Environmental Impact Assessment Report

Offshore Petroleum Production Phase II of Greater Bongkot South, Gulf of Thailand

PTT Exploration and Production Public Company Limited



Project Description



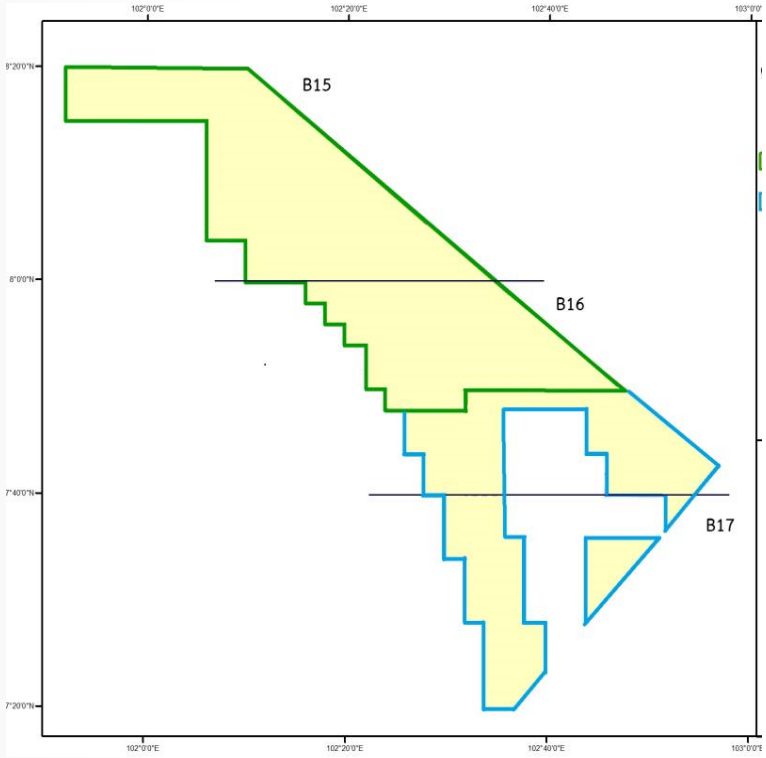
Project Background and Objectives

- PTTEP is petroleum concessionaire of Greater Bongkot South Project
- PTTEP operates natural gas and liquefied natural gas production
- Lower petroleum production
- PTTEP plans for petroleum production phase II of Greater Bongkot South Project
- Maintain production capacity of Greater Bongkot South Project



Project Overall of Petroleum Development in Greater Bongkot Area

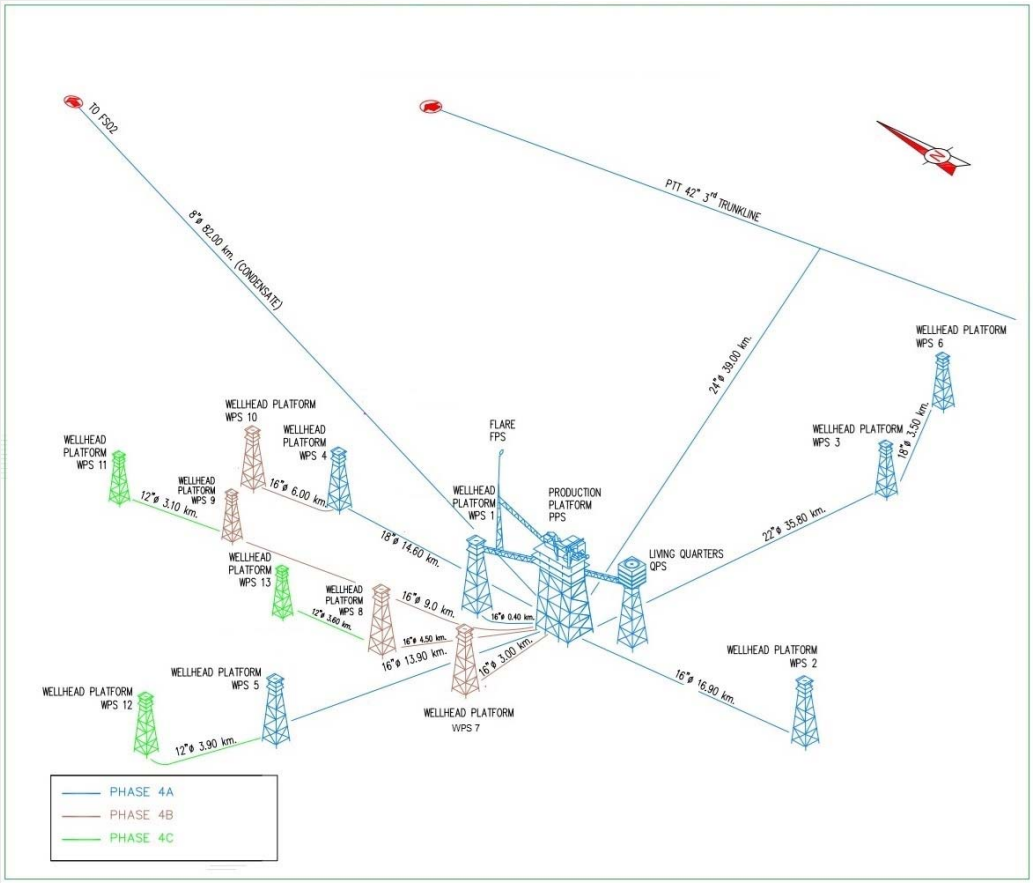
- Obtained concession in area B15 B16 and B17 (named Greater Bonkot) in 1968
- Greater Bongkot consists of
  - Greater Bongkot North
  - Greater Bongkot South (This project is a part of Greater Bongkot South)
- Greater Bongkot South officially started production since 2010 (EIA approved in 2007)





