



CI SUPPORTLAB™ · BG · LIVE READINGS · ALERTS · RECORDS

A boiler runs 168 hours a week.
The water-treatment record should
reach beyond the next manual test.

REMOTE BOILER & CONDENSATE MONITORING

BoilerGuard

Your boiler plant, on your phone.

FIVE SIGNAL GROUPS / SEVEN SENSORS / EVERY FIVE MINUTES*

*Pro configuration. Reporting interval and sensor coverage vary by service level.

A clearer picture of the boiler plant.

From the sample line to the decision, the response and the record.



Five signals. Seven sensors.
A service built around the hours
between manual tests.

01	What changes	03	02	The app	05
	The operator's week and the scope of the service.			Three mornings, three decisions, one interface.	
03	The dashboard	09	04	Alerts	11
	Whole-plant context, trends and exports.			Thresholds, first moves and escalation.	
05	What it reads	14	06	Records & reports	17
	Five groups, seven sensors and CI360 chemistry.			The log, business context and data handling.	
07	Field hardware	20	08	Service levels	23
	Panel, sensors and ongoing maintenance.			Lite, Pro and Enterprise side by side.	
09	Fit Check	24			
	Sampling arithmetic, site worksheet and commissioning.				

THE BOILERGUARD PROMISE

Readings with context.
Alerts with a next move.
A record that stays with the plant.

The panel is in the boiler room. The picture is on your phone.

Five signal groups. Seven sensors. Every five minutes with Pro.

CI BoilerGuard puts a sample-conditioning panel on the feedwater, blowdown and condensate lines, and a live picture of the plant in an app. Boiler water conductivity, feedwater ORP and temperature, condensate pH and conductivity, and makeup measured against condensate return report every five minutes to a phone, a tablet and a browser. Readings arrive with the band they should be inside. Alerts arrive with what to do next. The log writes itself.

ONE WEEK AT THE SAME PLANT

NOW • TESTS WHEN THERE IS TIME		WITH BOILERGUARD • SAME STAFF	
MON	Two tests, one log sheet Conductivity and sulfite drawn at the sample cooler, written on the sheet, keyed in at month end if at all.	MON	2,016 readings Pro: seven sensor channels, every five minutes, visible on the phone.
TUE	No test The shift was short and the boiler was steaming fine. Whatever happened at 04:00 happened unrecorded.	TUE	Nothing needed The screen says every band held overnight. That is a reading too, and it is on file.
WED	Blowdown “for a while” Conductivity read high at 14:05. The valve was opened and closed by feel. Nobody records how long, or what it cost.	WED	Blowdown with a number Conductivity, the setpoint and the recovery curve, so the valve closes when the cycles are right rather than when someone remembers.
THU-FRI	Two tests, both fine Both in range. The forty hours between them are an assumption, not a record.	THU	One task, for a reason Cell clean and calibration - not a walk to the sample cooler to take a number.
SAT-SUN	Plant unattended Fifty-two hours. The softener regenerated on a stuck valve at 03:00 Saturday and nobody knew until Monday.	SAT 03:12	Hardness alert Optional hardness analyser flags a breakthrough for operator investigation.

ILLUSTRATIVE WEEK / PRO CONFIGURATION

Seven channels at five-minute intervals produce 2,016 parameter readings per day, per monitored array. The hardness example requires the optional makeup hardness analyser. Event times illustrate a scenario, not a detection guarantee.

More of the week becomes visible.

The value is the decision you can make with a reading, and the record behind it.

GAIN 01

The call-in you do not make

Weekend and holiday trips exist to read three numbers. When the numbers arrive on their own, the trip is made when there is something to do at the other end.

GAIN 02

The restart you do not lose

Oxygen enters an idle boiler and meets bare steel at the first firing. A routine daytime test schedule can miss that first firing period.

GAIN 03

The cycles you stop guessing at

Blowdown by conductivity instead of by habit. US EPA puts the move from manual to automatic blowdown control at 2-5% of boiler energy and up to 20% less blowdown; the record helps diagnose the opportunity; BoilerGuard does not automate blowdown. See published context on page 18.

GAIN 04

The log you do not retype

Daily minimum, maximum and average per parameter, alerts and acknowledgements, exported in the shape an insurer, an inspector or an energy audit asks for.

WHAT THIS SERVICE IS, AND WHAT IT IS NOT

BOILERGUARD DOES

- Show boiler water conductivity, feedwater ORP and temperature, condensate pH and conductivity, and makeup against condensate return, on phone and browser.
- Learn this plant's own rhythm - firing pattern, weekend shape, seasonal load - then alert on departure from it.
- Send an alert that states the reading, the consequence, and the first three moves.
- Build the water-treatment log and the exports that support insurer, jurisdictional and energy reporting.
- Connect a measured condition to the CI360 boiler chemistry that answers it.

BOILERGUARD DOES NOT

- Control anything. Nothing in the app opens a blowdown valve, strokes a chemical pump, or moves a controller setpoint.
- Replace the wet tests. Sulfite, orthophosphate, nitrite, alkalinity and hardness titrations remain the operator's and the CI technician's work.
- Replace the operator, the chief, or the jurisdictional inspection.
- Require a new control system, a DCS project, or a plant shutdown to install on most sites.
- Report a number without context. A conductivity reading with no limit behind it is not a service.

MONITORING, NOT CONTROL

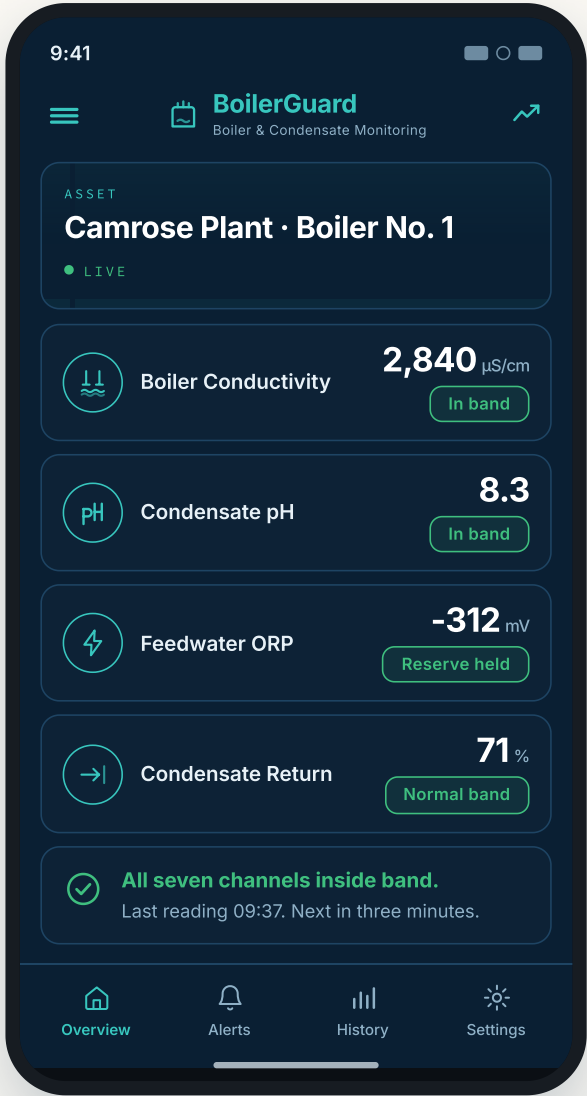
The panel is installed on an isolated, read-only monitoring path fed by a cooled, pressure-reduced sample line.

