



## ● **Engineering Services Key Activities for the Month of December 2009**

### **Summary**

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- Recent Events:
  - Diamond Valley Lake Boat Ramp
  
- Supply and Delivery Reliability:
  - Inland Feeder Program
  - Mills Water Treatment Plant Capacity Upgrade
  
- Infrastructure Reliability:
  - Conveyance and Distribution System Rehabilitation Program
  - Reservoir Cover Replacement Program
  - Skinner Water Treatment Plant Improvements Program
  - Weymouth Water Treatment Plant Improvements Program
  
- Water Quality:
  - Distribution System – Treated Water Cross Connection Prevention Program
  - Oxidation Retrofit Program
  
- Regulatory:
  - Chlorine Containment and Handling Facilities
  
- Stewardship:
  - CRA Property Recordation Program

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### **Attachments**

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Monthly Progress Report of Construction and Procurement Contracts for November 2009

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### **Detailed Report**

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This report details key engineering activities for the month of December 2009.

# Board Report (Engineering Services Key Activities Report for the month of December 2009)

## **Recent Events:**

**Diamond Valley Lake Boat Ramp:** The purpose of this project is to extend the Diamond Valley Lake (DVL) boat ramp to its ultimate build-out level, which is just above the lake bottom in the vicinity of the boat ramp. Private boat launches at DVL were indefinitely suspended on October 13, 2008, when dropping lake levels reached the end of the existing boat ramp. The Board awarded a construction contract in August 2009 to increase the boat ramp length and allow boating activities on the lake to resume. On November 24, 2008, construction (Figure 1) was completed on budget and more than 5 weeks ahead of its original completion date.



Figure 1: Completed DVL boat ramp extension

Board Report (Engineering Services Key Activities Report for the month of December 2009)

**Supply and Delivery Reliability:**

**Inland Feeder Program:** This program consists of 44 miles of pipeline and tunnels that will enable Metropolitan to convey State Water Project flows from the Devil Canyon Second Afterbay to Diamond Valley Lake (DVL). All construction contracts have been completed. In late November 2009, the contractor fully demobilized off the project and the Notice of Completion was recorded. In accordance with the project’s Environmental Impact Report and the United States Forest Service Special Use Permit, environmental monitoring and mitigation activities will continue along the Arrowhead Tunnels alignment over the next two years.

Metropolitan's Board approved settlement terms for the two remaining eminent domain actions with the Campus Crusade for Christ. The terms have also been approved by the board of Campus Crusade. Attorneys for both sides are drafting the written stipulations to be filed with the court, and the settlement is expected to be completed by mid-January.



Figure 2: Inland Feeder deliveries to DVL Inlet/Outlet Tower

Board Report (Engineering Services Key Activities Report for the month of December 2009)

**Supply and Delivery Reliability (cont.):**

**Mills Water Treatment Plant Capacity Upgrade:** This program will upgrade specific components of the Mills plant to match the plant’s hydraulic capacity of 326 mgd. The program consists of three active projects, while one has been completed. Recent activities include the following:

- **Solids Handling Upgrades** – This project will upgrade the solids system to reliably process residual solids after the plant’s full 326-mgd capacity is achieved. The recommended upgrades include addition of a washwater reclamation plant and thickeners. Preliminary design is complete. A Board action is planned for mid-2010 to request authorization to proceed with final design.
- **Modules Nos. 1 and 2 Rehabilitation** – To fully upgrade the Mills plant to 326 mgd, Modules Nos. 1 and 2 must be rehabilitated and returned to service. Final design is complete. Metropolitan has deferred advertisement of the construction contract pending reassessment of flow demands projected for the Mills service area. Figure 3 shows Module No. 1 equipment that will be upgraded.
- **Chemical System Capacity Upgrades** – Portions of the existing chemical facilities will be upgraded to support the full 326-mgd plant capacity. Final design is complete. Metropolitan has deferred advertisement pending reassessment of flow demands projected for the Mills service area.

The program is scheduled to be completed in 2013/14 and is within budget.



