

Field development process

FDP field development plan

PUD Plan for utbygging og drift

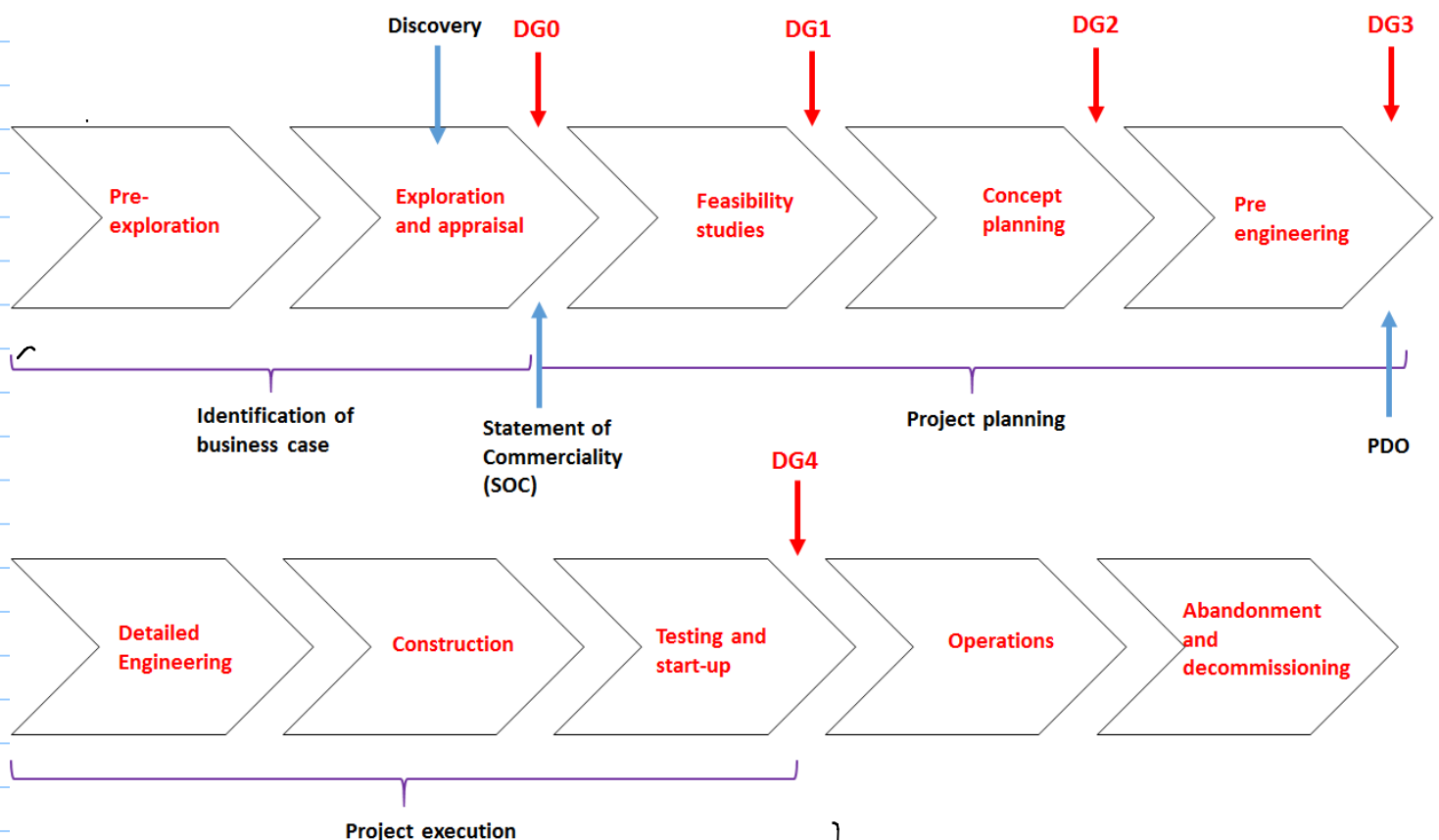
http://www.npd.no/Global/Engelsk/5-Rules-and-regulations/Guidelines/PDO-PIO-guidelines_2010.pdf

