POD
(PLAN OF DEVELOPMENT)
2003

Plan Of Development Team

1. Advisor : Mulyani Wahyono
2. Chairman : Ira Miriawati
3. Members : Heru Djoni P
   Eko Hari Endrarto
   Nizar Mujahidin
   Bayu Kristanto
Systematics

I. Objective

To convey Approval Procedure/Process for PSC Plan of Development (POD)
Plan of Development:

Plan to develop one or more oil and gas field in an integrated way in order to produce the hydrocarbon reserves optimally by considering the technical, economics and HSE aspects.

III. Types of POD
Types of POD

1. Plan of Development I
   • Prior to Law No. 22 of 2001, approval of the Development Plan for the first field within a given Block/Work Area only required approval from Pertamina’s Managing Director, which also served as commerciality for the work area.
   • Since Law No. 22 of 2001 came into force:
     ■ In accordance with Article 21, Development Plans for the first field in a given Block/Work Area must obtain the approval of the Minister of Energy and Mineral Resources, based on considered opinions from BPMIGAS after consultation with the government of the Province concerned.
     ■ In accordance with Article 17, if, after approval has been granted for the First POD in a given work area, activities are not carried out within a maximum period of five (5) years from the end of the exploration period, the entire work area must be returned to the Minister.

2. Plan of Development II and thereafter:
   The purpose is to develop one or more oil and gas field in an integrated way to develop/produce hydrocarbon reserves optimally with consideration to technical, economic, and HSE aspects.
   • POD proposal is submitted to BPMIGAS, based on actual conditions and approval by the Head of BPMIGAS.
   • Validity period of the POD is two (2) years from the date of approval. Changes in Scope of Work or delay in implementation of the POD without notification and approval will cause it to be considered canceled/expired.
3. POP (Put On Production)

Aim: To produce from a field with relatively small reserves, using nearby production facilities through “tie in” with existing facilities.
FLOW CHART: APPROVAL PROCESS FOR FIRST POD

CONSULTATION WITH LOCAL REGIONAL GOVERNMENT THROUGH DIRECTORATE GENERAL OF OIL AND GAS

BPMIGAS

CONSIDERED OPINIONS

MINISTER OF ENERGY & MINERAL RESOURCES

APPROVAL

NOT APPROVED

PSC

FLOW OF POD EVALUATION

POD Team

RESEARCH & DEVELOPMENT

EXPLORATION

EXPLOITATION

Finance- Eco & MARKETING

OPERATIONS

Other FUNCTIONS

POD Team Coordinator

PRELIMINARY MEETING

POD Team with PSC & Evaluation Result

DISCUSSION

PSC (FINAL POD)

Head of BPMIGAS

APPROVED

NOT APPROVED

Head of Division Research & Development

DEPUTY OF PLANNING

DRAFT POD

2 weeks

3 weeks

2 weeks

3 weeks

Total: 10 weeks

APPROVAL PROCESS (Research Division)

POD Team

DEPUTY OF PLANNING

HEAD OF BPMIGAS
FLOW CHART - POD APPROVAL

Field Economic Section/Research & Dev Division

PRELIMINARY PRESENTATION

Deputy of Planning BPMIGAS

POD APPROVAL

Sub Surface Aspects
Coordinator: EPT Study
Team: EPT, EKS, Other Functions

Evaluation Result

Process under condition - no principle problems (10 weeks)

Process under condition - there are problems which still need further discussion with the team (12 weeks)

Process under condition - there are management problems and/or non technical problems (>12 weeks)

Evaluation Result

Economic Aspects
Coordinator: Field Economic
Team: PDA, EPT, Marketing, Other Functions

Evaluation Result

For POD - I - need approval from Minister

APPROVAL PROCESS
GAS DEVELOPMENT

Discovery

Pre POD

Study

• Geology, Reservoir Modelling
• Development Production & Facilities (Conceptual)

Market

HOA GSA

Volume, Schedule, Price

• Reserves Certification P1, P2, P3
• Development & production Scenario (detail study)

Facility Construction Design (FEED, Benchmarking)

