CONCLUSIONS for TTHM reduction for the TOWN OF ULYSSES

Taken from: Hydraulic Analysis for Town of Ulysses, Hunt Engineers
October 2014

VII. Conclusion

The Town of Ulysses water system has functioned for a number of years without the disinfection byproduct concentrations exceeding the running annual average MCL of 80 ppb at their single department of health approved sampling point. In mid 2013, the MCL was exceeded and has been consistently exceeded since. The Tompkins County Department of Health has issued a notice of violation to the Town and required the violation be addressed by September 2015. Since receiving the notice of violation, the Town has amended its operational practices to limit the total volume of storage within their system, to no avail. Disinfection by-product exceedances have continued to occur regardless of system flushing and these operational changes.

Hydraulic modeling has demonstrated that the configuration of the system coupled with the current operational scenario will provide for extremely old water within the water storage tank that when withdrawn through flushing or periods of high use can cause for significant water age within the system.

Furthermore, it has been demonstrated through the model and additional testing that the existing water system design can contribute to significant water age by itself due to the original design intent of the system (i.e. designed for greater system demand, fire protection and interconnection to the Village of Trumansburg).

The inherent storage within the existing system cannot be reduced through operational changes (i.e. tank size or tank low operating levels) due to fire flow storage requirements or modifications to the distribution system unless drastic physical changes are made to reduce water main size. Significantly greater physical changes would have to be made to the system other than reducing the water main size in the dead ends of the system as identified by the elevated levels of disinfection by-products located at multiple places in the system upstream of the hydraulically remote portions of the system. Therefore, other improvement alternative solutions should be considered such as treatment, source modification, etc.

The Town of Ulysses elevated disinfection by-product concentration consists of elevated trihalomethanes. These chemicals are generally volatile and can be removed through mixing and aeration. This level of treatment has proven effective in up to a 50% reduction in trihalomethane concentrations. The hydraulic model has demonstrated that system operation would need to be amended to accompany installation of an aeration/mixing system in the VanDoren corners Road water storage tank. Current operating conditions show that only about 40% of the water at remote portions of the system pass through the tank, however, if a greater portion of the tank were utilized, the total amount of water passing through the tank at these same remote portions of the system would increase to over 80%.

This type of solution will increase system operation and maintenance in perpetuity and future regulation changes are unknown. It is anticipated that future regulations will become more stringent and require additional action. Therefore, the Town should consider more drastic changes for the long term including increasing the effectiveness of such a treatment system or modifying the water source.

Improving the effectiveness of a treatment system would include exposing all water consumed by the problem areas within the Town's distribution system to be treated. Increasing the percent of water consumed at the remote areas of the Town from 82+% passing through the tank to 100% would generate some increased efficiency but may not be suitable to continue to meet future regulations, therefore, alternative long term solutions should be pursued by the Village such as interconnection with the Village of Trumansburg to take advantage of a groundwater supply. Utilizing a groundwater supply would immediately and drastically reduce the disinfection by-product levels. The Village has not established a suitable groundwater supply and this alternative is too expensive for the existing water district to support.

Therefore, the Town should begin discussions with the Village and make preparations to solicit funding to accomplish such an interconnection. Consequently, the Town should begin pursuing an approach to address both the immediate violation as well as long term considerations that will include the following steps:

1. Complete additional sampling to validate recent September 2014 test results. Given the hydraulic considerations of the system, multiple tests should be taken in October and November.

2. If the test results are consistent with the patterns observed in the September 2014, the Town should pursue the installation of a tank treatment system.

3. Town should modify their pump and tank operations to allow for low and high water levels of 10+ ft. and 37.5+ ft. respectively.

4. Town shall begin discussions with the Village regarding purchasing groundwater for consumption in Water District #3.

5. Town should solicit funding to provide for an interconnection with the Village of Trumansburg. Funding should be solicited from NYSEFC, USDA Rural Development, Community Development Block Grant, etc.