CASE STUDY

# SIL 3 Scanner Upgrade

## InSight® Series 4

### Meeting the latest standards with enhanced technology

With ever-increasing requirements, Fireye is often requested to assist in upgrading flame scanners to meet ever-changing new standards and also provide increasing flame scanner features and functionality.

An example of such a scenario was a large gas plant in Western Australia that had been using Fireye's 45UV5 series flame scanners for many years. These flame scanners were ultraviolet (UV) and had been used for flame detection within their production process. The Fireye's 45UV5 series flame scanners were situated in a hazardous area of production and were enclosed in an IECEx certified housing. These UV scanners provided a flame signal to the Fireye Flame-Monitors™ and in turn to the gas plant's distributed control system (DCS). The existing scanners were not safety integrity level (SIL) rated and as such the gas plant required an upgrade to meet new SIL standards and the latest technology.

**Existing Fireye 45UV5 Series flame scanners at gas plant**

### Flexibility to reuse existing cabling saves installation time and money

The existing Fireye 45UV5 series flame scanners are 'discrete' scanners, meaning they require the use of a separate amplifier for the flame signal. In this example, the flame scanners were located at the burner front while the amplifiers were located within a separate control rack room. There were 8 separate burner front locations all with cabling back to the control rack room which was up to 900m away at its furthest point. These 4-core cables provided 2 wires for 120VAC power and 2 wires for flame signal.

The suggested replacement scanners were identified as the hazardous area version of the InSight Series 4, ultraviolet model (part# 95UVS4-CEX). This is a SIL 3, IECEx and Australian Gas Association (AGA) certified device. All InSight scanners are a 24VDC powered scanner with integrated amplifiers and offering more features than the Fireye 45UV series scanners. With the newer technology and increased features comes increased cabling requirements such as the use of up to a 12-core cable.

With multiple lengthy distances between the burner front and the control rack room, any re-cabling could be a costly exercise. A solution that utilized existing cable and kept installation cost and time to a minimum was required.

**Existing Fireye Flame-Monitors at gas plant**

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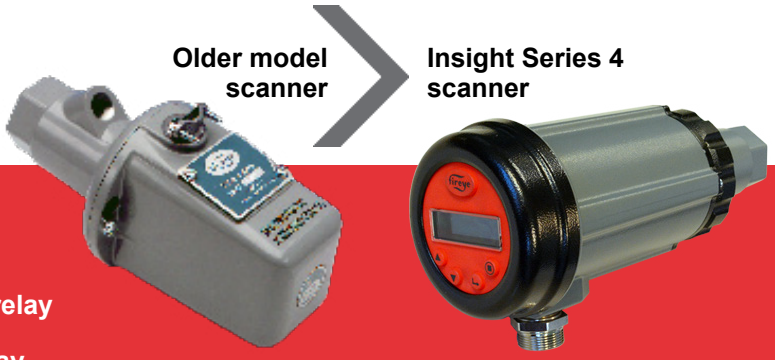



## Insight Series 4 Features

- Infrared (IR) or ultraviolet (UV)
- Microprocessor based
- State-of-the-art algorithms
- 21 selectable frequency ranges
- Integrated amplifier
- 1 flame relay
- Fault relay
- 4-20mA flame signal
- 4 selectable memory files
- Remote communication software
- Local display
- ATEX & IECEx options
- Global certifications & SIL 3 certified

## 4-Wire Cabling: Power, Flame & Fault Relay

Reusing the existing cabling to reduce installation costs meant the use of only 4 wires and that some additional outputs would not be accessible. With 2 wires required for power only 2 wires remained for output. It was required that these be used for the flame relay, however the InSight flame scanners allow for configuration of the wiring so that the flame relay will also open if there is a fault.

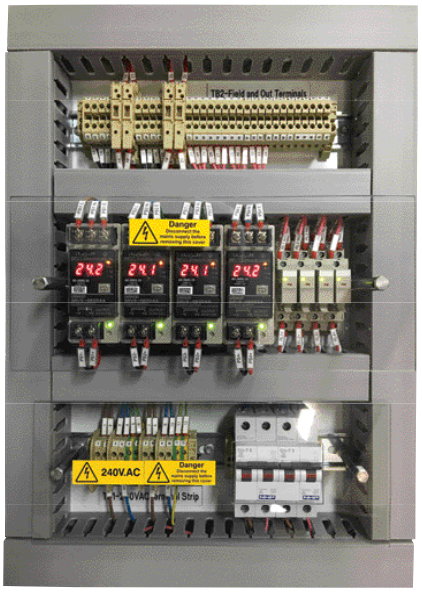
With this additional feature, a 2-wire power supply was included, required for conversion from 120VAC to 24VDC. In addition, a panel to replace the existing Fireye Flame-Monitor in the control rack room was also designed and supplied. These panels included a 24VDC power supply with redundancy and a series of junction terminals to link the existing scanner and DCS cables. The panels were designed in consultation with the gas plant by Fireye engineers supporting our local Australian distributor. The panel was manufactured locally, meeting all Australian standards and requirements.

- **Extra Wiring Options:** If extra cabling is available or if alternate outputs are required it is possible to utilize the extra features of a 4-20mA Flame Signal, a Second Flame Relay, a Dedicated Fault Relay, or a Modbus Communication.
- **Alternate Wiring Options:** It is also possible to utilize the features of the 4-20mA signal via the 2 wires (utilizing these signal settings to activate the flame relay), if required.

The additional signal outputs from the new scanners would not be required in this instance, however the features remain should the gas plant wish to utilize them at a later date. They use only an extra 2 wires for communication, for the future use of the Fireye Explorer (FEX) software, if necessary.

- **FEX Software:** All Fireye InSight flame scanners are compatible with the FEX software. This software can be utilized via modbus communication to receive live flame signal information, record trends and assist scanner set up and commissioning.

Upon timely delivery, Fireye's factory-trained and certified local Australian distributor assisted in the successful commissioning of the equipment. The upgrade resulted in a more reliable flame signal as well as the desired SIL certification.




**New power supply and junction terminal panel**

For more information, please contact your local Fireye Distributor.

**fireye.com**

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