



## COMPETENCE AND COMMITMENT REPORT

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Please complete this report electronically. Each subsection can be expanded to allow you to provide sufficient evidence of your chemical engineering competence. Your report should be around 2500 words.

Surname:                      Personal name:                      Title:

### A Evidence that you have the ability to apply to practical situations:

either                      **chemical and general engineering knowledge  
and understanding (for CEng route)**

or                              **scientific knowledge and understanding (for CSci route).**

**Tick one box only to indicate which Application Route this Section A refers:**

**CEng Route**

**CSci Route**

Notes: (i) if you wish to apply via both routes, an additional Section A **must** be submitted separately.  
(ii) even if you do not intend to take up a registration you **must** tick one box to aid us with your application for Corporate membership of IChemE.

### Evidence:

i) Identifying or defining a problem, opportunity or project:

The reboiler system on a petrochemical plant polishing column underwent significant modification as part of a plant debottlenecking project which included two new thermosyphon reboilers, a changing of steam supply and implementation of a condensate handling skid. Upon re-commissioning the system was behaving erratically and I was tasked to investigate.

I approached the problem by analysing electronically-logged plant operating data and through dialogue with the plant operators. I concluded that the instability was cyclical and was attributed to condensate backfilling into the reboilers effectively blanking the available heat transfer area. This resulted in the column level increasing until the level control loop increased the steam chest pressure to the reboilers. The chest pressure would increase until sufficient head was available to flow the condensate to the header, clearing the reboilers and the system regaining control, until the cycle repeated.

After reviewing the design dossier and datasheets I identified an error with a key design assumption. The design sought to optimise the reboiler chest pressure to minimise the tube-wall temperatures (for fouling mitigation). However, I identified that the specification of the condensate return pumps had assumed the previous operating chest pressure and hence the pumps were undersized for the duty. I assessed various options to change the impeller and/or motor configuration but ultimately replacement pumps were required.

ii) Combining ideas and contributions from different people and disciplines:

Whilst on assignment overseas I was tasked with the process engineering and delivery of a \$12m diesel storage, processing and offloading facility project. The delivery of this facility was critical-path for the commissioning of c.\$2bn of offshore facilities which posed a considerable schedule risk. I was tasked with developing a contingency solution.

I devised a process scheme that would safely satisfy the minimum volumes required, utilising the permanent infrastructure where possible (two storage tanks, water treatment unit, processing skid, bunding, quayside upgrades and the control room) along with temporary provisions (road tankers, pipework, manifolding and fire protection, etc...). I then sought input from the operations, HSSE and engineering teams through the means of a HAZOP and a HAZID with specific focus around the SIMOPs of having an operating hydrocarbon facility in close proximity to the ongoing construction work. I then formed a multidisciplinary task-force with the execution contractors consisting of their project managers, planners and discipline engineers, to seek their collective input and expertise on the engineering deliverables, the execution strategy, and to identify the key commitment milestones (i.e. material procurement) to maintain the contingency option.

Ultimately, to assure the stakeholders, the contingency plan was implemented - despite the permanent works being delivered prior to the diesel demand being realised.

iii) Creativity and innovation: developing your own ideas to produce new solutions, new designs and new technological approaches:

Whilst leading a logistics infrastructure project overseas, I had originally planned to tender the storage tank design, fabrication and erection scope to established international contractors, to API standards. However, the project was challenged to maximise local content and I learnt of a local tank fabricator that offered an innovate approach to tank fabrication and erection, adopting Russian GOST standards. This involved off-site fabrication and transportation of the tank as a coiled tube which was subsequently unrolled at site. I was intrigued by this innovative approach as it presented significant cost and schedule improvements as well as the increase in local content.

Following a pre-tender meeting with the contractor, it was apparent that all the requirements of the API standards could be met, except the rolling and unrolling installation process. My primary concern was the effect on material/weld integrity and I commissioned a study with a third-party to qualify the impacts on two pre-fabricated test pieces, one for each standard. The destructive testing concluded only a small detrimental impact in material/weld integrity was observed, which was within the tolerances of the API standard. After receiving Engineering Authority approval for the deviation I included the contractor within the tender and they ultimately won the contract.

