

POTW NUTRIENT REMOVAL IN ILLINOIS

Illinois Association of Wastewater
Agencies

Current Rules

- Effluent P limit 1.0 mg/l for lakes
- Interim P limit 1.0 mg/l for expansions and new POTWs
 - IAWA contested the rule-making
 - Testimony did not provide scientific support
- Chemical addition is used most often
- Nitrification to 1.5/4.0 mg/l Amm-N typical for POTWs without significant stream dilution – variety of technologies are used

Scope of 2003 Nutrient Removal Cost Study

- 814 Treatment Plants
- 3,196 MGD
- 32 Million P.E.
- > 50% of Flow MWRDGC
- > 50% of Plants are Smaller Than 0.5 MGD (5000 P.E.)

2003 Technology Knowledge Base

- Empirical Capital Cost Data Based on 1994 Study
- Operating Cost Based on 1994 Study, \$/gallon for Complete Treatment
- MWRDGC Developed Independent Capital Cost Estimates for 3 Largest Plants
- Data for P and N Removal to Technology Based Limit (0.5, 3), Not Separated

Cost Methodology

- Applied 1994 Empirical Cost Data to Illinois Plants in Different Size Categories
- Used Estimate of 50% Increase over 1994 Study Average \$/gallon Cost

Overall Findings

- Capital Cost Increase Estimated at \$5.3 Billion (1994 Dollars)
- O&M Cost Increase of \$500 Million / Yr (1994 Dollars)
- Capital Cost Ranges from \$74 - \$5,500 per PE, Avg of \$165 per PE
- O&M Cost Avg Increase of \$15/year/PE

Current Knowledge Base

- Chesapeake Bay Experience – 2007 Data Presented at WEFTEC 2008
- Capital Costs Projected to be 5-10 X Those Estimated in 2003 IAWA Study (\$25 to \$50 B)
- O&M Increase of 50% Estimated at \$1.1 Billion/year (IAWA 2007 Survey Data)
- ENR CCI Up 50%, CPI Up 45% Since 1994
- BNR (P=1, N=8) roughly 1/3 the cost of BAT (P=0.5, N=3)

Current Cost Ranges

- For Small POTWs, >\$75,000 per household in Capital Cost
- For Largest POTWs, ~\$1,300 per household in Capital Cost
- Average Cost ~\$2,900 per household
- Annual O&M cost increase \$70.00 per household
- \$15-\$500/month per household, avg ~\$25

Carbon Footprint Study

- Primarily tied to additional electrical costs
- BAT evaluated – 0.5 mg/l P and 3.0 mg/l N
- 45% Increase in wastewater electric costs
- 0.5% Increase in emissions from Illinois electric utilities
- ½ million tons per year CO₂ equivalent
- BNR not evaluated