"Our design team proposed a single sampling system located within the designated safe area, switched between the ducts."

"A GSM unit was used to transmit SMS text messages to the Site Manager in the event of alarms and faults during unmanned trials."

We were approached by a major design and build company within the Waste Water industry requesting a system to monitor parts per million of Hydrogen Sulphide, percent by volume levels of Methane and Oxygen within two Bio-gas pipe lines. The pipe lines were Zone 1 classified, contained high relative humidity, up to 1,000 ppm of H_2S and the nearest designated safe area was over 30 metres away.

Our design team proposed a single sampling system located within the designated safe area, with the capability to switch between the ducts. The cabinet was supplied in GRP, IP65 rated on Hot Dip Galvanised Unistrut framework suitable for Waste Water Treatment plant environments. Sample lines made of special material which is non porous to H_2S, CH_4 and O_2 were run from each duct to the instrumentation cabinet, where they entered ATEX approved Flame Arresters. These Arresters prevented flash backs up the sample line and protected the plant against explosion from the high concentrations of Methane (CH_4). The sample pump diaphragms were supplied in PTFE to reduce the potential of sample loss or corrosion from the H_2S.

A flow failure device also made from PTFE was used inline to check for flow and alarm as necessary.
A manifold block was used to split the sample into two streams. One stream would pass through a counter current drier to remove moisture but maintain integrity of the sample gas, through a dilution system electronically operated by Mass Flow Controllers to reduce the H_2S concentration, before being passing across a standard electrochemical cell H_2S sensor. This sample was returned to the duct via another Flame Arrester. The reading from the sensor was multiplied up by the dilution ratio for accurate measurement.

At the same time another pump would pull a section of the sample from the manifold block through another counter current drier, through a carbon filter to remove H_2S before being passed across an Infra Red sensor for detection of % by volume levels of CH_4, across an electrochemical cell oxygen sensor, through an ATEX approved Flame Arrester and back to the duct.

Every few minutes a PLC within the control cabinet would switch the sample between each duct and illuminate an LED on the front panel for indication of the stream being sampled and the gas concentrations. The information was duplicated via 4–20 mA signals and volt free contacts to the clients control room.

The PLC was also used to control switching of the H_2S sample stream between monitoring mode and introduction of fresh air. The fresh air sample was used to stabilise the sensor zero point.