



Oil & Gas
Authority

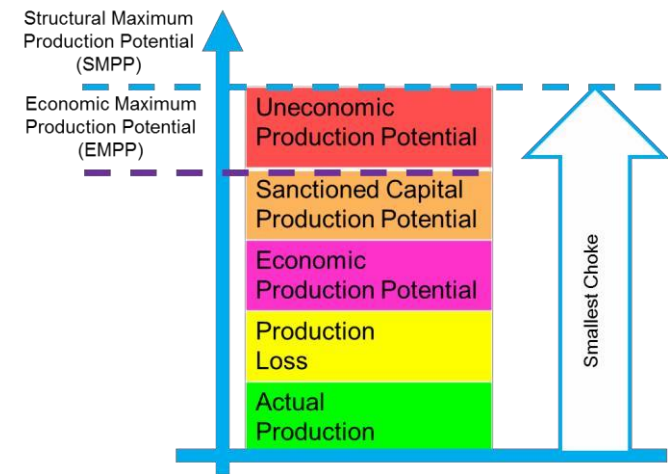
UKCS Production Efficiency Guidance





Production Efficiency(PE)

- 2015 Industry challenge to refine the Production Efficiency (PE) process with improved production potential definition, production loss assessment, (incl UPP, EPP, SCPD, actual loss), loss mitigation & PE improvement plans
- Joint industry, OGA & SPE effort to develop best practice paper
- Updated process is based on a 4 segment choke model (Well, Plant, Export, Market) for the production process that;
 - evaluates the maximum production potential per choke
 - determines the most constrained choke, (in structural & economic terms)
 - uses “source of loss” reporting to calculate overall Production Loss
 - Reports Production Efficiency of the process





The revised PE process

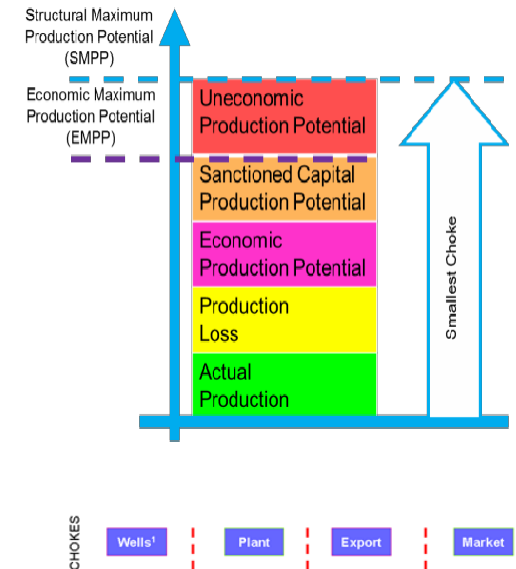
- SPE Draft “Best Practice Guidance” used by the OGA in the development of new PE process
- OGA issued new guidance and definitions supported by workshops to improve interpretation of new methodology and definitions.
- OGA issued Clarifications to issues raised, to also improve interpretation.
- Feedback session with Industry held September 2016, leading to refinement of subject matter going forward.

Society of Petroleum Engineers



White Paper:

