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รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม
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ภาคผนวกที่ 9

Maintenance and Inspection Management



PTT Exploration and Production Public Company Limited

S1 Production Operations

Maintenance Guideline

Maintenance and Inspection Management

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28-Mar-13	2	<ul style="list-style-type: none"> Reformatted document Aligned with new PTTEP SSHE MS, ISO14001:2022 and OHSAS18001:2007 requirement Updated organizational indicators from JGO to DSO
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1.0 INTRODUCTION

This document describes more what and how process of maintenance and inspection manage at Sirikit Oil Field (S1) asset. This document cascades down from Maintenance and inspection guideline 13245-GDL-1-S1M-ALL-MMS-001.

2.0 SCOPE

This guideline covers the followings:

- Several sources and formations of the maintenance and inspection strategy by selecting the most appropriate approach for the asset
- Concept of the maintenance and inspection approaches with appropriate options plans and definition of the resources required and the impact on production targets.
- Planning layer cascaded and rolled over to scheduling into execution step.
- Recommended key performance indicators for maintenance and inspections after execution.

3.0 KEY REQUIREMENTS

3.1 WOK FLOW DESCRIPTION

Maintenance and Inspection Management can be described in 4 major stages: Strategy and Approach, Planning & Scheduling, Execution, and Review & Improvement.

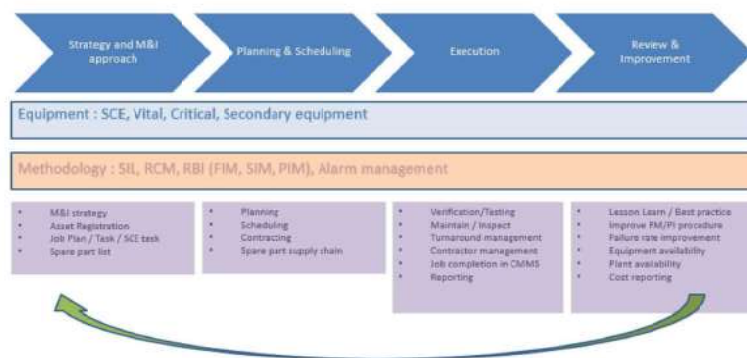


Figure 1 – Maintenance and Inspection Management



4.0 STRATEGY AND APPROACH

Maintenance Approach involves formulating maintenance and inspection strategies that conform to PTTEP objectives, reviewing, confirming, or updating requirements or assumptions.

Refer to high level maintenance and inspection direction well and facilities, the maintenance and inspection requirements are established the following approaches

4.1.1 The 5-Year Key-Activities roadmap

The 5-year key activities roadmap identifies key M&I activities that interrelated among other stakeholders to achieve mutual goals. MRP has been already incorporated.

Having been Integrated with RAI expectations, OMI co-KPI target, Production target, M&I cost, and manning strategy of S1 contributed by M&I, the 5-year key activities roadmap is purposefully used as reference to confirm whether approved budget is still adequate.

The 1st year is considered firm while the following years are changeable to suit business needs. However, maintenance and inspection activities that cause significant facility outage will require more detailed planning and integration into PTTEP Business Plans. The roadmap can be revised in yearly basis by default to ensure key M&I activities are addressed and well reconciled among stakeholders' needs.



Figure 2 – 5-Years key activities roadmap

4.1.2 Maintenance Reference Plan

Maintenance Reference Plan (MRP) is another set of maintenance and inspection tasks look ahead in high level for 5-10 years magnitude of time scale, associated OPEX/CAPEX, implications for the plant and equipment. MRP incorporates all constraints and business requirements underlying with equipment current condition is another main portion of maintenance.

MRP often split apart from typical approach for non-routine M&I activities such as upgrade, obsolescence management, and MOC related with debottlenecking or plant major change.

MRP is based on "Operation Philosophy" and "Maintenance and Inspection Philosophy" and sets the way things will be done according to business direction (FDP), current equipment reliability, integrity, performance, and statutory requirements as key drivers underlying with OEMS framework. MRP provides information needed to implement of Cost, Time, and Resources requirement over a long-term period in budgetary scale; i.e. accuracy could be slipped in certain extent up to 20-30%; the closest to current year will be more precise.

MRP determines what needs to be achieved in the years ahead, typically 10-years ahead with a one-year firm element, a four-year rolling element, and significant elements over the remaining life cycle. MRP can be updated either yearly, or any change based on field development and/or business plan catered for the original MRP.

S1 has recently reviewed its MRP in 2019 due to concession renewal via **12153-GDL-5-MMS-001**, and in 2022 LPG plant operating direction change via **13245-GDL-1-S1M-LKU-MMS-002**. Figure 3 gives one example of MRP deliverables in cost perspective along the life of LPG plant.



Unit: Million USD

Figure 3 – MRP example: case of LPG review in 2022 till EOC.

4.1.3 Risk and Reliability Approach

Proactive approach drives via Criticality of Asset during Register. It is a list of the equipment on which maintenance and inspection activities are required and are maintained in CMMS. The high-level asset hierarchy is also represented in the Chart of Accounts (COA) structure. The asset register forms the common database for Maintenance Management Module, Inspection Management Module, Materials and Procurement Module, and is fully integrated with the Finance Package. Hierarchical structure of Asset is registered in compliance with ISO14224 and is in line with OEMS RAI requirements.

Refer to Reliability and Integrity Framework, a short summary of RAI guides how each group of equipment is managed based on its criticality ranking result.

Different criticality of equipment is treated and managed by different strategies and approaches. Therefore, assessment of asset criticality is the risk-based assessment and is the key process to determine how critical equipment is. The criticality will bring all what and how S1 manage its equipment.

For High criticality rank of asset register i.e. SCE 4 and some selective VITAL 3, Risk and Reliability Maintenance (RRM) tools are recommended approach. These tools are Reliability Centered Maintenance (RCM), Risk Based Inspection (RBI) and Safety Integrity Level Classification and Verification Review (SIL class, SIL ver; also called Instrumented Protective Function or IPF review).

- RCM: Typically well applied to rotating equipment
- RBI: Typically well applied to static equipment
- SIL: Typically well applied to instrumentation, control and safeguarding systems

The intermediate rank of criticality (remaining VITAL 3, and CRITICAL 2), unless otherwise specially required, the framework recommends to approach by Failure Modes and Effect Analysis (FMEA), OEM manual of M&I recommendations, experienced based maintenance strategy from similar kind of equipment specification/functionality.

The lowest rank of criticality; SECONDARY 1, run-to-fail approach is preferred as long as the consequence of failure is less than repair cost.

The selection of the maintenance and inspection strategies is also approached by Quantitative Risk Assessment (QRA) and any Statutory requirements e.g. Gas sale agreement, EIA, local authorities regulations, etc.

RRM which includes but not limited to RCM, RBI, IPF or SIL can be read its methodology in more detail: 10012-GDL-5-MMS-002 for RCM, 10015-PDR-4-PRS-056 RBI, and 10008-GDL-5-INS-005 SIL Verification Guideline

4.1.4 Strategy Implementation and Job Card Development

The right maintenance and inspection options are presented in Maintenance and Inspection Strategy documents. Include appropriate interval or frequency to carry out tasks, it will be M&I strategy: WHAT/WHEN; which could be run-hour or calendar basis.

Applicable options deployed into strategy and approaches:

Applicable M&I Options	Failure behavior	Common Examples
Time-Based Replacement	Wear & Tear with known lifetime or confident MTBF.	Rotating equipment: Gearbox, Belt, bearing, impeller, engine, compressor valves,
Condition-based Maintenance	Random	Complicated system, DCS, control system, Instrument,
Risk-Base Inspection	Wear or Corrosion rate dominated failure or LOPC	Stationary, Vessel, Flowlines, Pipelines
Failure Finding Function Test	Hidden failures	Safeguarding
Precision Based Maintenance	Infant failure Craftmanship and competency related failure	relocation, recommission, conversion, startup, major turnaround

Table 1 – Correlation between M&I Options, Failure Behavior, and common Equipment



From strategy, detailed procedures (Job Cards and/or Task Lists) are developed to provide steps or HOW to execute the maintenance and inspection task with respect to anticipated criteria (QA/QC) Specifications or standards (of pass or fail) required to be revised should be included. Total set of maintenance and inspection strategies and tasks are implemented in CMMS for further deployment and implementation.

5.0 PLANNING AND SCHEDULING

MRP consolidates with M&I strategy embedded in CMMS form the basis of the overall planned maintenance schedule and is used for making strategic decisions on Maintenance Management; and in most cases incorporated with impact of production and business direction.

Maintenance Reference Plan can give indirect view of downtime to project to production deferment which varies over period of time and the consumption of resources due to foreseen M&I activities. It determines what needs to be achieved in years ahead

With a one-year firm element, a four-year rolling element, and significant elements over the remaining life cycle. MRP together with 52-week plan will be settled.

The medium-term plan contains a firm element of 3-months and a rolling element up to 1-year to proposed to 3-months IOP (integrated operation plan) look-ahead across stakeholders including drilling, well services, engineering etc. Normally when plan comes to the shorter and closer time in the period of 3-to-1 month usually confirmed upon IOP (integrated operation plan)

Scheduling will be rolling in magnitude of 1-month or 4-weeks lookahead with frontline production and maintenance team to simultaneously optimize and prioritize among various crew and resources to fit for actual daily production against situations at site.

Note that interval (5-yearly, 1-yearly, 3 monthly, 4-weekly, weekly, etc.) within hierarchical concept of planning could be timely adjusted based on dynamic of the asset production behavior.

The hierarchy of maintenance and inspection plans are conceptualized from upper level cascaded down to daily scheduling of work is depicted as below.

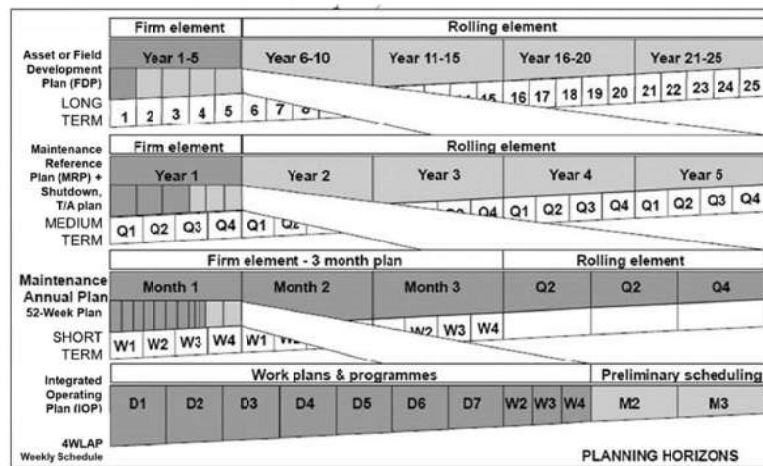


Figure 4 – Hierarchy of Maintenance and Inspection Plans



Scheduling is a time related process whereby the resources from pre-agreed plans are synchronized, sequenced, and converted into a detailed set of tasks to carry out within a discrete period. It essentially evolves around the development of the longer-term plans into weekly and daily work schedules.

The schedule should be continuously rolled forward with a time horizon of typically one-month firm and two-month rolling. **Figure 5** below illustrates correlation between maintenance and inspection planning types (refer to 10012-GDL-5-INT-008-R00, Maintenance and Inspection Planning Guideline).



Figure 5 – Correlation between Plan Types (from 10012-GDL-5-INT-008-R00)

5.1 RESPONSIBILITY FOR PLANING AND SCHEDULING

Responsibility of the preparation and approval of the various plans and schedules is shown in Table 2 below.

Plan and Schedule Type	Prepared by:	Approved by:	Notes
Field Development Plan	PTN/P	PTN	
Maintenance Reference Plan (MRP)	PS1/M and OMI	PS1	1
52-Week Look Ahead	PS1/M Supervisor PS1/M Scheduler	PS1/M and PS1/P	2, 3
3-Month Activity Plan (Integrated Operation Plan, IOP)	PS1/M Supervisor PS1/M Scheduler	PTN/P, PS1, PS1/T, PS1/P and PS1/M	4
2-Week Work Schedule	PS1/M Supervisor PS1/M Scheduler	PS1/P and PS1/M	5
Daily Work Schedule	PS1/M Team Leader PS1/M Scheduler	PS1/P and PS1/M	6



Notes:

1. PS1 approves MRP for further planning, deployment, and budget preparation.
2. To be per 52-week plan based on set strategy in CMMS. PS1/M Scheduler develops weekly look ahead, and PS1/M supervisor to review the plan.
3. Plan to incorporate maintenance, inspection and re-certification activities.
4. To be incorporated into IOP facilitated by PS1/T and presented in IOP monthly for review and approval.
5. PS1/M Supervisor and PS1/P to endorse 1-to-2 weekly work schedule.
6. PS1/P to endorse and revalidate via Permit-to-Work (PTW) to proceed M&I tasks.

Table 2 – Planning and Scheduling Responsibility Matrix

5.2 MAINTENANCE AND INSPECTION PLAN

5.2.1 52-Week Look-Ahead Plan

Regarding the 1st year of 5-Year Plan and MRP, they provides list of activities to be implemented within the year. It will be incorporated with routine 52-week maintenance and inspection plan. The 52-Week Look-Ahead Plan will form the high level plan. Performance will be judged against and form the basis for the more detailed 3-Month activity plans. The 52-Week Look-Ahead will also form the basis for the ordering of materials with long lead items, i.e., more than 3-Month Plan.

5.2.2 3-Month Activity Plan

This schedule is for the maintenance and inspection activities within 3-month period and are revised monthly on a rolling basis; they contain preventive and condition monitoring routines as well as approved corrective routines. Therefore, 1st month of the plan is considered firm, with the following 2 months tentatively agreed to enable the preliminary establishment and securing of manpower and materials. The 3-Month Activity Plan shall incorporate key equipment availability and resource utilization reports. The activities require partial or full facilities shutdown and/or having deferment potential included into the Integrated Operations Plan (IOP).

