

SUMMARY

The 2019 Annual Report highlights the significant projects completed at the Gloversville-Johnstown Joint Wastewater Treatment Facility (GJJWTF). Routine assignments such as tank cleaning, instrument calibration, laboratory analysis, sample collection, general maintenance and upkeep, while important, are not identified in this report. General statistics are included to illustrate additional activities at the facility.

UV Disinfection Project successfully operated from May 1 to October 31, 2019.

O & M budget totaled \$4.43 million for 2019. The estimated budget was projected to be \$4.78 million. Under budget savings is \$353,000.

Electrical Synopsis:

Generated	5,989,634 kilowatt hours	
Purchased	146,794 kilowatt hours	-- \$25,676
Sold	1,330,983 kilowatt hours	-- \$37,104
Consumed	4,805,445 kilowatt hours	\$422,879 (Saved, at \$0.088/kWh)

O & M revenues totaled \$4.14 million during 2019. The Industrial contribution was 45.2%, Residential 27.1% and Trucked/Pumped waste and miscellaneous revenue totaled 27.8%. The average industrial sewer bill slightly increased. The residential rate increased 2.8%. Use of \$468,317 from the rate stabilization reserve fund helped to minimize the rate increase.

Belt Filter Presses operated 3,789 hours producing 18,485 wet tons of sludge. Fulton County Department of Solid Waste received \$629,622 to accept the sludge.

The Dairy Industry accounted for **31.5%** of the total O&M revenue collected. Together, FAGE USA Dairy Industry, Inc. and Euphrates Inc. pumped a total of **28.1 million** gallons of whey and **206.5 million** gallons of washwater to GJJWTF for wastewater processing via two dedicated pipelines.

A dedicated pipeline transported the whey to a 180,000-gallon equalization tank. Then, operators pump the whey directly to the Primary Digester at a constant feed rate. During the digestion process, the digester anaerobes produce large quantities of digester gas (~55% Methane). The COGEN System (consisting of CAT-1, CAT-2 and CAT-3) combust the digester gas to generate the electrical power used to self-power the facility. Any excess electricity is sold to National Grid per a Power Purchase Agreement.

The other dedicated pipeline transports **237.8 million** gallons of dairy washwater from FAGE USA Dairy Industry, Inc. and Euphrates Inc. to the headworks of the Contact Adsorption Settling Thickening (CAST) System. CAST continued to successfully operate for all of 2019.

The foundation for success of GJJWTF is due to the support of the Gloversville-Johnstown Joint Sewer Board (GJJSB) and the work of its twenty-three (23) employees. As a result of the conscientious efforts by all GJJWTF employees on days, nights, weekends, holidays, during severe weather, and often in an inhospitable environment, the facility continues to operate and meet its wastewater discharge SPDES permit requirements.

Employee names (as of 12/31/19) are:

Barbara Allen	Matthew Handy	Richard Pedrick
Thomas Ambrosino	Reuben Kennedy	Donna Renda
Wallace Arnold	Mark Levendusky	Hilary Ruzycky
Ricky Barnett	David Malagisi	Michael VanAlstyne
Steven Burns	Catherine Maragno	Christopher VanAuken
Haleigh Dutcher	James McMillan	Christian Walters
Bruce Gardner	Adam Mihalik	Robert Yaggle
Erich Goodemote	Lacie Newland	

PERSONNEL

The total number of NYSDEC Grade 3A and 4A license holders at this facility totals six (6).

Retirements

Richard VanNostrand - Operator - 30 years of service.

New Hires

Adam Mihalik joined the GJJWTF Staff as an Operator Trainee.

Christian Walters joined the GJJWTF Staff as a Maintenance Mechanic.

Sick Days

Three (3) employees utilized three (3) sick days or less during 2019. The names of those employees are as follows:

Lacie Newland
Hilary Ruzycky
Christopher VanAuken

During 2019 there were five (5) injuries reported. Three of the reported injuries resulted in time lost from work.

WWTP Operator License Renewal – 5 Year Recertifications

Tom Ambrosino, Grade 4A

All current members returned to the Gloversville-Johnstown Joint Sewer Board in 2019.

OPERATIONS AND MAINTENANCE

Several improvement projects were accomplished during 2019 with assistance from the Operations and Maintenance staff:

1. Installed variable diffuser motor in Turblex air blower, calibrated, and performed 36,000-hour service. Assisted Howden Roots technician to change main bearings and clean all internal components. Assisted Howden Roots technician with computer upgrade to the control system.
2. Installed two (2) gas control valves on boiler in Screening Building. Installed new mechanical seal in water pump of boiler. Assisted Adirondack Mechanical with a full-service boiler cleaning.
3. Replaced eight (8) lights on the Finals tank walkway.
4. Worked with Trojan technician to start up the UV Disinfection System.
5. Removed Nash gas mix compressor and shipped back to factory for warranty repair due to hot bearings. Installed and tested the refurbished Nash gas compressor mixer. Technicians from Nash Equipment also provided on-site warrantee repairs.
6. Installed a temporary potassium permanganate chemical feed system on loan from Carus Corp. Later, installed a permanent potassium permanganate chemical feed system, including electrical wiring and water lines. Tested the new system with technicians from Carus Corp. System is now fully operational and the temporary system is removed.
7. Installed and programmed new HMI touch screen in Solids Handling Building.
8. Disconnected all wiring and piping from Cogen Engine #1. Removed the unit and sent to Milton Cat in Syracuse for a major rebuild. Reinstalled the engine after the rebuild and tested with the CAT technician. Cogen Engine #1 is back online.
9. Installed stainless steel flex joints to the 6" lines for sulfa treat to allow movement during winter frost.
10. Installed new grit belt on Gravity Belt Thickener #1.
11. Replaced rotor and stator in Moyno pump on Gravity Belt Thickener #2.
12. Removed a section of concrete floor near the reception area of the Administration Building to repair a broken drain pipe for the Men's Room. Repaired the 4" cast iron pipe with PVC pipe and re-cemented the floor. Relocated phone lines for front offices to run through the ceiling space instead of underneath the hallway flooring.
13. Installed and wired the water and polymer lines for new polymer emulsion blending system.
14. Worked with National Grid and Frontier Communications on High Yard DDT switch.
15. Assisted High Voltage Electric to cleaned all breakers and switch gears of the High Yard.
16. Relocated electrical conduit in the UV Building due to excessive interference from the UV lamps. Removed and stored all UV tubes/bulbs after the UV system seasonal shut down.
17. Installed new mechanical seal in water pump of boilers in the Sludge Building and Primary Sludge Pump No. 1.
18. Replaced the underground 4-inch stainless steel valve of Whey Tank No. 1.
19. Installed new fuel pumps on the gas tank and diesel tank.
20. Adirondack Mechanical installed a new boiler in the Recirculation Building.

GRANTS & LOANS

Received \$86,059 in November against the NYSERDA grants for the CAST Upgrade Project.

COMPLIANCE MONITORING AND TESTING

Annual reviews of the Laboratory Quality Assurance, Test Method Standard Operating Procedures (SOP), Administrative/Quality Procedures, Monitoring and Field Activities, and Laboratory Chemical Hygiene manuals completed as scheduled.

Technical Director completed the annual internal audit of the laboratory in April of 2019.

NYS Department of Health's Environmental Laboratory Approval Program (NYS DOH ELAP) conducted their bi-annual ELAP external audit on August 13, 2018. The next bi-annual assessment can be expected during the summer of 2020.