Approval Evaluation

Yes

No

Economic

Subsurface Re Evaluation

Facility & Construction Re-Design

Approval Process POD

Head of BPMIGAS

DRAFT POD

P SC
V. POD Handling

Content of POD

<table>
<thead>
<tr>
<th>Old</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Geological Findings</td>
<td>1. Executive Summary</td>
</tr>
<tr>
<td>2. Reservoir Description</td>
<td>2. Geological Findings</td>
</tr>
<tr>
<td>3. Drilling Results</td>
<td>3. Exploration Incentives</td>
</tr>
<tr>
<td>4. Field Development Facilities</td>
<td>4. Reservoir Description</td>
</tr>
<tr>
<td>5. Project Schedule</td>
<td>5. Secrec/EOR Incentives</td>
</tr>
<tr>
<td>7. Production Results</td>
<td>7. Drilling Results</td>
</tr>
<tr>
<td></td>
<td>9. Project Schedule</td>
</tr>
<tr>
<td></td>
<td>10. Production Results</td>
</tr>
<tr>
<td></td>
<td>11. HSE &amp; Community Development</td>
</tr>
<tr>
<td></td>
<td>12. Abandonment</td>
</tr>
<tr>
<td></td>
<td>13. Project Economics</td>
</tr>
<tr>
<td></td>
<td>14. Conclusion</td>
</tr>
</tbody>
</table>
1. Executive Summary

Summary of Plan of Field Development which consist of Technical, Economical and HSE

2. Geological Findings

Explain the geological finding for oil and gas by using the latest geological data based on logs and cutting analysis which is used to revise geological map.

Geological Overview:

- Regional Geology:
  - Boundary (If any), Formation, faults, sedimentary type, age of corresponding formation
- Stratigraphy
- Structure: Types of Folding, faulting, or unconformities
- Correlations: correlation among wells (structural / Stratigraphic)
- Maps: Top & bottom structures, Net sand/carbonate Isopach, revised as new data available.
3. Exploration Incentive

a. New Field:
   - Incentive package is given to motivate the Contractor to keep doing exploration activities. Procedure to obtain the incentive is referred to the “guidance” which was issued by the Exploration Division. The price difference between Old Oil and New Oil is intended to encourage the PSC to keep conducting the exploration activities during the first 60 months (incentive period)
   - Incentive: DMO Fee New Oil & Investment credit

b. Pra-Tertier Reservoir incentive (as per PSC Contract):
   - DMO Fee New Oil & Investment credit
   - Change of Split

PROPOSAL GUIDANCE FOR DETERMINING NEW FIELD

<table>
<thead>
<tr>
<th>RISK</th>
<th>POINT</th>
<th>2.5</th>
<th>5</th>
<th>7.5</th>
<th>10</th>
<th>TOTAL POINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOLOGICAL RISK</td>
<td>EXPLORATION CONCEPT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OLD EXISTING MODEL IN NEAREST STR.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OLD EXISTING MODEL IN WORKING AREA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NEW EXISTING MODEL IN ADJACENT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NEW NO MODEL IN ADJACENT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STRATIGRAPHIC POSITION</td>
<td>- FORM - MEMB. - ZONE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STRUCTURAL TREND</td>
<td>SAME SAME CULMINATION SEALING FAULT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SAME SEPARATE CULMINATION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SAME PARALEL POSITION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NEW NOT PARALEL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOGISTICAL RISK</td>
<td>DISTANCE FROM EXISTING FIELD</td>
<td>&lt; 5 KM</td>
<td>5 – 10 KM</td>
<td>10 - 25 KM</td>
<td>&gt; 25 KM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DISTANCE FROM EXISTING INFRASTRUCTURE</td>
<td>&lt; 50 KM</td>
<td>50 – 100 KM</td>
<td>100 – 200 KM</td>
<td>&gt; 200 KM</td>
<td></td>
</tr>
</tbody>
</table>

Geological risk = 60% x total point =
Logistical risk = 40% x total point =
Weighted Grand Total =

> 20  NEW FIELD
15 – 20  OTHER FACTOR TO BE CONSIDERANCE
< 15  NO INCENTIVE
4. Reservoir Description

a. Reservoir Condition

- **Initial condition:**
  - \( P_i, T_i, B_{gi}, R_{si}, B_{oi}, P_b \),
- **Rock characteristic:**
  - \( H, V_{cl}, \text{porositas, } Sw, K, Cr \)
- **Fluid properties:**
  - \( B_g, B_o, B_w, R_s, \text{Viscosity (Oil & Gas)} \)
- **Driving Mechanism:**
  - Gas cap drive, solution gas drive, expansion gas drive, water drive, and combination drive.
  - For production forecast and recovery factor calculation.

b. Hydrocarbon In-place

Utilize the Volumetric Method and reservoir simulation.

c. Hydrocarbon Reserves

Reserves are divided into 3 categories: Proved, Probable, Possible

**Proved Reserves:**

The quantities of crude oil, condensate, natural gas, natural gas liquids and associated substances which geological and engineering data demonstrate with reasonable certainty to recoverable in the future from known oil and gas reservoirs under existing economic and operating conditions (P-90).

