

## CASE STUDY

### The Pirbright Institute – United Kingdom

#### The Effluent Decontamination System for ISO11 Building



#### The Client

The Pirbright Institute is a world leading centre of excellence in research and surveillance of virus diseases of farm animals and viruses that spread from animals to humans. Working to enhance capability to contain, control and eliminate these economically and medically important diseases, the Institute's highly innovative fundamental and applied bioscience contributes to global food security and health, improving quality of life for animals and people.

#### The Project

Suncombe was involved in the initial design and implementation of the Effluent Treatment Plant at the Pirbright ISO11 building. The ISO11 building is used to conduct research into areas such as Vaccine development, efficacy testing and Viral transmission biology. The site houses animal units and conducts tests on pathogens at containment level four and since this is the highest containment level possible this project had a particular focus on highly secure solutions. We created an excellent team, all working to achieve the goal of the project, on time and to budget. The team was centred around the excellent Project Management provided by the 3PM staff and amalgamated the tremendous knowledge and experience of the Pirbright personnel, working with the Suncombe engineers who provided the expertise in detailed design and construction.

#### The Challenge

The challenge for this project was to design and implement an Effluent Treatment System that operated alongside the typical activities at the ISO11 building. In order to integrate the Effluent Treatment System into the existing facility, it was decided that the Effluent Treatment System would be primarily built and integrated into an offsite structure, made of specially manufactured shipping containers. These ETP containers were manufactured to provide a 100% contained environment as the operations involved 'high consequence' pathogens up to and including SAPO4 (including Foot and Mouth Disease Virus) and ACDP Hazard Group 3 (viruses that can cause serious disease in humans).

#### Building Methodology

The methodology to integrate the Effluent Treatment System into the existing facility using specially manufactured containers, allowed the equipment to be designed, manufactured, connected, installed and tested off-site and allowed the inclusion of all of the utilities and control systems in this single module.



Courtesy The Pirbright Institute

#### Our Approach

We started by reviewing the initial building specifications and worked with the client to develop models of the proposed ETP. These models included the P&ID, the 3D CAD model and a quality plan.

