

The Application of an Acoustic Camera to Locate Gas Leaks

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MODERN PROBLEMS, MODERN DIAGNOSTICS

Beverage production demands a focus on the environmental impact of production as well as a continued priority for safety.

Gas leaks, including compressed air, steam and carbon dioxide, can put people and the environment at risk while also increasing utility costs.

In a large plant these leaks can originate from many sources, and it is difficult to identify and specify the source.

Historically, these leaks were found by listening for leaks, using gas detectors or looking for bubbles in a soapy water solution. A gas leak would need to be large before these methods were useful.

At Carlton & United Breweries' Abbotsford Brewery, an acoustic camera has been employed to detect and identify the source of these leaks.



VISUALISING GAS LEAKS

An acoustic camera allows the user to visualise sound, discovering sound sources that are difficult to locate, such as gas leaks.

Carlton & United Breweries' Abbotsford Brewery purchased a Fluke acoustic camera to locate air leaks on the packaging lines and in large valve manifolds.

The camera was used to locate leaks to save on utility costs to produce compressed air.

- Could this camera be an opportunity to reduce CO₂ leaks causing alarms across the site?
- Does the camera work on CO₂?



SUCCESSFULLY TESTED ON CO₂

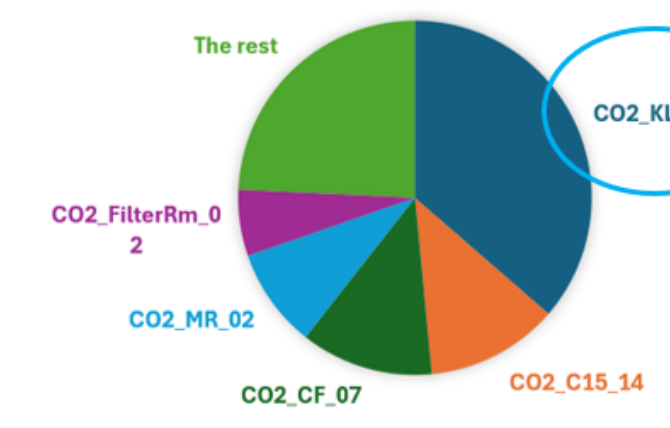
IDENTIFIED LEAKING FERMENTER VACUUM BREAKERS