*Production Efficiency Reporting –
Best Practice Guidance*

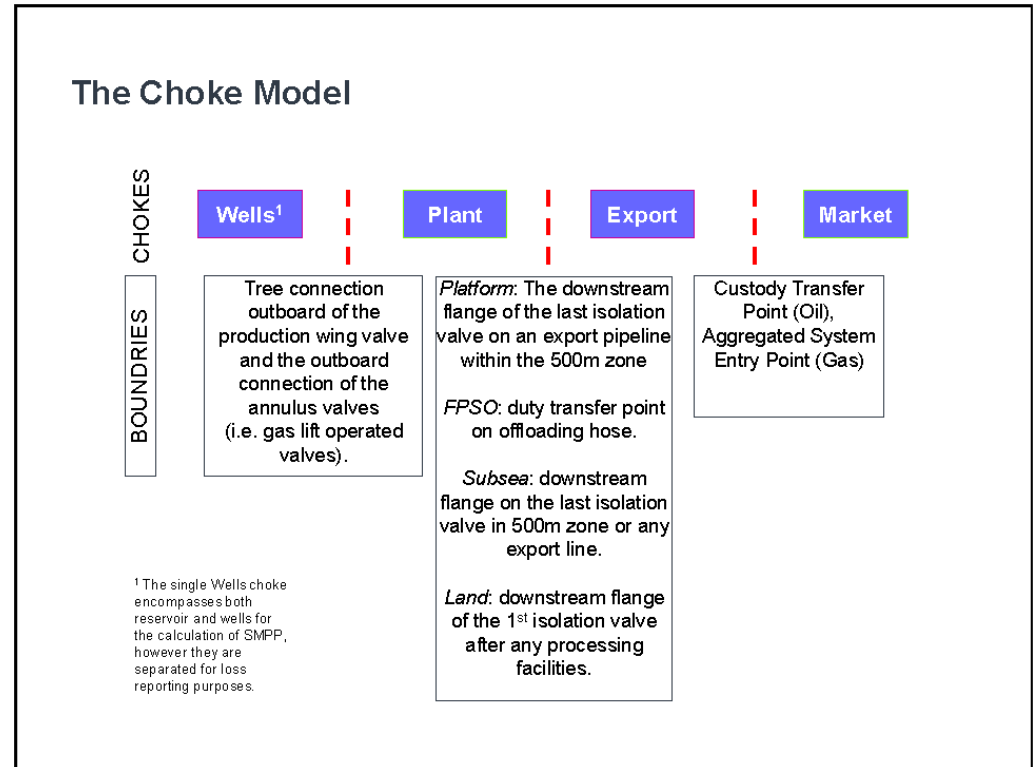




PE Process DEFINITIONS

The choke model

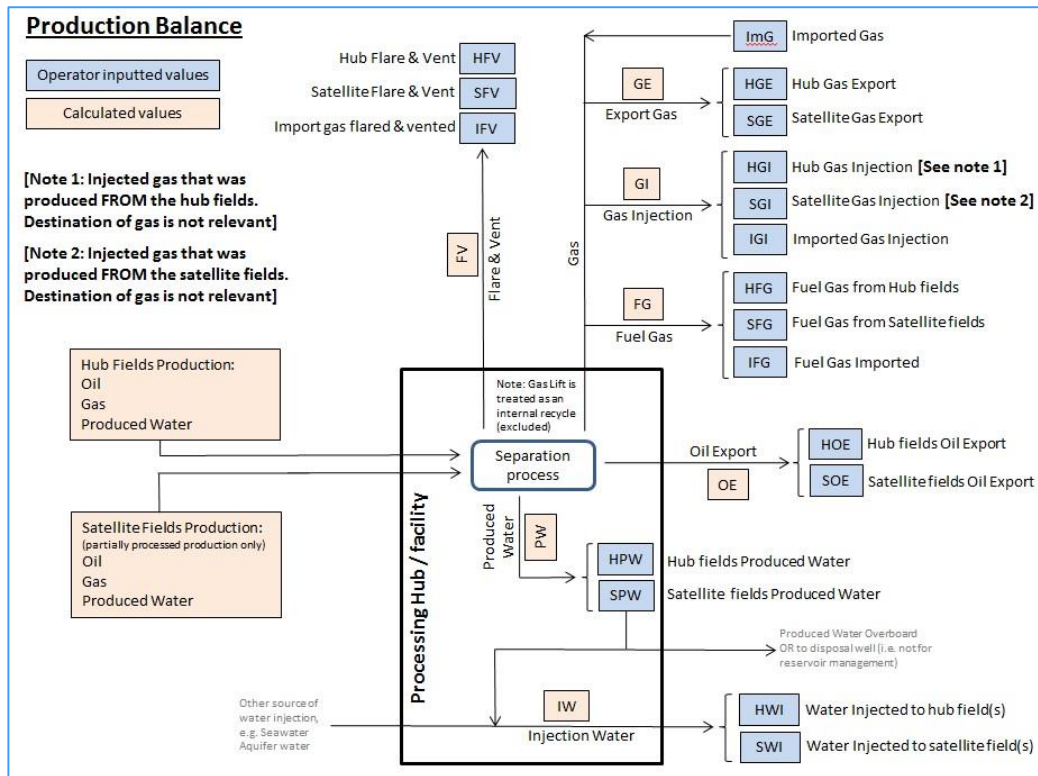
- The Production Efficiency (PE) Data Collection & Reporting process uses a 4 stage production choke model
- The 4 chokes in the production choke model are:
Wells, Plant, Export & Market
- The production choke model evaluates MPP (per choke), production loss, production potential and hence the Production Efficiency (PE) of the production process
- References
 - SPE draft white paper: Production Efficiency Reporting – Best Practice Guidance (2016)
 - SPE paper SPE-36848-MS 'Increasing Production in a Mature Basin: the 'choke' model(1996)



