

Personnel Return Plant to Compliance

Employees at award-winning plant roll up their sleeves to get the job done.

The Warner Village Water District is organized under state law to provide water supply and sewage disposal services to the inhabitants and businesses within the Warner Village District. The district is one of a handful of villages in New Hampshire that are solely responsible for operation of a wastewater treatment facility and water system, independent of the town government. Warner Village is a small rural district composed of about 200 residential and commercial customers, with a population served of about 575 persons. The treatment plant, which came on line in 1976, is based on the oxidation ditch concept of extended aeration, a modification of the activated sludge treatment process. An oxidation ditch aerates the sewage and a single clarifier settles out biological floc and passes clear supernatant to the chlorine contact tank before discharge to the river. Excess sludge is wasted to the aeration holding tank and supernatant drawn off and discharged to the drying beds. Concentrated sludge is periodically extracted and hauled to a disposal facility in liquid form. Presently, the treatment plant handles an average daily influent flow of .046 mgd.

In June 2003, an NPDES compliance sampling inspection discovered certain operational irregularities, which led eventually to the issuance of a consent decree by the State of New Hampshire. This decree mandated a series of measures that the district was required to implement to regain compli-

ance with its NPDES permit. Among these measures were: 1) a new chief operator be hired, 2) increased sampling for TSS and BOD be conducted five days a week, 3) the accumulation of solids in the chlorine contact tank be limited to 4 in., 4) any spills of sodium hydroxide be cleaned up, 5) leaks in the chlorine distribution system be identi-



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fied, and 6), the district maintain compliance with all environmental permits. This consent decree was clearly the low point in the Warner Village Water District's history.

The commissioners acted quickly to meet the stipulations in the consent

decree. In April 2004 a new superintendent was hired. Since summer 2004, the district has experienced dramatic improvement in every area of its WWTP operation. In fact, within eight months of the new superintendent taking charge, sufficient progress had been made to address the mandates of the consent decree that it was revoked and the district was found to be in compliance. The new superintendent has worked closely with the New Hampshire Department of Environmental Services (NHDES) and benefited from its technical assistance in making corrections and improvements to the treatment process. The progress is evident: from 2000 to 2004 the district experienced 275 process violations, including 19 chlorine violations, 195 pH violations, 2 BOD violations, 20 TSS violations, 40 *E. coli* violations, and 1 flow violation. Since then, there have been no violations of the district's NPDES permit.

Improvements have been concentrated in the following general areas at the Warner Treatment Plant: 1) improving and maintaining the collection system, 2) improving process control through better monitoring and lab testing, and 3), plant maintenance and equipment improvement. These efforts have resulted in over two years of consistently meeting effluent permit requirements.

Collection System Maintenance and Improvements

Before 2005, few manholes had ever been opened, inspected, or cleaned. A

few manholes were even “lost” due to lack of attention when repaving projects covered them with blacktop, and there were no inverts in two manholes. In 2005, personnel embarked on a program to inspect manhole conditions, beginning with the cleaning of two manholes on the main line leading to the plant. The manholes were cleaned and rags, grease, and debris were removed. This material was effectively holding back flow in the line, creating septic conditions in the influent and in the treatment plant’s process.

A more rigorous process of hydrant flushing was established throughout the village, which is combined with cleaning out the collection system and its manholes. In 2006, a comprehensive survey of the system’s manholes prioritized them in terms of condition and need for repair. In 2006, the district budgeted funds to replace an audible alarm at the Exit 9 lift station with one that will send a call directly over the district’s pager system to the superintendent. In a major collection system upgrade, the district committed \$167,000 to the replacement of 100-year old sewer lines on Mill Street in conjunction with the Town of Warner’s road reconstruction project. The old combined sewer main on this 800-ft long road receives stormwater runoff from several catch basins on Route 103, adding salt and sand material as well as water that need not be treated at the plant. The Mill Street project was completed in the fall 2006. The district has resolved to continue to improve the collection system as a long term investment in its capital facilities.

Monitoring and Lab Improvement

Personnel have worked closely with NHDES to improve the treatment process. In 2005, a baffle was installed in the oxidation ditch to improve internal hydraulics and increase mixing in the ditch. New chemical feed pumps have been installed for the chlorine and both the flow pacing system and check valves have been repaired. These improvements have permitted dosing to be based on the actual flow of waste going through the flow meter and have led to a reduction in the amounts of



The Warner Village Water District’s award winning wastewater treatment plant came on line in 1976.

chemicals purchased. The district saved \$1,121 in the reduced amount of chlorine purchased in 2005 compared to 2004. Another change in plant operation has been the use of a timer for the oxidation ditch control whenever excessive amounts of water enter the plant, the result of heavy precipitation. This procedure stops solids from building too fast in the clarifier and spilling out into the chlorine contact tank and ultimately into the river, resulting in a permit violation. The use of caustic soda to raise the pH of the effluent has also been stopped, a savings of about \$2,800 per year. The pH is rising naturally as a direct result of the way the process is now being operated.