ELAP proficiency testing (PT) was performed by GJJWTF lab staff in January/February and July/August in 2019. During July/August there was a data entry error causing an unacceptable score for TKN. Corrective action was submitted and accepted. All other reported results were found to be within the NYS DOH ELAP's acceptable limits.

Laboratory Director conducted the annual ethics and data integrity training of all laboratory and monitoring personnel during December of 2019.

GJJWTF issued twenty-two (22) Industrial Wastewater Discharge Permits in December of 2019 for year 2020.

Billed industrial loadings of the permitted Significant Industrial Users (SIUs) for 2019 compared to 2018 are as follows:

Industrial Flow:	Down	6.75%
Industrial Solids:	Down	15.75%
Industrial BOD:	Down	13.13%
Industrial TKN:	Down	15.52%

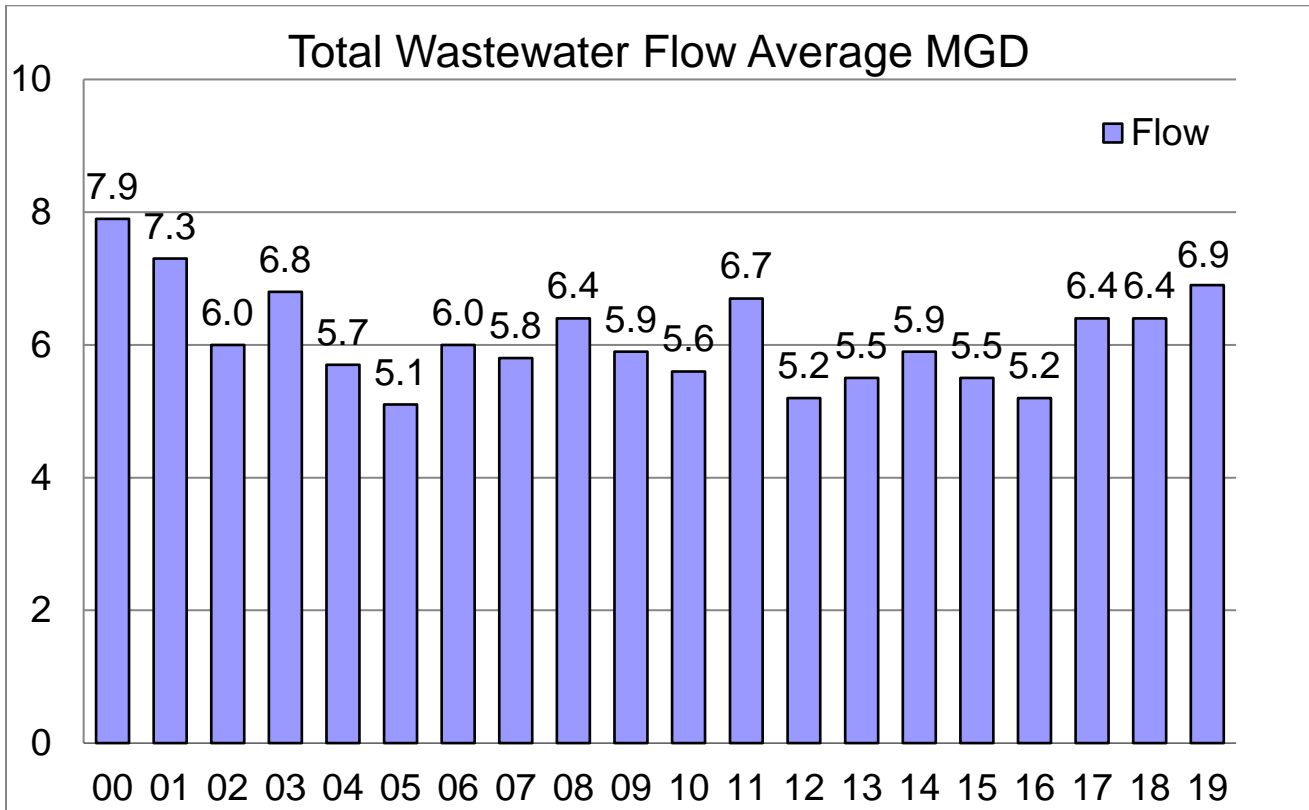
The SIUs received thirteen (13) industrial violations in 2019 as compared to twenty-six (26) in 2018 and seventeen (17) in 2017.

GJJWTF issued two (2) Consent Orders in 2019 versus four (4) in 2018 and none in 2017.

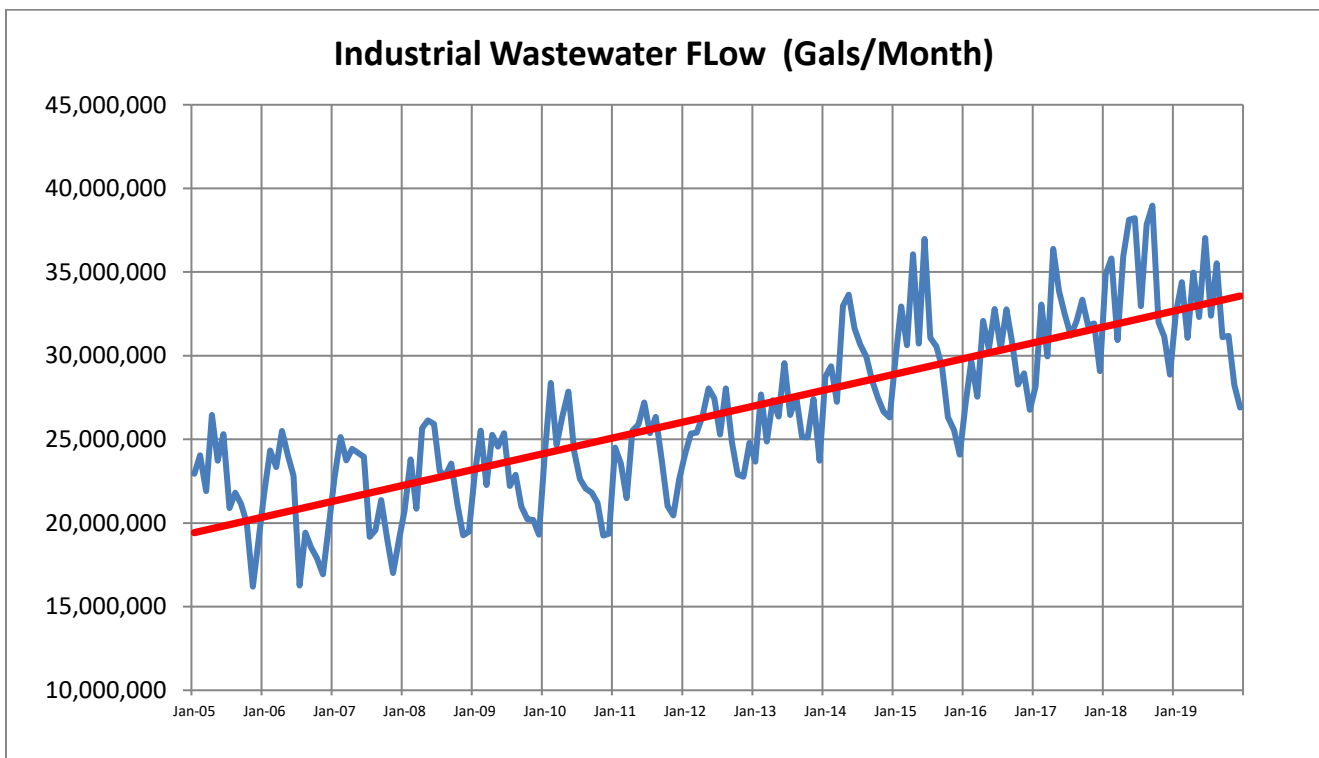
Laboratory personnel continued additional analysis of CAST samples in terms of removal efficiencies for COD and TSS. The Lab also sampled the effluent to determine the UV disinfection effective treatment of fecal coliform.