PS1/M IOP	Period	Location	Activities	Start Date	Finish Date	Duration
PS1/M	Aug-22	F/STN	PM ME (ENGINE + COMPRESSOR) 3Y K-3200 - Plan 08 - 11 August 2022 total 4 days.	8-Aug-22	11-Aug-22	4 Days
PS1/M	Aug-22	F/STN	PM ME GAS COMP K-3550 2M	2-Aug-22	2-Aug-22	4 hrs.
PS1/M	Aug-22	F/STN	PM ME GAS COMP K-3550 2M	28-Aug-22	28-Aug-22	4 hrs.
PS1/M	Aug-22	F/STN	PM ME (ENGINE BY + COMPRESSOR) 3Y K-3750 - Plan 15-26 August 2022 total 12 days.	15-Aug-22	26-Aug-22	12 Days
PS1/M	Aug-22	F/STN	PM ME (ENGINE + COMPRESSOR) 3Y K-3600 - Plan 29 August - 02 September 2022 total 5 days.	29-Aug-22	2-Sep-22	5 Days
PS1/M	Aug-22	F/STN	P-3801-A, THREE MONTHLY, PREVENTIVE MAINTENANCE	3-Aug-22	3-Aug-22	4 hrs.
PS1/M	Aug-22	F/STN	P-3802-A, THREE MONTHLY, PREVENTIVE MAINTENANCE	4-Aug-22	4-Aug-22	4 hrs.
PS1/M	Aug-22	UKU-B	P-117A, THREE MONTHLY, PREVENTIVE MAINTENANCE (WS-B)	4-Aug-22	4-Aug-22	4 hrs.
PS1/M	Aug-22	UKU-B	P-117B, THREE MONTHLY, PREVENTIVE MAINTENANCE (WS-B)	4-Aug-22	4-Aug-22	4 hrs.
PS1/M	Aug-22	UKU-B	P-115A, THREE MONTHLY, PREVENTIVE MAINTENANCE (WS-B)	3-Aug-22	3-Aug-22	4 hrs.
PS1/M	Aug-22	UKU-B	P-115B, THREE MONTHLY, PREVENTIVE MAINTENANCE (WS-B)	3-Aug-22	3-Aug-22	4 hrs.
PS1/M	Aug-22	UKU-E	P-345-A, THREE MONTHLY, PM (WS-E)	4-Aug-22	4-Aug-22	4 hrs.
PS1/M	Aug-22	UKU-E	P-345-B, THREE MONTHLY, PM (WS-E)	4-Aug-22	4-Aug-22	4 hrs.
PS1/M	Aug-22	UKU-E	P-342-A, PREVENTIVE MAINTENANCE (WS-E)	4-Aug-22	4-Aug-22	4 hrs.
PS1/M	Aug-22	UKU-E	P-342-B, PREVENTIVE MAINTENANCE (WS-E)	4-Aug-22	4-Aug-22	4 hrs.
PS1/M	Aug-22	PTT-NGV	A-3000, YEARLY, PREVENTIVE MAINTENANCE	3-Aug-22	3-Aug-22	3 Days
PS1/M	Aug-22	PTD-A	PTD-A GAS METERING 88-FPTR-602 YEARLY CALIBRATION	7-Aug-22	7-Aug-22	8 hrs.
PS1/M	Aug-22	STN-A	STN-A GAS METERING 88-FPTR-807A/B and 88-FPTR-558A/B YEARLY CALIBRATION	8-Aug-22	8-Aug-22	8 hrs.
PS1/M	Aug-22	NTM-A	NTM-A GAS METERING MONTHLY CALIBRATION	6-Aug-22	6-Aug-22	8 hrs.
PS1/M	Aug-22	F/STN	CRUDE METERING MONTHLY SMT	9-Aug-22	10-Aug-22	2 Days
PS1/M	Aug-22	F/STN	T-386 CALIBRATION AND PREVENTIVE MAINTENANCE	11-Aug-22	11-Aug-22	8 hrs.
PS1/M	Aug-22	NGV	QMA, NGV Online Moisture Analyzer	3-Aug-22	3-Aug-22	6 hrs.
PS1/M	Aug-22	BPE	BPE T-902 Tank calibration	12-Aug-22	12-Aug-22	8 hrs.
PS1/M	Aug-22	NSG-A	PM IN NSG-A, ESD/OSD function test 1Y	4-Aug-22	4-Aug-22	2 hrs.
PS1/M	Aug-22	NSG-A	PM IN NSG-A, ESD/OSD function test 1Y	11-Aug-22	11-Aug-22	2 hrs.
PS1/M	Aug-22	NSG-E	PM IN NSG-E, ESD/OSD function test 1Y	18-Aug-22	18-Aug-22	2 hrs.
PS1/M	Aug-22	UKU-M	PM IN UKU-M, ESD/OSD function test 1Y	25-Aug-22	25-Aug-22	2 hrs.
PS1/M	Aug-22	F/STN	PM ME+EL+IN K-5801A 1YPM + Engine Change out + RIG	10-Aug-22	14-Aug-22	5 Days
PS1/M	Aug-22	F/STN	PM ME+EL+IN K-5801B 1YPM	7-Aug-22	7-Aug-22	3 Days
PS1/M	Aug-22	F/STN	PM EL K-5802C 2500 HRS PM	8-Aug-22	8-Aug-22	6 hrs.

Figure 6 – 3-Month Activity Plan



5.2.3 2 Week Work Schedule

Derived from the firm plan for 1st month of 3-Month Activity Plan and updated on a weekly cycle. Concerns the maintenance and inspection activities for 14-days ahead, based on the activities on the monthly activity plan supplemented by work orders raised on an ad-hoc basis and required to be executed within 14-day timeframe. The 2-Week Work Schedule typically covers a period Monday-Sunday, with first 7 days firm and last 7 days tentative.

The following basic requirements applied to the 2-Week Work Schedule:

- Schedule is issued in MS Project or MS Excel
- Activities are grouped by location, i.e., Crude, LPG, well sites, outstations (essentially grouping by asset cost center)
- Activities are resourced in MS Project or MS Excel, including required trades, number of trade staffs and special resources (where required).
- Activities are assigned estimated duration, represented as grant chart.
- Activities are scheduled with due account given to operational constraints, i.e., LPG coolers to be starting in early morning, crude transfer pumps after morning production surge, etc.
- Planned resource usage is provided with schedule.

Maintenance Highlight Activity 15 - 28 August 2022

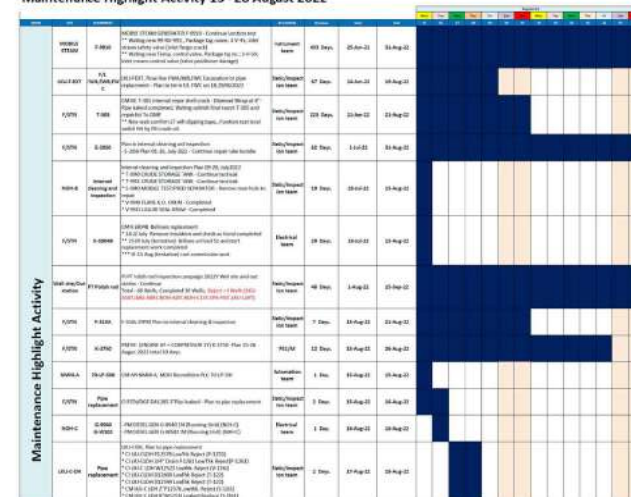


Figure 7 – 2-Week Work Schedule

5.2.4 DAILY-TO-WEEKLY WORK SCHEDULING

The Daily Work Schedule is a list of activities to be carried out the next day. It is not subjected to a separated approval; however, a review may be required at the morning of the workday itself for high priority work that may have been occurred overnight.

[illegible]

#	Project	Task	Start	End	Status	Comments
1	10001010	10001010	10/10/2010	10/10/2010	Completed	10/10/2010
2	10001011	10001011	10/10/2010	10/10/2010	Completed	10/10/2010
3	10001012	10001012	10/10/2010	10/10/2010	Completed	10/10/2010
4	10001013	10001013	10/10/2010	10/10/2010	Completed	10/10/2010
5	10001014	10001014	10/10/2010	10/10/2010	Completed	10/10/2010
6	10001015	10001015	10/10/2010	10/10/2010	Completed	10/10/2010
7	10001016	10001016	10/10/2010	10/10/2010	Completed	10/10/2010
8	10001017	10001017	10/10/2010	10/10/2010	Completed	10/10/2010
9	10001018	10001018	10/10/2010	10/10/2010	Completed	10/10/2010
10	10001019	10001019	10/10/2010	10/10/2010	Completed	10/10/2010
11	10001020	10001020	10/10/2010	10/10/2010	Completed	10/10/2010
12	10001021	10001021	10/10/2010	10/10/2010	Completed	10/10/2010
13	10001022	10001022	10/10/2010	10/10/2010	Completed	10/10/2010
14	10001023	10001023	10/10/2010	10/10/2010	Completed	10/10/2010
15	10001024	10001024	10/10/2010	10/10/2010	Completed	10/10/2010
16	10001025	10001025	10/10/2010	10/10/2010	Completed	10/10/2010
17	10001026	10001026	10/10/2010	10/10/2010	Completed	10/10/2010
18	10001027	10001027	10/10/2010	10/10/2010	Completed	10/10/2010
19	10001028	10001028	10/10/2010	10/10/2010	Completed	10/10/2010
20	10001029	10001029	10/10/2010	10/10/2010	Completed	10/10/2010
21	10001030	10001030	10/10/2010	10/10/2010	Completed	10/10/2010
22	10001031	10001031	10/10/2010	10/10/2010	Completed	10/10/2010
23	10001032	10001032	10/10/2010	10/10/2010	Completed	10/10/2010
24	10001033	10001033	10/10/2010	10/10/2010	Completed	10/10/2010
25	10001034	10001034	10/10/2010	10/10/2010	Completed	10/10/2010
26	10001035	10001035	10/10/2010	10/10/2010	Completed	10/10/2010
27	10001036	10001036	10/10/2010	10/10/2010	Completed	10/10/2010
28	10001037	10001037	10/10/2010	10/10/2010	Completed	10/10/2010
29	10001038	10001038	10/10/2010	10/10/2010	Completed	10/10/2010
30	10001039	10001039	10/10/2010	10/10/2010	Completed	10/10/2010
31	10001040	10001040	10/10/2010	10/10/2010	Completed	10/10/2010
32	10001041	10001041	10/10/2010	10/10/2010	Completed	10/10/2010
33	10001042	10001042	10/10/2010	10/10/2010	Completed	10/10/2010
34	10001043	10001043	10/10/2010	10/10/2010	Completed	10/10/2010
35	10001044	10001044	10/10/2010	10/10/2010	Completed	10/10/2010
36	10001045	10001045	10/10/2010	10/10/2010	Completed	10/10/2010
37	10001046	10001046	10/10/2010	10/10/2010	Completed	10/10/2010
38	10001047	10001047	10/10/2010	10/10/2010	Completed	10/10/2010
39	10001048	10001048	10/10/2010	10/10/2010	Completed	10/10/2010
40	10001049	10001049	10/10/2010	10/10/2010	Completed	10/10/2010
41	10001050	10001050	10/10/2010	10/10/2010	Completed	10/10/2010
42	10001051	10001051	10/10/2010	10/10/2010	Completed	10/10/2010
43	10001052	10001052	10/10/2010	10/10/2010	Completed	10/10/2010
44	10001053	10001053	10/10/2010	10/10/2010	Completed	10/10/2010
45	10001054	10001054	10/10/2010	10/10/2010	Completed	10/10/201

Figure 8 – Daily Work Schedule

5.2.5 Shutdown Plan

Shutdown or Turnaround Plan is specifically developed for maintenance and inspection activities requiring partial or full plant shutdown. These activities are typically grouped to take place in the same concurrent period; e.g. vessel internal inspection, and relief valve recertification, that cannot be carried out during plant normal operation which may cause high production deferment, mainly on process safeguarding and/or major vital equipment. Plant Turnaround approaches like project non routine works. S1 manages its shutdown activities in alignment with L3 Shutdown management 10012-PDR-5-MMS-003.

Year	2019	2020	2021	2022		2023	2024	2025	2026		2027	2028	2029	2030		2031
Plan				SD	OSD				SD	OSD				SD	OSD	
CUI	0	0	0	7	0	0	5	0	9	1	0	0	0	7	15	0
EXT	0	0	0	0	70	0	0	0	0	70	0	0	0	0	69	0
INT	0	0	0	5	0	0	0	0	63	0	0	0	0	5	0	0

Figure 9 – Shutdown Plan (driven by RBI)

5.3 PLAN AND SCHEDULE PROCESS

5.3.1 Plan and Review Cycles

Plans and schedules will have to be prepared and reviewed in a timely manner, consistent with PTTEP Sirikit Oil Field (S1) asset' other processes. The process is illustrated in Figure 10 below.

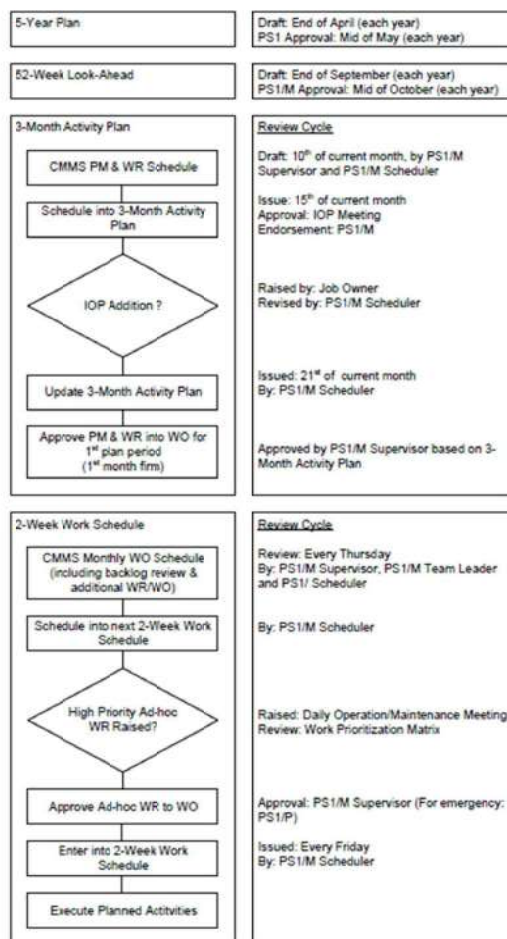


Figure 10 – Planning and Scheduling Process

5.3.2 Plan Review Meetings

Plans will be reviewed and updated on a regular basis to ensure plans reflect the latest work progress and charges to work scope.

- 1) **3-Month Activity Plan:** The 3-Month Activity Plan will be established in two (2) phases, to link the maintenance and inspection activities into S1 Integrated Operations Plan (IOP).

Phase 1 - Prior to IOP meeting, PS1/M, PS1/M Supervisor and PS1/M Scheduler will meet to:

- Obtain overview of maintenance activities in next 3-month period;
- Review priority setting of maintenance activities;
- Agree tentative plan (priorities, dates and resources) for next 3-month period;
- Prepare draft plan, clearly identifying deferment related activities and technical integrity related activities;
- Review work preparation plans and agree the list of actions.
- Proposed released date: Every 10th of the month

Phase 2 – The draft maintenance and inspection plan will be presented to IOP meeting for review and approval. The IOP meeting will be attended by delegates from Asset Planning, Reservoir, Production Planning, Maintenance and related sections. Proposed review date is Every 15th of the month.

- 2) **2-Week Work Schedule:** The 2-Week Work Schedule will be derived from the approved 3-Month Activity Plan, supplemented by approved work order's not featuring on the plan. The 2-Week Work Schedule will be reviewed on a weekly basis in order to:
 - Review next week's planned activities against approved (monthly) plan;
 - Review progress against approved (monthly) plan;
 - Review maintenance backlog;
 - Review additional, non-planned activities;
 - Confirm maintenance activity prioritization;
 - Confirm next week's schedule.

The weekly review meeting will take place every Thursday afternoon and be attended by PS1/M, PS1/M Supervisors, PS1/M Team Leaders and PS1/M Scheduler with the final plan as established during the meeting issued on the same day. Although the 2-Week Work Schedule is considered firm, the opportunity exists for items to be added to the schedule later as requirements and/or opportunities arise. In order to ascertain the requirement for late changes to the agreed schedule, all requests for additional items to be added shall be reviewed as to its priority as further described in this document.

- 3) **Daily Work Schedule:** The Daily Work Schedule is for use by the maintenance executor in order to direct maintenance staffs. The Daily Work Schedule is produced in every afternoon before and issued to relevant persons; a copy of daily work list is provided. Daily Work Schedule is reviewed the operation/maintenance morning meeting, where further work requests may be identified. Depending on the priority of additional work requests, changes to the daily work list may be required.

5.3.3 Prioritization of Maintenance Activities

To ensure the timely execution of maintenance activities, it is essential that priorities are assigned to the various maintenance and inspection activities and these priorities are used to schedule the activities. The priorities are recognized by S1 which considered in CMMS. The general meaning of priority based on risk assessed is well applicable to CM or CI that recommends completion date of work order.

Unlike CM/CI WO, Recommended completion date defined for Priority will not be applicable to the other plannable WO types (PM/PI or GSM/GSI, or MD) because some are carried out as campaign whose the completion interval can be longer than 3 months e.g. flowline UT inspection campaign.

Due to this constraint, Priority definition in CMMS is however more effective work around via Planning because PM/PI or GSM/GSI is the prevention and validation approach; i.e., nature of the work is to prevent, validate, or assure rather than to recover or reinstate the functionality or integrity of equipment back to normal like CM/CI's working nature.

