WORKSHOP TITLE: PRODUCE THE LIMIT

Workshop Duration: 7 to 12 days

Typically Used: During the Operate Phase of a development

Overview of the Workshop

Produce the Limit (PtL) started in Shell in 1997 as a facilitated process of peer review/examination of a field production system with the aim of identifying realistic opportunities for production enhancement. PtL has been successfully conducted on many joint-owned fields and the process, using a similar methodology, is part of the normal business processes in a number of Oil & Gas operators.

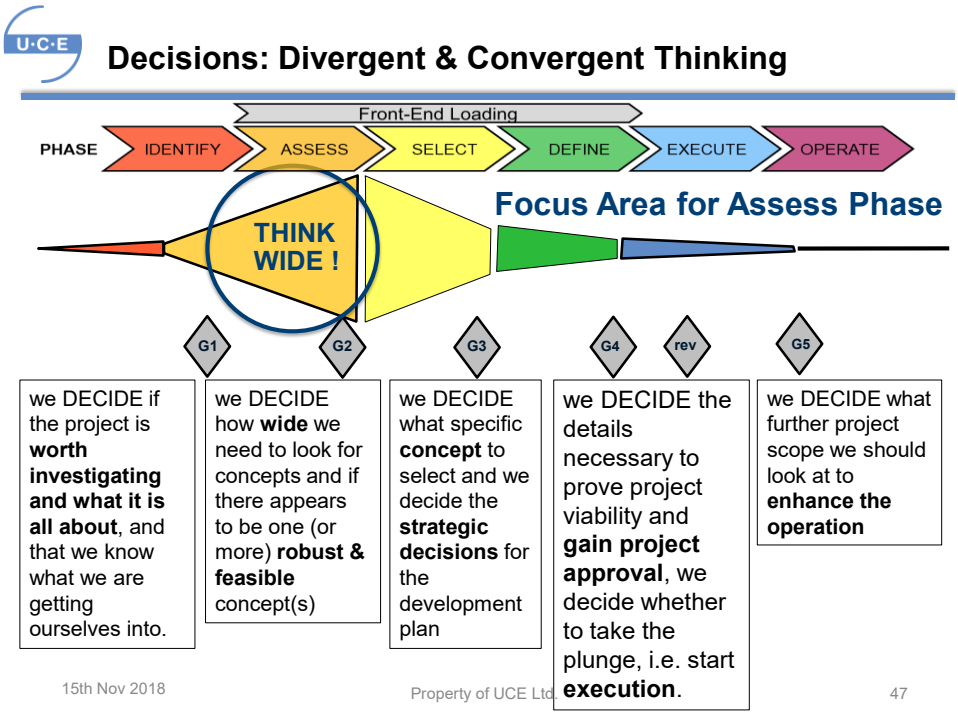
The PtL workshop is usually conducted in the offices of the Operating Company local to the facilities. A Site visit to the operating plant is commonly part of the workshop.

The workshop needs to be conducted by a multi-disciplinary team from the Operating Company that includes Reservoir Engineers, Well Engineers, Production Technologists, Operators, Maintenance Engineers and Surface Facilities (including Process Engineering) staff. All the workshop participants are required to devote their time fully to the workshop process throughout.

The duration of a PtL Workshop depends on the scope of the system being examined, the number of workshop participants and the logistics of the workshop. Durations typically vary between about 7 days and 9 to 14 days.

When to Use a PtL Workshop

The PtL Worksop is usually conducted during the Operate Phase of a Development.



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PtL can also be useful for development projects that relate to expansion or modification to an existing, operating, plant. The PtL might then be conducted in the Front-end-Definition phase of the expansion project.

