Providing our clients with experience and expertise, deliverables and tools for planning the control of Completions, Commissioning and Start-up early within the project life cycle.

We help clients in minimising costs and delivering projects on time with our technology, technical resources and ‘best practice’ processes. By providing specialised Completions and Commissioning services and products throughout every phase of the product life cycle, this phase of a project can be effectively controlled. Our ad hoc Consultancy service provides a cost-effective way of establishing early controlling mechanisms.

We operate in Conventional and Unconventional Oil and Gas, Mining and Minerals, Nuclear and Petrochemical and have extensive experience in Offshore and Onshore Production Facilities, FPSOs, Subsea, Pipelines and Decommissioning.

Our core values are

- We listen, understand and respond
- We invest in our people
- We put safety first
- We act ethically and with integrity
- We care about our communities
- We embrace diversity
- We connect globally as one team
- We deliver on promises
- We aspire to consistent excellence
- We develop full potential
- We agree clear expectations
- We care about our communities

The qedi Consultancy service is available to provide the highest level of Completions, Commissioning and Start-up Assist expertise in the early stages of the project life cycle and prepare control plans, estimates, budgets and strategies.

This service provides highly experienced and qualified time-served engineers, managers and directors available on an ‘as-required’ basis to develop, review and advise on the project Completion and Commissioning strategies.
In a healthy Commissioning programme, personnel mobilisation commences during E&P, ramps up towards the latter end of construction and tails off after Start-up as shown:

HOWEVER, since Commissioning and Start-up is at the end of the EPC line and inherits all previous slippages and problems, the manning profile and costs can increase dramatically to cater for this additional work, resulting in slippage, missed targets and lost production:

We provide tools and control methods on a cost-effective ad hoc basis at each of the EPC stages to help avoid this happening and to maximise the probability of the final execution schedule looking as it should.
An ongoing source of disruption to budget and schedule within major Construction projects is in the area of Commissioning and Start-up.

Inaccuracies in commissioning estimates, bad planning, placing of milestones, unachievable targets, delays in preceding phases, construction driving commissioning and sequence of handover all contribute in causing serious consequences when it comes to bringing the project to readiness for Start-up.

Consultancy services are delivered on an as-required basis commencing at the early stages of a project and are provided by senior personnel specialised in their own areas of expertise.
The timing of delivery of the Consultancy services is scheduled such that the client can use very experienced personnel on an ad-hoc basis in order to complete essential activities during the project set-up period, without the expense of employing full-time teams of personnel too early.

This figure illustrates where Consultancy services are deployed, which is normally:

- Commissioning Management Consultancy – both at the FEED stage and early into the detailed design stage
- Commissioning Engineering Consultancy
  - Stage 1, Strategies – early in the detailed design, 10-15% into the timeline
  - Stage 2, Design and Operational input – 15-20% into detailed design
  - Stage 3, Design preparation – 50% into detailed design. Main mobilisation of the Commissioning Engineering, Phase 3, is addressed when the final detailed design deliverables start being issued for Construction at 50% plus, in accordance with the project delivery schedule.
- Completions Consultancy – 15-20% into detailed design
- Operations Readiness Assurance during detailed design
Delivery Activities

Commissioning Consultancy
Deliverables that are produced by the Commissioning Management Consultant during the earliest stage of the Project include:

- Overall Project review and setting of milestones for Completions, Pre-Commissioning, Commissioning and Start-up
- A Commissioning Philosophy including Completions, Pre-Commissioning, Commissioning and Start-up and the corresponding delivery plans
- The commissioning sequence logic including initial milestones
- The Project Commissioning organisation and manning requirements for all phases from FEED through to start-up and Operation
- Roles and Responsibilities for the Team personnel
- A mob/demob schedule for all Commissioning personnel
- A Control Plan for Completions, Pre-Commissioning and Commissioning
- Commissioning control man-hour estimates for the preparation phase
- Commissioning control man-hour estimates for the execution phases
- Budget Cost Estimates for Commissioning requirements
- Project risk identification and mitigation schedules for Commissioning
- Minimum scope requirements for Early Start-up
- Interface schedules
- RACI charts for Commissioning and Start-up
- Input to EPC and Fabrication Contracts
- Flawless process parameters, methods and philosophy

All of these activities help to develop controlling mechanisms for the project at the earliest stages and normally addressed at either the FEED or early in the Detailed Design phase when only the basic Project information such as Process Flow Diagrams is available.
Control Mechanisms

Mob/ Demob Schedule Model 1

# BUDGET COSTING SCHEDULE

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## Model 2 Outline

- Contract Award
- FEED
- Detailed Design
- Fabrication
- Completion
- Yard Commissioning
- Transportation
- Site Commissioning
- Start-up
- Initial Operation
- Handover

### FEED PHASE

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Budget Costing Schedule Model 2
Commissioning Engineering is performed in three stages

Stage 1 - Strategies
Stage 2 - Design and Operational Input
Stage 3 - Detailed Preparation