Sensors read the plant; they cannot operate it. There is no button in the app that changes how the boiler runs.

Firing, blowdown, chemical feed and every safety function remain with the plant's own controls and the certified operator.

An ordinary Tuesday.

Most mornings, the useful answer is that nothing needs attention.



MORNING A

The test you did not walk out for

TUE 09:41 • ALL CLEAR

You were going to pull a sample and titrate for sulfite before the 10:00 round. The reserve is on the screen as an ORP band, taken three minutes ago, and the overnight minimum is already logged. The titration still happens on its schedule - it now confirms a record instead of being the whole record.

READINGS TODAY 2,016 seven sensors, every five minutes	REPORTING GAP 0 h illustrative complete data capture
OVERNIGHT LOW 8.1 pH condensate at 04:20, recorded while the plant was empty	NEXT HANDS-ON TASK Thu cell clean and calibration, not a reading

WHAT THE OPERATOR DOES NEXT

1

Open, glance, close. Four seconds. The verdict is next to every number, so nothing has to be interpreted.

2

Do nothing. No alert means no configured threshold is currently open. The service earns most of its keep on the days it says this.

3

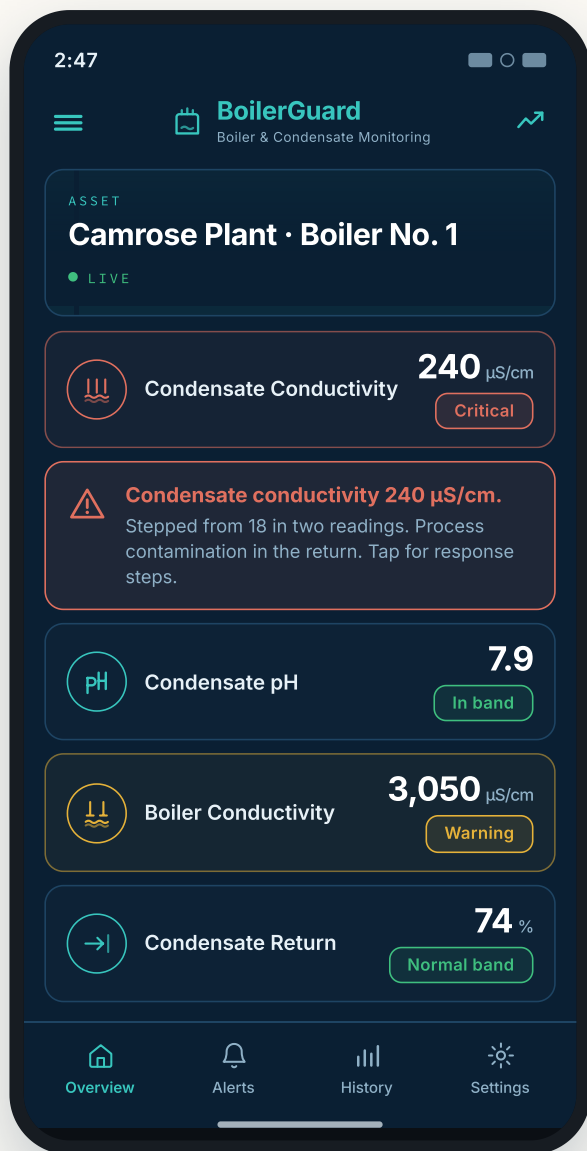
The log writes itself. Two thousand readings land in the record without anybody keying them in.

ILLUSTRATIVE INTERFACE / SITE-COMMISSIONED BANDS

Readings and outcomes are representative examples. ORP is a proxy for reducing conditions; it does not directly measure sulfite reserve or dissolved oxygen. Continue scheduled wet tests. Alert delivery depends on service level and connectivity.

The return changes at 02:41.

A contamination step reaches the phone while there is still a decision to make.



MORNING B

The contamination that arrived at 02:41

WED 02:47 • CRITICAL

A heat exchanger opened up and the return line began carrying process fluid toward the deaerator. On a morning-test plant this reaches the drum first and gets diagnosed a day later as foaming, carryover, or a mystery conductivity rise. Here the step was two readings wide and the alert went out six minutes after it started.

STEP DETECTED

02:41

18 $\rightarrow$ 240 $\mu\text{S}/\text{cm}$ in ten minutes

ALERT ISSUED

02:47

Pro example: push, SMS and email

RETURN DIVERTED

02:58

by the operator, logged with a name

BOILER WATER PEAK

3,050

$\mu\text{S}/\text{cm}$ - below the site limit; no boil-out required

WHAT THE OPERATOR DOES NEXT

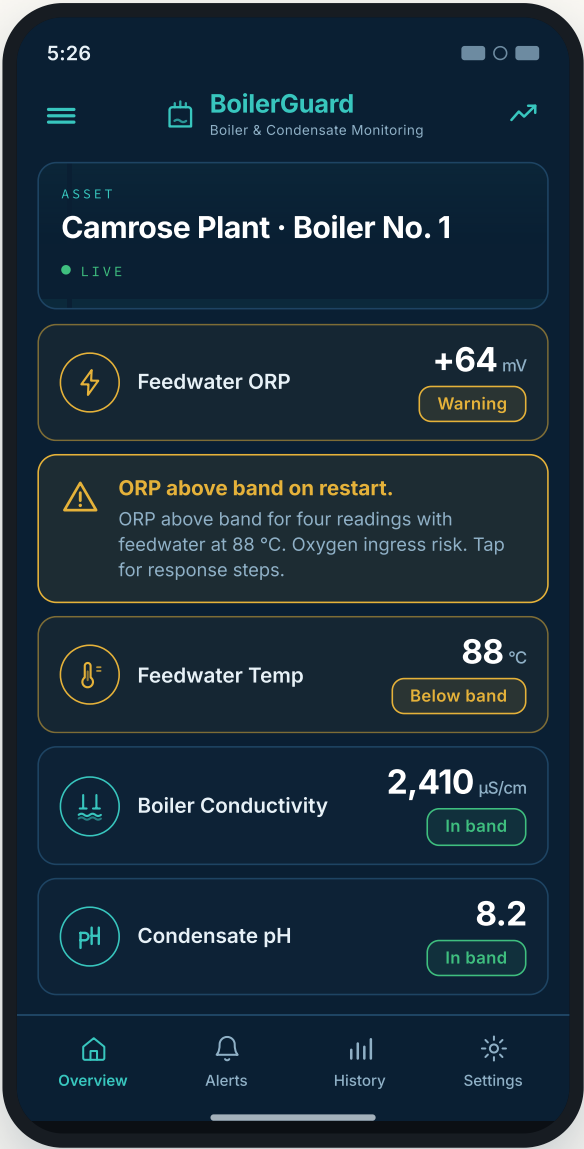
- Follow the approved procedure to divert a suspect return.** The first move protects the drum. Everything after that can be worked out with the boiler still clean.
- Isolate the heat users one at a time.** The trace shows exactly when the step started, which narrows the list to whatever changed at 02:41.
- Keep the trace.** It is the evidence behind the exchanger repair, the insurance file, and the conversation about who pays for it.

ILLUSTRATIVE INTERFACE / SITE-COMMISSIONED BANDS

Readings and outcomes are representative examples. ORP is a proxy for reducing conditions; it does not directly measure sulfite reserve or dissolved oxygen. Continue scheduled wet tests. Alert delivery depends on service level and connectivity.

The Monday restart.

Read feedwater ORP together with temperature, then confirm the cause.



