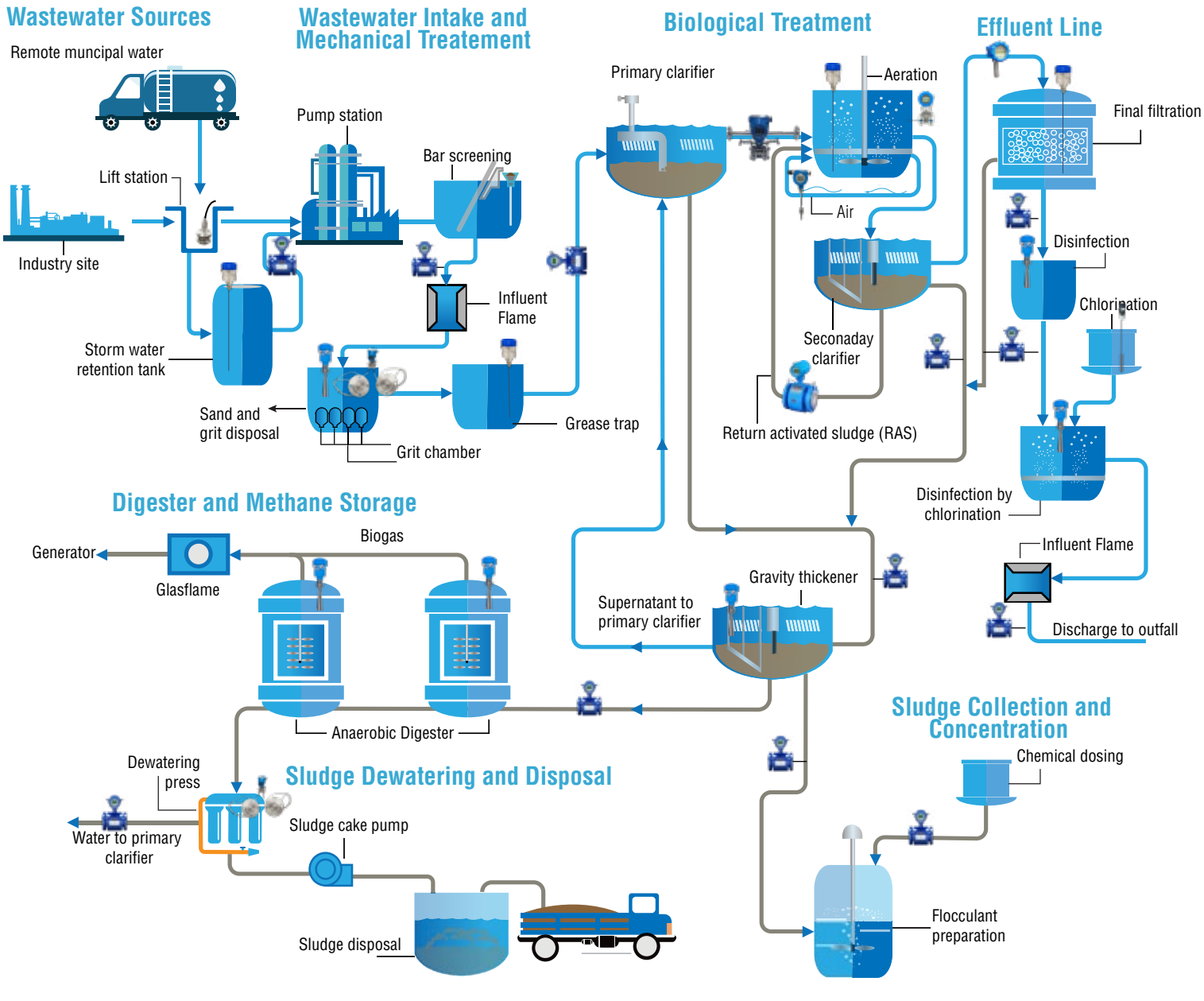
TEKTROL
Technology Solutions

The Wastewater Treatment Industry requires continuous process measurement systems and control. At Tek-Trol, we offer unique solutions tailored to these requirements.

