Industry Overview

Honeywell

Power

Power

Oil, coal, natural gas, nuclear power and other renewable sources are converted into electricity worldwide. Over 60% of the worlds' electricity is generated from coal and oil. However, these 'dirty' sources of electricity are being replaced by cleaner sources such as gas to satisfy international regulations and guidelines on emissions of toxic and greenhouse gases.

New power plants being built in established nations now make use of the latest turbine technology, such as combined cycle gas turbines. However, traditional coal and oil fired power stations continue to be built in developing countries. In Europe and North America power stations are being converted from the traditional oil and coal fired stations to combined oil / gas or oil / gas / coal.

CHP (Combined Heat & Power) plants supply many commercial, industrial and public sector buildings, such as office blocks, schools and hospitals. Approximately 10% of these are based on gas turbines. Larger units are located in oil and chemicals, food and drink, paper, iron and steel sectors where massive amounts of power and heat are required for the processes involved.

Market Drivers

Drive to green policies -
Environmental Pollution Act (1991)

Heat efficiency to reduce costs -
Climate Change Levy (2001)

Environmental Pollution Act (1991)

NoFFO treaty (1998)

Worldwide Kyoto Convention -
Industrial Emissions leading to Global Warming

Reduction in ash transportation costs by moving from coal fired to gas fuelled systems

Move from coal / oil fired system to natural gas to reduce CO2 emissions

Conversion from old style to CHP/CCGT (efficiency)

Reduction in transport logistical costs associated with coal supply

Potential Applications

Application 1:

Personal Protection (General)

From time to time areas which are not routinely occupied may need to be accessed by maintenance workers. Due to the potential gas hazards that can be found in a power station, portable gas detectors are required to meet national health and safety guidelines and provide a safe working environment.

Gas hazards include oxygen deficiency or enrichment (oxy-acetylene welding), flammable gas (leaking pipelines), carbon monoxide (incomplete combustion of fuels), sulphur dioxide (burning of sulphurous fuel stock) and hydrogen (sometime used for cooling).

For details of working safely in confined spaces refer to separate presentation and application guide.

Application 2:

Burner Monitoring (Coal, Oil & Gas)

As oil / coal stations are being converted to gas / oil or gas / oil / coal, there is a risk of flammable gas leaking from pipework and burners around the boiler. The flammable gas may be ignited due to hot surfaces of the boiler resulting in potentially hazardous conditions. Not only does this present danger to working personnel, but also loss of production will result in serious financial damage to the operator.

Due to this continuous threat, fixed gas detection systems should be installed to monitor all areas where leaks may occur. Typical areas would include above the burners, at the boiler front, any flanges or baffles on the associated gas supply pipeline and gas metering skids.

Application 3:

Desulpherisation Plant

Coal may be contaminated with various compounds including sulphurous. During the combustion process, depending on the quality of the coal, large quantities of sulphur dioxide and nitrogen containing gases (NOx) are produced. International guidelines for emissions control have been agreed (in principle) which demand these gases be removed. The area containing such removal equipment should be monitored for potential leaks of these toxic compounds, as these areas may contain monitoring equipment that must be routinely accessed by plant personnel.

Application 4:

Coal Transport System

Coal is delivered to the power plant by train, boat or road. It is transported from the reception depot to the coal storage hoppers by conveyor belt. From the hoppers, the coal is transported by the feeder (variable speed conveyor belt) to the pulverisation mill where the coal is crushed, graded and passed through to the burners of the boiler for combustion.

At all stages of this process, coal dust may collect. Process design is such that this is minimised wherever possible. Coal dust is extremely flammable and may, when heated, smoulder or spontaneously combust. Carbon monoxide can be monitored at various points of the process using a sampling system and this provides an early indication of a potential fire hazard. Should the risk of, or an actual, fire be detected the entire process is inerted to prevent full combustion or plant damage.