Existing Facilities of Greater Bongkot South

- Processing Platform South – PPS
- Living Quarter Platform –QPS
- 13 Wellhead Platforms
- Flare Platform South – FPS
- Natural gas and liquefied natural gas pipelines





Existing Facilities of Greater Bongkot South Phase II

Project facility

Existing facility

Wellhead platforms
(15 WHP)
(WPS14 – WPS28)

Subsea pipeline

Petroleum

WHP Phase I
(WPS1-WPS13)

Petroleum

PPS

Natural gas

PTT gas pipeline

Liquified natural gas

FSO2

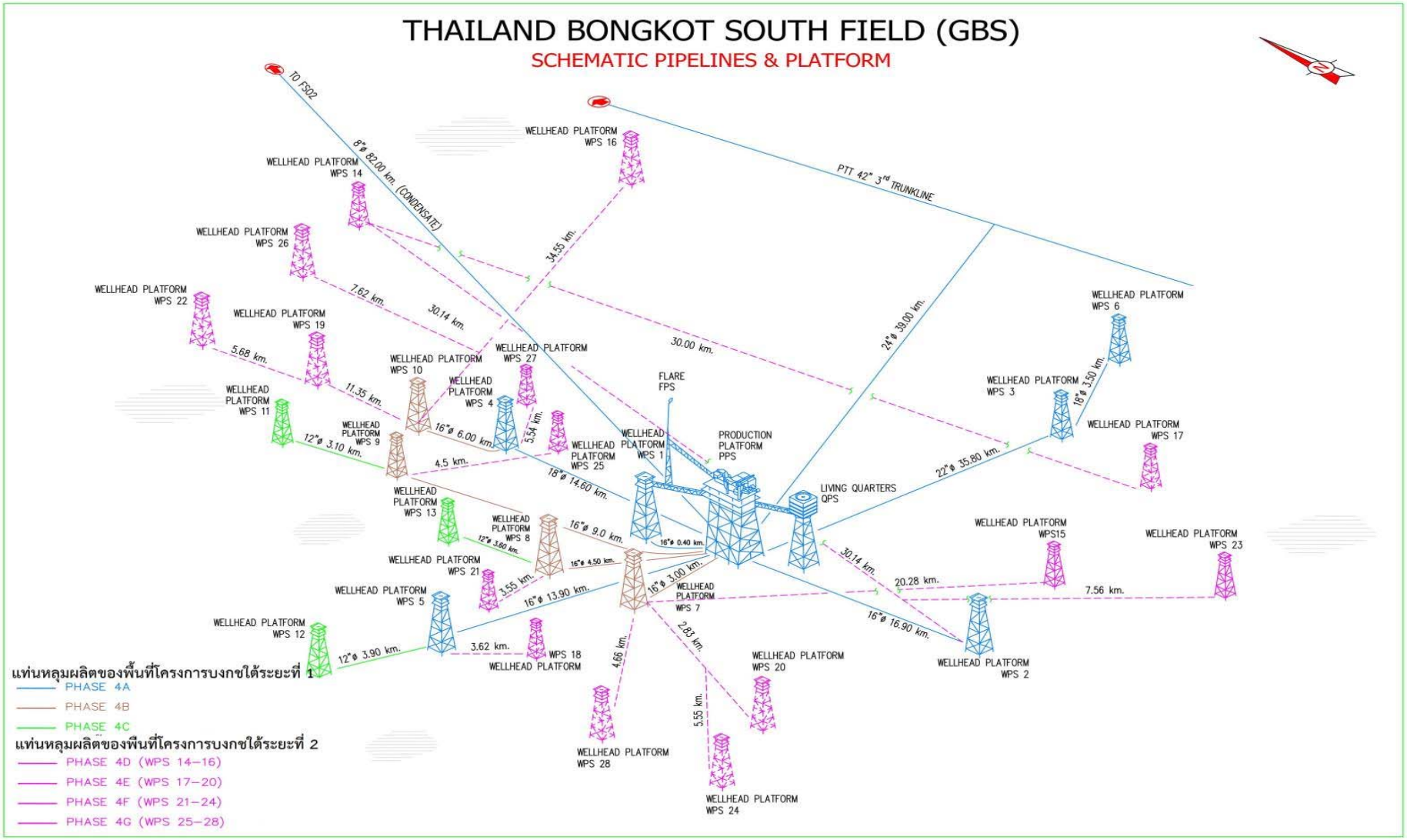
(installed in Greater Bongkot North area)

