

City of Palatka

Wastewater Treatment Facility Sludge Treatment System – Alternative Cost Analysis Preliminary Opinion of Estimated Probable Costs Workshop Meeting

September 25, 2014



CITY of *Palatka*
FLORIDA

AYRES
ASSOCIATES

Evaluated Alternatives

- **Alternative A**

 - **Retrofit Existing Anaerobic Sludge Treatment System**

 - *Decomposition and stabilization of organic/inorganic biosolids in absence of oxygen*

- **Alternative B**

 - **Convert to New Aerobic Sludge Treatment System**

 - *Decomposition and stabilization of organic/inorganic biosolids with oxygen, similar to the activated-sludge process*

- **Alternative C**

 - **Convert to New Chemical Sludge Treatment System**

 - *Stabilization of organic/inorganic biosolids by chemical oxidation*

- **Retrofit Existing Sludge Dewatering System**

 - **Common to All Evaluated Alternatives (A / B / C)**

 - *Belt-filter Press w/Polymer Conditioning (Mechanical Process)*

Existing Anaerobic Digesters



Digester Tanks



Sludge Digesters / Control Building

Existing Sludge Dewatering



Sludge Dewatering Building



Belt-filter Press Unit

Alternative A

Retrofit Existing Anaerobic Sludge Treatment System

- **Primary Components to be Replaced / Upgraded**
 - Digester Heat Exchanger
 - Covers
 - Recirculation/Mixer and Transfer/Pumping Systems
 - Gas and Process Piping and Control Valves
 - Miscellaneous Process Appurtenances
 - Sludge Return Pumps (RAS/WAS)
 - Electrical/Control Systems

Alternative A

Retrofit Existing Anaerobic Sludge Treatment System

Advantages and Disadvantages of Anaerobic Digestion	
Advantages	Disadvantages
Less energy/operational costs	Higher capital costs
Less biological sludge produced	May need supplemental natural gas for heating
Methane gas produced – Recoverable energy resource	Less stable after any “toxic shock” occurrence
Mechanical dewatering results better	Susceptible to odors if process upset occurs
Existing process – City WWTP personnel familiar with	Hazards of gas handling/processing

Alternative A Anaerobic Sludge Treatment and Dewatering System(s) Preliminary Opinion of Estimated Probable Costs Summary			
System Description	Capital Costs	Annual O&M Costs	Present Worth
Anaerobic Sludge Treatment System	\$2,857,500	\$78,500	\$3,835,610
Sludge Dewatering System	\$727,500	\$74,500	\$1,655,770
Anaerobic Sludge Treatment and Dewatering – Total	\$3,585,000	\$153,000	\$5,491,380

Alternative B

New Aerobic Sludge Treatment System

- **Systems Considered**
 - Surface Bridge or Float Mount Aeration/Mixer
 - Mechanical Blower / Coarse Bubble Diffused Air
- **Required Modifications**
 - New Blower Building / Mechanical Blowers/Diffusers
 - Transfer / Pumping Equipment
 - Sludge Return Pumps (RAS/WAS)
 - Process Piping
 - Electrical/Control Systems

Alternative B

New Aerobic Sludge Treatment System

Advantages and Disadvantages of Aerobic Digestion	
Advantages	Disadvantages
Less capital costs	Higher energy/operation costs
Easy to control process, easy start-up	No recoverable energy potential
Better quality return effluent - Low ammonia and CBOD ₅	Not typically used for primary sludge due to high O ₂ demand
Less odor potential	Temperature variability impacts operating performance
Standard process used throughout Florida	Stabilized sludge may be more difficult to dewater

Alternative B Aerobic Sludge Treatment and Dewatering System(s) Preliminary Opinion of Estimated Probable Costs Summary			
System Description	Capital Costs	Annual O&M Costs	Present Worth
Aerobic Sludge Treatment System	\$2,280,000	\$138,500	\$4,005,710
Sludge Dewatering System	\$727,500	\$74,500	\$1,655,770
Aerobic Sludge Treatment and Dewatering – Total	\$3,007,500	\$213,000	\$5,661,480



