



MARYLAND DEPARTMENT OF THE ENVIRONMENT

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MEMORANDUM

TO: Local Approving Authorities
Directors of Environmental Health

FROM: Barry Glotfelty, R.S. *BWG*
Chief, Onsite Systems Division

RE: Review of 1,500 GPD BATs

DATE: May 7, 2014

Nitrogen removing technologies for use with onsite sewage disposal systems with design flows of 1,500 gallons or greater per day and less than 5,000 gallons per day or with effluent not typical of domestic wastewater need to be individually engineered. MDE's list of pre-approved BAT technologies was developed for domestic wastewater flows less than 1,500 gallons per day and cannot be extrapolated beyond that.

This document provides guidance for the approval on a case by case basis of technologies proposed for uses where flows or other wastewater characteristics require individual engineering to establish and accomplish the minimum 50% nitrogen removal goal. Although the local Approving Authority is MDE's designee for approving these systems, their Regional Consultant should be involved in the review of the technology proposed.

Wastewater Characterization and Target Nitrogen Concentration

The first step in the design and evaluation of a proposal is to characterize the wastewater quality and quantity to be treated and then to determine the target concentration of nitrogen to be produced in the treated wastewater. Residential applications such as apartment buildings or shared facilities may reach the flow threshold requiring an individually engineered BAT. However, the expectation is that nitrogen concentrations in these wastewaters should be similar to those from like uses with lower flows. We would expect 60 mg/l to be produced from a residence. Therefore the target concentration to be produced by the treatment unit to achieve the required 50% reduction from similar residential uses is 30 mg/l.

For commercial, institutional, and other non-residential generators, the wastewater concentration to be treated can not be assumed. The engineer designing the system may need to conduct sampling of septic tank effluent from a similar use to the one proposed. Alternatively, literature values or other sampling data could be used if the facilities that were sampled are adequately analogous to the one proposed and the data is from a reliable source. Once the concentration to be treated is established, the target concentration reflecting 50% nitrogen removal can be established. The target concentrations for the treated wastewater should be included on the plan.



In characterization of the wastewater, factors besides the TN (total nitrogen) of the effluent to be treated are relevant. The biological oxygen demand, total suspended solids, fats oils and grease content, and alkalinity of the effluent to be treated must be factored into the treatment plan.

The quantity of wastewater to be treated must also be considered. Average and maximum daily flows and peak flows must all be known, as well as seasonal fluctuations in flow generation. Flow equalization may be needed to address fluctuating flows.

Engineering Justification and Sealed Plan

The plan for the system must include a statement regarding the effluent concentration(s) that the system will accomplish.

Documentation and/or engineering justification for the system's ability to provide the target treatment levels must be included with the plan.

The plan for the BAT design should be sealed with a qualified PE's (Professional Engineer's) stamp.

Operation and Maintenance

Any specialized operation required to enable the system to perform to attain the treatment targets should be included with the plan. And, an Operations and Maintenance Manual outlining the procedures necessary to optimize the engineered system's performance must also be provided to the Approving Authority and the system owner. A method to measure flow is required. The maintenance contract required for the system should be sufficient to assure that the necessary procedures in the O&M manual are accomplished and reported.

A sampling port should be included in the system design to allow for composite sampling of treated effluent. A flow through design is required with an adequate flow velocity to keep solids in suspension, including through the sampling sump. The sump must contain an adequate volume to allow a reasonable amount of effluent to be withdrawn at each sampling interval with the sampling pick up elevated above the port bottom. The port should be easily accessible for cleaning as well as sampling purposes. The sample port must be installed immediately downstream of the system. The design details of the port should be reviewed. Details for the design of this appurtenance may be found in the appropriate edition and section of NSF Standard 40, as currently promulgated and/or from manufacturer references.

Cc: Regional Consultants
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