Regional Recycled Water Program

Southern California Water Dialogue
January 25, 2017
Potential Regional Recycled Water Program Background

- Pilot Scale Studies (2010-12)
- Progress Report (September 2015)
- Board approval and appropriation for Demonstration Plant (November 2015)
- Historical Review and 2015 Update (February 2016)
- Progress Report (August 2016)
- Feasibility Study Final Draft (December 2016)

Demonstration Plant
  - Completion of Final Design (February 2017)
  - Award of Construction Contract (June 2017)
  - Detailed Facility Planning and Engineering (2017-18)
Regional Recycled Water Program

Collaboration between Metropolitan and Sanitation Districts of Los Angeles County

Development of new regional water source

- Up to 150 mgd (168,000 AFY)
- Deliveries to Member Agencies
- Recharge and store in multiple groundwater basins
- Increases Metropolitan’s regional storage reserves
Sanitation Districts of Los Angeles County

Wastewater and Solid Waste Management
- Serves 5.0 million people
- 800 sq. mile service area
- 400 MGD current average flow
- 11 water reclamation plants, including JWPCP

Joint Water Pollution Control Plant
- Located in Carson
- Current Avg Flow ~260 MGD
- Primary and secondary treatment
- Currently discharges to the ocean
35 acres of land for the project
Flow to produce up to 150 mgd of purified water
Brine and treatment residuals management
Flow equalization
Source control for Boron
Nitrogen management (exact configuration TBD)
Joint Water Pollution Control Plant
Location of AWT Facilities at JWPCP

Demo Plant Site

Full-Scale AWT Site

Sepulveda Blvd.

110

Figueroa St.
Demonstration Plant Objectives

- Develop data for Title 22 Engineering Report for regulatory approval
- Achieve technology acceptance and develop operating criteria AWT
- Establish cost clarity for full-scale treatment
- Coordinate MWD-LACSD operations
- Provide for public outreach and acceptance

*Builds upon 2010-12 Pilot Study demonstrating capability to successfully treat JWPCP effluent and meet regulatory requirements*

Pilot Plant at JWPCP
Full-Scale AWT Facilities

- Piloted the proposed process
- Demonstration Plant will enable process confirmation and optimization
- Significant LACSD contributions
- Capital Cost: $681,600,000
- Annual Operating Cost: $99,700,000
Full-Scale AWT Base Case Schematic

- Raw Wastewater → JWPCP → Flow EQ → MBR → RO → UV/AOP
- Sidestream Treatment
  - Ammonia-Rich Centrate
  - Secondary Effluent
  - AWT Influent Pump Station
- Stabilization
- Effluent Clearwell
  - Conveyance System
  - AWT Effluent Pump Station
Groundwater Basins

- Modeling prepared together with Member Agencies, basin managers, and LACDPW
- Well Facilities
  - 15 New Injection Wells
  - 4 Repurposed Injection Wells
  - 18 Monitoring Wells
  - 15 Relocated Wells
- Capital Costs: $155,000,000
- Annual Operating Cost: $1,200,000
Conveyance

- Approximately 60 miles
- Cement mortar-lined welded steel (diameters 30” to 74”)
- ROW challenges and easement possibilities
- Capital Costs: $769,700,000
- Annual Operations Costs: $28,100,000
Conveyance System Map

Base Case Alignment

- Pump Stations
- Spreading / Other
- Injection Well
- Spreading Grounds

- Segment 4: 10 Miles
- Segment 3: 15 Miles
- Segment 2: 16 Miles
- Segment 5: 5-8 Miles

- Rio Hondo Spreading Grounds
- West Coast Basin Injection Wells: 15 MGD
- Long Beach Injection Wells: 4 MGD
- PS-1: 13 Miles
- PS-2
- JWPCP
- 80 MGD
- 60 MGD
- Santa Fe Spreading Grounds
- Orange County Spreading Basin
Capital and O&M Costs

- Total capital cost of $2.7 billion
  - All new facilities including 150-mgd AWT, 60 miles of pipeline, and 3 pump stations
- Annual O&M costs of $129 million
  - Includes power costs for AWT and pump stations
- Total unit cost of $1600/AF
  - Interest rate at 4%
  - No grants or low-interest loans
  - Includes 35% capital cost contingency
- Total cost divided by total water sales of $150-$160/AF
  - Metropolitan water sales at 1.7 MAFY
Feasibility Study Findings
Key Questions

No Fatal Flaws?
Is it technically, institutionally, and legally possible to implement a 150 MGD Indirect Potable Reuse program using effluent from the LACSD Joint Plant?

Justified and Cost Effective?
Are the costs and benefits of the program consistent with the IRP and other approaches for achieving comparable amounts of recycled water?

