



## Wastewater Pollution Control Facility Achieves High Rate Nitrification with MBBR Installation

### Background

The Moorhead Wastewater Pollution Control Facility (WPCF), located in Minnesota, is one of the oldest installations using Moving Bed Biofilm Reactor (MBBR) technology to treat the wastewater generated in the community, managing six million gallons of wastewater per day. In 2002, the facility completed a comprehensive evaluation of treatment options, including biological wastewater treatment processes and conventional methods.

The engineering team at Headworks BIO™ Inc. (formerly Hydroxyl Systems Inc.) developed an innovative design process using attached growth biological treatment, known as MBBR technology.

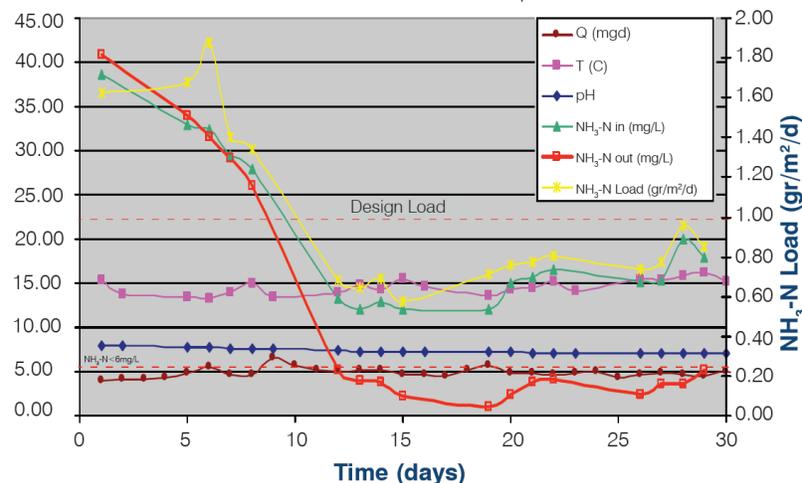
In the MBBR process, microorganisms growing in the biofilms attach to the interior protected surface area of plastic media. The media moves freely, suspended in the liquid of the reactor or basin. Biofilms growing on ActiveCell® media provide a more resilient, dense treatment population per unit volume compared to conventional suspended growth activated sludge systems.

**QUALITY THAT NEVER QUILTS™**

Customer: City of Moorhead  
Industry: Municipal

### Moorhead Performance Data for May

Media Installed the Week Prior to April 1st



## ActiveCell Solution

After researching the comparative technologies and completing a five month pilot program to test the effectiveness of ActiveCell media, the MBBR design was selected as the most efficient, cost-effective solution for the large municipal wastewater treatment plant.

## Design

The full scale wastewater pollution control facility was engineered and designed by worldwide engineering firm CDM, retrofitting an existing aerated pond. The plant was then commissioned in March 2003 by Headworks BIO Inc.



*Biofilms growing on ActiveCell media provide a more resilient, dense treatment population per unit volume compared to conventional suspended growth activated sludge systems.*

“*Since commencing operation, our MBBR has proven to require very minimal operator attention, effectively nitrifies even during the cold winters in Moorhead, and adapts well to fluctuations in loading.*”

*- Andy Bradshaw*

*Utilities Engineer for the City of Moorhead*

The ActiveCell<sub>450</sub> media are used for a separate-stage MBBR nitrification system designed to nitrify ammonia, meeting seasonal compliance standards of less than 4 mg/L NH<sub>3</sub> for effluent discharge to the Red River.

The separate-stage MBBR nitrification process uses free floating media that provide 402 m<sup>2</sup> /m<sup>3</sup> of internally protected active surface area. The process can be expanded by simply adding additional media and increasing the air supply to the diffuser system.

## Results

The MBBR process has provided many advantages to Moorhead WPCF, including the ability to operate on a single-pass, without the need of a post clarification process typically required in conventional treatment systems, to provide and maintain a MLSS concentration for activated

sludge processes. It is also capable of providing high rate nitrification even during exceptionally cold winter conditions in Minnesota while meeting stringent discharge parameters during the early days of Spring.

The self regulating biofilm process exhibits controlled sloughing rates and requires minimal operator attention. When asked how the system is running today, Andy Bradshaw, Utilities Engineer for the City of Moorhead, said, “Since commencing operation, our MBBR system has proven to require very minimal operator attention, effectively nitrifies even during cold winters in Moorhead, and adapts well to fluctuations in loading.” The advantages associated with installing the MBBR process have continued, after nearly a decade of operation, truly making this installation a success.



*Installation of ActiveCell media into the Moorhead WPCF nitrification reactor.*