Location: Cortland, New York  
Owner: City of Cortland  
Engineer: Cedarwood Engineering  
Contractor: Hubbard Construction  
Agent: Koester Associates, Inc.

Problem
Over the last several decades, the Cortland, New York, area has lost thousands of manufacturing jobs. When a large dairy processor expressed interest in placing a new Greek yogurt plant in an industrial park in Cortland, the community improved its chance to secure the plant and provide future economic growth by upgrading the City’s wastewater treatment plant (WWTP) so it could offer no-cost trucked waste disposal for the dairy facility.

One of the significant issues driving the upgrade was that the acid whey from the Greek yogurt process could not be accommodated by the current wastewater treatment facility. The municipality needed a quick solution.

The City of Cortland worked with Cedarwood Engineering to upgrade the WWTP plant so it could process the waste from the yogurt plant and generate heat and electricity from the methane produced from the trucked waste.

Analysis of Alternatives
The municipality had initially planned a new, large digester to accommodate the trucked waste, as well as a modest upgrade to their existing digester facilities. However, the time required for this option caused the facility to rethink the design of the project, and they decided to do a thorough upgrade to the existing digesters to more quickly accommodate the needs of the new yogurt plant.

The new plan replaced the aging carbon steel fixed covers with new covers made of 304 stainless steel, changed the gas storage from a fiberglass floating cover to a DuoSphere™ dual membrane.
fiberglass gas holder was also a plus. The DuoSphere was the first cover installed, requiring just three weeks for installation (much shorter than the steel covers) and allowing this newly-covered and mixed digester to start up much sooner than the others.

**Heat Exchanger**
The tube-in-tube heat exchanger was installed to preheat the whey before it is sent to the digesters. This feedstock is trucked in from the dairy processing facility, and the heat exchanger ensures that it stays in a liquid state for processing. The heating requirement is more significant in the winter, but the heat exchanger system is designed to accommodate these seasonal variations.

At high temperatures, minerals may collect and form hard grey colored granules referred to as “milk stone,” which can foul the tubes. To minimize the problems, the heat exchanger was provided with glass-lined tubes and fittings, and the facility set up an annual inspection schedule. Ports were provided on the piping so that if fouling becomes a problem, an acid wash system can be installed, and the heat exchanger will be periodically cleaned in place.

**Implementation**
One of the things that sets this project apart from others is how well the project team, client, contractors, manufacturer, and engineers cooperated and adapted to the various needs of the project under the tight timeline. “All partners worked in concert, putting the success of the project ahead of other considerations,” said Bruce Adams, Superintendent of the Cortland Wastewater Treatment Facility. “Having partners that were nimble and responsive was very important to the project’s success.”

The installation of the stainless steel covers was particularly well suited to the Cortland plant and its project schedule. Stainless steel covers eliminate priming and painting and the need to periodically inspect the interior coatings. The shop welding of alternate “pie slice” pieces...
secondary digester to a third primary digester. These upgrades increased the plant’s capacity so it could accommodate dairy waste and give the facility staff breathing room to plan the new digester and associated combined heat and power (CHP) equipment to be completed in a later phase.

**Recommended Solution**

The timeline was aggressive. WesTech received a purchase order in March, and the equipment was delivered in early June. The tight schedule encouraged the team to overcome any design obstacles that threatened delay. With the time constraints, WesTech suggested options that would work well with the equipment that was already in place at the facility.

**Mixers**

The existing gas mixing systems on the primary digesters were only marginally effective, even when they were working properly. The plant had issues with throughput, volatile solids reduction, and gas production. It was clear that the plant needed to improve their mixing to meet the project goals.

The facility had seen and wanted a gas piston-type system for the mixer because this design had no moving parts in the tank. But this required a costly retrofit and would have taken valuable building space for the compressors. The facility decided to install four WesTech ExtremeDuty™ Sludge Mixers that saved space, assured reliability, and helped the project schedule to stay on track. An added benefit was that these mixers are reversible and can reduce the risk of rapid volume expansion events as they can pump down to eliminate low-density sludge, scum, and foam. The internal mixers were easily mounted at the center of each of the two fixed covers. The two external mixers are mounted to the outside of the DuoSphere-covered digester.

**Covers**

The existing steel covers had corroded badly and needed to be replaced. To meet the schedule, two stainless steel covers were provided to replace the existing ones. Stainless steel covers are faster to install as they require less welding than carbon steel covers, no blasting, and no painting.

To capture the increased gas produced by the added whey, Cedarwood Engineering recommended the DuoSphere dual membrane cover to replace the floating cover. This would give the facility significantly more storage and flexibility when it implemented cogeneration in the next phase of the project. The ability to run at a higher operating pressure than they had with the concrete-ballasted rigid
gas holder, and converted the
allowed the covers to be quickly
installed.

“WesTech was highly responsive
throughout the installation and
start-up process, reacting quickly
to any issues that popped up and
working closely with our agent,
Koester Associates, to ensure all
their equipment was properly
installed and operational,” Adams
said.

With an aggressive schedule,
it was not surprising that the
occasional coordination challenge
arose. For example, the size and
location of the heat exchanger
made for a difficult installation. The
exchanger needed to be almost
completely disassembled to fit
through the access hatch, around
some piping, and into position
and reassembled two stories
below. Only later did the installer
realize that WesTech could have
designed the heat exchanger in
smaller sections had everyone
been aware of this issue.

**Results**

The Cortland WWTP successfully
transformed a 75-year-old
digester complex into a facility
with a 50% greater hydraulic
capacity and the ability to treat
this new, unique waste stream
in a sustainable way. “The
wastewater facility is far and away
the largest greenhouse gas (GHG)
producer within the Cortland city
government,” Adams said. “The
combined heat and power project
at the heart of our relationship with
the dairy businesses will reduce
our GHG to a small fraction of
what it was. The next phase CHP
project promises to reduce the
carbon footprint to near zero.”

The project is a timely response
from the municipality to the
challenge of climate change
and shows potential residents
and businesses that the
City is proactive regarding
environmental stewardship.

The digester facility has a much
greater capacity because of the
upgrades, particularly with the
mixing improvements, and this will
benefit the plant for many years to
come. Carbon steel equipment
was replaced with long-lasting
stainless steel to avoid the regular
expenses, downtime, and hazards
of inspection, repainting, and
replacement.

WesTech is proud to be part of
this project that quickly gave
the WWTP the ability to provide
no-cost trucked waste disposal
for the new dairy plant. This
improves the city’s competitive
economic position, allows
for future opportunities, and
strengthens the local economy.
Additionally, the update also gave
the City of Cortland more control
over operational costs of its most
energy-intensive endeavor –
wastewater treatment.

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