MORNING C

A restart that needs attention

MON 05:26 • WARNING

The plant came down Friday afternoon and back up at 05:00 Monday. The deaerator has not reached temperature, the reserve went during the idle period, and the boiler is firing on aerated water. This can be a high-risk period in the plant’s week, and a routine test schedule may not capture it.

ALERT ISSUED 05:26 four readings above the ORP band	FEEDWATER TEMP 88 °C against a 104 °C deaerator setpoint
SCAVENGER DRUM 11% day-tank level add-on flagged it Friday	BACK IN BAND 07:05 reserve restored, resolution logged

WHAT THE OPERATOR DOES NEXT

1

Read the pair, not the number. ORP above band with feedwater below temperature points first to deaeration. ORP above band at temperature points first to the feed system.

2

Confirm the drum and the pump before increasing the dose. A scavenger that is not in the tank cannot be increased.

3

Follow the approved restart procedure while the deaerator comes up, under the certified operator’s direction. Confirm recovery with wet testing.

ILLUSTRATIVE INTERFACE / SITE-COMMISSIONED BANDS

Readings and outcomes are representative examples. ORP is a proxy for reducing conditions; it does not directly measure sulfite reserve or dissolved oxygen. Continue scheduled wet tests. Alert delivery depends on service level and connectivity.

Built for the person carrying it.

Asset, value, unit and verdict together. The open condition comes first.

1

The asset header, not a device ID

The boiler is named the way the crew names it - No. 1, the east unit, the new one - with a live indicator and the age of the last reading. If the link drops, the header says so rather than showing a stale number as if it were current.

2

Reading, unit, and verdict together

Every signal shows the value and its commissioned status. **2,840 μ S/cm** means nothing on its own to a relief operator at 03:00. **2,840 μ S/cm · In band** is a decision.

3

The banner sits on the signal that raised it

An open condition appears directly beneath the reading that caused it, in the colour of its severity, with the sentence an operator needs. Everything else on the screen stays quiet. There is no wall of red icons to learn to ignore.

4

Colour that survives a boiler room

Status is carried by a labelled pill and a border, not by colour alone - readable under a sodium light, readable in a truck at noon, and readable by an operator with colour vision deficiency.

5

History stays close to the reading

Any signal opens to its own 24-hour, 30-day and season traces. The blowdown sawtooth, the cycles achieved, the overnight minimum and last winter's same week are already calculated.

6

Acknowledgement is the record

Acknowledging an alert writes a name and a timestamp. That line is what answers the insurer's question a year later about who knew what, and when.

TWO SURFACES, ONE ACCOUNT

PHONE · THE DECISION SURFACE

For the sixteen hours a day nobody is at a desk

- Live values with their band, one screen, no configuration.
- Push alerts with the response steps inside the notification.
- Acknowledge with one tap; the log records who and when.
- Switch between boilers, loops and buildings from a list.
- Works on the cellular signal you already get in the plant yard.

BROWSER · THE ANALYSIS SURFACE

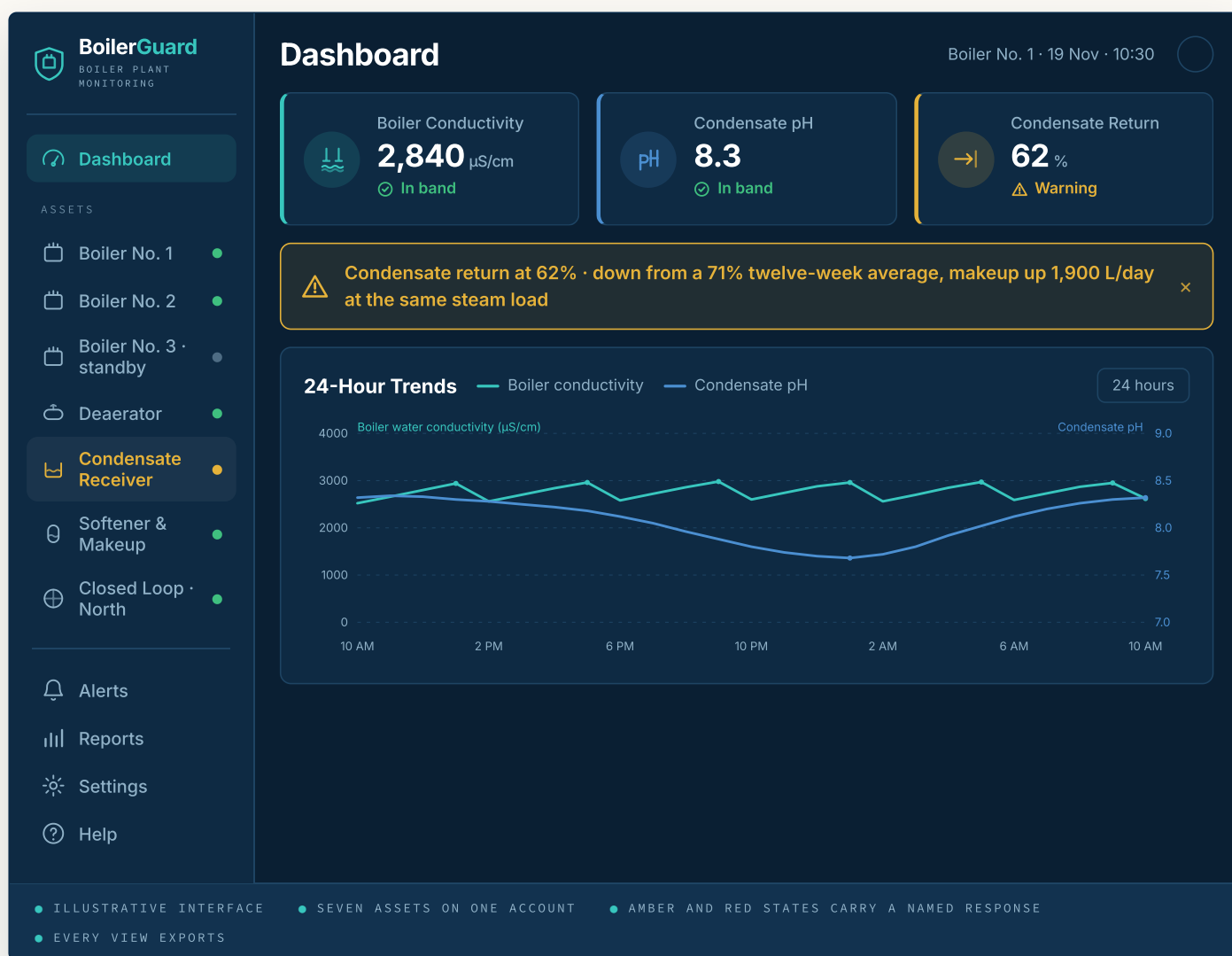
For the log, the trend, and the conversation with finance

- Every boiler and loop side by side with status at a glance.
- Overlaid traces, cycles of concentration, blowdown percentage and return percentage.
- Alert history with acknowledgement and resolution against every entry.
- Report generation and export in log and audit-ready formats.
- Role-based access for operator, administrator, viewer and inspector.

The week, explained. The record, ready to file.

Same data. More room for the trend, the comparison and the conversation.

The phone answers *what is happening now*. The dashboard answers *what has been happening, and what do I file*. Multi-asset sites get a rail with a status colour against every boiler, loop and receiver, so the first thing anyone sees on Monday is which asset moved over the weekend and which did not.



01 / WHOLE PLANT

Every asset has a state.

Boilers, loops, deaerators and receivers stay visible in one account.