WASTEWATER
INDUSTRY MARKETS

Instruments for Wastewater Industry
Process control

WASTEWATER INDUSTRY PROCESS CONTROL



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INTRODUCTION
ABOUT WASTEWATER INDUSTRY

Wastewater is obtained from domestic, commercial and industrial waste streams together with stormwater run-off. Apart from faeces matter, wastewater contains a variety of suspended and floating debris, including grit and other inert solids washed in from pavement and roof surfaces, paper, plastics, rags and other waste. Other constituents of wastewater are obtained from the process water from industry or commercial undertakings.

The monitoring of incoming wastewater should be sufficient to identify the characteristics which would affect the operation and performance efficiency of the plant. Tek-Trol offers unique wastewater solutions tailored to these requirements for proper operation of wastewater treatment plants. We offer cost effective and safe products as they are easy to operate and maintain while increasing productivity. Our Flow, Level, Pressure instrumentation provide accurate and reliable measurement in Wastewater Treatment process plant.

COST SAVING
INSTRUMENTS FOR WASTEWATER INSUDTRY

FLOW MEASUREMENT

Tek-Flux 1400A Electromagnetic Flow Meter
Tek-Flux 1400B Insertion Electromagnetic Flow Meter
Tek-Thermal 1700B Thermal mass Flow Meter

DP FLOW MEASUREMENT

Tek-DP 1610D Integral Orifice Assemblies
Tek-DP 1610C Orifice Flanges and Plates

PRESSURE MEASUREMENT

Tek-Bar 3110A Exp-Proof Dierential Pressure Transmitter
Tek-Bar 3110B Exp-Proof Piezo Differential Pressure Transmitter

LEVEL MEASUREMENT

Tek-Flex 4100B Two-Wire Loop-Powered OEM TDR Level Transmitter
Tek-Sound 4200B Two Wire Ultrasonic Level Transmitter
Tek-Wave 4300C Free Space Radar Level Transmitter
Tek-Hydro 4500A-D Differential Pressure Level Transmitter
Tek-Sub 4800D Wastewater Submersible Level Transmitter

WASTEWATER INTAKE AND MECHANICAL TREATMENT

In the preliminary process, the purpose of Wastewater Intake and Mechanical Treatment which is also known as primary treatment is to remove from the wastewater some of large solids which can clog or damage pumps or interface with subsequent treatment process. Tek-Trol's Ultrasonic Level, Hydrostatic Pressure Level and Differential Pressure Transmitter are used for pumping pressure measurement screen control and Electromagnetic Flow Meter which measures the inlet flow.

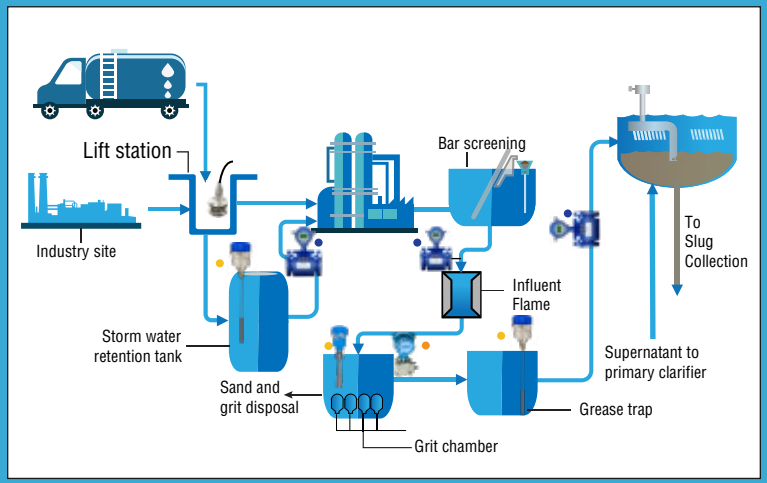
Bar Screen is used to remove these solid particles such as large objects, sticks, rags, leaves, plastics, sanitary products, rocks, toys, or trash. It is used to resist the flow of untreated Wastewater for years. The bar screen differential level is measured by Tek-Trol's Ultrasonic Level Transmitter. These bar screens typically made of steel or iron and place in parallel to one-half inch apart. Some large particles like sand, grit, and gravel are remaining in the screening process. These remaining particles are further pass through a the grinder mechanism. In this grinder process, large grit chambers are used to remove the impact of large solids from downstream processes. Tek-Trol's Non-contacting Radar Level Transmitter is used to measure large tank level of grit chambers. The large tanks of grit chambers are designed to slow down the Wastewater for the grit to drop to the bottom. This grit is washed after its removal from the chamber and disposed of buried in a landfill or destroy. The pressure between grit chamber and grit disposal is measure by Tek-Trol's Differential Pressure Transmitter. After the grit separation process, flow passes further to the primary treatment process. The overall Wastewater flow in screening process is measure by Tek-Trol's Electromagnetic Flow Meter.

