Pilot testing for wastewater treatment facilities

The following guidelines are provided to establish how "pilot testing" of wastewater treatment processes and/or equipment should be implemented.

Pilot testing

Pilot testing is the evaluation of wastewater treatment processes and/or equipment for a limited time and at a limited scale to determine the design conditions for full scale implementation. Pilot testing is usually done to compare different processes or equipment to determine which will work best at a specific installation. Pilot testing may also be done for just a single unit to determine design parameters for full installation. Pilot testing should be conducted when performance data for a given treatment process is unknown or not adequate to base full scale design and operation for the parameters of concern.

Written proposal for pilot testing

Before initiating a pilot test, the permittee should submit a written proposal. The Minnesota Pollution Control Agency (MPCA) will review each proposal on a "case by case" basis. Flexibility in the duration and scope of pilot testing will depend on permit conditions, goals of the study and previous installations with existing performance data. The following items should be considered in the development of the written proposal for pilot testing:

1. A discussion of why a pilot test is being proposed.
2. A discussion of the performance of the current treatment processes under various conditions, including seasonal changes. Wet weather, dry weather, and peak operating conditions should be addressed.
3. A discussion of the alternatives and technologies being considered, including where they have been used and the performance at those locations.
4. A discussion of bench testing or literature reviews that would aid in the design of the pilot test. Bench testing and literature reviews are not strictly necessary, but are recommended as a way to easily pre-determine pilot testing operational parameters (pH, chemical dosages, etc.).
5. Schematics and design data sheets of the actual processes proposed for the pilot testing. The design data sheets should include but not be limited to the physical dimensions, expected flow rates, detention time, and the range of hydraulic loading rates through each unit (to allow for direct extrapolation of the results to full scale facilities).
6. A discussion of the specific operational and performance characteristics that will be analyzed and the sampling frequency throughout the anticipated range of loadings, hydraulic flow rates, chemical feed rates, and other operating conditions (including seasonal cold weather conditions). Wet weather, dry weather, and peak operating conditions must be addressed. All water quality samples must be analyzed by a certified laboratory pursuant to 40 CFR 136.
7. A schedule defining the duration of each evaluation period. Evaluation periods should be of adequate duration to insure that the treatment units have experienced the representative range of organic and hydraulic loading rates that could reasonably be experienced at the facility, including seasonal changes.

8. A discussion of why any other seemingly adequate treatment alternatives and technologies, which were not selected for pilot testing were eliminated from consideration.
9. A discussion of how permit conditions will be maintained during the pilot testing.
10. A discussion of secondary pollutants of concern that may increase in the effluent due to the pilot test treatment system (e.g. chemical addition, ion exchange resins, or substrate materials).

The written proposal for pilot testing should address currently applicable effluent, water quality, and public health requirements. The written proposal for pilot testing shall take into consideration all analytes known or believed to be present in the wastewater treatment plant (WWTP) influents, including return flows (e.g. discharges from sludge handling systems) and any other requirements that can be reasonably expected within the next 20-year period.

The MPCA will respond in writing to acknowledge receipt of the written proposal for pilot testing and notify the proposer that they may proceed at their own risk, and must continue to be responsible for meeting all permit conditions. The MPCA will provide no waiver from potential future enforcement actions for permit noncompliance and will not formally approve of the pilot test. The MPCA may deny the proposal if there is reason to believe that the pilot testing will put the WWTP at risk or in noncompliance with permit conditions.

Pilot testing reports

The Permittee should, at a minimum, provide written progress updates on the pilot testing to the MPCA every three months. The updates shall include a discussion of what has occurred to date and what is planned for the up-coming three-month period.

The Permittee shall provide a final report of the pilot testing to the MPCA as soon as possible, but no later than three months following completion of pilot testing. The Permittee shall include a description of the selected treatment alternative and the complete wastewater treatment system of which it is a part. The following shall be used as guidelines for all reports:

- Minn. R. 7077.0272 subp. 2.;
- Recommended Standards for Wastewater Facilities, also known as "Ten States Standards", Chapter 10 and Chapter 50 - Section 53;
- Design of Municipal Wastewater Treatment Plants Water Environment Federation Manual of Practice #8 (WEF MOP 8) shall be used as guidelines for the Final Report.

The pilot testing final report should also include, but not be limited to:

1. A general summary of the project and a discussion of the effectiveness of the alternative in removing the parameters of interest.
2. A discussion of the ability of the alternatives and technologies to meet applicable effluent limits.
3. A description of any operational problems and treatment system limitations encountered during the pilot testing.
4. A description of all sampling and testing performed.
5. Tabular and graphical summaries and interpretations of the data, including but not limited to percentage removal of water quality parameters of concern.*
6. A complete set of all the raw water data obtained.*
7. Projected impacts to receiving water quality if the treatment process or equipment technology is implemented on a larger scale. Impacts for both current and anticipated future operating conditions should be discussed. Future impacts and operating conditions are those that can be reasonably expected within the next 20-year period.
8. The recommendations for full scale implementation and cost estimates.

9. Estimated costs for all of the alternatives/technologies identified.
10. Chemical usage, capital and operation and maintenance costs, and extrapolation of all data to full scale size.
11. The pilot testing final report must be signed by a Minnesota registered engineer.

* The water quality data obtained during the pilot testing must be analyzed by a certified laboratory similar to those required by NPDES permits pursuant to 40 CFR 136.

Following completion of the test and prior to implementation of any permanent change at the WWTP, the permittee must submit an engineering report, facility plan, and/or plans & specifications for WWTP modifications signed by a professional engineer licensed in Minnesota. These documents must be approved by the MPCA prior to implementation. Depending on the final scope of the project an application for permit modification and/or permit reissuance may be required.