

Basic Engineering Study for Aung Sinkha Development Project Phase 1A

PIPELINE CLASS LOCATION VERIFICATION REPORT

	PTT Exploration and Production Public Company Limited Aung Sinkha Development Project Phase 1A Basic Engineering
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	Basic Engineering Study for Aung Sinkha Development Project Phase 1A		
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CONTENTS

1. INTRODUCTION	3
1.1 Project Overview	3
1.2 Purpose of Document	5
1.3 Definitions	5
1.4 Abbreviation	5
2. SUMMARY, AND CONCLUSIONS	6
2.1 Summary.....	6
2.2 Conclusions.....	6
3. ONSHORE PIPELINE DATA	6
4. METHODOLOGY	7
4.1 Location Classification Study	7
4.2 Location Classification Criteria.....	7
5. RESULTS	8
6. REFERENCES	8

APPENDICES

APPENDIX A: BATTERY LIMITS FOR PIPELINES	9
APPENDIX B: PIPELINE ROUTE MARK UPS / Details of dwellings	10

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 received MOGE approval for ASK Field Development Plan in April 2021.

The ASK field is located at offshore in the Gulf of Moattama, Myanmar, as illustrated in Figure 1.0. The field is located approximately 70 km from Land Fall Point (LFP) at Daw Nyein village and 200 km south - west of Yangon with water dept range 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 ASK Metering Station (AMS) which is located nearby the MOGE Pipeline Center Station at Daw Nyein Village, via gas export pipeline 2.5 km from APF and tied-in to the existing MOGE gas pipeline network. The condensate will be stabilized and stored at APF before being transported via pipeline to ASK Condensate Offloading and Personnel Transfer Facilities (ACP) at Kyon Kaw river and offloaded to customers via tankers barge.

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.

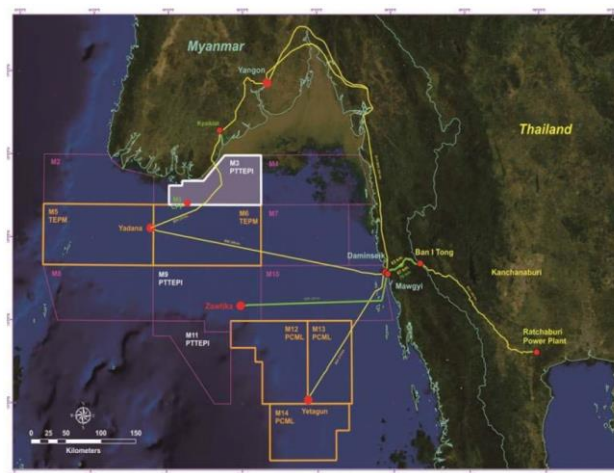


Figure 1-1: Block M3 – Aung Sinkha Field, Offshore Myanmar

The development of Phase 1A consists of the following facilities, as illustrated in Figure 1-2.

- Two (2) - Wellhead Platforms (WPA01 and WPA02) with jacket weight of 1,200 MT approx. and topside weight of 1,000 - 1,400 MT approx.
- One (1) - 12" x 6 km approx. Intra-field Pipeline which links between WPA01 and WPA02
- One (1) – 20" x 90 km approx. Multiphase Offshore Export Pipeline to transport combined fluid of WPA01 and WPA02 to Daw Nyein Land Fall Point
- APL01 One (1) – 20" x 2.5 km approx. Multiphase Onshore Export Pipeline to transport combined fluid from Daw Nyein Land Fall Point to ASK Onshore Processing Facilities (APF)
- ASK Onshore Block Valve Station No.1 (ABV01)
- ASK Onshore Processing Facilities (APF)
- APL02 One (1) – 8" x 18 km approx. Onshore Condensate Export Pipeline from APF to ACP
- APL03 One (1) – 12" x 1.58 km approx. Onshore Export Pipeline from APF to MOGE PLC at Daw Nyein Village
- ASK Metering Station No.1 (AMS01)
- ASK Condensate Offloading and Personnel Transfer Facilities (ACP) i.e., Condensate Offtake Facilities, Accommodation, Personnel and Material Transfer Facilities, Telecommunication System, road, etc.