Stage 1 - Strategies
Following the issue of the first revision P&ID’s but prior to the issue of detailed Engineering deliverables, there are series of windows available during the detailed designs phase that can help shape the Commissioning and Start-up of a project. These activities, which are performed by our Commissioning Engineering Consultants during this early stage of the Detailed Design phase are:

• Based on the Commissioning Philosophy, preparation of the Completions, Pre-Commissioning, Commissioning and Start-up Strategies for execution
• Using the Control Plan for Commissioning, Integration of milestones with the Engineering, Procurement, Fabrication and Operations schedules
• Setting Commissioning system limits on early revision P&ID’s that consider Commissioning, Start-up, Operational, Shutdown and Re-start requirements
• Identifying the Sub-systems that need to be created in order to achieve these limits
• Identifying Commissioning Management Tools that will be suitable for use on the Project
• Identifying Sub-Contractor and Specialist requirements and prepare Contracts
• Reviewing Sub-Contractor and Specialist tenders and submissions for Technical compliance
• Setting Plans for Commissioning and Start-up

The ad hoc provision of specialists to complete these important tasks by giving control at the early stage of Design will reap rewards in the latter stage.
Stage 2 - Design and Operational Input

- Input to the Design, P&IDs, HAZOPs, Constructability, Operability and Maintainability studies
- Preparation of the Project Start-up Plan
- Preparation of Performance Testing Plans
- Preparation of the Final Completion Plan
- Preparation of the PSSR Procedure
- Set up and populate the selected Commissioning Management Tools
- Develop a detailed Level 4 Construction/ Commissioning/ Start-up schedule
- Determine quality control objectives and the MOC process
- Identify safety critical equipment (SCE)
- Outline O&M Procedures
- Outline O&M Manuals

These activities should be performed prior to mobilisation of the Commissioning Engineering Team in order to capture any required changes to the Detailed Design prior to issue for Construction release.
Delivery Activities

Commissioning Engineering / 3

Stage 3 - Detailed Preparation
As Detailed Design and procurement matures and Engineering deliverables start being released for Construction, Commissioning Engineers can be provided for the following activities:

- Preparation of Commissioning and Start-up Procedures
- Preparation of Performance Testing Procedures
- Preparation of Commissioning Turnover Dossiers
- Preparation of Job Cards for Commissioning
- Agreeing the Completion and Work acceptance Process
- Preparing Manuals for Start-up and Initial Production
- Preparing WEFS for all CSU activities
- Refining the Control estimate for execution
- Refining the Mob/demob schedule
- Refining the budget and overall schedules
- Preparing Block Diagrams for overall Electrical, Instrument & Controls, Fire & Gas and ESD systems
- Generating Plans for SIT / FAT
- Attending FATs / SITs for Long Lead Items
- Preparing preservation procedures and schedule
- Identifying tools, materials, Plant and temporary requirements
- Identifying Commissioning and Start-up spares
- Identifying Operations Spares
- Preparing initial and final fill schedules
- Preparing Workplace risk assessments (WRAs)
- Preparing training programmes
- AFC population of the CMS
- Detailing O&M Procedures
- Detailing O&M Manuals
- SIMOPS reviews
- Detailing quality control activities and Plans

It is understood that at this stage of Engineering, Projects will more then likely have already established their full-time CSU groups, however we can provide additional or top-up personnel on an ad hoc arrangement and tools that can deal with the above tasks.
Completions Consultancy

The activities performed by Completions Consultants commence during the early stage of the Detailed Design phase, when it is too early to mobilise a full-time Completions Coordinator but it is necessary to set the strategy that will be used once the deliverables from Engineering start to be issued. The activities that we perform on behalf of our Clients are:

- Identifying the most suitable Completions Management Tools for the Project
- Developing a first revision Completions Strategy that includes an agreed flow of Completion from Procurer to Operator and covering handovers between:
  - Vendor and Construction
  - Construction and Pre-Commissioning (including Construction Completion)
  - Pre-Commissioning and Commissioning (including Mechanical Completion)
  - Commissioning and Start-up
  - Start-up and initial operation
  - Initial and final operation
- Setting the architecture for the Completions Management System
- Preparing the Inspection and Test Plan for peer approval
- Selecting the Procedures, Certificates and Inspection and Test Records that will be used on the Project for all execution phases
- Preparing a matrix that identifies the required inspection and testing by tag type and setting this within the Completions Management System application
- Initial CMS population
Commissioning Audits

_qedi_ Consultancy service is available at any phase of a project from FEED to Operation and offers provision of Senior Personnel in specific fields of expertise for ad hoc, stand-alone requests for assistance.

One area in our portfolio covers Commissioning audit and review, where a project is looking like, or has already gone off track from the original schedule for any number of reasons and has reached a point where the situation needs to be addressed and recovered.

Our personnel review the project in a logical and impartial manner, gather information against an agreed set of checks, analyse the results, compile a report and offer corrective actions and recommendations to help identify problems in detail and recover the situation.

