Meeting Minutes
February 2, 2011 - 1:00 PM
Community Room, City of Franklin Police Headquarters, 900 Columbia Avenue

Attendees:

David Parker, City of Franklin
Mark Hilty, City of Franklin
Vic Bates, City of Franklin
Ken Moore, City of Franklin
Eric Stuckey, City of Franklin
Eric Gardner, City of Franklin
Andrew Johnson, SSR
Carrie Carden, CDM
Michelle Hatcher, CDM
Kati Bell, CDM
Chris Provost, CDM
Zack Daniel, CDM
Richard Tsang, CDM

I. Introduction

The February 2 Workshop was the first of two Steering Committee Workshops that will be used to narrow the biosolids process alternatives to a short-list of viable alternatives for more detailed evaluations. The Pre-Screening Process Workshop was conducted to review current and emerging thickening, stabilization, and dewatering technologies that may be considered for application. Dr. Richard Tsang facilitated the Pre-Screening Process Workshop discussing the relative benefits and requirements of the thickening, stabilization, and dewatering technologies as they apply to the existing wastewater and future wastewater demands.

II. Overview of Waste Solid Management

In preparation for this meeting, the existing wastewater treatment plant (WWTP) records, including waste activated sludge (WAS) production and performance of the existing solids treatment systems, were reviewed along with the existing equipment and solids treatment systems. Communications with operating staff identified current operating procedures, performance, maintenance requirements, and estimates of remaining ~~on~~ useful service life for major solids handling equipment.

Based on the operations data collected from the current process and future flow projections, an average of 200,000 gallons per day (gpd) of WAS is wasted from the clarifiers ~~on a daily basis~~ at a concentration estimated by plant staff to be approximately ~~around~~ 0.5 percent solids. The final concentration of biosolids ready for disposal is estimated around 14-percent solids. ~~A preliminary mass balance around the solids process estimates the volatile solids content of the WAS at xx percent.~~ While there will be changes to the ~~mass and~~ character and concentration of the WAS if ~~solids wasted once~~ process upgrades are implemented, at a minimum, these ~~optimization takes place,~~ preliminary estimates of WAS can be used as the ~~have been developed to determine a~~ basis for estimating future solids loads ~~ing~~for alternative ~~to new~~ technology evaluations. ~~ies.~~

III. Criteria for Solids Management Strategies

During the meeting, key ~~several~~ criteria for developing an ~~were established as criteria for~~ effective solids management strategy ~~ie~~that will meet the long-term needs of ~~s to be implemented within~~ the City was established. Collectively, the group identified ~~decided on~~ the following factors:

- Efficiency of operations;
- Minimized ~~E~~energy consumption;
- Sustainability;
- Diverse portfolio of product ~~ity (~~disposal options~~)~~;
- Reliability;
- Risk reduction;
- Environmental/public acceptance;
- Odor control;
- Automated processes;
- Class A sludge;
- Expandable strategy for growth.

As part of the evaluation process, ~~Further into design,~~ a decision matrix with these evaluation criteria will be developed that will rate each of the solids designs for their applicability in meeting ~~to~~ the City's needs.

IV. Process Alternatives

During the ~~In preparation for this~~ Workshop, the major ~~descriptions of short listed~~ solids handling processes were discussed~~inclu~~. The Workshop ~~ded in the attached~~ presentation has been attached at the end of these meeting minutes, ~~,~~ and a short summary of the benefits and requirements for thickening, stabilization, dewatering, and drying are summarized herein. ~~The refined list of process alternatives will be formulated into system alternatives for further evaluation.~~

A. Thickening Processes

~~As a result of discussions during the Workshop, t~~Three sludge thickening technologies ~~processes~~will be included in further evaluations and include a ~~were selected for additional consideration,~~ gravity belt thickener, ~~ing,~~ drum thickener, ~~ing,~~ and screw press, ~~thickening,~~ in addition to ~~the current process the City uses,~~ dissolved air floatation (DAF). ~~thickening.~~ DAF is the technology currently used at

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the existing WWTP and serves as the baseline condition for evaluation of other technologies. Dissolved air floatation thickening currently utilizes ~~requires~~ two tanks on the existing site plan and requires air addition to the process. Thickening technologies may not be needed for some solids processing technologies, however thickening will be included in the evaluation for volume reduction prior to stabilization. ~~, however the air requirements for the process increase the operating cost. The City currently does not use a polymer to increase solids capture, however polymer addition can significantly add to the amount of solids recovery seen from the process.~~

A ~~The~~ gravity belt thickener can produce ~~perform well, typically ranging from producing~~ thickened sludge with a solids content ~~sludge~~ of 5 to 7 percent. Gravity belt thickening is a technology similar to the existing belt filter presses used for dewatering, and the similar technology could allow for ease of operator transition to the new process.

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~~presses used for dewatering, and the similar technology would allow for ease of operator transition to the new process.~~

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Other technologies that will be investigated include screw press thickening and rotary drum thickening. Advantages of using rotary screw or drum thickeners include both technologies have a compact footprint and can be completely enclosed, preventing emission of odors, vapors, or spray water. Operation and maintenance requirements are relatively low, and the process can be fully automated enabling simplification of continuous operations, if desired.