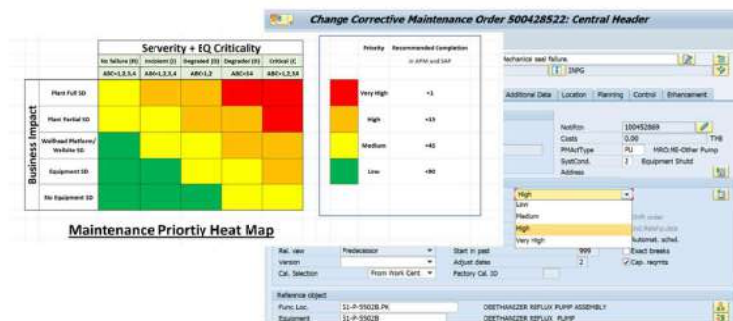


Figure 11 – Risk Based Priority corresponded to recommended completion date

6.0 EXECUTION

This is the only stage when field activities take place that is those directed at anything other than the acquisition and the processing of information. It is the part of the process which yields the return in the form of hydrocarbons and in which the physical implementation of planned activities takes place. Once the execution phase has been initiated, the activity management role changes from "Planning the work" to "Working the plan". The ability to significantly influence the reduction of costs or schedule has passed and the focus shifts to keeping to the plan in order to avoid time and cost overruns. Work Order generated by CMMS at scheduling phase is how the on-site supervision gets its instructions and how it controls and feedbacks information to the schedulers.

Maintenance and Inspection Management of S1 Asset recognizes four (4) steps for the execution workflow in daily work which to be described in the following Clauses.

6.1 SITE PREPARATION AND INTEGRITY ASSURANCE

Upon identification of the activity to be executed, as detailed in the relevant Work Order, the activity is further detailed in separate steps inclusive of the preparation required before the actual work taking place. Typically, preparation of the site will be considered as part of the actual activity to be undertaken; however in some circumstances the site preparation scope will form a separate activity itself, then follow the general structure outlined in Figure 10. The below outline is controlled by PTTEP S1 Asset Permit-to-Work (PTW) system as described in 13247- PDR-SSHE-505/08, SSHE Rules and Requirement Procedure.

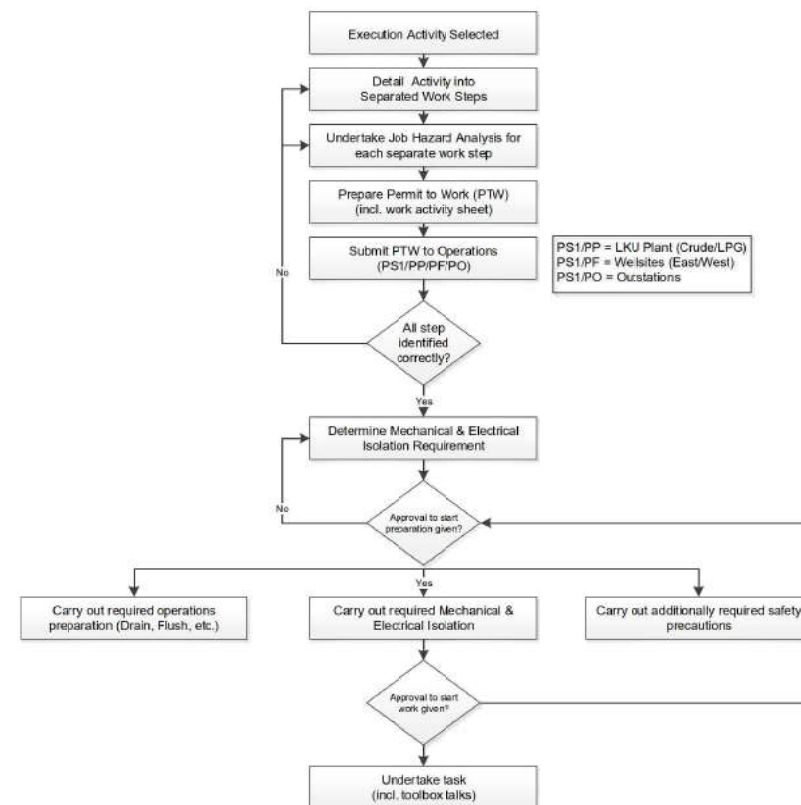


Figure 12 – Site Preparation and Integrity Assurance



Work Description	By	Notes
Detailed activity into separated work steps	Job executor, PS1/M Team Leader	1
Undertake job safety analysis for each separate work step	Job executor, PS1/M Team Leader (supported by Safety Officer)	1
Prepare permit to work (including work analysis sheet)	Job executor, PS1/M Team Leader	1
Submit permit to work to Production section for review	PS1/M Team Leader	
Determine mechanical and electrical isolation requirements	PS1/M Electrical, PS1/PP/PF/PO	2, 3
Carry out required operational preparation activities (drain, flush, etc.)	PS1/PP/PF/PO	
Carry out mechanical and electrical isolation	PS1/M Electrical, PS1/PP/PF/PO	3, 4
Carry out additionally required safety precautions	Job executor	
Undertake task (including toolbox talks)	Job executor	5
Notes: <ol style="list-style-type: none"> Maintenance jobs are normally executed by Maintenance/Inspection crews (under PS1/M Team Leader's supervision) who will be responsible for correctly identifying the separate work steps and permit requirements. For non-routine activities, the activity may be assisted by PS1/M Supervisor and/or Maintenance Discipline Engineers. Isolation requirements and additional safety precautions are established as per the requirements of PTW system and operation procedures. Electrical Isolation is carried out per Electrical Safety Rules procedures. Upon request, isolations may be brought in place by competent persons (typically PS1/M staffs) under the supervision of Production section. For electrical isolations, special requirement applied, as detailed in Electrical Safety Rules. Additionally required precautions (barriers, gas testers, etc.) are normally brought in place jointly by Maintenance/Inspection crews and Production section (PS1/PP/PF/PO), with ultimate approval of adequacy of these provided by Production section. Standard forms for toolbox talks to be used. 		

Table 3 – Responsibility for Site Preparation and Integrity Assurance

6.2 TASK UNDERTAKING

Once site preparation and integrity assurance are completed and approval to proceed work has been obtained as per the requirements of PTW system, actual task can be executed in accordance with the task description shown on the job cards and permit. A task is considered complete when all described tasks have been executed, the site has been re-instated, and the equipment worked on has been returned to a status in which it can safely resume operation.

For various maintenance and inspection activities, detailed procedures are available to provide further clarification to the activity described on the job card and to ensure the consistent execution of maintenance and inspection tasks. Relevant procedures are included in vendor manuals or separate PTTEP maintenance work procedures available from PTTEP's intranet.



Where a task involves the investigation of a failure, the conduct of this investigation and associated reporting shall follow the process outlined in the relevant S1 procedures including PTTEP maintenance work procedures.

6.3 HAND-OVER PREPARATION

This clause covers the process required to administer the resources used during the undertaking of the task, as well as the process to administer any relevant findings obtained during the undertaking of the task. This process exists of various separate steps as outlined in Figure 13.

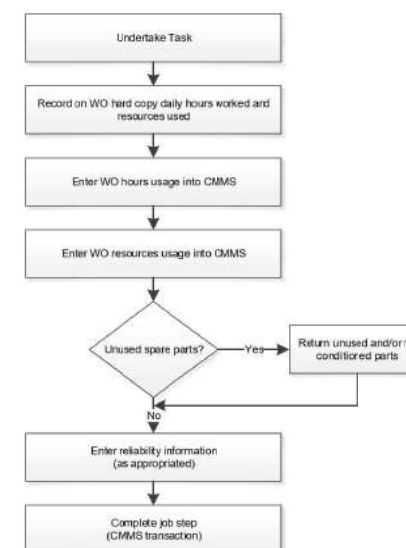


Figure 13 – Hand-over Preparation Process

6.3.1 Work Order Hardcopy Data Record

During the undertaking of tasks, usage of manpower resources (hour worked on WO per individually named person) and other resources are recorded on WO hardcopy on daily basis by the maintenance or inspection technicians. Upon completion of the work, the technicians return the WO hardcopy to their Foreman for entering the relevant data into CMMS.

6.3.2 WO Hours and Resource Usage Entering into CMMS

The information recorded on WO hardcopy is transferred to CMMS within two (2) working days of physical completion of the work, so called "posting of hours usage and resource usage". It is important that timely entry of this data is strictly adhered to, as it forms the basis of an efficient and effective maintenance scheduling process. Furthermore, it provides the necessary input to the automatic accrual system and thus the link between work management and finance system.



6.3.3 Unused Part Return

All parts and/or consumables reserved or consumed during the undertaking of the task shall be properly balanced against the Work Order bill of materials.

Unused or excess material, spare parts, and/or consumables shall be returned to the material warehouse (5101 is warehouse designated for S1 Maintenance section).

Hint: Stuff replaced by new material but considered reusable if refurbished can also be returned to warehouse as long as they are stock registered and were drawn to use via the WO's bill of Material. Once they are refurbished/reconditioned, the process to return can be further proceeded to the same WO that has yet not technically completed (TECO) under "USED" code of stock – Seek advice from local warehouse personnel for returning "Used part" to Warehouse.

6.3.4 Reliability Information Recoding

In order to capture data on equipment failure modes and frequencies, performing activities and reliability data needs to be entered into CMMS for all corrective maintenance activities. The format adopted by PTTEP S1 asset complied with the requirement of ISO14224, standard for reporting of equipment reliability, and as such requires the following data to be entered:

- Symptom of problem (how did the problem manifest itself?)
- Equipment cause of failure
- Equipment downtime
- Equipment repair time
- Corrective action undertaken

Further details of the entry of reliability data is provided in the relevant PTTEP maintenance work procedure.

Signals completion of work and administrative effort as described in the earlier Clause of this guideline for the relevant job step, and as such a quality check to confirm work completion and correct entry of relevant manpower, resource and materials utilization data. With the approval of a job step to be complete, all transactions are deemed complete, and the WO is ready for close-out.

6.4 WORK ORDER CLOSE-OUT

This process covers the final process of execution process and serves to add deferment data and quality checking the job history data, including reliability data and close out the entire work order, i.e., confirms that all job steps on the subject work order have been completed. For all jobs related to deferment of production, the associated deferment shall be entered by Production Planning section (PS1/T). Deferment related jobs can be identified by the deferment code associated with the work order.

Notes:

1. Where the Work Order involves corrective maintenance, completion also signifies that reliability information has been entered into CMMS.
2. Where a certain job step has not been completed but cancelled, the job card can still be closed out. The relevant cancelled job step will, however, remain shown as cancelled instead of complete in CMMS.
3. WO final closure will be by relevant PS1/M supervisor, discipline engineer followed by PS1/M, dependent on WO scope of work, and its criticality.



7.0 REVIEW AND IMPROVEMENT

Review is the stage in which all the results obtained during execution are analyzed to determine asset status and its performance in various perspectives.

The main source of data for analysis stage is the completed fulfillment on Notifications and Work Orders (WO) via CMMS with relevant parameters and quality of data; both master data of asset and transaction data of execution in a single work order on such registered asset.

S1 adopts Corporate's framework of Maintenance and Inspection Management System underlying with CEMS RAI where every company within PTT Groups are mutually developed, revised, and agreed to conform to develop S1 asset master data structures while transactional fields are configured for user to input relevant parameters into CMMS.

S1 CMMS architecture is therefore built in common with other assets of PTTEP and using the same data catalogue in order that they can be benchmarkable when performing analysis.

Other sources of information including PDMS (Production Data Management System, PDMS), Process Indicator monitoring system (PI), etc.

The analysis results have 3 major categories of outputs. Asset performance, Asset integrity condition, and Work Performance and Effectiveness.

7.1.1 Asset Performance

This activity is concerned with the performance of the physical facilities including items of equipment of the asset. They all have purposes to deliver intended function in efficient and reliable performance within operating context.

Performance Indicators (PI's) used in this area are the equipment performance in term of

- Key equipment or plant availability
- Key equipment or plant efficiency
- Mean Time Between Failures (MTBF)
- Bad actor lists
- Trips of key equipment
- Plant unplanned shutdown
- Plant reliability Index (RI)

7.1.2 Asset Integrity Condition

This activity is concerned with the technical integrity and safety status. Most facilities usually have additional dedicated systems to safeguard, protect, prevent, terminate or retard escalation of undesired circumstances in case the facilities were failed or run out of safe operating envelop.

The dedicated systems: so called SCE or safety critical elements, which determine asset's technical integrity status:

- Structural integrity
- Process containment
- Ignition control
- Protection systems
- Detection systems
- Shutdown systems
- Emergency response systems
- Lifesaving systems

Asset technical integrity condition must also be analyzed in conjunction with performance and validity of the asset design intent under the current conditions. Technical Authorities and Performance standards substantially involves with this analysis.



Examples of asset integrity condition or status are exemplified below:

- Safety relief valve inspection and certification status
- Static equipment (vessel, heat exchanger, tanks, piping) inspection status
- Instrumented Protective Function testing (ESD test, F&G system test) status
- Known variations of Equipment (safeguards overrides, temporary repairs, run out of operating envelop)
- PM compliances
- SCE Backlogs
- Anomalies List
- Critical Alarm Rates
- Findings and corrective action management related to technical integrity
- Corrosion Rate and remaining useful life of process containment.

7.1.3 Work Performance and Effectiveness

This activity is concerned with execution efficiency and effectiveness of maintenance activities themselves. These will include cost, time, and resources consumption to achieve the various deliverables. This analysis of resource performance data is at the core of management information and will bear directly on all aspects of Maintenance and Inspection management.

The impact will range from plans, designs, practices, and procedures and the Cost Model in whole process of Maintenance and Inspection.

Typical Performance Indicators are exemplified below:

- Meantime to Repair (MTTR)
- Turnaround compliance
- PM:CM ratio
- Overdue or Ready Backlogs
- Manhour analysis (Actual and Planned Manhour)
- Cost Analysis (expenditure by asset, activity, WO type)
- Cost per asset replacement value

7.1.4 Feedback and Lesson Learned

Key performance indicators will highlight the improvements and gaps to be fulfilled for the planning, resources, execution tactic, crew competency.

The improvements can be started more upfront to M&I approach and strategy or even further to engineering and design. Enablers and Technologies should enrich to all stages of M&I work process. Life-Cycle-Cost and Risk-based Approach is always underlying of M&I work process as it is the heart and M&I continuous improvement process.



8.0 ROLES AND RESPONSIBILITIES

The following table outlines the roles and responsibilities associated with this document.

Roles	Responsibilities
Document Author	<p>The author of Maintenance and Inspection Execution Management is S1 Maintenance Superintendent or equivalent or person as assigned by Document Owner, with responsible for:</p> <ul style="list-style-type: none"> • Investigate and plan of a document structure and its contents • Create and/or update a document as planned • Report to Document Owner on the progress of the work on a document • Issue draft revision of a document for review, and embed all comments made by Document Reviewers to the document
Document Custodian	<p>The custodian of Maintenance and Inspection Execution Management is S1 Maintenance Superintendent or equivalent or higher level who assigned by Document Owner, with responsible for:</p> <ul style="list-style-type: none"> • Identify deficiencies or potential improvements • Initiate periodic revision • Maintain revision history and document status register
Document Owner	<p>The owner of Maintenance and Inspection Execution Management is VP, S1 Production Operation Department, with responsible for:</p> <ul style="list-style-type: none"> • Issue this document and its revisions
Document Reviewer	<p>The reviewer of Maintenance and Inspection Execution Management is Technical Authority in reliability and integrity engineering or equivalent or higher level, with responsible for:</p> <ul style="list-style-type: none"> • Review the document contents to ensure adequate quality • Provide comments and/or suggestions on document issued



9.0 DEFINITIONS

9.1 LANGUAGE

In this document, the following verbal forms are used.

May	Indicates a possible course of action or permission.
Must	Indicates a mandatory and regulatory course of action.
Shall	Indicates a mandatory course of action or requirement.
Should	Indicates a preferred/logical course of action or recommendation.

9.2 TERMINOLOGY

The following terms and definitions apply to this document.