TOTAL WASTEWATER FLOWS

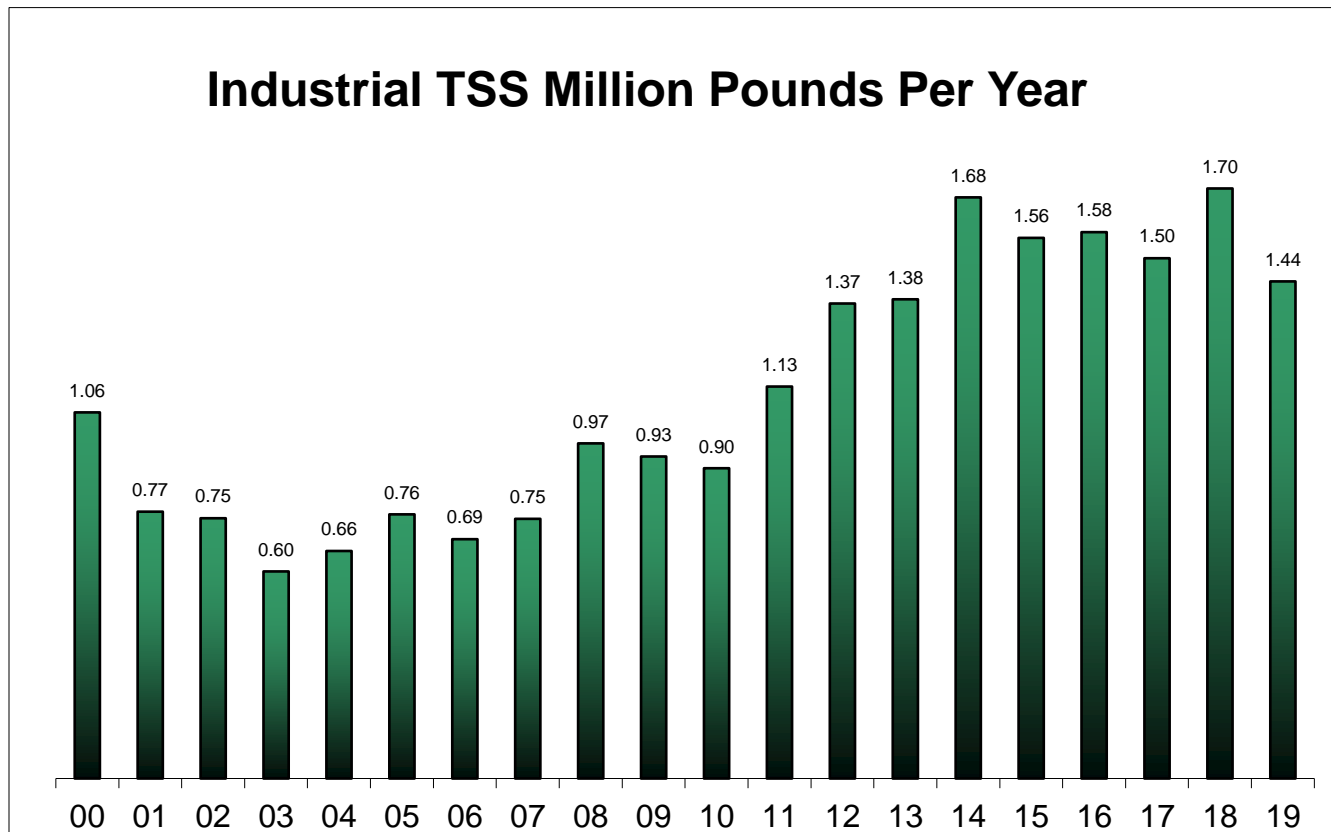
Historically, the total flow of Influent wastewater to the Plant is relatively constant.



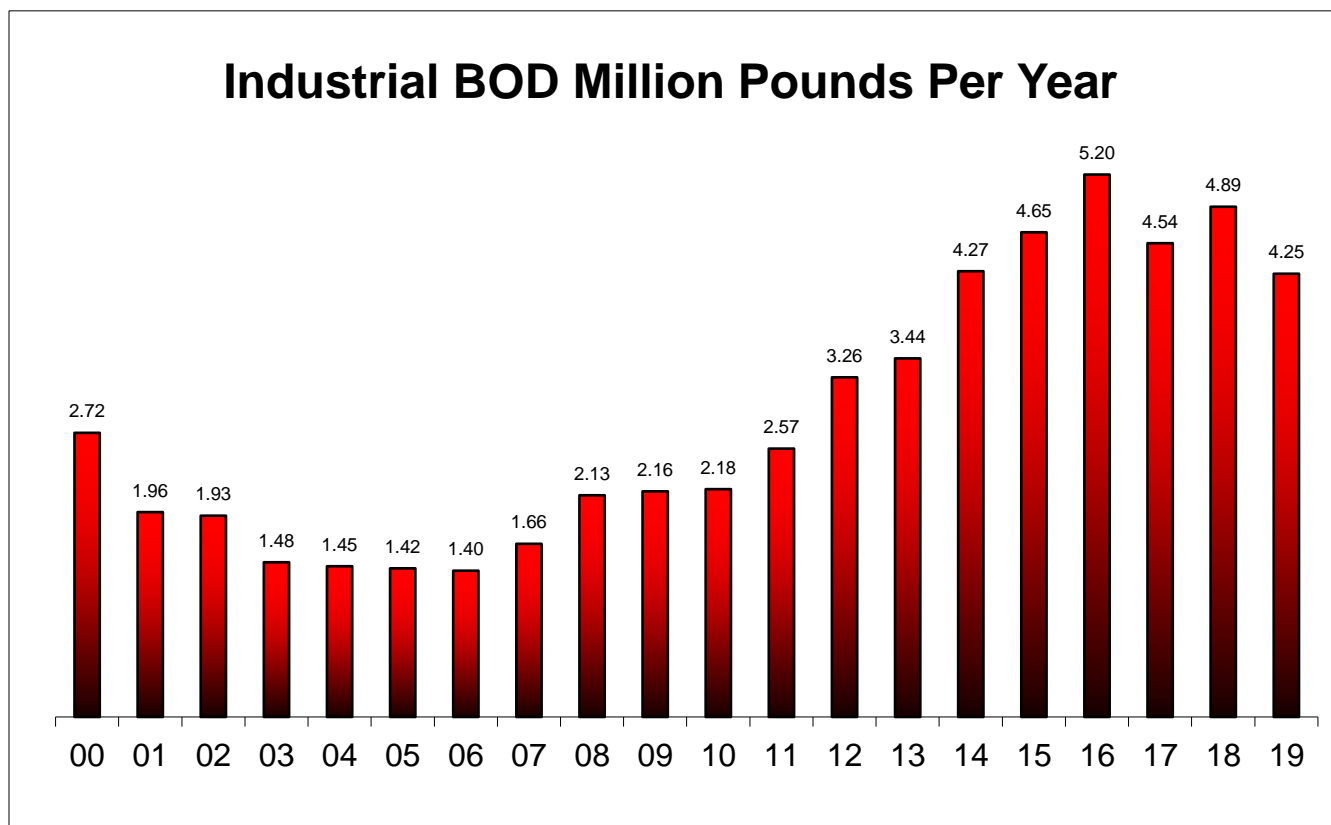
Total Industrial Flows decreased 6.8% in 2019.