Produced water

Re-inject to disposal well



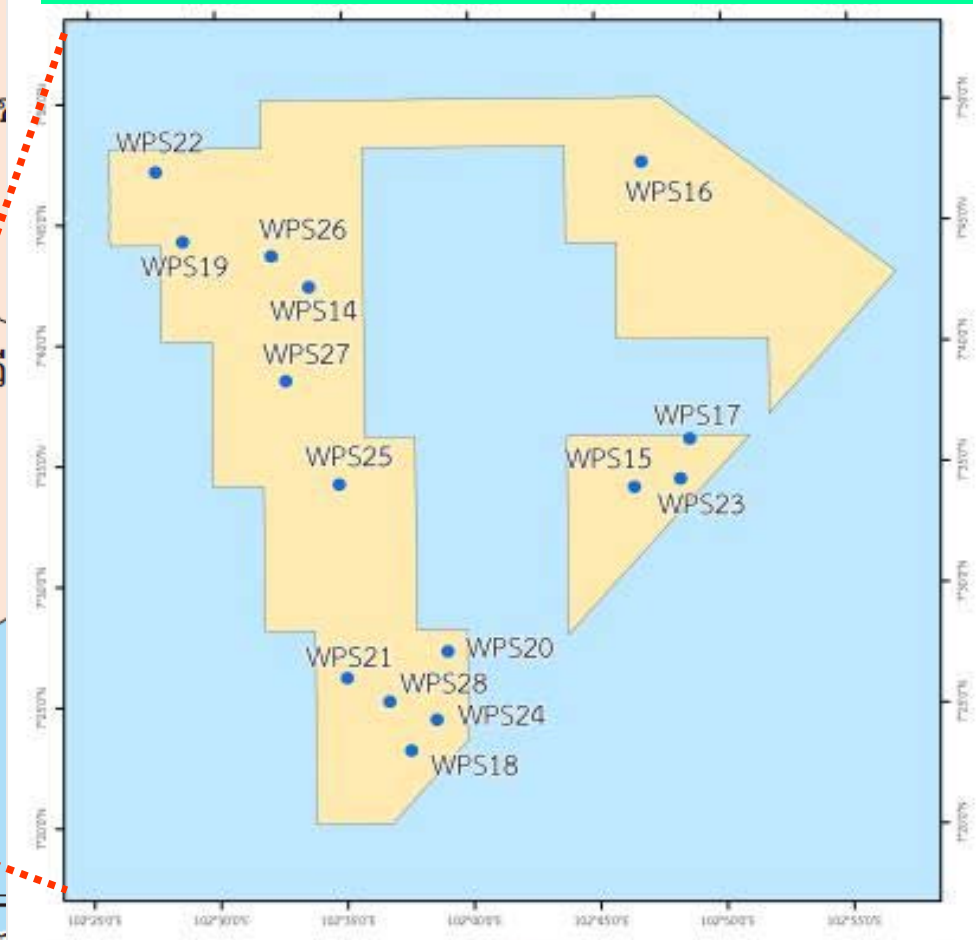
Pipelines and Platforms of Greater Bongkot South





