MINUTES OF THE *SPECIAL WORK SESSION*
BOARD OF MAYOR AND ALDERMEN
FRANKLIN, TENNESSEE
CITY HALL BOARDROOM
WEDNESDAY, AUGUST 7, 2013 – 5:00 P.M.

Board Members

Mayor Ken Moore	P		
Alderman Brandy Blanton	P	Alderman Margaret Martin	P
Alderman Clyde Barnhill	P	Alderman Dana McLendon, Vice Mayor	A
Alderman Pearl Bransford	P	Alderman Ann Petersen	P
Alderman Beverly Burger	P	Alderman Michael Skinner	P

Department Directors/Staff

Eric Stuckey, City Administrator	P	Paul Holzen, Engineering Director	P
Russell Truell, ACA Finance & Administration	P	Lanaii Benne, Assistant City Recorder	
David Parker, CIP Executive/City Engineer	P	Linda Fulwider, Board Recording Secretary	P
Mark Hilty, Water Management Director	P		

1. Call to Order

Mayor Ken Moore called the Special Work Session to order at 5.00 p.m.

SPECIAL WORK SESSION DISCUSSION ITEMS

2. Presentation of Biosolids Treatment Options at the Franklin Water Reclamation Facility

David Parker, City Engineer/CIP Executive
Mark Hilty, Water Management Director
Zack Daniel, CDM Smith Representative

In the design report for the upgrade of the Water Reclamation Facility, funding is available for a portion of biosolids treatment; however, a decision has not been made on how to handle biosolids. The treatment of biosolids is a key component and the solution must be for the long term to work with the existing plant or if the decision is made to build a new treatment plant.

Zack Daniel of CDM Smith presented costs and alternatives with Board members asking questions as they occurred during the presentation.

Existing Solids Treatment Process

- Most equipment in operation since 1996
- All facilities at the end of their useful lives
- Thickening equipment requires frequent maintenance & repairs
- Three full-time drivers haul solids to landfill 100+ miles away (To Camden)
- Additional capacity needed to handle future wastewater flows

16% is solid and the rest is water. Many landfills will not take waste activated sludge.

Key Goals for New Solids Treatment Process

- Reduce risk
- Improve operational efficiency
- Earn environmental/public acceptance

- Produce Class A biosolids
- Control odors

Mr. Daniel and Mark Hilty explained the risks of dependence on landfills to continue taking sludge. Were the landfills to decide to no longer accept the sludge, where would it go? That is of concern. As to growth, David Parker noted in future loads could rise from 1,600-1,700 dry tons per day to 5,100 tons per day.

Solids Treatment Alternatives Evaluation Process

- Concept-level equipment & facility sizing
- Planning level economic analysis
  - Capital cost
  - O & M cost
  - 20-year Net Present Cost (NPC)
- Non-cost evaluation
- Final scoring (cost & non-cost)

Proposed Solids Treatment Alternatives

Process Train	Thickening	Digestion	Dewatering	Drying	Disposal
Alternative 1: Continue Current Treatment Process	Dissolved Air Flotation	None	Belt Filter Press	None	Haul Dewatered Sludge to Distant Landfill
Alternative 2: Replace Thickening, Add Digestion & Screw Press Dewatering	Rotary Drum Thickener	Mesophilic Anaerobic Digestion	Belt Filter Press/Screw Press	None	Dewatered Class B Biosolids for Agricultural Use
Alternative 3: Alternative 2 Plus Solar Drying	Rotary Drum Thickener	Mesophilic Anaerobic Digestion	Belt Filter Press/Screw Press	Solar Dryer	Dried Class A Biosolids[1] for Public Use
Alternative 3A: Alternative 3 with Partial Solar Drying	Rotary Drum Thickener	Mesophilic Anaerobic Digestion	Belt Filter Press/Screw Press	Solar Dryer (Partial Installation)	Dried Class A Biosolids[1], Dewatered Class B Biosolids
Alternative 4: Alternative 3 Plus Thermal Hydrolysis	None	Thermal Hydrolysis + Mesophilic Anaerobic Digestion	Centrifuge + Belt Filter Press	Solar Dryer	Dried Class A Biosolids for Public Use
Alternative 4A: Alternative 4 with Partial Solar Drying	None	Thermal Hydrolysis + Mesophilic Anaerobic Digestion	Centrifuge + Belt Filter Press	Solar Dryer (Partial Installation)	Dried Class A Biosolids, Dewatered Class A Biosolids

[1]Class A status of solar drying process is subject to approval by TDEC

Alternative 1: Continue Current Treatment Process

- Advantages
  - Lowest complexity
  - Staff has extensive experience with these processes
  - Lowest NPC
- Disadvantages
  - No reduction in quantity of solids to be disposed
  - Unsustainable – continues dependence on landfill disposal
  - Highest O&M cost due to hauling & disposal expenses
  - Solids cannot be beneficially reused
  - Highest net carbon emissions