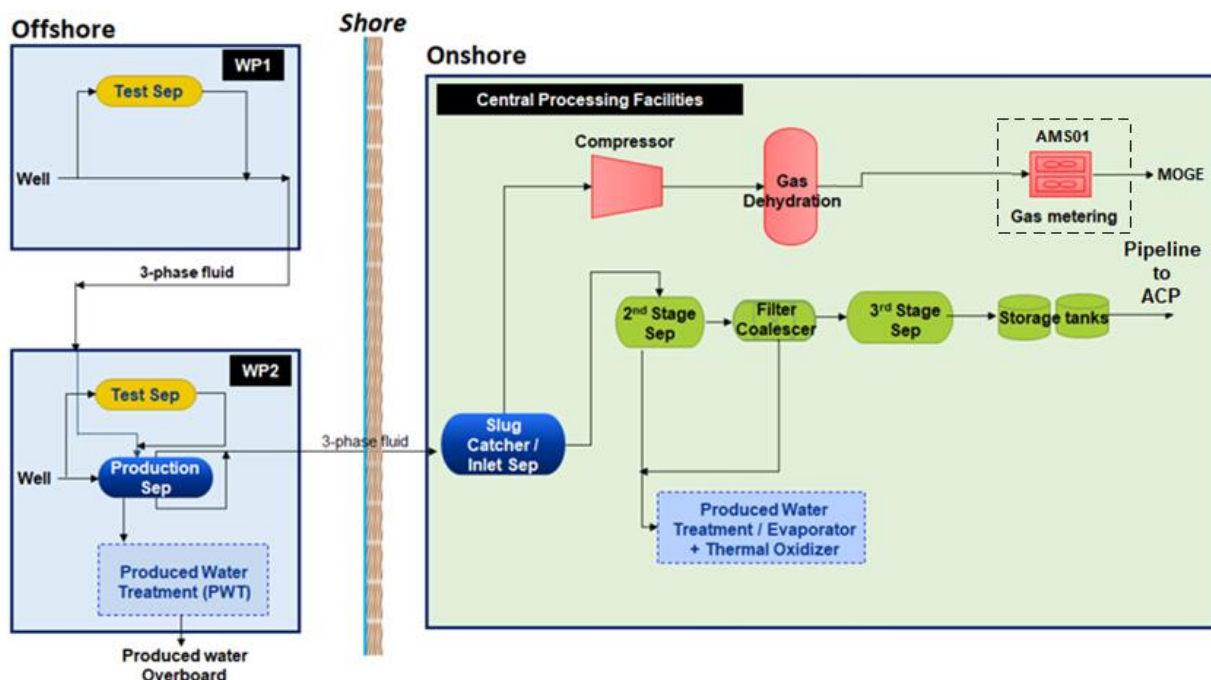


Figure 1-2: Field Block Flow Diagram

1.2 Purpose of Document

The purpose of this document is to present a desktop study and the surveyed data to determine class location along the 12" ASK Onshore Gas Pipeline Pipeline from APF to AMS01 stations in Daw Nyein in the Provision of Basic Engineering for Pipelines and Onshore Facilities for Aung Sinkha Development Project Phase 1A.

1.3 Definitions

The following definitions shall apply to this document:

COMPANY	PTTEP International Limited
PROJECT	Basic Engineering Study for Aung Sinkha Development Project Phase 1A

1.4 Abbreviation

3LPE	Three Layer Polyethylene
AMS	ASK Onshore Metering Station
APF	ASK Onshore Processing Facilities
API	American Petroleum Institute
ASK	Aung Sinkha Development Project
ASME	American Society of Mechanical Engineers
CDC	Contractual Daily Capacity
CFR	Code of Federal Regulations
FEED	Front End Engineering Design
GRS	Gas Receiving Station
KP	Pipeline Kilometer Post
LFP	Land Fall Point
MOGE	Myanmar Oil & Gas Enterprise
WPA	Wellhead Platform

2. SUMMARY, AND CONCLUSIONS

2.1 Summary

To verify the assigned class location value, a desktop study using Google Earth aerial maps was conducted to quantify the number and type of buildings along the pipeline route. For the areas where types of the buildings could not be clearly identified by aerial map, site survey might be conducted to determine the type of buildings if it seems necessary.

Based on the collected information, the sliding mile concept was used to determine class location of each section of the pipeline. The methodology of this approach is described in Section 4. Detailed results of class location studies are presented in Section 5.

2.2 Conclusions

Based on the pipeline class location study performed in this project, it can be concluded that class location of onshore gas pipeline from APF to AMS01 is class 3.

Block valves spacing was not considered due to the below reasons;

- Pipeline overall length is 1.58km, this is well below the Class 4 requirement to require an intermediate station.
- No major waterway or geohazard crossings to require intermediate isolation.

3. ONSHORE PIPELINE DATA

Onshore pipeline data are presented in Table 3-1 [1].

Table 3-1: Pipeline Design Data [1]

Description	Unit	Value
Service	-	Onshore Gas Pipeline (Sweet Service)
Originating from	-	APF
Terminating at	-	AMS01 / MOGE PLC Station
Pipeline Size	mm (Inch)	323.9 (12.75)
Approximate Length	km	1.58
Pipeline Status	-	Buried
Design Life	Years	20
Corrosion Allowance	mm	3
Anti-corrosion Coating & Thickness	-	3LPE / 3.5 mm

4. METHODOLOGY

4.1 Location Classification Study

The Class Location along the pipeline route will be determined by applying the criteria presented in this section. It will be based on “Class Location Unit”/ “Sliding Mile” concepts. In case of COMPANY / Regulatory approval, “clustering” of buildings will be taken into account.

