

Report Maersk Developer Oil Rig

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Question

1. Describe your initial operating strategy, covering the following points:

- Production volume
- Overhauls
- Maintenance and safety spending
- Crew management

Initial strategy

The group's initial strategy prioritizes safety while seeking profitable production, combining planned overhauls, maintenance spending, and crew development.

Production volume

In practice round 1 (PR1), the production volume was tested by increasing the production to its maximum (1,650,000 bbls) and hiring more workers. This allowed the group to understand how extreme conditions affect the sustainability factors.

The takeaway for PR1 was that increasing the production volume to its maximum value was not the correct strategy under the specific starting conditions of PR1, as profit was reduced by high hiring costs.

In practice round 2 (PR2), the focus shifted from maximizing crude oil production to testing a more safety-oriented approach.

Decisions in PR1 and PR2 were made to understand how the economic factors respond to these decisions.

The production volume in Round 1 was set to 1,300,000 bbls. To ensure a high volume, ten workers were hired. The same strategy was applied for Round 2.

After Round 1 and Round 2, the group was breaking even. This result is helpful in identifying the threshold at which production becomes profitable under specific conditions.

The next steps in production aim to keep the company profitable.

Overhauls

The overhaul schedule in Figure 1 illustrates how the timing of major overhauls affects the BOP (Blow out preventer) value over successive rounds.

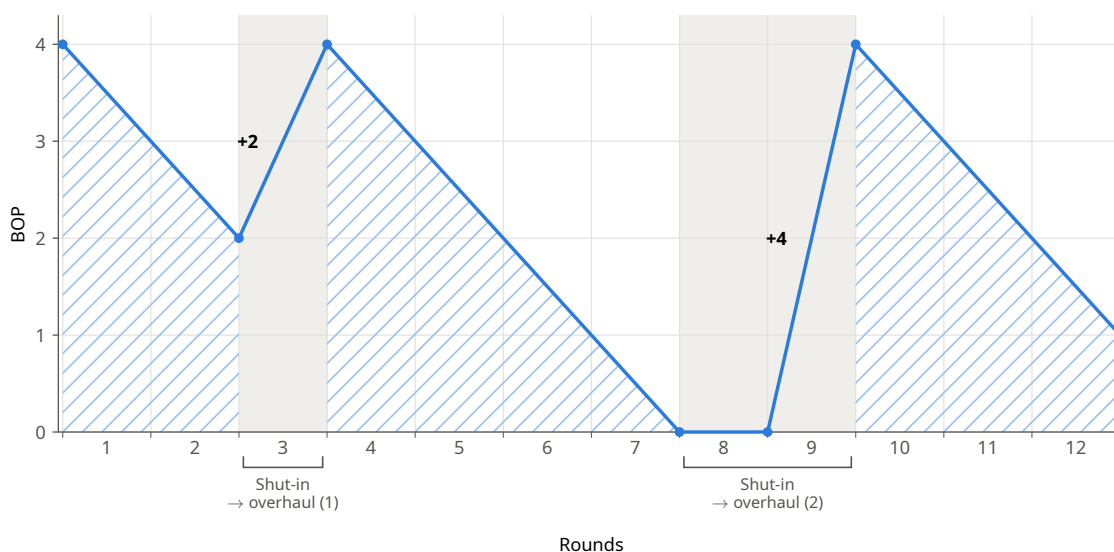


Figure 1: BOP planning schedule

The weather report predicts Beaufort 10 (Storm) in Round 3. A shut-in is necessary if a storm occurs, as the platform and the oil pumps might be compromised. An early overhaul is the best option because it restores the BOP before the expected storm, reducing the risk of a blowout. Assuming that a Beaufort 10 will occur only in Round 3, this strategy allows crude oil production to continue for multiple rounds, meaning that major overhauls would only be needed in Rounds 8 and 9.

The overhaul schedule aims to keep the BOP value above 0. The risk of a blowout exists regardless of the BOP value, but once it reaches 0, the BOP can no longer effectively prevent a blowout.

Maintenance and safety spending

Regular maintenance spending aims to keep the Rig Equipment Condition Index (RECI) above its baseline value of 100.

Two spending approaches are being considered:

1. Invest in maintenance and safety to keep the probability of failures and accidents low
→ Higher spending, lower risk

Table 1: Maintenance and safety expenditure

	Maintenance [\$/bbl.]	Safety [\$]	RECI
Baseline	8	1,200,000	100
Round 1	12	2,000,000	141
Round 2	12	2,000,000	182

2. Let the RECI degrade and restore it to its baseline value (100) during major overhauls performed every six rounds.
→ Cheap but risky.

During Rounds 1 and 2, the first strategy was used. To decide which strategy to adopt, a better understanding of the RECI and its effect on safety is needed.

Crew management

Five crew members were hired in Round 1 to support increased production while keeping the tiredness index low.

Each round, five crew members receive training, allowing expertise to develop over time while keeping training costs low.

Ethical Questions

#1: Arctic Investment Opportunity

The Arctic investment was considered too risky given the expected return and the high initial cost. Therefore, no investment was made.

#2: Backup Battery

The BOP backup battery test costs approximately \$5 million.

Table 2: Cost and probability comparison of a blowout and the BOP backup battery test

	Cost [1e6 \$]	Estimated chance [%]	Normalized cost [1e6 \$]
Blowout (minimum)	250	1	2.5
Backup Battery test of BOP	5	100	5
Blowout (realistic)	500	1	5

A blowout has an estimated minimum cost of \$250 million, while a more realistic estimate is \$500 million. Assuming a 1% probability of blowout, the expected cost would be \$5 million, equal to the cost of the test (Table 2).

Under these assumptions, the test costs as much as the estimated expected loss from a blowout. Carrying out the test is justified as a precaution to verify the backup system's reliability before relying on it during production.