Dreissenid Mussel
Response & Control Plan
January 13, 2011
Presentation Topics

- Overview
- Regulation
- Regulatory Impacts
- Operational Impacts
- Control Plan Highlights
- Recommendation
Overview

- Oct-07: Fish & Game Code Sect. 2300 created
- Jun-08: Control Plan Submitted to DFG
- Mar-08: Mussels found in Olivenhain Reservoir
- May-07: Olivenhain-Hodges Tunnel completed
- Jan-07: Quagga mussels found in MWD System
- Aug-09: Liability removed from Sect 2301 for approved & compliant plans
- Jan-10: Control Plan Revised
- Dec-10: Control Plan Revised
- Jan-11: Control Plan Approved by DFG
- Aug-10: Fish and Game Liability excluded from Section 2301
- Oct-10: Control Plan Revised
Fish & Game Code 2301(d)(1) requirements:
- Prepare and implement a plan to control or eradicate mussels (containing)
  - Methods for delineation of infestation
  - Methods for control or eradication…and decontamination
  - Systematic monitoring program
- Cooperate with (CDFG) to update or revise measures to address scientific advances
Regulatory Impacts

- Monitoring
  - Staff time (field work, inspections, reporting, etc.)
  - Laboratory analysis & inspection
- Control
  - Equipment rental/purchase
  - Facility modification
- Scientific advances
  - Conducting new research
  - Evaluating research by others
Operational Impacts

- Impacts
  - Operating obstruction
  - Component corrosion
  - Water quality changes

- Response
  - Chlorination
  - Physical removal
  - Facility repairs/modifications
Control Plan Highlights

- Originally submitted June 2008
- Resubmitted in January, October and December 2010
- Main issue: Mussel movement between Olivenhain and Lake Hodges
- Resolution: Turbulence as control
- Plan approved by Dept. of Fish and Game on January 3, 2011
Recommendation

- Approve the Water Authority’s Dreissenid Mussel Response and Control Plan dated December 2010
Agenda

- Project Overview
- Construction History
  - Inlet/Outlet Structure Differing Site Condition
  - Equipment Layout
  - Water Infiltration
  - Water Damage from Storm Event
  - Turbine/Generator Assembly Issues
- Project Update and Schedule
Pump House Detail
Project Roles

- MWH - Designer (prepared both pre-procurement and construction contracts)
- GE/Andritz Hydro – Pre-procured Equipment
- Archer Western – Construction Contractor
- Jacobs Civil – Construction Manager
- Water Authority Staff – Contracts Management
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Runner
Modification to Removable Parts
Wicket Gates
Project Site
Agenda

- Project Overview
- Construction History
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  - Equipment Layout
  - Water Infiltration
  - Water Damage from Storm Event
  - Turbine/Generator Assembly Issues
- Project Update and Schedule
Recent Milestones

- Turbine/Generator Build – Complete December 17, 2010
- Energization of Facility – Complete December 30, 2010
- Begin Wet Testing – January 4, 2011
- Commercial Operation – April 2011
- Notice of Completion – May 2011
## Current Budget

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Current Budget</td>
<td>$168.9M</td>
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<tr>
<td>Spent to Date</td>
<td>$160.0M</td>
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<tr>
<td>Cost to Complete</td>
<td>$8.5M</td>
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<tr>
<td>Remaining Construction</td>
<td>$1.5M</td>
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<tr>
<td>Designer Support (MWH)</td>
<td>$0.3M</td>
</tr>
<tr>
<td>Construction Support (CM/WA/Power/Legal)</td>
<td>$5.2M</td>
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<tr>
<td>Post Construction Period</td>
<td>$1.0M</td>
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<tr>
<td>Insurance, Lease, Other Minor Costs</td>
<td>$0.5M</td>
</tr>
<tr>
<td>Reserves</td>
<td>$0.4M</td>
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</tbody>
</table>
Emergency Storage Project

Special Board Presentation
January 13, 2010
Presentation Outline

- ESP Facilities
- Construction Status of ESP Facilities
- Status of Facility Testing
- Future Testing
ESP Phase I Facilities

- Facilities
  - Olivenhain Dam,
  - Olivenhain Pump Station
  - Olivenhain Pipeline
  - Twin Oaks Valley WTP
ESP Phase I Facilities

- Phase I Purpose:

To deliver untreated water from the Olivenhain Reservoir to the Olivenhain Pump Station where it is pumped north on P/L 5 to the TOVWTP for treatment.
## ESP Phase I Testing Status

<table>
<thead>
<tr>
<th>ESP System Test</th>
<th>Test Complete</th>
<th>Test Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump UW from Olivenhain Res. to TOVWTP</td>
<td>Yes</td>
<td>May-08</td>
</tr>
<tr>
<td>Pump UW from Olivenhain Res. to Weese WTP</td>
<td>No</td>
<td>May-11</td>
</tr>
<tr>
<td>Deliver TW from TOWTP north on P4, across VCP &amp; south on 1st Aqueduct</td>
<td>No</td>
<td>May-11</td>
</tr>
</tbody>
</table>

**Legend**

- **Testing Complete**
- **Testing Scheduled**
- **Testing Schedule Pending**
ESP Phase II Facilities