Figure 3: Module No. 1 mixing equipment that will be refurbished

## Board Report (Engineering Services Key Activities Report for the month of December 2009)

### **Infrastructure Reliability:**

**Conveyance and Distribution System Rehabilitation Program:** This program was initiated to maintain reliable deliveries through specific repair and rehabilitation projects on Metropolitan's pipelines, reservoirs, and control structures. The program currently contains 36 active projects, while 39 have been completed.

Recent activities include the following:

- **Middle Feeder Cathodic Protection** – This project will install cathodic protection stations along a portion of the Middle Feeder to protect the pipeline from corrosion. Construction is 15 percent complete and is scheduled to be completed by July 2010.
- **OC-71 Service Connection Fire Repairs** – This project will repair fire damage caused by the 2007 wildfires. Construction was completed in November 2009. Staff has submitted a request for partial reimbursement of construction expenses to the Federal Emergency Management Agency Public Assistance Program. The fire damaged area was declared a Federal Disaster Area in 2007.
- **Lake Skinner Outlet Conduit** – This project will repair three distressed Prestressed Concrete Cylinder Pipe (PCCP) segments on the Lake Skinner Outlet Conduit. The distressed pipe segments will be repaired by inserting a steel liner. Final design and pipe fabrication by Metropolitan forces has been completed (Figure 4). The Board awarded a construction contract in December 2009.
- **Box Springs Feeder Repair** – Replacement of distressed pipe sections is being executed in four phases. Phase 1 repairs are complete. Phase 2 construction commenced in October 2009. Construction is 5 percent complete and is scheduled to be completed by September 2010. Phases 3 and 4 preliminary design is 30 percent complete and is scheduled to be completed by April 2010.

The program is on schedule and is within budget.



Figure 4: Fabricated steel liner for the Skinner Outlet Conduit repair

Board Report (Engineering Services Key Activities Report for the month of December 2009)

**Infrastructure Reliability (cont.):**

**Reservoir Cover Replacement Program:** This program consists of replacement of the floating covers, installation of liners, and related repairs at Orange County and Palos Verdes Reservoirs, Skinner Finished Water Reservoir, and Jensen Finished Water Reservoir No. 2.

- Skinner Finished Water Reservoir – The contractor mobilized in November. The reservoir was drawn down and removed from service on December 7, 2009. The fabrication of 70,000 square feet of hypalon material has been completed (Figure 5). The existing cover has been removed and the new hypalon floating cover is being installed. During the reservoir shutdown, deliveries to member agencies will not be interrupted. The reservoir is scheduled to be returned to service by March 2010. Construction is 50 percent complete and is scheduled to be completed by May 2010.
- Orange County Reservoir – Final design is 50 percent complete and is scheduled to be completed by March 2010.
- Palos Verdes Reservoir – The floating cover will be removed to inspect the condition of the reservoir liner and to prepare specifications for repair. Staff has completed dewatering the reservoir. Final design is 5 percent complete and is scheduled to be completed by February 2011.
- Jensen Finished Water Reservoir No. 2 – A study has been completed to modify the floating cover at the reservoir inlet. A request to the Board to authorize final design is scheduled for April 2010.

The program is on schedule to be completed by fiscal year 2012/2013 and is within budget.



Figure 5: Fabrication of hypalon panels

## Board Report (Engineering Services Key Activities Report for the month of December 2009)

### **Infrastructure Reliability (cont.):**

**Skinner Water Treatment Plant Improvements Program:** This program was initiated to maintain reliability and improve operating efficiency of the Skinner plant through specific improvement projects. The program currently contains 17 active projects, while 12 have been completed, and one is being executed under the Skinner Oxidation Retrofit Program construction contract. Recent activities include the following:

