Anaerobic Digestion

This fact sheet addresses common questions about the **anaerobic digestion system** that is being incorporated in the proposed project.

Purpose and Benefits of Process

Anaerobic digestion's purpose is to stabilize sludge into biosolids. Sludge refers to the raw solids removed from wastewater in the treatment process. Biosolids refers to sludge that has been treated to EPA's standard requirements for beneficial reuse. The benefits of anaerobic digestion include:

- Reduction of sludge volume, which reduces the volume of sludge that needs to be transferred off-site; this will significantly reduce truck traffic to, from and within the WRF.
- Reduction of disease causing organisms (pathogens), and making the biosolids less attractive to animals that can carry diseases (vector attraction reduction).
- Production of biogas, which will be consumed in a combined heat and power (CHP) engine. The CHP engine will produce electricity and heat that will be used within the Franklin WRF.
- An air-tight treatment process, which greatly reduces the odor potential associated with sludge treatment.
- Low power demands, which will help lower Franklin WRF's operating costs.

Description of Process

The anaerobic digesters will be fed sludge that has been pretreated in the thermal hydrolysis system. The digesters are air tight tanks, devoid of oxygen, and are filled with a community of anaerobic organisms that break down the sludge. The digesters will be kept at a temperature of 100 degrees Fahrenheit, and will be well mixed. Digested biosolids are pumped from the digesters to a storage tank before being dewatered. The biogas created in the digesters will be piped to a biogas treatment system before being consumed in CHP engines or boilers to provide energy and heat to the WRF. Digested sludge will be pumped to the digested sludge storage tank and will be pumped from there to the sludge dewatering.

What Process Modifications will be made?

The anaerobic digestion system will be an addition to the site rather than a modification of existing structure or systems. The entire existing biosolids system at the Franklin WRF is past its useful life and is being replaced with the proposed new biosolids process. The anaerobic digestion, which will be part of the new biosolids system, will consist of two digestion tanks, pumps between the two tanks, and additional pumps

located in the adjacent digester building.

Is the process a potential odor source? Is the process odor controlled?

The anaerobic digesters are air tight concrete tanks with integral concrete roofs. The digesters will produce methane and will operate at a slight positive pressure. Methane will be collected and transmitted to a gas cleaning system and then used for generation of power and heat. The only potential release to the atmosphere would be through pressure relief valves, which are safety features. However, it is very unlikely that a pressure relief valve would be triggered to open.

Since the digesters are air tight, the anaerobic digestion process is not odor controlled.

Does the process include equipment that has the potential to create noise? If so, is there any noise control provided?

The anaerobic digesters will be located outside; between the two digesters will be three 40HP pumps (2 duty, 1 standby). These pumps will make noise, but the noise levels associated with this equipment will be significantly quieter than existing equipment at the Franklin WRF. For example, the proposed anaerobic digester mixing system will have two 40HP pumps operating outside. Meanwhile, there are six 100 HP and three 150 HP surface aerators currently continuously operating in a location much closer to the property line. All the other pumps associated with the anaerobic digestion system are located inside a building and will therefore not be heard off of the WRF property.

Will the process modification change the look and feel of the site?

The anaerobic digesters will be located outdoors adjacent to the proposed Digester Building. The two digesters will be 40 feet in diameter and have a height of 40 feet above the ground. These new digesters will be approximately the same size as two existing sludge storage tanks that are being demolished as part of this project. The tanks are designed to match the look and feel of the existing site.

The proposed single-story Digester Building was designed with aesthetics as well as functionality in mind. The building aesthetic incorporates contextual cues from the site. Contextual cues from existing onsite buildings include material selection and color to blend the new building into the surrounding fabric.

Will the process modification change the safety of the site?

The anaerobic digestion system does not use any chemicals. The system generates methane by design and the methane is cleaned and used in an engine to generate power and heat. If the engine is down for service the methane will be used in a boiler to create steam for use in other processes.

The digesters, gas handling, gas cleaning and gas usage systems are designed in accordance with all safety standards, including NFPA 820, Standard for Fire Protection in Wastewater Treatment and Collection Facilities. Safety precautions include:

- The use of flame arrestors at all pressure relief valves.
- The pressure inside the digester tanks is continuously monitored, and high pressure switches trigger the removal of sludge from the tank and terminate the feeding of sludge to the tank.
- Explosion proof electrical equipment is used in areas proximate to the digesters and gas handling areas.

There are over 230 anaerobic digester systems safely operating at municipal wastewater treatment plants in the U.S., including installations in close proximity to residential areas. If methane generated by anaerobic digestion were not available for onsite energy needs, natural gas would be used to fulfill those same needs and the same network of gas piping and the same safety measures would be necessary.

In the unlikely event that a methane release were to occur the volume of release would likely be much more limited than a release from a natural gas pipeline break since the volume of available gas is limited to rate at which methane can be generated by the digesters. Since methane is lighter than air, it would rise into the atmosphere and be dispersed rather than migrate laterally to adjacent areas.