- Facilities
  - San Vicente Pipeline,
  - San Vicente Surge Facility
  - San Vicente Pump Station
  - Rancho Penasquitos Pressure Control and Hydro-generation Facility
  - Valley Center Pump Station
    - 3rd Pump Addition
ESP Phase II Facilities

- **Phase II Purpose:**

  To deliver untreated water from the San Vicente Reservoir south through the MLP and west through the San Vicente Pipeline to the 2nd Aqueduct. Once at the 2nd Aqueduct, the untreated water will be distributed south to terminus and north to the Del Dios area.
## ESP Phase II Testing Status

<table>
<thead>
<tr>
<th>ESP System Tests</th>
<th>Completed</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump UW from SV Res. to MLP, 2\textsuperscript{nd} Aqueduct &amp; north to Badger WTP</td>
<td>No</td>
<td>Feb-11</td>
</tr>
<tr>
<td>With 3\textsuperscript{rd} Pump at VCPS pump TW across VCP at greater capacity</td>
<td>No</td>
<td>TBD</td>
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</tbody>
</table>

### LEGEND

- **Black**: Testing Complete
- **Blue**: Testing Scheduled
- **Red**: Testing Schedule Pending
ESP Phase III Facilities

- Facilities
  - Lake Hodges Pump Station and Hydro-electric Facility
  - Lake Hodges to Olivenhain Reservoir Pipeline
  - North County Pump Stations
**ESP Phase III Facilities**

- **Phase III Purpose:**
  
  To deliver untreated water from Lake Hodges to the Olivenhain Reservoir and deliver treated water from the TOVWTP north along the 2\textsuperscript{nd} Aqueduct to northern most reaches of 2\textsuperscript{nd} and 1\textsuperscript{st} Aqueducts.
## ESP Phase III Facilities Testing Status

<table>
<thead>
<tr>
<th>ESP System Tests</th>
<th>Completed</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump UW from Lake Hodges to Olivenhain Reservoir</td>
<td>No</td>
<td>Mar-11</td>
</tr>
<tr>
<td>Pump TW to northern portions of 1(^{st}) and 2(^{nd}) Aqueducts</td>
<td>No</td>
<td>2015</td>
</tr>
</tbody>
</table>

**LEGEND**

- **Done**
- **Within 3 years**
- **5 years or more**
ESP Phase IV Facilities

- Facilities
  - San Vicente Dam raise and reservoir expansion
  - San Vicente Dam outlet works
  - San Vicente Pump Station, 3rd Variable Frequency Drive (VFD) installation
ESP Phase IV Facilities

- **Phase IV Purpose:**

To deliver untreated water from the San Vicente Pump Station to the Moreno Lakeside Pipeline for distribution south and through the San Vicente Pipeline to the 2\textsuperscript{nd} Aqueduct at full ESP capacity. Will require the installation of the 3\textsuperscript{rd} VFD at the SVPS.
## ESP Phase IV Facilities Testing Status

<table>
<thead>
<tr>
<th>ESP System Tests</th>
<th>Completed</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump UW from Expanded SV Res. to MLP and 2(^{nd}) Aqueduct</td>
<td>No</td>
<td>Jan-13</td>
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<tr>
<td>With 3(^{rd}) VFD at SVPS full capacity could be pumped to MLP &amp; 2(^{nd}) Aq.</td>
<td>No</td>
<td>2015</td>
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</tbody>
</table>

**LEGEND**

- **Done**
- **Within 3 years**
- **5 years or more**
## ESP Testing Status Summary

<table>
<thead>
<tr>
<th>ESP Phase</th>
<th>Description</th>
<th>Complete</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td>Phase I</td>
<td>Pump UW Oliv PS To TOVWTP</td>
<td>Yes</td>
<td>May-08</td>
</tr>
<tr>
<td></td>
<td>Pump UW Oliv PS To Weese WTP</td>
<td>No</td>
<td>May-11</td>
</tr>
<tr>
<td></td>
<td>Pump TW TOWTP to 1st Aq.</td>
<td>No</td>
<td>May-11</td>
</tr>
<tr>
<td>Phase II</td>
<td>Pump UW SV to MLP, 2nd Aq, Badger</td>
<td>No</td>
<td>Feb-11</td>
</tr>
<tr>
<td></td>
<td>Pump TW VC P/L to 1st Aq. w/3rd pump</td>
<td>No</td>
<td>TBD</td>
</tr>
<tr>
<td>Phase III</td>
<td>Pump UW Hodges to Olivenhain</td>
<td>No</td>
<td>Mar-11</td>
</tr>
<tr>
<td></td>
<td>Pump TW to northern 1st &amp; 2nd Aq.</td>
<td>No</td>
<td>2015</td>
</tr>
<tr>
<td>Phase IV</td>
<td>Pump UW SV to MLP &amp; 2nd Aq.</td>
<td>No</td>
<td>Jan-13</td>
</tr>
<tr>
<td></td>
<td>Pump UW w/3rd VFD to MLP &amp; 2nd Aq.</td>
<td>No</td>
<td>2015</td>
</tr>
</tbody>
</table>