Terminology	Description
Approval	The authority in writing given by COMPANY to 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 constructed accordingly.
Asset	Any physical facilities used in the exploration, production, processing or transportation of oil and gas, and any supporting facilities or equipment.
Asset Integrity (AI)	The ability of an asset to perform its required function efficiently and effectively whilst safeguarding life and the environment.
Availability	The ability of an item to performs its required function under given conditions at a given instant of time or during a given time interval. The availability of an item does no necessarily imply that it is performing, but it is a state to perform.
Barrier	Measure which reduces the probability of releasing a hazard's potential for harm or which reduces its consequences. The hierarchy of barriers is prevention, detection, control, mitigation and emergency response.
Company	PTT Exploration and Production Public Company Limited PTTEP Siam Limited
Contractor	Any company PTTEP has signed a contract with for the Engineering, Procurement, Construction, Installation, Maintenance and Inspection of a part of service work.
Major Accident Event (MAE)	Any incident that results in multiple fatalities or equivalent damage, production loss, environment impact as per the risk matrix.
Quantitative Risk Assessment (QRA)	QRA is the evaluation of the extend of risk arising, with incorporation of calculations based upon the frequency and magnitude of hazardous events.



Reliability	The ability of an item to perform a required function under give conditions for a given period of time. This is document it is used as "Reliability Performance" and refers to probability of failure.
S1 Asset	Sirikit Oil Field under PTTEP Siam Limited
Safety Critical Element (SCE)	Safety Critical Elements are any part of the installation, plant or computer programs whose failure will either cause or contribute to an MAE, or the purpose of which is to prevent or limit the effect of an MAE.
Technical Authority (TA)	PTTEP personnel responsible for technical standards, providing advice on issues relating to their discipline and Four Pillars of integrity as defined in CMS. There are two levels of TA as defined in CMS.
Technical Integrity	Technical soundness, within E&P context it is "The technical integrity of a facility is achieved when, under specified operating conditions, there is no foreseeable risk of failure endangering the safety of personnel, environment or asset value".

9.3 COMMON ACRONYMS

Set out below in alphabetical order are common acronyms as found within this document.

AI	Asset Integrity
CM	Corrective Maintenance
CMMS	Computerized Maintenance Management System
COA	Chart of Accounts
CPFT	Critical Proof Function Test
ESD	Emergency Shutdown
F&G	Fire and Gas System
FMEA	Fault Modes and Effect Analysis
IOP	Integrated Operations Plan
IPF	Instrument Protective Function
MRP	Maintenance Reference Plan
MS	Microsoft Software
MTBF	Mean Time Between Failure
OMI	Maintenance and Inspection Department
QRA	Quantitative Risk Assessment
PI	Performance Indicator
PM	Preventive Maintenance
PS1	S1 Production Operations Department
PS1/M	S1 Maintenance and Inspection Section



PS1/P	S1 Production Section
PS1/T	S1 Production Support Section
PTN/P	S1 Asset Planning Department
PTW	Permit to Work
RAM	Risk Assessment Matrix
RBI	Risk Based Inspection
RCM	Reliability Centered Maintenance
RRM	Risk and Reliability Maintenance
S1	Sirikit Oil Field
SCE	Safety Critical Element
SSHE	Safety, Security, Health and Environment
TA	Technical Authority
WO	Work Order
WR	Work Request

10.0 DOCUMENT REFERENCE LIST

PTTEP internal references, international codes and standards, provincial legislation, and other references pertinent to this document are indicated in the table below.

Document Code	Document Title
PTTEP internal references	
10012-GDL-5-INT-008-R00	Maintenance and Inspection Planning Guideline
10017-PDR-5-MMS-001-R00	Maintenance and Inspection Approach
13245-GDL-1-S1M-ALL-MMS-001-R04	S1 Maintenance and Inspection Guideline
10015-STD-4-PRS-006-R00	Reliability and Asset Integrity Management Standard
HQ.2020.01082.3	Reliability and Integrity MGT Framework
12153-GDL-5-MMS-001-R00	S1 MRP 2019-2031
13245-GDL05-MMS-002-R00	S1 MRP LPG 2022-2031
International codes and standards, provincial legislation, and other references	
ISO 14224	Petroleum, Petrochemical and Natural Gas Industries – Collection and Exchange of Reliability and Maintenance Data for Equipment

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บริษัท ปตท.สผ. สยาม จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม
โครงการผลิตปิโตรเลียมแหล่งสิริกิติ์ตอนเหนือและพื้นที่ใกล้เคียง แปลงเอส 1 จังหวัดกำแพงเพชร พิชณุโลก และสุโขทัย
ฉบับเดือนมกราคม - ธันวาคม พ.ศ. 2566

ภาคผนวกที่ 10

Flowline and Well Gas Lift Line



PTTEP Procedure

FLOWLINE AND WELL GAS LIFT LINE

Document No: SMNT-MS-M-05

Revision No: 05



APPROVAL REGISTER	
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Revision History			
Rev	Description of Revision	Authorised by	Date
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2	Change document No. A72 to SMNT		26/08/2009
3	(1) Reformatted from SMNT-MS-M-05: FLOWLINES AND WELL GAS LIFT LINES (2) Aligned with new PTTEP SSHE MS, ISO14001:2004 and OHSAS18001:2007 requirement (3) Updated Organizational Indicators from JGO to DSO	DSO/M	16/10/2010
4	Updated Organizational Indicators from DSO/M to DSF/M	DSF/M	18/10/2013
5	(1) Change document to corporate format and revise section ,Department Abbreviate (2) Update Strategy (3) Added Thickness Monitoring Location Guideline	PS1/M	01/07/2016





Document Approvals			
		Signature	Date
Author:	Samatcha Panthuvichien		15 AUG 2016
Document Owner:	Sarayut Niamrit (PS1/M)		18-08-2016
THIS DOCUMENT WILL BE REVIEWED 5 YEARS FROM DATE OF APPROVAL OR REVISED EARLIER IF NECESSARY			



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1.0 PURPOSE

The objectives of the maintenance strategy are:

- To demonstrate and maintain the technical integrity of (safety critical) assets
- To fulfil maintenance activities in the most business-efficient manner by effective and efficient deployment and use of resources
- To improve asset reliability, availability and performance and optimise maintenance efforts such that company targets in terms of product quantity, quality and unit maintenance cost can be met
- To have in place and operate an auditable system of asset performance and maintenance controls
- To comply with all applicable legislation and company SSHE policies

2.0 SCOPE

This generic maintenance strategy is written to cover well flowlines and well gas lift lines in perimeter of PTTEP Siam, S1 Asset. The term "flowline" is used to define line from wellhead to the first common manifold including the part of the manifold, which is directly connected to the well (i.e. the section after the choke valve).

3.0 REFERENCES

3.1 PTTEP CONTROLLING DOCUMENTS

Document Number	Document Title
S1.SMNT.PH.00	PTTEP S1 Maintenance Philosophy
EP 2000-5008	Carbon Steel Pipeline Corrosion Engineering Manual

3.2 OTHER REFERENCE DOCUMENTS

Document Number	Document Title
API 570	Piping Inspection Code
NACE Standard RP0274-98	High Voltage Electrical Inspection of Pipeline Coating
NACE Standard RP0169-96	Control of External Corrosion on Underground or Submerged Metallic Piping Systems
ASME B31.3	Process Piping
ASME B31.8	Gas Transmission and Distribution Piping System

4.0 DEFINITIONS

Terminology	Description
Flowline	B31.3 Process piping between wellhead to manifold



4.1 COMMON ACRONYMS

Set out below are common specific terms presented in alphabetical order:

SAP	PTTEP Computerized Maintenance Management System
PI	Planned Inspection (Work Order Type)
CI	Corrective Inspection (Work Order Type)

5.0 ROLES AND RESPONSIBILITIES

5.1 OWNERSHIP OF THE DOCUMENT: PS1/M

The owner of the document is Superintendent, Maintenance with responsibilities for:

- Issuing the FLOWLINE AND WELL GAS LIFT LINE INSPECTION Procedure and its revisions
- Ensuring effective implementation of the procedure

5.2 CUSTODIAN OF THE DOCUMENT: TA1

The custodian of the document is TA1, In-service Inspection and Corrosion with responsibilities for:

- Identifying deficiencies or potential improvements
- Initiating periodic revision
- Maintaining revision history and document status register

6.0 STRATEGY

The need for the regular inspection of flowlines on PTTEP facilities to assure integrity in service is identified in PTTEP Maintenance Philosophy and also in Statutory Regulations.

6.1 FLOWLINE

In PTTEP the wells are drilled from common well site locations and grouped in manifolds after a short distance from wellhead.

A. INTERNAL CORROSION

Currently the field operates with low carbon dioxide contents (approx. 1.5% mole) and minor amount of hydrogen sulphide. The water cut averages at 50% across the field with some wells producing up to 90% water. With the introduction of the water flooding of the reservoir the water cut will increase more rapidly than before.

B. SAND EROSION

Some wells are producing high volume of sand and sand erosion takes place at flow direction change location such as elbow, and tee junction.

C. EXTERNAL CORROSION

A large portion of the flowline is underground. That section is protected against external corrosion by protective wrapping. No cathodic protection is applied. In some well locations that section of the flowline is routed through open concrete trench and some have no protective coating, as such they are more vulnerable to external corrosion.

**6.2 WELL GAS LIFT LINES****A. EXTERNAL CORROSION**

Same as well flowlines

B. INTERNAL CORROSION

The lift gas is generally dry. However with the introduction of wet gas wells directly to the gas lift system there is an increasing risk of internal corrosion.

6.3 INSPECTION FREQUENCIES

Since well fluid condition of each well is changed with hardly to notice and re-evaluate inspection frequencies on time. Therefore, thickness monitoring frequency of each flowline is 3 monthly as campaign basis on February, May, August and November.

SAP shall regularly generated PI Work Order of each well site accordingly. Thickness monitoring location for each flowline and manifold shall be followed Appendix II using Ultrasonic Thickness Measurement to find minimum thickness of each location.

In case possibility of high wall thickness loss due to well fluid condition changing such as high sand alert from lab sampling, CI Work Order shall be manually created in SAP for the concerned well to monitor thickness ASAP.

**7.0 APPENDIX****7.1 APPENDIX I: CALCULATION OF MINIMUM ALLOWABLE PIPING WALL THICKNESS**

A. The Final retirement thickness for piping is based on the higher of two thicknesses:

- Pressure design thickness under internal pressure - Wall thickness required for pressure competency can be calculated with the following formula (as per ANSI B31.3)

$$t = P * D / [2(SE+PY)]$$

Where

D= Nominal outside diameter of pipe, mm

P= Operating pressure, barg

S= Stress value at design temperature, MPa

E= Quality factor

Y= Coefficient

t= Pressure Design thickness, mm

- Wall thickness required to cover other loading on the pipe, besides internal pressure, e.g. support loading, third party damage, vibration etc., which are very difficult to quantify, often called the "Structural retirement thickness"

NPS (in)	Recommended retirement Thickness (mm)
0.5 - 3	2.50
4	3.00
6	3.75
8	4.50
10	4.75
12	4.75

B. Line standards

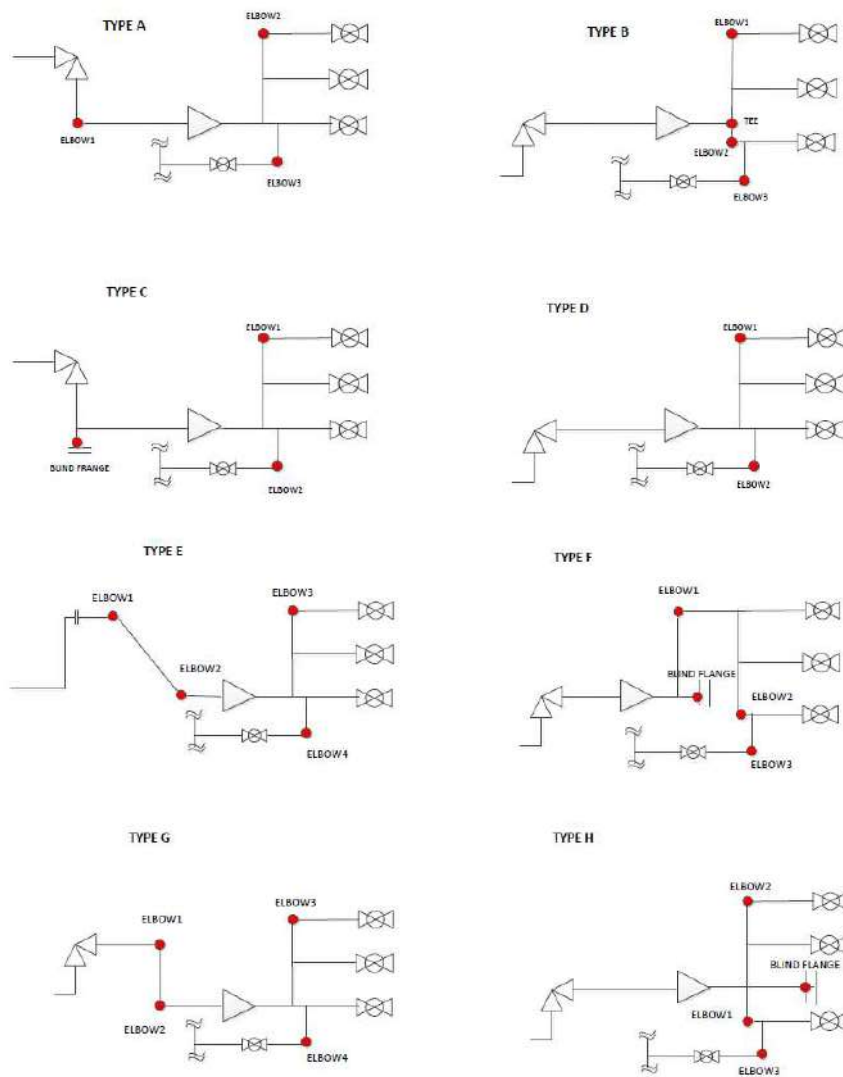
A standard well flowline consist of the following sections:

- 3"- SCH 160 line pipe and elbows, material API 5L Grade B (Yield Strength 241 MPa), from X-mas tree until the choke valve
- 3"- SCH 80 line pipe and elbows, material API 5L Grade B, from choke valve to the manifold
- 1"- SCH 80 line pipe and elbows, material API 5L Grade B, drain line after choke valve
- Gas lift lines are 2" SCH 80 line pipe, material API 5L Grade B

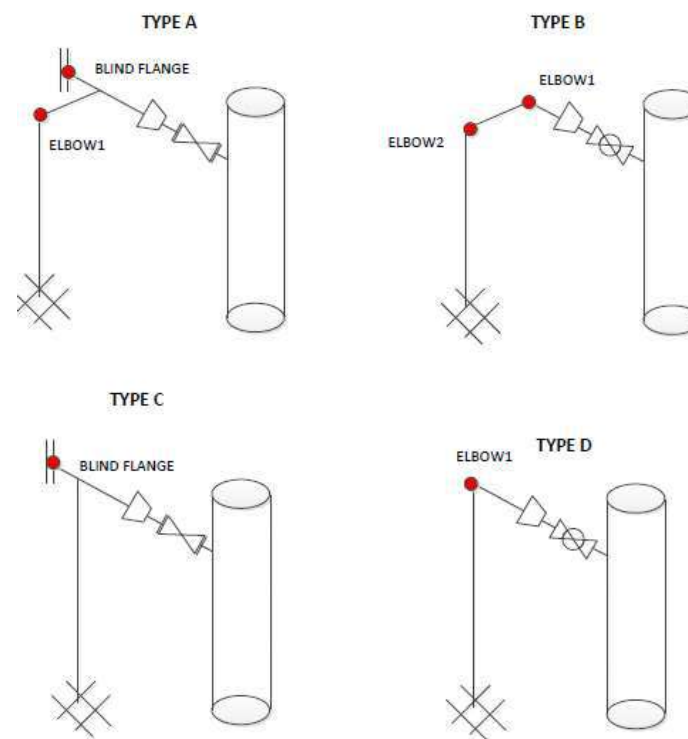
NPS (in)	SCH	OD (mm)	WT (mm)
1	80	33.4	4.55
2	80	60.3	5.54
3	80	88.9	7.62
3	160	88.9	11.13



