

# BSO Update Event – May 2024



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University Biomedical Services

# Autoclaves – The AMB Story

- Major Building Project on Cambridge Biomedical Campus

## The Anne McLaren Building

- £120M state of the art biofacility for UBS
- 4 distinct bio-secure barriered lab areas
- Sterilisation of goods/equipment going in
- Sterilisation of waste/goods leaving (CL2 and CL3)

# Autoclaves – The AMB Story

- 2016 - Tenders specifications drawn up for 7 bulk autoclaves
- Tender contains essential information on our key requirements
  - 3 x 6000 litres
  - 3 x 7000 litres
  - 1 x 1000 litres
- Critical manufacturing deadline to deliver to site – intrinsic to build
- Contract awarded to Sychem/Steelco
- Final design specifications agreed

# Autoclaves – The AMB Story





# Factory Acceptance Testing

- Factory Acceptance Test (FAT) is a process that evaluates the equipment during and after the assembly process by verifying that it is built and operating in accordance with design specifications.
- Achieve independent proof of functionality, quality and integrity with an established and comprehensive checking process
- Including safety features (E-stops etc)
- Verify all important documents, such as manuals, instructions, plans, drawings, piping and instrumentation diagrams (P&IDs)
- Ensure that your equipment performs as expected under the testable range of likely conditions, including mishandling and error

# Factory Acceptance Testing

- This also includes cycle development
- Validation of cycles using representative loads –
  - Cages, racking, bedding, enrichment, nesting, diet, water bottles
  - Scrubs
  - Carcasses (sausages!)
  - Milestone!

# Factory Acceptance Testing



# Factory Acceptance Testing





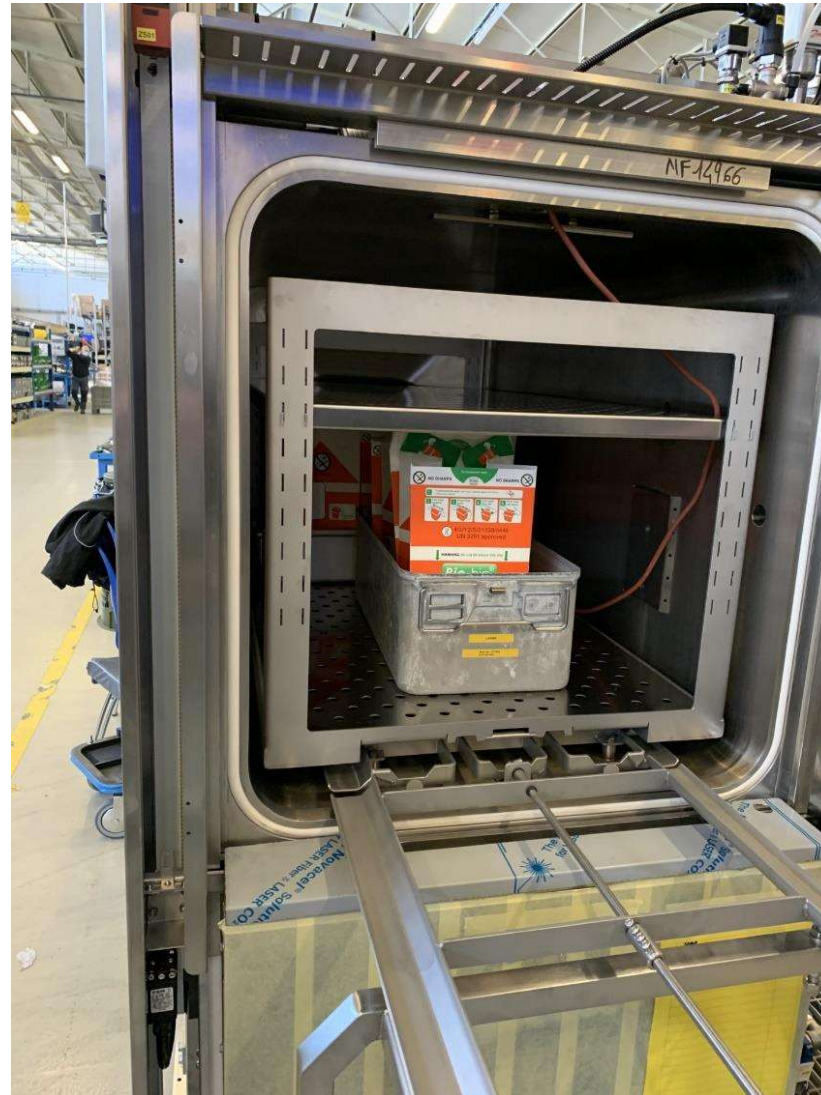
# Factory Acceptance Testing – P&ID



# Factory Acceptance Testing - Representative loads



# Factory Acceptance Testing – Representative loads



# Next steps...

- Once passed the FAT, the machines are dismantled and shipped to site
- On site they are re-built
- Once services (electricity, steam, compressed air etc) are available and connected, commissioning can take place
- Leading eventually to the Site Acceptance Testing



