

Water System Reliability

There are many factors that affect the reliability of water systems. Some of these factors vary widely depending on the size and complexity of the system. In any case, the reliability of the system is dependent on the raw water source, conveyance of the water from the source to the treatment facility, the treatment process itself, finished water storage, transmission of finished water to system storage, and distribution from system storage to water customers. State and Federal law applies to all systems, permitting authority is delegated to the state level in Georgia. Bent Tree's operating permit is established and monitored by the Georgia Environmental Protection Division (EPD). EPD mandates minimum levels of reliability and redundancy for all operating facilities.

Bent Tree has a small but complex water system with many points of vulnerability. For example, all water treatment facilities must have a backup source of power. Bent Tree is fed from two separate feeds, but both feeds come from a single substation. This is the minimum level of reliability required. Critical unit processes also require redundancy, normally provided by multiple units (e.g. pumps, filters). Each process has a controls system, some can be accessed through telemetry for operations or monitoring. System storage (water tanks) are provided to allow adequate capacity for several days under normal conditions. Leakage throughout the system significantly impacts reliability in a water system. The topography of Bent Tee dictates a system with six primary pressure zones, further complicating reliable water supply.

Most local governments and private water entities develop a formal Water Conservation Program (WCP) that addresses leak detection in addition to establishing recommendations for water conservation in emergency situations. Education of the community is critical to the success of a conservation program.

Focusing on the power side, emergency generators can be provided for use in power outage conditions. For the Bent Tree system, a single generator at the water plant would be ineffective in many instances since water distribution equipment is located throughout the property. As many as 8-10 generators could be required to provide backup power to all critical water facilities. In addition to capital costs to install, there is a significant cost associated with the continuing operation and maintenance of these systems and they are also often prone to failure when needed.

Another way to improve reliability is through additional storage. Additional storage tanks for systems 2 and 4 in Bent Tree would significantly improve reliability for a large portion of Bent Tree by providing additional days of storage during conservation events.

The Bent Tree Water Department is working with engineers to improve the existing system to provide reliable and economical service to the community. Everyone must do their part in emergency situations to manage this critical resource.