

Mobile Water Nitrate Treatment Plant for Handling Affected Regions – Sales Packet

System Overview • Vessel Sizing • Engineering Analysis

Prepared for: LOTRAM LLC / OptimumALS

Introduction

This is a containerized water treatment plant designed for rapid deployment in rural, emergency, nitrate-affected regions. The plant treats raw surface water (lake or river) using specialized anion exchange resin and is housed in a fully self-contained 10 ft x 40 ft shipping container.

It was built to support a new housing development in Chino California. Permit No. SSP033 was included with plant paperwork. It suggests that the plant operated for less than five years. It was later removed from service when the community water system was connected. It appears in excellent condition and has the original components, including spare parts. Our intended project was cancelled; therefore, the never put it in service.

This system is ideally suited for organizations seeking fast, mobile, and compliant water treatment solutions with high nitrate removal efficiency. Contact us for availability, inspection, or delivery logistics. Extensive photos and videos can be found on our website www.Lotram.com

We are including our analysis of the potential capabilities of this plant. It is included to facilitate your consideration of the purchase.

However, the normal disclaimer is included.

Disclaimer

The information provided herein is for general informational purposes only. While every effort has been made to ensure accuracy, no representation or warranty, express or implied, is given regarding the completeness, reliability, or suitability of this information for any particular purpose. Users are responsible for making their own independent evaluations and determinations before relying on any information or making purchasing decisions.

System – Overview

Key Selling Features

Note: This system is designed specifically for nitrate removal. It does not include tannin-selective resin and is not intended for tannin or humic substance reduction. If tannin reduction is required, pretreatment would be necessary.

- Container Size: 10 ft x 40 ft steel seartrain (mobile & self-contained)
 - Filter Vessels: 16 pressure vessels in parallel
 - Media Type: Strong Base Anion (SBA) resin
 - Primary Function: Removes nitrates (NO₃-).
- Special Feature: ResinTech SIR-100-HP is nitrate-selective, designed to preferentially remove nitrates even in the presence of sulfates and other competing anions. This prevents nitrate dumping and retains operating capacity in high-sulfate waters.
- Monitoring: Integrated nitrate output meter
 - Regeneration: Brine line included for NaCl regeneration
 - Proven configuration for lake or river water
 - It has a large collection of component manuals.

System Components

- 16 Pressure Vessels – each pre-loaded with SBA (Strong Base Anion) resin for nitrate removal
- Brine System – includes brine injection lines, and regeneration controller
- Dual 6-inch Headers – for balanced flow across vessel banks

Control & Monitoring

- HACH SC100 Digital Controller – for real-time nitrate concentration monitoring
- SmartRTU with PLC Logic – handles vessel cycling and brine regeneration
- Controller Modules for Each Vessel Pair – enables modular operation and diagnostics
- Electrical Distribution Panel – wired for single-point external power connection
- Conductivity measurement probes.

Estimated Service Record

- Permit SSP033 April 12, 2013, through April 12, 2016.
- Hach Service tag: Last Service 9/20/17 next service due 3/18.
- Suggesting that this plant was operated for less than 5 years.

Application Scenarios

- Humanitarian aid and disaster relief
- Temporary or emergency potable water supply
- Rural communities with nitrate-contaminated sources
- Surface water treatment in agricultural regions

System Advantages

Note: Originally permitted in California in 2013, this plant was designed to meet U.S. EPA and California drinking water standards for nitrate (10 mg/L as N). Its containerized, turnkey design makes it ideal for emergencies or temporary use worldwide. Buyers must confirm compliance with local regulations at the deployment site. Meets California nitrate compliance expectations

Vessel Sizing Methods (with Nitrate-Selective SBA Resin)

- Per-vessel flows (based on 35" ID, 4' bed, 26.7 ft³ resin):
 - 3 gpm/ft² → 20 gpm, EBCT ≈ 10.0 min (upper safety margin)
 - 4 gpm/ft² → 27 gpm, EBCT ≈ 7.5 min
 - 5 gpm/ft² → 33 gpm, EBCT ≈ 6.0 min (within nitrate resin vendor range)
 - 6 gpm/ft² → 40 gpm, EBCT ≈ 5.0 min (nitrate resin target EBCT)
 - 8 gpm/ft² → 53 gpm, EBCT ≈ 3.7 min (lower bound of nitrate resin acceptable range)

Engineering Analysis

Vessels & Headers

System Configuration

- Vessels: 16 × FRP pressure vessels
 - OD: 36", ID ≈ 35" (≈6.68 ft² area)
 - Bed depth: 4.0 ft (≈26.7 ft³ media volume each)
- Headers: Dual 6" PVC Sch 80 (per run ~40' length)
 - First 12' section carries full flow, remainder progressively reduces via tees
 - Assumed velocity cap: 8 ft/s (per header)

Operating Envelope

- Per-vessel service flow:
 - 20 gpm @ 3 gpm/ft² (EBCT ≈ 10 min)
 - 33 gpm @ 5 gpm/ft² (EBCT ≈ 6 min)
 - 40 gpm @ 6 gpm/ft² (EBCT ≈ 5 min)
 - 53 gpm @ 8 gpm/ft² (EBCT ≈ 3.7 min)
- System capacity (16 vessels total):
 - Vessels: 320–640 gpm within 3–6 gpm/ft² range
 - Headers: Max ~855 gpm at 8 gpm/ft² (under 8 ft/s header velocity with two parallel runs)

Hydraulic Performance

- Header velocities per pipe: 2–5 ft/s across operating range
- Total header friction loss (40' run, C≈150 PVC): ~0.06 psi
- No inline valves or restrictions; only straight-through tees

Key Points

Performance values assume nitrate-selective SBA resin. EBCT range of 3–6 minutes is consistent with vendor recommendations for nitrate removal; higher EBCT values are conservative safety margins.

- Dual 6" headers safely carry total flow under 8 ft/s cap
System governed by vessel/media performance, not header hydraulics
- Header capacity allows for additional vessels added externally to the plant. Thereby increasing capacity where and when needed.
- Provides 320–640 gpm practical design flow with EBCT in the 5–10 min range

Additional Equipment

PolyProcessing SAFE-Tank® Double-Wall Tanks

These tanks were purchased at the same time as the Plant.

Four PolyProcessing SAFE-Tank® systems available

Primary capacity: 8,700 gallons; Secondary containment: 10,150 gallons

Tank-within-a-tank design for spill prevention

Hydrotested by a third party; water-only service

See additional Data on www.Lotram.com