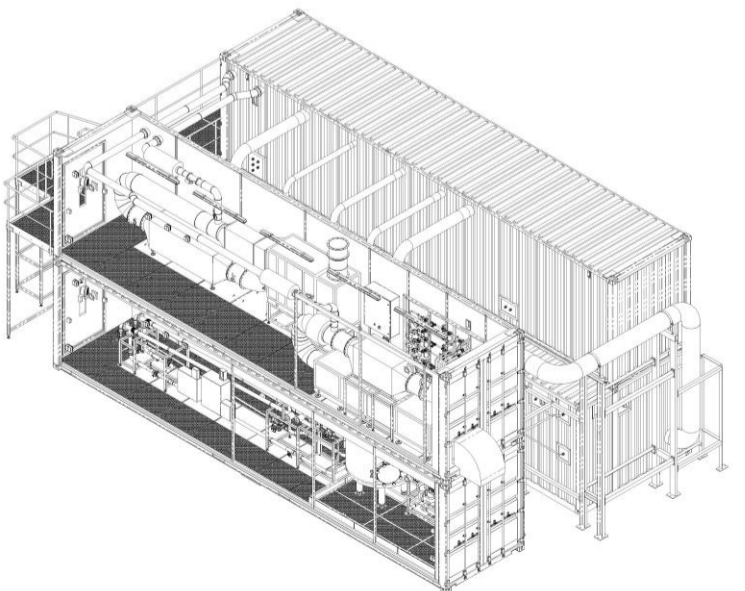
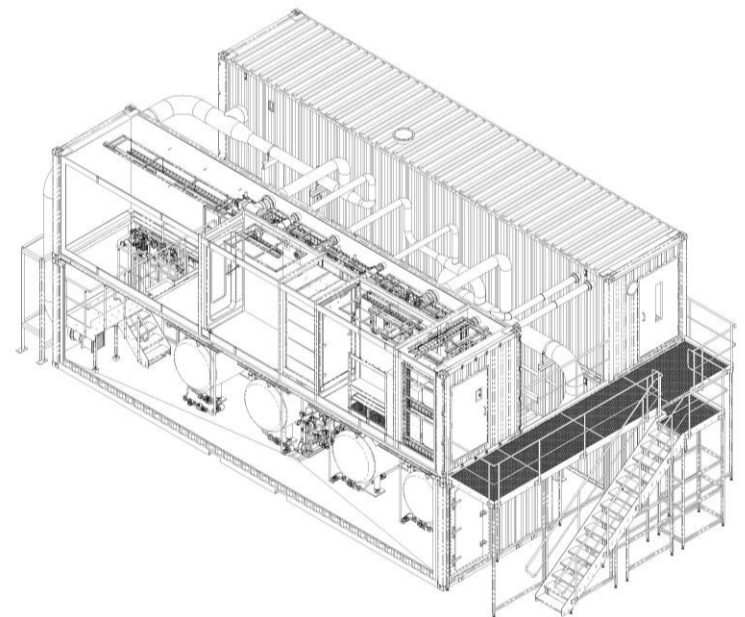
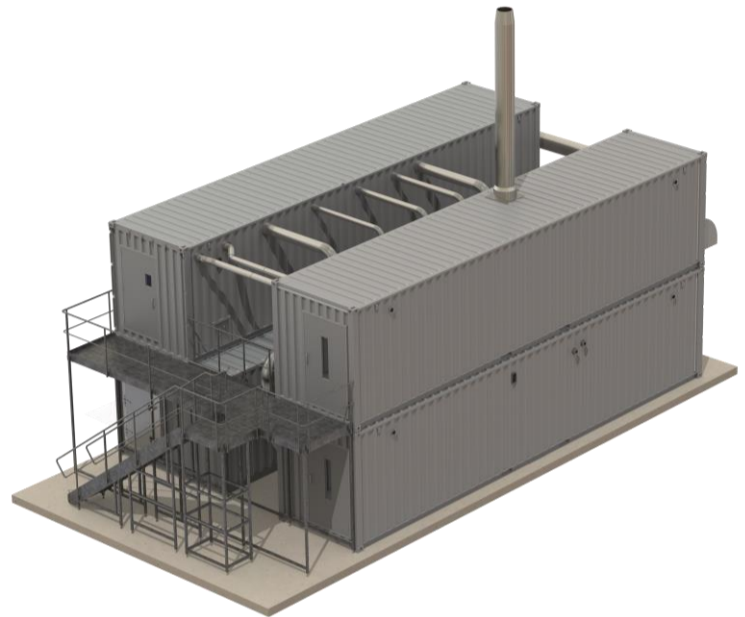
Following preliminary design, we held and attended design evaluation meetings, HAZOPs and risk assessment, to jointly develop the optimum methodology for guaranteed effluent treatment at the containment level 4.

We identified and specified all the performance testing needed to carry out in order to provide test results and demonstrations and developed the planning of the testing and commissioning of the final system early in the project programme.

We identified all of the critical outcomes and the requirements of the statutory authorities and using these we developed the designs. We worked in close co-operation with the client and long term Suncombe engineers who have been working on biowaste effluent treatment and critical decontamination and sterilisation system throughout our company's 60+ years of operation.

The detailed design process occurred over an elongated design period, to ensure all stakeholders requirements were achieved and due to the particularly complicated nature of the task at hand as well as containment concerns.

One of the challenges faced was the provision of labour and the procurement of materials during the COVID-19 pandemic, all of which needed to be completed and delivered on time and in the correct order so that project build could occur in a timely fashion. We ensured that extra precautions were taken to ensure a safe workspace whilst allowing critical work to go ahead.