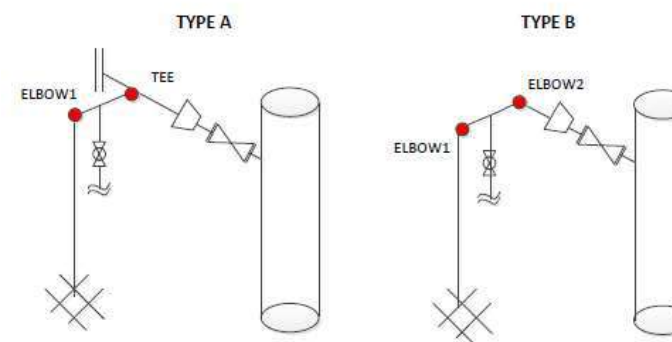
7.2 APPENDIX I: THICKNESS MONITORING LOCATION GUIDELINE

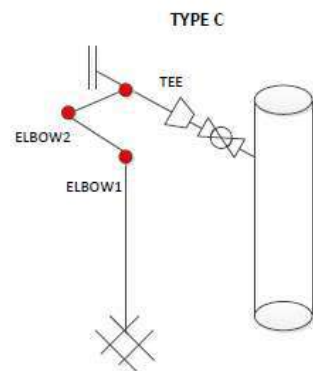


Manifold Thickness Monitoring Location



Crude Flowline Monitoring Location





Water Flowline Monitoring Location



บริษัท ปตท.สผ. สยาม จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม
โครงการผลิตปิโตรเลียมแหล่งสิริกิติ์ตอนเหนือและพื้นที่ใกล้เคียง แปลงเอส 1 จังหวัดกำแพงเพชร พิชณุโลก และสุโขทัย
ฉบับเดือนมกราคม - ธันวาคม พ.ศ. 2566

ภาคผนวกที่ 11

ตัวอย่างเอกสารการตรวจสอบแนวท่อ (X-ray)
และการทดสอบแรงดันน้ำ (Hydrostatic Test)

INSPECTION REPORT RADIOGRAPHIC EXAMINATION				REPORT No.: RT-TS-001/2021					
CLIENT: PTTEP Siam Limited				PAGE No. 1 OF 1					
PROJECT : 10" MA GAS FLOWLINE FROM WSM TO F/STN (REVISE PLS.PHASE II)				LOCATION : WSM to F/STN					
PROCEDURE NO.(REV): PTTEP/THC18-5127/RTG-2008AP Rev.D (Date:13-03-20)				JOB No.: FL21/012					
REF. CODE/STD: ASME V Article 2				DATE /TIME OF TEST : June 14, 2021					
WORK INSTRUCTION : WI-RT				REQUEST No. 3044/21, BI No. E-1480201					
EQUIPMENT, MATERIALS & OPERATION PARAMETERS...									
RADIATION SOURCE...		EXPOSURE & TECHNIQUE ...		FILM...					
X-RAY EQUIP : - KVP.		TIME : 3:46 MIN.		BRAND : FUJI					
TUBE VOLTAGE : - KVP.		TECHNIQUE (E & V) : DWE/SWV		TYPE : "IX50" (C3)					
TUBE CURRENT : - Ma.		SOD/OFD: 254/19.08 MM.		SIZE : 89 X 432 MM.					
GAMMA RAY SOURCE : Ir-192		IQI TYPE/SIZE : ISO (EN) W10		INTENSIFYING SCREEN...					
SOURCE ACTIVITY : RANGE: 26.13 Ci (P.89)		IQI PLACEMENT : FILM SIDE		FRONT : 0.125 MM.					
SOURCE SIZE : 3.0 x 2.0 MM.		Ug : 0.27 MM.		BACK : 0.125 MM.					
DENSITOMETER S/N: 060-4787		% OF EXAM : 100		NO OF FILM / FOLDER : 1 OF 1					
FILM PROCESSING : <input checked="" type="checkbox"/> MANUAL <input type="checkbox"/> Auto NO OF RADIOGRAPHS (Exp): 16									
LOCATION MAKER PLACEMENT <input type="checkbox"/> SOURCE SIDE <input checked="" type="checkbox"/> FILM SIDE									
PART IDENTIFICATION & INFORMATION...									
ISO/DWG No.: 10" MA F/L		LINE/SPOOL/PART ID: -							
MATERIAL: API 5L X42+API 5L X42		NOMINAL PIPE SIZE (Inch) 10 Inch							
WELDING PROCESS: GTAW+SAW		MATERIAL THICKNESS: (mm.) 15.88 mm							
WELD THICKNESS : 19.08 mm.		REINFORCEMENT : 1.6+1.3 mm.							
SENSITIVITY REQUIRED: ESSENTIAL WIRE No. 10 (Ø 0.40 mm.)		DENSITY (RANGE) 2.0-4.0							
SENSITIVITY ACHIEVED: SMALLEST VISIBLE WIRE No. 11 (Ø 0.32 mm.)		DENSITY ACHIEVED(RANGE) 2.6-2.7							
STATE OF EXAMINATION: <input type="checkbox"/> PREPARED EDGE <input type="checkbox"/> AFTER REPAIR <input type="checkbox"/> BEFORE P.W.H.T <input type="checkbox"/> AFTER P.W.H.T <input checked="" type="checkbox"/> AS WELDED <input type="checkbox"/> AS ROLLED <input checked="" type="checkbox"/> BEFORE HYDROTEST <input type="checkbox"/> AFTER HYDROTEST <input type="checkbox"/> OTHER...									
ACCEPTANCE CRITERIA: Section 9.3 of API 1104 (Referred to in 9.3.1 through 9.3.13 acceptance standards for radiographic testing) OTHER: 10008-STD-6-PLR-025-R00									
WELD/Joint/RADIOGRAPH IDENTIFICATION...									
COUPON No.	WELD JOINT TYPE	WELDER NO	FILM INTVL-NO	TYPE	SIZE (mm.)	ACCEPT	REJECT	Sensitivity	Remark
J.214	BW	TW 326	A-B	NO	-	ACCEPT	-	1.3%	
		TW 325	B-C	NO	-	ACCEPT	-	1.3%	
			C-D	NO	-	ACCEPT	-	1.3%	
			D-A	NO	-	ACCEPT	-	1.3%	
J.215	BW	TW 826	A-B	NO	-	ACCEPT	-	1.3%	
		TW 825	B-C	NO	-	ACCEPT	-	1.3%	
			C-D	NO	-	ACCEPT	-	1.3%	
			D-A	NO	-	ACCEPT	-	1.3%	
J.216	BW	TW 661	A-B	NO	-	ACCEPT	-	1.3%	
		TW 662	B-C	NO	-	ACCEPT	-	1.3%	
			C-D	NO	-	ACCEPT	-	1.3%	
			D-A	NO	-	ACCEPT	-	1.3%	
J.217	BW	TW 648	A-B	NO	-	ACCEPT	-	1.3%	
		TW 831	B-C	NO	-	ACCEPT	-	1.3%	
			C-D	NO	-	ACCEPT	-	1.3%	
			D-A	NO	-	ACCEPT	-	1.3%	
ABBREVIATION:									
<p>Note: Material Specification</p> <p>AI : Accumulation of Imperfection BT : Burn-Through C : Crack CP : Cluster Porosity ESI : Elongated Slag Inclusions EU : External Undercut</p> <p>HB : Hollow-Bead Porosity IC : Internal Concavity UCP : Inadequate Cross IF : Incomplete Fusion IFD : Incomplete Fusion Due to Cold Lap IP : Inadequate Penetration w/o High Low IPD : Inadequate Penetration due to High Low ISI : Isolated Slag Inclusions IU : Internal Undercut No : No Significant Discontinuity P : Individual Cr Scattered Porosity TI : Tungsten Inclusion</p>									
AUTHORIZATION... INTERPRETED/EVALUATED: REVIEWED BY CLIENT: CA (3 rd Party) or Agency: REVIEWED AND APPROVED BY OWNER:									
SIGNED: NAME: PONGKORN S. METHOD (LEVEL): PONGKORN (NO. 323213) COMPANY: THAI NDT PCL. DATE OF ISSUE : June 16, 2021									

INSPECTION REPORT RADIOGRAPHIC EXAMINATION				REPORT No.: RT-TS-002/2021					
CLIENT: PTTEP Siam Limited				PAGE No. 1 OF 1					
PROJECT : 10" MA GAS FLOWLINE FROM WSM TO F/STN (REVISE PLS.PHASE II)				LOCATION : WSM to F/STN					
PROCEDURE NO.(REV): PTTEP/THC18-5127/RTG-2008AP Rev.D (Date:13-03-20)				JOB No.: FL21/012					
REF. CODE/STD: ASME V Article 2				DATE /TIME OF TEST : June 15, 2021					
WORK INSTRUCTION : WI-RT				REQUEST No. 3044/21, BI No. E-1480201					
EQUIPMENT, MATERIALS & OPERATION PARAMETERS...									
RADIATION SOURCE...		EXPOSURE & TECHNIQUE ...		FILM...					
X-RAY EQUIP : - KVP.		TIME : 3:46 MIN.		BRAND : FUJI					
TUBE VOLTAGE : - KVP.		TECHNIQUE (E & V) : DWE/SWV		TYPE : "IX50" (C3)					
TUBE CURRENT : - Ma.		SOD/OFD: 254/19.08 MM.		SIZE : 89 X 432 MM.					
GAMMA RAY SOURCE : Ir-192		IQI TYPE/SIZE : ISO (EN) W10		INTENSIFYING SCREEN...					
SOURCE ACTIVITY : RANGE: 25.94 Ci (P.90)		IQI PLACEMENT : FILM SIDE		FRONT : 0.125 MM.					
SOURCE SIZE : 3.0 x 2.0 MM.		Ug : 0.27 MM.		BACK : 0.125 MM.					
DENSITOMETER S/N: 06014787		% OF EXAM : 100		NO OF FILM / FOLDER : 1 OF 1					
FILM PROCESSING : <input checked="" type="checkbox"/> MANUAL <input type="checkbox"/> Auto NO OF RADIOGRAPHS (Exp): 8									
LOCATION MAKER PLACEMENT <input type="checkbox"/> SOURCE SIDE <input checked="" type="checkbox"/> FILM SIDE									
PART IDENTIFICATION & INFORMATION...									
ISO/DWG No.: 10" MA F/L		LINE/SPOOL/PART ID: -							
MATERIAL: API 5L X42+API 5L X42		NOMINAL PIPE SIZE (Inch) 10 Inch							
WELDING PROCESS: GTAW+SAW		MATERIAL THICKNESS: (mm.) 15.88 mm.							
WELD THICKNESS : 19.08 mm.		REINFORCEMENT : 1.6+1.3 mm.							
SENSITIVITY REQUIRED: ESSENTIAL WIRE No. 10 (Ø 0.40 mm.)		DENSITY (RANGE) 2.0-4.0							
SENSITIVITY ACHIEVED: SMALLEST VISIBLE WIRE No. 11 (Ø 0.32 mm.)		DENSITY ACHIEVED(RANGE) 2.6-2.7							
STATE OF EXAMINATION: <input type="checkbox"/> PREPARED EDGE <input type="checkbox"/> AFTER REPAIR <input type="checkbox"/> BEFORE P.W.H.T <input type="checkbox"/> AFTER P.W.H.T <input checked="" type="checkbox"/> AS WELDED <input type="checkbox"/> AS ROLLED <input checked="" type="checkbox"/> BEFORE HYDROTEST <input type="checkbox"/> AFTER HYDROTEST <input type="checkbox"/> OTHER....									
ACCEPTANCE CRITERIA: Section 9.3 of API 1104 (Referred to in 9.3.1 through 9.3.13 acceptance standards for radiographic testing) OTHER: 10008-STD-6-PLR-025-R00									
WELD/Joint/RADIOGRAPH IDENTIFICATION...									
COUPON No.	WELD JOINT TYPE	WELDER NO	FILM INTVL-NO	TYPE	SIZE (mm.)	ACCEPT	REJECT	Sensitivity	Remark
J.218	BW	TW 848	A-B	NO	-	ACCEPT	-	1.3%	
		TW 831	B-C	NO	-	ACCEPT	-	1.3%	
			C-D	NO	-	ACCEPT	-	1.3%	
			D-A	NO	-	ACCEPT	-	1.3%	
J.219	BW	TW 826	A-B	P	Ø1.0 mm.	ACCEPT	-	1.3%	
		TW 825	B-C	NO	-	ACCEPT	-	1.3%	
			C-D	NO	-	ACCEPT	-	1.3%	
			D-A	NO	-	ACCEPT	-	1.3%	
ABBREVIATION:									
<p>Note: Material Specification</p> <p>AI : Accumulation of Imperfection BT : Burn-Through C : Crack CP : Cluster Porosity ESI : Elongated Slag Inclusions EU : External Undercut</p> <p>HB : Hollow-Bead Porosity IC : Internal Concavity UCP : Inadequate Cross IF : Incomplete Fusion IFD : Incomplete Fusion Due to Cold Lap IP : Inadequate Penetration w/o High Low IPD : Inadequate Penetration due to High Low ISI : Isolated Slag Inclusions IU : Internal Undercut No : No Significant Discontinuity P : Individual Cr Scattered Porosity TI : Tungsten Inclusion</p>									
AUTHORIZATION... INTERPRETED/EVALUATED: REVIEWED BY CLIENT: CA (3 rd Party) or Agency: REVIEWED AND APPROVED BY OWNER:									
SIGNED: NAME: PONGKORN S. METHOD (LEVEL): PONGKORN (NO. 323213) COMPANY: THAI NDT PCL. DATE OF ISSUE : June 16, 2021									