The tanks were safely constructed and are now in-service with significant cost, schedule and local content benefits realised.

iv) Scientific or technical evaluation and optimisation (of product, process, equipment, method, project etc against the requirements you identified, or the brief you were given.):

A column overheads condenser, employed in a particularly corrosive duty, was identified for replacement during a turnaround inspection. During this turnaround the plant was debottlenecked and upon re-commissioning the exchanger was failing to achieve the required subcooling duty. The opportunity arose to expand the replacement bundle into the available shell-space whilst upgrading the metallurgy to Zirconium. I was tasked with the re-design.

I built models in ASPEN and TASC (specialist sizing software) using the physical properties, operating conditions and fouling characteristics observed from historical plant operation. Using these I assessed the impact of the new metallurgy and differing U-tube configurations on the overall heat transfer capability. I was conscious to ensure an otherwise reliable system was not compromised, minimising any additional back-pressure on the column, ensuring that minimum tube flow velocities were maintained (as fouling mitigation) and not increasing the risk of impingement from the incoming feed. I concluded that the optimum solution was to expand the bundle horizontally from 49 to 61 U-tubes with the same baffle configuration, in-addition to the metallurgy upgrade.

I produced the specification datasheet and the bundle was fabricated and installed at the next plant outage. It is currently successfully meeting the design intent.

v) Planning and execution of projects: organising or performing technical work to implement or validate solutions, designs etc:

Whilst on assignment overseas I was tasked with planning and executing a \$12m logistics infrastructure project incorporating diesel storage, processing and bunkering facilities, along with site utilities. Leading a team of 10, with a site workforce of c.100, I was accountable for HSSE, Quality, Schedule, Cost and Operability in addition to performing the role of Process Engineer, bridging gaps in the competencies of the engaged engineering contractors.

During the planning phase I was accountable for: remedying the design to ensure compliance with corporate standards; arranging the HAZOP and Integrity-level reviews; proving the integrity of a deviation from API650 to enable local tank construction methods; the tendering of five major contracts and production of the sanction-case justification (cost, schedule, risk, economics and the execution plan).

During the execution phase I was accountable for: establishing the organisation; managing five execution contracts; managing technical/contractual interfaces between contractors; managing the cost, schedule and risk; managing relationships with the client, stakeholders and local regulatory bodies; resolution of technical queries, contractual variations and the management of change process. I also planned and executed the commissioning scope, the initial operating phase to steady-state and negotiated the handover to the client.

The project was delivered on-schedule, under-budget with an excellent HSSE record. The facility is operating today as per the design intent.

vi) Other:

## **B Evidence that you are able to handle the wider implications of your work as an engineer**

i) Ability to handle health, hazard and safety aspects: to apply appropriate principles, good practice, meet legislative requirements etc.

I have participated in three HAZOPs involving the design of a new forced-draft cooling tower, a chemical treatment system and a diesel processing, storage and bunkering facility. For the later I also managed a HAZID into impacts of concurrent construction and operation.

I was involved in a team tasked with assessing the Integrity levels for all protective trip devices for two large petrochemical facilities.

Whilst leading a project overseas I was responsible for establishing, implementing and managing the 'Management of Change' and 'Hydrocarbon Permit to Work' processes.

I produced the IPPC BAT report for two petrochemical facilities, which is an important legislative document submitted to the Environmental Agency demonstrating utilisation of industry best practise.

I led a project overseas to ensure a fabrication site adhered to the environmental and social requirements of the Corporation and International Financial Institutions.

I have been involved in incident investigations, using root cause analysis, the most significant being a High Potential incident involving a vehicle collision with storage tank discharge pipework containing highly flammable material.

I have participated in many project HSSE assurance reviews, the largest being for an offshore subsea development.

ii) Ability to handle sustainability aspects: these could include environmental, public concern and other societal issues, recognition of risks etc.

Whilst on assignment overseas I was tasked with implementing a series of infrastructure and system improvements at a Topsides fabrication yard to ensure the environmental and social expectations of both the corporation and associated third parties (lenders, partners and NGOs) were adhered to by the contractor.

