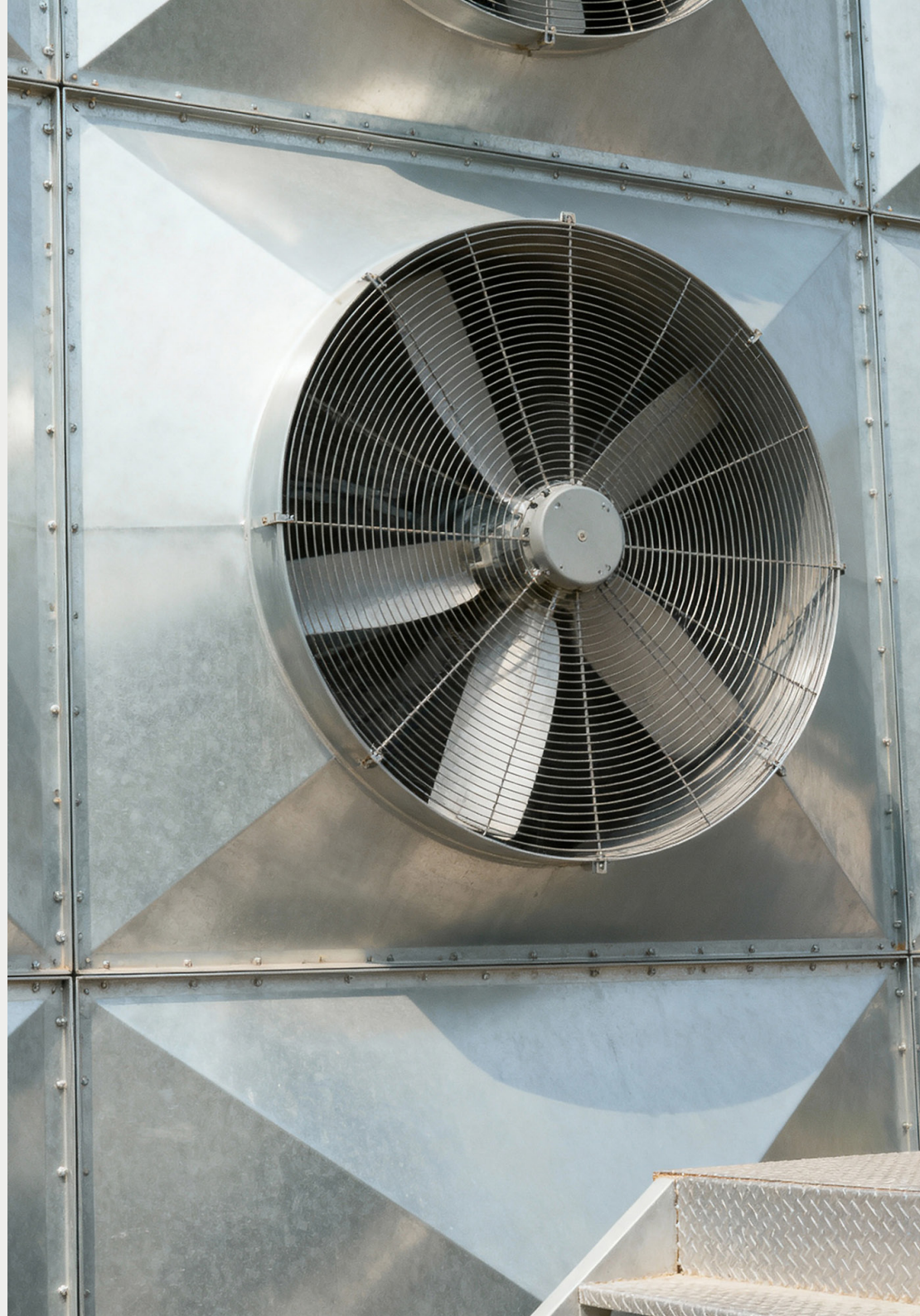


Case story
United States

Premium reconditioning keeps a landmark direct air capture plant on track

A newly commissioned Direct Air Capture (DAC) plant in the United States, one of the world's largest, suffered a heat exchanger leak just seven months after start-up, in the middle of winter. The unit sat in the process solution loop, a critical position in the train, and the plant could not run without it. Alfa Laval service and capital teams responded fast and resolved it with a tailored service solution. The train was back in operation with no impact on the customer's planned 2026 start-up of its remaining trains.