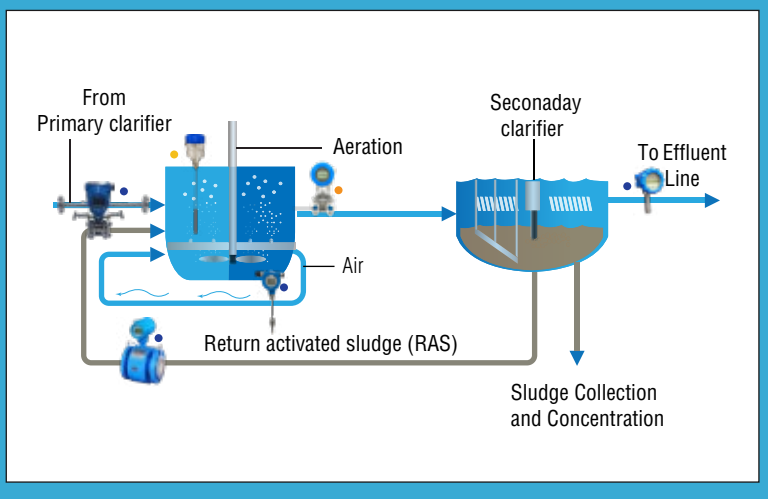
In primary treatment, settling tanks are used to remove light or suspended solid particles. These settling tanks are also called sedimentation tanks or clarifiers. The level of sedimentation tank or settling tank is measured by Tek-Trol's Non-contact Radar Level Transmitter. Big basins of settling tanks are designed to hold Wastewater for several hours. During this time, floating material is separated, and suspended solids can drift to the bottom of the tank. These tanks reduce the velocity of the Wastewater, where solids can settle out. The suspended solids on the bottom of the tank are collected into sludge vessels (mechanical scrapers). After that, these suspended solids are pumped out of the bottom of the tank. The Wastewater flows by gravity through the biological treatment process for further processing. This wastewater flow is measured by Tek-Trol's Electromagnetic Flow Meter.

- **Flow Measurement**
  Tek-Flux 1400A Electromagnetic Flow Meter

- **Pressure Measurement**
  Tek-Bar 3110B Smart Differential Pressure Transmitter

- **Level Measurement**
  Tek-Flex 4100B Two-Wire Loop-Powered OEM TDR Level Transmitter
  Tek-Sound 4200B Two Wire Ultrasonic Level Transmitter
  Tek-Wave 4300C Free Space Radar Level Transmitter
  Tek-Sub 4800D Wastewater Submersible Level Transmitter





BIOLOGICAL TREATMENT

Biological Treatment is also called secondary treatment and is used when more organic solids in suspension or solution than the receiving water could accept if only primary / Wastewater Intake and Mechanical Treatment are used. Biological treatment depends primarily on aerobic and anaerobic processes. Biological aerobic break down organic wastes using normal cellular processes, producing inorganic and stable organic solids. Tek- Trol's Integral Orifice Assemblies and Orifice Flanges and Plates are used for volume and mass flow of air to aeration lanes.

Wastewater and microorganisms are mixed in a large tank using constant aeration and agitation for a couple of hours to an entire day. The aeration and agitation tank level are measure by Tek-Trol's Ultrasonic Level Transmitter. Aeration tanks use bubbling air to help suspend microorganisms in the Wastewater. These microorganisms can break down the waste materials into carbon dioxide and clean water.

The activated sludge process is used to help treatment plants control microorganisms to filter or settle out the resulting solids. The mixed liquor (i.e., solids with microorganisms and water) is then sent to the secondary clarifier. Solids settle out to the bottom of secondary clarifier, which is sent to the solids handling process. Most of the biological solid is recycled back to replenish the population of microorganisms in the aeration tank to treat incoming Wastewater. Tek-Trol's Differential Pressure Transmitter is used for air pressure measurement in aeration tank.

