
Treatment of river water from Mekong River, Duc Hoa, Long An, Vietnam, with De.mem NF (Nanofiltration) membrane

Date of Commencement

November 1, 2017

Membrane Details

Module ID: N1H1744006

Membrane Area: 10 m²

Operating pressure: 1.5 bar

Pure water flow rate: 14 LMH.bar

Objective

- To run the De.mem NF membrane under low operating pressure of 1.5 bar
- To demonstrate that the De.mem NF membrane can run in a simple process without Microfiltration (MF) or Ultrafiltration (UF) pre-treatment and hence, reduce equipment cost
- To show that the river water feed can run directly into the De.mem NF module (only using 100 micron bag filter as a pre-filter), while the De.mem NF is able to maintain rejection performance
- To obtain high grade treated water that is superior to a UF permeate under similar operating conditions, i.e., key parameters for potable water such as turbidity and bacteria are substantially reduced
- To confirm standard operating routines and that the De.mem NF membrane is easy to clean

Description

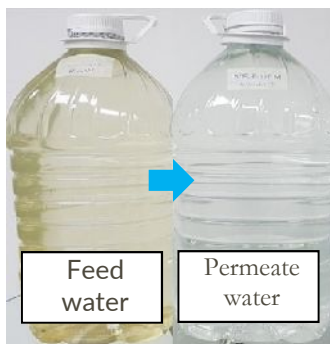
- A skid mounted De.mem NF system was installed at a site in Duc Hoa, Long An province, Vietnam, near the Mekong river. Feed water was pumped through a pipeline from the Mekong river to the NF system
- Another water treatment system using a market-standard UF system was installed at the site, to benchmark the performance of the De.mem NF membrane
- The systems have been operating continuously since November 2017. The project is still ongoing.

Skid Pictures

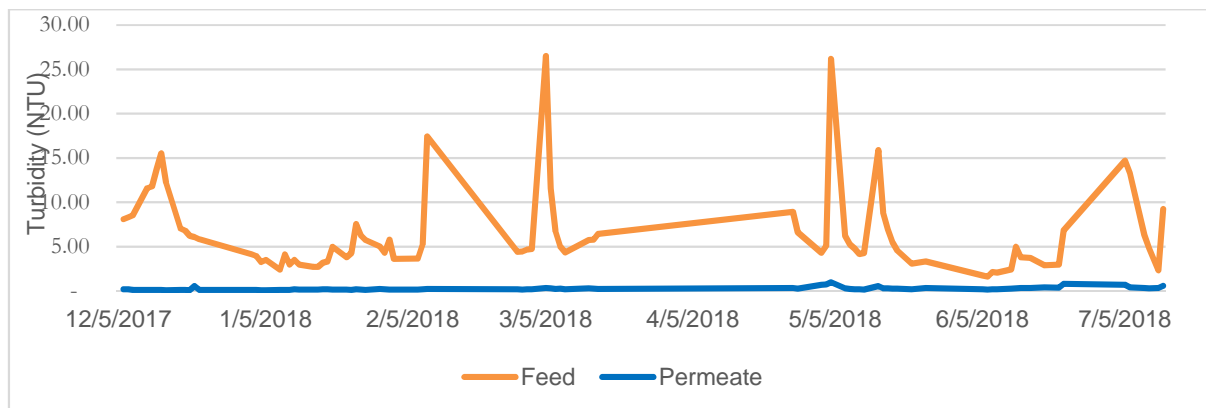


Treatment Result and Sample Test Data

Product Water - Pictures



Turbidity



The data above shows a trial over 7 months and confirms that the De.mem NF membrane has been able to substantially reduce the turbidity from 10-15 NTU to 0.1-0.5 NTU, or by up to 99.3%. The turbidity

levels achieved fall within the limits established by the World Health Organization (WHO) for drinking water.

Bacteria

RESULTS:

Test Parameter	Unit	Test Method	Feed Water - River	Permeate UF	Permeate NF
Total Bacteria Count	cfu/ml	APHA 9215B	54,000	109	<1
<i>E.coli</i>	cfu/100mL	APHA 9222G	700	<1	<1

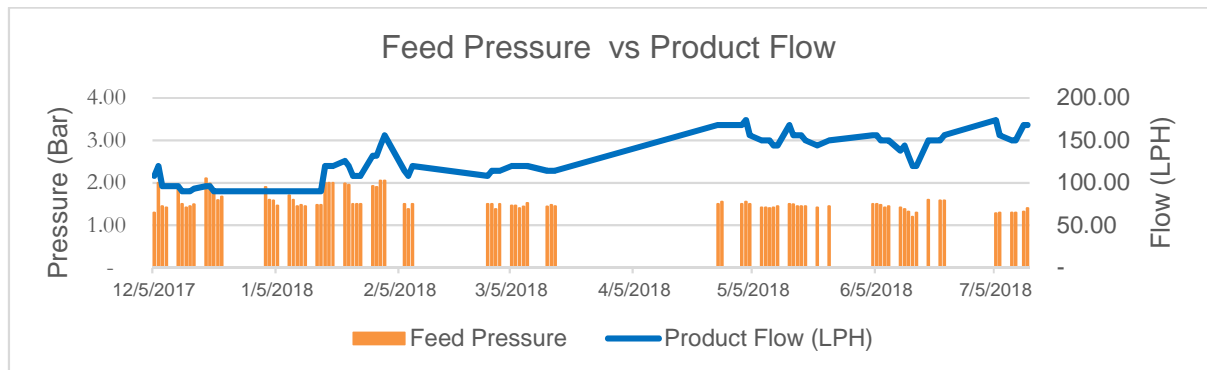
*Bacteria count performed by accredited testing lab

The bacteria count demonstrates the capability of the De.mem NF to very effectively remove bacteria from water. The results have been benchmarked to a market-standard UF membrane, which has been run in a parallel cycle using the same feed water. The De.mem NF membrane shows a 6-log reduction of bacteria which is superior to the results for the UF.

Operating Parameters

The optimization of the operating parameters and cleaning methods have been established through on-site testing.

The following chart shows relevant operating data over a period of almost 8 months with 8 hours operation during weekday and weekly cleaning cycles performed:



Based on regular and automated cleaning procedures, the membrane was operated with stable performance, as the constant feed pressure indicates.

Summary

1. At low operating pressure of 1.5 bar and in a simple process without any pre-treatment by MF or UF, the De.mem NF is capable of significantly reducing the turbidity of the feed water by up to

99.3%, and bacteria count and E.coli reduction to <1, without the need for MF or UF pre-filtration. Those parameters are in line with WHO drinking water standards.

2. The De.mem NF can be operated in simple and automated processes and is capable of maintaining stable performance.