



# Organization for the Assabet River

## Meeting the new permit limits: Assabet towns rise to the challenge

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The permits have been issued, the appeals have been settled. What's next for the Assabet sewered municipalities? Marlborough, Northborough, Westborough, Shrewsbury, Hudson, and Maynard are beginning the process of upgrading their wastewater treatment facilities to meet the new pollutant limits, including the phosphorus concentration limit of 0.1 mg/L. Each of the towns and its consultants must now choose from among several phosphorus removal technologies on the market. The towns must consider such factors as cost, reliability, and the technologies' effectiveness in meeting not just the 0.1 mg/L concentration limit, but likely lower future limits. Following is an update on the progress.

### Treatment Pilots come to Hudson Wastewater Plant

Hudson resident and OAR board member Marty Moran accompanied OAR staff for a first-hand look at the three wastewater treatment technologies being piloted at the Hudson wastewater treatment plant in early May. Hudson is leading the way, testing three new technologies designed to reduce the effluent's total phosphorus levels to the 0.1 mg/L required by 2010 as part of the current NPDES permit. All of the treatment processes being tested can also reduce effluent metals concentrations.

To evaluate the new technologies, pilot systems for each were installed at the Hudson wastewater treatment plant for a three-week trial run. Two pilot systems were housed in large trailers and the third was an outdoor system that included a two-story tank. During this period, various flows, chemicals and other process adjustments were made and the resulting level of treatment monitored for each system's effluent to determine the optimal system operation and treatment. Test samples were sent to an independent lab for analysis.

Public Works Director Tony Marques led the tour through the facility, last upgraded in 1986, together with staff from Wright-Pierce, the town's consulting engineer. The plant is permitted to discharge up to an average of 3.0 million gallons of effluent per day (mgd) and currently operates at a flow of approximately 2.2 mgd. Efforts to reduce flow from groundwater infiltration and from illicit connections have been effective at reducing wastewater flows down from 2.82 mgd eight years ago.

### Capturing the phosphorus

The three technologies being tested are: Kruger's Actiflo® system; Infilco Degremont's DensaDeg® system; and Infilco Degremont's AquaDAF™ system. Any of these systems could be added to Hudson's current process to treat the effluent stream prior to disinfection and discharge into the Assabet River. As a first step, each of the pilot systems adds ferric chloride as a coagulant (other coagulants are also being tested) which combines with phosphorus to form ferric phosphate particles. Polymer is then added to bind



Kruger's Actiflo® system uses sand to make particles settle out.



Infilco Degremont's DensaDeg® system uses its own recycled sludge to make particles settle out.

the particles together into larger clumps; some metals are also bound with them.

### Getting the phosphorus out

At this point the three processes diverge. In the Actiflo® system, sand is added as the ballast material, to which the particles adhere and quickly settle out. The sand is continuously "cleaned" to separate the organic from the inorganic material and then recycled. In contrast, the AquaDAF™ system bubbles air through the solution and the particles float to the top as a sludge which is skimmed off. The DensaDeg® system uses some of its own recycled sludge as ballast to make the particles settle out. All three technologies result in similar amounts of sludge being produced, which would be combined with sludge from the rest of the plant, processed and trucked off-site. As chemicals necessary for this treatment process can be expensive, the process that uses the smallest amount of chemicals may have an operational cost advantage over the other systems.

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Although not being specifically tested onsite, the disinfection process is also being evaluated to determine whether ultraviolet disinfection could replace the current chlorination/dechlorination process.

### The initial results and the future

According to Wright-Pierce, so far all three processes being pilot tested have demonstrated an ability to reduce the effluent phosphorus level to 0.1 mg/L. The pilot testing systems are also being pushed to see if treatment levels below 0.1 mg/L can be achieved.

The pilot testing is a critical step in the design process as the technology selected for full-scale implementation should meet both the phosphorous discharge limits currently specified in the NPDES permit and lower limits which can be expected in the future.

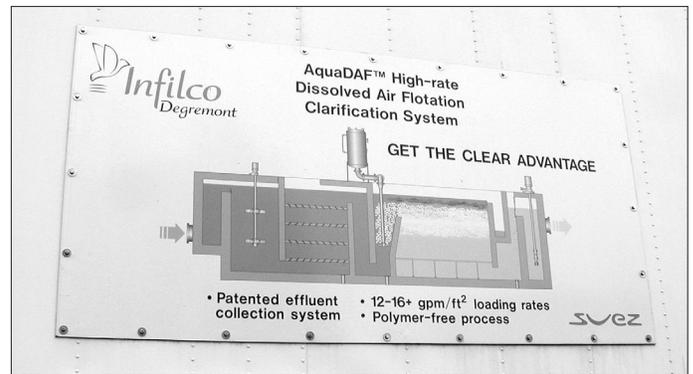
### Progress all along the river

The four wastewater treatment plants discharging to the Assabet are all part of the Comprehensive Wastewater Management Plan (CWMP) process being carried out by the six municipalities discharging to the river. All communities are in the process of finalizing the CWMP Phase III report to the Commonwealth, which will present various alternatives for meeting nutrient removal levels. Each plant

is different in its processes and wastewater composition. We will be reviewing these reports, which will be submitted as draft Environmental Impact Reports to the state through the MEPA process.

The Phase III report for the **Westborough** wastewater treatment plant, also serving **Shrewsbury**, will be submitted to the state by mid- to late summer according to plant operator Chris Pratt. They are completing the alternatives analysis, which includes 5-6 options, one of which will be recommended by their consultants. Whether they need to do pilots will depend on how similar their plant and needs are to existing plants elsewhere in the country. It will then be available for public review and comment.

**Marlborough** is scheduling a pilot of the BioMag technology, according to the Chief Operator of the Marlborough Westerly wastewater treatment plant, Harry Butland. BioMag is the next generation of the CoMag phosphorus-removal process used in Concord, developed by Cambridge Water Technologies. BioMag



Schematic of Infilco Degremont's AquaDAF™ system which uses bubbles of air to float particles to the top where they are skimmed off.

is designed to increase the removal of solids, which include nitrogen as well as phosphorus. They are also considering switching from chlorination to UV disinfection, depending on the phosphorus removal process selected. The Marlborough Westerly plant also treats wastewater from **Northborough**.

In **Maynard**, Charlie Dismuke, wastewater treatment plant Manager and Chief Operator, says they are looking at three technologies: AquaDAF and Actiflow (described above for Hudson), and CoMag, and expect to have the design work out for bid later this year, depending on how quickly the MEPA review is completed. They are also open to whatever new technologies may emerge. ❖

Please note: This article is reprinted from the July 2006 OAR newsletter.