02 / OPEN CONDITION

The exception gets the space.

A named warning sits above the chart with the reading and the change that caused it.

03 / SHARED RECORD

Every view exports.

Use the same record for analysis, a water-treatment log or a PDF report.

From a reading to an explanation.

Trends belong together. So do the operating context and the action record.

VIEW	SURFACE	STANDARD	ASSETS
BG-DB	Browser console · operator and administrator roles	Status before values · one open condition · every view exports	1-∞
WHAT THE CONSOLE IS SHOWING WHY IT BELONGS · OPERATOR NOTE			
1	Every boiler and loop on one screen	A status colour against each asset in the rail, so a plant with three boilers, a deaerator, a receiver and two loops sees the whole system before it sees any single number. The one that needs attention is the one that is not green.	
2	Cards carry the verdict, not just the value	Each signal shows its reading, its unit and its state. A warning card changes its border and its label; it does not rely on the operator remembering which conductivity number is close to the ABMA limit for this drum pressure.	
3	One banner for the open condition	The same rule as the phone. The condition that needs a decision sits above the charts, with the number and the rate of change inside the sentence.	
4	Trends read together, not one at a time	Conductivity and condensate pH on one 24-hour frame, because the shape of the pair is the diagnosis. A sawtooth that stops sawing means the blowdown valve is open, stuck, or the controller has quit - and that reads instantly as a flat line.	
5	Everything on the screen exports	The same view becomes a CSV, a PDF, or a formatted water-treatment log. Nothing is retyped into a spreadsheet to become a submission.	

DERIVED METRICS / CONFIRM THE INPUTS

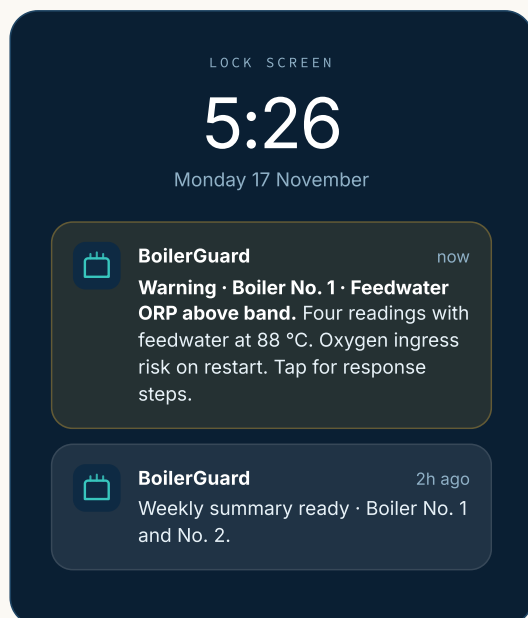
Cycles of concentration, blowdown percentage, return percentage and recovered-energy estimates turn data into operating context. Confirm the feedwater reference, flow balance, temperatures and calculation assumptions during commissioning; not every metric is directly measured by the seven-sensor array.

ACCESS IS SCOPED

Administrator, operator, viewer and inspector roles support multi-factor authentication. Read-only access can be scoped for an insurer or inspector. Reporting formats and integration are defined by the service tier.

A useful alert says what to do next.

Reading. Consequence. First moves. Expected recovery.



CHANNELS FOLLOW THE TIER

Lite delivers by email. Pro adds SMS and app push. Enterprise adds a phone call on an unacknowledged critical.

Whichever channels a site carries, the four-part wording is identical, so an operator reads the same thing on a lock screen, in an inbox, and in the console.

WHERE THE OPTIONAL HARDNESS ANALYSER IS FITTED

A detected hardness breakthrough with the boiler firing. Every hour of it lays deposit on a heated surface, and deposit is the only failure on this list that cannot be undone by feeding something afterwards. It is delivered on every channel the tier supports and it stays open until a person acknowledges it.

WARNING Z2 · Feedwater ORP · above band

BOILER NO. 1 · 05:26

WHAT

Feedwater ORP has risen to +64 mV and has been above the site band for four consecutive readings, with feedwater temperature at 88 °C against a 104 °C deaerator setpoint.

WHY IT MATTERS

An ORP rise above the commissioned band can indicate reduced scavenger effectiveness or a change in feedwater conditions. Dissolved oxygen reaching hot steel pits it, and pitting is localised, fast, and not reversible by chemistry after the fact.

WHAT TO DO

1. Confirm the scavenger day tank has product and the pump is stroking.
2. Check deaerator pressure, vent and steam supply before increasing the dose.
3. If ORP stays above band with feed confirmed, contact Chem International technical support before the next firing period.

EXPECTED RESOLUTION

With deaeration restored and feed confirmed, ORP should return to band within one to two hours. On a Monday restart a short excursion may occur – the trend across restarts, not the single reading, is what decides.

[VIEW LIVE DATA](#)

[ACKNOWLEDGE](#)

[CALL SUPPORT](#)

WHY THE LAST LINE IS THERE

“Expected resolution” is what separates a useful alert from an anxious one. It tells the operator whether this is an emergency, a watch item, or a normal feature of the plant they have never seen written down before. It is also what stops the 05:00 call that did not need to happen.

The band behind every verdict.

Illustrative threshold logic. Commission actual limits for the boiler, pressure and metallurgy.

SIGNAL Zone and sensor	WARNING Watch and diagnose	CRITICAL Act now	FIRST MOVE Before reaching for a product	ESCALATE ONLY IF...
Z3 Boiler water conductivity	85% of the site limit	Above the commissioned critical limit for the boiler	Confirm the blowdown valve position and the controller setpoint before touching chemical feed.	Conductivity will not fall at full blowdown, or it climbs with the valve open.
Z2 Feedwater ORP	Above band, three readings	Above band with feedwater below deaerator setpoint	Confirm the day tank and the pump. A scavenger that is not in the drum cannot be increased.	The excursion repeats at every restart rather than happening once.
Z2 Feedwater temperature	5 °C below setpoint	10 °C below, sustained	Check deaerator pressure, the vent, and the steam supply valve.	Temperature runs low at normal steam demand, not only at restart.
Z5 Condensate pH	Below 7.5	Below 7.0	Confirm the neutralising amine feed and the return percentage, then look for a new load on the header.	pH holds low with feed confirmed correct - there is a CO ₂ source or a return you have not found.
Z5 Condensate conductivity	Step above baseline	Sustained step, or above the makeup limit	Follow the approved return-diversion procedure; isolate heat users to locate the source.	The step repeats on a cycle rather than once - that is a leaking exchanger, not an event.
Z1/Z4 Makeup vs return flow	Return below the site floor	Makeup up sharply at unchanged steam load	Walk the trap list. Check for a blowdown valve left open before assuming a leak.	Makeup keeps climbing with no cause found across an operating week.
RULE OF THUMB	Bands are commissioned per boiler against the ABMA limits for its drum pressure and this plant's own baseline, then written down and left alone. A threshold that gets adjusted every time it fires is not a threshold; it is a preference.			