System Models



System on Site



Treatment Hall Internals



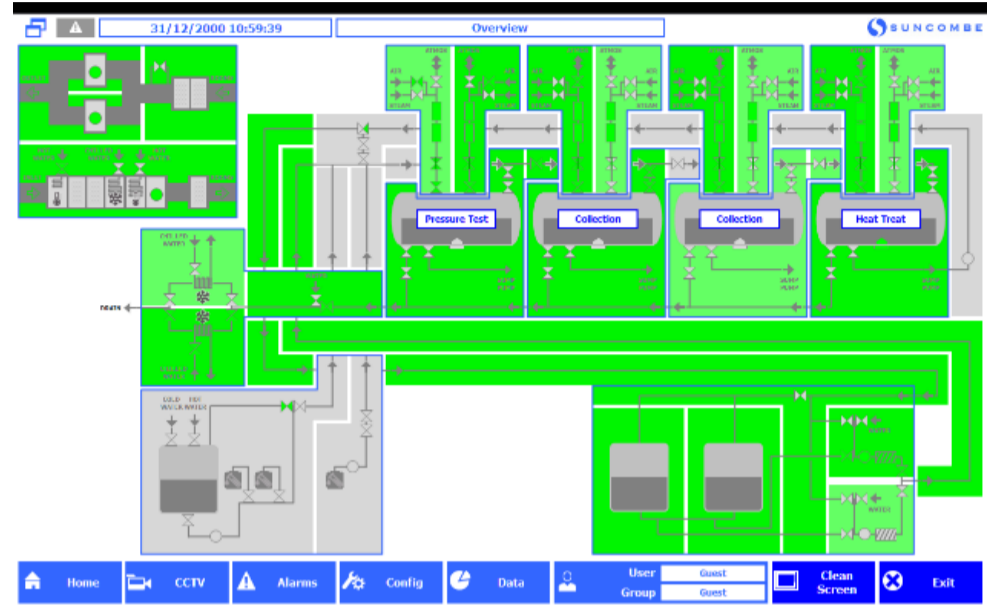
Treatment Hall Entrance



Utility Container Internals

## Our Automation

Suncombe BioSuite Control Systems have been specifically developed for ultimate control of these highly critical decontamination systems. They include a User friendly interface allowing visualisation, reporting and audit of the process, whilst incorporating system redundancy, to ensure continued operation and safe shutdown availability, together with Functional Safety Logic and Elements. The optimised design of these systems has been developed to keep the equipment as well as people working around safe, to remove downtime during a failure condition, to keep running the critical process without intervention and to prevent breach of containment, damage to critical machine or equipment



System Human Machine Interface Screen

## Our Testing

A Factory Acceptance Testing process occurred and was carried out to pre-approved testing protocols. System documentation and certifications were also reviewed, and a full testing process occurred including simulated load tests and automation.

These extensive pre-delivery tests were carried out to ensure that on delivery to site the system was pre-tested meaning that reconnection and preparedness for operation was straightforward. In addition, the simulated load tests provided evidence to the client that the system would function correctly even in a worst possible scenario.

Following delivery and installation, the testing regime continued with the next stage of commissioned Site Acceptance Testing, once again against pre-approved protocols. Tests were carried out to prove that the installed system maintained the operation of the Factory Accepted system and continued on to challenge testing and bio-deactivation testing.

## Suncombe Comments

**Steve Overton** (Suncombe Operations Director) commented; *“The ISO11 project was an exciting, challenging project that saw a great project team working very hard to achieve the project goals. The project life cycle was extended, due to a number of operational changes and due to the COVID-19 pandemic, but throughout these changes the project team adapted and with close co-operation, worked together to ensure the optimum outcome. I am grateful to The Pirbright and 3PM personnel, as well as the Suncombe team, for ensuring the successful outcome of this challenging project”.*

**Mark Keen** (Suncombe Mechanical/Process Lead) commented: *“The high containment area was designed with many considerations in mind, combining the requirements of containment, maintainability, equipment removal, future proofing and access, together with the most important being 100% guaranteed effluent treatment,*

**Elliott Sutton** (Suncombe Automation Lead) commented: *“The ISO11 project entailed the incorporation of hot standby methodology, ensuring 100% uptime in the automation system, which combined with an N+1 design provided an ‘always up’ availability. The Suncombe systems evaluated under the premise of Functional Safety standards IEC 61508 and IEC 61511, to provide a SIL level 2 and 3 system for the ultimate release of treated waste.*

## 3PM Project Manager Comments

**Michael Hamid** (Project Manager) commented; *“It was a very complicated job running to an accelerated schedule but it all came together very well. Suncombe always hit key dates in delivering different elements of the plant. There was always clear reporting on their status and progress, and constant updates keeping you in the picture on progress.*

*Pirbright simply wouldn't have gone ahead into operation if they weren't 100% happy with everything. We all got on really well with the team from Suncombe. Day to day working relationships, and communication and reporting, were all really good, and their paperwork was always spot on. So yes, I'd definitely work with Suncombe again! “*

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