Alternative C

New Chemical Sludge Treatment System

- **System Considered**
 - BCR Environmental – Proprietary CleanB™ System
- **Required Modifications**
 - New Process Equipment / Buildings / Structures
 - Chemical Storage Facilities
 - Transfer/Pumping Equipment / Piping Modifications
 - Sludge Return Pumps (RAS/WAS)
 - Electrical/Control Systems

Alternative C

New Chemical Sludge Treatment System

Advantages and Disadvantages of BCR CleanB™ System	
Advantages	Disadvantages
<ul style="list-style-type: none"> Less capital costs Small footprint/space requirement Less mechanical process components Faster stabilization process Potentially less overall operation costs Eliminates need for typical sludge digestion process Less odor potential 	<ul style="list-style-type: none"> Proprietary / sole source process May reduce WWTP operation/performance flexibility by eliminating existing treatment unit processes Increased loading conditions to aeration system No recoverable energy On-site chemical storage/handling No biological solids volume reduction Lower sludge feed concentration to dewatering – Concern for achieved final % solids results Not familiar to City WWTP personnel

Alternative C BCR CleanB™ Sludge Treatment and Dewatering System(s) Preliminary Opinion of Estimated Probable Costs Summary			
System Description	Capital Costs	Annual O&M Costs	Present Worth
BCR CleanB™ Sludge Treatment System	\$2,430,000	\$89,500	\$3,545,170
Sludge Dewatering System	\$727,500	\$74,500	\$1,655,770
BCR CleanB™ System Treatment and Dewatering – Total	\$3,157,500	\$164,000	\$5,200,940



Sludge Dewatering System

Retrofit Existing Sludge Dewatering System

- **Common to all Sludge Treatment Alternatives (A / B / C)**
- **Primary Components to be Replaced/Upgraded**
 - Belt-filter Press
 - Polymer Storage/Feed System
 - Dewatered Sludge Transfer Conveyor System
 - Electrical/Control Systems

Cost Estimates Comparison

Sludge Treatment System(s) Preliminary Opinion of Estimated Probable Costs Summary				
Alternative	Capital Costs	Annual O&M Costs	Present Worth	Rank
Alternative A Anaerobic System	\$2,857,500	\$78,500	\$3,835,610	2
Alternative B Aerobic System	\$2,280,000	\$138,500	\$4,005,710	3
Alternative C BCR CleanB™ System	\$2,430,000	\$89,500	\$3,545,170	1

Sludge Treatment and Dewatering System(s) Preliminary Opinion of Estimated Probable Costs Summary				
Alternative	Capital Costs	Annual O&M Costs	Present Worth	Rank
Alternative A Anaerobic System and Dewatering	\$3,585,000	\$153,000	\$5,491,380	2
Alternative B Aerobic System and Dewatering	\$3,007,500	\$213,000	\$5,661,480	3
Alternative C BCR CleanB™ System and Dewatering	\$3,157,500	\$164,000	\$5,200,940	1



Project Implementation Period

- **Alternative A**
Retrofit Existing Anaerobic Sludge Treatment System
Design / Permitting / Construction: 18-24 Months
- **Alternative B**
Convert to New Aerobic Sludge Treatment System
Design / Permitting / Construction: 18-24 Months
- **Alternative C**
Convert to New Chemical Sludge Treatment System
Design / Permitting / Construction: 15-18 Months
- **Retrofit Existing Sludge Dewatering System**
Common to All Evaluated Alternatives (A / B / C)
Design / Permitting / Construction: Included in Alternatives

Funding Alternatives

Priority Funding Programs to Consider / Pursue

- **Clean Water State Revolving Fund Loan Program (CWSRF) – Loans**
 - Loan Interest Rate <2.0%
- **Small Communities Wastewater Facilities Grants Program – Grants**
 - 30%-70% Project Grant / Population <10,000 (Typical)
- **USDA Rural Development – Grants**
 - Population <10,000 (Typical)
 - Sometimes Slow Process
- **Community Budget Issue Requests (CBIR) – Legislative Grants**
 - Politically Motivated / Lobbying
 - Legislature Awarded Several in 2014



Questions