☐ First-move column - the diagnostic step that precedes any chemistry ☐ Escalation column - the conditions that change the plan

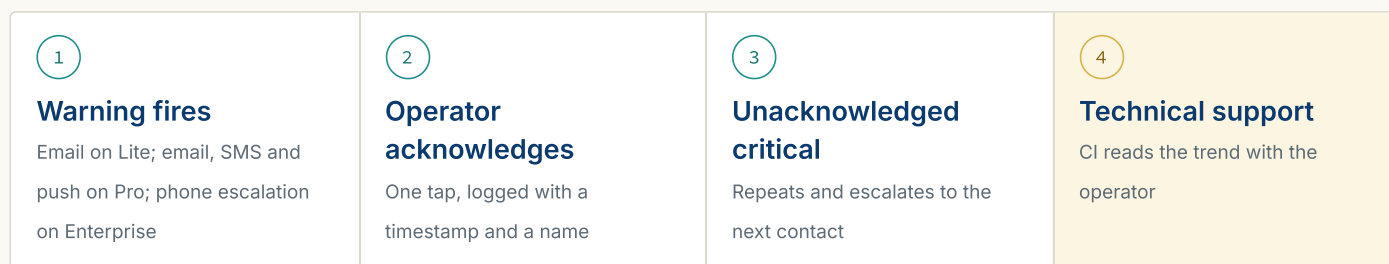
FIRST MOVES FOLLOW THE SITE PROCEDURE

The matrix is a diagnostic guide. Boiler controls, safety functions, firing decisions and return diversion remain with the plant and its certified operator. ORP excursions indicate a condition to investigate; wet tests and, where specified, dissolved-oxygen measurement confirm it.

A named response. A traceable close.

The alert is useful now. The acknowledgement matters later.

ESCALATION PATH



ALERT FATIGUE IS A DESIGN FAILURE, NOT A USER FAILURE

If a threshold fires at every Monday restart, investigate both plant performance and the commissioned band. Commissioning includes a seven-day supervised period specifically to tune bands against how this plant actually fires, blows down and shuts down. An operator who ignores alerts has been trained to by the system that sent them.

THE RECORD IS THE SECOND PRODUCT

Every alert, acknowledgement and resolution is retained. When a tube fails, an insurer asks a question, or a warranty claim turns on whether the water was in control, the answer is a timestamped trace rather than a recollection. That record is frequently worth more to the plant than the alert that created it.

THE RESPONSE CHAIN

Reading → alert → acknowledgement
→ action → resolution

LITE

Email

Business-hours email support, with escalation contacts agreed at commissioning.

PRO

Email · SMS · push

Business-hours phone and email support; named contacts receive the condition and next steps.

ENTERPRISE

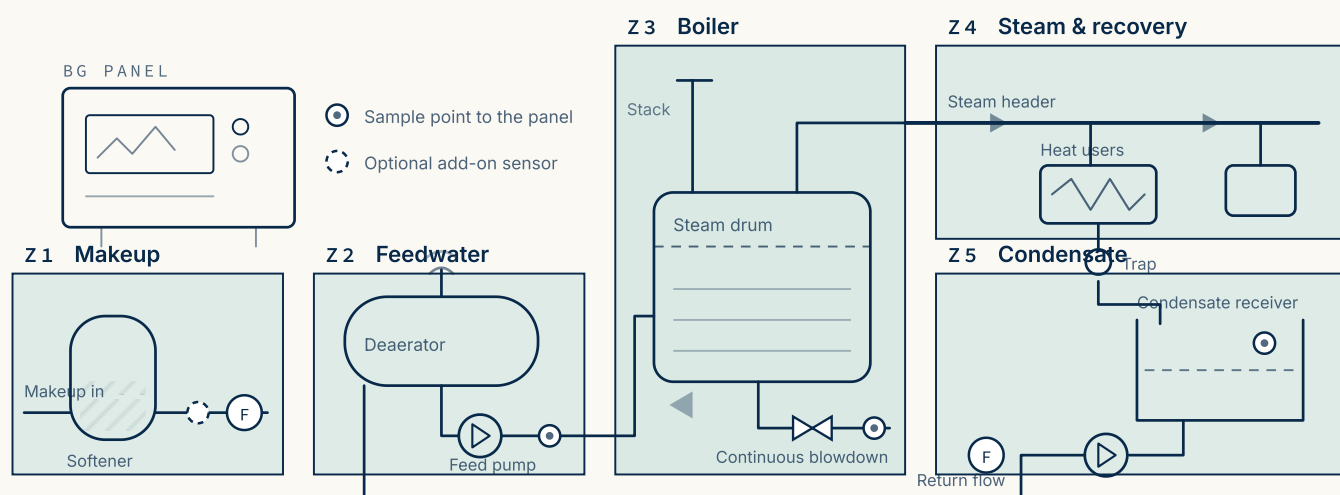
Phone escalation

An unacknowledged critical can escalate by phone, with 24/7 support and a dedicated account manager.

Five signal groups. One connected plant.

What arrives. What is removed. What concentrates. What comes back. What it costs.

The screens above are only as good as what is behind them. Seven sensors on one sample-conditioning panel carry five signals: what arrives, what is removed, what concentrates, what comes back, and what that costs. Each is banded against this plant's own baseline and the ABMA limits for its drum pressure, not a textbook. The flow schematic maps each group to its measurement point.



LOW-PRESSURE STEAM PLANT • SCHEMATIC
ONE PANEL • SEVEN SENSORS • FIVE SIGNALS

FIVE SIGNAL GROUPS / SAMPLE POINT MAP

Z1	Z2	Z3	Z4	Z5
Makeup	Feedwater	Boiler	Steam & recovery	Condensate
What is arriving? Hardness requires an add-on.	Is the oxygen gone before the water meets steel?	Are the cycles where they should be?	How much of what you heated comes back?	Is the return protecting itself, or eating itself?
		COND	RETURN	pH / EC

● ZONE KEY FLOW OTHER ZONES ORP / TEMP RIGHT COLUMN = THE SENSOR THAT CARRIES IT

● CI360 WATER TREATMENT = CATALOGUE SECTION OF A LINKED PRODUCT ADD-ON SENSORS ARE OPTIONAL AND SITE-SPECIFIC

STANDARD PRO ARRAY / OPTIONAL HARDNESS

Z1 measures makeup flow. It does not directly measure hardness. Add a colorimetric hardness analyser at the softener outlet when breakthrough detection is part of the required scope.

Pressure and metallurgy choose the treatment lane.

Use the plant's baseline and the applicable engineering limits to set the bands.

BLIND SPOT 01

The hours nobody is in the room

A plant that tests twice a shift on weekdays has chemistry data for a handful of hours out of a hundred and sixty-eight. The rest is an assumption carried forward from the last titration.

BLIND SPOT 02

The restart

Oxygen enters an idle boiler through every vent and seal. The reserve is gone before the first Monday test, and the damage happens in the first hour of firing.

BLIND SPOT 03

Scale is invisible until the fuel bill

Deposit builds over months. The first cheap evidence is stack temperature climbing at a constant firing rate. The expensive evidence is a tube.

BLIND SPOT 04

The condensate you already paid to heat

A failed trap or a lost return raises makeup quietly. Very few plants meter both sides, so the loss shows up as a water bill and a chemical bill rather than as a fault.

BLIND SPOT 05

Contamination that arrives at 02:00

A leaking exchanger puts process fluid into the return, and it reaches the drum long before the morning test. It is usually diagnosed as foaming or carryover a day later.

DRUM PRESSURE AND METALLURGY DECIDE THE TREATMENT LANE

LOOP / HOT WATER

Hot water & closed loops

Inhibitor reserve, loop pH and dilution are the whole programme. ● No. 20 Boiler Compound

- No. 25 Boiler Compound for a nitrite programme, and
- No. 32 Boiler Compound for recirculating service.

LOW-PRESSURE STEAM

Low-pressure steam

The standard industrial lane. ● No. 30 Boiler Compound with ● OS15 or ● OS100 oxygen scavenger, and ● PD-90 Liquid Phosphate Dispersant for deposit control.

