SUPER COMPUTER

RISKS:

Data centres are considered critical to business infrastructure and crucial to our day to day lives as they affect our lifestyle in many ways, from managing the information used to run our cities, to streaming our entertainment and handling the huge amounts of data we produce every day in our working and personal lives.

In a data centre there are a number of potential risks. The main one is fire caused by overheating electrical components, cables, power supplies or faulty lighting. The volume of cables in a datacentre can lead to excess heat that may not be able to disperse easily. This heat can cause the insulation on cables to melt, often resulting in live cables igniting. Fans and ventilation systems used to keep the room and equipment cool, cause an increased amount of air movement often pulling air away from conventional smoke detectors. Air movement can also have a dilution effect on any smoke in the room. Under such circumstances, smoke could go undetected for some time and its concentration could be allowed to reach undesirable levels.

The occurrence of fire in mission critical facilities can lead to business interruption costs often exceeding thousands of dollars.

INTRODUCTION:

The University of Edinburgh is home to the most powerful supercomputer in the UK. The £43m Advanced Research Computing High End Resource (ARCHER) system is capable of more than one million billion calculations every second and can carry out complex computations which provide high performance support for multiple research and industry projects in the UK.

It can support what is known as Big Data applications - huge collections of information too large for traditional analytical methods.

The system is designed to help researchers carry out complex calculations in diverse areas such as calculating the airflow around aircraft, or simulating the Earth's climate. Its magnitude and design has enabled scientists to tackle problems on a scale that was previously thought impossible.

This world-class supercomputer is operated by Edinburgh Parallel Computing Centre (EPCC), the high-performance computing centre based at the University of Edinburgh, and is located at EPCC's Advanced Computing Facility data centre on the outskirts of Edinburgh.

CHALLENGE:

A comprehensive fire safety concept is needed to ensure business continuity, personal safety and damage mitigation in the event of fire.

Providing complete fire protection and detection for such a valuable asset is vital, however not without its challenges, something that the team at Automatic Protection Ltd (APL), an authorised HYGOOD distributor specialising in automatic fire suppression and extinguishing systems, encountered when selecting the most suitable fire suppression solution for the UK Research Data Facility.

Firstly as a pioneer for sustainable buildings, the University of Edinburgh is committed to being a world leader in addressing global challenges including poverty, climate change and the growing demand for energy, food and water. Consequently the ARCHER system, is among the greenest computer centres in the world; with cooling costs of only 8p for every £1 spend on power.

In line with their eco-friendly requirements, in the building specification the University stipulated a clear requirement for the building's fire protection system to be green; causing minimal damage to the environment whilst being a more sustainable solution to protect the asset.

During the installation, APL faced another challenge, as the datacentre room was equipped with heating ventilation and air conditioning (HVAC) units at the side of the building. These were positioned to prevent the data room from overheating and to help minimise the risks of fire. Due to the position of these units, it was necessary for the gas cylinders to be installed within the unusable gaps in between the HVAC units in order to save space and ensure the design and layout of the room was not compromised.

In a data centre environment, where the assets are invaluable and down time is costly, fast response and release times are essential criteria when selecting fire protection for the building. For instance, a small fire in critical facilities such as data centres, computer-controlled manufacturing operations can result in catastrophic loss by interrupting vital operations and damaging high-value equipment.

The design standards for fire suppression systems within a server room and data centre have been developed with strict guidelines to help ensure the safety of the system. Design considerations such as the position of cylinders, piping and nozzles, to ensure quick response times, also play a key role when selecting the most effective fire suppression solution for this type of environment.

SOLUTION:

Due to its environmentally friendly properties HYGOOD's clean agent SAPPHIRE System with Novec ™ 1230 was selected as the most suitable fire suppression system to protect the datacentre room. SAPPHIRE systems are known for their reduced environmental impact due to the fact that the agent, Novec™ 1230 Fluid, has zero ozone depletion potential (ODP) and negligible global warming potential (GWP). The atmospheric lifetime of the Novec 1230 Fluid is only between three and five days making the SAPPHIRE system an ideal solution to protect the data room without compromising the environment.

HYGOOD SAPPHIRE systems are ideal for use in occupied areas. Independent toxicity studies have established that the Novec 1230 agent is very low in both acute and chronic toxicity with high safety margins between its normal use concentrations and the No Observable Adverse Effect Level (NOAEL)

The SAPPHIRE System works fast and is designed to rapidly absorb heat to the point where combustion ceases. Once actuated, HYGOOD SAPPHIRE systems deliver the extinguishing agent within 10 seconds of activation of the panel, stopping fires before they have the chance to spread. Most importantly when a fire is suppressed quickly, the result is less damage, lower refurbishment costs and reduced downtime.

In order to accommodate for the limited free space available, the team at APL chose a modular design for the system. This meant that the cylinders could be placed in between the HVAC units so that the installation costs and piping were kept to a minimum whilst making the most efficient use of the floor space.

Stuart Harrison Director - APL said: "Protecting one of the most powerful computers in the world from fire has been an incredible project. The solution we have developed in collaboration with Tyco is one that addresses various challenges we encountered during the installation. With our expert knowledge and support, our engineers were able to tailor the solution specifically to meet the demands of the client"

"Selecting the SAPPHIRE system in this case was the most effective due to its green properties and as we had limited space in the room for the cylinders, we had to design the system around the HVAC set up. With SAPPHIRE we have the option to position the containers around the room in the spaces available, an inert system would just not offer this kind of flexibility. The long standing collaboration between APL and Tyco has been really successful on this project. Together we have developed an effective solution to protect this high value critical asset from fire."

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