

# Water Quality is Center Focus for Michigan's Genesee County Communities

In the wake of the clean-water public health catastrophe in Flint, Michigan, a dozen communities in Flint's own Genesee County are now receiving potable water from one of the newest water treatment facilities to go into operation in the U.S.

By Jim McMahon



Reactor Chamber of CONTRAFast. In This Chamber Incoming Water Mixes with Previously Settled Solids to Promote Flocculation and Solids Contacting. Chemical Addition is Also Introduced in This Process.

**RECENTLY, A DOZEN** communities located in Genesee County, Michigan began receiving potable water from a new multimillion-dollar water treatment plant in neighboring Lapeer County's Columbiaville Village. The USD 72 million facility, which services more than 200,000 customers, receives water from Lake Huron via the newly-built Karegnondi Water Authority (KWA) pipeline. The pipeline is capable of delivering 125 Million Gallons per Day (MGD) of raw water. The plant can treat about one-quarter of that vol-

ume - 30 MGD.

But not all of the communities that originally committed to utilize the pipeline will access its water. One of those communities is Flint in Michigan, the county seat and population center in Genesee County.

Flint, along with Genesee County, was a key initiator of the KWA pipeline. But in late November 2017 Flint instead opted to receive its water from the Great Lakes Water Authority which was created in late 2014, following months of debate on which source to

choose.

Earlier, in April 2014, Flint stopped using treated water from the Detroit water system and began pumping water from the Flint River for the city's drinking water source. A lack of corrosion-control chemicals caused the more corrosive river water to damage the city's water infrastructure, and caused lead to leach into the city's water system, resulting in a city-wide health emergency by exposing Flint residents to toxins.

**The Emphasis on**

## the Water Safety

With the heightened emphasis on safe potable water following the highly-publicized concerns over water safety in Flint, Genesee County officials have made rigorous efforts to ensure its water meets State and EPA requirements for the communities and residents serviced by the KWA pipeline and the county's new water treatment plant. Genesee County Drain Commissioner, Jeff Wright, told the Flint News in November: "We understand the importance of water safety. Our plant mirrors the first-

class treatment process conducted by our previous water supplier, the Great Lake Water Authority, treating the same Lake Huron water."

Wright described the thorough and deliberate planning, construction, and operation of the plant, how every action focused on safety and reliability.

Testing took place for four months at the county water treatment plant and multiple locations along the distribution system. To ensure the water is of the highest quality, Genesee County completed its lead and copper testing for 2017 while it was still connected to the Great Lakes Water Authority. In addition to lead and copper, the county water facility completed a battery of additional water sampling. These tests measured parameters such as temperature, pH, hardness, chlorine, fluoride, aluminum, zinc and sulfates, and many other factors. The tests established a baseline for future water testing.

## The Plant Process

When Genesee County decided to treat its own water and build a new treatment plant, it considered several options on the type of treatment it could utilize. The choices included conventional treatment, reverse osmosis, and microfiltration. County officials chose a conventional treatment plant because they believed it was the best system to deliver the highest quality water to its residents.

After traveling 67 miles from Lake Huron, the raw water reaches a 150 million gal-



CentROL Gravity Filter

lon holding pond where the lake water can settle before it



**Supplied by water from Lake Huron via the newly-built USD 274 million Karegnondi Water Authority (KWA) pipeline, the USD 72 million Genesee County Water Treatment Plant is equipped with the latest-generation process technology, including a CONTRAFAST® high-rate sludge thickening clarifier, and CentROL® gravity filters, designed by WesTech Engineering.**

### **CONTRAFAST® High-Rate Sludge Thickening Clarifier**

Central to the performance of the Genesee County Water Treatment Plant is its high-rate sludge thickening clarifier. As early as 2015, the county began testing a clarifying technology called CONTRAFAST, developed by WesTech Engineering, at one of the City of Saginaw's reservoirs, which also receives water from Lake Huron.

The CONTRAFAST pilot operated like a miniature water treatment plant, pulling water from one of Saginaw's two 90-million-gallon reservoir cells. A filtration pilot column was included as part of the testing to determine the filterability of the CONTRAFAST unit effluent. Testing of the treated water gauged pH levels, turbidity, and other factors. The process was designed to assess the effectiveness of the entire treatment process which Genesee County planned to use in its new plant and ultimately did select.

"The clarifier utilizes a combination of internal and ex-

ternal solids recirculation and tube-settling clarification," said Jeff Easton, WesTech Process Engineer. "It is capable of running at four times the rate typically used for conventional clarifiers, and produces sludge with as much as 10 percent solids by weight, eliminating the need for a gravity thickener."

The entire process takes place in a single basin, greatly reducing plant footprint. Here's how the CONTRAFAST clarifier works:

- o Raw water is combined with recirculated sludge and treatment chemicals in a center draft tube;
- o A variable-speed impeller mixes the flow at high G-values, accelerating flocculation and densifying the solids;
- o Water and densified solids are recirculated within the reactor chamber;
- o A high velocity upflow port prevents settling in the reactor and transfers the water to the settling chamber;
- o A baffle directs the water to a more quiescent settling area where the solids settle out;
- o Tube or plate settlers remove residual solids;
- o Effluent launders collect clarified water;

- o Dense sludge settles to the basin floor where it is continually scraped and further thickened;
- o Thickened solids are continuously recirculated to the draft tube to seed future floc and densify sludge;
- o Periodic blowdown removes solids from the process as needed.

### **CentROL® Gravity Filters**

Once the CONTRAFAST units have clarified the water, it passes through two CentROL gravity filters in a cluster arrangement. Each CentROL unit includes four gravity filter cells arranged around a centrally located influent distributor box, and backwash waste control column. An operating platform on top of the distributor box allows convenient visual inspection of four filter cells from this central location. Inlet weirs within the distributors evenly divide flow between all online filter cells without the use of electro-mechanical flow control systems. Hydraulic flow control through the filter system eliminates potential flow surging providing a consistent high-quality effluent. Use of a downstream ef-

### **PROJECT FILE**

**Customer:** Genesee County Water Treatment Plant  
**Location:** Flint, Genesee County, Michigan, USA  
**Service Provider:** WesTech Engineering, Inc.  
**Products/Technology Involved:** Sludge Thickening Clarifiers, Gravity Filters

fluent weir system allows the filter system to generate the required backwash supply without the need for additional storage or pumping systems. The backwash of the filter incorporates WesTech's MULTIWASH® Filtration Process, using sustained simultaneous air-water backwashing to return the filter media to like new condition after each backwash while minimizing backwash waste generation. Specially-designed baffles, situated around the wash troughs, prevent media loss during the backwash process.

### **Water Independence for Genesee County Communities**

The 94,000-sq-ft treatment plant, accessory buildings, and retention basins, positioned on 80 acres, put Genesee County at the forefront of water supply safety and innovation. Shortly after the facility opened, Wright told the Division Index (a publication in Michigan) that the pipeline and treatment facility were constructed on time and under budget. He also said that the facility will save hundreds-of-millions of dollars over the next 30 years, stabilize water rates, ensure the lowest water rates in the Great Lakes region, and provide a solution that will last 100 years.

WesTech Engineering, Inc. provides process solutions for water treatment, liquids/solids separation, and biological treatment needs to municipal, industrial and minerals clients worldwide.

### **About the Author**

**Jim McMahon** regularly writes on several water & wastewater issues.