Read compendium from page 42-49

http://folk.uio.no/hanakrem/svalex/Misc/Visund_PDO_PUD.pdf example for Visund field

Impact assessment

Project execution phase



• Individual contracts

↳ several companies

Detailed engineering

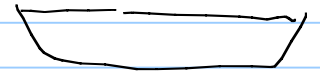
Bids, contracts

Construction, fabrication

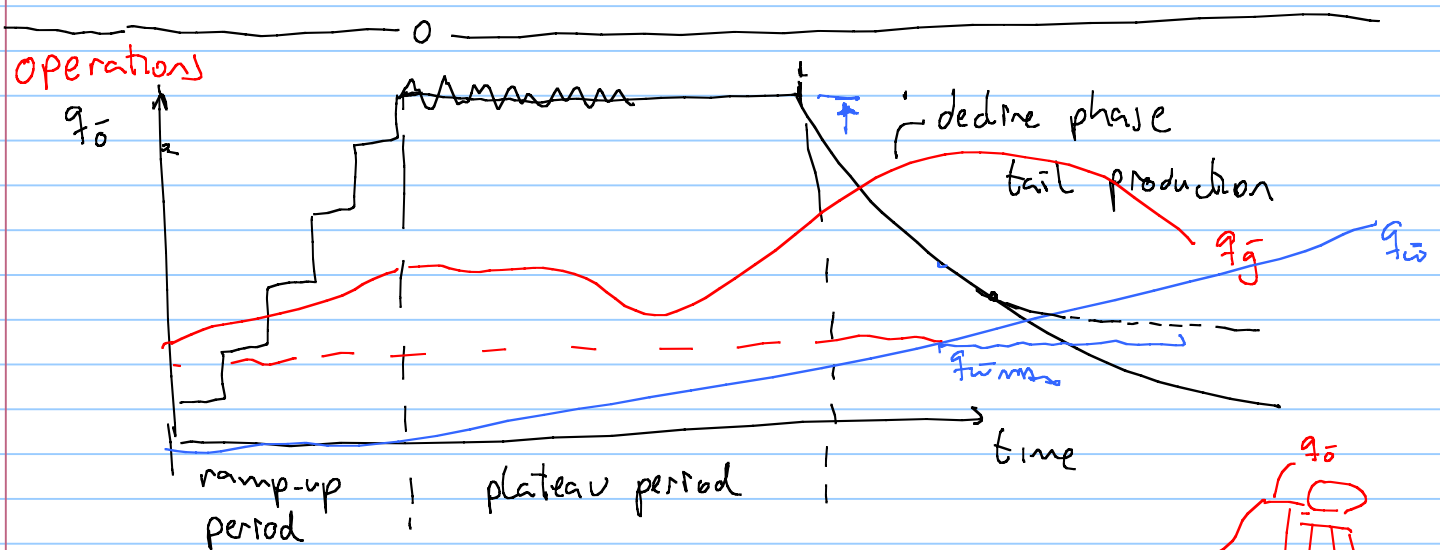
Installation

Commissioning

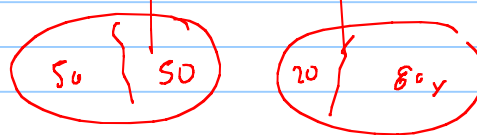
EPCM (Engineering, procurement, construction, management)
Single company.



- Constructing well
- Perform hand over to asset, operations
- prepare for start-up, operation and management



- Maintenance
- Allocation. $\rightarrow$ metering
- troubleshooting
- Debottlenecking



facilities have $q_{g \max}$
 $q_{w \max}$
 $\rightarrow$ dealing with associated products

- IOR improved oil recovery methods.
 - drilling more wells
 - boosting
 - artificial lift
 - repertorate
- stop production