HIGHER-PRESSURE SERVICE

Tighter limits, less tolerance

Higher pressure can require tighter conductivity and silica limits and less tolerance for carryover.

- PBT20 Polymer Boiler Treatment where a polymer programme suits the water.

Al

Aluminium & mixed metallurgy

Conventional alkaline assumptions do not apply, and neither does conventional cleaning.

- Neutral Boiler Cleaner and a controlled-pH approach on the aluminium side.

WHY THIS PAIRING MATTERS

Boiler chemistry is not a strength ladder. A hot-water loop treatment and a low-pressure steam compound are different programmes for different failure modes, and a filming amine is not a stronger neutralising amine - it is a different mechanism. Drum pressure, metallurgy and condensate return percentage are what select the lane. Continuous data is what makes that a measured decision instead of an inherited one.

Measured conditions. Defined chemistry lanes.

BoilerGuard is the CI SupportLab monitoring service alongside the CI360 boiler treatment program.

OXYGEN IS THE CONSTRAINT

ORP sits above band, feedwater runs below deaerator temperature, or the plant comes back cold every Monday.



OS15 Oxygen Scavenger

- Sulfite-based feedwater scavenger



OS100 Catalyzed Scavenger

- Faster response, higher oxygen demand



No. 30 Boiler Compound

- Low-pressure steam internal treatment

DEPOSIT AND HEAT TRANSFER ARE THE CONSTRAINT

Conductivity runs high, hardness is leaking past the softener, or stack temperature has been climbing for a season.



PD-90 Liquid Phosphate Dispersant

- Deposit control and sludge conditioning



PBT20 Polymer Boiler Treatment

- Polymer scale conditioning



No. 110 Descaler

- Inhibited scale removal

THE RETURN LINE IS THE CONSTRAINT

Condensate pH sags overnight, the returns show iron, or the plant has replaced the same length of pipe twice.



No. 45 Corrosion Inhibitor

- Steam condensate line protection



No. 49 Filming Steam Boiler Compound

- Barrier-style return protection

THE LOOP OR THE METAL IS THE CONSTRAINT

Closed heating, glycol, or aluminium in the circuit - where the standard steam programme is the wrong answer, not a weaker one.



No. 25 Boiler Compound

- Nitrite closed-loop protection



No. 32 Boiler Compound

- Recirculating system treatment



Neutral Boiler Cleaner

- Aluminium-safe cleaning

CHEMISTRY IS NOT A SUBSTITUTE FOR PRETREATMENT

A dispersant will carry a hardness leak for a while. It will not fix a softener that regenerates on a stuck valve, and every hour of breakthrough is deposit on a heated surface. Use the chemistry to hold the boiler while the pretreatment fault is corrected, and record both, so the next argument about softener capacity starts from evidence.

SENSORS CARRY THE TREND; TITRATIONS CALIBRATE IT

Orthophosphate, sulfite and nitrite test kits stay in the toolkit. Continuous ORP is a proxy for scavenger reserve, not a measurement of it; conductivity is a proxy for dissolved solids, not a phosphate result. The wet test remains the reference, and the continuous record is what tells you which day to draw it on.

The month ends. The log is already written.

The second product is the file, and it gets more valuable with time.

Every reading, alert, acknowledgement and resolution is retained for the term of the tier. The report is generated from that record rather than assembled by hand from a clipboard, a spreadsheet, and a memory of what the month was like. What used to be an afternoon is a download.

What the record has to survive is a question asked a year later.

Pressure equipment in Alberta is regulated under the Safety Codes Act and administered by ABSA, and boiler and machinery insurers commonly expect evidence that a water treatment programme exists and is being held. The chemistry limits themselves come from the ASME consensus operating practices for feedwater and boiler water chemistry in industrial boilers, and from the ABMA table of maximum recommended limits by drum pressure.

BoilerGuard is supplementary to all of it. It does not certify a boiler, it does not replace a jurisdictional inspection, and it does not replace titration or laboratory analysis. What it supplies is the continuous operating record behind those things: what the plant was doing between service visits, when the chemistry moved, what the alert said, who acknowledged it, and what was done. That is the part of a file that is normally missing.

STATED PLAINLY

Continuous sensor data supports your water-treatment record and your energy reporting. **It does not certify the boiler, replace a jurisdictional inspection, or replace laboratory analysis.** Confirm your obligations with your jurisdiction, your insurer and your permit conditions.

What a period report contains.

1

Cover and period

Plant name, boiler identification and jurisdictional numbers, reporting period, and the statement naming the BoilerGuard panel serial and the operating client.

2

Summary and data tables

Days in band, alerts triggered, actions taken, and daily minimum, maximum and average for every monitored parameter - with cycles achieved, blowdown percentage and condensate return percentage.

3

Trends and alert log

Thirty-day, ninety-day and annual charts, plus every threshold breach with its timestamp and its resolution.

4

Equipment appendix

Calibration records and the maintenance log - the evidence that the data behind the report was trustworthy.

The gap has a cost. Measure yours.

Published industry figures explain the opportunity. They are not BoilerGuard results.

01 / SCALE

2% fuel penalty

DOE illustrates roughly 2% fuel loss from 1/32 inch of normal scale, rising to 3.9% at 1/16 inch. These figures apply to firetube boilers without stack-gas heat recovery.

[DOE Steam Tip Sheet #7](#) ↗

02 / BLOWDOWN

2-5% energy

EPA reports this potential reduction from switching to automatic blowdown control, alongside up to 20% less blowdown. BoilerGuard supplies monitoring; achieving these savings requires control changes and operating action.

[EPA WaterSense at Work / \\$6.5](#) ↗

03 / CONDENSATE

More than 10%

DOE shows that returned condensate can contain more than 10% of total steam energy in a typical system. Return quality and useful recovery determine the opportunity at each plant.

[DOE Steam Tip Sheet #8](#) ↗

04 / DOWNTIME

US\$125,000 / h

ABB's 2023 survey of 3,215 maintenance decision-makers reported this approximate cross-industry median. It is a self-reported industrial benchmark, not a boiler-specific cost estimate.

[ABB / Value of Reliability, 2023](#) ↗

BLOWDOWN CONTEXT

DOE describes typical blowdown rates of 4-8% of boiler feedwater flow. Optimum rates depend on boiler type, operating pressure, treatment and makeup quality.

[DOE Steam Tip Sheet #9](#) ↗

PLANT ECONOMICS

Your fuel. Your water. Your operating response.

Evaluate the service against your own fuel price, water and treatment costs, return configuration and downtime exposure. A continuous record identifies the condition; the benefit depends on what the plant does with it.

A record you can share. Access you can scope.

Data handling, retention and integration are part of the service design.

CA

Canadian data residency

Hosted in Canadian cloud regions, with handling aligned to Canadian privacy legislation.

TL

Encrypted in transit and at rest

TLS 1.3 in transit, AES-256 at rest, certificate-based device authentication.

RB

Role-based access

Administrator, operator, viewer and inspector roles, with multi-factor authentication.

RT

Retention by tier

Raw data held one to seven years; aggregated trends retained substantially longer for season-over-season comparison.

OT

Monitoring-only path

The panel has no control authority over boiler equipment, valves or feed pumps. It reads and reports.

AP

Integration where it is wanted

Enterprise sites can pull data into an existing BAS, SCADA, CMMS or energy reporting system through a secure API.