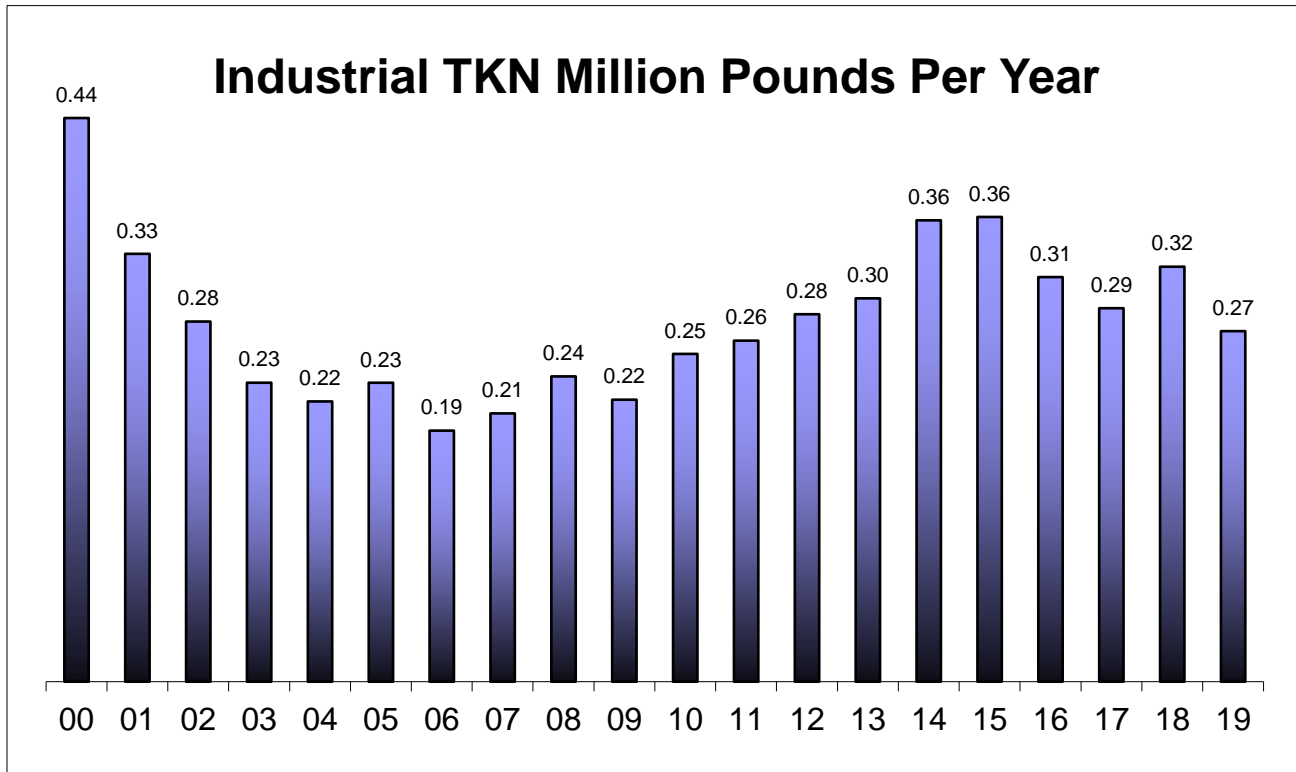
Industry: Total Suspended Solids (**TSS**) decreased 15.3% in 2019.



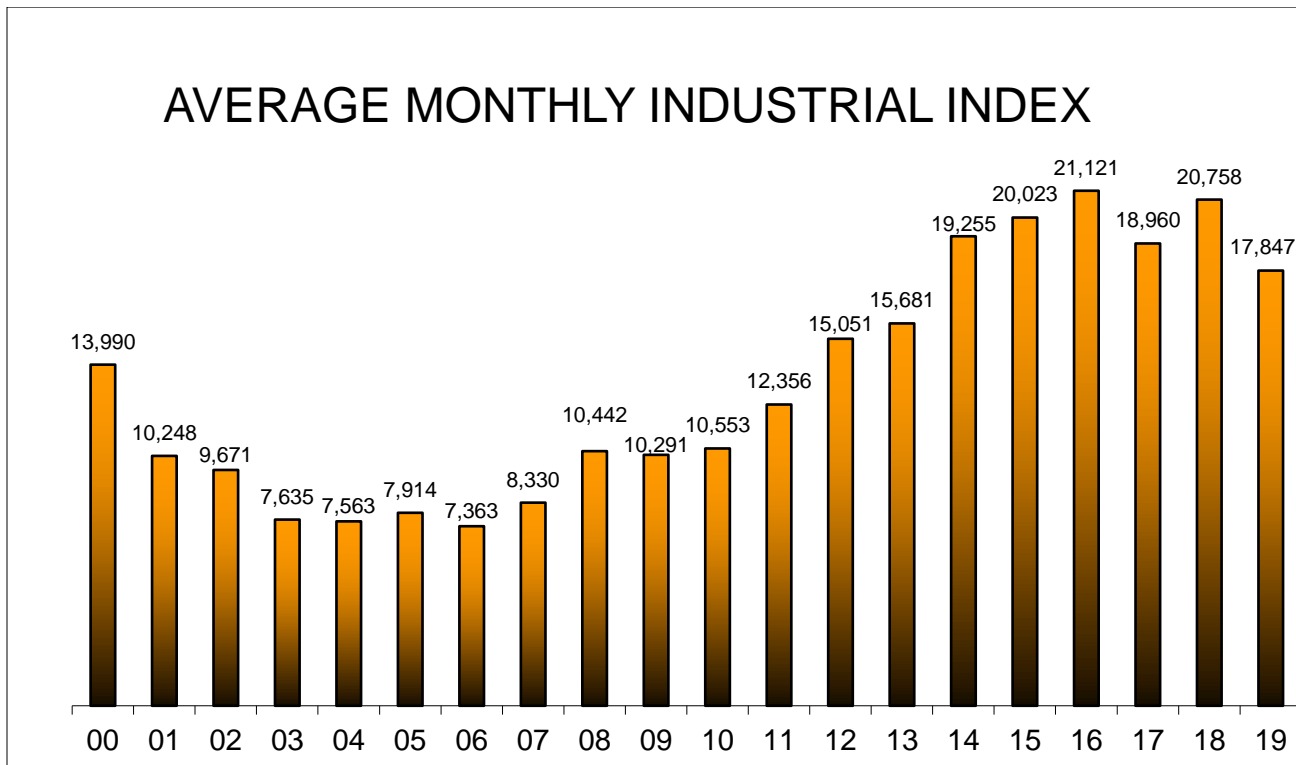
Industry: Biochemical Oxygen Demand (**BOD**) decreased 13.1% in 2019.



Industry: Total Kjeldahl Nitrogen (TKN) decreased 15.6% in 2019.



Finally, in order to measure the relative strength of the industrial waste, staff developed a formula that combines TSS, BOD and TKN data. The resulting value, **Industrial Index**, provides a single numeric number. The Industrial Index decreased 14.0% in 2019.



Overall, Industrial wastewater conveyed to GJJWTF via the sanitary sewer decreased in 2019.

However, the industrial index system does not incorporate the following waste streams:

- 1) Whey directly piped to the anaerobic digesters;
- 2) Dairy washwater directly piped to the CAST System;
- 3) National Grid remediation discharges;
- 4) Fulton County Department of Solid Waste's Leachate.

