Methanol Feed for Denitrification Filters

- 30 years operating experience using methanol in denitrification filters
- Kinetic issues associated with methanol are critical for operation and design of activated sludge systems but less so for fixed film
- Methanol (or alternate carbon source) must be "clean" and consistent

Methanol Feed for Denitrification Filters, Cont’d

- Control of chemical dosing is even more critical than for activated sludge
  - Last treatment unit before disinfection
  - Must control dosing to avoid BOD breakthrough to effluent
  - Must avoid partial denitrification
    - Meet nitrogen requirements
    - Avoid elevated nitrite going to chlorine disinfection
  - Issues similar for other "stand-alone" tertiary denitrification facilities
Methanol Feed Control

- Manual
- Flow-paced
- Feed-forward
- Feed-forward and Feedback with Effluent Concentration

Havelock WWTP, Havelock, NC

Havelock WWTP Process Performance

- NO$_3$-N reduced from approx. 12 mg/L to about 2 mg/L
- Effluent TN averages about 3 mg/L
  - NH$_4$-N = 0.2 mg/L
  - Org-N = 0.8 mg/L
  - NOx-N = 2 mg/L
- Effluent TP averages about 0.5 mg/L
Havelock WWTP Methanol Control

- Methanol Initially Flow Paced
  - Sometimes difficult to meet effluent CBOD limit (3 mg/L)

Havelock WWTP Methanol Control, cont'd

- ChemScan analyzer and Tetrapace control system installed in 1998
  - CBOD Std Dev dropped from 4 to 1 mg/L
  - TN Std Dev dropped from 3 to approx 1.8 mg/L
  - Estimated 30% MeOH savings
    - Better matching of dosage
    - Ability to “dial-in” the desired effluent NO₃-N

Havelock Effluent CBOD and BOD Data, Before and After Methanol Control Upgrades
Additional Control Considerations

- What level of control is needed for a particular installation
- Process parameters to consider
  - NO$_2$-N only
  - NO$_2$-N and NO$_3$-N
  - NOx-N only
  - NO$_2$-N, NO$_3$-N and DO
- Reliability of online monitoring equipment

Questions