

Keeping Iceland green

Fire safety specialist ARK Security commissioned Hochiki Europe to deliver the sensing technology for one of Iceland's most high-profile renewable energy projects in recent years.

Geothermal power is one of Iceland's most prized national assets, so keeping the country's newest power station safe from the ravages of fire is a heavy responsibility. Iceland is an island with a population of just 300,000. It lacks coal reserves, but is endowed with massive glaciers that produce huge volumes of water that can be harnessed to generate electricity. Indeed, all electricity on the island is generated through geothermal or hydroelectric sources.

The latest development in Iceland's renewable energy programme is the construction of the new Hellisheidi Geothermal Power Plant, the only emission from which is water vapour. Reykjavik Energy owns and operates the plant, which sits in snow-covered hills 13 miles outside of Reykjavik. When completed later this year, the plant will generate 300 megawatts of electricity and 400 megawatts of thermal energy. The central building contains the control rooms and shared equipment for the whole plant, while production facilities for electricity and district heating will be located on each side of this main facility.

With such dependence being placed on the new plant, and with plans for future expansion if energy demands increase, careful thought was given to plant's fire detection and alarm installation. This was designed by electrical consultancy Raffeikning hf, as a multi-phase project to run alongside a phased commissioning programme that started in 2006. It was installed and



commissioned by Icelandic fire safety specialist ARK Security, and incorporates the latest sensing technology from Hochiki Europe. This is integrated with a number of Kentec Electronics' Syncro fire control panels – that are also interfaced to high-sensitivity smoke detection systems – dividing the installation into 60-70 zones.

Around 750 Hochiki devices have been installed including Hochiki ESP – Enhanced System Protocol – analogue addressable sensors, call points, beam detectors and analogue addressable relay controllers. These relay controllers allow multiple inputs and outputs at one physical address, which maximises functionality and minimises the number of modules. The plant is protected by a number of different types of sensor, including photoelectric smoke sensors, multi-heat sensors, beacons and beam detectors. "A power plant is a high-hazard environment where fire safety is absolutely critical, so fast and reliable fire detection is essential," said Kjartan Scheving, Managing Director of ARK Security. "The Hellisheidi plant is a particularly challenging environment, so it was agreed with Reykjavik Energy that the site needed sensing technology that allowed every device to be automatically re-calibrated every 24 hours to compensate for any environmental contamination in the plant. This way we could be sure that every sensor will continue to operate reliably at the specified sensitivity."

False alarm management was deemed to be crucial. Hochiki's ESP provides what is called "full digital transmission" that delivers exceptionally secure signalling. It also incorporates Hochiki's Checksum error checking to safeguard the integrity of the data and ensure reliably correct communication, and has high immunity from electrical noise, so there are no false alarms due to corruption. The ESP system also has a suite of false alarm management tools called ARM (Alarm Reduction Management) which includes "drift compensation". When activated by the control panel, it automatically recalibrates the sensors every 24 hours.

The optical sensors at Hellisheidi incorporate what Hochiki calls "flat response" chamber technology. This optimises the sensor's sensitivity to both smouldering and flaming fires. The multi-heat sensors incorporate a variable temperature heat element and a rate-of-rise heat element, both of which are controlled from the control panel. This allows either of the thermal elements, or both elements, simultaneously to be active in making the fire decision.

Power generation plants are well known for their huge turbine machine rooms and Hellisheidi is no exception. Beam detectors spaced at 17-metre intervals are able to detect smoke scattered over a large area with emitters and receivers that cover a distance of anything between five metres and 100 metres, and a total area coverage of 1,500 square metres. However, the decision was taken that some areas of the plant would be best protected using high-sensitivity smoke detection equipment to provide the very highest levels of sensitivity and the ability to differentiate between smoke, dust and steam in "dirty" environments, where it is able to sense the very smallest amounts of smoke.

Wireless fire detection system

Cooper Fulleon has launched a wireless fire alarm and detection system, Radio+.

Radio+ uses a new secure wireless system, providing a complete fire detection system without the need for a cabled connection between the field devices and the control panel. Benefits over wired detection and alarm systems include fast and simple installation, low costs, and flexibility. According to Cooper Fulleon, the system's well proven components – ie detectors, sounders, beacons and call points – give Radio+ a highly reliable foundation.

It features the market's first wireless detector with integrated sounder and beacon, reducing the need for multiple devices. The system also boasts the longest signal range in the market measuring up to 2km in free air, limiting the amount of booster devices needed. The development of Radio+ has tracked the progress of the European standard EN54-25 "Fire detection and fire alarm systems. Components using radio links", and has therefore been designed to conform fully to all aspects of this document. The new system is available now in the UK, and globally in early 2010.

