Case Study: Bio-decontamination of a 7000m³ bio-medical research building

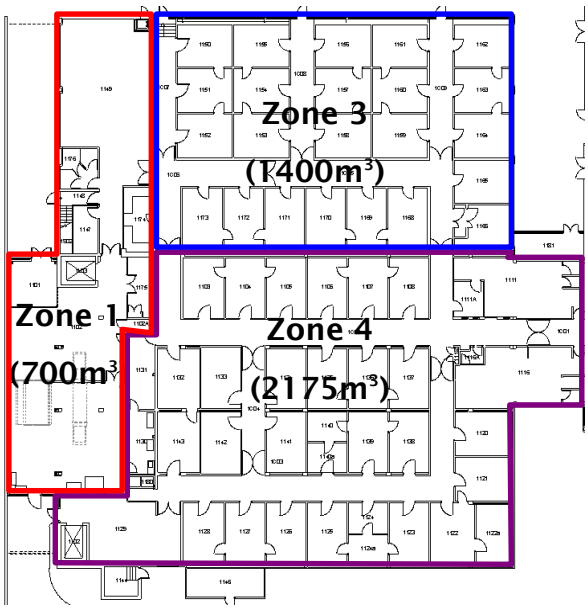
Site:	***GlaxoSmithKline***
Location:	***Harlow***

The Challenge

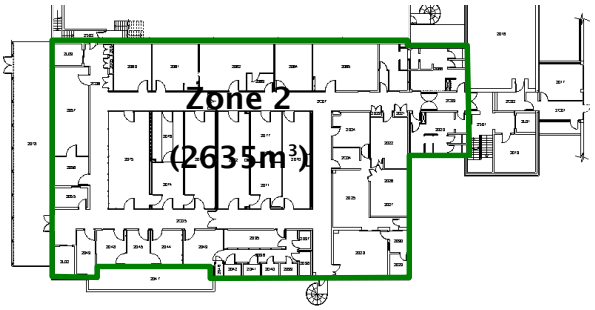
Following renovation, a large (approximately 7000m³) bio-medical research facility had a requirement for bio-decontamination before the building was re-occupied. The key criteria used to select the method employed were: (i) capability for large-scale deployment in order to complete the simultaneous bio-decontamination of rooms, corridors, and other inter-connected areas in accordance with the overall project timetable; (ii) ability to overcome challenging topology, such as lifts and lift shafts; (iii) residue-free technology to leave the building ready for immediate re-occupation; and (iv) documented verification of the biological efficacy of the bio-decontamination.

Solution

BIOQUELL's Room Bio-decontamination Service ("RBDS") was selected to treat the area. The two floor building was divided into four discrete zones, which were bio-decontaminated sequentially. Up to 17 Clarus™ 'R' hydrogen peroxide vapour generators were strategically placed in the zones to ensure even vapour distribution; 29 Clarus™ R2 aeration units were also included to remove the H_2O_2 vapour at the end of the cycle; and instrumentation modules were located in each zone to monitor the key parameters. Each zone was then sealed before bio-decontamination commenced and remained sealed until the H_2O_2 vapour had been removed at the end of the process via catalytic conversion to water vapour and oxygen. The entire process was monitored and controlled from outside the room via the control computer. The perimeter of each zone was monitored for leakage using hand-held hydrogen peroxide vapour sensors.



Gassing Cycle Verification



Geobacillus stearothermophilus spores dried onto metal discs and sealed in Tyvek pouches were used as biological indicators (BIs) to verify the efficacy of the bio-decontamination project. Two different inocula were used: BIs inoculated at >1.0x10⁶ for standard locations and BIs inoculated at >1.0x10⁴ for challenge locations. Standard BIs were distributed around the building according to BIOQUELL's protocols. Challenge BI locations were established prior to the bio-decontamination of each zone and included sites around and within intricate equipment.

Results

The BIs were retrieved after aeration and incubated for seven days at 60°C. Positive control BIs that were not exposed to the bio-decontamination process showed signs of growth. **600/600 BIs that were exposed to the bio-decontamination process were negative (following remedial bio-decontamination[1] in two small rooms).** BI challenge sites included inside computer equipment, lift shafts, anaesthetic equipment and cage racks.

None of the sensitive electronic equipment that was exposed to the hydrogen peroxide vapour was affected, demonstrating the excellent materials compatibility of the RBDS process.

Conclusion

The bio-deactivation target of a 6-log reduction in Tyvek pouched *G.stearothermophilus* spores in standard locations and a 4-log reduction in challenge locations was achieved throughout the building. The entire bio-decontamination project was completed in six working days. Hence, the RBDS system provides a very rapid and effective bio-decontamination system, which combined with the rapid aeration method produces a minimal cycle time.

[1] Two standard BIs were positive, indicating a <6-log reduction at these sites. These rooms were isolated and remedially bio-decontaminated to ensure that the full 6-log bio-deactivation target was achieved.

Background: *Bio-decontamination within a room or chamber is achieved by depositing an even layer of approximately 1 micron* 'micro-condensation' *of H_2O_2 over all surfaces. The term* 'micro-condensation' *may be defined as a microscopic film of H_2O_2, which being at a sub-micron level is invisible to the naked eye. Scientific research has proven that it is this low temperature, residue-free deposit that rapidly deactivates micro-organisms during the bio-decontamination process.*

This system is used frequently in many other applications such as the bio-decontamination of specific problem-causing micro-organisms or for general bio-decontamination of laboratories, including CL3 facilities, cleanrooms, pharmaceutical manufacturing plants and hospitals. The RBDS system is infinitely scalable so that very large areas and entire buildings (as in this case) can be rapidly and effectively bio-decontaminated.

For further details of H_2O_2 bio-decontamination solutions including equipment and room services, please contact BIOQUELL.

BIOQUELL Bio-decontamination solutions

For further information contact:
BIOQUELL (UK) Ltd, Walworth Road, Andover, Hampshire, SP10 5AA, UK
Tel: (44) 01264 835835
Fax: (44) 01264 835917
Email: RBDS@bioquell.com
http://www.bioquell.com