Critical machines review for top tier COMAH sites

All top tier COMAH sites are mandated by the HSE to identify the major accident risks presented by operating rotating equipment and to introduce appropriate controls / mitigation measures. A recent review was conducted on a facility which is over 35 years old. The plant is routinely overhauled, but has now reached a point where it has exceeded its original design life. In order to ensure continued safe operation for the next 20-25 years it was decided to conduct a critical machines review.

The aim of the review was to:

- Determine the machines current condition
- Identify any potential major accident risks
- Recommend the introduction where necessary of additional controls and mitigation
- Provide budget costs for the ongoing upkeep of existing equipment and the buying of new equipment

A previous history of working with the client and a successful track record of delivering well-researched and objective findings and recommendations meant that ABB was selected for this project.

ABB has an international track record for delivery of asset assessments including: criticality and vulnerability assessments, asset health checks, asset life studies and asset life extension studies.

Solution

The review covered all of the site’s rotating equipment inventory and followed a 3-step approach:

1. Criticality review of all machines
2. Design verification exercise
3. Produce individual asset life plans

Of the 3000 (approx) machines in operation on the site, approximately 10% (381 items) were identified as being ‘critical’ in accordance with the HSE’s COMAH design code. Their failure in service could potentially result in a major accident with the potential for loss of life.
Each critical machine underwent design verification in order to determine that the appropriate controls and mitigations were in place to support continuous safe operation. Where there were ‘gaps’ or ‘weaknesses’ in the required protection systems and / or operating and maintenance procedures, they were identified and recommendations made to address the shortfalls. Where the machines were found to be adequately protected and operated / maintained in line with good industry practice, they were awarded a design verification certificate.

The final stage of the 3-step approach was to produce individual asset life plans for each critical machine. The asset life plan methodology developed by ABB, delivers a long-term look at the operational needs for asset replacement and maintenance. This allows future spending requirements to be identified, allowing effective cash flow forecasting and planning of resource requirements. In this instance, the plans primarily identified whether or not the machine was supportable for the next 20-25 years or should be replaced. Further, the plans identified if additional maintenance requirements were necessary to support the machines to the end of their service life. A significant benefit yielded from producing the asset life plans was the ability to produce financial expenditure profiles for CapEx and OpEx costs for the remainder of the plant’s life.

All the critical machine records were entered into ABB’s bespoke asset management database pRIME2. This allows the plant operator to access their machine data via the internet in real time. It also enabled both the plant operator and ABB to expedite machines related issues more swiftly and efficiently.

The final report identified that in order to sustain safe operations for the next 20-25 years the plant operator would require an investment of £55 million - predominately over the next 5-10 years. The report also contained a list of equipment specific recommendations, all of which were aimed at ensuring compliance with both UK regulations and company standards.

Benefits
- HSE assurance of compliance with EU machinery directives and legislation
- Improved safety and reliability of operations
- On-site access to live information on all critical machines through pRIME database
- Improved response to resolving technical issues
- Introduction of industry good engineering practices
- Justification for future rotating equipment investment