

# Case Study: Conrad

## PHOSPHORUS & NITROGEN REMOVAL CONRAD, MONTANA (POPULATION 2,600)

Effective Nutrient Removal without Facility Upgrade

Cost: \$2,500

Nitrogen and Phosphorus Removal

Operational Cost Savings: Reduced Electrical Consumption



Biological phosphorus removal provides an effluent total-phosphorus concentration of 0.15 mg/L at Conrad's 0.5 MGD extended aeration plant. Sludge from the periodically aerated sludge holding basin returns to the aeration basin, resulting in a 94% total-P reduction. This is accomplished without any chemical addition and without filtration at a plant not designed for nutrient removal.

Nitrogen removal is achieved by cycling aeration on and off throughout the day. The mixed liquor concentration has been increased from 1500 to 5000 mg/L. Effluent total-N now averages 7 mg/L; an 80% reduction from 35 mg/L before the process changes.

The current mode of operation is as follows. During the summer Conrad operates the aeration tank to receive air for 3 hours followed by 2 hours without aeration. During the winter, including periods of -20° F weather, Conrad operates the aeration tank to receive air for 2 hours followed by 1½ hours without aeration. The sludge digester receives the same amount of aeration as the aeration tanks.

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