Project Location

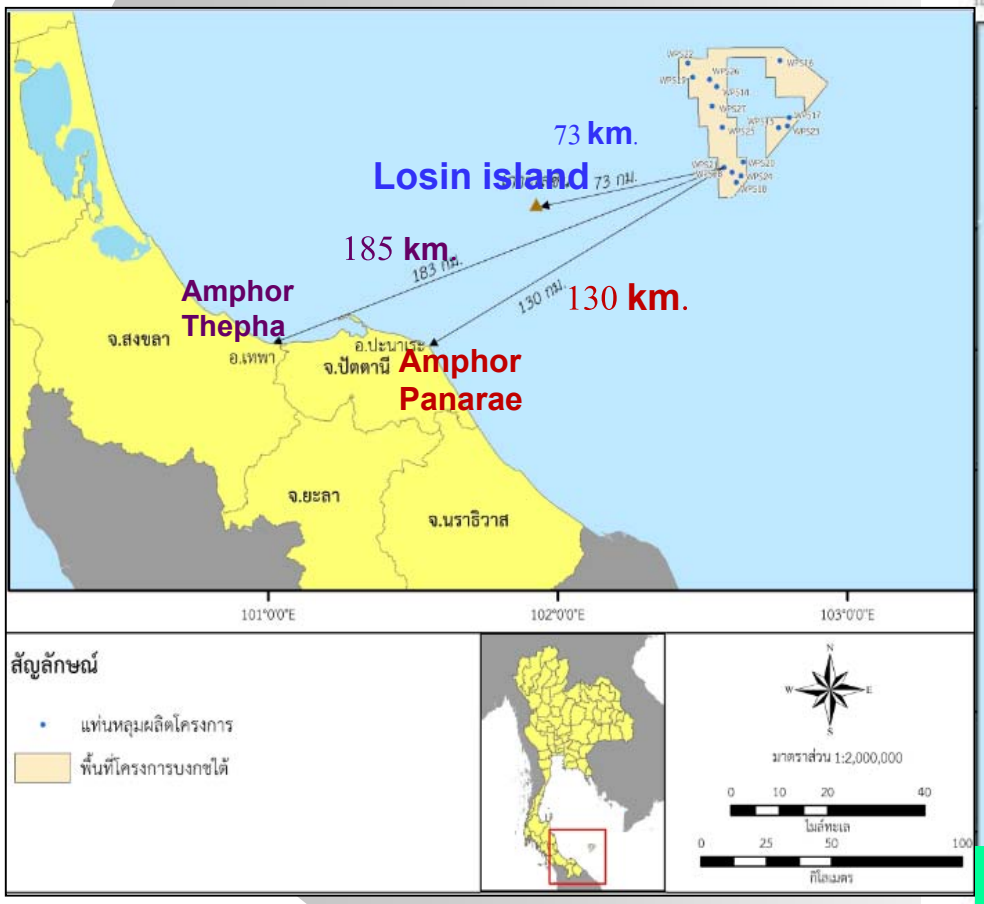
Greater Bongkot South Project

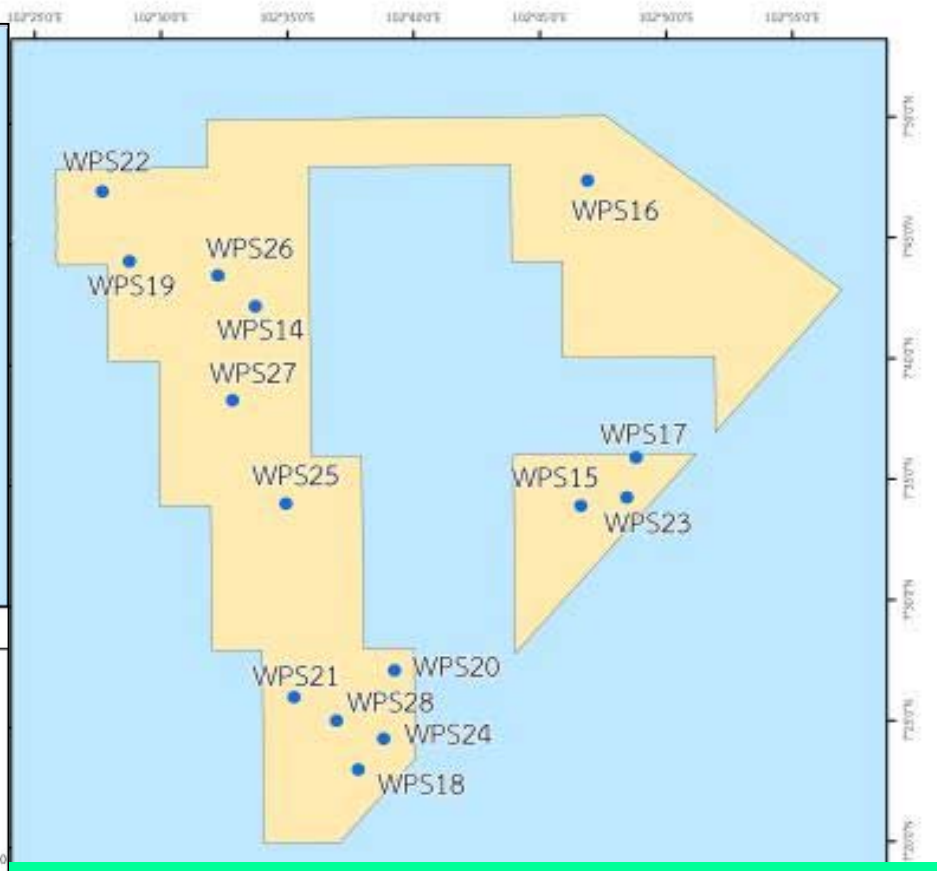


15 Wellhead Platforms



Location and component of Greater bongkot South Phase II





WHP to be installed of 15 WHPs



Project activity

1. Preparation and installation phase
2. Drilling phase
3. Production phase
4. Plug and abandonment phase



Project activity

1. Preparation and installation phase (Platform Structure)

Platform structure assembled at onshore

1

Platform structure transported to designated location

2

Installation of platform jacket

3

Example of installed platform

5

Installation of platform top side