# Site Acceptance Testing

- A Site Acceptance Test (SAT) is a process in which a machine or plant is tested and accepted at the customer's site. Milestone!
- Similar to the FAT the purpose of the SAT is to ensure that the machine or system has been properly installed and configured and is ready for operation.
- Installation is complete and adequate
- Integration with supporting systems is appropriate
- Important process parameters are achieved
- Functionality is aligned with requirements

# Site Acceptance Testing and commissioning

- Again this includes cycle testing and validation using representative loads and thermocouples
- Independent verification using Chemical and Biological Indicators
- Following successful SAT, final is commissioning undertaken
- Includes Comprehensive Staff Training
  - 'HSE guidance document PM73, which requires that the autoclave can only be operated by trained and competent staff'

# Chemical indicators



# Biological Indicators





# Insurance check - BES

- Every two years for the safety valves and 'in service inspection'



**BRITISH  
ENGINEERING  
SERVICES**

*HEALTH AND SAFETY EXECUTIVE  
THE PRESSURE SYSTEMS SAFETY REGULATIONS 2000*  
**REPORT OF AN EXAMINATION OF AN ITEM WITHIN A  
PRESSURE SYSTEM**

In any correspondence relating to this report please quote:

District **B146**  
Policy **CAMBUNI/001**  
Item No. **BAS68**  
User Ref **Autoclave 8**

The next examinations should be completed by:  
Out of Service 09/06/2025  
In Service 09/06/2025

|      |                                                                                          |                                                                                                                                                           |                    |
|------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| 1    | Name of user (or of owner in the case of a mobile system)                                | The University of Cambridge                                                                                                                               |                    |
| 2    | Address of user (or of owner in the case of a mobile system, or lessee.)                 | THE UNIVERSITY OF CAMBRIDGE - THE ANNE McLAREN BUILDING<br>The Anne McLaren Building<br>90 Francis Crick Avenue<br>Cambridge<br>Cambridgeshire<br>CB2 0BA | Client Ref<br>H145 |
| 2 a) | Location of the System if different to the above                                         | As above                                                                                                                                                  |                    |
| 3    | Description of the System                                                                | Steam system and the associated protective devices.                                                                                                       |                    |
| 3 a) | Pressure System Number                                                                   | Autoclave 8                                                                                                                                               |                    |
| 3 b) | WSE Number or WSE Revision number                                                        | 1-709332I/WSS                                                                                                                                             |                    |
| 3 c) | Date Written Scheme of Examination last reviewed                                         | Drawn up 06/2022 by Matthew Clark of Bureau Veritas UK LTD                                                                                                |                    |
| 3 d) | Description of the Item                                                                  | AUTOCLAVE - LEVEL 4, STEELCO AUTOCLAVE                                                                                                                    |                    |
| 3 e) | Makers Name                                                                              | WMI SRL                                                                                                                                                   |                    |
| 3 f) | Distinctive number                                                                       | 1253                                                                                                                                                      |                    |
| 3 g) | Date of construction (if ascertainable). The history should briefly be given, eg repairs | 2017<br>No evidence of modification or repair.                                                                                                            |                    |
| 4    | Date and details of last hydraulic test                                                  | 19/05/2023 witnessed by Matthew Clark CP to BES.                                                                                                          |                    |
| 5    | Date and details of last special examinations, preparations or NDT carried out.          | Not known.                                                                                                                                                |                    |
| 6    | Details of examination and tests carried out                                             | In service examination under normal operating pressure to complete the 2 part examination in accordance with the Written Scheme.                          |                    |
| 6 a) | Additional tests                                                                         | None.                                                                                                                                                     |                    |
| 7    | Parts inaccessible                                                                       |                                                                                                                                                           |                    |