INSPECTION REPORT RADIOGRAPHIC EXAMINATION				REPORT No.: RT-TS-004/2021					
CLIENT: PTTEP Siam Limited				PAGE No. 1 OF 1					
PROJECT: 10" MA GAS FLOWLINE FROM WSM TO F/STN (REVISE PLS.PHASE II)				LOCATION: WSM to F/STN					
PROCEDURE NO.(REV): PTTEP/THC18-5127/RTG-2006AP Rev.0 (Date:13-03-20)				JOB No.: FL21/012					
REF. CODE/STD: ASME V Article 2				DATE/TIME OF TEST: June 16, 2021					
WORK INSTRUCTION: WI-RT				REQUEST No. 3044/21, BI No. E-1430201					
EQUIPMENT, MATERIALS & OPERATION PARAMETERS...									
RADIATION SOURCE...		EXPOSURE & TECHNIQUE ...		FILM...					
X-RAY EQUIP: - KVP,	TIME: 5:22 MIN.	BRAND: FUJI							
TUBE VOLTAGE: - KVP,	TECHNIQUE (E & V): DWE/SWV	TYPE: "IX50" (C3)							
TUBE CURRENT: - Ma,	SOD/OFD: 254/19.08 MM.	SIZE: 89 X 432 MM.							
GAMMA RAY SOURCE: Ir-192	IQI TYPE/SIZE: ISO (EN) W10	INTENSIFYING SCREEN...							
SOURCE ACTIVITY: RANGE: 25.69 Ci (P.90)	IQI PLACEMENT	FRONT: 0.125 MM.							
SOURCE SIZE: 3.0 x 2.0 MM.	Ug: 0.27 MM.	BACK: 0.125 MM.							
DENSITOMETER S/N: 06014787	% OF EXAM: 100	NO OF FILM / FOLDER: 1 OF 1							
FILM PROCESSING: <input checked="" type="checkbox"/> MANUAL <input type="checkbox"/> Auto NO OF RADIOGRAPHS (Exp): 20									
LOCATION MAKER PLACEMENT <input type="checkbox"/> SOURCE SIDE <input checked="" type="checkbox"/> FILM SIDE									
PART IDENTIFICATION & INFORMATION...									
ISO/DWG No.: 10" MA F/L		LINE/SPOOL/PART ID: -							
MATERIAL: API 5L X42+API 5L X42		NOMINAL PIPE SIZE (Inch) 10 Inch							
WELDING PROCESS: GTAW+SAW		MATERIAL THICKNESS: (mm.) 15.88 mm.							
WELD THICKNESS: 19.08 mm.		REINFORCEMENT: 1.6+1.6 mm.							
SENSITIVITY REQUIRED: ESSENTIAL WIRE No. 10 (Ø 0.40 mm.)		DENSITY (RANGE) 2.0-4.0							
SENSITIVITY ACHIEVED: SMALLEST VISIBLE WIRE No. 11 (Ø 0.32 mm.)		DENSITY ACHIEVED(RANGE) 2.6-2.7							
STATE OF EXAMINATION: <input type="checkbox"/> PREPARED EDGE <input type="checkbox"/> AFTER REPAIR <input type="checkbox"/> BEFORE P.W.H.T <input type="checkbox"/> AFTER P.W.H.T <input checked="" type="checkbox"/> AS WELDED <input type="checkbox"/> AS ROLLED <input checked="" type="checkbox"/> BEFORE HYDROTEST <input type="checkbox"/> AFTER HYDROTEST <input type="checkbox"/> OTHER...									
ACCEPTANCE CRITERIA: Section 9.3 of API 1104 (Referred to in 9.3.1 through 9.3.13 acceptance standards for radiographic testing) OTHER: 10008-STD-6-PLR-025-R30									
WELD/Joint/RADIOGRAPH IDENTIFICATION...									
COUPON No.	WELD JOINT TYPE	WELDER NO	FILM INTVL-NO	TYPE	SIZE (mm.)	ACCEPT	REJECT	Sensitivity	Remark
J.223	BW	TW 662	A-B	NO	-	ACCEPT	-	1.3%	
		TW 661	B-C	NO	-	ACCEPT	-	1.3%	
			C-D	P	Ø0.5 mm.	ACCEPT	-	1.3%	
			D-A	NO	-	ACCEPT	-	1.3%	
J.224	BW	TW 662	A-B	NO	-	ACCEPT	-	1.3%	
		TW 661	B-C	ESI	L= 4.0 mm.	ACCEPT	-	1.3%	
			C-D	NO	-	ACCEPT	-	1.3%	
			D-A	P	Ø10 mm.	ACCEPT	-	1.3%	
J.225	BW	TW 662	A-B	NO	-	ACCEPT	-	1.3%	
		TW 661	B-C	NO	-	ACCEPT	-	1.3%	
			C-D	P	Ø0.5 mm.	ACCEPT	-	1.3%	
			D-A	NO	-	ACCEPT	-	1.3%	
J.226	BW	TW 662	A-B	NO	-	ACCEPT	-	1.3%	
		TW 661	B-C	P	Ø15 mm.	ACCEPT	-	1.3%	
			C-D	P	Ø15 mm.	ACCEPT	-	1.3%	
			D-A	ES	L= 15 mm.	ACCEPT	-	1.3%	
J.227	BW	TW 825	A-B	NC	-	ACCEPT	-	1.3%	
		TW 825	B-C	NC	-	ACCEPT	-	1.3%	
			C-D	NO	-	ACCEPT	-	1.3%	
			D-A	NO	-	ACCEPT	-	1.3%	

ABBREVIATION:

AI: Accumulation of Imperfection
BT: Burn-Through
C: Crack
CP: Cluster Porosity
IFI: Incomplete Fusion Due to Cold Lap
EU: External Undercut

Note: Material Specification

HB: Hollow-Bead Porosity
IC: Internal Concavity
UCP: Inadequate Cross
IF: Incomplete Fusion
IFI: Incomplete Fusion Due to Cold Lap
IP: Inadequate Penetration w/o High Low
TI: Tungsten Inclusion

IPD: Inadequate Penetration due to High Low
ISI: Isolated Slag Inclusions
IU: Internal Undercut
No: No Significant Discontinuity
P: Individual Or Scattered Porosity
T: Tungsten Inclusion

AUTHORIZATION...	INTERPRETED/EVALUATED:	REVIEWED BY CLIENT:	CA (3rd Party) or Agency:	REVIEWED AND APPROVED BY OWNER
SIGNED: Mangkorn S.	PCN.R.I.I (NO. 323213)	Ampon Gromwet	-	-
NAME: Mangkorn S.	THAI NDT PCL.	Ampon Gromwet	-	-
METHOD (LEVEL):	THAI NDT PCL.	Ampon Gromwet	-	-
COMPANY:	THAI NDT PCL.	Ampon Gromwet	-	-
DATE OF ISSUE: June 17, 2021	June 17, 2021	June 17, 2021	-	-

INSPECTION REPORT RADIOGRAPHIC EXAMINATION				REPORT No.: RT-TS-005/2021					
CLIENT: PTTEP Siam Limited				PAGE No. 1 OF 1					
PROJECT: 10" MA GAS FLOWLINE FROM WSM TO F/STN (REVISE PLS.PHASE II)				LOCATION: WSM to F/STN					
PROCEDURE NO.(REV): PTTEP/THC18-5127/RTG-2006AP Rev.0 (Date:13-03-20)				JOB No.: FL21/012					
REF. CODE/STD: ASME V Article 2				DATE/TIME OF TEST: June 16, 2021					
WORK INSTRUCTION: WI-RT				REQUEST No. 3044/21, BI No. E-1430201					
EQUIPMENT, MATERIALS & OPERATION PARAMETERS...									
RADIATION SOURCE...		EXPOSURE & TECHNIQUE ...		FILM...					
X-RAY EQUIP: - KVP,	TIME: 5:22 MIN.	BRAND: FUJI							
TUBE VOLTAGE: - KVP,	TECHNIQUE (E & V): DWE/SWV	TYPE: "IX50" (C3)							
TUBE CURRENT: - Ma,	SOD/OFD: 254/19.08 MM.	SIZE: 89 X 432 MM.							
GAMMA RAY SOURCE: Ir-192	IQI TYPE/SIZE: ISO (EN) W10	INTENSIFYING SCREEN...							
SOURCE ACTIVITY: RANGE: 25.69 Ci (P.90)	IQI PLACEMENT	FRONT: 0.125 MM.							
SOURCE SIZE: 3.0 x 2.0 MM.	Ug: 0.27 MM.	BACK: 0.125 MM.							
DENSITOMETER S/N: 06014787	% OF EXAM: 100	NO OF FILM / FOLDER: 1 OF 1							
FILM PROCESSING: <input checked="" type="checkbox"/> MANUAL <input type="checkbox"/> Auto NO OF RADIOGRAPHS (Exp): 12									
LOCATION MAKER PLACEMENT <input type="checkbox"/> SOURCE SIDE <input checked="" type="checkbox"/> FILM SIDE									
PART IDENTIFICATION & INFORMATION...									
ISO/DWG No.: 10" MA F/L		LINE/SPOOL/PART ID: -							
MATERIAL: API 5L X42+API 5L X42		NOMINAL PIPE SIZE (Inch) 10 Inch							
WELDING PROCESS: GTAW+SAW		MATERIAL THICKNESS: (mm.) 15.88 mm.							
WELD THICKNESS: 19.08 mm.		REINFORCEMENT: 1.6+1.6 mm.							
SENSITIVITY REQUIRED: ESSENTIAL WIRE No. 10 (Ø 0.40 mm.)		DENSITY (RANGE) 2.0-4.0							
SENSITIVITY ACHIEVED: SMALLEST VISIBLE WIRE No. 11 (Ø 0.32 mm.)		DENSITY ACHIEVED(RANGE) 2.6-2.7							
STATE OF EXAMINATION: <input type="checkbox"/> PREPARED EDGE <input type="checkbox"/> AFTER REPAIR <input type="checkbox"/> BEFORE P.W.H.T <input type="checkbox"/> AFTER P.W.H.T <input checked="" type="checkbox"/> AS WELDED <input type="checkbox"/> AS ROLLED <input checked="" type="checkbox"/> BEFORE HYDROTEST <input type="checkbox"/> AFTER HYDROTEST <input type="checkbox"/> OTHER...									
ACCEPTANCE CRITERIA: Section 9.3 of API 1104 (Referred to in 9.3.1 through 9.3.13 acceptance standards for radiographic testing) OTHER: 10008-STD-6-PLR-025-R30									
WELD/Joint/RADIOGRAPH IDENTIFICATION...									
COUPON No.	WELD JOINT TYPE	WELDER NO	FILM INTVL-NO	TYPE	SIZE (mm.)	ACCEPT	REJECT	Sensitivity	Remark
J.220	BW	TW 662	A-B	NO	-	ACCEPT	-	1.3%	
		TW 661	B-C	NO	-	ACCEPT	-	1.3%	
			C-D	NO	-	ACCEPT	-	1.3%	
			D-A	NO	-	ACCEPT	-	1.3%	
J.221	BW	TW 662	A-B	NO	-	ACCEPT	-	1.3%	
		TW 661	B-C	NO	-	ACCEPT	-	1.3%	
			C-D	NO	-	ACCEPT	-	1.3%	
			D-A	NO	-	ACCEPT	-	1.3%	
J.222	BW	TW 662	A-B	NO	-	ACCEPT	-	1.3%	
		TW 661	B-C	NO	-	ACCEPT	-	1.3%	
			C-D	NO	-	ACCEPT	-	1.3%	
			D-A	ESI	L= 15 mm.	ACCEPT	-	1.3%	

ABBREVIATION:

AI: Accumulation of Imperfection
BT: Burn-Through
C: Crack
CP: Cluster Porosity
IFI: Incomplete Fusion Due to Cold Lap
EU: External Undercut

Note: Material Specification

HB: Hollow-Bead Porosity
IC: Internal Concavity
UCP: Inadequate Cross
IF: Incomplete Fusion
IFI: Incomplete Fusion Due to Cold Lap
IP: Inadequate Penetration w/o High Low
TI: Tungsten Inclusion

IPD: Inadequate Penetration due to High Low
ISI: Isolated Slag Inclusions
IU: Internal Undercut
No: No Significant Discontinuity
P: Individual Or Scattered Porosity
T: Tungsten Inclusion

AUTHORIZATION...	INTERPRETED/EVALUATED:	REVIEWED BY CLIENT:	CA (3rd Party) or Agency:	REVIEWED AND APPROVED BY OWNER
SIGNED: Mangkorn S.	PCN.R.I.I (NO. 323213)	Ampon Gromwet	-	-
NAME: Mangkorn S.	THAI NDT PCL.	Ampon Gromwet	-	-
METHOD (LEVEL):	THAI NDT PCL.	Ampon Gromwet	-	-
COMPANY:	THAI NDT PCL.	Ampon Gromwet	-	-
DATE OF ISSUE: June 17, 2021	June 17, 2021	June 17, 2021	-	-



INSPECTION REPORT

RADIOGRAPHIC EXAMINATION

CLIENT:	PTTEP Siam Limited	REPORT No.:	RT-TS-007/2021
PROJECT:	10" MA GAS FLOWLINE FROM WSM TO F/STN (REVISE PLS.PHASE II.)	PAGE No.	1 OF 1
PROCEDURE NO.(REV):	PTTEP/HC18-512/IRTG-200BAP Rev.0 (Date:13-08-20)	LOCATION:	WSM to F/STN
REF. CODE/STD:	ASME V Article 2	JOB No.:	FL21/012
WORK INSTRUCTION:	WIR-T	DATE / TIME OF TEST:	June 17, 2021
EQUIPMENT, MATERIALS & OPERATION PARAMETERS...		REQUEST No.	304421, B1 No. E-1480201
RADIATION SOURCE...	TIME: 5:22 MIN.	BRAND:	FUJI
X-RAY EQUIP:	- KVP	TECHNIQUE (E & V):	DW/ESWV
TUBE VOLTAGE:	- KVP	TYPE:	'X50" (C3)
TUBE CURRENT:	- Ma	SIZE:	38 X 432 MM.
GAMMA RAY SOURCE:	I-192	ISO/EN W10	INTENSIFYING SCREEN...
SOURCE ACTIVITY RANGE:	25.45 Ci (p.90)	FILM SIDE	FRONT: 3.125 MM.
SOURCE SIZE:	3.0 x 2.0 MM.	BACK:	0.125 MM.
DENSITOMETER SN:	06014737	% OF EXAM:	100
FILM PROCESSING:	<input checked="" type="checkbox"/> MANUAL <input type="checkbox"/> Auto	NO OF RADIOGRAPHS (Exp):	8
LOCATION MAKER PLACEMENT	<input type="checkbox"/> SOURCE SIDE <input checked="" type="checkbox"/> FILM SIDE		
PART IDENTIFICATION & INFORMATION...			
ISODWG No.:	10" MA FIL	LINE/SPOOL/PART ID:	
MATERIAL:	API 5L X42-API 5L X42	NOMINAL PIPE SIZE (inch):	10 inch
WELDING PROCESS:	GTAW-SMAV	MATERIAL THICKNESS (mm):	15.88 mm.
WELD THICKNESS:	19.08 mm.	REINFORCEMENT:	1.6+1.6 mm.
SENSITIVITY REQUIRED:	ESSENTIAL WIRE No. 10 (0.040 mm.)	DENSITY (RANGE)	2.0-4.0
SENSITIVITY ACHIEVED:	SMALLEST VISIBLE WIRE No. 11 (0.032 mm.)	DENSITY ACHIEVED(RANGE)	3.1-3.2
STATE OF EXAMINATION:	<input type="checkbox"/> PREPARED EDGE <input type="checkbox"/> AFTER REPAIR <input type="checkbox"/> BEFORE P.W.H.T <input type="checkbox"/> AFTER P.W.H.T	<input checked="" type="checkbox"/> BEFORE HYDROTEST <input type="checkbox"/> AFTER HYDROTEST	<input type="checkbox"/> OTHER....
ACCEPTANCE CRITERIA:	Section 9.3 of API 1104 (Refer to in 9.3.1 through 9.3.13 acceptance standards for radiographic testing)		
OTHER: 1008-STD-6-PLR-005-400			

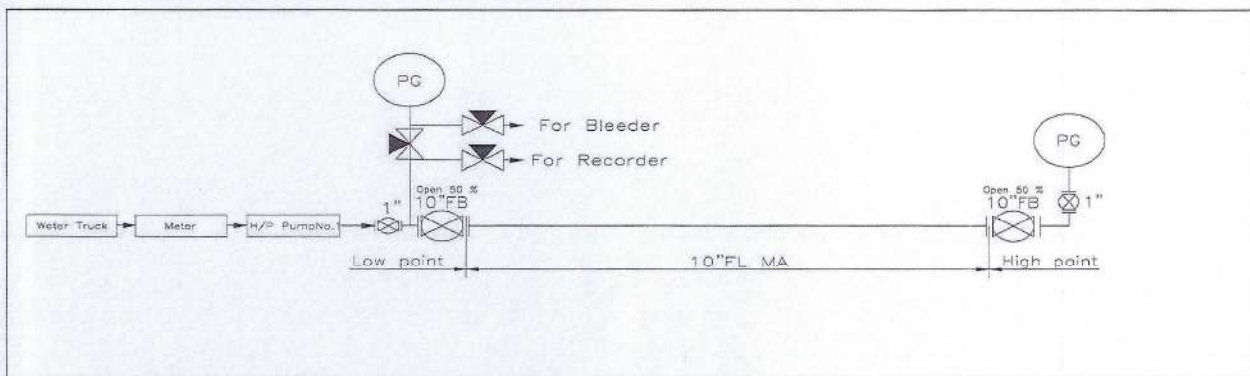
COUPON No.	WELD JOINT TYPE	WELDER NO.	FILM INTVL-NO	TYPE	DISCONTINUITY SIZE (mm.)	JUDGEMENT	REMARK
						ACCEPT	REJECT
J.228	BW	TW 825	A-B	NO	-	ACCEPT	1.3%
			B-C	NO	-	ACCEPT	1.3%
			C-D	NO	-	ACCEPT	1.3%
			D-A	NO	-	ACCEPT	1.3%
J.228A	BW	TW 825	A-B	P	02.5 mm.	ACCEPT	1.3%
			B-C	NO	-	ACCEPT	1.3%
			C-D	NO	-	ACCEPT	1.3%
			D-A	NO	-	ACCEPT	1.3%

