

Basic Engineering Study for Aung Sinkha Development Project Phase 1A

SPECIFICATION FOR CATHODIC PROTECTION SYSTEM INSTALLATION

	PTT Exploration and Production Public Company Limited Aung Sinkha Development Project Phase 1A Basic Engineering
☒	1. APPROVED
☐	2. APPROVED with comments (Proceed to IFB)
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 PTTEP	PTTEP INTERNATIONAL LIMITED	 JST
	Basic Engineering Study for Aung Sinkha Development Project Phase 1A	
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1. INTRODUCTION

1.1 Project Overview

PTTEP International Limited (PTTEPI) intends to develop and produce hydrocarbon from the offshore Block M3 named Aung Sinkha (ASK) field. The project is under Production Sharing Contract (PSC) with Myanmar Oil & Gas Enterprise (MOGE) signed on 7th August 2004 while the PSC effective date was on 1st November 2004.

PTTEPI as an Operator had performed 2,842 line-km of 2D seismic, 619 km² of 3D seismic, and drilled 11 Exploration and Appraisal wells. After successful exploration and appraisal drilling campaigns in 2015, PTTEPI completed the ASK Field Development Plan and submitted it to MOGE for approval. MOGE approved ASK Field Development Plan in April 2021.

The ASK field is located offshore in the Gulf of Moattama, Myanmar, as illustrated in Figure 1-1. The field is located approximately 70 km from Land Fall Point (LFP) at Daw Nyein village and 200 km south-west of Yangon with a water depth range of 15 - 25 meters.

The feed gas will be transported from two (2) offshore wellhead platforms through an offshore export pipeline to ASK Onshore Processing Facilities (APF) located in Daw Nyein village for processing. The sales gas after processing will be exported to the tie-in point at Gas Receiving Station no. 2 (GRS#2), of Domestic Gas to Power Pipeline Development Project, nearby the APF. The condensate will be kept in onshore storage tanks before loading, transporting/ offloading to customers. The design of the surface facilities will be based on a Contractual Daily Capacity (CDC) of 60 MMscfd with provision for future expansion to 100 MMscfd. The gas production is planned to start up by Q4 of 2025.

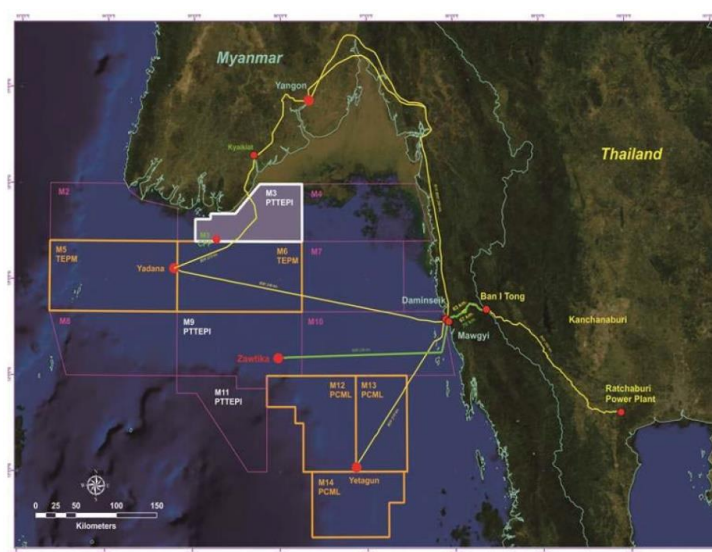


Figure 1-1: Block M3 – Aung Sinkha Field, Offshore Myanmar

The development of Phase 1A consists of the following facilities, as illustrated in Figure 2.0.

- 2 Wellhead Platforms (WPA-1 and WPA-2)
- 1 Intra-field pipeline which links between WPA-1 and WPA-2
- 1 Multiphase export pipeline to transport combined fluid of WPA-1 and WPA-2 to ASK Onshore Processing Facilities (APF)
- ASK Onshore Processing Facilities (APF)
- Onshore pipelines from APF to Gas Receiving Station#2 (GRS#2)
- Onshore infrastructure i.e. condensate offtake facilities, accommodation, Personal Material Transfer Facilities, telecommunication system, roads, etc.
- APL01 Onshore pipeline from landfall to APF

