

Industry: Oil & Gas

Products Used: Modular PLCs

A flair for flares

Ensuring the safety of any system involving gas is important, but when dealing with the massive gas flare system at BP Grangemouth, there is no room for error. So when the existing flare control and safety system required substantial upgrading, BP brought in Mitsubishi Electric systems partner Elite Control Systems Ltd. Their brief was to use PLCs within a fail-safe environment.

The flares are needed because the crude oil, piped to BP Grangemouth from the Fortes field in the North Sea, brings with it tons of gas. The gas is drawn off then separated into



its different parts such as butane and methane. These are used as feed stocks for petro-chemical products, fuel products and as fuel for the boilers and power plants within the BP complex. Stopping the flow of oil is not an option should the volume of available gas exceed the demand; in that situation the gas must be flared off.

Ewan McAllister, Technical Director of Elite Control Systems explains, "The original system was configured in such a way that in the event of a failure it simply shut the whole system down...everything. We promptly configured into the system passivation groups. Now if a fault were to develop the group in which the fault lies would only be shut down, giving the highest possible system availability".

The PLC configuration constructed for BP ensures safety by using two output channels wired in series to hold each safety circuit on. Either output can switch then switch the circuit off. In addition, an input circuit is connected to each of the outputs so that correct operation can be checked by pulsing the outputs for a very short time, which is sufficient to monitor correct response via the fast solid state input circuit, but too fast to trip the shut-down system. For critical inputs, a similar arrangement is used with duplicate inputs arranged so that either can initiate the fail safe response and each is tested by connection to a PLC output that can pulse them for a short time to check for correct operation.

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Elite's work involved redesigning the existing system. They completely re-wrote the PLC code then tested its integrity by computer simulation. The result was a system that met the original brief and exceeded all expectations.

Application story first released December 1997 by Mitsubishi Electric UK