This was a demanding task as the expectations themselves were defined after the contract was signed, with many constituting a departure from the contract and/or local operating practice (especially Waste Management, Pollution Prevention & Transport Management), which was identified as an area of risk.

In performing this role, I had to interpret the expectations and then engage with the contractor to develop their respective implementation plans - resolving variations to the contract where necessary. A significant part of the scope involved me designing and overseeing the development of a waste segregation and processing facility, in addition to monitoring contractor performance against the new-created implementation plans, to provide assurance that environmental and social requirements were being adequately met.

The site was subsequently chosen for audit by the International finance Institutions, with full compliance being observed.

iii) Ability to handle commercial and economic aspects:

Prior to leading a logistics infrastructure project whilst on assignment overseas, I was tasked with preparing the sanction-case justification which included the estimate, schedule, risk and economic sensitivity analysis. I was also budget accountable for the development, with a delegated financial authority of \$100k (US). I managed the tendering of four large (>\$1m) contracts for the civil, structural, mechanical, I/E and tank erection scope, which I subsequently executed. This included devising the contracting strategy, structuring the form of the contract, raising variation orders, approving invoices and resolving disputes/claims. The role also required presentation to the contracts committee governance board in relation to these contracts.

In my role as a Project Analyst I was tasked with analysing Major Project performance across the companies upstream portfolio, evaluating delivery performance (cost, schedule and operability) versus the original sanction-case economics, an assessment of how each project benchmarked versus our competitors, and the identification of systemic weaknesses in the project management system and the effectiveness of value leveraging strategies to create future value for the group. In addition to this, I also performed a global analysis of projects and engineering resources versus the future demand, which led to a significant external recruitment exercise.

iv) Other:

## **C Evidence of interpersonal, leadership and communication skills**

### **i) Managing interpersonal relationships:**

Concurrent to my core duties whilst on assignment overseas, I performed the role of upstream facilities technical liaison in relation to the financing of a (\$Xbn) oil export pipeline. This role required me to actively manage the interface with the lenders, their lawyers, technical consultants and the project team in demonstrating the technical robustness of the investment case.

This role required me to facilitate the resolution of technical queries, communicating the responses to all parties. This required me to build and maintain professional relationships with the external parties, but also involved significant engagement and influencing of various members within the project team (often more senior than myself) to expedite a satisfactory response, whilst minimising the potential distraction on overall project delivery. I believe this was a true test of my communication/influencing skills and also my ability to build and maintain professional collaborative relationships.

All the queries were successfully closed-out and the financing proceeded. My efforts were recognised by the Project Manager, the Business Manager and the Group Treasurer.

### **ii) Demonstrating leadership in a professional role:**

Whilst leading a diesel processing and infrastructure project overseas I was given a high degree of autonomy to deliver a challenging project, which provided my first real experience of leading multicultural multidiscipline teams.

With direct accountability for HSSE, quality, cost and schedule I had to engage, motivate and lead a project management team of 10 full-time resources and a site workforce of c.100 to deliver the technical and commercial objectives. Throughout the project execution I had to make difficult decisions around the resourcing, selection of contractors, resolution of disputes and negotiated a particularly difficult handover to the operations team.

I consider the success of the project was driven through a conscious effort to recruit and integrate a highly-effective workforce, for both the client and contractor teams, all of which were motivated to make the project a success. In addition to this, I ensured that leadership expectations were clearly articulated and communicated, ensuring that any conflicts were detached and fairly resolved away from day-to-day execution of the project.

### **iii) Communicating ideas and plans by report writing and oral presentation:**

I undertook a role as a Project Analyst within a central Projects & Engineering function of [Company X]. This role involved rigorous and detailed analysis of project performance and resourcing data, the conclusions of which would be included in written reports and presentations that were subsequently presented to senior management/executives within the organisation. Examples include an analysis of project delivery versus sanction promises on cost, schedule and operability; identification of systemic weaknesses in sanction-level definition/preparation; and a report on competitiveness of [Company X] major projects versus our industry peers.

