

THE RAHWAY VALLEY SEWERAGE AUTHORITY CO-DIGESTION OF BIOSOLIDS TO ENERGY ENHANCEMENT PROJECT

Presented By:

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PRESENTATION OVERVIEW

- 1 – Introduction to Project
- 2 – Technical Challenges and Considerations
- 3 – Legal/Contractual Challenges and Considerations
- 4 – Status and Lessons Learned

INTRODUCTION AND DESCRIPTION OF THE AUTHORITY

- Rahway Valley Sewerage Authority is located in Central New Jersey
- 11 member and 4 customer municipalities
- More than 250,000 residents and 3,500 industrial and commercial customers
- Average daily flow of 25-30 MGD and a peak design capacity of 105 MGD

OBJECTIVES FOR IMPORTING FOOD WASTE

- Objectives – Lower electricity costs (\$1.5M/year), decrease dependency on the Grid, lower carbon footprint, benefit financially and utilize existing infrastructure
- Three existing anaerobic digesters with approximately 30% unused capacity
 - Target for food waste to use 20-25%
- Existing cogeneration facility oversized
 - Produced enough digester gas for 1 engine to run 8 hours a day (22% of average daily electrical demand)
 - Goal is for one engine to run 24 hours a day on digester gas (66% of demand)

REASONS TO USE PPP

- Steady Supply of Material Without the Need for a Dedicated Marketing Effort
- Guarantee of Long Term Supply and Tip Rate Before Committing the Finances for a Receiving Station
- Partner to Help Optimize the Digester Operation and Share in Operational Risks
- Shift Siting and Technology Risk
- Aggregate Responsibility in Single Entity

Part 2

Technical Challenges and Considerations

MAJOR TECHNICAL CONCERN - IMPACT OF HIGH STRENGTH FEEDSTOCK ON DIGESTER OPERATION

- Protect Health and Functionality of Digesters
 - Past experience with waste from a juice manufacturer causing foaming upsets
 - Request for Proposals therefore targeted an acceptable feedstock range for key parameters including COD, TS, pH, and metals
- Private Partner Success Dependent on Health of Digesters
- Contractual Rights to Suspend Receipt of Feedstock

OTHER MAJOR TECHNICAL CONCERNS

- Onsite feed-in storage needed so digesters could be fed a uniform product at a continuous pumping rate:
 - Continuous steady flow with sufficient onsite storage to allow for weekends, holidays, and possible delivery disruptions
 - Desire to avoid potential for delays and finger pointing
- Residuals:
 - Expected residuals could vary greatly depending on the level of preprocessing

MAJOR TECHNICAL CONSIDERATIONS

- Coordination with Ongoing Upgrade Projects
 - New digester gas treatment system sized based on future needs assuming a single engine on full digester gas
 - New bladder type digester covers which provide the following benefits:
 - Increased gas storage
 - Increased gas pressure control
 - Installation schedule – coordination with startup of PPP

MAJOR TECHNICAL CONSIDERATIONS

- Considered impact to add once operational
 - Dedicated feed pipeline or tie into existing thickened sludge pipe
 - Material question (existing ductile iron vs PVC or stainless steel)
 - Pipe diameter and required flow rate
 - Cost of adding new pipeline in future not significantly more expensive
 - Coating tank would be difficult once operational

Part 3

Legal/Contractual Challenges and Considerations

ROLE AS SPECIAL COUNSEL

- Identify Statutory Procurement Authority
- Ensure Procurement is Carried Out in Accordance with Statute
- Prepare Request for Proposals including Draft Contract/Principles
- Transparent and Level Playing Field
- Assist with Proposal Review, Clarification and Evaluation
- Negotiate and Prepare Final Comprehensive and Clear Contract

KEY TRANSACTION CONSIDERATIONS

- Vet Key Elements of Transaction Such As:
 - Scope
 - Term
 - Costs/Revenue
 - Risks/Risk Tolerance/Appropriate Allocation
 - Regulatory Issues
 - Mandatory Requirements
 - Absolute “No-Nos”

LEGAL CHALLENGES

- Identify Statutory Authority that Allows for:
 - Scope
 - Long Term Contract
 - Evaluation Factors in Addition to Price
 - Aggregation of Services into a Single Contract
 - Ability to Negotiate Contract

REQUEST FOR PROPOSALS

SCOPE

- Long-term Guaranteed Delivery of Acceptable Liquid Waste (Specified Feedstock)
- Tipping Fees
- Design-Build Improvements to Existing Receiving Tank or Design-Build of New Receiving Tank
- On-going Digester Optimization Consultation

REQUEST FOR PROPOSALS (Cont'd)

KEY ELEMENTS

- No On-Site Processing of Solid Waste
- Off-Site Processing Facility to be DBOOF by Company
- Liquid Waste Must Meet Specified Feedstock Requirements
- 10-year Feedstock Delivery Requirement
- Contract Principles

SIGNIFICANT CONTRACTUAL PROVISIONS

Guarantees:

- Guaranteed Design-Build Price and Schedule
- Minimum Feedstock Delivery Commitment at Guaranteed Price (“Put or Pay”)
- Only Deliver Specified Feedstock
- Maximum Solids Production
- Environmental Guarantees

SIGNIFICANT CONTRACTUAL PROVISIONS (Cont'd)

- Term – 10 Year Initial Term
 - 3 Year Renewal Term at RVSA Option
 - 7 Year Extension Upon Mutual Agreement
- On-going Optimization/Coordination
- Third Party Supply
- Sharing of REC Revenues

KEY PROTECTIONS FOR RVSA

- Only “Specified Feedstock”/Rejection Rights
- Ramp Up Period
- Authority Right to Suspend Deliveries
- Specified Performance Guarantees/Damages
- Off-Ramps

SECURITY FOR PERFORMANCE

- WM Parent Guarantee
- Performance Bonds
- Letter of Credit

Part 4

Status and Lesson Learned

STATUS

- Financing
- Permitting
- Design-Build Work
- Acceptance
- Operations/Optimization

STATUS (Cont'd)

- Started up with Service Water and Added Feedstock Gradually (April, 2018)
- Current Feed Rate of Approximately 20,000 GPD
- Gas Production has Increased by at Least 40%
- No Significant Increase in Residuals
- Running 1 Engine on Bio-Gas 24/7

TECHNICAL LESSONS LEARNED

- Best to Pump Feedstock at 5 – 12 % Solids
- Continuous Pumping Preferred Over Batch Pumping
- Stainless Steel vs PVC
- Best to have Separate Line to Transport Feedstock to Digester
- Separate Odor Control System for Feedstock Handling

PROJECT LESSONS LEARNED

- Choose Partner Wisely
- Create True Partnership Incentives/Disincentives
- Keep Line of Communications Open
- Public Sector Project Champion is Key

QUESTIONS?

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<u>Parameter</u>	<u>Units</u>	<u>Min</u>	<u>Max</u>
COD	mg/L	100,000	300,000
TS	%	5	15
VS	%	80	100
pH	SU	3.5	9.5
TKN	mg/L	0	8000
SO4	mg/L	0	5000
Mesh	mm	0	10

<u>Parameter</u>	<u>Units</u>	<u>Max</u>
Arsenic	mg/kg	12.3
Cadmium	mg/kg	11.7
Copper	mg/kg	450
Lead	mg/kg	90
Mercury	mg/kg	5.1
Molybdenum	mg/kg	22.5
Nickel	mg/kg	126
Selenium	mg/kg	30
Zinc	mg/kg	840