Sacramento’s Biosolids Management Program Through Design-Build Approach

Ruben R. Robles, P.E.

SCAP
Biosolids Emerging Technology Workshop
September 28, 2004
Presentation Outline

- SRCSD Background
- Historical Biosolids Program
- Drivers for Biosolids Recycling Facility
- Why DBOO?
- BRF Agreement Highlights & Project Costs
- Issues To Considered & Lessons Learned
- Questions
SRCSD Background
Sacramento Regional County Sanitation District

- Wastewater treatment & conveyance for over 1.1 M people
- 181 MGD permitted capacity
SRWTP Biosolids

- Biosolids Production
  - Class B Biosolids - Anaerobic Digestion
  - Low Metals

25,000 dry tons/year
Historical Biosolids Program
Anaerobic Digestion
Solids Storage Basins
Drivers For
Biosolids Recycling Facility
SRWTP Biosolids Program
Objectives

**RWQCB Waste Discharge Requirement:**
- discontinue use of existing DLDs by November, 2001

- Sustainable & Reliable
- Diversification
- Recycling if at “reasonable” cost
Elements of Diversified Biosolids Program

• District Biosolids Management Options
  – Disposal on lined dedicated land disposal units
  – Land application on publicly owned land (offsite land purchase)
  – Landfill & landfill cover

• Private Sector Biosolids Management Options
  – Class A treatment option - to recycling markets
  – Class B land application
## LDLD/BRF Scenarios Considered

<table>
<thead>
<tr>
<th>Scenario</th>
<th>BRF Size (dtpd)</th>
<th>Number of L-DLDs</th>
<th>Number of DLD Closures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1</td>
<td>0</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>20</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>45</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Anaerobic Digestion (Existing)

~ 25%

Biosolids Recycling Facility

20 Dry Ton/Day BRF

Solids Storage Basins (SSBs) (Existing)

Lined Dedicated Land Disposal (L-DLDs)

3 Lined DLDs

"Beneficial Use"
Why DBOO Biosolids Recycling Facility?
Why DBOO?

- Marketing of biosolids product
  - to be sold or distributed
- Private sector experience
  - can meet marketing needs
  - modify operations for optimum product quality
- Contractual single point of contact
  - all functions; design, construction, finance, ops.
Why DBOO? (cont.)

• Reduced District risk
  – no service fee payment until facility operational and accepted by District

• Bonding capacity preserved

• Financial protection against project failure
Results of RFQ/SOQ Process

• Received 14 SOQs
  – Short listed 5 teams and 6 technologies
• Received 4 proposals
  – One proposal deemed non-responsive to the RFQ
  – Site visits to 6 facilities
• Selected highest ranked proposal for negotiations
  – if necessary, would negotiate with second ranked team

Technologies included:

- fertilizer pellets, biosolids to oil, chemical stabilization, compost, land application
## Short Listed Teams

<table>
<thead>
<tr>
<th></th>
<th>Proposing Team Leader</th>
<th>Technology</th>
<th>Product Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Berlie Technologies, Inc.</td>
<td>heat drying</td>
<td>fertilizer pellets</td>
</tr>
<tr>
<td>2.</td>
<td>Earth Tech</td>
<td>chemical stabilization</td>
<td>soil amendment</td>
</tr>
<tr>
<td>3.</td>
<td>Minergy Corporation</td>
<td>glass aggregate</td>
<td>road base, roofing shingles</td>
</tr>
<tr>
<td>4.</td>
<td>Synagro WWT, Inc.</td>
<td>heat drying</td>
<td>fertilizer pellets</td>
</tr>
<tr>
<td>5.</td>
<td>US Filter</td>
<td>heat drying</td>
<td>fertilizer pellets</td>
</tr>
<tr>
<td>6.</td>
<td>US Filter</td>
<td>invessel compost</td>
<td>soil amendment</td>
</tr>
</tbody>
</table>
Facilities Visited
The District and Malcolm Pirnie visited 6 facilities.

<table>
<thead>
<tr>
<th>Proposer Team</th>
<th>Facility Location</th>
<th>Technology</th>
<th>Average Quantity of Finished Product Generated (dtpd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earth Tech</td>
<td>Kingwood, Texas</td>
<td>Bioset pasteurization</td>
<td>10</td>
</tr>
<tr>
<td>Earth Tech</td>
<td>Kissimmee, Florida</td>
<td>Bioset pasteurization</td>
<td>28</td>
</tr>
<tr>
<td>Synagro</td>
<td>Baltimore, Maryland</td>
<td>Seghers Pelletizer</td>
<td>55</td>
</tr>
<tr>
<td>Synagro</td>
<td>Bayville, New Jersey</td>
<td>Andritz Drum Dryer</td>
<td>25</td>
</tr>
<tr>
<td>USFOS</td>
<td>Forest City, North Carolina</td>
<td>SludgeMASTER Dragon Dryer</td>
<td>10</td>
</tr>
<tr>
<td>USFOS</td>
<td>Toronto, Canada</td>
<td>Seghers Pelletizer</td>
<td>80 (capacity) (not yet operational)</td>
</tr>
</tbody>
</table>
Earth Tech – Kingwood, TX

