

CASE STUDY

How **Scientific Problem-Solving** Revealed the Root Cause of an Advanced Therapy CDMO's Mold Challenge

An Elemental Machines' Case Study

An advanced therapy CDMO faced a recurring mold issue that threatened their operations. As a biotechnology company requiring pristine laboratory conditions, any environmental contamination posed significant risks to their research integrity and regulatory compliance. To remedy this issue, they initially sought a simple dew point monitoring solution. Using that information, Elemental Machines then guided them to uncover the true root cause of the problem and delivered an effective, long-term resolution.

This case study demonstrates how engineering expertise and methodical analysis can resolve chronic issues and create opportunities for comprehensive facility improvement.

The Initial Request

The CDMO approached Elemental Machines with what seemed like a straightforward request: display dew point data from their Element-A sensors [on their dashboard](#).

Persistent condensation was occurring on steel columns throughout their facility, and the company believed that monitoring dew point would serve as an early warning system, allowing for timely adjustments to building ventilation. Additionally, the facility already had Element-A sensors capturing temperature and humidity data, so dew point calculations were certainly possible.

The Scientific Investigation

Elemental Machines' [Sridhar Iyengar](#) (Founder, Chief Strategy & Technology Officer) and the company's VP of Science quickly recognized that the CDMO's mold issue required deeper analysis. A thorough investigation revealed the following series of events:

- During construction, indoor concrete curing created the initial moisture issues, which led to mold growth on cold surfaces
- A contractor applied a perchlorate-based treatment that temporarily eliminated the mold
- The treatment left behind unremoved chemical residues, which decomposed into salt deposits

Key Takeaways

- **Engineering excellence:** Scientific expertise transformed a monitoring request into comprehensive problem resolution
- **Root cause analysis:** Looking deeper into the issue at hand revealed the unexpected origins of surface-level symptoms
- **Elegant simplicity:** The most effective solution proved simpler than initially anticipated
- **Proactivity > reactivity:** Understanding the chemistry prevented future issues rather than just treating symptoms
- **Better together:** Partnership strength between Elemental Machines and the CDMO enabled thorough problem-solving

The Critical Discovery

Elemental Machines' VP of Science identified this case study's breakthrough insight: *The perchlorate cleaning treatment had decomposed into sodium chloride residues on steel surfaces.* Salt deposits were attracting moisture — even at 75% relative humidity. This meant that condensation was occurring well before normal dew point conditions, so dew point monitoring alone would not help prevent the issue.

Bottom Line: The previous remediation had created ideal conditions for mold growth.

Elemental Machines' Solution

Elemental Machines recommended a targeted approach to remediating the CDMO's ongoing mold issue:

Primary Treatment:

- Clean water wipe downs to remove salt
- Three complete cleaning cycles to ensure removal
- No additional cleaning agents

Specifically Avoided:

- Soap solutions (risk of organic residues)
- Hydrogen peroxide (potential surface oxidation)
- Acetic acid (risk of iron acetate staining)
- Volatile organic compounds (minimal benefit, new risks)

Implementation and Results

Following Elemental Machines' recommendations, the CDMO successfully eliminated unexpected condensation and broke the cycle of persistent mold growth. They also refined their environmental monitoring strategy, established more effective humidity-based alerts, and expanded their partnership with Elemental Machines for additional facility solutions. Win-win-win.

Looking Forward

This case demonstrates how Elemental Machines' commitment to engineering and scientific rigor delivers lasting solutions rather than quick fixes. By combining environmental monitoring expertise with deep scientific understanding, Elemental Machines helps facilities maintain optimal conditions for critical operations.

Ready to solve your facility's environmental challenges?

Contact Elemental Machines today to learn how our engineering-first approach can help optimize your operations.

[Let's Get Started](#)

About Elemental Machines

Elemental Machines' Intelligent Operations Platform leverages the best of Internet of Things (IoT) technology and custom hardware/software solutions, delivering actionable insights to operators in life sciences, biopharma labs, biobanks, analytical labs, and manufacturing facilities. By connecting the physical and digital worlds, the platform simplifies, optimizes, and augments operations. Leaders in science, facilities, and technology trust Elemental Machines' ecosystem for insights that accelerate innovation, predict outcomes, and shift from reactive to proactive management. With scalable solutions from incubator to enterprise, custom integrations to fit each operation's unique needs, and a wide ecosystem of partnerships, Elemental Machines ensures operational excellence and the future-proofing of lab and manufacturing processes.