On many occasions, especially with the project resourcing analysis, I was required to present my findings to various forums, including: (a) the global project leadership community, (b) project discipline network leaders, and (c) the heads of project resourcing in each of the upstream businesses across the globe.

I also produced an IPPC BAT report, which was an environmental legislative report submitted to the Environment Agency for two petrochemical plants. This report analysed emissions and comparing them against the short-term and long-term exposure levels - demonstrating the application of industry best practice.

### **iv) Other:**

## **D Evidence to show that you are committed to high standards of professional conduct**

In delivering a diesel processing, storage and bunkering infrastructure project overseas, I was delegated accountability to ensure that HSSE and integrity within the design was maintained, along with being trusted with the budget and financial approval authority. I also led a multicultural project management team of ten reports. These things combined demonstrates my professionalism with respect to:

- Ensuring a fair, transparent and ethical tendering process
- Ensuring that commercial pressures did not interfere with technical integrity
- Ensuring that the diverse cultures on the site were included and respected

As the technical liaison for the financing of a large oil export pipeline, I was effectively the face of the project with the international finance institutions, which demonstrated I can maintain important professional relationships whilst delivering the mutual objectives.

I have completed a training course which outlines the companies approach to ethics, and a training course which outlines the companies approach to ensuring integrity of process plant and equipment.

My aspiration to achieve chartered status demonstrates my commitment to professional conduct, with an accreditation which is recognised and respected throughout the industry. I attended a seminar to strengthen my application in Q1'07. I have also supported local school initiatives and graduate recruitment fairs to raise awareness and encourage younger people to a career in Chemical/Process Engineering.

## E Continuing Professional Development (CPD)

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|---|---|
| <p>(i) Report of CPD already undertaken</p> <p>Formal Training:</p> <ul style="list-style-type: none"> <li>- ASPEN Plus Process Simulation Course</li> <li>- In-House Process Engineering Course</li> <li>- In-House Project Management Course</li> <li>- Hydrocarbon Permit to Work Course</li> <li>- In-House Ethics Course</li> <li>- In-house Integrity Course</li> <li>- Incident Investigation &amp; Safety Audit Course</li> </ul> <p>Development Exposure:</p> <ul style="list-style-type: none"> <li>- HAZOP, HAZIDs</li> <li>- Incident Investigation</li> <li>- Integrity Level Analysis</li> <li>- Management of Change</li> <li>- TASC Heat Exchanger Design Software</li> <li>- Project Management &amp; Contracting</li> <li>- Governance Processes</li> </ul> | <p>Benefits received</p> <p>My first assignment in [Company X] was in petrochemicals. The complexity of the processes and high competency of the discipline engineers provided a fantastic grounding in chemical/process engineering. My formative training covered modelling/sizing packages, corporate process engineering practices, and the management of change process.</p> <p>Through my career to date I have had some excellent development opportunities that have allowed me to apply my technical knowledge. My assignment to [Country Y] really deepened my understanding of engineering and project management processes, as well as broadening my overall cultural awareness.</p> <p>My assignment within a corporate function has provided me an understanding of the oil and gas industry, and an insight into what makes successful engineering projects.</p> |
| <p>(ii) Future CPD Plan</p> <p>Formal training:</p> <ul style="list-style-type: none"> <li>- In-House Project Leadership Course</li> <li>- Risk Analysis (IChemE)</li> <li>- ESI Negotiation &amp; Influencing Skills Course</li> </ul> <p>Development Roles:</p> <ul style="list-style-type: none"> <li>- Process Project Engineer (Oil &amp; Gas)</li> </ul>  | <p>Expected benefits</p> <p>I intend to continue my career in the engineering and delivery of process facilities within oil &amp; gas major projects, ultimately seeking an engineering project management role.</p> <p>In pursuit of this aim, I have identified gaps in my knowledge of oil &amp; gas process technologies, and also the detailed engineering process as it applies other disciplines. I hope to fill these gaps through my new role on [Project Z].</p> <p>On a personal level, I have identified a training need around negotiation and influencing skills.</p>   |

