Dual Snyder 4,500-gallon polyethylene tanks on concrete containment pad — LibertyCES field installation. Stage 1 FOG holding tank (left) and Stage 2 pH blending tank (right) inside double containment structure.

CASE STUDY — INDUSTRIAL WASTEWATER TREATMENT

Cleaning Up.

How a fully automated pH neutralization system turned 3.3 pH discharge into city-compliant effluent — and eliminated every compliance risk in the process.

CLIENT	INFLOW pH	TARGET pH	DAILY VOLUME	SYSTEM TYPE
Mfg. Plant	**3.3 (Corrosive)**	**5.5–6.5 (Compliant Range)**	**20,000–40,000 GPD**	**Fully Automated, 2-Stage**

Engineered and authored by James Riggins — Founder & Lead Spec Solutions Partner, LibertyCES
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SECTION 01

THE PROBLEM

What was actually at stake — and why manual treatment was never going to be the answer.

> ***At 3.3 pH, this wasn't a wastewater problem. It was a liability sitting one inspection away from a shutdown.***

3.3 pH
DISCHARGE ACIDITY
Incoming wastewater — corrosive, non-compliant with city sewer standards

50×
ABOVE FEDERAL FLOOR
3.3 pH is 50× more acidic than the 5.0 pH federal pretreatment threshold

$25K /day
MAX CIVIL PENALTY
Per-day civil penalty exposure under municipal pretreatment rules

What the Plant Was Dealing With

A small manufacturing plant was discharging wastewater into the municipal sewer at a pH of 3.3. The city required effluent to test above 5.5 pH before entering the system. The gap between those two numbers was the entire compliance problem — and it was not small.

A pH of 3.3 is roughly 5,000 times more acidic than neutral water and 50 times more acidic than the federal pretreatment floor of 5.0 pH, below which discharge into a public sewer is federally prohibited. At peak operation, the plant was discharging between 20,000 and 40,000 gallons of this water per day — 14.6 million gallons per year of sub-5.0 pH effluent entering public infrastructure. The city's concrete sewer pipes, joints, and manholes were being slowly eaten from the inside.

Municipal administrative penalties for this type of violation run $1,000–$5,000 per day. Civil penalties reach $25,000 per day. Permit revocation and mandatory shutdown are also on the table. This was not a problem the plant could manage indefinitely with a manual dosing routine.

Why Manual Treatment Wasn't Going to Work

Having an operator manually add caustic and check pH fails for several reasons. It requires someone physically present at every discharge event. Manual batch dosing consistently overshoots or undershoots, producing pH spikes that are non-compliant in the opposite direction. And it generates no documentation — when a regulator asks for discharge records, "the operator checked it" is not a compliance record.

What this plant needed was a system that never slept, never guessed, and never forgot to file the paperwork.

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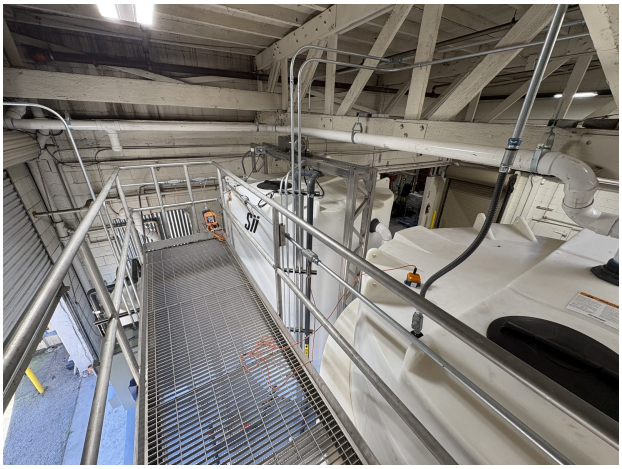
On the numbers. A well-designed automated dosing system reduces chemical waste by 10–30% versus manual batch dosing — because variable-rate feed matches actual demand. On labor, eliminating continuous manual monitoring typically saves $25,000–$100,000+ per year. Automation pays for itself. Non-compliance does not.



Elevated view of the LibertyCES wastewater pH treatment installation — Snyder tanks, catwalk access structure, process piping, and Prominent instrumentation visible. This is a real system inside a real manufacturing facility.