Bioset process (foreground) and belt press (background).
Earth Tech – Kissimmee, FL

View of the facility.
Earth Tech – Kissimmee, FL

Bioset blending area (lime, sulfamic acid, and dewatered biosolids).
Synagro – Baltimore, MD

Centrifuges (foreground) and Seghers Pelletizers (background).
Synagro – Baltimore, MD

Side view of a Seghers pelletizer (includes access portals and view ports).
Side view of the facility (includes finished product storage silos).
Synagro – Bayville, NJ

Biosolids feed line into an Andritz Direct Drum Dryer.
Synagro – Bayville, NJ

Burners (for the dryers).
US Filter – Forest City, NC

Side of the facility (includes the finished product storage silo and truck loading area).
US Filter – Forest City, NC

US Filter Dragon Dryer.
US Filter – Toronto, Canada

View of the facility (includes finished product storage silos).
US Filter – Toronto, Canada

Side of the pelletizer (picture taken from the top of the dryer).
Inside view of a pelletizer (picture taken perpendicular to the side of a dryer from the access door).
BRF Agreement Highlights
SRCSD/Synagro Agreement
Highlights

• 20 Year Contract, 20 dtpd
• Private financing & ownership
• Design (B&V), Construction (Whiting Turner), Operations & Maintenance (Synagro)
• Andritz centrifuge/heat dryer
Agreement Highlights (cont.)

- Service fee payments begin after acceptance test
- Company responsible for permitting and regulatory compliance
- Company responsible for marketing
- Odors & emissions - BACT, completely enclosed operation
BRF: Implementation Schedule

• Contract approved - July 2002
• Design/Permitting Complete - Spring 2003
• Construction Complete - mid/late – 04’

Performance Testing Complete and Operations Begin - Oct. 2004
Contract Project Costs
BRF Project Costs – Capital

- **Site Improvements**: $1.2 M
- **Facility**: $13.7 M
  - Engr & Design: $1.1 M
  - Permitting: $0.1 M
  - Equipment: $6.4 M
  - Construction: $6.1 M
- **Other**: $4.8 M
  - Finance Cost: $3.0 M
  - Admin., Insur., Accp. Test: $1.8 M

**Total Fixed Design Build Price**: $19.7 M
Annual O&M

- O&M Cost: $2.4 M (2002 $)
- Electricity: $0.19 M
- Natural Gas: $0.39 M

Note: Electricity & gas are pass through costs
Costs (continued)

- **Annual Service Fee:** $5.0 M
  (2005 dollars)

- **Cost per dry ton:** $429
  (NPV)
Economies of Scale (Proposal Costs)

20 DTPD BRF
- Total Fixed DB Price: $21.2 M ($19.7 M Contract)
- Annual O & M Cost: $2.5 M ($2.4 M Contract)

45 DTPD BRF
- Total Fixed DB Price: $24.8 M
- Annual O & M Cost: $3.2 M
Biosolids Recycling Facility
Under Construction
Andtriz Rotary Drum Dryer
Biosolids Recycling Facility
Issues to Consider & Lessons Learned
Issues / Lessons Learned

- Risk allocation
- Permitting
- Financing
- Labor, prevailing wages
- Performance based contract & inspection
- Legal & negotiations
- CEQA
Issues & Lessons Learned (cont.)

- Procurement process
- Facility transfer
- Allowable technologies
- Energy consumption & price risk
- Performance testing & acceptance
- Emissions & offsets
- Odor Control
Issues & Lessons Learned (cont.)

- Operator certification
- BRF input & return streams
- Insurance, bonding, guarantees
- Underground
- Safety
- Public outreach
- Contractor coordination
Conclusions

• Biosolids recycling adds diversification to District program
• Diversification has a cost – more costly than DLDs
• Private financing is insurance against project failure – but adds cost
Conclusions (cont.)