• Decommissioning phase

- Define a timeline and a plan
- Coordinate with relevant environmental agencies
- well plugging and abandonment (TPG4200)
- Cut conductor
- engineer "down and clean" flushing and clean tanks, processing equipment, piping
- prepare the offshore structure for removal
- plan and remove topside equipment
- lifting operations and transport
- remove or bury subsea pipelines
- mark and register leftover installations on marine maps
- monitoring
- Recovery of material / steel
 - recycling of equipment
 - Gas turbine
 - separator
 - pump
 - processing
- disposal of residues

Decommissioning:

Overview of activities

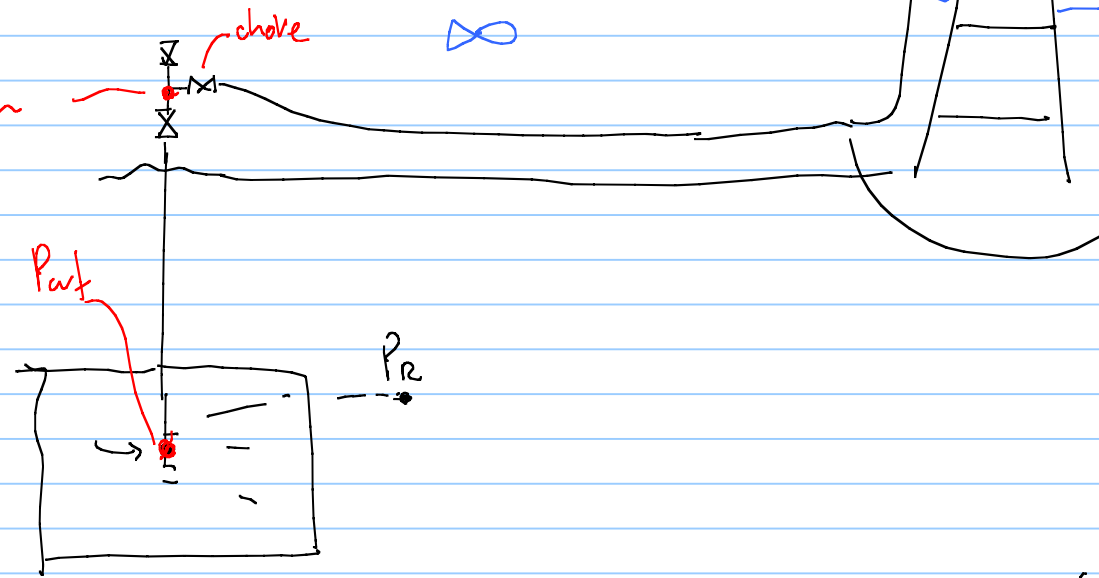
<https://www.youtube.com/watch?v=8Xm9VNZul9M>

Transport of platform and scrap yard

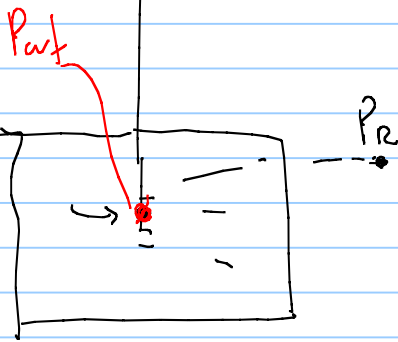
<https://www.youtube.com/watch?v=1GA3Elu81rw>

