

## NuWave Sensors Remote Pathogen Monitoring System results in rapid detection of mold in a compromised laboratory

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**Deployment Environment:** IVF Laboratory

### Background

Air quality in an IVF laboratory is extremely critical due to the impact it can have on the embryonic development process. Contamination can come from multiple sources including VOC's (Volatile Organic Compounds), particulate contamination, and microbial contamination - all of which can be harmful to embryo development. To protect against these contaminants, IVF labs are typically equipped with clean room grade technologies, such as high-quality air filtration systems coupled with positive pressure room control for air particulate control.



### Specific Customer Concerns

Building works can be a cause of real concern for sensitive environments such as IVF laboratories, as it can introduce contaminants, such as VOC's, from new building materials, as well as disturb particulates which can transport contaminating bacteria. In one such instance, where remedial works in a building lead to water ingress in a room adjacent to the laboratory, a customer became aware of the possibility of the air being compromised with mold spores growing in the damp environment.

To alleviate worry and test for the presence of mold the customer required air sampling to be carried out. The LU45 was chosen for the experiment, as it offers several advantages over traditional methods, such as spot tests with petri dishes or impactors.

### Key Advantages of the LU45 to the customer

The key advantages for the customer was that they could continuously monitor the indoor environment while the remedial works were finalised. Air sampling using a petri dish or impactor would give them a snapshot of contamination levels at particular times, whereas the LU45 could monitor over a period of weeks and alert them at the earliest possible time of mold being detected.

The remote monitoring capabilities proved an important factor, as laboratory maintenance staff and management typically have several labs to overlook, and could therefore carry on their duties knowing that if anything occurred a local (LED status change on unit) and online (e-mailed alerts sent to the user) alert kept them informed of any need for action or concern.

### Configuration of System - Hardware

A pre-installation survey confirmed that a system could be installed at the earliest possible opportunity. The laboratory identified the area of concern which was accessible and confirmed that a data connection was also available to provide connectivity for the sensor to transmit data online.

A wireless LU45 sensor was installed in close proximity to the area of concern near which water ingress had previously occurred. From here laboratory technicians could access the sensor to install sampling cartridges when needed.

The wireless data hub was installed in a different part of the laboratory. This type of configuration gave the option for the installation of multiple sensors if required, which could all simultaneously communicate with the data hub.



LU45 Sensor and Gateway

## Selection of Cartridge

An aspergillus cartridge was chosen as the most appropriate cartridge for mold testing. The cartridge is optimised to detect *Aspergillus* genus fungi, but will also detect other molds present in the air such, as *Penicillium*. The cartridge also contains an active antibiotic ingredient to ensure that only molds are detected, removing the chance for bacterial contamination. The cartridge is designed to sample for a period of 2 weeks, taking an air sample every 10 minutes, which provides continuous monitoring compared to a spot sampling approach using petri dishes or samples collected using an impactor.

## Operational Outcomes

Once the sensor began operating it sampled for a period of 11 days before a detection was confirmed. Laboratory staff were made aware of the detection through an automated e-mail alert indicating that a detection event had occurred. This confirmed that there was a low presence of mold in the area. At this time, remedial works were ongoing and further monitoring was required once these works were completed to validate decontamination.

## Automated Report

In addition to the automated e-mail alert, the customer also received an automated report detailing the detection time, details of the detection cycle and environmental conditions at the time of detection.



LU45 Automated Report

## External Validation Report

Customers have an option to validate the sample that has been detected through a lab partner service. This involves sending the cartridge to an external testing laboratory for further analysis and identification of the detected pathogen. This option was availed of and results confirmed that there was fungal growth present. A detailed test report was also supplied with the results.

## Ongoing Testing

An additional 3 mold cartridges were employed following the initial experiment, once the remedial works had been completed. Each operated for the full duration of their life cycle (2 weeks per cartridge) without a single detection of mold contamination. This indicated that the decontamination and cleaning procedures had successfully removed mold contamination.

After a consultation on the best way to continue to monitor the laboratory the customer made the decision to use a broadband cartridge for the detection of bacteria, yeast and molds. This non-specific cartridge is designed to detect the presence of most biological contaminants typically present in the air.

For the customer, this meant the system would act as an alarm system for the presence of microbial contamination in the air which could also affect embryonic development. This additional safeguard is used in conjunction with best in class air filtration and good laboratory practices to ensure the air remains as sterile as possible.

## Benefits to the customer

For the customer, the benefits were clear;

- Rapid awareness to confirm the presence of mold
- Continuous monitoring to confirm if decontamination procedures were effective
- Remote monitoring and alerts meant staff only needed to intervene when a contamination event occurred
- Ongoing monitoring of the presence of pathogens through the use of a non-specific agar cartridge

For more information on the LU45 please contact NuWave Sensors for information on distribution partners in your area: [info@nuwavesensors.com](mailto:info@nuwavesensors.com)