Competence and Commitment report – past examples

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Example 1

Three processes were being considered to treat the increasing load through XXXX water treatment works; ion exchange, lamella clarification and a proprietary clarifier.

My role was to evaluate whether these options were technically viable, and then with a multidisciplinary team produce designs for a whole life cost comparison.

I reviewed water quality and modelled existing processes using a mass balance and process calculations. I found that the existing direct filtration plant was the pinch point and the new process needed to take load off this process.

As my company had no experience of this particular type of ion exchange, I project managed a one year trial and with a process scientist carried out tests on a pilot scale plant and a filter pilot plant. I designed and commissioned the filter pilot plant. The trial proved the ion exchange process would work.

Designs for the three options were produced. My input included:

- Modelling all the processes on site so the designs were integrated into the existing site
- Specifying the design parameters for each technology.
- Working with suppliers on process guarantees.
- Designing associated processes such as chemical dosing, chemical storage, sludge treatment and waste treatment.
- Producing a scope list for use by other discipline engineers and estimators.
- Outlining how the processes would be operated so operational costs could be estimated
- Calculating the embodied and operational carbon

The designs produced allowed each option to be accurately estimated and the ion exchange process achieved the lowest whole life cost making substantial budget savings.

A further example of technical evaluation is a review of a supplier's mass and energy balance for improvements to an advanced digestion process.

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Example 2	
Example 2	As part of the aforementioned gas project in Egypt, I performed hydraulic evaluations and optimisation of the pipeline network which was developed during the conceptual stage. The studies were conducted with the aid of Schlumberger's PIPESIM software. As part of the aforementioned gas project in Egypt, I performed hydraulic evaluations and optimisation of the pipeline network which was developed during the conceptual stage. The studies were conducted with the aid of Schlumberger's PIPESIM software. I systematically varied the pipeline configuration and size to achieve optimum values for pipeline pressure drop (to enable delivery of contractual gas quantities), liquid hold-up (to reduce operational constraints) and erosion velocities (to increase asset life). I undertook the evaluations for several production scenarios (field start-up, plateau and end-of-life) and well configurations. I also evaluated and optimised the hydrate inhibitor and chemical injection flow networks against available onshore pumping requirements. As a process engineer with an EPC contractor, I evaluated the capabilities of process equipment on a gas and condensate field development against a gradual decline in flowing wellhead pressures from 150 to 50bar throughout the life of the field. I determined gas export capacity based on limitations on the separator vessels and internals, pipework, equipment nozzles and intrusive instrumentation (resonance frequency) using data sourced from the basis of design document, piping and instrumentation diagrams, piping isometrics, equipment data sheets, vendor data and HYSYS simulations. In evaluating the limitations due to pipeline erosion, reference was made to company erosion guidelines and API RP 14E (ISO 13703). I optimized the process configuration by modifying the original design to include additional gas compression and condensate pumping head. I undertook the evaluations for several production scenarios (field start-up, plateau and end-of-life) and well configurations. I also evaluated and optimised the hydrate inhibitor and chemical injection flow networks against available onshore pumping requirements. As a process engineer with an EPC contractor, I evaluated the capabilities of process equipment on a gas and condensate field development against a gradual decline in flowing wellhead pressures from 150 to 50bar throughout the life of the field. I determined gas export capacity based on limitations on the separator vessels and internals, pipework, equipment nozzles and intrusive instrumentation (resonance frequency) using data sourced from the basis

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Example 3	Alterations to an aged softened water distribution system were required to remove redundant pipe routes and provide new sections to supply additional equipment. I reviewed the pipework layout, identified which sections could be removed or altered to reduce overall flow requirement, and surveyed the existing user points on the system to determine the required delivery rates at each point. I then determined the duty required from the distribution pump to feed the revised system. I discovered that the existing pump would not be capable of feeding the required concurrent user points while maintaining the required minimum velocity for a water distribution system in the return leg of the ring main. With a very short expected lifetime for the system on site, and a limited budget, one of the primary aims was to minimise the requirement for new equipment - hence I identified that a spare pump installed in the distribution system could be operated in parallel with the duty pump to boost the available flow. This had the additional benefit of eliminating the risk from the inherently non-GMP design of the existing duty and spare system, so contributing further to the secondary aim of the alterations - improving the GMP design of the pipework system. On commissioning a CIP (clean-in-place) system for a liquid sachets filling line, the team had identified that they were continually running out of cleaning fluids during the desoiling phase of the system - the single pass flow out of the CIP supply skid was greater than the feed rate to the skid, and there was not sufficient buffer capacity to maintain the output flow for long enough to clean the four different sub-routes of the filler product lines in series, some of which required high flowrate to scour pipes and some high pressure to rotate sprayballs. I revised the cleaning cycle valve sequencing in order to change the order of route cleaning and also to first desoil the main 4" feed pipework to the filler as a single pass clean. I then altered the remainder of the desoil stage to operate with the 4" line circulating the bulk of the fluid back to the skid and divert only the required proportion to complete the single pass desoil stages within the filler itself. This allowed the CIP skid to maintain the required pressure to operate the sprayballs within the filler while maintaining the flowrate high enough for the other stages.
Example 4	a. I carried out a series of experimental design to establish the best conditions and the minimum amount of reagents required for optimum product yield and quality, in the lab. This experimental design work involved a series of tests designed using a combination of the following parameters: varying agitator speeds, varying temperature, addition rate, material concentration, use of catalysts at different times into the reaction. Several campaigns were run in the pilot plant. The results saved the company millions of pounds on the production of a pharmaceutical product. I was given an incentive award for achieving excellent results. b. The Provision and Use of Work Equipment Regulations (PUWER) requires a risk assessment to be carried out on every piece of work equipment and should be in date. I was tasked with writing a procedure for the site, as there wasn't a procedure in place and not all equipment had an assessment in place. The site procedure for carrying out work equipment risk assessments was tested before the procedure was implemented as a site procedure. These assessments are now carried out on new equipment by project engineers and myself at various stages of the project life cycle. This assessment is also carried out during IQ/OQ of equipment.