

Waukesha Engine Energizes New Hampshire Water Utility Digesting Sludge for Fuel

Nashua, New Hampshire, is completing an anaerobic digester project that will transform gas from treating sludge to electricity, thereby making a big part of its operation energy self-sufficient. Plus, it'll soon send far less sludge to local landfills.

The city's water utility has the essential, but unenviable, job of treating and cleansing wastewater before it's allowed to join the nearby Merrimack river. A waste-water treatment plant since the '40s, it's rated at 50 million gallons treatment capacity. The plant serves a highly populated area and handles 12 to 18 million gallons of wastewater per day.

Through a sludge digesting process methane gas, a usable by-product, will soon be available to fuel an engine/generator set that will provide electricity and hot water to the facility. For heat and electricity, the digester plant relies on a Waukesha Enginator® engine/generator package. The dual-fuel, 12 cylinder Waukesha VGF36GLD produces 365 kW of continuous power at 1800 rpm.

Smelly, slimy sludge is a by-product of treating wastewater. In the past dried, or de-watered, sludge would be disposed of in landfills, which are quickly running out of room. Therefore, transforming sludge into dry compost, a marketable product, is a much better idea. De-watering is part of a composting process, which reduces bulk by about 30%. The compost can be used by golf courses, for state road projects and given away to locals. However, you can't compost "undigested" sludge.

Using proven technology from Europe (where newer generations are already in use), digesters are being built around Boston and Baltimore, plus in Pennsylvania, Nebraska, and California. And, experts say more are coming in the future. These digesters, like the one in Nashua, are novel because they are using an egg-shaped digester chamber.

A by-product of sludge is digestion methane gas. At Nashua, the gas will be used to run a Waukesha engine linked to a generator to provide electricity to

power the digestion process and other parts of the treatment facility. The engine will also provide heat, which is needed by the anaerobic bacteria to produce the methane gas.

Sludge itself is actually the bodies of bugs that exist on nutrients found in the wastewater. In the controlled environment of an anaerobic (meaning without air or oxygen) digester, micro-organisms destroy biodegradable pollutants. It's similar to what occurs naturally in stagnant water; the digester controls and speeds up this natural process. The leftover material, bio-solids or digested sludge, is then separated from the water and thickened before being used as compost or fertilizer.

According to Dan Brassard, the project manager at the digester site, "without regular sludge circulation, the digester will 'die' and what you wind up with is a 1.3 million gallon holding-tank full of smelly, worthless sludge."

The engine was purchased through W. A. Kraft, Woburn, MA, the local authorized Waukesha Engine Division distributor who also helped with engine controls system.

When fully operational, 60 thousand gallons a day of sludge will be fed into the digester, producing methane gas to run the Waukesha engine.

"The ideal we're striving toward is for the Enginator package to provide electrical power 24/7," Brassard says. "On days when not enough gas in being produced we can use natural gas as backup power."



The anaerobic "egg" sludge digester



Dan Brassard, Project Manager

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