• DBOO can reduce municipality risk
• Evaluation should not be based solely on price - want best value project, not lowest cost
• Public agency team expertise required
Questions?
Procurement Team

- Sacramento Regional County Sanitation District
  - Diverse and experienced staff
- Malcolm Pirnie, Inc.
  - Extensive experience with the DBO/DBOO procurement process
  - Assisted District from strategy development through contract negotiations
BRF Procurement Overview

Two Stage Selection Process:

• Phase I
  – Request for Qualifications
  – Statements of Qualifications evaluation

• Phase II
  – Request for Proposals
  – Financial analysis of Biosolids Management Program and BRF size selection
  – Proposal evaluation
  – Site visits
  – Service contract negotiations
Qualification Process

RFQ Issuance

Issue RFQs → SOQ Responses → Pass Minimum Quals? → Yes → Enhanced Qualifications Evaluation

No → Teams Eliminated

Minimum Qualifications Review

Enhanced Qualifications Review

“B” Teams

“A” Teams
Qualification Process (continued)

Enhanced Qualifications Review (cont’d)

Field Test and Pre-qualification

“B” Teams

Request Field Test?

Yes

Perform Field Test

Test Result Positive?

Yes

Pre-qualified Teams

“B” Teams

No

Teams Eliminated

No

Teams Eliminated

“A” Teams

RFP Process
Request for Qualifications (RFQ)

• Goal of RFQ
  – Present risk allocation
  – Determine market interest
  – Pre-qualify 3-6 DBOO teams

• Contents of RFQ
  – Project scope
  – Project constraints (risk, cost, etc.)
  – Evaluation process and criteria
  – Required guarantees
Statement of Qualifications (SOQ) Evaluation Process

- Minimum qualifications
  - DBO
  - Biosolids
  - Project personnel
  - Financial
- Enhanced qualifications
  - Project experience
  - Technology viability
  - Project team capabilities
  - Financial capabilities
- Process yields pre-qualified teams
## Qualifications Evaluation Criteria

<table>
<thead>
<tr>
<th>Category</th>
<th>Criteria Weighting</th>
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<tbody>
<tr>
<td><strong>Project Experience</strong></td>
<td>20</td>
</tr>
<tr>
<td>- Design, construction, operation experience</td>
<td></td>
</tr>
<tr>
<td>- Biosolids Management</td>
<td></td>
</tr>
<tr>
<td><strong>Technology Viability</strong></td>
<td>30</td>
</tr>
<tr>
<td>- Technology operating experience</td>
<td></td>
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<tr>
<td>- Regulatory compliance</td>
<td></td>
</tr>
<tr>
<td><strong>Project Team Capabilities</strong></td>
<td>20</td>
</tr>
<tr>
<td>- Project team structure</td>
<td></td>
</tr>
<tr>
<td>- References</td>
<td></td>
</tr>
<tr>
<td>- Prior experience working as a team</td>
<td></td>
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<tr>
<td><strong>Financing Capabilities</strong></td>
<td>30</td>
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<tr>
<td>- Private sector internal financing</td>
<td></td>
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<tr>
<td>- Project guarantor qualifications</td>
<td></td>
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<tr>
<td></td>
<td>100%</td>
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Proposal Process

RFP Issuance and Proposal Evaluation

- Qualification Process
  - RFP Issued to Pre-qualified Teams
  - Proposal Evaluation
  - Highest Ranked Proposal?
    - Yes
      - Service Agreement Negotiation
    - No
      - A

Yes

No
Request for Proposals (RFP)

• Goal of RFP
  – Facilitate thoughtful, thorough proposals

• Contents of RFP document
  – Detailed project scope
  – BRF Input specifications
  – Performance standards
  – Selection process / evaluation criteria
  – General design requirements / specifications
  – Submittal requirements
# Proposal Evaluation Criteria

<table>
<thead>
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<th>Category</th>
<th>Criteria Weighting</th>
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</thead>
<tbody>
<tr>
<td>Technical Reliability and Viability</td>
<td>20</td>
</tr>
<tr>
<td>– Technical reliability</td>
<td></td>
</tr>
<tr>
<td>– Technical viability</td>
<td></td>
</tr>
<tr>
<td>Environmental Impacts</td>
<td>15</td>
</tr>
<tr>
<td>Price Competitiveness of Service Fee</td>
<td>40</td>
</tr>
<tr>
<td>Financial Qualifications, Financial Plan, Legal Standing, and Contract Position</td>
<td>20</td>
</tr>
<tr>
<td>– Financial qualifications*</td>
<td></td>
</tr>
<tr>
<td>– Financing plan</td>
<td></td>
</tr>
<tr>
<td>– Legal standing*</td>
<td></td>
</tr>
<tr>
<td>– Contract position</td>
<td></td>
</tr>
<tr>
<td>Proposer Team Experience*</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
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*Evaluated as part of the SOQ evaluation process.
Service Contract Negotiations

- Negotiating strategies
  - Single team
  - Simultaneous
- Legal Assistance
  - Draft service Contract provided by outside legal counsel
  - Negotiations performed by District legal staff
Energy

- Electrical consumption: 3,600,000 KW hours
- Electrical demand: 825 KW
- Natural gas: 640,000 therms/year