Direct Air Capture is an emerging technology that pulls CO₂ directly from ambient air. It is considered a frontier carbon removal technology because commercial-scale plants are still new, and DAC hubs in the US have only begun reaching full operation since 2024–2025.

The customer operates one of the largest DAC facilities in the world, built in modular units known as trains. The site is designed for four trains in total; two were commissioned in 2025, with the remaining two due to start up in 2026. This was the customer's first DAC plant, and Alfa Laval already had a significant installed base of process-loop heat exchangers across all four trains.

A critical leak in the coldest months of the year

Seven months after commissioning, one of the process solution heat exchangers began to leak. This was unusual: heat exchangers of this type do not normally fail so early in their operating life, which made the root cause difficult to identify at first.

The unit sat in the process solution loop, one of the most critical positions in the train, and as a result, the leak forced that train offline. With winter conditions adding pressure and a 2026 start-up already scheduled for the other two trains, any extended downtime or wrong diagnosis risked delaying the wider project.

Investigating the fault meant opening the exchanger, which could only be done with the train shut down. The customer faced two possible paths forward: change the plate pack or purchase an entirely new exchanger. Both options carried long lead times and significant costs to a newly commissioned plant.

A same-day response, a next-day site visit

After an initial phone assessment, Alfa Laval service and capital team scheduled an on-site visit for the following day, a fast response chosen specifically because the affected train was already offline and every additional day carried cost.

On site, the two teams walked the customer through the trade-offs between a full plate pack replacement and a new

exchanger purchase, weighing lead time, cost, and risk against the start-up schedule for the remaining trains.

After several rounds of discussion and evaluation, the two teams recommended a Premium Reconditioning service rather than a full replacement, because it offered a faster and more economical route back to operation without compromising reliability. Unlike a standard reconditioning service, Premium Reconditioning includes 100% dye penetrant inspection of every plate, which gave the full visibility into the true condition of each plate.

To avoid losing time to a second failure mid-repair, the service team also secured an order of 100 spare plates alongside the reconditioning work, so that any plate found cracked during inspection could be replaced immediately rather than triggering a new procurement cycle.

The inspection finally identified the root cause: the inlet pipe connected to the heat exchanger had not been flushed during commissioning. This allowed fouling and clogging to build up over time, so that process-side flow continued while utility-side flow was restricted. The resulting differential pressure across the plates was ultimately what caused the plates to fail and the unit to lose integrity.

"When everyday uptime matters, expertise makes a difference. Fast actions with qualified solutions are key to earning customer confidence and building lasting trust," says Imran Haidar, Regional Service Business Development Manager, Alfa Laval.

"As Direct Air Capture projects scale across North America, asset reliability becomes critical from day one. Working with one of the world's largest DAC facilities, we (Alfa Laval) demonstrated how Premium Reconditioning can deliver a faster, more cost-effective alternative to replacement while giving customers the confidence to meet their project milestones," says Muttul Amin, Cleantech Business Development Manager, Alfa Laval.

What any new DAC plant can learn from this

Commissioning steps that seem minor, such as fully flushing inlet piping before start-up, protect critical equipment from



The reconditioned heat exchanger in Alfa Laval service center.

fouling-driven failures that can take months to surface. Where in-house teams are unsure, a dedicated commissioning service from Alfa Laval can verify that heat exchangers and similar equipment are installed and started correctly.

Second, an early call to a trusted service partner like Alfa Laval, backed by inspection methods that go beyond the standard scope, can turn an uncertain failure into a fast, well-diagnosed fix.



Contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com