

Using Enhanced Primary Clarification to Reduce Energy Use in Wastewater Treatment

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Background

- Typically, 60% of the energy used in wastewater treatment is for aeration
- Enhanced Primary Clarification (EPC) is the addition of chemicals to enhance particle aggregation and settling

Objective

- Assess the feasibility of EPC in reducing aeration
- Determine the effect of EPC on biological nitrogen removal
- Evaluate overall treatment performance under low DO conditions



Figure 1: Ferric chloride feed reservoir

Scope

- Wastewater from Mines Park Residential Area
- Coagulant: **Ferric chloride (20mg/L)** Flocculant: **Nonionic polymer (2 mg/L)**
- Effluent quality parameters: **COD, PO₄, NH₃-N, NO₃-N**
- Airflow to maintain 0.2 - 0.8 mg/L dissolved oxygen as proxy for energy use

Major Preliminary Results

- Similar final effluent quality between conventional and EPC system
- Nitrogen removal slightly lower for EPC system
- Complete nitrification occurred but denitrification was carbon limited for both systems
- Air Flow Required (Lpm):

CPC

7 - 8

EPC

2 - 2.8

1/3 airflow required

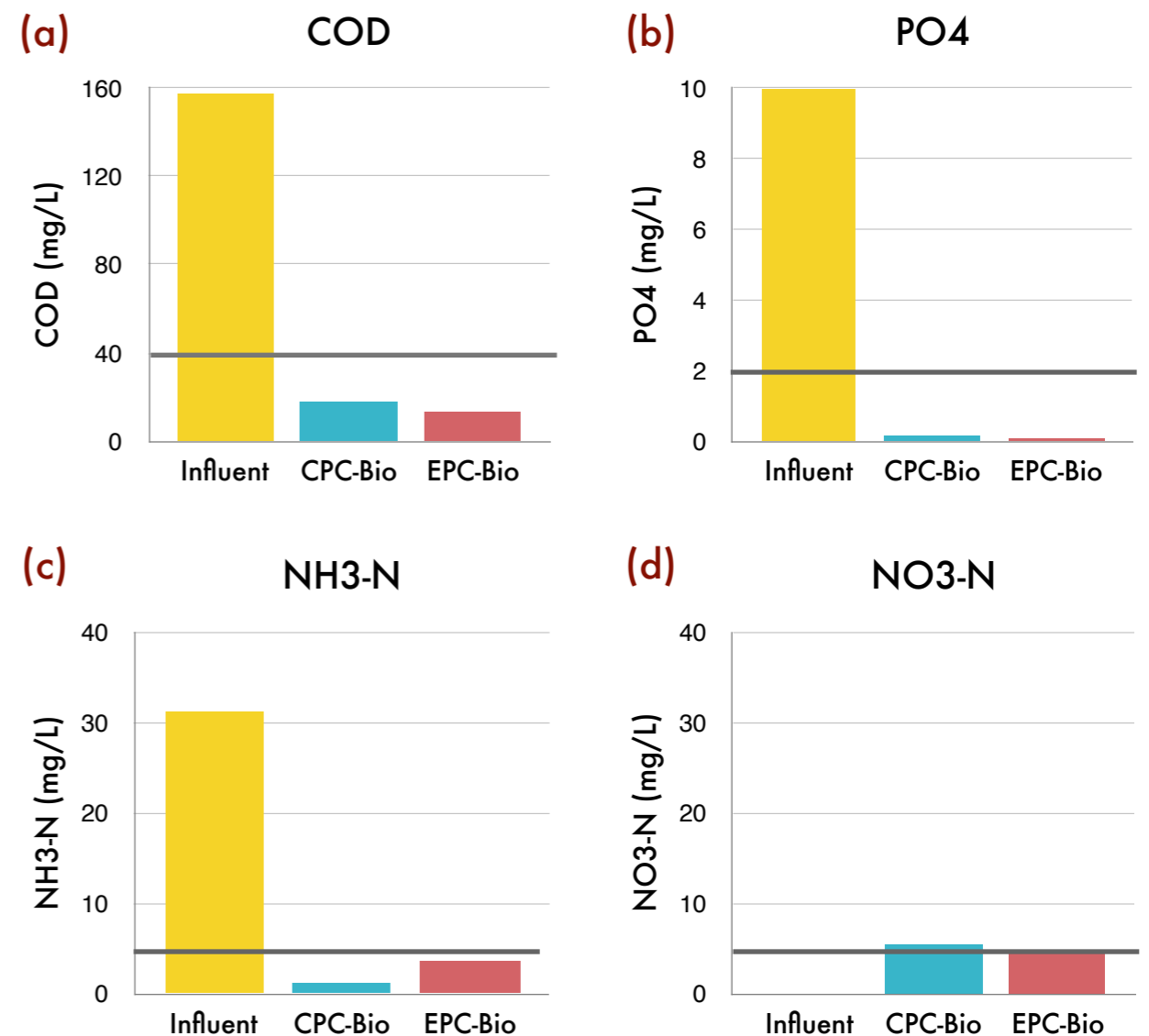


Figure 2: COD (a), Reactive P (b), NH₃-N (c) and NO₃-N (d) of the influent and final effluents of both systems. Black horizontal lines represent typical permit limits.