td>Shut Down (10 days) &amp; Low flows</td>
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<tr>
<td>Dec</td>
<td>$711,418</td>
<td>$708,539</td>
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</tr>
<tr>
<td>Jan</td>
<td>$800,345</td>
<td>$781,557</td>
<td>-2</td>
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<tr>
<td>Feb</td>
<td>$900,871</td>
<td>$781,557</td>
<td>-13</td>
<td>Shut Down (3 days) &amp; Low flows</td>
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<tr>
<td>Mar</td>
<td>$1,020,730</td>
<td>$827,998</td>
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</tr>
<tr>
<td>Apr</td>
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<td>Low flows due to .36” rainfall</td>
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<tr>
<td>May</td>
<td>$1,256,580</td>
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<tr>
<td>Jun</td>
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<td>Projected</td>
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</tbody>
</table>

*June “YTD Revenue Earned” includes projected month of June earnings.
Reservoirs and Storage Opportunities

Serving multiple functions including: surface water capture, seasonal shift water storage, carryover storage, and local sources of emergency water supplies, member agency and Water Authority reservoirs function as system capacity buffers during peak demand periods and offer a level of security for short and long-term emergency situations. The size and location of each reservoir affects the extent to which it can perform the various functions, as does the individual agencies’ operational plan implemented at each location (Figure 11 and Table 2).

Figure 11 - Location and Relative Capacities of San Diego County Reservoirs
Table 2 – Storage/Capacity in Member Agency and Water Authority Reservoirs (AF)

<table>
<thead>
<tr>
<th>Reservoir</th>
<th>Total</th>
<th>Usable</th>
<th>Dead (unusable)</th>
<th>Storage As of May 1, 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Member Agency</td>
</tr>
<tr>
<td>Henshaw</td>
<td>54,000</td>
<td>53,994</td>
<td>6</td>
<td>15,290</td>
</tr>
<tr>
<td>Wohlford</td>
<td>3,255</td>
<td>2,905</td>
<td>350</td>
<td>2,460</td>
</tr>
<tr>
<td>Dixon</td>
<td>2,610</td>
<td>2,545</td>
<td>65</td>
<td>2,279</td>
</tr>
<tr>
<td>Sutherland</td>
<td>29,508</td>
<td>29,396</td>
<td>112</td>
<td>8,984</td>
</tr>
<tr>
<td>Hodges</td>
<td>30,251</td>
<td>28,422</td>
<td>1,829</td>
<td>20,192</td>
</tr>
<tr>
<td>San Dieguito</td>
<td>883</td>
<td>717</td>
<td>166</td>
<td>725</td>
</tr>
<tr>
<td>2San Vicente</td>
<td>89,312</td>
<td>38,680</td>
<td>341</td>
<td>24,041</td>
</tr>
</tbody>
</table>

Notes:
1. Capacity information: JMM Consulting Engineers, Inc. (1990), San Diego County Water Authority Optimal Storage Study: Reservoir Summary Report, unless updated by Member Agency staff.
2. San Vicente Reservoir’s usable storage capacity prior to the dam raise was 88,971 AF. It is drawn down to approx. 38,680 AF until 2013 to facilitate the San Vicente dam raise portion of the Emergency Storage Project.

In addition to meeting local storage and operational demands, both the Olivenhain and San Vicente reservoirs play a significant role in the Water Authority’s Emergency Storage Program (ESP), regional carryover storage, and the Emergency Storage Operations Guidelines (ESOG). These reservoirs figure prominently in planned responses to regional emergency situations related to water supply availability. Water Authority staff is working on a system-wide plan that utilizes a regional perspective on storage needs.
Figure 12 - Reservoir Levels (% of Capacity) as of May 1, 2010
(This Figure represents the Water Authority’s Carryover Storage and ESP not the individual Member Agencies)
Major Maintenance Activities

Major maintenance activities for FY 2011 include start-up activities at the Lake Hodges Hydroelectric Facility, support for the January 2011 Water Authority shutdown, and installation of a new triple offset butterfly valve at the Otay 13 turnout structure (Figure 13). Additionally, a December outage will involve draining portions of the system and removing equipment from selected structures.

Figure 13 - Major Maintenance Activities for FY 2011