

Production System Optimization Workshop



Burney Waring worked for Shell for 29 years and was part of team facilitating the first 'Producing the Limit' (PtL) workshop in Shell in 1997. He participated in various PtL workshops before designing and teaching PtL workshop facilitation and production system optimization (PSO) in Shell for several years. In 2009 he created Shell's continuous PSO process as a part of their Well, Reservoir and Facilities Management (WRFM) processes. He retired from Shell in 2010 and has since provided PtL-type workshops for 11 assets. These workshops have been very, very successful with identified production gains up to 80%. The new workshop process Burney created is a bit more streamlined than the one used in Shell, but uses similar tools.

A Production System Optimization Workshop is a tool to rapidly generate opportunities to increase production in a field 10-20%, or more.

Production System Optimization Workshops Led by Burney Waring in 2011, 2012 and 2013

Risked, Expected Gains:		\$NPV millions	Oil (bbl/d)	Gas (mmscfd)	% Increase	Main areas
Antipodes	Onshore	12		11.3	21%	Reperfs, add perfs, recompletions, cleanouts.
Middle East	Onshore	65	5793	0	35%	Chokes, pipes at manifold, sep press.
Antipodes	Onshore	13		12	21%	Could be 40% with surface. Recompletions, gas jacks, reperforation.
Antipodes	Offshore	209	3000		46%	Screen resizing, proactive pump replacment, reduced backpressure, improved metering
North Africa	Offshore	67	1887		30%	Siimulation, workover, add ESP, sidetrack
Eastern Europe	Onshore	121		11.7	18%	Reperf, beanup, WSO, recompletion, modify compressor
Western Europe	Onshore	18	698	3.2	22%	Rig interventions, flowline/choke cleanouts, gas lift rate changes
Western Europe	Onshore	116	2107	2.6	258%	Additonal wells, add pipelines, recompletions, speed up pumps, run ESP`
North Africa	Onshore	117	4700		72%	Add poor-boy gas lift, bean up, gas lift optimisation, ESP installation, stimulation
Eastern Europe	Onshore	163	2390		36%	Beanup, add ESP, stimulations, reperf
Western Europe	Onshore	39	1887		76%	Change SRP to ESP, bean ups, electrical upgrades

This tool has had a long and successful history in the oil and gas industry. The workshops are derived from business process mapping exercises used in Shell Oil Co. in the 1980s which evolved into the well-known and successful 'Drilling the Limit' process. Following that success, other disciplines in Shell attempted to create similar processes. **The best of these was the 'Producing-the-Limit' process.**

PtL was used extensively in Shell for over 10 years (covering virtually every asset) and in at least two other international oil and gas companies. The process consistently increases asset value in the short and medium term by finding, quantifying and prioritizing opportunities such as: simple re-routing of wells, intermittent production, simple facilities modifications, gas lift modifications, acid stimulations, compressor

modifications, pipeline installations, ESP installations, separator set pressure changes, process control modifications, reoperation, recompletions, etc.



What is required?

- Support and sponsorship for finding asset value in the short and medium term that crosses disciplines
- One to two external facilitators with expertise in the Production Optimization Workshop process, managing large teams and extensive experience in production optimization
- One team facilitator (can be internal) with expertise in leading teams, with experience in production optimization
- A proven process and specialized techniques
- Dedicated asset staff time for 2 weeks, especially Reservoir, Production, Facilities and Operations staff who work for the asset. Operations supervisory staff are also important but need not be dedicated full-time.
- An optional one-day field visit (normally on the middle weekend)
- Two dedicated conference rooms
- Relevant field data and models available to staff during the event
- Presentation to management by the asset team on the last day

Why does this approach work?

- Full system, integrated review and analysis
- The asset team is removed from 'fire-fighting mode'
- Sharing of relevant experiences and unbiased opinions
- Frequent use of the questions 'Why?' and 'Why not?'
- Process uncovers and evaluates the most diverse ideas
- Serious challenge to current approaches
- Quantification and ranking of best ideas
- Results created by and thus owned by the asset team
- Staff learn more about their own field and from other disciplines

Production Optimization Workshop Field Example

The asset manager asked for a review of one part of a very large, very mature oil field. The reservoir in this area of the field had wells with high water cut, but very good inflow performance. The wells were limited by the chosen artificial lift technique (beam pumps). Multiple surface systems (especially power) were already at their limits. Experienced, technically-competent staff were working on this field in the normal course of their single-discipline jobs and were successful in meeting production targets.

Using the Production Optimization Workshop process, a dedicated multidiscipline team was formed mostly from the asset's staff and led by Burney Waring. Over the course of two weeks the team performed a full well and facilities review and quantified the gains from a variety of opportunities but primarily by moving to another artificial lift technique (ESP). The team also quantified the costs of removing the limitations on the surface systems. Comparing these, the team realized that although the cost of the extensive upgrades necessary was substantial, the long term value of these upgrades made for a very profitable project even with conservative estimates. The team produced detailed technical documentation, and presented to the asset manager a notional 2.5 year, 6-phase project plan, with preliminary project economics. The team concluded that oil production from this area of the field could be increased by 80%!

The company's management agreed that this was a great success and is carrying out the project over the next several years. Subsequently the company held many more such events for other assets over the next two years.

This is a great illustration that a team with deep knowledge of their field can realize substantial value if they can work together as a dedicated, integrated, multidiscipline team.