As shown in the graphs, industrial loadings to GJJWTF decreased significantly over the previous year. Total Industrial Flows decreased 6.75%. Total suspended solids (TSS) decreased 15.75%. Biological Oxygen Demand (BOD) decreased 13.13%. Total Kjeldahl Nitrogen (TKN) decreased 15.52% in 2019.

With the CAST Project operational, the dairy washwater loadings for TSS, BOD and TKN are no longer captured by the influent sampler at the Plant headworks. Instead, the supernatant, greatly reduced by 50% to 70% of the dairy washwater loadings, flows to the primaries. As required by permit, the dairy washwater flow is added to the Plant headwork's recordable daily influent flow.

PLANT LOADINGS

2019 Industrial loadings (Total, Includes Dairy):

FLOW: 387,636,401 gals
 BOD: 4,249,730 lbs
 TSS: 1,435,743 lbs
 TKN: 271,724 lbs

2019 Dairy Loadings:

211,637,684 gals
 3,460,736 lbs
 1,042,759 lbs
 148,580 lbs

The FAGE dairy washwater strengths are as follows:

BOD	TSS	TKN
(mg/L)	(mg/L)	(mg/L)
1770	568	77.0

The Euphrates dairy washwater strengths are as follows:

BOD	TSS	TKN
(mg/L)	(mg/L)	(mg/L)
5183	970	204

Dairy accounts for:

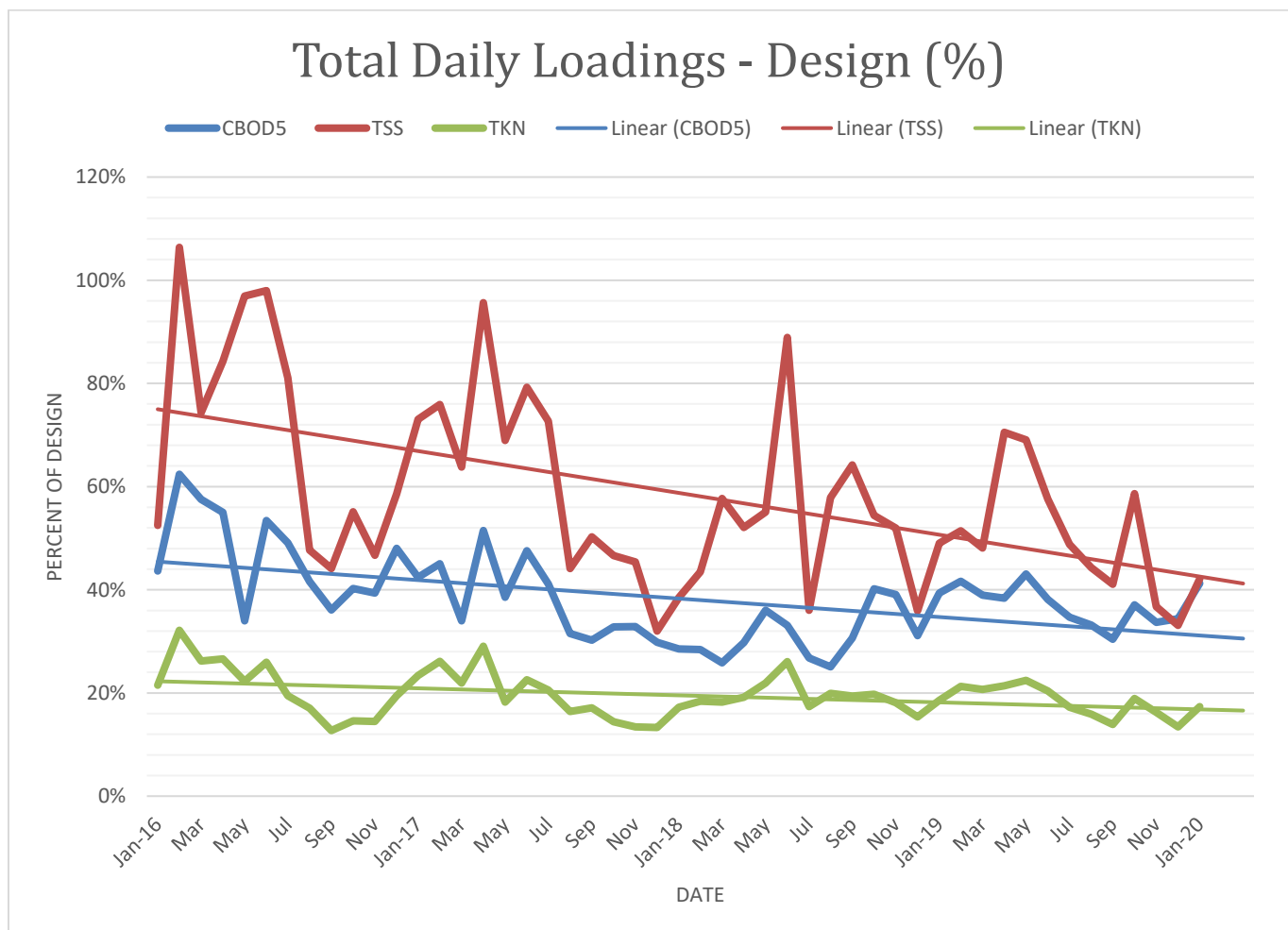
54.6% of Industrial Flow
 81.4% of Industrial BOD
 72.6% of Industrial TSS
 54.7% of Industrial TKN.

CAST

Contact Adsorption Settling Thickening Project (CAST) continues to reduce the overall wastewater load on the facility's Aeration System. During 2019:

- 1) CAST removed 53.8 percent of the dairy washwater's COD load and 69.3 percent of the TSS load to the facility.
- 2) CBOD daily loadings (lbs/d), averaged monthly, equaled 36.9% of GJJWTF's Designed CBOD Removal Capacity. May was highest at 43.1 % of Design Capacity.
- 3) TSS daily loadings (lbs/d), averaged monthly, equaled 50.7% of GJJWTF's Design TSS Capacity. April was highest at 70.5 % of Design Capacity.
- 4) TKN daily loadings (lbs/d), averaged monthly, equaled 18.4% of GJJWTF's Design TKN Capacity. TKN Capacity. April was highest at 22.4 % of Design Capacity.

The wastewater Plant continues to operate below its Design Capacity to handle current loads due to CAST's removal of the dairy load. This allows GJJWTF to accept additional wastewater loads from the community at large and industry/businesses, as well.



LEGAL/MISCELLANEOUS

The Gloversville-Johnstown Joint Sewer Board (GJJSB) continued contracting for legal services from the Glens Falls based law firm Miller, Mannix, Schachner, & Hafner, LLC (MMSH). MMSH specializes in environmental issues. The GJJSB extended the contract for legal services with MMSH through 2022.

ENVIRONMENTAL

Enforcement of the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) permit continues. This stringent effluent permit regulates the discharge limits of a multitude of parameters measured on a daily, weekly, monthly and/or annual basis.

GJJWTF was not in full compliance with all the SPDES permit conditions during 2019.

1. On August 8, 2019, exceeded the monthly mass loading for cadmium and triggered an action level. The action level required GJJWTF to perform a short-term, high-intensity monitoring program of three (3) samples for cadmium over three (3) consecutive days. This was instituted on September 10, 11 and 12. All three samples showed non-detection and were recorded as <1.000 ug/L Cd. No further actions were required.
2. On November 1, 2019, exceeded the recorded settleable solids in the effluent Imhoff cone.

GJJWTF received a total of fifteen (15) odor complaints in 2019. These odor complaints were posted on the GJJWTF website.

GJJWTF exercised three (3) NY-Alert Notifications during 2019.

