

## Harrisonburg-Rockingham Regional Sewer Authority

### Better Biosolids and Recovered Energy

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#### Overview

The Harrisonburg-Rockingham Regional Sewer Authority (HRRSA) provides wastewater treatment for the City of Harrisonburg, Rockingham County and the towns of Bridgewater, Dayton, and Mount Crawford. HRRSA owns and operates the North River Wastewater Treatment Facility in Mount Crawford, Virginia. The Enhanced Biosolids Reuse and Reduction (EBRR) Project has led to energy and cost savings at the North River Wastewater Treatment Facility.

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#### What is the goal of wastewater treatment at HRRSA?

HRRSA's core values include a commitment to protecting the environment. They do this by striving to achieve environmental excellence every day through superior process control and implementation of pollution prevention practices, attaining regulatory requirements and providing an effective pretreatment program.

#### What is the process for treating wastewater at the North River Wastewater Treatment Facility?

- The treatment facility is designed to process 22 million gallons of wastewater per day.
- The facility usually treats 13-14 million gallons per day.
- The facility was upgraded to meet enhanced nutrient removal treatment standards in 2010 to comply with the Chesapeake Bay tributary strategies.
- Processes include influent pumping, influent coarse and fine screening, primary clarification, secondary biological treatment, biological and chemical phosphorus removal, secondary anoxic treatment for nitrogen removal, final clarification, effluent filtration, chlorine disinfection and dechlorination and cascade aeration prior to discharging the processed water.



Treated wastewater being discharged into the North River using cascade aeration.

#### What happens to the organic waste collected by HRRSA?

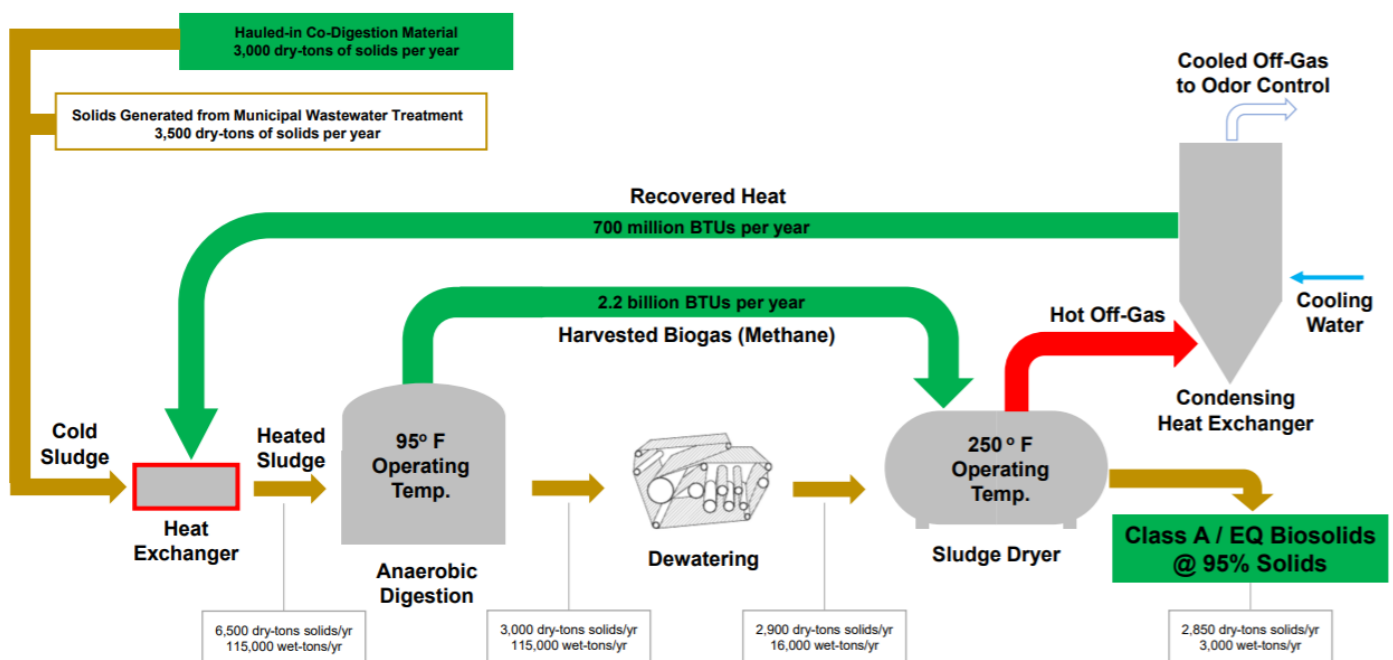
HRRSA treats the wastewater it receives to release clean water. To do this, solids are removed from the wastewater. At HRRSA, biosolids are treated by anaerobic digesters, which use bacteria to break down organic matter without oxygen. This process produces biogas, made mostly of methane, which is recovered and used to heat the digestion process. The biosolids are nutrient rich organic materials. Following the digestion process, the biosolids are dewatered and applied as fertilizer to farmland. Prior to this project, the biosolids produced were EPA Class B and approximately 18 percent solid.

### How did HRRSA enhance its biosolids reuse?

HRRSA's EBRR Project aimed to capture additional anaerobic digester gas, beyond that used for digester heating, to fuel a biosolids dryer to provide additional dewatering to the Class B biosolids. Additional drying would increase the quality of the final biosolids. After the additional thermal drying, the final product is greater than 90 percent solids and meets the EPA definition of a Class A Exceptional Quality (EQ). In addition to significant cost saving from reduced biosolids hauling, the project is strategically important as the Class A/EQ materials has superior pathogen reduction and greatly increases biosolids storage and disposal options including wholesale marketing and distribution.

### Without supplemental fossil fuels how was HRRSA able to achieve the additional dewatering?

By using the recovered methane from the anaerobic digester, supplemental fossil fuel has never been used by the facility for digester heating or the sludge dryer. Methane recovered from anaerobic digestion did not provide enough energy on its own to dry the biosolids to Class A/EQ standards. The EBRR Project utilizes co-digestion in the anaerobic digester system to increase the amount of methane gas available for recovery. By importing poultry processing waste, HRRSA's anaerobic digester produces enough methane to provide additional dewatering to meet the Class A/EQ standards. In addition, spiral heat exchangers recover the waste heat from the system to heat the anaerobic digesters.



### What was the financial impact of the project?

The Clean Water Revolving Loan Fund provided the initial funds to cover the cost of the project. Since there are no regulatory drivers for producing Class A biosolids in Virginia, the project needed to run on the cost savings generated by reducing the volume of biosolids hauled and additional revenue received from co-digestion of imported poultry processing waste. The weight of the biosolids produced has been reduced by over 80% which significantly reduces truck trips hauling the material which also reduces the associated air emissions. By 2019 the Authority saw a cost savings of \$85,000. The projected annual savings is \$510,000. The savings improve each year as rates for disposal and hauling typically increase by 2-3% annually.

### How can similar facilities enact these practices?

The co-digestion program is being achieved utilizing an existing high-rate mesophilic anaerobic digestion system, which is commonly used at most regional wastewater treatment facilities in Virginia that have a 15 million gallons a day or more capacity. This program can be implemented at high capacity facilities that have access to similar local waste streams available for co-digestion.