Public Opposition is Shaping Solids Treatment Strategies

- Utility client in the Carolinas
- Land applies biosolids in North & South Carolina
- Residents near application sites in S.C. opposed permit renewal
- Resistance highlights client's risk of 100% dependence on land application
- Client is reconsidering costs of recommended diversification, new facilities
- Alternative 1 has high risk of 100% dependence on landfill disposal
- Alternative 1 should be removed from consideration

Alternative 2: Replace Thickening, Add Digestion & Screw Press Dewatering

- Advantages
  - Reduces quantity of solids to be disposed
  - Biogas can be beneficially used
  - Biosolids can be beneficially reused in agriculture
  - Lower O&M cost & odor potential than Alternative 1
- Disadvantages
  - Slightly higher NPC than Alternative 1
  - More complex than Alternative 1
  - Requires hauling of dewatered biosolids to farms

Alternative 3: Alternative 2 Plus Solar Drying

- Advantages
  - Biogas can be beneficially used
  - Biosolids can be beneficially reused by residents or in agriculture
  - Further reduces volume of solids to be disposed
  - May eliminate hauling costs if product is picked up
  - Lower O&M cost than Alternative 1
- Disadvantages
  - Few solar dryer facilities
  - High odor potential
  - High energy consumption
  - Highest NPC

This is Class B but could go to Class A if a sample from every batch was tested. Mr. Daniel will advise if the restrictions to use this on plants for consumption are the same as for reclaimed water. Alderman Burger mentioned she would at some point like to talk about how biosolids could be used for revenue.

Alternative 3A: Alternative 3 with Partial Solar Drying

- Advantages
  - Biogas can be beneficially used
  - Biosolids can be beneficially reused by residents and in agriculture
  - Allows City to review solar dryer performance on small scale
  - Lower O&M cost than Alternative 1
- Disadvantages
  - Few solar dryer installations
  - High odor potential from solar dryers
  - High energy consumption
  - Requires hauling of dewatered biosolids to farms

Alternative 4: Alternative 3 Plus Thermal Hydrolysis

- Advantages
  - Greatest reduction in solids to be disposed
  - Biosolids can be beneficially reused by the public

  - Produces more biogas for heat/power generation
  - Fewer solar dryers required
- Disadvantages
  - Few solar dryer installations
  - THP is new technology with no operating U.S. installations
  - High odor potential from centrifuges & THP system
  - High energy consumption & complexity, second highest NPC

Use of Thermal Hydrolysis is automatically a Class A

<u>Alternative 4A</u>: **Alternative 4 with Partial Solar Drying**

- Advantages
  - Great reduction in solids to be disposed
  - Biosolids can be beneficially reused by the public and in agriculture
  - Produces more biogas for heat/power generation
  - Allows City to review solar dryer performance on small scale
- Disadvantages
  - Few solar dryer installations
  - THP is new technology with no operating U.S. installations
  - High odor potential from centrifuges & THP system
  - High energy consumption & complexity, high NPC

Economic Analysis – Capital Cost

Process Train	Estimated Capital Cost at Each Phase (Millions)			Net Present Capital Cost of Three Phases[1] (millions)
	Phase I (2018-2023)	Phase II (2024-2031)	Phase III (2032-2040)	
~~**Alternative 1:** Continue Current Treatment Process~~	~~$18.0~~	~~$3.4~~	~~$0.0~~	~~$19.0~~
<u>Alternative 2:</u> Replace Thickening, Add Digestion	$33.0	$11.6	$1.6	$38.0
<u>Alternative 3</u>: Alternative 2 Plus Solar Drying	$67.0	$21.0	$22.0	$84.0
<u>Alternative 3A:</u> Alternative 3 with Partial Solar Drying	$41.0	$12.0[2]	$5.0[2]	$47.0[2]
<u>Alternative 4:</u> Alternative 3 Plus Thermal Hydrolysis	$64.0	$15.0	$6.0	$70.0
<u>Alternative 4A:</u> Alternative 4 with Partial Solar Drying	$55.0	$6.0[2]	$3.0[2]	$55.0[2]

[1]2013 dollars. [2]Does not include Phase II or III solar dryer expansion

Economic Analysis – Total Annual O&M Cost (2040)

- Includes cost offset from use of biogas for power generation
- 2013 dollars

~~Alternative 1~~	Alternative 2	Alternative 3	Alternative 3A	Alternative 4	Alternative 4A
~~$1.4 million~~	$0.5 million	$0.8 million	$0.6 million	$0.7 million	$0.7 million

Economic Analysis – O&M Cost per Dry Ton Fed to Process (2040)

- Includes cost offset from use of biogas for power generation
- 2013 dollars

~~Alternative 1~~	Alternative 2	Alternative 3	Alternative 3A	Alternative 4	Alternative 4A
~~$228 million~~	$89 million	$124 million	$98 million	$116 million	$106 million

