A major chemicals manufacturer in the UK asked ABB to review and test a change to their previously established turnaround strategy put in place following their last major turnaround in June 1999.

At this time the client’s strategy was modified from a 2 year turnaround / 12 month reactor catalyst change to a 3 year turnaround / 18 month reactor catalyst change. Various strategy options had been previously tried by the customer over a number of years and it was not clear whether the new strategy was the best for the business.

In addition, it was felt that it was an appropriate time to take a fresh look at their Turnaround Strategy as other sites seemed to be moving away from very large, but infrequent set-piece events. Finally, there was a keen desire to make cost savings through Risk Based Inspection (RBI) techniques and to quantify the possible savings.

All manufacturing companies need to perform maintenance on their production lines and process equipment to ensure high reliability and compliance with legislation.

Turnarounds are typically large maintenance events with potentially high planning, execution and materials costs and have a significant impact on the business due to lost production. Maintenance is carried out to reduce the risk of equipment failure and possible downtime, but it is hard to know if your strategy is providing value for money and the protection of your assets and your business.

ABB offers the expertise to help our customers optimise their turnaround strategies, in terms of size, frequency and timing to produce the best combination of low cost and acceptable risk to the business.

**Solution**
ABB consultants used a process to identify, model and compare realistic strategies in terms of cost, workscope, frequency and risk.

The total cost to the business was determined by the size of the event. In turn, this was determined by the scope of work and the duration of critical path jobs within the turnaround.

A turnaround cost prediction model was established and calibrated against the known costs and workscope from a previous Turnaround. The model was then used to determine the total costs for different turnaround workscopes.

ABB identify over £1.8M of savings through an optimised turnaround strategy.
The total business impact was then be calculated taking into account total event, lost production costs and performance losses. Further sub-strategies were also examined to consider the effect of variation in event length, event cost and product cost per tonne.

Asset Performance Tools (APT) specialist asset performance software was also used to carry out cost / risk evaluation of particular maintenance activities and factor these into the result. In this case the optimum time and cost for replacement of reactor catalyst was identified and used in the overall strategy evaluation.

**Benefits**

Recommendations on the optimum turnaround strategy identified:

- Lower total business impact by at least £500K per year by changing to a fixed 12 monthly reactor turnaround event, reversing the change implemented since 1999
- That the current 3 year major turnaround should be maintained to result in a saving of £360K per year over a 2 year turnaround frequency
- Cost benefits from implementation of Risk Based Inspection of at least £300K per year

Further detailed investigation on the key problems and vulnerabilities in the reactor highlighted a number of areas with significant affect on the strategy including:

- Reduction in the rate at which the reactor tubes were blocking due to degraded catalyst with a potential benefit of £400K per year on a 12 month reactor turnaround strategy
- Reduction in tube erosion with the potential benefit of £250K per year with an extension in reactor life by 10 years.