Impacts on cost of water to Member Agencies?
How would the cost of water be affected if the base case and its assumptions were implemented?
Feasibility Study Process

- Comprehensive technical evaluation
- Coordination with Regulators throughout
- Cooperation and support from groundwater basin managers
- Expert advisory panel review and input
Major Findings

- 150-mgd program is feasible
  - Treatment, conveyance, and groundwater recharge technically feasible
  - Institutional complexity but no fatal flaws
  - Regulatory approvals and permitting feasible
- Program provides significant regional benefits
- Costs and benefits are consistent with the 2015 IRP Update
- Adaptable to future Direct Potable Reuse regulations, if needed
### Program Element Findings

<table>
<thead>
<tr>
<th>Program Element</th>
<th>Feasibility</th>
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<tbody>
<tr>
<td>1. Advanced Water Treatment Plant</td>
<td>Feasible</td>
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<tr>
<td>2. Conveyance System</td>
<td>Likely Feasible</td>
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<td>3. Groundwater Basins, Storage, and Extraction</td>
<td>Feasible</td>
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<td>4. Environmental and Regulatory Feasibility</td>
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<td>5. Feasibility of Essential Agreements with LACSD</td>
<td>Feasible</td>
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<td>6. Feasibility of Essential Institutional Arrangements</td>
<td>No Fatal Flaws</td>
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<td>7. Regional Benefits and Consistency with IRP</td>
<td>Feasible</td>
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<td>8. Overall Estimated Program Costs</td>
<td>Feasible</td>
</tr>
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<td>9. Public Acceptability (with robust outreach effort)</td>
<td>Feasible</td>
</tr>
</tbody>
</table>

**Feasible:** No fatal flaws, limited dependence on other parties, other examples of success, and some unknowns.

**Likely Feasible:** No fatal flaws, significant dependence on other parties, limited comparable existing examples, and many unknowns.

**No Fatal Flaws:** No fatal flaws but in need of further investigations and studies.
Advisory Panel Members

Richard Atwater, Chair
- Former Executive Director of Southern California Water Committee

Shivaji Deshmukh
- Assistant General Manager of West Basin Municipal Water District

Thomas Harder
- Thomas Harder and Associates (Hydrogeology)

David Jenkins
- Professor Emeritus, University of California, Berkeley

Edward Means
- President, Means Consulting LLC

Joseph Reichenberger
- Professor, Loyola Marymount University

Paul Westerhöfff
- Professor, Arizona State University
Advisory Panel

- Concluded findings are reasonable
- Do not see any technical fatal flaws
- Emphasized institutional complexity
- Helped identify program risks
- Contributed to and support recommendations

“The Advisory Panel agrees with the findings and recommendations of the Feasibility Study Report and supports moving forward”
Regional Benefits

- Consistent with MWD IRP 2015 Update
- Augments regional supplies during normal, drought, and emergency conditions
- Reduced frequency and magnitude of supply allocations
- Increases storage in groundwater basins and Metropolitan storage reserves within Southern California
Regional Recycled Water Project Dry-Year Supplies with IRP Targets

Dry-Year Storage and/or Additional Development*

Dry-Year Retail Demand with Conservation

RRWP

Dry-Year Retail Demand

SWP

CRA

Local Supply

Million Acre-Feet

Forecast Year

*Additional Development of Local Supplies or Conservation Beyond IRP Target
Meeting Regional Demands

Without Program

- MWD Imported Supplies
- Groundwater Basins
- Other Local Supplies
- Regional Retail Demands
- MWD Storage
Meeting Regional Demands

With Program

- MWD RRWP
- MWD Imported Supplies
- MWD Storage
- Groundwater Basins
- Other Local Supplies
- Regional Retail Demands
RRWP Provides Supply Reliability Benefits to All MWD Member Agencies

- RRWP offsets the use of imported supplies to meet groundwater replenishment needs
- The offset imported water is stored in MWD regional storage for use in dry-years
- Dedicated replenishment supplies stabilize groundwater production
Future Resource Development Costs

($/AF)

$0 $1,000 $2,000 $3,000 $4,000 $5,000 $6,000 $7,000 $8,000 $12,000

Stormwater Centralized
Stormwater Distributed
Groundwater Recovery
Recycled Water
Seawater Desalination

High
75th Percentile
25th Percentile
Low
RRWP

Source: Integrated Water Resources Plan 2015 Update

1 Estimated unit cost is based on 4% interest rate financing and does not include additional outside funding or optimized design.
Next Steps
Next Steps

- Complete design, construction, start-up and operations of Demonstration Plant
- Proceed with facilities planning, engineering, and additional groundwater modeling
- Finalize agreements with Sanitation Districts
- Develop institutional and financial arrangements needed for implementation
- Initiate public outreach effort focused on Demonstration Plant
Program Timeline (2016-2019)

2016
- Demo Plant Design
- Feasibility Study
- Regulatory Coordination

2017
- Construction
- Facilities Planning & Eng.
- Institutional Arrangements

2018
- Operations
- CEQA
- Conceptual/Prelim Design

2019
- Public Outreach
- Planning Phase
- Design Phase
Future Opportunities

- Additional Indirect Potable Reuse deliveries
  - Chino and Raymond basins
- Flexibility to accommodate future Direct Potable Reuse regulations
  - Regional conveyance in close proximity to Weymouth and Diemer plants
  - Treatment augmentation through Weymouth and Diemer Plants
  - Additional recycled water delivered from Joint Water Pollution Control Plant or other regional wastewater treatment plants (e.g., Hyperion)