**Probable Reserves:**

Probable reserves are less certain than proved reserves and can be estimated with a degree of certainty sufficient to indicate they are more likely to be recovered than not. This estimate takes into consideration known geology, previous experience with similar types of reservoir and seismic data, if available. (P-50)

**Possible Reserves:**

Possible reserves are less certain than probable reserves and can be estimated only with a low degree of certainty. Insufficient information is available to indicate whether they are more likely to be recovered than not. (P-10).
4. Reservoir Description

d. Production Forecast/Incremental Production

Forecast hydrocarbon production in the future by using the methods/assumptions which is used in the calculation, as follows:

- Decline curve analysis
- Reservoir Simulation

5. Secrec/EOR Insentif

Secondary Recovery
Improve the hydrocarbon recovery by adding the natural energy by injecting fluid (water flooding and gas flooding).

E O R
All methods related to the use of the external energy resource to recover the oil which is not produced under conventional methods (Primary and Secondary Recovery), For example: steam flood and chemical flood.

Incentive
Secrec and EOR will obtain incentive in the form of investment credit dan DMO
6. Field Development Scenarios

Explain the field development scenario which consist of:

- Phasing Development
- Full Development
- Development Strategy
- Production Optimization
- Local Content: The products and services that will be used directly to structural building and infrastructure development with regard to the field development should prioritise the domestic product/service.
- etc

7. Drilling

Consist of:

a. Platform/cluster/well location onshore, offshore
b. Well design:
   vertical, deviated, horizontal, radial, slim hole
c. Drilling Schedule
d. Drilling report
e. Completion
8. Field Development Facilities

a. Primary Recovery Facilities
   1. Offshore Production Facilities
      - Offshore Platform Facilities
         Jacket, Deck, Processing Facilities, etc.
      - Other Offshore Facilities
         Sub marine pipeline production junction facilities, Disposal Facilities, Storage etc.
      - Additional Facilities
         Civil construction, Office, Living Quarter, etc.
   2. Onshore Production Facilities
      Consist of: Processing facilities, Flow-line and storage facilities, Disposal facilities.
   3. Artificial Lift Equipment

b. Enhanced Oil Recovery Facilities

9. Project Schedule

Describe the sequences of the completion target of activities during the field development, such as:

- **Planning**:
  - Screening study
  - Feasibility study
  - Conceptual Engineering

- **Execution**:
  - Detail Engineering
  - Procurement
  - Fabrication
  - Installation
  - Commissioning

- **Operation**
10. Production Results

Describe the activities to lift the hydrocarbon and to increase the production (if any) by means of:

1. Stimulation
2. Gas Lift
3. Pumping
4. Sec.Rec.
5. Enhanced Oil Recovery

11. HSE & Community Development

Comprehensive study related to the effects of a certain field development to the Health, Safety and Environment (HSE) in the areas close to the field that will be developed. There are four stages:

- Pre-Contruction,
- Construction,
- Operation,
- Post-Operation
12. Abandonment & Site Restoration

Explain the technical and cost study with regard to the field abandonment mechanism both onshore and offshore in case the field is no longer economics to be produced and will be permanently abandoned.

13. Project Economics

Economics Analysis Calculation based on the latest data:

- Certified Reserves.

- Production forecast

- Development cost:
  Investment: Well cost, production facilities cost, pipeline cost, compressor, platform.
  Operating cost: Direct production cost, work over/stimulation, maintenance, G&A
13. Project Economics

• Economics Indicator
  – Government:
    GOI (Government Income) and Percentage of Government Income to the Gross Revenue.
  – Contractor:
    Net Cashflow (NCF), Internal Rate of Return (IRR), Net Present Value (NPV).
  – Profit to Investment Ratio (PIR), Pay out Time (POT)
  – Sensitivity → Spider diagram
    Based on 4 parameters:
    Price (Oil & Gas), Capex, Opex and Production

14. Conclusion

Conclude the field development by selecting the best alternative from Technical and Economical Perspective
VI. POD Revision

POD Revision

POD that has been approved can be revised with considerations:

- Change in Development Scenario
- Change in oil and gas reserves significantly compared to the initial plan.
- Change in Investment Cost
Thank You