1. On June 24, 2019, National Grid experienced a power malfunction that resulted in loss of power to the Facility and the disruption of UV disinfection treatment for approximately 2-hours.
2. On July 1, 2019, communication was lost between the Facility's dedicated phone line and National Grid causing disruption of UV disinfection treatment and a discharge of 153,000 gallons of partially treated wastewater to the Cayadutta Creek.
3. On October 8, 2019, the 52U main circuit breaker failed at the High Yard causing disruption of UV disinfection treatment and a discharge of 403,472 gallons of partially treated wastewater to the Cayadutta Creek.

GJJWTF received NYSDEC's Conditional Approval on a Pilot Basis to continue using Potassium Permanganate for effective odor control and Aluminum Chlorohydrate for improved CAST sludge settling in 2019.

OPERATIONS

The year-to-year removal efficiency rates for the GJJWTF are as follows:

Parameters	2015	2016	2017	2018	2019
Total Suspended Solids	97%	98%	95%	97%	97%
Biochemical Oxygen Demand	99%	99%	98%	98%	98%
Total Kjeldahl Nitrogen	92%	92%	91%	93%	92%

As shown in the Table, the TSS and BOD removal efficiencies are greater than the permitted removal rate of 85% prior to discharge to the Cayadutta Creek.

Belt Filter Presses (BFPs) operated 3,789 hours producing 18,485 wet tons of sludge. During 2019, sand and/or dried sludge was blended into the sludge cake to meet the minimum 20% solids landfill disposal requirement.

Together, the BFPs and Gravity Belt Thickeners (GBTs) utilized 36,950 pounds of polymer (1.0%, ↑). In addition, the BFPs used another 8,080 gallons of an emulsion polymer ((1.0%, ↑) to enhance sludge dewaterability.

During 2019, the GJJWTF purchased 31,608 gallons of Ferrous Chloride (0.9%, ↓) to control sulfides at the anaerobic digesters. GJJWTF also purchased 43,493 therms of Natural gas to heat various buildings (20.1%, ↓).

BACKFLOW PREVENTERS

Adirondack Mechanical Corporation tested all backflow preventers on-site. The nine (9) backflow preventers currently working as designed to keep the Plant effluent from entering and contaminating the City's drinking water supply. Only one (1) 4-inch backflow preventer was repaired.

SULFA-TREAT VESSEL

Precision Industrial Maintenance removed and discarded the spent media (AxTrap 4003) which scrubbed the digester gas of Hydrogen Sulfide. The removed AxTrap 4003 media lasted from 9/26/18 to 10/26/2019 or 13 months.

Replacement media, IP4, by NICHEM Company was purchased under a new contract and loaded into the vessel on 10/26/2019.

LEACHATE

GJJWTF processed 19.1 million gallons of leachate in 2019. This represented an 9% decrease compared to 2018. The Fulton County Landfill pumps leachate to the facility via a dedicated five (5) mile long force main.

ENERGY RECOVERY

The Dairy Industry pumped **28,060,584 gallons of whey** via a dedicated pipeline directly to two (2) whey storage tanks located at GJJWTF. From these tanks, operators pump the whey at a constant feed rate to the anaerobic digesters. Then, anaerobic bacteria break down the whey and expire large quantities of digester gas (~ 53.8% Methane and 42.4% Carbon Dioxide).

The Anaerobic Digester System produced **168.2 million cubic feet** of biogas from the whey, CAST Washwater Settleable Solids, Primary Sludge and Waste Activated Sludge.

The biogas generators combusted 77.3% of this gas to generate **5.99 million kilowatt hours** of electricity.

The biogas generators (CAT-1, CAT-2 and CAT-3) are rated at 1.10 megawatts. GJJWTF generated 5,989,634 KW (14.0%,↑), sold 1,330,983 KW (10.3%,↑) and purchased 146,794 KW (74.8%,↓) in 2019. GJJWTF consumed 4,805,445 KW (3.8%,↑).

The dairy COD strengths for whey are as follows:

FAGE (mg/L)	Euphrates (mg/L)	Blended (mg/L)
52,710	118,685	62,431

FAGE's yogurt product creates a relatively low COD strength whey byproduct.
Euphrates' feta cheese product creates a relatively higher COD strength whey byproduct.

ULTRA-VIOLET (UV) DISINFECTION PROJECT

In 2019, the UV Disinfection system successfully operated from May 1, 2019, to Oct 31, 2019 per GJJWTF's SPDES Permit. No Notice of Violation (NOV) were issued for high fecal coliform concentrations. However, there were three (3) New York Alerts declared for three (3) loss of power incidences as described earlier in this report.

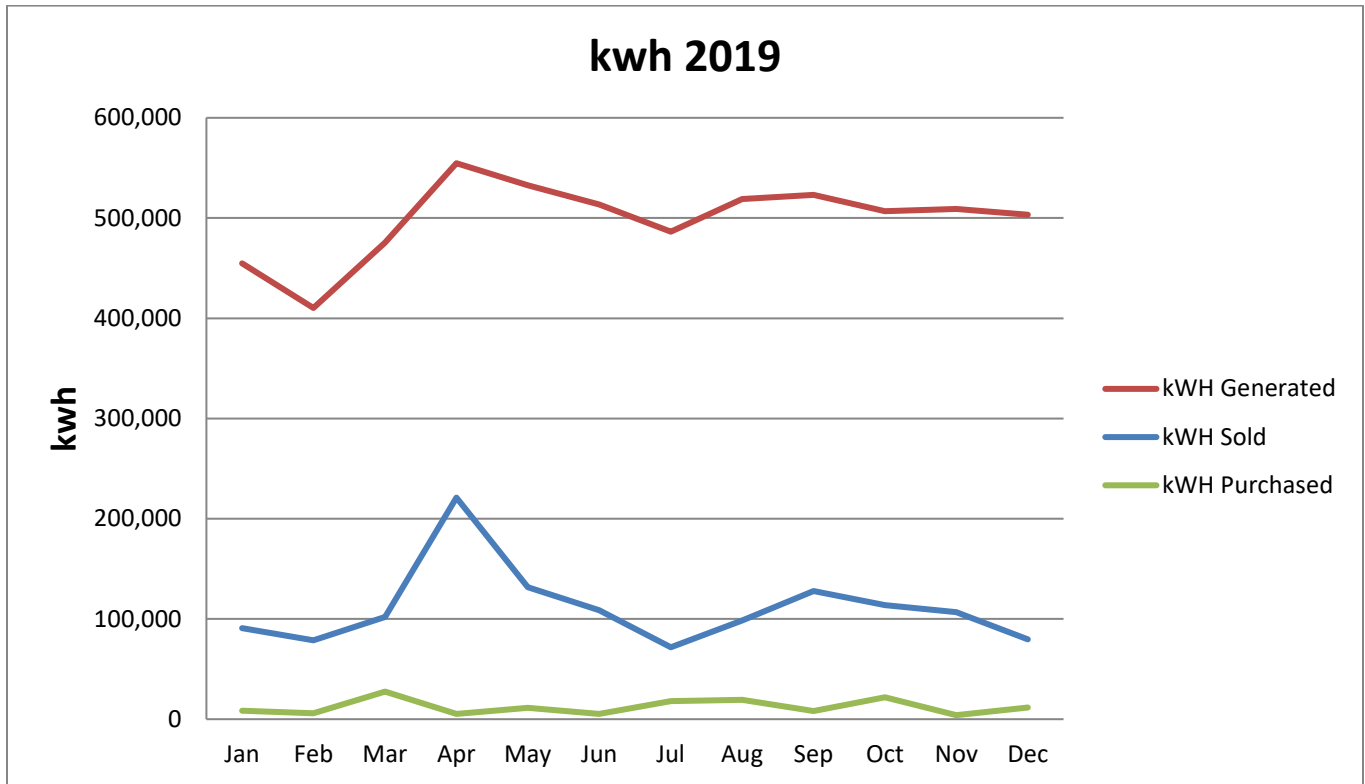
HEAT EXCHANGER PROJECT

In 2018, GJJWTF purchased a 3.5 Million BTU per hour, shell & tube, sludge heat exchanger. The new heat exchanger replaced the old spiral heat exchanger. During the winter months, cooling water from CAT-1 and CAT-2 supply the necessary hot water to maintain the temperature of the anaerobic digesters. The optimum temperature for GJJWTF's anaerobic digester is 98.6°F (Body Temp).