- **Electrical Buildings Upgrade and Ground Fault Upgrade Projects** – These projects will replace deteriorated electrical equipment, install air conditioning systems, install insulation, provide seismic upgrade and upgrade the plant’s ground fault protection system in twelve electrical buildings to improve reliability. The construction will be divided into two phases: 1) Electrical building and ground fault protection upgrades; and 2) Electrical building HVAC, insulation and seismic upgrades. The Board authorized Phase 1 construction by Metropolitan forces in December 2009. Design of the Phase 2 work is 60 percent complete and is scheduled to be completed by February 2010. Phase 2 construction will be performed by a contractor.
- **Modules Nos. 4-6 Filter Surface Wash Valve and Actuator Replacement** – This project will replace the existing surface wash valves and actuators in Modules Nos. 4 through 6. The work will be executed in two phases. The initial phase, consisting of a performance evaluation, is scheduled to be completed by 2010. Phase 2 will include the procurement and installation of valves and actuators, based on the results of the performance evaluation.
- **Modules Nos. 5 and 6 Filter Surface Wash Header Rehabilitation** – This project will recoat corroded surface wash pipe headers, replace corroded pipe couplings, and install isolation valves at key locations in the surface wash systems. The Board authorized construction by Metropolitan forces in June 2009. Construction is scheduled to be completed by June 2010.
- **Chemical Systems and Solids Collection Improvements** – These projects have been consolidated into one construction package to reduce costs and optimize project coordination.
  1. **Wastewater Reclamation Plant No. 2 Solids Removal Equipment** – This project will replace worn-out chain and flight solids collection equipment and will add isolation valves on the solids removal pump manifolds at Wastewater Reclamation Plant No. 2. This project will enhance plant reliability and reduce the frequency of repairs and basin shutdown.
  2. **Chemical Systems Improvements** – This project will: (1) replace damaged filter backwash sodium hypochlorite and polymer piping (Figure 6) and will add secondary containment for that piping at Plants Nos. 1 and 2; (2) add a concrete trench (secondary containment) at Modules Nos. 5 and 6 and relocate existing direct-buried sodium hypochlorite piping into the trench for compliance with environmental regulations; and (3) provide a new potable water pump with back-up power supply which is dedicated to supplying chlorine solution water during a power outage, thereby improving the reliability of the chlorine disinfection system.

## Board Report (Engineering Services Key Activities Report for the month of December 2009)

The Board awarded a construction contract for these two projects in August 2009. Construction is 7 percent complete and is scheduled to be completed in November 2010.

The overall program is on schedule to be completed in fiscal year 2013/14 and is within budget.



Figure 6: New double-wall chemical piping in blue

## Board Report (Engineering Services Key Activities Report for the month of December 2009)

### **Infrastructure Reliability (cont.):**

**Weymouth Water Treatment Plant Improvements Program:** This program was initiated to maintain reliability and to improve operating efficiency of the Weymouth plant through specific improvement projects. The program currently contains 30 active projects, while 9 have been completed. Recent activities include the following:

- Weymouth Coagulant Tank Farm Modifications – Construction is 56 percent complete and is scheduled to be completed by December 2010 (Figure 7).
- Weymouth Electrical Upgrade – The Board awarded a construction contract in November 2009 and staff anticipates that the Notice to Proceed will be issued by early January 2010.
- Rapid Mix Systems Upgrade – Construction is 5 percent complete and is scheduled to be completed by March 2011.
- Junction Structure Seismic Upgrades – This project will repair leaky valves and will seismically upgrade the Weymouth Junction Structure. In July 2009, Metropolitan’s Board awarded a procurement contract for the inlet valves. Fabrication of the valves is 5 percent complete and is scheduled to be completed by November 2010. Final design of the seismic upgrades is complete and the project was advertised for bids in December 2009.
- Weymouth Reservoir Inlet Gates Replacement – Final design is complete. A request to the Board to authorize Metropolitan force construction is scheduled for January 2010.
- Weymouth Filter Rehabilitation – Final design is complete and construction bids were opened in December. A request to the Board to award a construction contract is scheduled for January 2010.

The program is on schedule to be completed in fiscal year 2012/13 and is within budget.