NEXT STAGE: CO₂ ALARM REDUCTION PROJECT

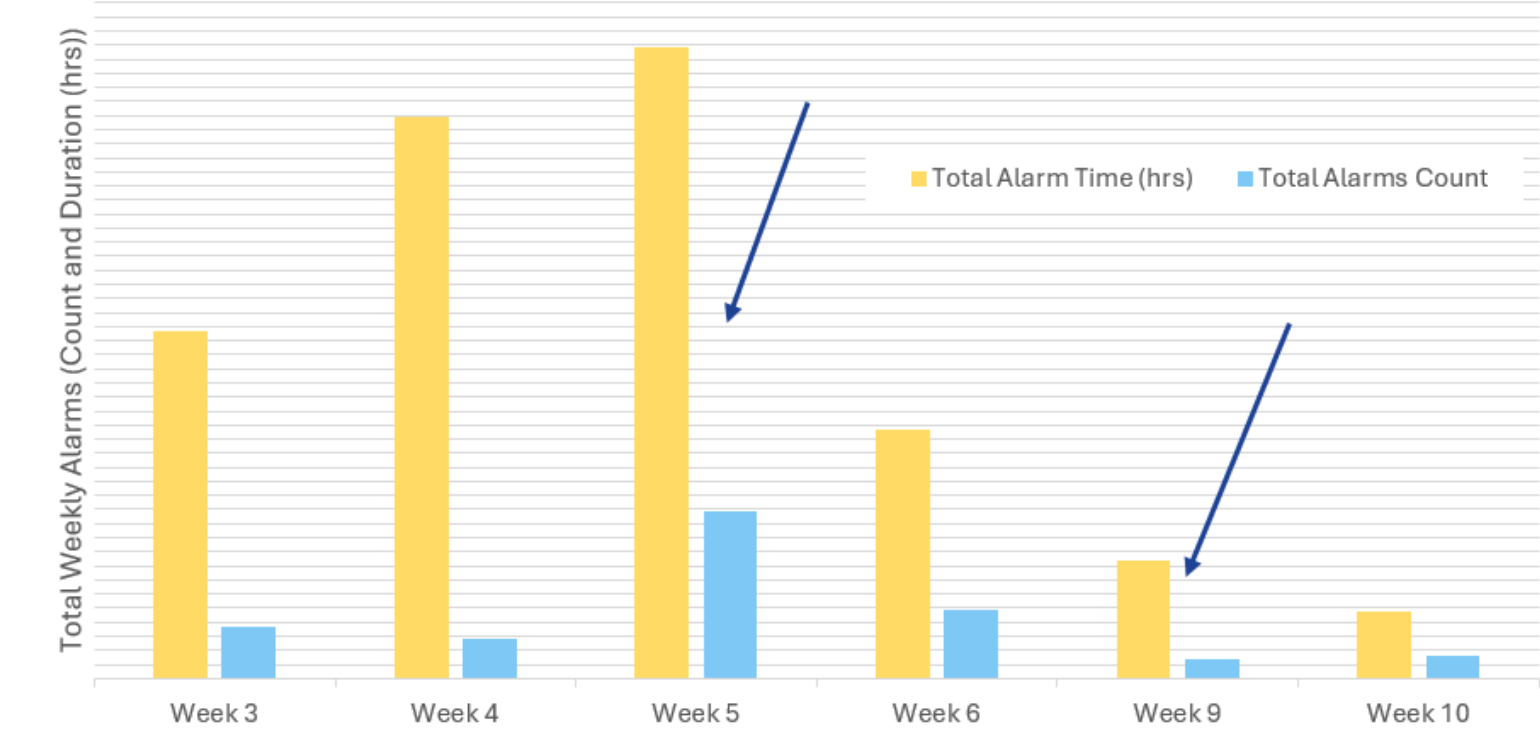
The Brewing team at Abbotsford initiated a project to reduce the number of CO₂ alarms to minimise CO₂ exposure and avoid alarm desensitisation.

A weekly report identified one of the bright beer cells (K Cellar) as the area with the most alarms.



The gas camera had proven to detect CO₂ leaks from the fermenter vacuum breakers, so it was used at the bright beer tank tops. Leaking vacuum breakers were identified.

CO₂ alarm PDCA weekly totals



In the weeks between Week 5 and Week 9 of the project the gaskets on these vacuum breakers were replaced.



THE TECHNOLOGY: HOW DOES THE GAS CAMERA WORK?



- The camera uses small microphones to establish the sound frequency of a leak and indicates the location with a sound image overlaid on a visual image.
- Tiny, supersensitive microphones generate a spectrum of decibel levels per frequency.
- An algorithm calculates a sound image superimposed over visual image. The camera can capture the images and save them to the memory on the camera.
- The frequency level is adjustable on the display to focus on quieter sounds in a busy environment, like a gas leak.

CO₂ ALARM REDUCTION:

IDENTIFYING SOURCE OF CO₂ IN BRIGHT BEER CELLAR

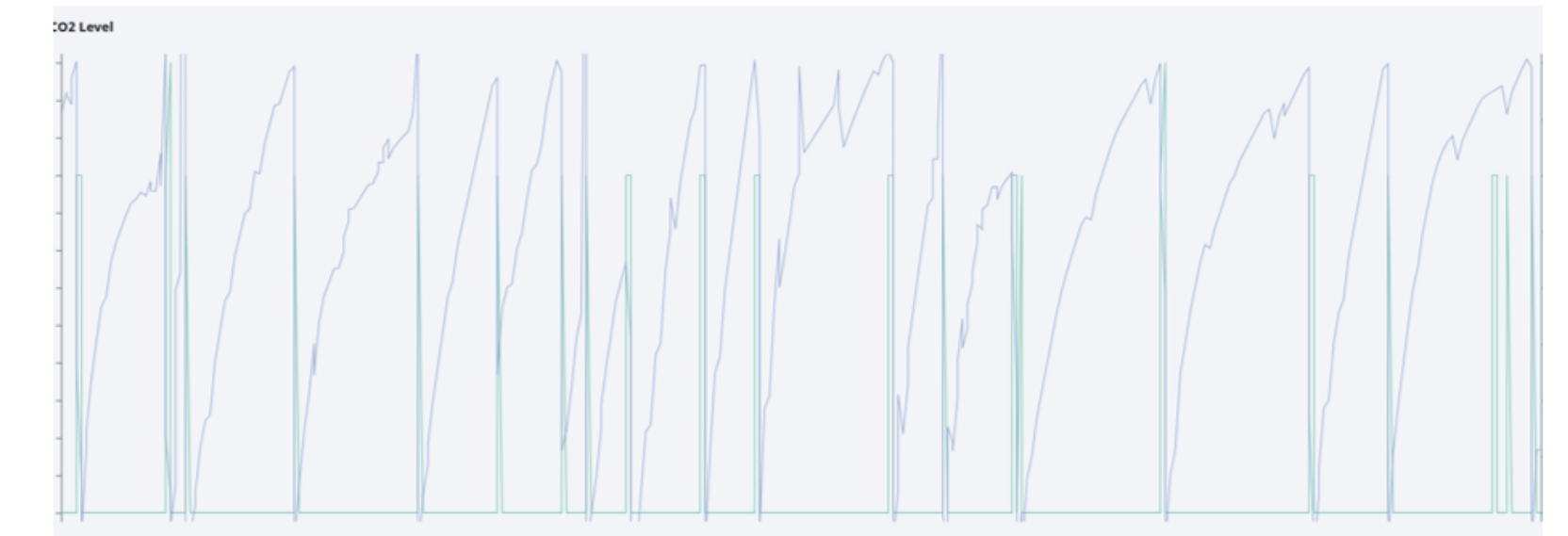


➤ LEAKING VACUUM BREAKERS FOUND

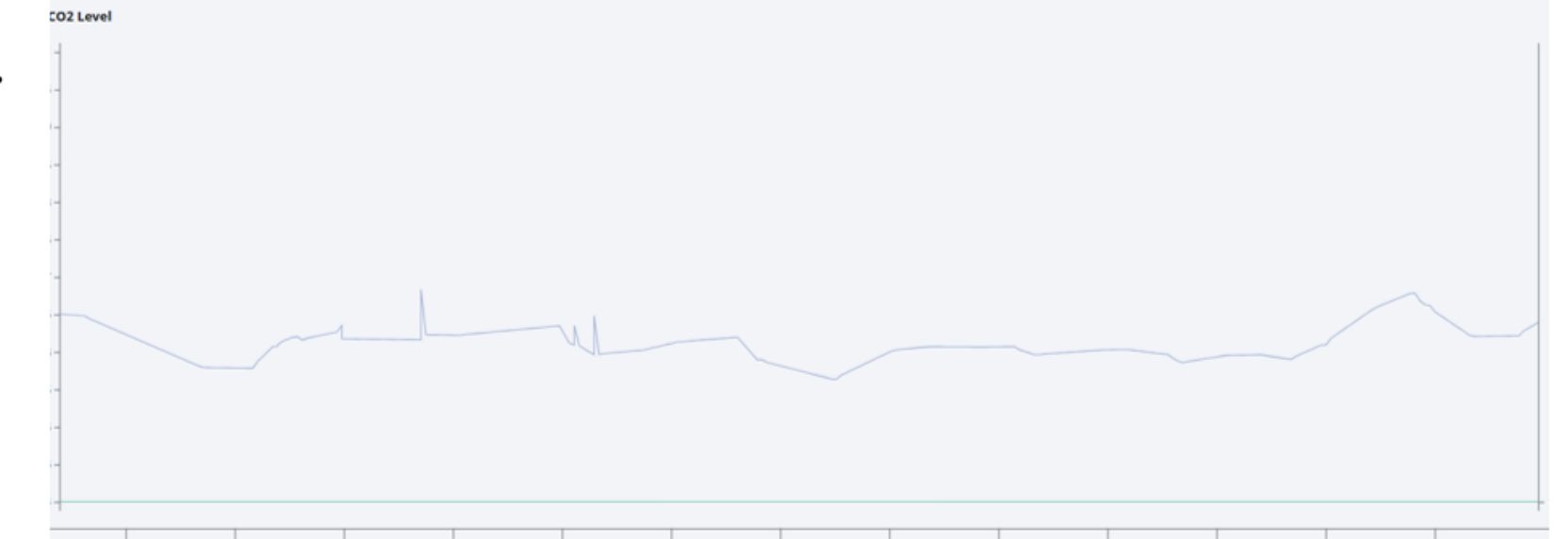
CO₂ ALARM REDUCTION PROJECT

Week 5: Before gas camera was used to identify leaking vacuum breakers in the cellar.