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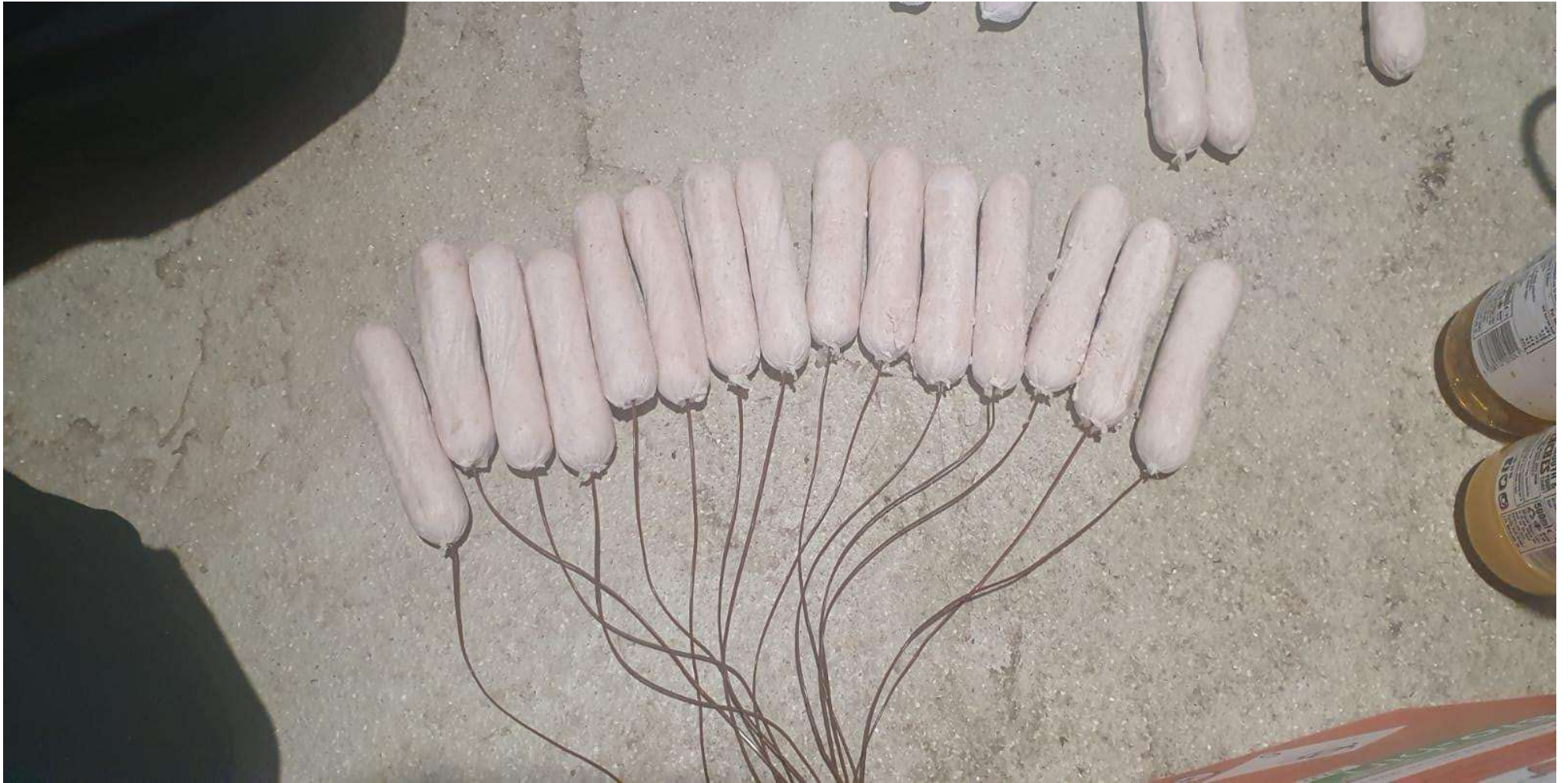
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# Cycle validation – carcass disposal





# Cycle validation



# Cycle validation

- 5 litre Biobins each containing 30 bodies
- Thermocouples
- Biological Indicators





# Cycle validation



# Cycle validation



# On going support and regular servicing...

- Service contract - 24 hour call out, 6 monthly servicing, preventative schedule
- Critical spares lists – maintenance packs on site (door seals, gaskets, valves etc...)
- Annual validation of cycles – using Thermocouples, BIs and CIs
- Regular confirmatory checks on loads using CIs
- Insurance checks - BES



# And finally...





# And finally...



Thank you for listening



Any questions?