- A class location unit with a length of 1-mile (1.6 km) that extends 220 yards (200 m) on either side of the centerline of the pipeline will be considered. Class location for this unit will be determined based on the criteria established in Section 5.2 below.
- The unit will be shifted along the pipeline route with 400 m steps, and class location for the new location of the unit will be determined based on Section 5.2 below.
- This process will be continued until end of the pipeline.
- Class Location of each overlapping section equals to highest determined class location.
- Clustering concept has not been considered conservatively.

4.2 Location Classification Criteria

Class location selection criteria will be based on ASME B31.8, Article 840.2 and Article 840.3 definitions summarized in below table.

Table 4-1: Class Location Study Criteria [3]

Class Location	Number of Buildings Intended for Human Occupancy	Description
1	10 or fewer	A Class Location 1 is intended to reflect areas such as wasteland, deserts, mountains, grazing land, farmland, and sparsely populated areas.
2	11 to 45	A Class Location 2 is intended to reflect areas where the degree of population is intermediate between Class Location 1 and Class Location 3, such as fringe areas around cities and towns, industrial areas, ranch or country estates, etc.
3	46 or more	A Class Location 3 is intended to reflect areas such as suburban housing developments, shopping centers, residential areas, industrial areas, and other populated areas not meeting Class Location 4 requirements.
4	-	Class Location 4 includes areas i) where multistory buildings ⁽¹⁾ are prevalent ⁽²⁾ , ii) where traffic is heavy or

Class Location	Number of Buildings Intended for Human Occupancy	Description
		dense⁽³⁾, and iii) where there may be numerous other utilities underground. It should be noted that; - All of the three above conditions (i.e., i to iii in this bullet point) must exist in order to qualify a class location unit as Class Location 4; - As per US CFR 192.5, the length of Class location 4 may be adjusted to end 220 yards (200 meters) from the nearest building with four or more stories above ground. Same definition can be derived from ASME B31.8, Article 840.2.1 (c).

Notes:

1. Multistory means four or more floors aboveground including the first or ground floor. The depth of basements or number of basement floors is immaterial.
2. "Prevalent" means 50% or more of the buildings are four stories or more.
3. "Heavy or dense traffic" is a location where lot of cars are moving very close to each other.
4. Pipelines near places of public assembly or concentrations of people (20 or more), such as temple, school, multiple dwelling unit building, hospital, or recreational area of an organized nature in Class Location 1 or 2 shall meet requirements for Class Location 3.

5. RESULTS

The results of pipeline class locations for onshore gas pipeline from APF to AMS01 route is presented in Table 5-1. Please see Appendices B for class location studies and Google Earth mark ups (year 2023), respectively. At present moment, the area is of Location Class 2 nature. However, **Location Class 3 is selected due to nearby villages and communities are gradually expanding towards this area as a major restaurant and one hospital are in near proximity to the pipeline.**

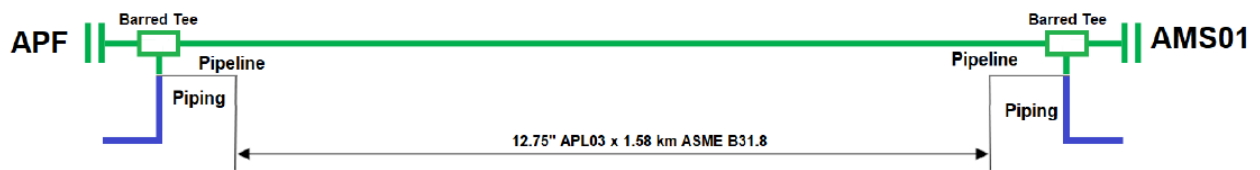
Table 5-1: Summary of Class Location Study of APL03 from APF to AMS01

KP	Class Location	Length (km)	Remark
0.000 – 0.400	2	0.400	APF
0.400 – 0.800	2	0.400	-
0.800 – 1.200	2	0.400	-
1.200 – 1.580	2	0.400	AMS01

6. REFERENCES

- [1] Pipeline Basis of Design and Design Criteria, MM-ASK-1A-APL03-PLR-BOD-0001
- [2] Design and Construction of Onshore Pipeline and Railway, Road & Canal Crossings, 10008-STD-6-PLR-029
- [3] Gas Transmission and Distribution Piping Systems, ASME B31.8

APPENDIX A: BATTERY LIMITS FOR PIPELINES

**Figure A-1: Pipeline System Design Battery Limits****Note:**

1. Scope of this document is APL03.

APPENDIX B: PIPELINE ROUTE MARK UPS / DETAILS OF DWELLINGS



Current dwelling count is 11 houses, however it is noted that expansion is occurring within the restaurant and adjacent areas.

Highlighted areas are ; 1) Daw Nyein Hospital, 2) Major restaurant