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SECTION 02

THE SOLUTION

Contain. Transfer. Neutralize. Verify. Discharge. Document.

How the System Works

LibertyCES engineered a two-tank sequential treatment process. Acidic wastewater enters Stage 1 for containment and level monitoring. Once it reaches a set volume, it transfers automatically to Stage 2, where caustic is metered in under PLC control, mixed to chemical homogeneity, verified at target pH, and discharged to sewer — with every event documented in an automated email report. From inflow to compliant discharge, a human hand does not touch a single valve.

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STAGE 1 — PRIMARY CONTAINMENT

The FOG Tank

All acidic inflow is diverted into a **4,500-gallon Snyder holding tank** — the FOG tank. The first physical barrier between the plant's process water and the public sewer. The tank sits inside a double containment structure. If the vessel fails, the containment holds. Nothing acidic reaches the floor or the drain.

A **Prominent non-contact radar unit (AP05)** monitors liquid level continuously. At approximately **115 inches**, the PLC activates the transfer pump. No operator decision required.

STAGE 1 SPECIFICATIONS

Tank	**4,500-Gal. Snyder — Holding / FOG**
Containment	**Double-wall secondary**
Level Sensor	**Prominent Radar Unit AP05**
Transfer Trigger	**~115 in. — PLC automatic**
Inflow pH Monitor	**Prominent pH Sensor AP00**
Inflow pH	**3.3 (Corrosive)**

Prominent Gamma X metering pump — variable-rate caustic injection unit. Electronic stroke-length adjustment, max 7 GPH, Dialog X controlled.

Prominent non-contact radar level sensor (AP05) mounted on Snyder tank — green status LED active, orange signal cable running to Dialog X controller. 115-inch trigger activates transfer pump.

STAGE 2 — ACTIVE NEUTRALIZATION

The pH Blending Tank

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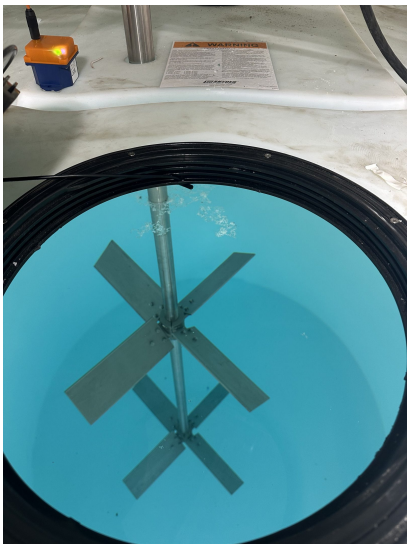
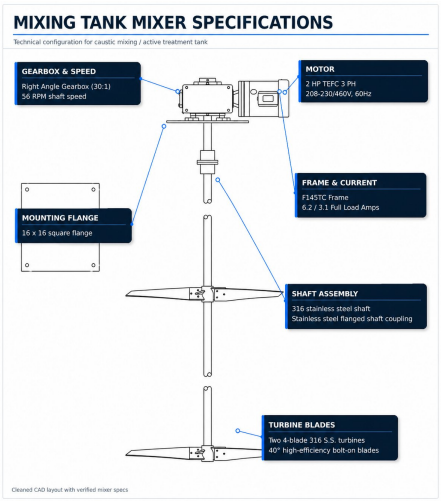


Top-down into the pH blending tank — Grovhac 316 SS turbine blades submerged in blue caustic solution. Two 4-blade high-efficiency turbines at 56 RPM output.



Grovhac mixer technical specification diagram — motor, gearbox, shaft, and turbine assembly.

When the FOG tank triggers, the transfer pump moves the waste into a second **4,500-gallon Snyder treatment tank**. This is where neutralization actually happens.

The treatment tank runs a **Grovhac industrial mixer** continuously. This is not incidental equipment — it is a hard requirement for accurate pH sensing. An unmixed tank stratifies: caustic floats, acid sinks, the probe reads a false average. You dose on bad data, you overshoot, you discharge out of spec. The Grovhac mixer prevents exactly that.