- **Flow Measurement**

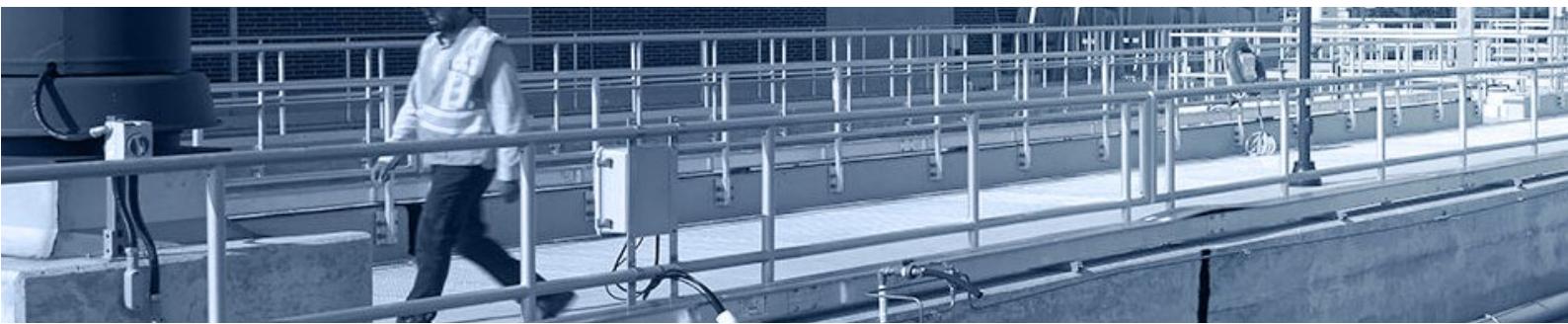
  Tek-Flux 1400A Electromagnetic Flow Meter
  Tek-Flux 1400B Insertion Electromagnetic Flow Meter
  Tek-DP 1610D Integral Orifice Assemblies
  Tek-DP 1610C Orifice Flanges and Plates
  Tek-Thermal 1700B Thermal mass Flow Meter

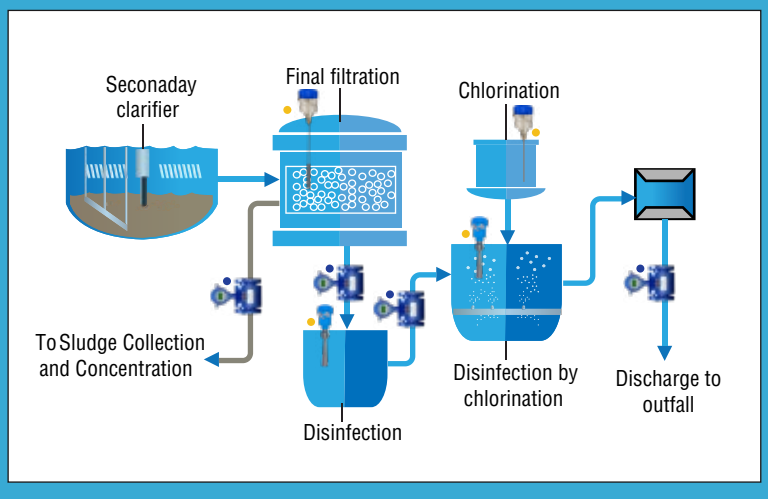
- **Level Measurement**

  Tek-Flex 4100B Two-Wire Loop-Powered OEM TDR Level Transmitter
  Tek-Sound 4200B Two Wire Ultrasonic Level Transmitter

- **Pressure Measurement**

  Tek-Bar 3110B Explosion-Proof Piezo Differential Pressure Transmitter





EFFLUENT LINE

Effluent Line is also known as Disinfection where some suspended solid particles are removed in the filtration process. Tek-Trol's Ultrasonic Level and Hydrostatic Pressure Transmitters are used for level measurement and control in filtration process.

In the filtration process, Wastewater is passed through granular material, such as sand and coal. Eventually, the filter becomes clogged by removing material from the Wastewater. The head loss across the filters is measure by Tek-Trol's Differential Pressure Transmitter. This clogged filter is cleaned by reversing the Wastewater Flow process known as blackwashing. This blackwash and Wastewater flow is measure by Tek-Trol's Electromagnetic Flow Meter. The blackwashing removes the solids and is recycled back into the Wastewater plant for further processing. For detecting blackwash solids, Tek-Tol's Ultrasonic Level Transmitter is used. Sometimes membrane filters are used in place of granular filters to produce a very high-quality effluent. In filtration process, the final effluent discharge is monitored by Tek-Trol's Ultrasonic level Transmitter, Electromagnetic Flow Meter and Differential Pressure Transmitter. After the filtration process, water passes for the disinfection process.