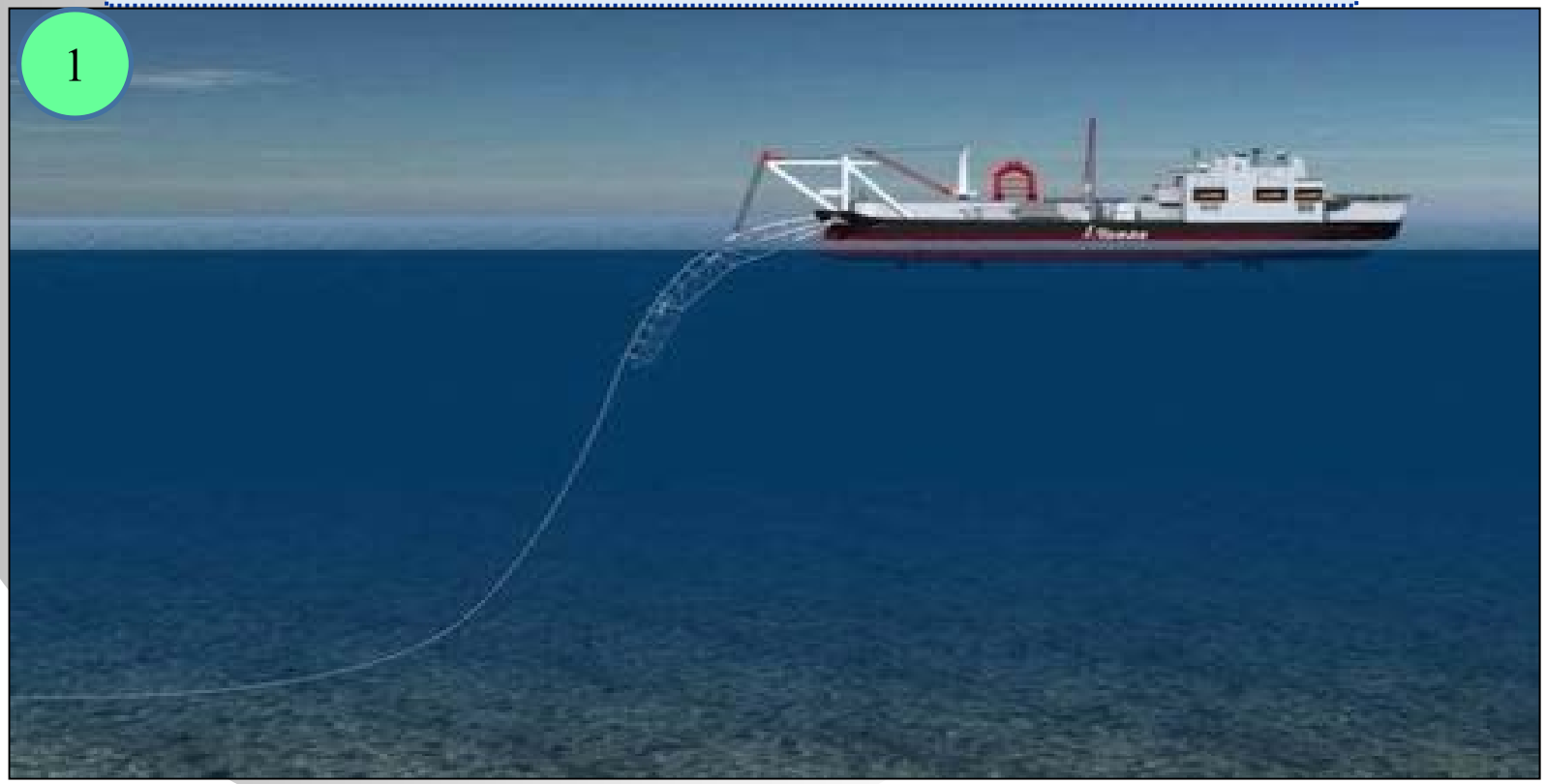
4



Project activity

1. Preparation and installation phase (Subsea pipeline)

Subsea pipeline installation – By vessel





2. Drilling phase

2.1 Rig

Tender rig

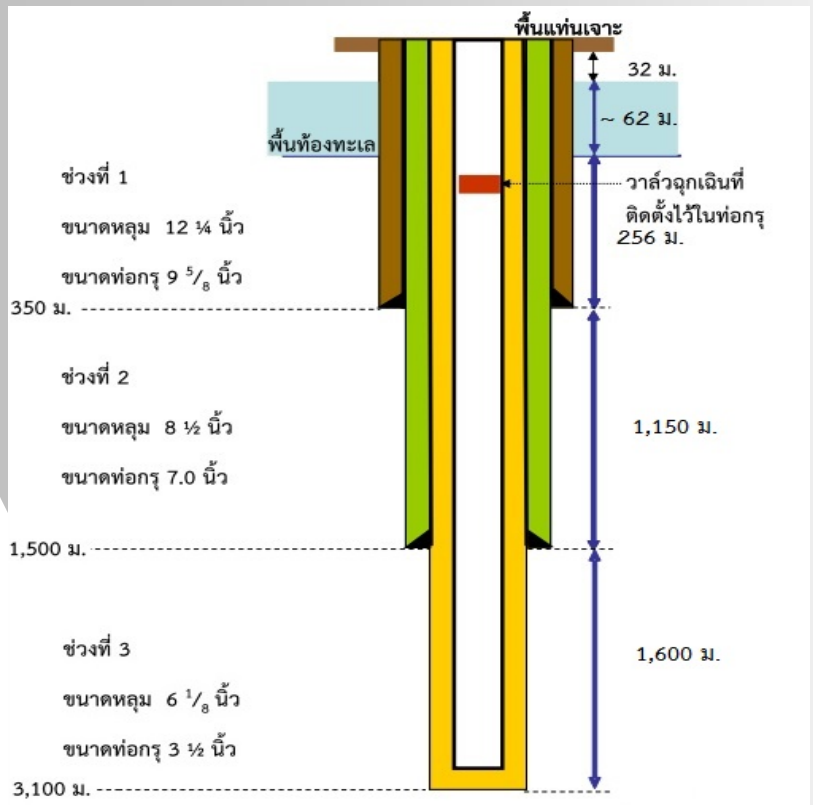
Jack-up rig



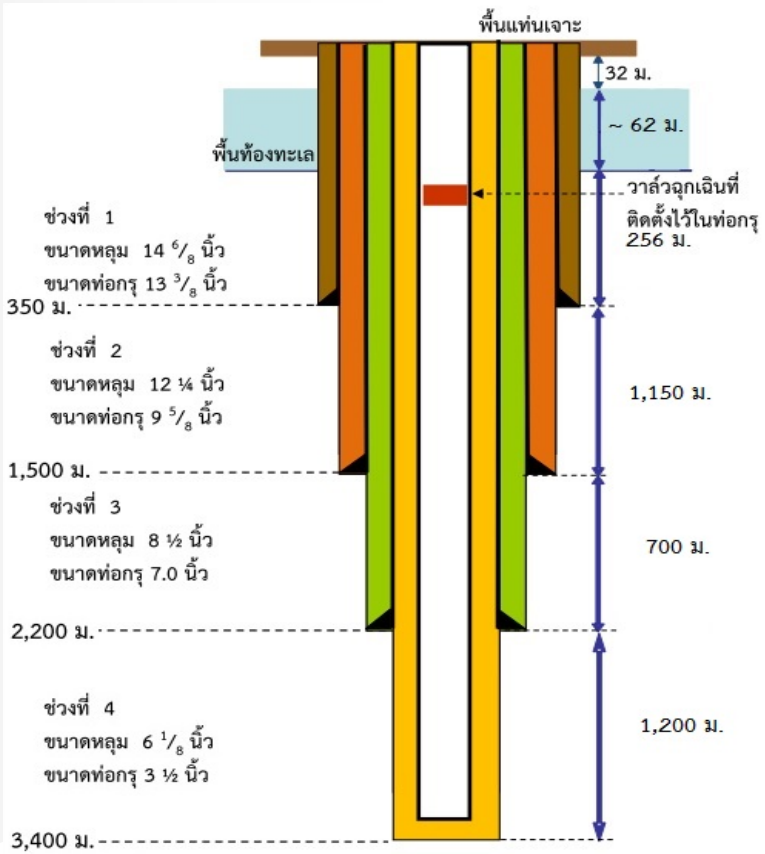
2. Drilling phase

2.2 Drilling well design

3 strings type



4 strings type





2. Drilling phase

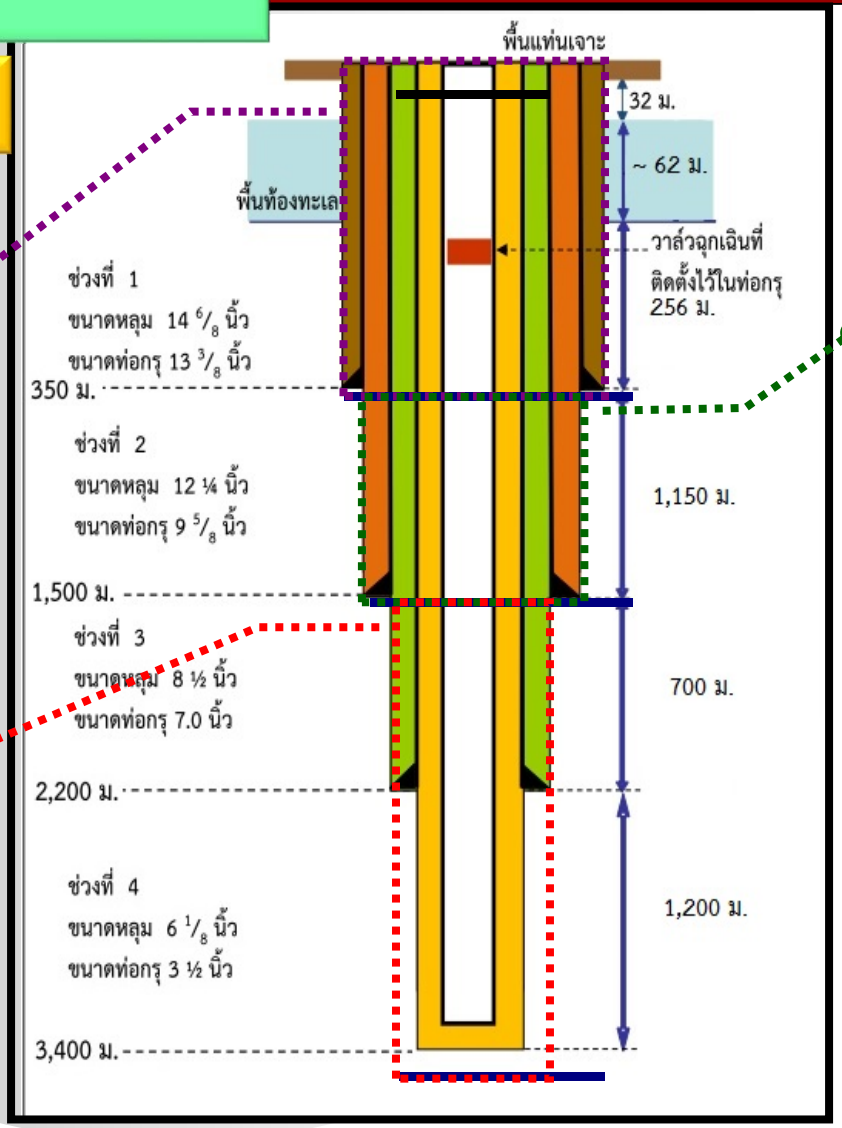
2.3 Drilling Fluid

- **Upper section** (section 1)

  Use seawater as drilling fluid

- **Medium and lower section** (Section 3 and 4)

  Use synthetic based mud (SBM) as drilling fluid



- **Medium section**