Economic Analysis – Net Present Cost (2013 Dollars)

	~~Alternative 1~~	Alternative 2	Alternative 3	Alternative 3A	Alternative 4	Alternative 4A
Total NPC-20 Years O&M Costs	~~$27.9 million~~	$12.1 million	$16.9 million	$13.6 million	$16.7 million	$15.2 million
Total NPC-Capital Costs	~~$18.5 million~~	$38.1 million	$83.9 million	$47.1 million	$70.3 million	$55.1 million
	~~$46.0 million~~	$50.0 million	$101.0 million	$61.0 million	$87.0 million	$70.0 million

Non-Cost Evaluation

- Each alternative scored according to 11 non-cost criteria established during IWRP work
  - 1 = Most desirable
  - 5 = Least desirable
- Each criterion weighted according to priority
  - 1 = Low priority
  - 5 = High priority
- Low total score = Alternative is closely aligned with City's goals for solids treatment

Non-Cost Scoring Matrix reviewed

Results of Non-Cost Evaluation

Process Train	Total Non-Cost Score	Non-Cost Evaluation Ranking
~~**Alternative 1:**~~ ~~Continue Current Treatment Process~~	~~131~~	~~6~~
Alternative 2: Replace Thickening, Add Digestion & Screw Press Dewatering	112	5
Alternative 3: Alternative 2 Plus Solar Drying	94	1
Alternative 3A: Alternative 3 with Partial Solar Drying	101	4
Alternative 4: Alternative 3 Plus Thermal Hydrolysis	96	2
Alternative 4A: Alternative 4 with Partial Solar Drying	98	3

Final Scoring of Alternatives

- Step 1: Calculate cost and non-cost scores
  - Cost score is based on percentage of highest NPC
  - Non-cost score from scoring matrix
- Step 2: Normalize cost and non-cost scores to 100-point scale
- Step 3: Weight cost and non-cost scores
  - Higher cost score weighting = cost is priority
  - Higher non-cost score weighting = non-cost factors are priority
- Step 4: Calculate total score
  - Low total score = Good combination of cost and non-cost factors

Final Scoring of Alternatives – Results

Weighting of Cost Score	0%		25%		50%	
Weighting of Non-Cost Score	100%		75%		50%	
Process Train	**Total Score**	**Rank**	**Total Score**	**Rank**	**Total Score**	**Rank**
~~**Alternative 1:**~~ ~~Continue Current Process~~	~~57.2~~	~~n/a~~	~~63.1~~	~~n/a~~	~~57.2~~	~~n/a~~
Alternative 2: Replace Thickening, Add Digestion	58.9	5	56.6	3	54.2	1
Alternative 3: Alternative 2 Plus Solar Drying	49.5	1	62.1	5	74.7	5
Alternative 3A: Alternative 3 w/Partial Solar Drying	53.2	4	55.0	1	56.8	2
Alternative 4: Alternative 3 Plus Thermal Hydrolysis	50.5	2	59.4	4	68.3	4
Alternative 4A: Alternative 4 w/Partial Solar Drying	51.6	3	56.0	2	60.4	3

Weighting of Cost Score	75%		100%	
Weighting of Non-Cost Score	25%		0%	
Process Train	**Total Score**	**Rank**	**Total Score**	**Rank**
~~**Alternative 1:**~~ ~~Continue Current Process~~	~~51.4~~	~~n/a~~	~~45.5~~	~~n/a~~
Alternative 2: Replace Thickening, Add Digestion	51.9	1	49.5	1
Alternative 3: Alternative 2 Plus Solar Drying	87.4	5	100.0	5
Alternative 3A: Alternative 3 w/Partial Solar Drying	58.6	2	60.4	2
Alternative 4: Alternative 3 Plus Thermal Hydrolysis	77.2	4	86.1	4
Alternative 4A: Alternative 4 w/Partial Solar Drying	64.9	3	69.3	3

Thermal Hydrolysis – Potential Public-Private Partnership

- Suggested by manufacturer of solar dryer & THP systems
- Could reduce Alternative 3A, 4 or 4A Phase 1 capital cost
- If we assume reduction in equipment purchase price:
  - Alternative 3A: NPC reduced by up to $2 million
  - Alternative 4: NPC reduced by up to $6 million
  - Alternative 4A: NPC reduced by up to $3 million
- Discussions with manufacturer are underway

Discussion ensued on thermal hydrolysis and sale of finished product for agricultural purposes.

3. Other Business

None

ADJOURN

Work Session adjourned @ 6:14 p.m.

_____

Dr. Ken Moore, Mayor

Minutes prepared by: Linda Fulwider, Board Recording Secretary, City Administrator's Office - 11/13/2013 3:43 PM