GROVHAC MIXER — INSTALLED SPECIFICATION

Motor	**Grovhac — 2 HP, Continuous Duty**
Voltage	**208–230/460V, 60Hz, 3-Phase**
Frame / Enclosure	**F145TC / TEFC**
Full Load Amps	**6.2A (230V) / 3.1A (460V)**
Motor Speed	**1,740 RPM**
Gearbox	**Right-Angle, 30:1 Ratio**
Shaft Output	**56 RPM**
Turbine Assembly	**Two 4-Blade, 316 SS, 40° HE**

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SECTION 03

DOSING LOGIC & SYSTEM CONTROL

How the Prominent Dialog X manages every variable, in real time, without human input.

The Brain of the System

Every decision this system makes — when to transfer, how much caustic to add, when the water is clean enough to discharge, how to document the event — runs through the **Prominent Fluids Dialog X controller**. It is a PLC that speaks directly to every sensor and every pump. It does not wait for human input. It acts on data.

01

Inflow pH is read at the FOG tank inlet.

Prominent pH Sensor AP00 measures continuously. The system knows exactly what it is receiving before it commits to a treatment volume.

02

The FOG tank fills to the transfer threshold.

Prominent Radar Unit AP05 monitors level in real time. At approximately 115 inches, the Dialog X activates the transfer pump — automatically.

03

Waste transfers to the pH blending tank.

The transfer pump moves acidic water into Stage 2 while the Grovhac mixer runs continuously, preventing chemical stratification at all times.

04

The Prominent Gamma X metering pump injects caustic.

50% concentration caustic is drawn from a double-contained 1,000-gallon mini-bulk tank and injected at up to 7 gallons per hour. The Dialog X ramps stroke rate up or down in real time, matching feed to actual pH demand — not a fixed preset.

05

Outflow pH is verified at sensor AP02.

The system does not authorize discharge until the outlet pH sensor confirms pH is within the compliant range of 5.5–6.5. If the target is not met, the system holds. Nothing exits.

06

Compliant effluent discharges through the GF Mag-Meter.

The electromagnetic flow totalizer (AP17) records gallons per minute and cumulative volume to sewer. The Dialog X logs everything.

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07

An automated email report is sent to the plant owner.

Volume discharged, final pH, timestamp — every event documented without human action. This is the compliance record.

Vertical process piping manifold with 'WASTE WATER' labeled black pipes, ball valves, and sensors — inflow routing from manufacturing process into the FOG holding tank.

Prominent non-contact radar level sensor (AP05) — orange housing, green active status LED, mounted on Snyder tank. Continuously monitors liquid level and triggers transfer pump at ~115 inches.

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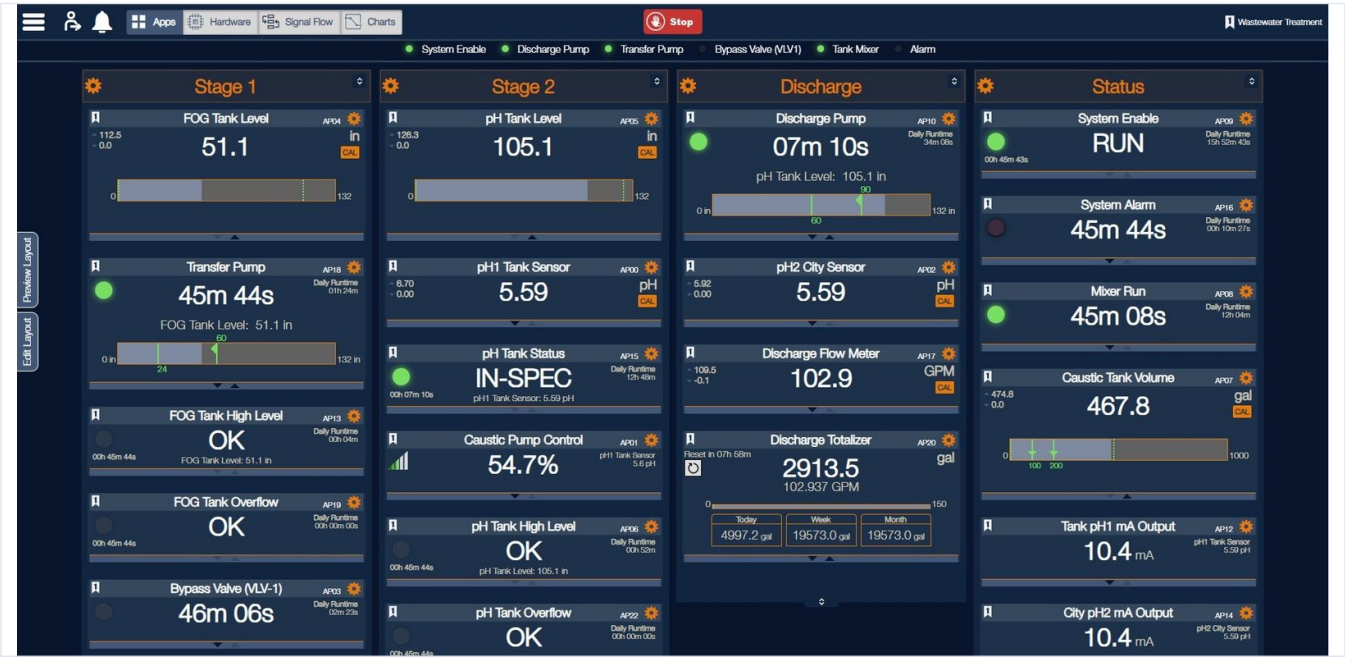
SECTION 04

