CHEMICAL CASE STUDY - MAJOR PETROCHEMICAL COMPANY, UK

PEL provides relief system assurance

Using PEL to quickly and accurately assess the suitability of their relief system.

Modifications and expansions to the client site over its 40 year life resulted in the relief system being operated outside of the original design intent. The client was aware that if their relief system was not up to standard it could lead to serious safety and environmental incidents.

As part of their Process Safety Management (PSM) plan they wanted to ensure that the relief and blowdown provision in their storage and distribution area was fit for purpose. They also wanted to make sure that the associated relief stream documentation was complete and up to date.

They used ABB’s PEL software to carry out this work more effectively.

““The different search criteria available in ProvueDB has made searching for datasheets quick and easy, ensuring we always have the information we need on hand”

Logistics Development Manager, Major Petrochemical Company, UK

Solution
The PEL software from ABB is a highly effective solution for generating and managing process engineering data.

The process engineers used a number of PEL tools to complete the review of around 60 supercritical ethylene relief values, which were operating at between 800 and 1400 psig.

Physpack
The engineers used this physical properties database to carry out an evaluation of the ethylene’s physical properties at varying pressures and temperatures using the LKP / LKP VLE method. They studied density, compressibility, specific heat (Cp), specific heat (Cv), enthalpy, entropy, viscosity and thermal conductivity. This allowed them to assess the suitability of the existing relief system.

Before subscribing to PEL the engineers had to do the calculations by hand, a very time consuming process and prone to errors. As this relief system is safety critical errors cannot be tolerated. PEL minimises the chance of any human errors and provides reliable, accurate results quickly.

Calculated results were compared against empirical data to give further confidence in the findings.
VisualPiper

Due to the rapid change in the physical properties of the supercritical fluids with changes in the temperature and pressure, the usual PSHEG equations to specify capacity of relief values did not apply.

PEL’s VisualPiper module is able to calculate pressure changes of two-phase mixtures and was used to map the changes to produce a complete record and Microsoft Visio drawing.

ProvueDB

Datasheets for all the equipment in the relief stream were created in PEL’s ProvueDB database management system. The engineers used the pre-designed templates to create the datasheets simply and quickly.

The tool manages revision control and enforces checking and approving to ensure that everyone is working from the same, up to date revision.

The datasheets will be used during future inspections and maintenance and will provide vital information on the equipment. The datasheets are all held in a searchable database within ProvueDB, ensuring engineers have the information they need to hand quickly in critical times. This will remove the time and effort that would have been taken up searching for documents.

Technical support

Throughout the project the client team had unlimited access to the PEL support service. The PEL team were on hand to provide technical assistance via email and phone.

The use of PEL on this project allowed the engineers to quickly and accurately calculate the information they needed to assess the suitability of their relief system. It also allowed them to document key equipment information to aid in future inspections and maintenance and achieve the key performance indicators in their PSM plan.

Benefits

- Assurance that relief system is fit for purpose
- Calculations carried out efficiently, allowing engineers to be more productive
- Opportunities for human error in calculations reduced
- Fast and simple production of datasheets
- Easy and quick access to the controlled datasheets through the searchable database