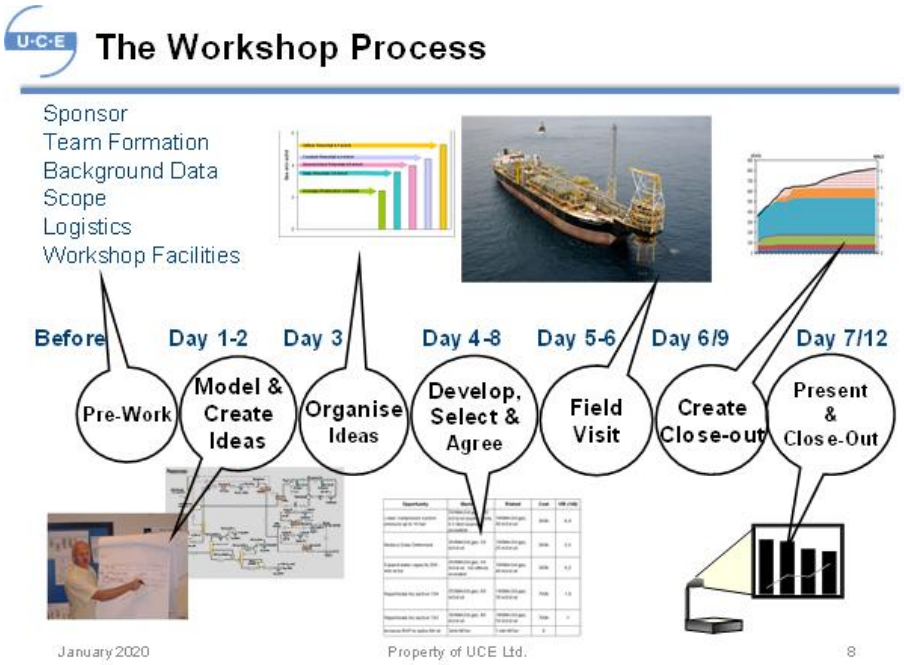
PtL workshops can be part of routine business in the Operate Phase of a development with, for example, a bi-annual repetition of the workshop on the same plant(s).

Although they are typically geared towards increasing production output of oil or gas field(s), they have also be successfully used to address extension of plateau time for fields. For example, when gas volumes are set by a contract DCQ level so increased daily output is not an option but extension of the plateau production period does have value.

How the Workshop is conducted

PtL workshops are conducted with an integrated, multi-disciplinary, group of staff. The disciplines required in any particular workshop will depend very much on the plant/asset being examined. For example, a deepwater offshore oil field development will require somewhat different team members from an onshore gas field. However, common to all PtLs are usually Reservoir Engineers, Production Technologists, Process Engineers and Operators.

During the first phase of the workshop, the production facility is examined from reservoir through to export and ideas for increasing the capacity of each part of the production system are generated. Following the 'ideas creation' phase the workshop continues to select and develop ideas that are considered to have the highest likelihood of success and highest impact.



The workshop is facilitated by an experienced Workshop Facilitator, who guides the participants through the structured sequence of activities.

The Facilitator will engage with the Workshop Sponsor(s) in good time before the workshop in order to plan the workshop and tailor it to the specific development and the sponsor's requirements. It normally takes from 4 to 8 weeks to plan a PtL Workshop.

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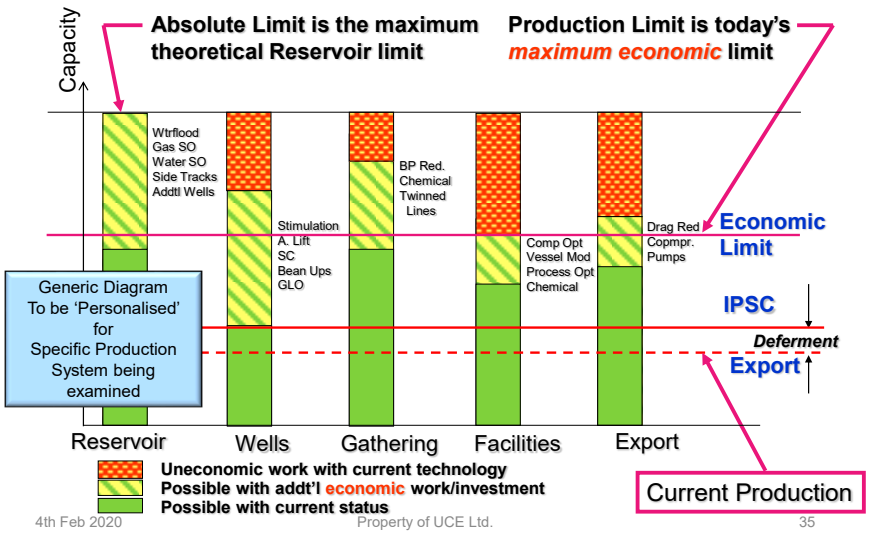
One of the key tool used in a PtL Workshop is the Integrated Production System capacity Diagram (IPSC) which depicts the capacity of each part of the production system separately. These diagrams are sometimes referred to a ‘Choke Models’ or ‘Technical Limit Diagram’.

IPSC Limit Diagram



The IPSC diagram is used to show the current system that is limiting production output. This IPSC diagram is then updated during the workshop to show the potential benefit of the ideas generated in the workshop. The tool helps the workshop team to focus on the actual system bottlenecks and also helps to create some realism in the potential gains from all the ideas combined.