ABBREVIATION:	AI : Accumulation of Impurities BT : Burn-through C : Crack CP : Cluster Porosity ES : Embedded slag inclusions EL : External Leakage	Note: Material Specification IPD : Inadequate Penetration due to High Low ISI : Isolated Slag Inclusions IU : Internal Undercut NI : No Significant Discontinuity PI : Individual or Scattered Porosity TI : Tungsten Inclusion
AUTHORIZATION:	INTERPRET/EVALUATED:	REVIEWED BY OWNER:
SIGNED:	Mangkhon S.	N/A
NAME:	POK R. (NO. 323213)	
METHOD (LEVEL):	THAI ROT PCL.	
COMPANY:	June 18, 2021	
DATE OF ISSUE :		



HYDROSTATIC TEST DIAGRAM FOR PIPELINE

PROJECT: 10"-MA" GAS FLOWLINE FROM 'WSM' TO 'F/STN' (REVISE PLS.PHASE II.) JOB ID. No. FL21/012
DRAWING No.: 10"MA PARTIAL TEST (JOINT NO.214-228A)



Piping Class:	10" FL T= 0625" (15.88 mm.)	Test Press.	Min 2486 Psi Max 2515 Psi	Pressurization	25% By: 625 Psi 50% By: 1250 Psi 75% By: 1875 Psi 100% By: 2500 Psi
Design Press.:	ST = 2000x1.25 = 2500 Psi. N/A Psi	Test Temp.	Min N/A °C Max N/A °C	Test Fluid	Water Ltr.
Design Temp.:	N/A °C	Test Fluid Q/T	996.54 Ltr.	Holding Time	2 Hrs.
Prepared By:	Amnat Thapluas Date: 22 JUN 2021	Signature:	N/A	Approved By:	Chairat Jaitang PTTEP ECM QA/QC 23 JUN 2021
Signature:		Name:		Signature:	
Name:		Date:		Name:	
Date:				Date:	




บริษัท ปตท.สผ. สยาม จำกัด


รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม
โครงการผลิตปิโตรเลียมแหล่งสิริกิติ์ตอนเหนือและพื้นที่ใกล้เคียง แปลงเอส 1 จังหวัดกำแพงเพชร พิชณุโลก และสุโขทัย
ฉบับเดือนมกราคม - ธันวาคม พ.ศ. 2566


ภาคผนวกที่ 12


ตัวอย่างเอกสารการตรวจสอบและบำรุงรักษาระบบท่อลำเลียงปิโตรเลียม
(Flowline Inspection)

FLOWLINE SUMMARY REPORT										PS1/IM INSPECTION TEAM	
FLOWLINE INFORMATION										NORMAL	
Tag number:		S1-KMGA-NTMC-6-KMGAA-P-CO				Report number:		FL-6-KMG-AA-CO-2023-02			
Line number:		KMG-AA				Inspection date:		Aug 02, 2023			
Location: Front-To		KMG-A		NTMC-C		Inservice date:		Jun 01, 2005			
P&ID number:		NTMC-1-08-005C & KMG-1-08-005				API Classification:		2.00			
Piping group:		Process				API MILI (yrs):		5.00			
Service description:		Crude oil				WO number:		500410224			
THICKNESS SUMMARY										NORMAL	
CML-TP Number:		E-E5-S383-W383-D				Nominal thickness (mm):		7.93			
Distance Description:		4202m 4202000mm From W383 0mm				Lowest actual thickness (mm):		7.3			
Location Description:		500 Before S-210-15				Retirement thickness (mm):		2.00			
NPS (inch):		6.00				Selected corrosion rate (mm/yr):		0.75			
Material:		API 5L X42				Remaining life (yrs):		7.03			
CML MILI, RL/2 (yrs):		5.00				Next inspection date (NID):		Feb 20, 2027			
MAWP											
Piping inspection interval (months):		12				Derate Pressure rec (psig):					
t(ta-2)(CRxInterval) (mm):		5.31				Retired after derate pressure (mm):					
MAWP (psig):		1590.66				Remaining Life after Pressure (months):					
EXTERNAL VISUAL INSPECTION SUMMARY										GOOD	
Damage mechanism check list											
Leak or Seepage						Good					
General corrosion						Good					
Vibration						Good					
Soil-to-Air Interface						N/A					
Corrosion under insulation (CUI)						N/A					
Corrosion under support (CUS)						Good					
Other						N/A					
Piping component check list											
Weld seam						Good					
Painting						N/A					
Insulation						N/A					
Pipe Support						Good					
Flange/Bolt/Nut/Gasket						N/A					
Instrument Component						N/A					
Deck Penetration						N/A					
Other						N/A					
INSPECTION SUMMARY										RECOMMENDATION DESCRIPTION	
<p>- KMG-AA 6" During a Crude flowline examination, it was discovered that the low reading thickness indicated considerable internal corrosion, which generally occurred at the root weld and nearby base material, as detected by TFM Technique with a low corrosion rate on inspection time & remaining thickness at CML no.C-C5-S232-W232-W is 6.72 mm, with SCR 0.07 mm./yr. & RL is 70.92 yrs. The overall thickness reading was still within acceptable range with slignity of internal metal loss & moderate corrosion rate on this period. The minimum remaining thickness at CML no.D-D1-S262-W262-D is 5.90 m. with SCR 0.29 mm./yr. & RL is 13.24 yrs.(General internal corrosion determined by MFL scanning and UTMI)</p> <p>Note; As previous inspection on Feb 11/2023.</p> <p>1.) This flowline have weld joint under block culvert shall be plan to inspect as detail below:</p> <p>- A2: have weld joint no.W42 thru W43 from support no. S-215,6-55 to S-215,6-54.</p> <p>- A3: have weld joint no.W42 thru W43 from support no. S-215,6-55 to S-211-47.</p> <p>2.) Underground of this flowline at subsection B5 has weld joint no.W160 thru</p>										<p>- Frequency to yearly extent inspection 5% or Min.10 of welding joint by PAUT/TFM Technique for detect internal weld metal loss within 12 months.(Aug 2-4)</p> <p>- Continue normal flowline 40%inspection (Sub-section 3 & 4) of entire flowline length for plan in next year 2024.(Feb-24)</p> <p>- Underground flowlines should be inspected with a MII of three years by excavating 20% of the underground section and testing with MFL, TFM, or DRT techniques. However, S/A must be extended by excavate at least 1.5 meters away from any underground bend pipe or elbow welding joint.</p> <p>- Plan to extend for flowline under block culvert inspection shall be done at least once a year for general visual inspection or other NDE Technique should be executed for internal corrosion detection for pipe & weld.</p> <p>- For crude transfer flowlines, the normal maximum operating pressure shall not exceed 500 PSI.</p>	
REQUIRED ACTION										Repairment	
Temporary repair										Rerating	
Permanent repair										Derating	
Inspected by:		Manop N.				Date:		Aug 09, 2023			
API Inspector reviewed by:		Jirawat C.				Date:		Aug 12, 2023			
TTTPEP Leader reviewed:		Prawit J.				Date:		Jan 26, 2024			


			FLOWLINE THICKNESS REPORT																
Tag No.:		S1-KMGA-NTMC-6-KMGAA-P-CO				Total length (m):		4300				Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):		6				% Inspection:		20				1st Inspection date:		Jan 27, 20 20		6th Inspection date:		Aug 02, 2023	
Flowline No.:		KMG-AA				No. of section (sections):		5				2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:		KMG-A		NTM-C		Length of section (m):		860				3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:		P		Process		Length of subsection (m):		172				4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:		CO		Crude oil		Total spool (spools):		391				5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL										
A	A1	1	0	A-A1-S0-W1-U	200 After Flange	7.93	2.00	U		Jan 16, 2019	12.50	12.40	Feb 11, 2023	12.55	12.45	-0.01	35.24		
		1	0	A-A1-S1-W1-D	200 After Flange	7.93	2.00	D		Jan 16, 2019	13.40	13.50	Feb 11, 2023	13.45	13.55	0.09	122.27		
		1	0	A-A1-S1-W1-W	200 After Flange	7.93	2.00	W TFM											
		2	11	A-A1-S1-W2-U	400 After Flange	7.93	2.00	U		Jan 16, 2019	13.50	14.00	Feb 11, 2023	13.55	14.05	0.06	190.61		
		2	11	A-A1-S2-W2-D	400 After Flange	7.93	2.00	D		Jan 16, 2019	10.40	10.40	Feb 11, 2023	10.45	10.45	0.07	118.00		
		2	11	A-A1-S2-W2-W	400 After Flange	7.93	2.00	W TFM											
		3	22	A-A1-S2-W3-U	3000 After Flange	7.93	2.00	U		Jan 16, 2019	9.70	10.00	Feb 11, 2023	9.75	9.96	0.05	156.32		
		3	22	A-A1-S3-W3-D	3000 After Flange	7.93	2.00	D		Jan 16, 2019	7.00	7.40	Feb 11, 2023	7.05	7.86	0.03	183.35		
		3	22	A-A1-S3-W3-W	3000 After Flange	7.93	2.00	W TFM											
		4	33	A-A1-S3-W4-U	2800 Before S-215-.7-63	7.93	2.00	U		Jan 16, 2019	7.00	7.00	Feb 11, 2023	7.05	7.05	0.02	305.58		
		4	33	A-A1-S4-W4-D	2800 Before S-215-.7-63	7.93	2.00	D		Jan 16, 2019	9.80	10.00	Feb 11, 2023	9.85	10.05	0.03	285.01		
		4	33	A-A1-S4-W4-W	2800 Before S-215-.7-63	7.93	2.00	W TFM											
		5	44	A-A1-S4-W5-U	1800 Before S-215-.7-63	7.93	2.00	U		Jan 16, 2019	10.59	10.59	Feb 11, 2023	10.64	10.64	-0.00	29.14		
		5	44	A-A1-S5-W5-D	1800 Before S-215-.7-63	7.93	2.00	D		Jan 16, 2019	10.59	10.39	Feb 11, 2023	10.64	10.44	-0.00	28.47		
		5	44	A-A1-S5-W5-W	1800 Before S-215-.7-63	7.93	2.00	W TFM											
		6	55	A-A1-S5-W6-U	1700 Before S-215-.7-63	7.93	2.00	U		Jan 16, 2019	10.29	10.39	Feb 11, 2023	10.34	10.44	-0.00	28.13		
		6	55	A-A1-S6-W6-D	1700 Before S-215-.7-63	7.93	2.00	D		Jan 16, 2019	10.99	10.39	Feb 11, 2023	11.04	10.44	-0.00	28.47		
		6	55	A-A1-S6-W6-W	1700 Before S-215-.7-63	7.93	2.00	W TFM											
		7	66	A-A1-S6-W7-U	200 Before S-215-.7-63	7.93	2.00	U		Jan 16, 2019	10.29	9.99	Feb 11, 2023	10.34	9.04	0.23	30.19		
		7	66	A-A1-S7-W7-D	200 Before S-215-.7-63	7.93	2.00	D		Jan 16, 2019	7.19	7.29	Feb 11, 2023	7.24	7.34	-0.00	17.67		
		7	66	A-A1-S7-W7-W	200 Before S-215-.7-63	7.93	2.00	W TFM											


				FLOWLINE THICKNESS REPORT															
Tag No.: S1-KMGA-NTMC-6-KMGAA-P-CO						Total length (m): 4300				Installation date: Jun 01, 2005				Service life (yrs): 18.67					
Pipe size (in): 6						% Inspection: 20				1st Inspection date: Jan 27, 2020				6th Inspection date: Aug 02, 2023					
Flowline No.: KMG-AA						No. of section (sections): 5				2nd Inspection date: Jan 02, 2021				7th Inspection date: Jan 19, 2016					
From-To: KMG-A NTM-C						Length of section (m): 860				3rd Inspection date: Feb 21, 2022				8th Inspection date: Jan 27, 2017					
Process: P						Length of subsection (m): 172				4th Inspection date: Dec 08, 2022				9th Inspection date: Jan 16, 2018					
Service: CO						Crude oil				Total spool (spools): 391				5th Inspection date: Feb 11, 2023				10th Inspection Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL										
		8	77	A-A1-S7-W8-U	1000 After S-215-7-63	7.93	2.00	U		Jan 16, 2019	7.00	7.49	Feb 11, 2023	7.05	7.54	0.01	916.75		
		8	77	A-A1-S8-W8-D	1000 After S-215-7-63	7.93	2.00	D		Jan 16, 2019	6.89	6.99	Feb 11, 2023	6.94	7.04	-0.00	16.66		
		8	77	A-A1-S8-W8-W	1000 After S-215-7-63	7.93	2.00	W TFM											
		9	88	A-A1-S8-W9-U	1000 After S-215-7-61	7.93	2.00	U		Jan 16, 2019	7.19	6.79	Feb 11, 2023	7.24	6.84	-0.00	16.32		
		9	88	A-A1-S9-W9-D	1000 After S-215-7-61	7.93	2.00	D		Jan 16, 2019	8.30	7.69	Feb 11, 2023	8.35	7.74	-0.00	19.36		
		9	88	A-A1-S9-W9-W	1000 After S-215-7-61	7.93	2.00	W TFM											
		10	99	A-A1-S9-W10-U	2200 Before S-215-7-60	7.93	2.00	U		Jan 16, 2019	9.00	8.69	Feb 11, 2023	9.05	8.74	-0.00	22.73		
		10	99	A-A1-S10-W10-D	2200 Before S-215-7-60	7.93	2.00	D		Jan 16, 2019	6.79	7.20	Feb 11, 2023	6.84	7.25	-0.00	16.32		
		10	99	A-A1-S10-W10-W	2200 Before S-215-7-60	7.93	2.00	W TFM											
		11	110	A-A1-S10-W11-U	2500 Before Fix Support	7.93	2.00	U		Jan 16, 2019	7.39	7.10	Feb 11, 2023	7.44	7.15	0.02	311.63		
		11	110	A-A1-S11-W11-D	2500 Before Fix Support	7.93	2.00	D		Jan 16, 2019	7.30	7.09	Feb 11, 2023	7.35	7.14	-0.00	17.34		
		11	110	A-A1-S11-W11-W	2500 Before Fix Support	7.93	2.00	W TFM											
		12	121	A-A1-S11-W12-U	2500 After Fix Support	7.93	2.00	U		Jan 16, 2019	7.30	7.39	Feb 11, 2023	7.35	7.44	0.01	971.21		
		12	121	A-A1-S12-W12-D	2500 After Fix Support	7.93	2.00	D		Jan 16, 2019	7.29	7.40	Feb 11, 2023	7.29	7.45	0.00	4801.58		
		12	121	A-A1-S12-W12-W	2500 After Fix Support	7.93	2.00	W TFM											
		13	132	A-A1-S12-W13-U	2500 Before S-215-7-56	7.93	2.00	U		Jan 16, 2019	7.30	7.59	Feb 11, 2023	7.35	7.64	0.01	971.21		
		13	132	A-A1-S13-W13-D	2500 Before S-215-7-56	7.93	2.00	D		Jan 16, 2019	7.40	7.59	Feb 11, 2023	7.45	7.64	0.02	329.79		
		13	132	A-A1-S13-W13-W	2500 Before S-215-7-56	7.93	2.00	W TFM											
		14	143	A-A1-S13-W14-U	2600 Before S-215-7-54	7.93	2.00	U		Jan 16, 2019	7.00	7.10	Feb 11, 2023	7.05	7.15	0.03	183.35		
		14	143	A-A1-S14-W14-D	2600 Before S-215-7-54	7.93	2.00	D		Jan 16, 2019	7.29	6.90	Feb 11, 2023	7.34	6.95	0.04	128.37		
		14	143	A-A1-S14-W14-W	2600 Before S-215-7-54	7.93	2.00	W TFM											