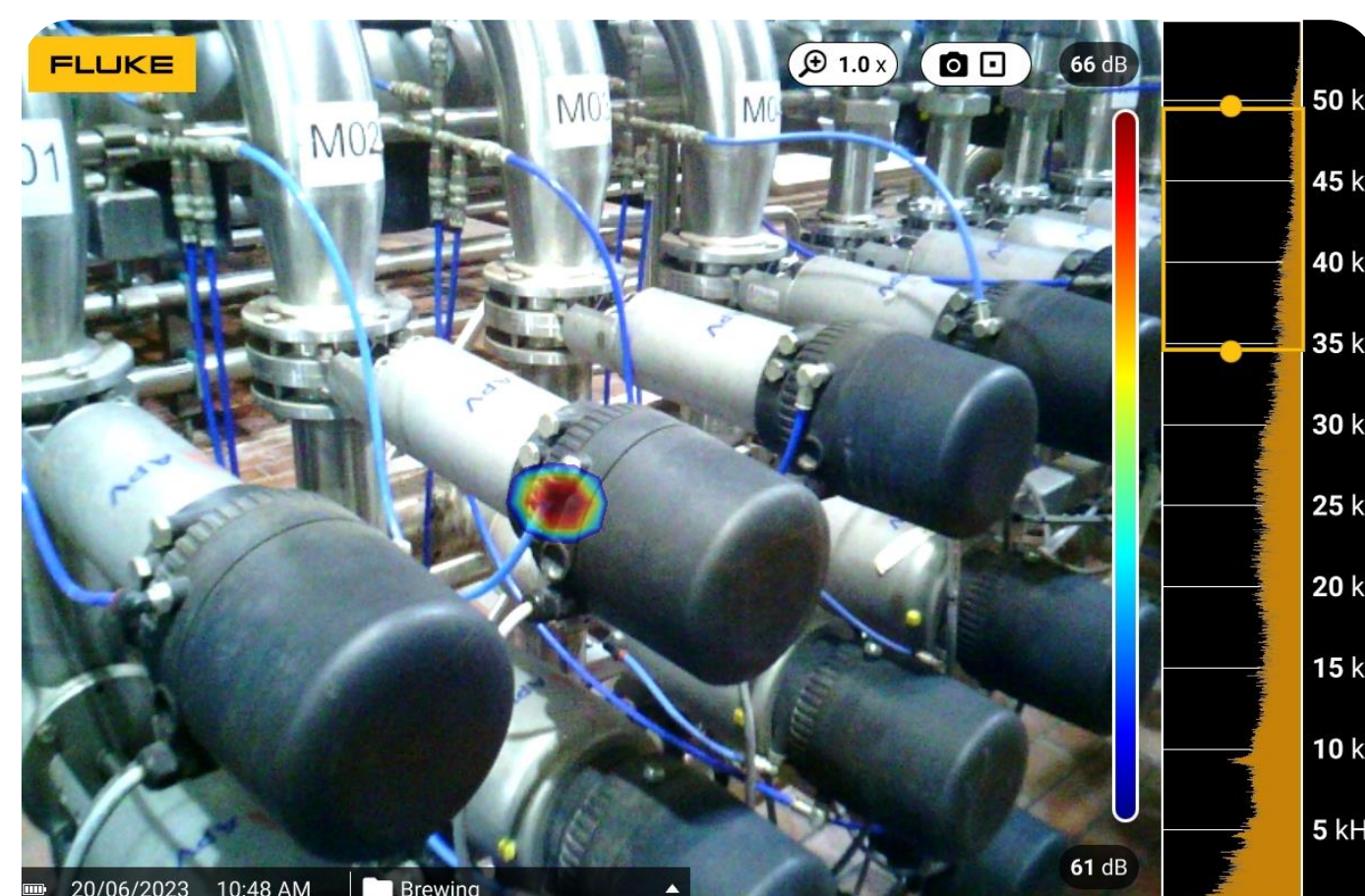
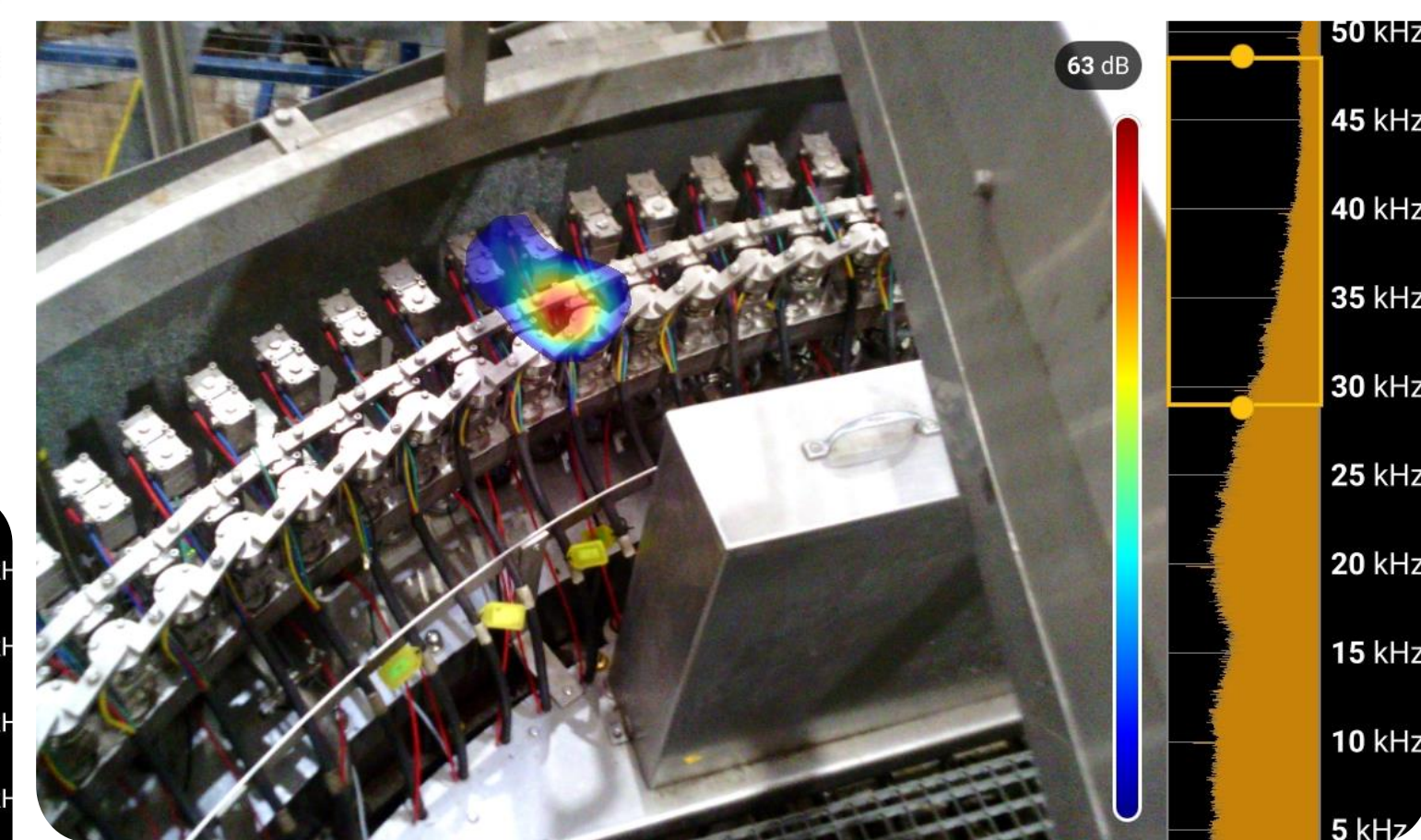
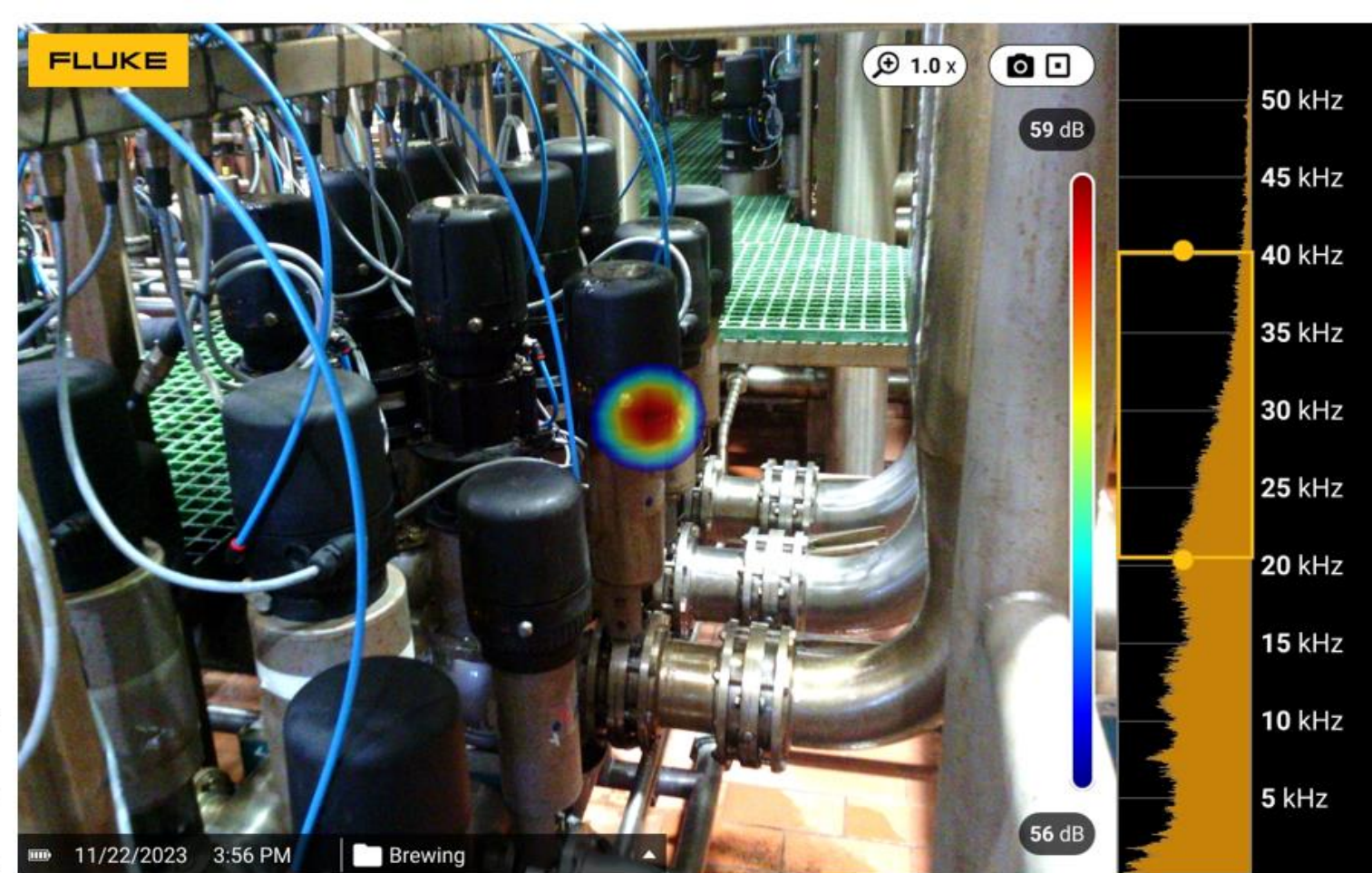
Blue: CO₂ levels
Green: Extraction fan (triggered to reduce CO₂ levels)



Week 9: After gaskets were replaced.



WHAT DO AIR LEAKS LOOK LIKE?



KEY FINDINGS AND RESULTS

- Find the source of CO₂ leaks of any size quickly and easily by simply pointing the camera at an area.
- Locate the source of leaks from a distance. Avoid using scaffolding, a ladder, or confined space entry to search for leaks.
- Specify the location of leaks that would not have been suspected, from pinholes or welds.
- Safety improvements: Locate the source of CO₂ leaks to reduce CO₂ levels in working areas
- Reduced energy usage and associated cost savings from identifying compressed air, steam and CO₂ leaks.