Figure 7: Demolition of existing underground containment vessel for Weymouth coagulant tank farm

Board Report (Engineering Services Key Activities Report for the month of December 2009)

**Water Quality:**

**Distribution System – Treated Water Cross Connection Prevention Program:** This program was established to relocate air release and vacuum valves on treated-water feeders from their current location in subsurface vaults to new above-ground configurations to eliminate potential cross connections at approximately 300 sites (Figure 8). The program is being executed in four phases under 12 separate construction contracts, with approximately 75 sites per phase.

- Phase I – Construction under contracts 1, 2, and 3 (74 sites) was completed in March 2008.
- Phase II – Construction under contracts 4, 5, and 6 (87 sites) is approximately 95 percent complete and is scheduled to be completed by January 2010.
- Phase III – Final design of the Phase III relocations (75 sites) is complete. This work was advertised for competitive bids in November and bids were received in December 2009. A request to the Board to award a contract is scheduled for February 2010.
- Phase IV – Final design of the Phase IV projects (65 sites) is complete and is scheduled to be advertised for competitive bids in March 2010.

The program is on schedule to be completed in fiscal year 2012/13 and is within budget.



Figure 8: New air release valve above-ground structure

Board Report (Engineering Services Key Activities Report for the month of December 2009)

**Water Quality (cont.):**

**Oxidation Retrofit Program:** This program was established to add ozone to provide disinfection, to control tastes and odors, and to reduce the level of disinfection by-products in the finished water at all five of Metropolitan’s treatment plants. Ozone will enable Metropolitan to meet state and federal drinking water regulations. Recent activities include the following:

- Mills Plant –Start-up testing is complete for Contactors Nos. 3 and 4, and they are in full operation. Fabrication of additional ozone equipment is complete. Installation and testing of the additional ozone equipment is scheduled to be completed by September 2011.
- Jensen Plant – The plant’s ozone system became fully operational in July 2005.
- Skinner Plant – Construction is 99 percent complete and is scheduled to be completed in December 2009. Currently, the contractor is focusing on punch list items. The ozone equipment vendor, Ozonia North America (Ozonia), is ordering new ozone generator fuses to replace the incorrect ones it supplied. Ozonia will continue the ozone equipment functional acceptance testing when the new fuses have been installed. All start-up and testing activities will be completed by June 2010.
- Diemer Plant – Construction of ozone facilities is approximately 33 percent complete and is scheduled to be completed by mid-2012 (Figure 9). Fabrication of ozone equipment is complete. Major construction activities continue on the ozone contactors, Ozone Generation Building, liquid oxygen tank farm and electrical support facilities.
- Weymouth Plant – This program consists of multiple, staged construction contracts. In September, the Board authorized completion of final design for the Weymouth ORP ozone facilities. Design is underway and is currently 15 percent complete. In November, the Board awarded a construction contract for the Weymouth ORP Switchgear project. Construction of the Weymouth Inlet Conduit Relocation, which is required to support the Weymouth ORP, is currently 8 percent complete.