WHERE THE CHEMISTRY PROGRAMME FITS

BoilerGuard is a CI SupportLab service, and it is designed to sit alongside the CI360™ boiler treatment programme rather than replace anybody's judgement about it. The measured condition selects the lane: a lost scavenger reserve points to oxygen chemistry, a conductivity climb points to blowdown and deposit control, a sagging condensate pH points to the return line, and a conductivity step in the return points upstream to a heat user. Sites running both get a chemical review cadence driven by data instead of by the calendar.

MONITORING-ONLY PATH

The panel reads the plant. It cannot operate the plant.

SECURITY AND RETENTION

Encryption is specified as TLS 1.3 in transit and AES-256 at rest, with certificate-based device authentication. Raw data retention is one, three or seven years by tier. Confirm hosting, access scope, aggregation retention and integration requirements in the site service agreement.

Built for the boiler room.

A conditioned sample, a protected sensor and a reliable path to the record.

The hardware constraint here is not accuracy, it is the sample. Boiler water leaves the drum at pressure and well above 100 °C, and no pH or conductivity cell survives that. The field unit is a wall-mounted panel fed by a cooled, pressure-reduced sample line off the continuous blowdown, with separate cells on feedwater and condensate. Plant power, plant network where there is one, cellular where there is not. No control wiring, no DCS project, and on most plants no shutdown to install.

COMPONENT	SPECIFICATION	WHY IT IS SPECIFIED THAT WAY
1	Enclosure IP65 / NEMA 4X painted steel or polycarbonate	Roughly 60 × 50 × 20 cm. Wall or unistrut mount within a few metres of the sample points. Small enough to go on the boiler-room wall without a structural conversation.
2	Environment 0 °C to +50 °C ambient, sample conditioned below 40 °C	Boiler rooms run hot and humid. The panel is rated for the room; the sample cooler is what protects the cells. Sample temperature is itself monitored, because a hot sample is a wrong reading, not a missing one.
3	Sample conditioning Cooler, pressure-reducing valve, relief, flow control, flow cells	Boiler water off the continuous blowdown; feedwater after the pump; condensate at the receiver. Sample flow is monitored, so a plugged line reports as a fault instead of quietly becoming a flat line.
4	Power 120 VAC, buffered memory and battery-backed clock	No solar, no trenching - boiler rooms have power. With the panel powered, readings are buffered through a communications interruption and uploaded when the link returns. Continued sensing through a power outage requires a suitable backup supply.
5	Communication Plant Ethernet or Wi-Fi primary, 4G LTE fallback	Transmission every 5 minutes, configurable; burst transmission on an alarm event. Outbound only, and on its own VLAN where the site's IT policy prefers it.
6	Security TLS 1.3 in transit, AES-256 at rest, certificate-based authentication	Isolated monitoring path. No control authority by design: the panel has no output to a valve, a pump, or a controller, and nothing on the network can make it acquire one.

INSTALLATION SCOPE

The panel connects to cooled, pressure-reduced boiler samples, with separate feedwater and condensate measurement points and flow meters. Available isolation, cooling water, sample points and site rules determine installation time and shutdown requirements.

Seven sensors. A named service interval.

Standard Pro array. Accuracy and installed configuration are confirmed at assessment.

SENSOR	TYPE	ACCURACY	MAINTENANCE INTERVAL
Boiler water conductivity	Contacting 4-electrode, temperature compensated	±1% of reading	Clean monthly · calibrate every 6 months
Feedwater ORP	Platinum band electrode	±5 mV	Clean monthly · calibrate quarterly
Feedwater temperature	Platinum RTD (Pt100)	±0.1 °C	None · solid state
Condensate pH	Glass electrode, low-conductivity reference	±0.05 pH	Clean monthly · calibrate every 1-3 months
Condensate conductivity	2-electrode, low range	±1% or ±0.5 µS/cm	Clean monthly · calibrate every 6 months
Makeup flow	Magnetic or turbine, pulse output	±1% of reading	Verify annually
Condensate return flow	Magnetic or turbine, pulse output	±1% of reading	Verify annually

OPTIONAL ADD-ON SENSORS · specified only where the site justifies them

Makeup hardness analyser

Colorimetric, on the softener outlet. Turns “the softener is probably fine” into an alarm at breakthrough rather than a scale bill in eighteen months. Reagent change every 30-60 days.

Stack temperature

Thermocouple in the breeching. A stack temperature climbing at a constant firing rate is the earliest cheap evidence of waterside or fireside fouling.

Chemical day-tank level

Level sensor in the scavenger and treatment drums. Most reserve losses start as an empty drum on a Friday afternoon.

Feedwater dissolved oxygen

Membrane or optical DO cell. Where the pressure, the warranty or the insurer justifies measuring oxygen directly instead of inferring it from ORP.

Keep the sample honest.

Cleaning and calibration are how a continuous record stays trustworthy.

Client tasks

Trained during onboarding

MONTHLY

Wipe the flow cells and confirm sample flow at each cell. This single task prevents most false trends.

QUARTERLY

Check the sample cooler for scaling on the cooling-water side. A cooler that has stopped cooling is the most common cause of drift.

CI field technician

Scheduled service visits

MONTHLY TO QUARTERLY

pH electrode calibration; ORP checked against a standard; wet tests drawn alongside the sensors to confirm the trend.

EVERY 6 MONTHS

Conductivity cell constants verified, condensate cell cleaned, reagent replaced where a hardness analyser is fitted.

Annual

CI technical team

ANNUALLY

Full system audit, firmware update, and a threshold review against the year of data and the current drum pressure.

ANNUALLY

Season-over-season comparison - cycles achieved, blowdown percentage, return percentage, and whether the plant is holding or degrading.

THE HONEST MAINTENANCE LINE

Boiler-room sample lines foul and plug. Conductivity cells film over, pH electrodes drift, and a sample cooler on hard cooling water will scale on the shell side and quietly stop cooling. A monitoring service that does not name a cleaning and calibration schedule is a monitoring service that will be confidently wrong in its second year.

Choose the coverage the plant needs.

The same service foundation. Different sensor coverage, cadence and support.

CAPABILITY	Lite ONE BOILER, ESSENTIAL SIGNALS	Pro THE STANDARD PLANT DEPLOYMENT	Enterprise MULTI-BOILER AND INDUSTRIAL
Monitored signals	3 · boiler conductivity, feedwater ORP, condensate pH	7 · adds feedwater temperature, condensate conductivity, makeup and return flow	7 plus custom sensor array
Transmission interval	Every 15 minutes	Every 5 minutes	Every minute
Data retention	1 year	3 years	7 years
Alert channels	Email	Email, SMS and app push	Email, SMS, app push and phone
Reporting	Monthly summary	Weekly, monthly and automated water-treatment log	Daily, on-demand and custom
Record formats	Data export	Insurer, jurisdictional and energy-audit formats	Custom formats with audit support
Derived metrics	Cycles of concentration	Adds blowdown %, return %, and recovered condensate energy	Adds fouling trend and cost modelling
Custom thresholds	Standard ABMA bands	Adjustable per signal	Fully configurable
Assets covered	One boiler	Up to three boilers and one loop	Unlimited, with site map and cross-plant reporting
API access	-	-	Secure REST API for BAS, SCADA, CMMS and energy reporting
Technical support	Business-hours email	Business-hours phone and email	24/7 phone with a dedicated account manager
Chemistry integration	Quarterly chemical review	Monthly review with scheduled delivery	Weekly review and full programme management

All tiers carry a minimum term. Hardware, installation and training are quoted per site once the plant is assessed.