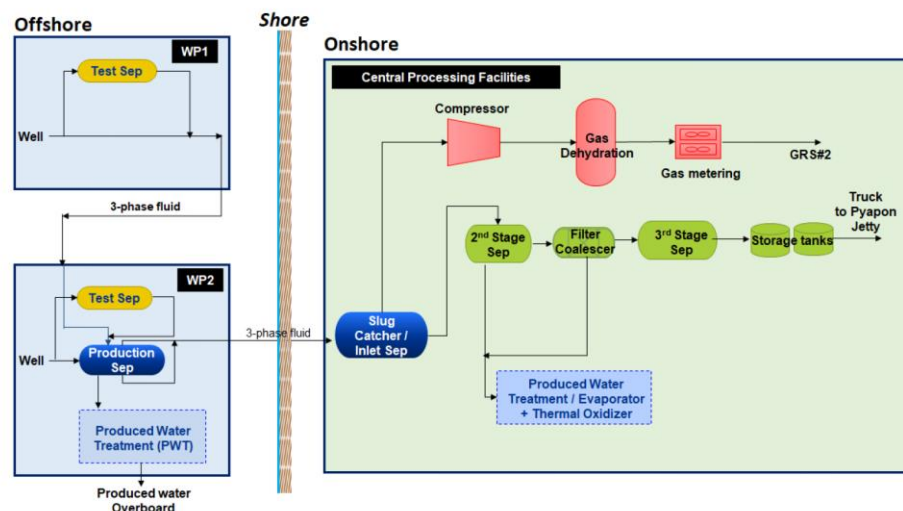


Figure 1-2: Field Block Flow Diagram

1.2 Abbreviation

3LPE	Three layer polyethylene
3LPP	Three layer polypropylene
CP	Cathodic Protection
DC	Direct Current
ERP	Electrical resistance probe
FBE	Fusion bonded epoxy
IC	Impressed current
T/R	Transformer rectifier

1.3 The Parties Involved

COMPANY	PTTEP International Limited
CONTRACTOR	For the purposes of this document, CONTRACTOR shall mean any person who has entered into a formal written contract with the COMPANY for the performance of work and or services for and or in connection with the COMPANY for and or in connection with ASK Development Project, or any part thereof.
SUBCONTRACTOR	For the purposes of this document, SUBCONTRACTOR shall mean any person to whom the performance of any part of the WORK is subcontracted including subcontractors of any tier.
SUPPLIER or VENDOR	For the purposes of this document, SUPPLIER or VENDOR shall mean a supplier of any of; skid mounted assembly, packaged equipment and associated items, itemized (tagged) materials and equipment, linepipe and associated materials, non-itemized (bulk) materials and all other materials and things, for use in the ASK Development Project or for handover to the COMPANY. The term VENDOR shall include vendors of any tier.

2. GENERAL INFORMATION

2.1 Purpose of Document

This specification defines specification for cathodic protection system installation in Basic Engineering Study for Aung Sinkha Development Project Phase 1A. All pipelines are operated and in “Severe Sour Service” condition.

Cathodic protection, coatings, supply of flanges, fittings and additional requirements for the supply of bends and other items pertaining to subsea pipeline systems are presented in separate specifications.

2.2 Language

The English Language shall be used in all project communications, reports, correspondences, drawings, specifications, calculations, and invoices etc., submitted to COMPANY. All drawings and documents shall be annotated in S.I. units with other units in parenthesis, where applicable.

In this document, the words should and shall have the following meanings:

Approval	The authorization in writing given by the COMPANY to the Contractor on a procedure or to proceed with the performance of a specific part of the work without releasing in any way the Contractor from any of his obligations to conform with the technical specifications, requisitions, etc. The words “Approve”, “Approved” and “Approval” shall be construed accordingly
Purchase Order	The order issued by Purchaser consisting Terms and Conditions and attachments thereto including but not limited to Data Sheets and Drawings, Specifications including referenced documentation therein, and all other documents and attachments.
Shall	Used to indicate that a provision is mandatory.
Should	Used to indicate that a provision is not mandatory but is recommended as good practice.
May	Used to indicate that a provision is optional
PPS	Designates Project Particular Specification detailing the additional tests and requirements or the possible modifications to the present specification, based on the particular design conditions or the local legislation of the project.

2.3 Reference Document

This specification defined as the Project Particular Specification (PPS) shall be read jointly with the following COMPANY’s general specification:

MM-ASK-1A-APF-COR-SPE-0001	Specification for DC Decouplers and Over Voltage Protector
MM-ASK-1A-APF-COR-SPE-0002	Specification for Insulating Flange Kits and Monolithic Isolation Joint
MM-ASK-1A-APF-COR-SPE-0005	Specification for Onshore Cathodic Protection
MM-ASK-1A-APF-COR-SPE-0006	Specification for Soil Resistivity Survey & Testing
MM-ASK-1A-APF-COR-SPE-0007	Specification for Internal Corrosion Monitoring
MM-ASK-1A-APF-COR-PHI-0001	Cathodic Protection Design Philosophy