B. Stabilization

The Workshop included a discussion of solids stabilization alternatives including both aerobic and anaerobic biological processes. Also, a no stabilization option, and ~~or~~ continuing the current process of dewatering raw WAS, ~~, w~~was ~~as~~ discussed as ~~an~~ alternatives for consideration in combination with other processing methods, such as drying, that may not require stabilization.

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Two stabilization technologies were discussed ~~during the meeting~~, aerobic and anaerobic digestion. Conventional aerobic digestion, which operates at ambient temperatures typically ~~and~~ produces biosolids meeting Class B standards; the process ~~and~~ can result in ~~create~~ high energy requirements, issues with dewatering ~~aerobically digested sludge~~, and low volatile solids reduction when compared to other stabilization technologies. Conventional anaerobic digestion operates at mesophilic temperatures (90°F to 100°F) and produces biosolids meeting Class B

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pathogen reduction standards. Anaerobic digestion consumes very little electricity and offers the potential to capture energy from the biogas.

With the ~~se~~ criteria identified by the Steering Committee, anaerobic digestion was the only stabilization process that will be evaluated further, along with the option of continuing existing WWTP operations with no stabilization.

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C. Dewatering

Dewatering was discussed during the Workshop, with ~~however~~ specific technologies being introduced, but ~~were~~ not discussed in detail. Dewatering is typically performed after stabilization, or in the existing process, after thickening to remove excess water from the sludge prior to disposal. The existing WWTP currently utilizes the belt filter press (BFP) ~~technology~~ for dewatering after sludge is thickened from the DAFs. The BFPs at the existing plant are enclosed in the solids handling building that is vented to the odor control unit.

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Other technologies that will be evaluated further include a screw press and centrifuge dewatering. Both of these technologies have a footprint that can be housed inside a building to reduce odor potential. Centrifuge dewatering can typically have high energy costs associated with the technology, however can reach solids percentages between 10 to 30 percent.

D. Drying

During the Workshop, drying was considered due to its significant volume reducing capabilities and potential for multiple end uses of the dried biosolid. Dryers that will be considered include the belt dryer with the proprietary energy recovery system and the solar dryer.

Energy efficiency and low operations and maintenance (O&M) costs are key considerations for long-term operations at the City's WWPT. Solar drying requires very little maintenance and power requirements, and can be fully automated during the drying process. Although there are multiple advantages to solar drying, the disadvantages include space requirements, which is not a limiting factor for solar drying in Franklin.

Commercially available belt drying systems from Andritz and Kruger can utilize a variety of energy sources, including oil, natural gas, steam, and biogas from a digestion process (energy recover system). Manufacturers of belt drying systems tout the system's safety features, such as the enclosed nature of the process and the relatively low operating temperature, low speed of the belt, the reduced explosion hazard due to very low dusting, and the fully automated operation. However, although belt drying is becoming established in Europe, only a handful of installations have been completed in the U.S.

V. Formulation of System Alternatives for Evaluation

A summary of the unit processes that were retained for further evaluation is provided in **Table 1**. Unit processes were formulated into four primary systems based on discussions during the Workshop. While only four systems will be evaluated, the City can "mix and match" individual unit processes as additional information is obtained. A final technical memorandum (TM) will provide analysis of each of these systems, comparing them with the evaluation criteria established in Section III.

Table 1
Summary of Unit Processes and System Alternatives

Process Train	Thickening	Stabilization	Dewatering	Drying	Biosolids Class
Option 1 (Existing)	DAF	None	Belt Filter Press	None	NA
Option 2	Drum Thickener	Anaerobic	Screw Press	Solar	A
Option 3	Screw Press	Anaerobic	Centrifuge	Solar	A
Option 4	Gravity Belt Thickener	None	Centrifuge	Belt Dryer with ERS	Ash

Planning level cost estimates of the above equipment will be provided in the TM, along with ancillary requirements, estimated annual operations and maintenance costs (including labor, energy, and chemicals) and a list of installation locations. Because the energy use by the dryer is such an important part of the long-term costs of these technologies, it is difficult to compare costs at the conceptual level without a thorough life-cycle cost analysis, which will be performed for the System Analyses in the TM.

VI. Summary and System Alternatives Evaluations

For the selected viable process combinations identified during the Workshop, information will be refined during the detailed evaluations. Site inspections will be arranged of WWTPs using the same technologies (as applicable) to facilitate discussion with plant operations staff regarding the performance and operations and maintenance requirements of the systems. Through the evaluation of the cost and non-cost criteria, detailed information will be presented in the Alternatives TM.

Much of the discussions during the Workshop focused on energy efficiency as it relates to sustainable operations of the solids handling facilities over the life of the design. Along with this were discussions on innovative funding for "green" and "sustainable" technologies. Funding for these types of projects could be available through Department of Energy stimulus funding and other economic stimulus grant/funding packages and will be investigated further.