LIVE MONITORING, SAFETY & FINAL DISCHARGE

What operators actually see — and what happens when something falls out of spec.

What the Dialog X Sees

The Dialog X platform provides remote access to the full system state at any time, from any computer. No on-site visit required. The screenshot below is the actual monitoring dashboard from this installation, running live.



Prominent Dialog X live monitoring interface. Stage 1: FOG tank at 51.1 in. Stage 2: pH tank at 105.1 in., caustic pump control 54.7%, pH1 sensor 5.59, status IN-SPEC. Discharge: 102.9 GPM, totalizer 2,913.5 gal. Caustic tank volume: 467.8 gal. remaining.

Reading the Dashboard

The interface shows four operational panels. **Stage 1** — FOG tank level, transfer pump runtime, overflow status. **Stage 2** — pH tank level, pH1 sensor reading (5.59 at time of capture), caustic pump control percentage (54.7%), tank high-level OK. **Discharge** — discharge pump runtime, outflow pH (5.59 city sensor), flow rate (102.9 GPM), and a running totalizer showing 2,913.5 gallons sent this cycle, 19,573 gallons this week. **Status** — SYSTEM ENABLE RUN, mixer runtime, caustic tank volume, both pH mA output signals. Everything visible here is also accessible remotely. The owner sees what the system knows, when it knows it.

SAFETY & ALARM SYSTEMS

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What Happens If Something Goes Wrong

The system includes an **Edwards Signaling horn/strobe alarm unit** that triggers on any fault — pH exceedance, overflow, pump failure, or communication loss. 90 dBA at 10 feet. 1 flash per second strobe. No ambiguity about whether it is active.

EDWARDS HORN/STROBE — SPECIFICATION

Sound Level	**90 dBA nominal @ 10 ft.**
Flash Rate	**~1 fps (strobe)**
Voltage	**120V AC or 24V AC/DC**
Operating Temp	**32–150°F (indoor/outdoor)**
Mount Options	**Surface indoor, outdoor, flush/panel**
Model Series	**867STR / 868STR / 869STR**

Discharge to sewer is conditional. The Dialog X authorizes the discharge pump only after pH Sensor AP02 confirms outflow is within the compliant 5.5–6.5 pH range. If the target is not reached, the system holds.

A **George Fischer electromagnetic mag-meter (AP17)** records every gallon discharged — GPM and cumulative total. The Dialog X captures this and automatically emails the plant owner after each discharge event: volume sent, final pH, timestamp. That email is the compliance record. It requires no manual entry. It is generated every time.

Full installed system — Dialog X control panel (wall-mounted), Snyder treatment tank, and chemical feed piping. All components integrated and commissioned by LibertyCES.