indicates standard conditions

flowing wellhead pressure P_{wh}

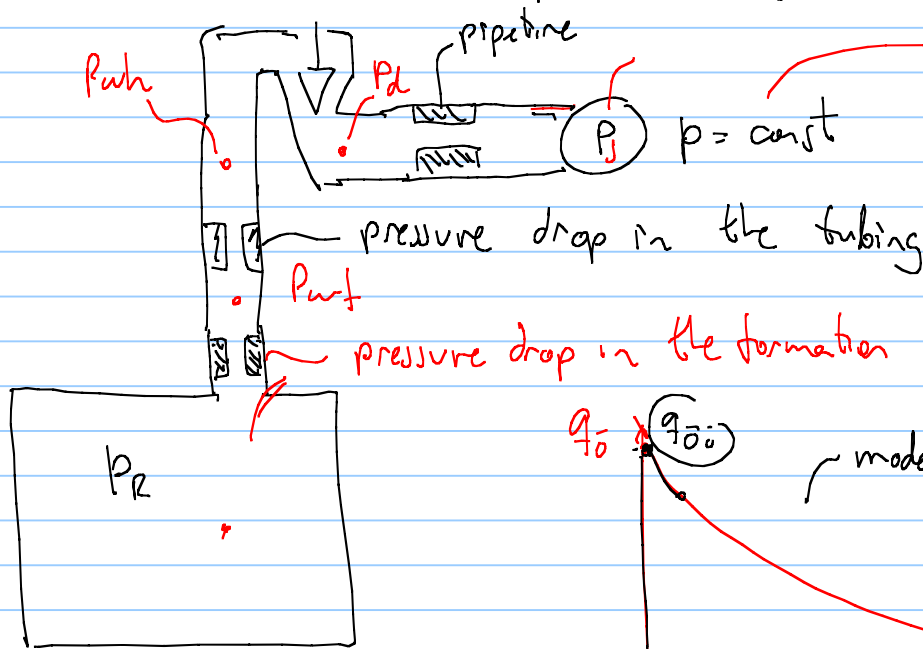


flowing bottomhole pressure



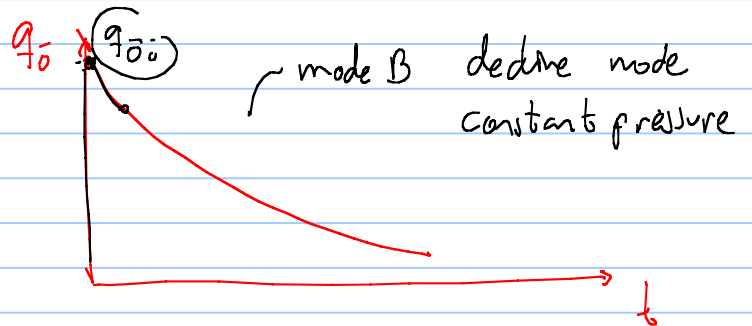
$$v = f(P, T)$$

mechanical analog of my production system



$p = \text{const}$

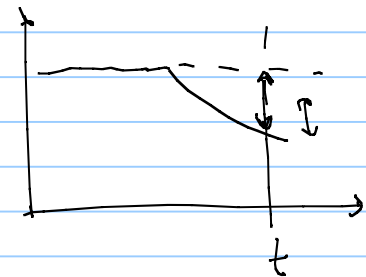
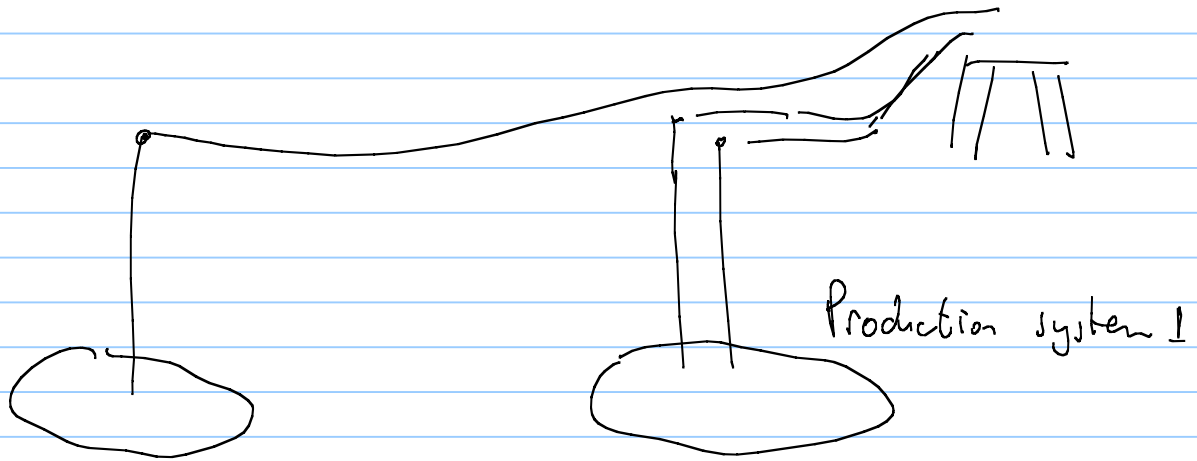
$$\Delta p = P_R - P_{sep}$$