The elements within the audit process address:
- The overall project
- Design and procurement
- Work definition
- Construction
- Inspection and testing
- Pre-Commissioning
- Commissioning
- Start-up
From these departmental analyses, by using standard audit check lists, the findings are compiled and a summary report is generated, highlighting shortfalls within each department.

The summary report gives an analysis of the project, a summary of any issues, a true set of target dates for Completions and Start-up and recommended actions required to achieve these target dates.
Operational Readiness

Quality Excellence Delivery (QED)

Using specialised personnel and our in-house and Amec Foster Wheeler processes and systems, we provide Quality Delivery Consultants to deliver a ‘Right First Time’ handover between Project and Owner.

Consultancy
Providing experience and expertise in commissioning, completions & start-up

GoTechnology®

QED Option turned on in GoCompletions®

Start-up
Supporting clients in managing the transfer from commissioning-completion through to start-up

Commissioning Execution
Manpower provisions to support existing project commissioning and completions functions

Including QED actions

Completions & Commissioning Management
Managing completions and commissioning on behalf of our clients

Select and Train QED Champions within the Management Team

GoCompletions Greenfield

FEED
Detailed Design
Construction
Completions and Commissioning
RFSU
Start-up

Foundations created
Specific details and plans developed
Field Surveillance and actions
Field Surveillance and actions
The QED process commences with a selection step during which stakeholders select a balanced set of quality areas from the following main categories.

These chosen areas are then mapped, studied and documented to form a custom delivery programme in accordance with the owners requirements.
Amec Foster Wheeler draws upon a global knowledge pool, developed over almost 40 years of industry experience to provide expertise across the full asset lifecycle. This integrated approach with the associated strategies, collaborative procedures and performance standards help to deliver the maximum value.

In terms of Project Delivery and Management support, our integrated approach considers the lifecycle of the asset, and does not treat this as a series of disconnected sub-projects. Each phase in an asset lifecycle impacts the next, with decisions made during the design influencing the direction and choices available later in the asset life. Small slips in the early phases can have very unwelcome effects as the Project progresses.

Our Operational Readiness Assurance approach then provides a range of services, starting with Consultancy during FEED, to ensure Commissioning, Start-up, Operations and Maintenance processes are all in place to allow a smooth transition from EPC to Operation.

With this combined strength, we can provide the following suite of integrated Services to manage CAPEX into OPEX:

- Commissioning preparation and readiness
- Quality Delivery techniques
- Operations Readiness Assurance
- Assistance with Start-up
- Duty Holder
- Pre-Operations facilities covering:
  - Compliance and Verification
  - Condition Based Management
  - Condition Monitoring
  - Fabric Maintenance
  - HAZID/HAZOP
  - FMECA
  - Maintenance Development
  - Operability
  - Operating Procedures
  - RCM and SPEM

- Maintenance execution
- Overhauls
- Modifications
- Engineering and Procurement in the Operational phase

Finally, the combination of qedi’s parent Company AMEC with Foster-Wheeler, allows us to extend these services through Amec Foster Wheeler’s global coverage of the Upstream, Midstream and Downstream Oil and Gas and Petrochemical markets.
Our Commissioning Engineering techniques take two concurrent approaches, the ‘top down scheduling’ and the ‘bottom up detailing’ approach.

- Define Commissioning Systems
- Determine logic and plan with intent to minimise durations

- Define pre-Commissioning sub-systems on PFDs
- Determine logic, areas and schedule
- Produce marked-up P&ID’s

- Consider crew size and budget on the L2 Plan
- Add areas and network the L4 WEFS logic
- **Merge and optimize to produce L3 Schedule**

- Schedule the interdependencies of activities to equipment within sub-systems
- Generates low level WEFS

- Allocate these activities to equipment within the subsystems

- Define the activities to be performed during MC, PC and Commissioning at each location

This approach was taken when organising preparation and execution activities for a recent project and illustrates the kind of techniques we offer as part of our Commissioning Engineering expertise.
Stand-alone Consultancy projects quite often involve us providing personnel and tools for the identification of system and sub-system breakdown. We have performed numerous services such as this for both Greenfield (new) and Brownfield (existing) Assets onshore and offshore, as an ad hoc arrangement.
Typical Delivery 3 - Completions Consultancy

The Completions Consultant uses this information in order to set the equipment tagged items parameters with the Detailed Design and testing parameters. The Completions database is then ready for population. This can be performed as an ad hoc stand-alone exercise as it has been for many of our clients.

The asset is split as required by:
- Project Phase
- Process e.g. Gas, Oil
- Area, PAU, Module
- Primary System e.g. Separation, Fractionation, Export
- Sub-system e.g. Train 1, Train 2
- Tagged Equipment is allocated to the appropriate Sub-system.
Summary

What we can do for you:

- Spending a little creating the required control during preparation....
- And continually auditing the control during execution....
- ...or risk losing a fortune by not meeting delivery targets.......

Targets Overrun !!

Planned Program
## Our Track Record

### Europe

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