In the disinfection process, water is disinfected by chlorination and/or ultraviolet radiation method. Disinfection significantly reduces the remaining bacteria and viruses, which helps to protect the public from exposure to potentially pathogenic microorganisms. Tek-Trol's Non-contacting Radar Level Transmitter is used to measure tank level in disinfection process. The treated water further passes for reuse or discharge in rivers.

- **Flow Measurement**
  Tek-Flux 1400A Electromagnetic Flow Meter

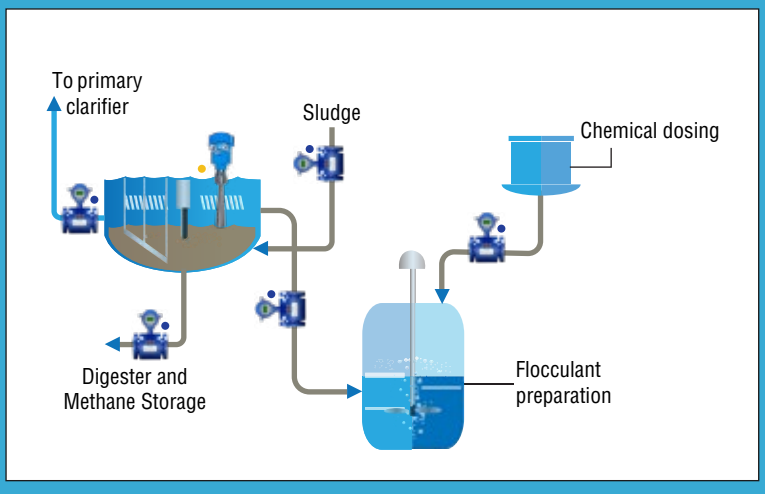
- **Pressure Measurement**
  Tek-Bar 3110A Exp-Proof Dierential Pressure Transmitter

- **Level Measurement**
  Tek-Sound 4200B Two Wire Ultrasonic Level Transmitter
  Tek-Wave 4300C Free Space Radar Level Transmitter
  Tek-Hydro 4500A-D Differential Pressure Level Transmitter

SLUDGE COLLECTION AND CONCENTRATION

Waste activated sludge (WAS) or untreated solids are further processed in the stabilization process. This sludge is collected from the secondary settling tanks and pumped to the primary settling tanks. Tek-Trol's Electromagnetic Flow Meter is used to measure flow between secondary and primary settling tanks. This waste activated sludge is co-settled with primary sludge in the primary settling tank. The co-settled sludge is automatically pumped to one of the two primary digesters for stabilization.

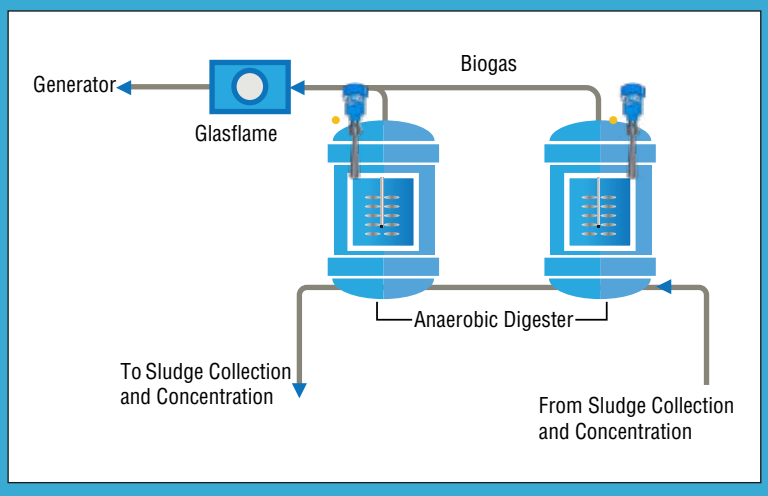
- **Flow Measurement**
  Tek-Flux 1400A Electromagnetic Flow Meter
- **Level Measurement**
  Tek-Wave 4300C Free Space Radar Level Transmitter

