Pathways for Permitting Innovative Potable Reuse Projects

JOHN KENNY AND BRIAN PECSON
TRUSSELL TECHNOLOGIES, INC.
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Key lessons:

- Process and water quality knowledge is essential
- Data forms conclusions (demo, pilot, bench, sampling)
- Design & operation is impacted by data and regulatory process
- IAP increases regulatory confidence
- Regulators: frequent communication smooths process
Example projects

► Pure Water Monterey
  ▪ Groundwater Replenishment Reuse Project
  ▪ Permitted under 2014 regulations
  ▪ Regulatory environment constantly evolving

► Pure Water San Diego
  ▪ Surface Water Augmentation Project
  ▪ First SWA project design and permitted
  ▪ Developed in the absence of regulations
Pure Water Monterey project

- Monterey One Water
- 5 mgd, 3,700 AFY injection
- Motivated by CDO
- Injection imminent

Examples:
- Finding new wastewaters
- Including ozone pretreatment
- RO concentrate management

October 2019
Pure Water Monterey schedule

- **Bench Testing**
- **Pilot Testing & Quality Sampling**
- **On-going Demonstration Testing**

- **2012**
  - Concept Approval
  - EIR

- **2013**
  - T22 Eng Rpt
  - WRR/WDR

- **2014**
  - NPDES

- **2015**
  - OOP

- **2016**
  - AOP

- **2017**
  - Alternatives
  - BODR
  - 30% 60%
  - Final

- **2018**
  - Construction, ESDC, Startup

- **2019**

- **2020**
Additional source waters

- Challenge: not enough wastewater
- Solution: bring in additional wastewaters
  - Agricultural drainage waters
  - Agricultural industrial wastewater
- Data:
  - Bench-scale treatability testing
  - Water quality monitoring campaign
  - Pilot and demonstration testing
- Result: sufficient wastewater for Project
  - AWPF tailored to wastewaters
  - Regulatory approval of source waters
Ozone pretreatment

- Challenge: high membrane fouling potential
  - New industrial wastewater
  - Challenging TF/SC secondary effluent

- Solution: incorporate ozone into the AWPF

- Data:
  - Bench-scale treatability testing
  - Pilot and demonstration testing

- Results:
  - Improves MF and RO treatment performance
  - Oxidizes CECs and pesticides, gaining public and regulatory support
  - Improves RO concentrate discharge compliance with Ocean Plan objectives
Challenge:
- RO concentrate is only waste discharged during parts of the year
- Constituents projected to exceed NPDES permit

Alternatives:
- Dilution: reduces water available for project
- Treatment: increase project costs
- Innovative regulatory approach: dilution credit for range of flows

Data:
- Source water sampling,
- Ocean outfall dilution modeling

Results: regional Board approval of novel NPDES permitting approach
San Diego Pure Water
Phase 1 Project Overview

Pure Water will produce 1/3 of San Diego’s water locally.

Phase 1
- 2019 Construction
- 30 mgd
- North City PWF to Miramar
**Original Concept was to use San Vicente Reservoir**

- **San Vicente Reservoir**

  **Benefits**
  - Retention time
  - Volume
  - Regulatory approval
Miramar Concept Developed

San Vicente Reservoir

Benefits
- Retention time
- Volume
- Regulatory approval

40x smaller
Miramar Reservoir

Benefits
- Pipeline cost
- Environmental impacts
- Schedule
How do we compensate for a much smaller environmental buffer?
Miramar Project Pushed the Boundaries

- The first surface water augmentation project in the state
- Developed in the absence of regulations
- Evolved in parallel with SWA regulations and led to greater flexibility
- At the edge of IPR and DPR

So how did we get there?
Developing Sound Concepts with DDW

1. Develop Concept
2. Meet with Regulators to Describe Concept
3. Identify Regulatory Intent
4. Demonstrate Concept Feasibility
5. Receive Feedback from Regulators
6. Incorporate Concept into Design and Engineering Report
Initial drafts of SWA seek benefits of “substantial” buffers by requiring:
- Long retention times
- High degrees of dilution/mixing

Willing to accept lower dilution with higher level of treatment

Is a 2-month reservoir feasible?
Developed a concept for **reliability** that includes both **failure prevention** and **failure response** features.

Engaged DDW and IAP in development of a test plan to evaluate concept.

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**Miramar Concept Testing**

- 2012
- 2013
- 2014
- 2015
- 2016
Concept Development and Testing

Pathogen Credit at NCWRP

Yearlong, site-specific monitoring campaign
**Concept Development and Testing: RO Crediting**

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Concept Development and Testing: Reservoir Modeling

- Comprehensive limnology and water study of Miramar Reservoir
- Model setup, calibration, validation approved by IAP with DDW present
DDW’s hesitation with no regulation in place….

How do we compensate for a much smaller environmental buffer?
Our Answer: Project Reliability

*Standby capacity for unit processes and monitors is built into each of the treatment facilities.
Permitting Schedule

- 2016: Develop Draft 1 of T22 ER
- 2017: Miramar Concept Approval
- 2018: Draft 2, Draft 3, Public Hearings
- 2019: Conditional Approval Letter
- 2020 to 2023: No specific activities mentioned
Regulator Engagement

Topics Discussed
- Source Control
- Operational Ramp-Up
- Project Reliability
- Pathogen Reduction
- Chemical Control
Supported by the IAP

- Miramar Concept Approval
- Develop Draft 1 of T22 ER
- Draft 2
- Draft 3
- Public Hearings
- Conditional Approval Letter

DDW Meetings

IAP Meetings

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NWRI National Water Research Institute

Date: November 2, 2017

Title: Anya Dorantes, P.E.
City of San Diego
Public Utilities Department
600 B Street, Suite 800
San Diego, CA 92101

From: George Theodoreopoulos, Ph.D., P.E., NAE, ASCE, Chair, NWRI Independent Advisory Panel to Review the City of San Diego’s Pure Water Program
Ken M. Hardy, Executive Director, National Water Research Institute

Subjects: Panel Findings and Recommendations Based on a Meeting Held October 9-10, 2017, to Review the City of San Diego’s Pure Water Program
Conditional Approval Letter Received

- Approval of 2-month retention time
- Approval of 10:1 dilution in Miramar Reservoir
- RO LRV crediting
- Pathogen credits at NCWRP
Interaction between testing, permitting, and design

SV Concept Testing
Miramar Concept Testing
Add O₃/BAC to Demo
Miramar Concept Approval
SV Concept Approval
Miramar Concept Proposal
Miramar Concept Approval
Draft Conditional Approval
Title 22 Engineering Report & NPDES Development
Bid, Construction, Startup
Draft regulations require *practical* applications

Permitting requires project concepts that support the *regulatory intent* and are supported with sound data and research

A real project could lead to regulatory modifications that provide *greater flexibility*

Make the *regulators your partner* when pursuing a project