

CHALLENGE

Underground **leaks, EHS exposure** and discharge risk resolved on a 10,000+ ton campus chilled-water loop — without shutdown

A 10,000+ ton university district cooling loop had known underground piping leaks, continuous nitrite top-up to ground, weekly manual handling of a skin-sensitizing biocide, and a deteriorating microbiological and corrosion profile. A capital pipe-replacement project was on the table — along with EPA discharge exposure of \$103,445–\$293,445 per day, per incident.

UNIT SERVED

University · 10,000+ tons

KEY ISSUE

Underground leaks · EHS · Discharge

RISK

EPA penalties / day-per-incident

OUTCOME

Shutdown & capex avoided

CHALLENGE

What was happening

Continuous nitrite addition replacing inventory lost to underground leaks. Weekly manual top-up of an Isothiazolin biocide — a skin sensitizer with splash exposure to staff. Baseline trending the wrong way: corrosion 2.5 mpy, ATP 560 RLU, nitrite degradation ≈50% over 20 days. Each leak discharging nitrite-laden water to soil and groundwater was a potential reportable EPA incident at \$103,445–\$293,445 per day.

INTERVENTION

What we did

Designed a two-phase program inside the plant's constraints — no drain, no flush, no shutdown. Phase 1: non-foaming biodispersant to mobilize biofilm and deposits, paired with a graduated filtration step-down by pore size. Phase 2: replaced the nitrite/Isothiazolin program with a non-nitrite, non-phosphate corrosion inhibitor compatible with the campus discharge profile and safer for routine handling.

PROOF · BASELINE > AFTER

1. **Corrosion:** 2.5 mpy > <0.1 mpy (25× improvement).
2. **Microbiological:** ATP 560 RLU > <10 RLU (56× improvement).
3. **Inhibitor stability:** non-nitrite chemistry held its residual instead of degrading 50% in 20 days.
4. **EHS:** skin-sensitizing biocide eliminated from weekly manual handling.

VALUE DELIVERED

\$500K+ avoided

plus EPA discharge exposure removed

Capex deferred	\$500K pipe project
EPA exposure	\$103K–\$293K / day
Corrosion	25× lower
ATP / microbial	56× lower
Chem OPEX	Higher, fully offset

Closed loops get neglected — until they can't. Once corrosion, microbial activity and leaks compound, the default playbook is drain, flush, refill or full capital replacement. A first-principles review can often restore the loop in service and clear the EHS and discharge risk without the shutdown or the capital project.