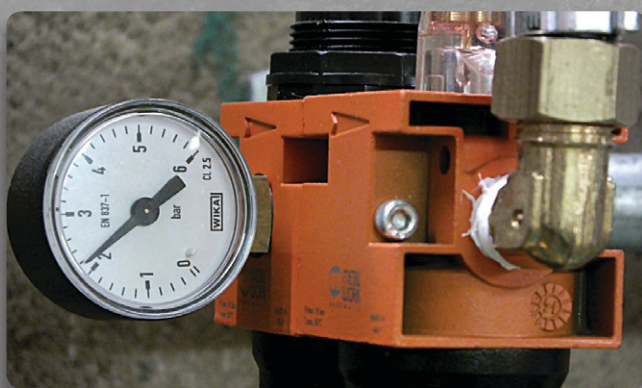


Chlorine Compliance

ensuring the safety of toxic gas assets across Yorkshire

by Pete Bingham

Yorkshire Water has 12 (No.) toxic gas dosing sites across the region. Some of these dose chlorine only and some dose both chlorine and sulphur dioxide using gas cylinders, drums or in some cases both. A detailed condition survey including radiography was completed on these installations and they were confirmed to be in good condition, and there were detailed and robust H&S procedures for all operational tasks which were well observed. However, if there was a toxic gas escape, site personnel would have to enter the gas store to manually close all cylinder or drum valves to stop the gas escape and safely bring the plant back into operation. This is both a H&S risk to site personnel but also a relatively slow response time meaning the volume of gas escape is far higher than would be the case with a remote operated shutoff valve (ROSoV) system.



System is activated by sensor or external shut off points



Chlorguard activation points - Courtesy of Chlorguard

Solution

To remove the necessity of personnel having to enter the gas store to manually close all cylinder or drum valves in the event of gas escape, Yorkshire Water took the decision to install a ROSoV system at all twelve toxic gas sites. This project was undertaken with Yorkshire Water's contract partner Amey and the PSI Global Chlorguard system was selected for time, cost and quality.

The remote operated shutoff valve system

On detection of gas by the Crowcon gas detectors already installed in the gas store, the gas alarm panel was configured to send a new signal through to the Chlorguard panel which will in turn activate the Chlorguard system.

Air drive assemblies fitted to each cylinder or drum and powered by an ABAC horizontal receiver mounted compressor will then drive them closed using a torque of 12Nm. This is within the maximum of 15Nm given by the cylinder/drum manufacturer to avoid the risk of damaging the valve and also to allow them to be opened by hand easily following any Chlorguard activation.

Once the system is activated all cylinder or drum valves will be fully closed within 5 seconds reducing any gas escape to the minimum possible quantity.

The Chlorguard control panel is failsafe and has telemetry alarms as follows:

ChlorGuard[®]

IT'S YOUR SAFEGUARD

**...the natural choice for
toxic gas auto shutdown systems**

Water Care Division of PSI[®]Global Limited

Exclusive Distributors of **JESCO**

Gas Chlorination Equipment within the UK & Ireland

As legislative pressures increase on toxic and other gas users, ChlorGuard[®] offers a very flexible safeguard to prevent leaks and increase site safety.

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Remote, rapid shutdown

Designed for drum and cylinder systems

Safe operation by compressed air

Low running and maintenance costs

Adaptable and compatible system

**Advanced safety and diagnostic features
including telemetry feedback**

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World class customer support

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**Complete Gas Chlorination Supply and Installation
with ChlorGuard Emergency Valve Shutdown System**



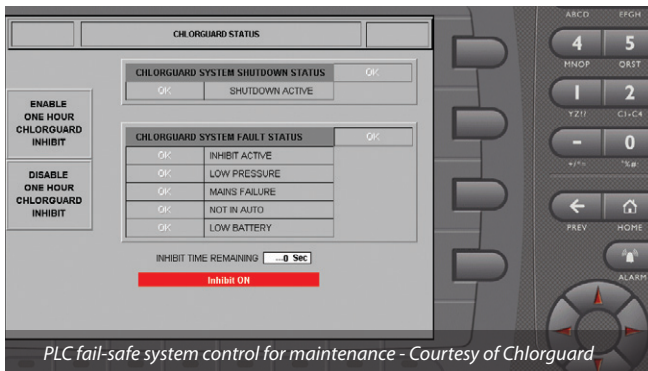
Gas detection sensors in the gas store - Courtesy of Chlorguard



Drive assemblies fitted to gas cylinder installation
Courtesy of Chlorguard



Warning beacon signalling Chlorguard activated PLC fail-safe system control for maintenance - Courtesy of Chlorguard



PLC fail-safe system control for maintenance - Courtesy of Chlorguard



Drive assemblies fitted to gas drum installation - Courtesy of Chlorguard

- Chlorguard active.
- Chlorguard fault grouped alarm for:
 - ▲ Low air pressure.
 - ▲ Mains power failure.
 - ▲ Lever not in auto position.
 - ▲ Low battery.

For visual warning to any on site personnel a strobe alarm light to indicate Chlorguard active or Chlorguard not in auto has been fitted on all sites.

Additional scope identified through collaborative working

Following discussions within Yorkshire Water it was identified that there could be a risk to water quality if the Chlorguard system shutoff chlorine dosing in 5 seconds and the fail-safe shutdown system did not stop production until it detected a low chlorine dose.

To resolve this potential risk the Chlorguard system has been fully integrated into the fail-safe shutdown software at all sites. This means that now if there is a Chlorguard activation the site will immediately stop all water production and shut down the works in a controlled manner. This not only removes the process risk but also allows for a faster return to production following the Chlorguard activation.

To avoid this fail-safe integration creating production losses during maintenance and testing of the Chlorguard or gas alarm systems due to unnecessary plant shut downs a shutdown inhibit was required. Options of an inhibit switch on the Chlorguard panel and a PLC Inhibit option were explored with the main consideration being H&S through ensuring control of work polices and procedures were robust and practically viable.

The PLC inhibit met all the H&S requirements such as being easily linked to telemetry alarms so the system could not be left inhibited through human error. This approach was also quicker to implement and lower cost than the option of a manual inhibit switch on the panel.

Project benefits

The successful delivery of the project has meant that the risk of uncontrolled toxic gas escape on any of Yorkshire Waters sites is now at an absolute minimum, with the time needed to return to full production greatly reduced through the controlled shutdown that has been implemented.

To maintain the high H&S standards of operation at these sites in addition to the full training given to both operational and maintenance teams a bespoke training DVD has been commissioned. This is to ensure the highest standard of training can be repeated with consistency across all teams for both refresher courses and for new starter training as long as the systems are in operation.

Project completion

Overall the project has:

- Provided £8,880 in capital efficiencies and over £18,000 in out-performance savings.
- Resolved the H&S risk of uncontrolled toxic gas escape at all Yorkshire Water toxic gas sites.
- Reused and recycled materials and equipment from other sites.
- Completed the project with no accidents or near misses.

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