In addition to monitoring carbon monoxide, flame detectors, fuseable plugs and conventional smoke detectors may also be used generally to detect fires.

Application 5:

Dead Space Monitoring (Above Boiler)

Water flow through pipework in the boiler and is converted to super-heated steam. These pipes pass through the roof of the boiler and on to the steam driven turbines. At the point where the pipes penetrate the boiler roof they are enclosed. This is a no go area. When being maintained, the boiler is cooled resulting in thermal contraction of all pipework. This may result in flammable gas leaks which, being lighter than air, can collect in the dead space. When the boiler is re-ignited there is a risk of explosion resulting in loss of life and plant. The dead space can be monitored via a sampling system for the accumulation of flammable gas.

Application 6:

Turbine Hall

Boilers produce superheated steam which is utilised within a steam driven turbine to produce electricity before being fed back to the boiler for reheating (more efficient). Turbines may be cooled using Hydrogen due to its excellent thermal properties. Leaks of Hydrogen pose a flammable risk and gas detection equipment is normally fitted to mitigate that risk.

While the turbine hall in general comprises steam driven turbines, lubricating oils and insulating materials represent further fire hazards. For example, lubricating oil of a baring runs low, resulting in increased wear and friction and significantly increased temperature, may provide sufficient energy to cause a fire. Flame and smoke detectors are used to protect the turbine hall from such major incidents.

A backup gas driven turbine may also be found to top up electricity output during peak demand. Such turbines are housed in turbine enclosures which result in the potential containment of flammable gas, should a leak occur. High temperature flammable gas detectors are normally fitted in order to protect against flammable gas hazards. In addition, heat detectors may also be used to detect fire.

Application 7:

Water Treatment

Demineralisation / water treatment plant (H_2S) - especially using estuary water is essential. Water is utilised to generate steam for turbine operation. Before it can be used, the water must be treated to remove contaminants.This process makes use of Chlorine to purify the water which must be monitored for safety levels. Untreated water entering the plant can contain effluent that produces H_2S which must also be monitored.

Application 8:

Various

Nuclear - Steam Spaces (CO_2, CO, O_2, flam), Chemical Tanks (CO_2, H_2S & NH_3), Charcoal Filters (CO_2, O_2, CO & H_2S). In a nuclear power plant, CO_2 is used as a coolant instead of water, and is processed using chemical tanks and filters to ensure purity. At each mechanical interruption, the CO_2 must be monitored for leakage including gas pipework and valve pits.

Our Product Range

Fixed Gas Monitoring

Honeywell Analytics offers a wide range of fixed gas detection solutions for a diverse array of industries and applications including: Commercial properties, industrial applications, semiconductor manufacturers, energy plants and petrochemical sites.

- Detection of flammable, oxygen and toxic gases (including exotics)
- Innovative use of 4 core sensing technologies – paper tape, electrochemical cell, catalytic bead and infrared
- Capability to detect down to Parts Per Billion (ppb) or Percent by Volume (%v/v)
- Cost effective regulatory compliance solutions

Portable Gas Monitoring

When it comes to personal protection from gas hazards, Honeywell Analytics has a wide range of reliable solutions ideally suited for use in confined or enclosed spaces. These include:

- Detection of flammable, oxygen and toxic gases
- Single gas personal monitors – worn by the individual
- Multi-gas portable gas monitors – used for confined space entry and regulatory compliance
- Multi-gas transportable monitors – used for temporary protection of area during site construction and maintenance activities

Technical Services

At Honeywell Analytics, we believe in the value of great service and customer care. Our key commitment is providing complete and total customer satisfaction. Here are just a few of the services we can offer:

- Full technical support
- Expert team on hand to answer questions and queries
- Fully equipped workshops to ensure quick turnaround on repairs
- Comprehensive service engineer network
- Training on product use and maintenance
- Mobile calibration service
- Customised programmes of preventative/corrective maintenance
- Extended warranties on products

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