  (Section 2)

  Use seawater and water based mud (WBM) as drilling fluid

15



2. Drilling phase

2.4 Seismic survey

- Collect characteristics of rock bed such as electrical property, porosity, etc.
- Verify fuild type stored in rock bed
- Spend 1 day/well

2.5 Production well preparation

- Well completion
- Perforating
- Production well testing
- Spend 1.5 days/well



Project activity

3. Production phase

Examples of existing facilities of GBS



PTTEP

3. Production phase

Project facility

Existing facility

Wellhead platforms
(15 WHP)
(WPS14 – WPS28)

Subsea pipeline

Petroleum

Petroleum

WHP Phase I
(WPS1-WPS13)

Produced water

Re-inject to disposal well

Natural gas

PPS

PTT gas pipeline

Liquified natural gas

FSO2

(installed in Greater Bongkot North area)



Project activity

4. Plug and abandonment phase

With reference to Petroleum Act (B.E. 2514), PTTEP will propose plug and abandonment plan to Department of Mineral Fuel for approval before starting the activity



Environmental Impact Assessment, Mitigation and Monitoring Measures



Seawater quality, seabed sediment and marine ecosystem impact assessment

Waste from vessel, rig and wellhead platform

- Wastewater and sewage from domestic purpose
- Oily wastewater, e.g. drainage from vessel deck, bilge water, etc.