SPE best practice guidelines are used in the PE Data Collection & Reporting process



PE Process - Production Balance

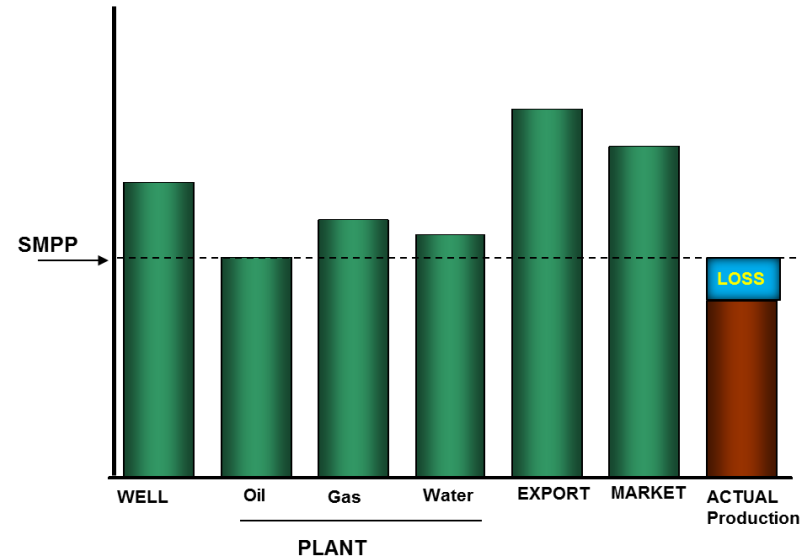


- **Hub** fields flow to the facility/platform/hub for processing. Well production is calculated in the balance
- **Satellite** fields require a measure of pre-processing before flowing to the facility/hub for further processing
- Fuel, flare & vent volumes now included in the Production balance calculation.
- Gas lift is not included as it is an internal process recycle
- The Operator of the named facility/platform/hub is responsible for collecting & inputting data into the production balance sheet in the PE data collection template

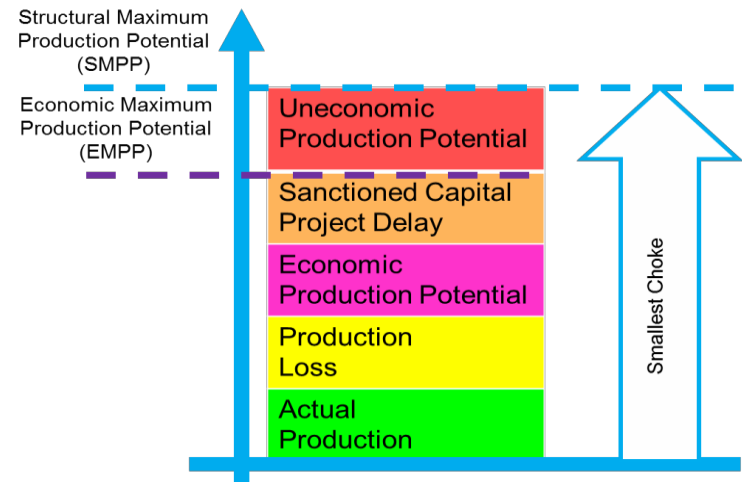


SMPP & contributors of loss

- Structural Maximum Production Potential (SMPP) is the lowest structural production potential of the well, plant, export & market systems including volumes processed from satellite fields.



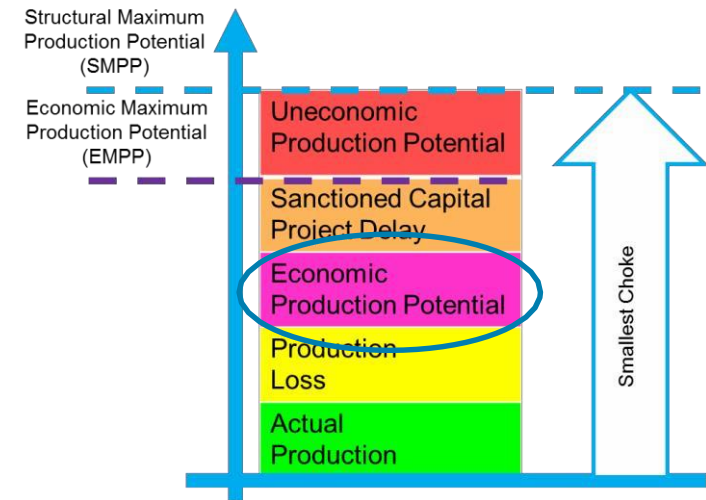
- The update introduced some new categories (UPP, EPP & SCPD) aligned with MERUK, in addition to the original SMPP calculation