Typical Agenda for a PtL Workshop

A typical Workshop agenda might be :

Day 1: Model & Create Ideas

- Introductions & Overview of the Workshop agenda
- Description of the PtL Process
- Sponsor’s Message
- Paint-the-Picture Sessions
- Reservoir(s)
- Wells
- Gathering Systems

Day 2: Model & Create Idea cont.

- Production Plants
- Export System
- Operations & Maintenance
- Review and Rank all Ideas
- Select Ideas for Development

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Day 3: Organise the Ideas & Construct IPSC Diagram

- Construct the IPSC Diagram for the current production system
- Allocate the ideas between the team members
- Introduce the development and quantification methodology
- Begin developing selected ideas

Day 4 to Day 5: Develop Ideas /Site Visit

- Continue developing and quantifying the benefit of the selected ideas
- Part of the workshop team conduct a site visit

Day 5 to Day 7: Continue Developing Ideas

- Continue developing and quantifying the benefit of the selected ideas

Day 6 to Day 9: Agree the Outcome of the Developed Ideas

- Summarise the quantified benefits of the ideas
- Combine the ideas into a logical set of opportunities that can be followed up
- Begin creation of the Workshop Output Presentation

Day 7 to Day 12: Prepare and deliver the Workshop Feedback Presentation

- Complete creation of the Workshop Output Presentation
- Dry Run of Presentation
- Deliver Final Presentation to Workshop Sponsor and Senior Management Team

The deliverables from a PtL Workshop

The output from the Workshop are a set of ideas that are each developed and quantified to a sufficient level of detail to enable them to be followed up outside the workshop.

A Feedback Presentation is normally the last activity in the workshop. This is a key deliverable to help garner senior management support for the proposed follow-up plan which will undoubtedly require resources to further evaluate and quantify each idea and take it to a level required to obtain execution budget approval.

UCE will normally also offer to generate a Workshop Report in Microsoft Word format that documents the full workshop process and results.

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Example : Idea Development Sheet

Idea No : B19	**Title:** Identify sand bailing candidates (sanded wells)

Rank Score : 6	Author's Name : xxxxxxxx
System the Idea Addresses :	Reservoir

ESTIMATED GAIN		
	Oil (bpd)	Gas (MMscf/d)
Production Gain	1,100	0.28
Duration of Gain (months/yrs):	3 Years	

IMPLEMENTATION	
Estimated Cost : (US$ '000):	6,000
UTC : (US$/bbl)	10.3

	Short (Weeks)	Medium (Months)	Long (>1 yr)
Time to Implement		X	

	Low	Med	High
Poss. of Success		X	

Current Situation / Activity
- Candidate identified for sand bailout: yyyyyy 39L (0 bpd – Sanded up)
- Could identify 3 strings more with further more work (@ 350 bpd/string)

Proposed Change / New Activity or Method
- Bail-out the sand from the well using rigless stimulation.

Assumptions
- Assumes learnings from previous intervention, est. EUR in 3 years ~ (525,000 bbl)
- Estimated EUR for 3 strings @ 210,000 bbl/String => TOT = 630,000 bbl (for 3 strings)
- **TOTAL EUR = 1.16 mill bbl**
- Cost ($1.5 mill per job 24 hour max) **Total Cost = $6.0 mill** (for 4 jobs)

Description of Benefits
- 39L (500 bpd).
- 3 strings X 200 = 600 bpd **TOTAL GAIN = 1,100 bpd**

Facilitator

Phil Tudhope is currently Director of a consulting company, specialising in technical and project management training for graduates and more senior technical staff. He has a first class honours B.Sc. in Mechanical Engineering from Bristol University and is a Chartered Engineer, Fellow of the Institution of Mechanical Engineers and Associate Member of the Institution of Chemical Engineers.

Phil has over 40 years' experience in Project Management, Technical Development and Change Management in the oil & gas industry and proven technical and managerial capabilities to achieve results with a strong business focus and to effect significant positive change. He is a specialist in front-end (feasibility & concept selection) phases of upstream oil & gas developments with midstream (LNG) experience and project execution experience and has the ability to perform analysis and development work as well as lead and motivate teams.

Amongst other roles, he was Specialist Front End Advisor at Petronas Carigali, Chief Process Engineer at BG Group and Head of Upstream Engineering at Shell Technology India. He has experience worldwide in differing political, social and remote environments, having worked overseas for 28 years including the Far East, USA, Europe, the Middle East and India.

Phil is an experienced instructor and has designed and facilitated over 50 workshops including; Opportunity Framing, Concept Identification and Selection, Value Engineering, Risk Management, Contract Management and Produce-the-Limit.

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