

# City of Hickory Water Treatment Plant

The City of Hickory's Water Treatment Plant is a regional water supply facility, providing potable drinking water to three counties and manages three purchased water systems extending from Icard to Claremont and from northern Alexander County to the Town of Catawba and Sherrills Ford. We also supply water to the towns of Maiden & Long View.

The plant is a conventional surface water treatment facility, drawing water from the Catawba River. The Catawba River Basin originates from springs in the tallest mountains of the Appalachian Mountain chain and flows east past Hickory. This provides us with an abundant water source, relatively free from contamination. Duke Power operates two hydroelectric dams, Rhodhiss upstream and Oxford downstream from the plant. These two dams create a deep-water reservoir at our intake and help manage the water flow to reduce contamination from water run-off.

We employ eleven state certified Operators, one state certified laboratory Chemist and one Water Quality Technician. We operate 24 hours a day, 7 days a week... we never close! We have a rated capacity of 32 million gallons of water per day.

Our treatment facility has earned the distinction of the Area Wide Optimization Award for 10 of the past 14 years. Most recently in 2017, we received our 6<sup>th</sup> consecutive recognition. This award recognizes outstanding turbidity removal, a key indicator of water quality and clearly demonstrated improvement in public health protection.



# The Treatment Process

1. Raw water is pumped from the Catawba River and large things such as sticks, fish and plants are screened at the pump intake. The raw water is treated with chemicals in this first step of the treatment process. A chlorine disinfectant is added to the water to kill pathogenic (disease-causing) organisms, aluminum sulfate is added to help remove fine particles that are suspended in the water by coagulation and sodium hydroxide is added to adjust the pH and provide alkalinity to the mixed water. The raw water pumps push the water to the flash mixer and is gravity fed through the rest of the treatment process.



2. At the flash mixer, the water is then rapidly mixed to evenly distribute the chemicals. The flash mixer is a small basin that will contain the water for just a matter of seconds and provide even distribution of the treatment chemicals that were just added.

3. The water then flows to a large basin where the chemicals cling to the impurities in the water in a process called *coagulation*. Flocculators move the water slower in this basin to provide the chemicals contact with the impurities and to clump together in large particles. This process is called *flocculation*. The water remains in the flocculators for several minutes.



4. The treated water then moves to the settling basins where the large, heavy particles quickly settle to the bottom. Water moves very slowly and is not disturbed during the *sedimentation* process. Depending on raw water flow rate, it takes from 6 to 12 hours for the water to move through these basins.

5. After making its journey across the settling basin, the water along the top of the sedimentation basin flows through common troughs to the filters. The filters are comprised of layers of gravel, sand and hard coal (anthracite). The filters remove any of the remaining small particles of floc that failed to settle and any other impurities left in the water.



6. After filtering, the water is chemically treated once again. Chlorine is added to provide enough of residual to remain in the distribution system. Fluoride is added to prevent tooth decay. More sodium Hydroxide is added to raise the pH level of the water. Finally, a phosphate is added to inhibit corrosion and prevent copper and lead from leaching into the water through piping in the distribution system.



7. The finished water is then stored in ground storage tanks, called *clearwells* before being pumped to elevated storage tanks. The water is stored in these tanks for just hours. This gives the final dosing of disinfectant some time to work before the water is delivered to the first customers.



8. The final step is pumping the finished water up to the elevated storage tanks. The elevated storage tanks create water pressure to deliver the water to customers and provide a ready supply for the customer.



# Sodium Hypochlorite Generation



For over a century, water plants have used chlorine gas. It is a very good disinfectant, but safety is a major concern in its use and handling. Many water plants have switched to sodium hypochlorite as a disinfectant. Most plants have concentrated commercial grade delivered by truck, but Hickory was the first in North Carolina to purchase its own sodium hypochlorite generator.

The sodium hypochlorite generator system consists of 2 units with a capacity of up to 1600 pounds per day. Each unit consists of 5 electrolytic cells arranged vertically to increase safety. Saturated brine and water are

pumped into the unit and electrical energy is applied. The electro-chemical reaction breaks the hydrogen bond in the water to create sodium hypochlorite and hydrogen gas. The sodium hypochlorite is pumped into storage tanks while the hydrogen gas is diluted and vented to the air.

Chlorine gas reacts with organics in the water to create chemicals in the tri-halomethane group. These chemicals have been identified by the Environmental Protection Agency as possible carcinogens. Sodium hypochlorite seems to be less prone to reacting with organics in this manner and reduces harmful by-products found in the distribution system. Also, the sodium hypochlorite seems to keep a residual longer in the distribution system using smaller dosages than just chlorine gas.

## Why Drink Purified Water?

Purified drinking water is tested every day for pathogenic bacteria in our state certified laboratory. We conduct nearly 100,000 individual laboratory tests each year. Our chemist and operators continuously monitor chlorine content, daily physical analysis, and treatment monitoring tests to assure quality standards that meet or exceed all state and federal regulations for drinking water. The City of Hickory's water has a low iron and hardness content so that it will wash clothes better. Fluoride is added for the prevention of tooth decay (this is particularly important in children). But mainly, it's safe and has a pleasant taste!



## For Further Information

Thanks for stopping by our website! If we can be of further assistance, please feel free to call the City of Hickory Water Treatment Plant at (828) 323-7530.