Success Story

Getting to the Root of the Problem at ICI Chlor Chemicals Ltd.

A history of local corrosion to the reactor cooling coil necessitated frequent repairs to the coil and hence substantial reactor downtime. ICI Chlor Chemical tired many solutions and asked ABB to shed more light on the problem.

Client: ICI Chlor Chemical Ltd.
Location: Runcorn, United Kingdom
Scope of Work: Consulting, Benefits/Risk Analysis

"ABB appears to have found the solution. We have not had any problems with the modification and we have every intention of proceeding with the same upgrade on the two reactors due in next year’s overhaul."

Paul Carter
Cereclor Plant Engineer
ICI Chlor Chemical, Runcorn

Benefits

- **Maintenance Cost Savings:** savings have been made by removing the need to repair the coil.
- **Safety:** there is no longer a need to undertake the hazardous activity of cutting, lifting and welding in a confined space.
- **Potential Savings:** on the basis that the inspection interval for each reactor overhaul could be increased from two years to four years, savings of a similar magnitude could be made in lost production.

The challenge: ICI Chlor Chemicals needed reassurance that a practical design change would not introduce failure modes elsewhere. The consequences of getting it wrong would have been significant plant downtime and damage to the reactor and reputations.

Previous attempts to solve this corrosion problem had concentrated on trying to treat the symptoms, for example: eliminate the leaks by improving the stuffing box design. ABB’s radical departure from this approach was to remove the root cause by eliminating the differential expansion between the coil and the reactor head. This allowed the stuffing box to be designed out.

The project involved the following:

- Identifying and understanding the cause of the localized corrosion that resulted in leakage.
- Quantifying the differential expansion using novel techniques.
- Developing several solution options.
- Preparation of a benefit/risk analysis for each option.
- Detailed design of the chosen option including flexibility analysis of the complex geometry.
- Recommendations for removing the stuffing box and re-supporting the coil at the bottom.
- Liaison with fabricators to build on their experience of coil repairs.