Speak to your CI representative for current pricing and any applicable program eligibility.

How much of the plant are you actually watching?

A transparent comparison of manual testing and a continuous monitoring record.

Start with the real sampling schedule. Compare parameter-reading volume and the labour spent on manual test rounds; these describe different things and are not interchangeable measures of chemical protection.

EXAMPLE / PLANT

2 boilers

7 test rounds per week, per boiler; 4 parameters per test; 20 minutes per complete site round.

MANUAL / 30 DAYS

240 readings

$7 \times 4 \times 2 \times 30 \div 7 = 240$ manual parameter readings in a 30-day month.

PRO / 30 DAYS

120,960 readings

288 transmissions per day $\times$ 7 channels $\times$ 2 arrays $\times$ 30 days. Assumes full availability and one array per boiler.

MANUAL TESTING

121 hours / year

7 complete site rounds $\times$ 20 minutes $\times$ 52 weeks $\div$ 60. Scheduled titrations continue; this is current effort, not promised labour savings.

SAMPLING IS NOT CONTINUOUS OBSERVATION

Pro samples nominally every five minutes; Lite every fifteen minutes and Enterprise every minute. Point-in-time tests do not establish that an entire hour was observed. Use reporting interval, actual sensor uptime and valid-data gaps to measure coverage.

LITE

One boiler, essential signals

Screening starting point for a simple single-boiler site without additional monitoring or reporting needs.

PRO

A standard plant deployment

Consider for two or three boilers, reporting needs, restart exposure, scale history, corrosion or return-contamination risk.

ENTERPRISE

Multiple plants or broader scope

Consider for four or more boilers, complex multi-site reporting, custom instrumentation, APIs or 24/7 support needs.

Bring the operating picture.

A practical worksheet for scoping the panel, the service and the response chain.

SITE / LOCATION

BOILERS / LOOPS / BUILDINGS

TEST ROUNDS PER WEEK / PER BOILER

CONTACT / ROLE

BOILER CLASS / DRUM PRESSURE

PARAMETERS / MINUTES PER SITE ROUND

Conditions to discuss

- ☐ Insurer, jurisdictional or energy reporting obligation
- ☐ Scale history, tube failure or previous descaling
- ☐ Night, weekend or seasonal shutdowns and cold restarts
- ☐ Closed heating loops or glycol circuits
- ☐ More than one plant or a remote building
- ☐ Condensate corrosion, low pH or return-line replacement
- ☐ Softener upset or hardness breakthrough
- ☐ Process contamination risk in the condensate return
- ☐ Aluminium or mixed metallurgy

Confirm the installation

SAMPLE POINTS / AVAILABLE ISOLATION

120 VAC / NETWORK / CELLULAR SIGNAL

FIRST ALERT CONTACT / CHANNEL

COOLING WATER / SAMPLE COOLER

RETURN CONFIGURATION / FLOW METERS

SECOND CONTACT / ESCALATION

ASSESSMENT OUTPUT

A scoped deployment: sensor array, optional measurements, service tier, sample points, installation requirements and commissioning plan. Chemistry lanes are selected from measured conditions and confirmed against current labels and SDS.

Set it once. Document it for the next chief.

Baseline, bands, contacts and maintenance belong in the operating record.

1

Baseline the plant

Two to three weeks of unfiltered data before any threshold is finalised - including at least one weekend and one cold restart. Every band in the app is set against how this plant actually behaves.

2

Write the bands down

Warning and critical for each signal, set from the ABMA limits for the drum pressure and this plant's baseline, agreed with the chief and recorded. A threshold nobody agreed to is a threshold nobody will act on.

3

Name the alert chain

First contact, second contact, channel, and what happens when a critical alert goes unacknowledged. Decided before the first one fires.

4

Tune for seven days

A supervised go-live week to remove the alerts that fire on normal firing, blowdown and shutdown behaviour. This is where alert fatigue is prevented.

5

Set the service calendar

Monthly cleaning, calibration intervals and the annual audit booked into the work-order system rather than remembered.

6

Document it against turnover

Bands, contacts, sample points, drum pressure and the ABMA limits used, recorded where the next chief will find them.

WHAT TO MEASURE ONCE THE SERVICE IS LIVE

UH

Unobserved hours

Hours per week with no chemistry data. This is the number the service exists to move, and it should approach zero.

AK

Time to acknowledge

Alert issued to alert acknowledged. A rising figure usually means the thresholds need tuning, not that the operator needs reminding.

FA

False alert rate

Alerts that turned out to be normal plant behaviour. Should fall sharply after the go-live week and stay low.

UP

Sensor uptime

Percentage of expected transmissions received. Drops here are power, link, or a plugged sample line, and each has a different fix.

CY

Cycles held

Average cycles of concentration achieved against target. This is the number that turns directly into water, fuel and chemical spend.

CR

Condensate return

Return as a percentage of feedwater. A slow decline is a trap survey; a step is a leak. Finance understands this one without being taught boiler chemistry.

The record supports the program.

A guide to scope, interpretation and the references behind this catalog.

CI SupportLab™ BoilerGuard is a monitoring service guide, not a substitute for site-specific engineering, jurisdictional requirements, insurance conditions, or operator judgement. Application screens shown are illustrative representations of the operator interface; layout, values and alert wording are configured per site. Sensor accuracy, thresholds, transmission intervals and service scope are confirmed per site during assessment and commissioning. Continuous sensor data supports the water-treatment record and energy reporting; it does not certify pressure equipment, replace jurisdictional inspection, or replace titration and accredited laboratory analysis. Published cost and efficiency figures are attributed to their sources and are not representations of BoilerGuard results. Confirm all product dilution, dosage and handling against current labels and SDS before use. Product names follow the Chem International catalogue.

SCREEN EXAMPLES

Illustrative, not live plant data

The app and dashboard values reproduce representative scenarios from the supplied BoilerGuard HTML. Screens, wording, thresholds and alert routes are configured per site. Cover imagery is illustrative.

FIVE GROUPS / SEVEN SENSORS

Keep the measurement names precise

The five groups cover makeup, feedwater, boiler water, steam recovery and condensate. Pro uses seven sensor channels. Hardness, direct dissolved oxygen, day-tank level and stack temperature are optional.

ENGINEERING LIMITS

Commission the right band

Use the applicable ABMA/ASME guidance, boiler manufacturer requirements, drum pressure, metallurgy and plant baseline. Illustrative values in this catalog are not universal limits or dosing instructions.

DATA QUALITY

Pair trends with verification

Retain wet tests for sulfite, orthophosphate, nitrite, alkalinity and hardness. Validate sample flow, temperature and calibration. Derived metrics require valid reference inputs and documented assumptions.

PUBLICATION

Chem International / CI SupportLab™ BoilerGuard / Service Catalog / 2026. Service descriptions and product names adapted from the supplied BoilerGuard HTML. Published economic benchmarks are linked beside the figures on page 18; regulatory context is linked on page 17.



CI SUPPORTLAB™ • BOILERGUARD

Want to know what your feedwater does at 03:00?

A site assessment covers boiler class and drum pressure, sample points, cooling water, network coverage and condensate return configuration - and returns a scoped deployment for your actual boiler room.

[Request a site assessment ↗](#)

[Call 1-800-665-7287](#)

Chem International A division of Aliysha Enterprises Ltd.

10770 180 St NW, Edmonton, AB T5S 2S4

info@chemintonline.com chemintonline.com

ISO 9001:2015 / CANUTEC emergency: 1-613-996-6666