Water from pipeline hydro-testing

- Water used for hydro-testing comprises of seawater, oxygen scarvenger, microbial inhibitor (Hydrosure O-3670R) to prevent pipe corrosion , and Fluorescent LT Dye
- Having hazard level to environment in GOLD Level (the lowest toxicity level) following to OCNS Group classification

➢ Record type and amount of chemicals used for hydro-testing

Key mitigation measure

➢ Rigs and vessels having volume of over than 400 gross tonnages have to install Oil Filter Equipment with reference to MARPOL Convention 73/78 and Vessel Inspection Requirement (Issue No. 34) B.E. 2551. This is to treat and limit oil concentration in bilge water of less than 15 ppm before releasing to the sea

➢ Verify equipment and oil & chemical spill/leak in working area, vessel deck and rig to prevent oil and chemical contamination to the sea when raining

➢ Verify contaminated wastewater containment to be in good condition to prevent oil and chemical contamination to the environment

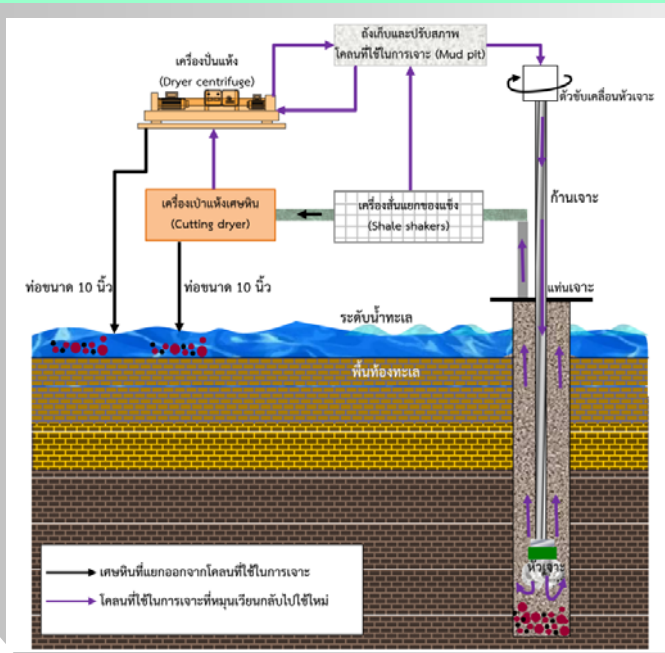
➢ Follow the waste management mitigation



Seawater quality, seabed sediment and marine ecosystem impact assessment

Impact from drilling mud and cutting

- Use environmental friendly mud and chemical and operate drilling operation in close system by separating drilling mud from cutting and circulating it for reuse, then, discharge the cutting to the sea



Impact from produced water

- Produced water will be collected to re-inject into depleted well and no produced water discharged to the sea

Key mitigation measure

- Use slim hole drilling technique to reduce mud volume used
- Limit oil on cutting (the key constituent of SBM) not exceeding 12.5% by weight before discharging to the sea
- Control cutting discharge level at 3 meters from sea surface
- Verify cutting characteristics to confirm if it is hazardous waste by testing Total Threshold Limit Concentration (TTLC) and Soluble Threshold Limit Concentration (STLC) (refer to Notification of Ministry of Industry on Waste Disposal BE 2548)



Occupational health and personal safety impact assessment

Potential impacts from diseases from work and accidents at work may be generated by inappropriate working environment and working postures. Accidents at work may be caused by unsafe working environment and unsafe act of employees

Key mitigation measure

- Provide appropriate working condition e.g. Sufficient lighting, ventilation.
- Provide appropriate and sufficient PPE according to the type of work and provide warning label for PPE use.
- Provide annual health check-up about hearing for offshore personal.
- Implement HSE procedures and preventive measures i.e. equipment safety procedures and permit to work procedures etc.
- Provide first aid for affected workers who loss of consciousness caused by heat exposure while working in hot workplace.
- Prepare patient or injured person evacuation plan in case of emergency.



Hazard from petroleum spill impact assessment (Blowout event)

Potential blowout during production well drilling and spill from separator during production testing and spill from subsea pipeline causing harm to personnel and damages in equipment and structure (rig, WP and subsea pipeline)

(Blowout Preventer, BOP)

Key mitigation measure

- Conduct a shallow gas survey in the rig installation area and drill production Monitor downhole pressure and mud circulated throughout drilling.
- Select rig installed with blowout preventer (BOP), monitor BOP effectiveness and conduct change spare part appropriately for use regularly. Monitoring and maintenance shall be made before each well drilling or BOP is used more than 21 days.
- Implement blowout response plan and provide support for personnel in evacuation, medical support and prevention of damages in production wells and drilling rigs.
- Prepare oil spill response equipment to respond with oil spill tier 1 at the offshore operational base and onshore support base. Equipment shall be maintained in a good condition, ready for use.
- Implement oil spill response plan, coordinate and ask for assistance from relevant agencies in case of petroleum spill tier 2 or 3.