Prominent non-contact radar level sensor mounted on top of Snyder tank — orange housing with green active status LED. Provides continuous level data to the Dialog X controller.

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SECTION 05

EQUIPMENT — FULL BILL OF MATERIALS

Every component specified, verified, and installed. No substitutes. No catalog guesses.

The following is the complete equipment specification for this installation as designed by James Riggins. Every item was selected for material compatibility, duty cycle, and long-term reliability under continuous industrial service. No manufacturer paid for inclusion in this document.

TANKS & CONTAINMENT

COMPONENT	MODEL / DETAIL	FUNCTION
4,500-Gal. Snyder Holding Tank	Snyder polyethylene	Stage 1 FOG tank. Double-wall secondary containment. Inflow buffer. Radar level sensor AP05.
4,500-Gal. Snyder Treatment Tank	Snyder polyethylene	Stage 2 pH blending tank. Grovhac mixer installed. Active caustic neutralization.
1,000-Gal. Mini-Bulk Chemical Tank	Double-contained mini-bulk	Caustic storage — 50% concentration. Double-contained. Feeds Gamma X metering pump.

PUMPS & CHEMICAL FEED

COMPONENT	MANUFACTURER / TYPE	FUNCTION
Prominent Gamma X Metering Pump	ProMinent Fluid Controls	Caustic injection. Max 7 GPH. Electronic stroke-length adjustment. Variable rate. Dialog X controlled.

INDUSTRIAL MIXING EQUIPMENT

COMPONENT	MANUFACTURER / TYPE	FUNCTION
Grovhac AC Motor	Grovhac Inc. — 2HP, TEFC, 3-Phase	208–230/460V, 60Hz. 1,740 RPM. Continuous duty.
Grovhac Mixer Assembly	Grovhac Inc. — Right-angle gearbox	30:1 ratio. 56 RPM shaft output. Two 4-blade 316 SS turbines, 40° HE, bolt-on.
Grovhac Series 700 Direct Drive	Grovhac Inc. — .25 to 1.00 HP	Direct drive at 1,725 RPM. Available TEFC, air-drive, explosion-proof, variable-speed.

CONTROLLERS, SENSORS & METERS

COMPONENT	MANUFACTURER / TYPE	FUNCTION
Prominent Dialog X Controller	ProMinent Fluid Controls — PLC	Full process management. Remote online monitoring. Auto email compliance reports per discharge event.
Prominent Radar Level Units	ProMinent — Non-contact radar	Continuous level monitoring on FOG tank and treatment tank. Triggers transfer pump at ~115 in.

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Prominent pH Sensors	ProMinent — Inflow & outflow	Active acidity measurement. Outflow sensor gates discharge authorization within compliant 5.5–6.5 pH range.
GF Electromagnetic Flow Meter	Georg Fischer (GF)	Records GPM + cumulative gallons discharged. Data logged by Dialog X. Compliance record.
Edwards Signaling Horn/Strobe	Edwards Signaling	90 dBA @ 10 ft, 1 fps strobe. Fault alarm for pH exceedance, overflow, pump failure.

GROVHAC SERIES 700 DIRECT DRIVE — AVAILABLE CONFIGURATIONS

The Grovhac Series 700 Direct Drive line covers .25 HP through 2.00 HP at 1,725 RPM. Available in electric TEFC, air-drive, explosion-proof, and variable-speed configurations. Mount options include 16×16 sq. flanges, 150# flanges, double mechanical seal, stuffing box, and angle mount. Contact LibertyCES for selection and sizing specific to your tank volume, viscosity, and chemical compatibility requirements.

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LIBERTYCES

Your next non-compliance event will cost more than this system did.

James Riggins has been engineering industrial chemical feed and water treatment systems for over 30 years. Zero spec failures across 100+ municipal and industrial installations.

LibertyCES is not a catalog. We design the system, specify every component, and own the outcome. When the system underperforms, James answers the phone — not a manufacturer's 800-number.

CALL JAMES DIRECTLY

559-395-5500

Engineering line. James picks up.

EMAIL

james@libertyces.com

Direct to James — not a form.

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→ Industrial Wastewater pH Control Systems — libertyces.com/industrial-wastewater-ph-control

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