MM-ASK-1A-APF-COR-RPT-0002	Cathodic Protection System Conceptual Design Report
MM-ASK-1A-APF-COR-MTO-0001	Provisional Material Take Off for Cathodic Protection System
MM-ASK-1A-APF-COR-SPE-0003	Material Specification for Cathodic Protection System
MM-ASK-1A-APF-COR-DTS-0001	Datasheet for Cathodic Protection System DC Decoupler and Over Voltage Protector
MM-ASK-1A-APF-COR-DTS-0002	Datasheet for Cathodic Protection System Pipeline Insulation Joints and Gasket Kits
MM-ASK-1A-APF-COR-TYP-0001	Typical Installation Details for Cathodic Protection System Cover Sheet
MM-ASK-1A-APF-COR-TYP-0002	Typical Installation Details for Cathodic Protection System Index
MM-ASK-1A-APF-COR-TYP-0003	Typical Exothermic Welding Installation Details
MM-ASK-1A-APF-COR-TYP-0004	Typical Test Station Installation Details (Type A)
MM-ASK-1A-APF-COR-TYP-0005	Typical Test Station Installation Details (Type F)
MM-ASK-1A-APF-COR-TYP-0006	Typical Test Station Installation Details (Type D)
MM-ASK-1A-APF-COR-TYP-0007	Typical Test Station Installation Details (Type CR for Foreign Pipeline)
MM-ASK-1A-APF-COR-TYP-0008	Typical Test Station Installation Details (Type E)
MM-ASK-1A-APF-COR-TYP-0009	Typical Test Post Guard Rail
MM-ASK-1A-APF-COR-TYP-0010	Typical Sacrificial Anode Installation Details (Type AM)
MM-ASK-1A-APF-COR-TYP-0011	Typical DC Decoupler Installation Details
MM-ASK-1A-APF-COR-TYP-0012	Typical Test Station and Bond Box Details
MM-ASK-1A-APF-COR-SCH-0001	CP/AC Schematic Diagram and Test Facility Schedule

The present PPS provides confirmations and/or modifications and/or additional requirements to the COMPANY's general specification. The matters covered in the general specification, which are not mentioned under this specification, shall apply in full.

2.4 Regulation, Standards and Code of Practice

The Aung Sinkha Development Project shall be designed primarily in accordance with PTTEP's general specifications (PEGSs) and corporate specifications, as appropriate, and the applicable Myanmar legislative requirements. Where such standards are not applicable, accepted international codes/industry good engineering practices will be adopted. Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published on the effective date of a contract.

Any deviation from the standard shall be documented for derogation and proper permission from PTTEP in writing.

The order of precedence of the applicable documents shall be:

- 1) Government Laws, Rules and Regulations
- 2) Purchase Order/ Service Order/ Contract Documents
- 3) Data Sheet, Drawings and Project Particular Specification (PPS)
- 4) PTTEP Engineering General Specification (PEGS)
- 5) Other COMPANY specifications, standards, and documents
- 6) International Codes and Standards

In case of conflicts/contradictions between the various codes, standards, regulations and specifications, unless otherwise agreed or decided by COMPANY, it is understood that the more stringent requirement shall apply.

Exceptions to or deviations from this specification are not permitted unless they have been raised during the bidding stage and previously accepted in writing by the COMPANY. For this purpose, requests for substitutions or changes of any kind shall be completed with all pertinent information required for COMPANY assessment. COMPANY's approval, nevertheless, will not, in any way, relieve the SUPPLIER's responsibility to meet the requirements of the industry Codes and Standards referred to and amended herein, in the event of a conflict.

2.5 CONTRACTOR/ SUPPLIER's Responsibility

All work shall be carried out in compliance with this specification, reference documents, Codes and Standards, and Specifications listed unless otherwise stated. The SUPPLIER's submissions should provide sufficient data to allow the equipment to be evaluated against the total life and field costs estimated to be incurred. In this respect, equipment capital cost,

weight, size, cost of spares, utility and power requirements, maintenance, reliability and production downtime costs may be considered.

SUPPLIER is required to have relevant proven prior experience in the fabrication and testing of line pipes, which is to be supplied.

3. AMENDMENTS/ SUPPLEMENTS TO 10008-STD-6-COR-023-R00

This section details the additions, amendments, and deletions to Company's general specification for Longitudinally Submerged Arc Welded (LSAW) Pipes for Carbon Steel Pipelines (Mild, Intermediate and Severe Sour Service), Document No. 10008-STD-6-COR-023-R00 based on the requirements of this project. The paragraphs hereinafter have the same numbers as the relevant paragraphs in the COMPANY's general specification.

Paragraph 7.3.1: Surface to be Protected

[Amend]

The minimum current density for three-layer polyethylene (3LPE) coated pipeline shall not be less than 0.01 mA/m² in non-AC mitigation areas and 0.03 mA/m² for AC mitigation areas where zinc ribbon/grounding is installed.

For CP design calculations, the maximum coating resistance shall be 33,333.00 Ω.m² for 3LPE and 10,000 Ω.m² FBE.

Paragraph 7.5.5: Sacrificial Anodes

[Amend]

The sacrificial magnesium anodes may be used bare where soil resistivity is below 10 Ω.m. Magnesium anodes shall be supplied preconditioned in a non-hydrated regulating compound ("backfill"). For anode characteristics refer to 10008-STD-6-COR-025, PEGS-12059COR-025.

The backfill used with magnesium anode shall comply with the following composition requirements:

[Amend Bullet Point]

- 75% gypsum (CaSO₄ – 2H₂O) Magnesium
- 20% bentonite Magnesium

[Add]

The backfill used with Zinc anode shall comply with the following composition requirements:

[Add Bullet Point]

- 50% Gypsum ($\text{CaSO}_4 - 2\text{H}_2\text{O}$) Zinc
- 50% Bentonite Zinc

END