Contributor to SMPP Economic Production Potential (EPP)

- Production potential identified as realisable production potential in the reporting year
- Made up of production potential which is economically achievable for the Operator through actions such as intervention, workover, repair, maintenance activity, etc.
- EPP is usually described in the Operators annual asset or field plan, for the reporting year.
- EPP can also be found in Operators commitments to the regulator (eg approved Field Development Plans (FDPs) or FDP Addendum)
- The economic evaluation & justification of EPP shall be reported separately to the regulator (for review as part of the regulator's Asset Stewardship process)

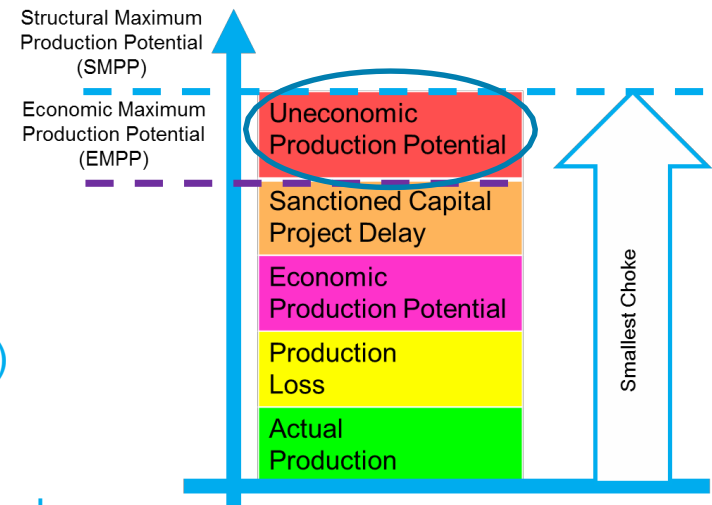




Contributor to SMPP

Uneconomic Production Potential (UPP)

- Production potential which is not economically achievable for the Operator, in the reporting year. UPP is part of SMPP.
- This category can include Capital Project production potential that has met the Operators technical approval requirements but that has been put on hold (not meeting the Operators economic approval criteria)
- UPP can be Field or Facility specific. Hence both the field Operator and the facility/platform/hub Operator shall evaluate & report UPP.



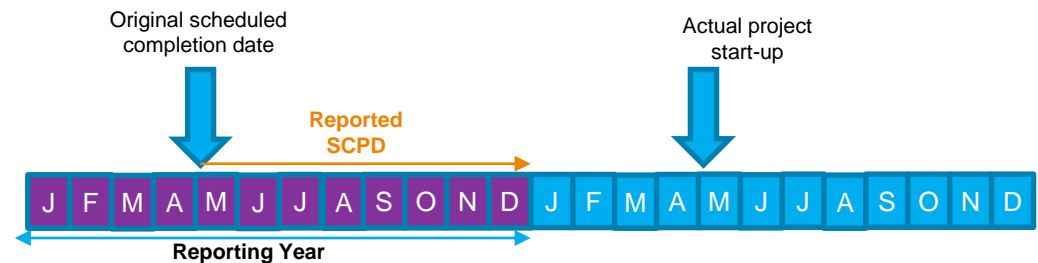
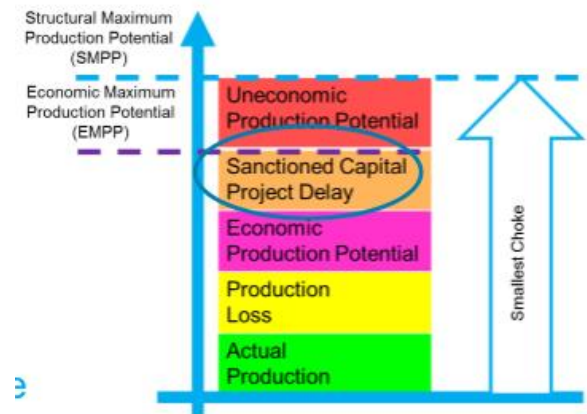
The Facility/Platform/Hub Operator is responsible for collecting & reporting all advised UPP in the new data collection template,