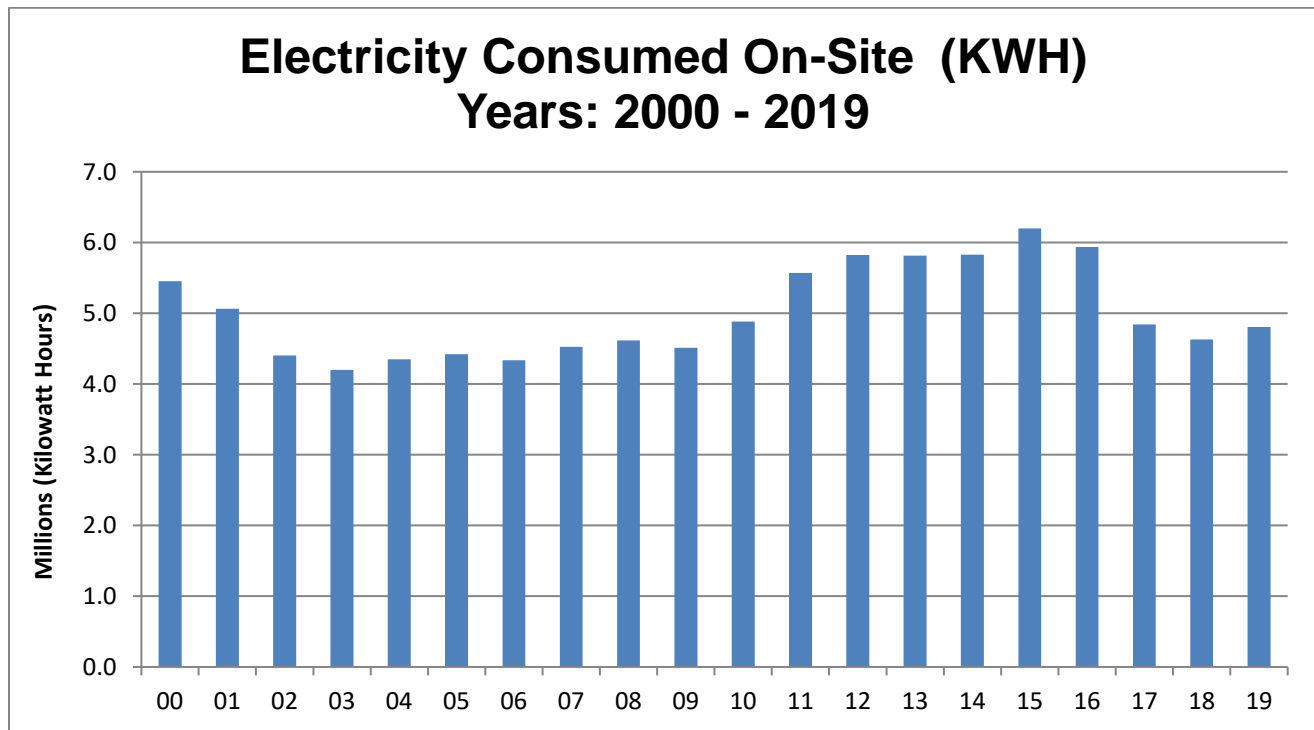
During past winter seasons, the digester temperature had dropped to as low as 87.5°F. At 85°F, the anaerobe bacteria in the digester cease. The new heat exchanger should maintain the optimum temperature and transfer enough heat to raise the temperature of the digester under winter conditions.

During 2019, the Primary Digester's temperature ranged from a low of 95.8°F to a high of 99.8°F. The average was 97.7°F. The Heat Exchanger performed as expected.

Electricity Profile at GJJWTF:



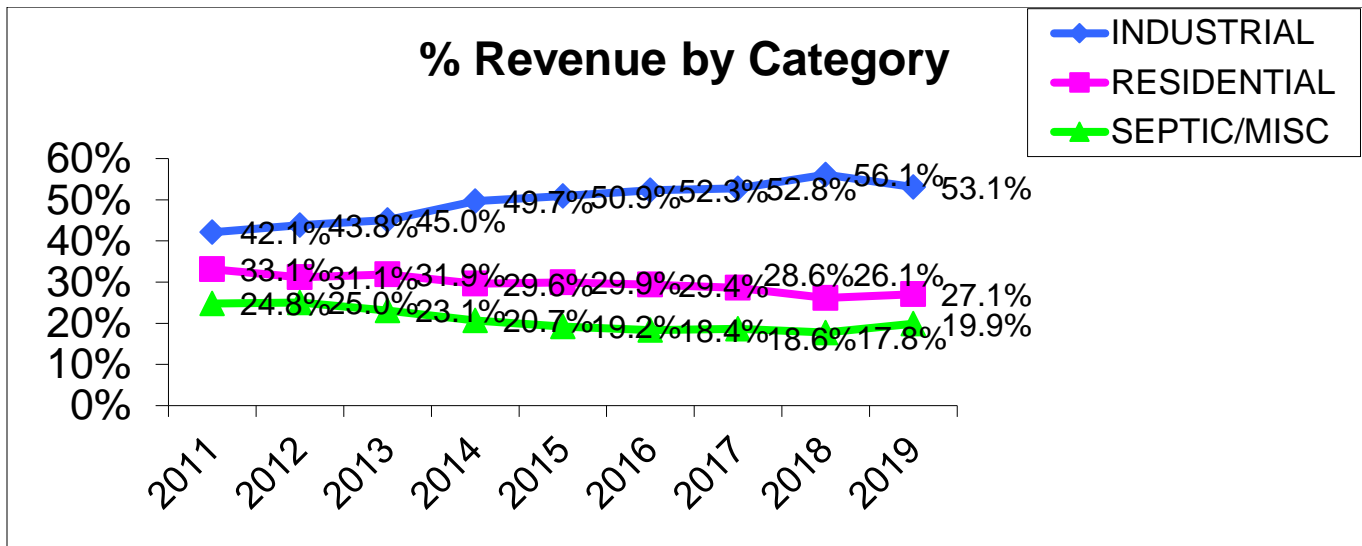
Electrical Power Consumption at GJJWTF:



FINANCE OFFICE

The 2018 Financial Audit Summary from Bollam, Sheedy, Torani & Co. disclosed no issues of noncompliance, and no alternative procedures or corrective actions were suggested.