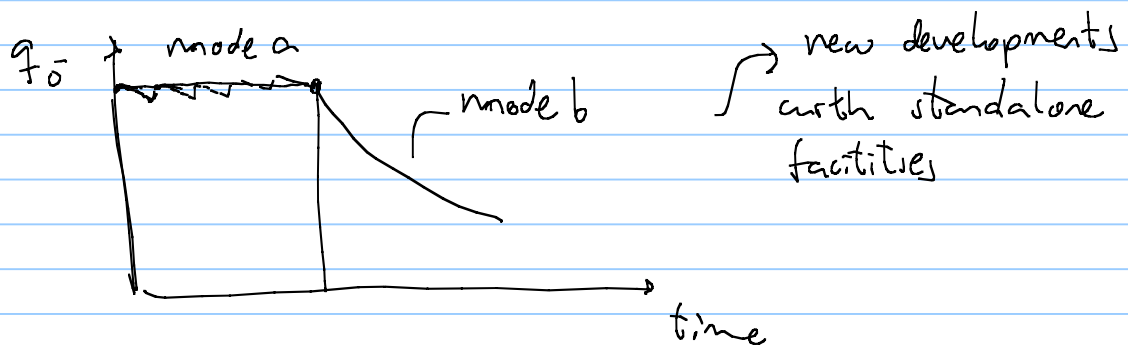
$$q = f(P_R - P_{sep})$$

Satellite field that are tied-back to existing processing facilities

not used for standalone projects.



mode a plateau mode
constant rate mode



http://www.ipt.ntnu.no/~stanko/Field_Simulator.html

for fields operating in plateau mode:

a rule of thumb i drain 10% of the ^{oil} TRR
total recoverable reserves
in a year

IOIP(N)

IGIP(G)

TRR = N · RF

G · RF

~ recovery factor

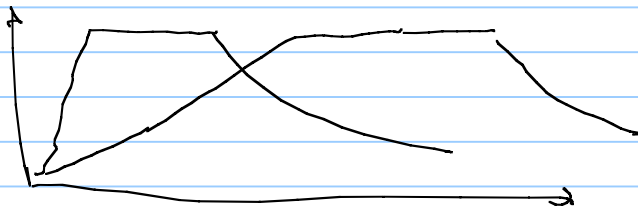
$$q_{\text{plateau rate}} = \frac{M. RF. 0.1}{365} = \quad [stb/d]$$

for gas 0.03-0.05 per year

page 18 of the compendium

Onshore

- there are neighboring field of easy access to tie-in production



longer ramp-up than in offshore.

longer appraisal and overlapping with production

- test and verify reservoir communication and structure $\rightarrow$ use production data to improve reservoir models

- delay the planning of gas and water injection

oil vs gas developments

- transportability $\sim$ oil $\rightarrow$ shipped in tank high energy density

price oil > price gas $\rightarrow$ gas $\rightarrow$ pipeline $\rightarrow$ LNG plant

Offshore development

- short ramp-up
- short appraisal
- Get production as soon as possible to get a healthy cashflow
- Don't acquire much production data to improve my reservoir model
- plan ahead for water and gas injection
- review planning and models "on the go"

- Contract $\rightarrow$ time, amount, price $\text{USD}/\text{Sm}^3/\text{d}$, gas specs
 MMScfd } heating value
 $\text{N}_2, \text{CO}_2, \text{H}_2\text{S}$
- You need to have a buyer, contracts

If using LNG it is necessary to have an LNG infrastructure

sending LNG facility

Carrier LNG

receiving LNG facility

oil fields have a plateau 2-5 years

gas fields have a plateau 10-25 years $\rightarrow$ contracts

