The Road Not Taken:
Applying for coverage under the Recycled Water General Permit

Amanda Roa, Delta Diablo SD
WateReuse Association Meeting
Northern California Chapter
May 17, 2013
Delta Diablo Sanitation District

Population: 200,000
2° Capacity: 16.5 mgd
Dual biological treatment
Recycled Water Facility

- Completed in 2000
- Capacity: 12.8 mgd
- Treatment Processes:
  - Coagulation/Flocculation
  - Sedimentation
  - Filtration
  - Disinfection
Existing Industrial Customers
Existing Irrigation Customers
City Hall/City Parks
Recycled Water Permitting

- District is covered under the San Francisco Bay Regional Water Quality Control Board (Region 2) General Water Reuse Order 96-011
- Submitted Notice of Intent (NOI) and Title 22 Engineering Report
- Region 2/DHS approved program
- Coverage since 2001
- New sites were just reported to Region 2 with annual report
Antioch Recycled Water Project

- Delta Diablo Sanitation District’s Recycled Water Facility
- Fairview Park
- Antioch City Park
- Mountaire Park
- Chichibu Park
- Lone Tree Golf Course
- Reservoir and Pump Station Site
- Rehabilitate Existing 18” Raw Water Pipeline
Split Regions

REGION 2

REGION 5

Outfall

Treatment Plant
Permitting Options

- Allow landscape irrigation in Region 5 under the existing Region 2 General Order
  - Special MOU’s between Regions for other issues
- Obtain master reclamation permit from Region 5
- Seek coverage under newly adopted State Water Resources Control Board General Waste Discharge Requirements for Landscape Irrigation Uses of Municipal Recycled Water (General Permit)
Key Dates

7/7/09
- General Permit Adopted

9/8/09
- Met with SWRCB staff to discuss application submittal

10/30/09
- Submitted Notice of Intent and Operation & Maintenance Plan
Key Dates (cont’d)

11/24/09
• Permit application package posted on SWRCB website

1/20/10
• Conditional Notice of Applicability Issued – 200 AFY

7/23/10
• Revised Conditional Notice of Applicability Issued – 487 AFY
Agronomic Rates

• Specification 4 - “Application of recycled water to the Use Area shall be at reasonable agronomic rates and shall consider soil, climate, and nutrient demand.”

• Specification 5 - “The seasonal nutritive loading of the Use Area including the nutritive value of organic and chemical fertilizers and of the recycled water shall not exceed the nutritive demand of the landscape.”
Agronomic Rates (cont’d)

- Required to submit water balance
  - Calculated irrigation demand using crop coefficients and ET₀ values under three scenarios (drought, average and 100-year rainfall)

- Little to no historical data on nitrogen in recycled water
  - First total nitrogen result was 37 mg/L (1.0 mg/L nitrate and 36 mg/L TKN -- all ammonia)
  - SWRCB: Exclusive irrigation with recycled water would exceed the 174 lb/acre-year agronomic rate for turf grass by 100%
Nitrogen Cycle
## Results from Other Sites

<table>
<thead>
<tr>
<th>Question</th>
<th>Current Hypotheses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of N in soil</td>
<td>No evidence of accumulation</td>
</tr>
<tr>
<td>Form of N in the soil</td>
<td>Where aeration is poor, there is little nitrate</td>
</tr>
<tr>
<td>Rate of water leaching from profile</td>
<td>Salinity and irrigation scheduling data indicate little leaching (&lt;10% of applied water)</td>
</tr>
<tr>
<td>Leaching of nitrate</td>
<td>Low porewater concentrations and rate of water leaching suggest very little nitrate leaching</td>
</tr>
<tr>
<td>N losses and transformations</td>
<td>Volatilization and denitrification are fast enough so that agronomic rates are maintained.</td>
</tr>
<tr>
<td></td>
<td>Low nitrification and water leaching rates further limit N leachability</td>
</tr>
</tbody>
</table>
SMRP Requirements

• Soil Testing:
  – Baseline, after 1\textsuperscript{st} full year of irrigation, and after 2\textsuperscript{nd} full year of irrigation
  – Test for NH\textsubscript{4}-N, NO\textsubscript{3}-N, NO\textsubscript{2}-N, pH, Exchangeable Sodium Percentage, Electrical Conductivity (EC)
  – Depth intervals of 0-6, 6-12, 12-24, and 24-36 inches below ground surface (bgs) for the first two years and an additional 36-48, 48-60, and 60-72 inches bgs (as feasible with manual push probe) after the second year
Soil Sampling Locations
SMRP Requirements (cont’d)

• Water Testing:
  – Test monthly at the outlet of the Recycled Water Facility
  – Test for flow, Total Dissolved Solids, NH$_4$-N, NO$_3$-N, NO$_2$-N, pH, EC

• Annual Report due at each year’s end
SMRP Implementation

- Background soil sampling
  - Nov 2010

- Year 1 soil sampling
  - Nov 2012

- First SMRP report submitted
  - 12/27/12
Irrigation Volume

![Irrigation Volume Graph](image)
Nitrogen Concentration

![Nitrate-N Concentration Graph]

- **Average of Nitrate-N Year 1**
- **Average of Nitrate-N Background**

**Nitrate-N (mg/kg)**

1 2 3 4 5 6 7 8 9 1 2 3 4 5 6 7

**F** **G**
Final Results

- February 2013, District requested discontinuation of SMRP – little underlying risk to groundwater
- Discontinuation granted and final NOA issued April 3, 2013
## Budget/Expenses

<table>
<thead>
<tr>
<th>Permit Application</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOI/Antideg/O&amp;M Plan</td>
<td>$19,881</td>
</tr>
<tr>
<td>SWRCB Application Fee</td>
<td>$2,759</td>
</tr>
<tr>
<td>N Sampling/SMRP Negotiation</td>
<td>$64,663</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$87,303</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SMRP Requirements</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Sampling &amp; Analysis</td>
<td>$15,608</td>
</tr>
<tr>
<td>Water Sampling &amp; Analysis</td>
<td>$14,000</td>
</tr>
<tr>
<td>Results Analysis &amp; Reporting</td>
<td>$25,748</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$55,356</strong></td>
</tr>
</tbody>
</table>
Potential/Future Issues

- **SMRP**
  - Will other applicants have to implement?

- **Adding sites**
  - Will a new NOA be issued every time?

- **Agronomic rates**
  - How is it checked and what happens if exceeded?
Contact Information

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## Other Permit Issues

<table>
<thead>
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<th>Issue</th>
<th>Outcome</th>
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<tbody>
<tr>
<td>Limiting Recycled Water Application</td>
<td>Permitted to use full 487 AFY w/conditions</td>
</tr>
<tr>
<td>Maximum Recycled Water Usage</td>
<td>Retained irrigation maxima, while acknowledging drought years</td>
</tr>
<tr>
<td>Supplemental Monitoring &amp; Reporting Program Requirements</td>
<td>Focused on the fate of applied nitrogen</td>
</tr>
<tr>
<td>Condition B.2</td>
<td>Agronomic rate requirement to be provisionally met by SMRP</td>
</tr>
<tr>
<td>NOA Expiration</td>
<td>Expiration date removed and stated that District would be covered under the Conditional NOA until a final NOA is issued</td>
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