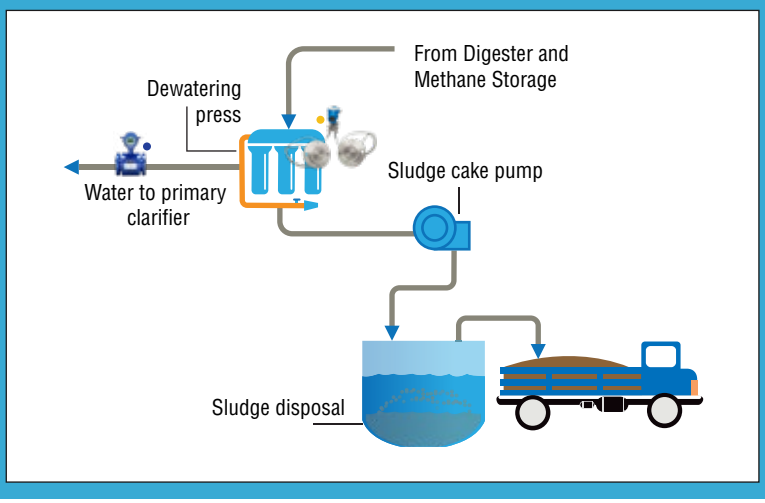


DIGESTER
AND METHANE STORAGE

Stabilization is an anaerobic digestion process. This process occurs at the highest temperature i.e., 90 ˚F to 95˚F and takes over some time (minimum 15 days) for volatile organic substances are converted to methane (CH_4) and Carbon dioxide (CO_2). The process takes place in an airtight reactor (digester). The resulting stabilized solids have a greatly reduced pathogen content. These stabilized solids are pumped to the two secondary digesters or the sludge storage tank, where additional low-rate stabilization occurs. The open tank and sludge digester level is measure by Tek-Trol's Non-contacting Radar Level Transmitter in digester and methane storage process.

- **Level Measurement**
  Tek-Wave 4300C Free Space Radar Level Transmitter

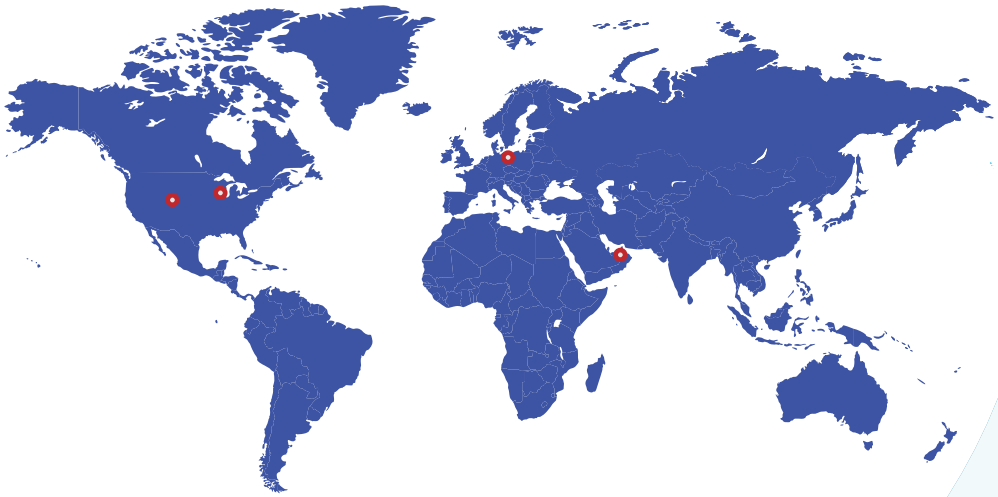




SLUDGE DEWATERING AND DISPOSAL

Sludge dewatering reduces the liquid volume of sludge. In this process, digested sludge is sent through large centrifuges. The flow of sludge is measure by Tek-Trol's Electromagnetic Flow Meter. These large centrifuges operate like the spin cycle of a washing machine. The force of the centrifuges separates most of the water from the solids in the sludge, creating biosolids. Tek-Trol's Hydrostatic Pressure Level Transmitter is used for DP level and control. Dewatering the sludge with a dewatering filter press significantly reduces its weight and volume before disposal. In this process, filter presses produce excellent cake dryness as compared to other filtration equipment.

- **Flow Measurement**
  Tek-Flux 1400A Electromagnetic Flow Meter
- **Level Measurement**
  Tek-Hydro 4500A-D Differential Pressure Level Transmitter



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