Considerable attention has also been given to the lab facility and the test equipment that is in regular use. All of the testing equipment is now being used and maintained to ensure that the results are carried out according to EPA standards.

In 2005, the district built a separate building to house the storage and metering of bisulfite, introduced into the effluent stream to provide dechlorination. The building was purchased at Home Depot for about \$2,000 and made suitable for its storage purpose by district personnel. Before this separation, sodium bisulfite and chlorine had

been stored and handled in the same building. This combination proved to be extremely corrosive to any metals in the building and represented a hazard to the district’s employees. The new building allows the bisulfite to be introduced without using district water to carry it, lowering the use of bisulfite from 20 gpd to 1 gpd. It has also resulted in longer times between pump rebuilds, since this equipment is being worked much less than before. As an overall measure of savings in chemicals for the plant, 29 percent less was spent in 2005 than in 2004, a savings of \$2,255 to the district. These and other improvements have been made by plant personnel, working on their own initiative. The use of outside contractors has fallen dramatically, with the exception of electrical work, which continues to be performed by a local licensed electrician.

In 2005, winterizing the supernatant transport line serving the sludge holding tank was completed, allowing for year round use. This measure gives greater control over the sludge management process and reduced the frequency of sludge hauling. By wasting supernatant to the drying beds year round, there is always room in the holding tank for emergencies, such as floods and excessive rain. Several other changes have

been made in the management of the plant's sludge as well. First, the rate of wasting was slowed to create a thicker sludge. Second, the sludge return pump is now shut in the morning to allow the sludge to thicken in the clarifier prior to wasting. Also, corrective action was taken to change the sludge pump rotation. These changes have led to significant savings in the costs of sludge handling. In 2005 the district spent \$5,798 for sludge removal, compared to \$17,267 in 2002. Sludge is hauled off-site for disposal at the treatment plant in Concord, NH.

Maintenance and Equipment Improvement

Beginning in the fall 2004 and continuing through 2005, aggressive measures have been adopted to clean and maintain the plant facilities. A prime example was the cleaning of both wet wells and the grit and grease channels at the head works. Also, the contact tank is now being cleaned annually. All valves at the treatment plant have been repaired so the return can be sent to the head works; the clarifier sump pump is used to transfer waste to the tank, rather than to paying to have it pumped out. Equipment purchases are now consistent; buying pumps from the same manufacturer means that replacement parts are more readily available and will result in cheaper operating costs.

For many years, tools needed to carry out necessary repairs were either unavailable or the property of a district employee. Previously, this did not pose a major concern since many routine repairs were done by outside contractors. Since repairs are now done by plant personnel, new tools and a portable pump have been purchased. The old pump regularly lost its prime, requiring hours of staff time to bring it back on line. With the new pump, staff experiences less down time and can move onto the next task faster and with the right tools. Spending on outside contractors has been significantly reduced, ultimately saving the district money.

Safety has become a high priority. The district has purchased a safety tripod and harness and a gas detection meter that allow personnel to enter confined spaces, particularly manholes, with a high degree of safety. Outdoor lights have been installed in the clarifier building and above the contact tank to provide a safe environment for the staff working in these locations at night or on overcast days. A laborer was hired to help with the plant clean up and to perform other duties as assigned. All valves have been located, marked, and checked to see that they are functional.

Finally, although the district is not part of the town government, it is crucial that the two work together. The district now enjoys not only a closer rela-

tionship with the town, but with its residential and business customers as well.

All of the hard work by plant personnel paid off when it was recently selected by the EPA for a National First Place Award in the Most Improved Plant category as part of the annual 2006 U. S. EPA Clean Water Act Recognition Awards. Plant superintendent Jeremiah Menard along with operators Thomas Chandler and Daniel Burnham were acknowledged for their professional commitment and resourcefulness in the operation and maintenance of Warner Village's wastewater treatment plant. The staff and facility were honored during the annual Water Environment Federation Technical Exhibition and Conference (WEFTEC), held in Dallas, October 21 to 25.

The Clean Water Act Recognition Awards program is sponsored by EPA's office of Wastewater Management. The awards recognize municipalities and industries, including Tribal Nations and U. S. military commands, for demonstrating outstanding technological achievements or an innovative process, method, or device in their waste treatment and pollution abatement programs. The program is intended to educate the public about the contributions that publicly-owned treatment facilities make to clean water and to recognize communities that go far beyond the minimum needed to meet Clean Water Act requirements. 