The basis & economic evaluation of Field or Facility UPP shall be reported separately (for review as part of the regulator's Enhanced Asset Stewardship process)

Contributor to SMPP

Sanctioned Capital Project Delay

- Sanctioned capital projects are defined as projects that have received the Operators Financial Investment Decision approval
- The Sanctioned Capital Project Delay (SCPD) category identifies production potential loss *in the reporting year*, for Sanctioned Capital Projects which have reached their Original Scheduled Completion Date at FID but have yet to complete
- SCPD should be recorded as the total loss during the reporting year. I.E if a project was delayed for 12 months from March then 8 months of SCPD are recorded for the current survey year with the remaining 4 months reported the following year



SCPD

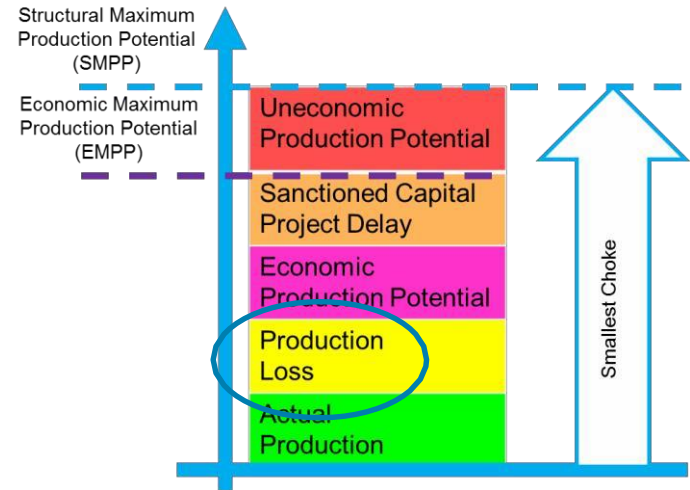


Contributor to SMPP Production Loss

- In the new SPE choke model, Production Loss has been redefined as:

Production Loss is calculated as:

$$\text{Production Losses} = \text{SMPP} - \text{Uneconomic Production Potential} - \text{Capital Project Delays} - \text{Economic Production Potential} - \text{Actual Production}$$



- Production losses are allocated into defined “loss categories” designed by the SPE to provide a high level approximation of where losses occur, per choke
- The new template is based on SPE “source of loss” categories to record production loss. Individual choke production loss values are summed together to obtain the total production loss for the facility/platform/hub



Hub or Satellite?

- “Hub” definition
The facility/platform/hub that received hub field production and processes HC to export spec. Hub fields are those whose wellhead production is gathered and processed on the facility/ platform/ hub
- “Satellite” definition
A Field whose production is routed from a separate facility (where some level of processing takes place) to the hub facility/platform/hub where additional production processing occurs (in the hub facility) prior to export

Note that this excludes 3rd party production that goes "up & over" with no processing that involves a compositional change (for example oil export pressure boosting or gas export pressure boosting is not considered as 'processing' as there is no compositional change).



Q&A Examples(1)

Well MPP?

- Definition is sum of the well tests... but will this always be the case?
We could use the modelled potential of a well...
the issue is up for debate but in the end the Operators subsurface or wells TA will determine the potential ... and hence it is for the Operator to justify the value at the asset stewardship review with OGA

Sanctioned Capital Production Delay (no production in the year)?

- If the sanctioned capital project has a delay of more than 12 months (from sanctioned first oil date) and the delay has resulted in no production in the reporting year then the whole of the estimated production in the reporting year will be logged as SCPD)



Q&A Examples(2)

Loss examples?

- Deman due to extreme weather
(Loss categorised as - Plant choke loss, full plant loss)
- Production stopped due to regulatory action
(Loss categorised as - Plant choke loss, full plant loss)
- Well awaiting intervention, (in asset work activity plan to do)
(Loss categorised as - Well choke loss, EPP loss)
- Well expected on line in May, comes on line in Dec
(Loss categorised as - Well choke loss, SCPD loss from May to start-up date)
- EPP (plant configuration N or N+1)?
(It could be argued that N+1 configuration had a potential to bring on additional plant capacity, but if the Operator can show the facility runs a maintenance strategy of N+1, the plant capacity (for loss calculation) is therefore based on N)