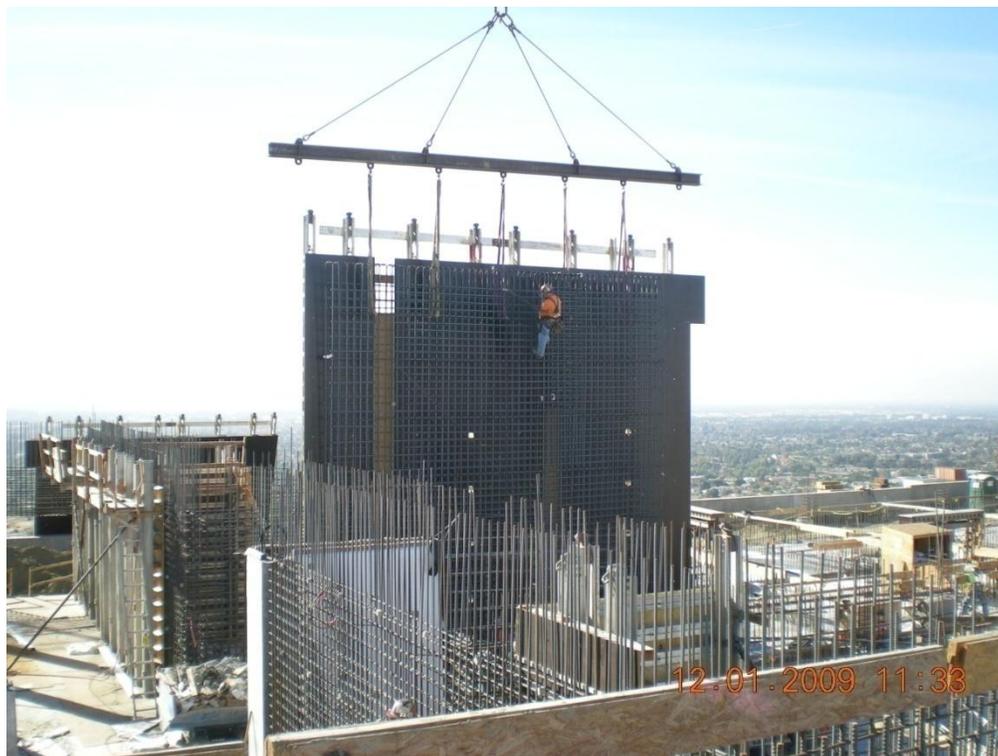


Figure 9: Diemer plant ozone contactor wall construction

Board Report (Engineering Services Key Activities Report for the month of December 2009)

**Regulatory:**

**Chlorine Containment and Handling Facilities:** This program includes construction of facilities to handle and contain chlorine to prevent a chlorine leak and to comply with security and safety regulations. Recent activities include the following:

- Water Treatment Plants – Chlorine containment facilities are operational at each of Metropolitan’s five treatment plants.
- Chemical Unloading Facility (CUF) – Preliminary design for a chlorine containment facility is 27 percent complete and is scheduled to be completed by May 2010. Construction of the dechlorination system is 40 percent complete and is scheduled to be completed by February 2010. Figure 10 shows recent construction progress.
- Filter Outlet Chlorine Capacity Increase Projects – Final design is complete for the Mills and Skinner facilities. Final design for the Jensen facility is 95 percent complete and is scheduled to be completed by June 2010. Construction of the Mills facility is scheduled to be completed by April 2010, while the Jensen facility is scheduled to be completed by December 2010. Construction of the Skinner facility is scheduled to be completed by June 2010. In October, the Board authorized preliminary design to proceed for the Diemer and Weymouth projects.

The program is on schedule to be completed in fiscal year 2015/16 and is within budget.



Figure 10: Containment area for dechlorination system

# Board Report (Engineering Services Key Activities Report for the month of December 2009)

## Stewardship:

**CRA Property Recordation Program:** This program was established to perform land survey work to accurately locate Metropolitan’s property that had not been updated in 75 years by setting visible boundary markers, identifying encroachments, and recording detailed maps with the local counties. In October 2003, the Board directed staff to complete the work within eight years, and to prioritize activities to address the more critical areas early in the schedule (e.g., areas with encroachments, illegal dumping, trespassing, etc.). The Board also authorized four-year professional services agreements to assist with the work. Accomplishments to date include:

- A total of 350 (out of approximately 360 total) task orders have been completed covering all desert parcels comprising of approximately 130,000 acres, which provided critical arecxa boundary maps, control surveys, structure locations, encroachment documentation, and purchase of title reports.
- Approximately 10,500 (85 percent) boundary markers and 6,000 (100 percent) facilities markers have been set to identify property corners and alignments of pipelines (Figures 11 and 12).
- Assessor parcel numbers have been assigned to all Metropolitan properties in San Bernardino and Riverside Counties.
- Title insurance for all fee parcels purchased from the federal government have been received, filed and indexed.
- Data and graphics for 6,370 (64 percent) parcels have been updated and made available to internal staff through geographic information systems.

The program is 76 percent complete and on schedule to be completed in fiscal year 2011/12 and is within budget.



Figure 11: 1930’s Metropolitan surveyors along the CRA



Figure 12: Today’s utilization of helicopter to perform environmentally sensitive surveys