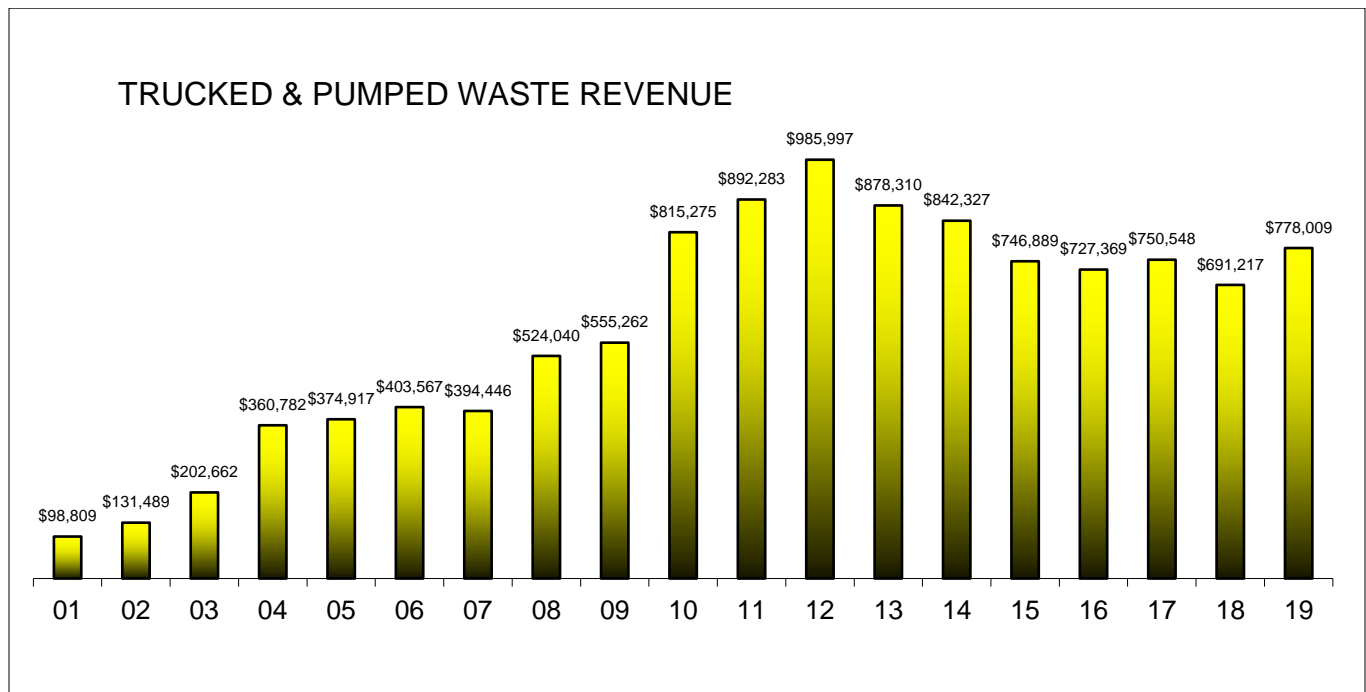
O&M revenues totaled \$4.1 million during 2019. The Industrial contribution was 53.1%, Residential 27.1%, and Trucked/Pumped waste and miscellaneous revenue totaled 19.9%. Compared to 2018, Trucked/Pumped waste and miscellaneous revenue increased by 12.6% and the industrial contribution decreased by 10.4%.



Residential rates have remained low since 2008.



Continued marketing to make surrounding communities and entities aware of what our facility has to offer proved beneficial during 2019. For 2019, trucked & pumped waste receipts totaled \$778,009. The single largest trucked waste contract was Adirondack Septic.



FAGE USA Dairy and Euphrates Inc. pumped **28.1 million** gallons of whey directly to the facility via a dedicated pipeline during 2019. The whey increased 16.5% compared to 2018 in gallons treated due to the Digester Cleaning Project of 2018.

Sewer Rates

Sewer rates were adopted after a public hearing in April 2019. The average industrial sewer bill increased slightly, while the residential rate increased 2.8%. Rates remained relatively stable due to a variety of reasons including the use of \$468,317 of rate stabilization reserve funds.

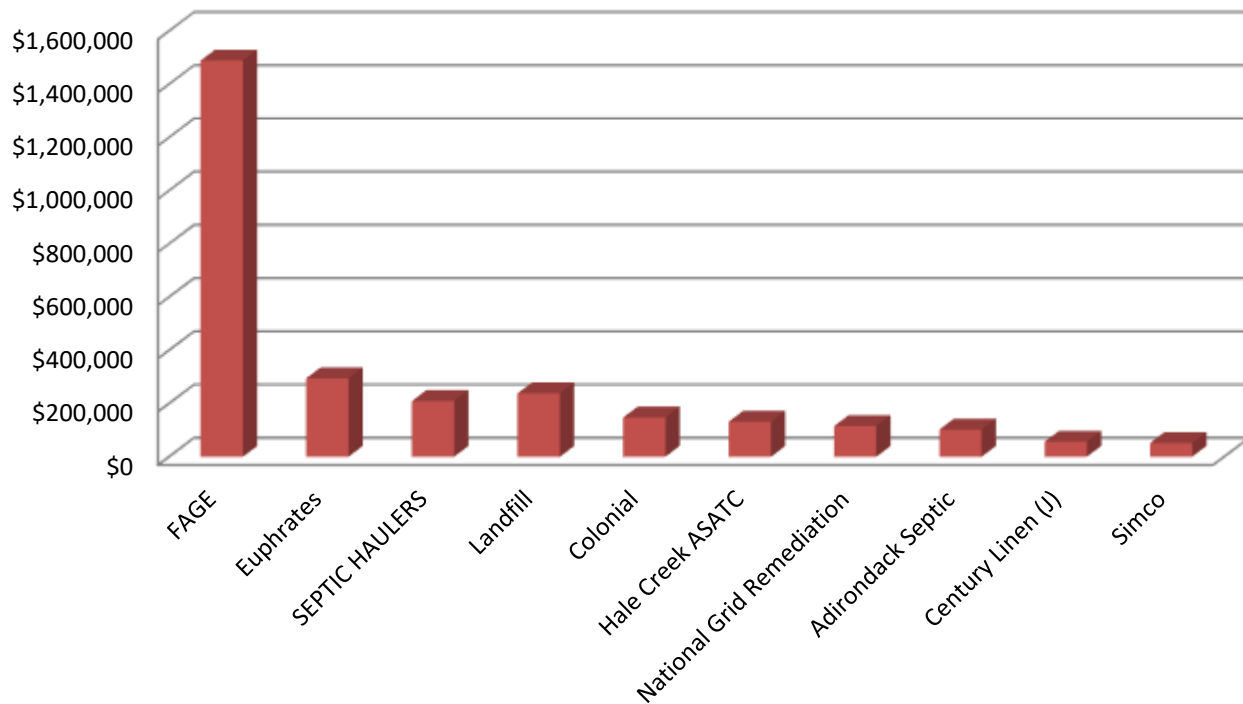
INDUSTRIAL USE

O&M revenue from industrial users decreased 10.4% in 2019. FAGE USA Dairy Industry, Inc. ranks as the Number 1 user. Euphrates Inc. ranked as the second largest user of the wastewater facility.

One (1) trucked waste account (Adirondack Septic) in the Septic Haulers category and two (2) leather industries (Colonial Tanning and Simco Leather) were in the top ten of revenue producers.

Fulton County Landfill, Hale Creek ASATCA, National Grid remediation site and Johnstown’s Century Linen and Uniform round out the top ten largest customers of the facility in 2019.

2019 Industrial O&M Revenue



Boy Scout Troop 5051 toured the facility in 2019.



COGEN 1 – On way to Syracuse for Major Engine Overhaul



UV Disinfection Equipment – Operational from May 1 to November 1, 2019.



UV Command Center



Cleaning the Algae Screen



Chemical Feed System – Potassium Permanganate



HDR Site Cleanup – Tenants (2003-2019)