			FLOWLINE THICKNESS REPORT														
Tag No.: S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m): 4300			Installation date: Jun 01, 2005		Service life (yrs): 18.67									
Pipe size (in): 6			% Inspection: 20			1st Inspection date: Jan 27, 2020		6th Inspection date: Aug 02, 2023									
Flowline No.: KMG-AA			No. of section (sections): 5			2nd Inspection date: Jan 02, 2021		7th Inspection date: Jan 19, 2016									
From-To: KMG-A		NTM-C	Length of section (m): 860			3rd Inspection date: Feb 21, 2022		8th Inspection date: Jan 27, 2017									
Process: P		Process	Length of subsection (m): 172			4th Inspection date: Dec 08, 2022		9th Inspection date: Jan 16, 2018									
Service: CO		Crude oil	Total spool (spools): 391			5th Inspection date: Feb 11, 2023		10th Inspection Jan 16, 2019									
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL								
		15	154	A-A1-S14-W15-U	2600 Before S-215.7-52	7.93	2.00	U		Jan 16, 2019	7.50	7.49	Feb 11, 2023	7.55	7.54	-0.00	18.68
		15	154	A-A1-S15-W15-D	2600 Before S-215.7-52	7.93	2.00	D		Jan 16, 2019	7.19	7.09	Feb 11, 2023	7.24	7.09	0.00	4620.05
		15	154	A-A1-S15-W15-W	2600 Before S-215.7-52	7.93	2.00	W TFM					Dec 08, 2022		7.73	0.01	502.28
		16	165	A-A1-S15-W16-U	2800 Before S-215.7-50	7.93	2.00	U		Jan 16, 2019	7.69	7.49	Feb 11, 2023	7.74	7.54	-0.00	18.68
		16	165	A-A1-S16-W16-D	2800 Before S-215.7-50	7.93	2.00	D		Jan 16, 2019	7.09	7.09	Feb 11, 2023	7.14	7.14	-0.00	17.34
		16	165	A-A1-S16-W16-W	2800 Before S-215.7-50	7.93	2.00	W TFM					Dec 08, 2022		7.91	0.00	5180.56
		17	176	A-A1-S16-W17-U	2600 Before S-215.7-48	7.93	2.00	U		Jan 16, 2019	7.19	7.50	Feb 11, 2023	7.24	7.55	-0.00	17.67
		17	176	A-A1-S17-W17-D	2600 Before S-215.7-48	7.93	2.00	D		Jan 16, 2019	6.90	7.09	Feb 11, 2023	6.95	7.14	0.02	299.53
		17	176	A-A1-S17-W17-W	2600 Before S-215.7-48	7.93	2.00	W TFM					Dec 08, 2022		7.55	0.02	256.05
		18	187	A-A1-S17-W18-U	2600 After S-215.7-47	7.93	2.00	U		Jan 16, 2019	7.59	7.49	Feb 11, 2023	7.64	7.54	-0.00	18.68
		18	187	A-A1-S18-W18-D	2600 After S-215.7-47	7.93	2.00	D		Jan 16, 2019	7.19	7.29	Feb 11, 2023	7.24	7.34	-0.00	17.67
		18	187	A-A1-S18-W18-W	2600 After S-215.7-47	7.93	2.00	W TFM					Dec 08, 2022		7.73	0.01	502.28
		19	198	A-A1-S18-W19-U	2000 After S-215.7-45	7.93	2.00	U		Jan 16, 2019	7.30	7.59	Feb 11, 2023	7.35	7.50	0.03	194.24
		19	198	A-A1-S19-W19-D	2000 After S-215.7-45	7.93	2.00	D		Jan 16, 2019	7.40	7.49	Feb 11, 2023	7.45	7.54	0.01	989.36
		19	198	A-A1-S19-W19-W	2000 After S-215.7-45	7.93	2.00	W TFM					Dec 08, 2022		7.36	0.03	164.86
		20	209	A-A1-S19-W20-U	1800 After S-215.7-43	7.93	2.00	U		Jan 16, 2019	6.80	7.30	Feb 11, 2023	6.85	7.35	0.05	97.83
		20	209	A-A1-S20-W20-D	1800 After S-215.7-43	7.93	2.00	D		Jan 16, 2019	7.60	7.20	Feb 11, 2023	7.62	7.25	0.03	190.61
		20	209	A-A1-S20-W20-W	1800 After S-215.7-43	7.93	2.00	W TFM					Dec 08, 2022		7.36	0.03	164.86
		21	220	A-A1-S20-W21-U	1500 After S-215.7-41	7.93	2.00	U		Jan 16, 2019	7.79	7.59	Feb 11, 2023	7.84	7.64	-0.00	19.02
		21	220	A-A1-S21-W21-D	1500 After S-215.7-41	7.93	2.00	D		Jan 16, 2019	7.69	8.19	Feb 11, 2023	7.74	8.24	-0.00	19.36
		21	220	A-A1-S21-W21-W	1500 After S-215.7-41	7.93	2.00	W TFM									


		FLOWLINE THICKNESS REPORT													
Tag No.:		S1-KMGA-NTMC-6-KMGAA-P-CO		Total length (m):		4300		Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):		6		% Inspection:		20		1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:		KMG-AA		No. of section (sections):		5		2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:		KMG-A NTM-C		Length of section (m):		860		3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:		P Process		Length of subsection (m):		172		4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:		CO Crude oil		Total spool (spools):		391		5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	

Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL								
		22	231	A-A1-S21-W22-U	1000 After S-215.7-39	7.93	2.00	U		Jan 16, 2019	7.49	7.49	Feb 11, 2023	7.54	7.54	-0.00	18.68
		22	231	A-A1-S22-W22-D	1000 After S-215.7-39	7.93	2.00	D		Jan 16, 2019	7.90	7.59	Feb 11, 2023	7.95	7.64	-0.00	19.02
		22	231	A-A1-S22-W22-W	1000 After S-215.7-39	7.93	2.00	W TFM									
		22.1	232.1	A-A1-S22-W22.1-U	1400 After S-215.7-36	7.93	2.00	U					Feb 11, 2023	7.82	7.95	0.01	937.00
		22.1	232.1	A-A1-S22.1-W22.1-D	1400 After S-215.7-36	7.93	2.00	D					Feb 11, 2023	7.95	8.01	-0.00	20.07
		22.1	232.1	A-A1-S22.1-W22.1-W	1400 After S-215.7-36	7.93	2.00	W TFM									
A	A2	23	242	A-A2-S22.1-W23-U	1100 After S-215.7-34	7.93	2.00	U		Jan 27, 2020	7.60	7.60	Feb 11, 2023	7.65	7.65	0.00	1479.84
		23	242	A-A2-S23-W23-D	1100 After S-215.7-34	7.93	2.00	D		Jan 27, 2020	8.20	7.20	Feb 11, 2023	8.25	7.25	-0.00	17.71
		23	242	A-A2-S23-W23-W	1100 After S-215.7-34	7.93	2.00	W TFM									
		24	253	A-A2-S23-W24-U	1000 After S-215.7-32	7.93	2.00	U		Jan 27, 2020	7.20	7.90	Feb 11, 2023	7.25	7.95	0.00	1375.07
		24	253	A-A2-S24-W24-D	1000 After S-215.7-32	7.93	2.00	D		Jan 27, 2020	7.00	7.50	Feb 11, 2023	7.05	7.55	-0.00	17.03
		24	253	A-A2-S24-W24-W	1000 After S-215.7-32	7.93	2.00	W TFM									
		25	264	A-A2-S24-W25-U	2000 After S-215.7-30	7.93	2.00	U		Jan 27, 2020	7.40	7.40	Feb 11, 2023	7.45	7.45	-0.00	18.38
		25	264	A-A2-S25-W25-D	2000 After S-215.7-30	7.93	2.00	D		Jan 27, 2020	8.00	7.40	Feb 11, 2023	8.05	7.45	-0.00	18.38
		25	264	A-A2-S25-W25-W	2000 After S-215.7-30	7.93	2.00	W TFM									
		26	275	A-A2-S25-W26-U	500 Before S-215.7-28	7.93	2.00	U		Jan 27, 2020	7.20	7.70	Feb 11, 2023	7.25	7.75	0.03	196.44
		26	275	A-A2-S26-W26-D	500 Before S-215.7-28	7.93	2.00	D		Jan 27, 2020	7.50	7.70	Feb 11, 2023	7.55	7.75	0.00	1453.64
		26	275	A-A2-S26-W26-W	500 Before S-215.7-28	7.93	2.00	W TFM									
		27	286	A-A2-S26-W27-U	600 Before S-215.7-26	7.93	2.00	U		Jan 27, 2020	7.40	7.20	Feb 11, 2023	7.45	7.25	-0.00	17.71
		27	286	A-A2-S27-W27-D	600 Before S-215.7-26	7.93	2.00	D		Jan 27, 2020	7.80	6.80	Feb 11, 2023	7.85	6.85	-0.00	16.36
		27	286	A-A2-S27-W27-W	600 Before S-215.7-26	7.93	2.00	W TFM									


			FLOWLINE THICKNESS REPORT														
Tag No.: S1-KMGA-NTMC-6-KMGAA-P-CO					Total length (m): 4300			Installation date: Jun 01, 2005			Service life (yrs): 18.67						
Pipe size (in): 6					% Inspection: 20			1st Inspection date: Jan 27, 2020			6th Inspection date: Aug 02, 2023						
Flowline No.: KMG-AA					No. of section (sections): 5			2nd Inspection date: Jan 02, 2021			7th Inspection date: Jan 19, 2016						
From-To: KMG-A NTM-C					Length of section (m): 860			3rd Inspection date: Feb 21, 2022			8th Inspection date: Jan 27, 2017						
Process: P					Length of subsection (m): 172			4th Inspection date: Dec 08, 2022			9th Inspection date: Jan 16, 2018						
Service: CO					Total spool (spools): 391			5th Inspection date: Feb 11, 2023			10th Inspection: Jan 16, 2019						
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL								
		28	297	A-A2-S27-W28-U	1100 Before S-215.7-24	7.93	2.00	U		Jan 27, 2020	6.90	7.30	Feb 11, 2023	6.95	7.35	-0.00	16.69
		28	297	A-A2-S28-W28-D	1100 Before S-215.7-24	7.93	2.00	D		Jan 27, 2020	7.20	7.30	Feb 11, 2023	7.25	7.35	-0.00	17.71
		28	297	A-A2-S28-W28-W	1100 Before S-215.7-24	7.93	2.00	W TFM									
		29	308	A-A2-S28-W29-U	1100 Before S-215.7-22	7.93	2.00	U		Jan 27, 2020	6.80	7.00	Feb 11, 2023	6.85	7.05	-0.00	16.36
		29	308	A-A2-S29-W29-D	1100 Before S-215.7-22	7.93	2.00	D		Jan 27, 2020	7.30	6.90	Feb 11, 2023	7.35	6.95	-0.00	16.69
		29	308	A-A2-S29-W29-W	1100 Before S-215.7-22	7.93	2.00	W TFM									
		30	319	A-A2-S29-W30-U	2500 After S-215.7-21	7.93	2.00	U		Jan 27, 2020	7.20	7.60	Feb 11, 2023	7.25	7.65	-0.00	17.71
		30	319	A-A2-S30-W30-D	2500 After S-215.7-21	7.93	2.00	D		Jan 27, 2020	7.60	7.30	Feb 11, 2023	7.52	7.35	-0.00	18.04
		30	319	A-A2-S30-W30-W	2500 After S-215.7-21	7.93	2.00	W TFM									
		31	330	A-A2-S30-W31-U	2000 After S-215.7-19	7.93	2.00	U		Jan 27, 2020	7.20	7.50	Feb 11, 2023	7.25	7.55	-0.00	17.71
		31	330	A-A2-S31-W31-D	2000 After S-215.7-19	7.93	2.00	D		Jan 27, 2020	7.10	7.00	Feb 11, 2023	7.15	7.05	0.00	1322.68
		31	330	A-A2-S31-W31-W	2000 After S-215.7-19	7.93	2.00	W TFM									
		32	341	A-A2-S31-W32-U	1800 After S-215.7-17	7.93	2.00	U		Jan 27, 2020	7.30	7.60	Feb 11, 2023	7.35	7.65	-0.00	18.04
		32	341	A-A2-S32-W32-D	1800 After S-215.7-17	7.93	2.00	D		Jan 27, 2020	7.00	7.20	Feb 11, 2023	7.05	7.25	0.02	264.54
		32	341	A-A2-S32-W32-W	1800 After S-215.7-17	7.93	2.00	W TFM									
		33	352	A-A2-S32-W33-U	1800 After S-215.7-15	7.93	2.00	U		Jan 27, 2020	7.80	7.90	Feb 11, 2023	7.85	7.95	0.01	510.74
		33	352	A-A2-S33-W33-D	1800 After S-215.7-15	7.93	2.00	D		Jan 27, 2020	7.30	7.50	Feb 11, 2023	7.35	7.55	-0.00	18.04
		33	352	A-A2-S33-W33-W	1800 After S-215.7-15	7.93	2.00	W TFM									
		34	363	A-A2-S33-W34-U	1200 After S-215.7-13	7.93	2.00	U		Jan 27, 2020	7.70	7.10	Feb 11, 2023	7.75	7.15	-0.00	17.37
		34	363	A-A2-S34-W34-D	1200 After S-215.7-13	7.93	2.00	D		Jan 27, 2020	7.50	7.80	Feb 11, 2023	8.55	7.85	-0.00	19.73
		34	363	A-A2-S34-W34-W	1200 After S-215.7-13	7.93	2.00	W TFM									


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67		
Pipe size (in):			6			% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023		
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016		
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		35	374	A-A2-S34-W35-U	1200 After S-215.7-10	7.93	2.00	U		Jan 27, 2020	7.80	7.70	Feb 11, 2023	7.85	7.70	0.01	746.47			
		35	374	A-A2-S35-W35-D	1200 After S-215.7-10	7.93	2.00	D		Jan 27, 2020	7.40	7.90	Feb 11, 2023	7.45	7.95	0.01	475.82			
		35	374	A-A2-S35-W35-W	1200 After S-215.7-10	7.93	2.00	W TFM												
		36	385	A-A2-S35-W36-U	100 After S-215.7-08	7.93	2.00	U		Jan 27, 2020	7.30	7.40	Feb 11, 2023	7.35	7.45	-0.00	18.04			
		36	385	A-A2-S36-W36-D	100 After S-215.7-08	7.93	2.00	D		Jan 27, 2020	7.00	7.50	Feb 11, 2023	7.05	7.55	0.03	188.95			
		36	385	A-A2-S36-W36-W	100 After S-215.7-08	7.93	2.00	W TFM												
		37	396	A-A2-S36-W37-U	900 After S-215.7-06	7.93	2.00	U		Jan 27, 2020	7.30	7.50	Feb 11, 2023	7.35	7.55	0.01	467.09			
		37	396	A-A2-S37-W37-D	900 After S-215.7-06	7.93	2.00	D		Jan 27, 2020	7.60	7.20	Feb 11, 2023	7.65	7.25	-0.00	17.71			
		37	396	A-A2-S37-W37-W	900 After S-215.7-06	7.93	2.00	W TFM												
A	A3	38	407	A-A3-S37-W38-U	600 Before S-215.7-04	7.93	2.00	U		Jan 19, 2016	7.29	7.29	Jan 02, 2020	7.40	7.50	-0.01	18.21			
		38	407	A-A3-S38-W38-D	600 Before S-215.7-04	7.93	2.00	D		Jan 19, 2016	7.60	7.40	Jan 02, 2020	7.40	7.60	0.03	161.16			
		38	407	A-A3-S38-W38-W	600 Before S-215.7-04	7.93	2.00	W TFM												
		39	418	A-A3-S38-W39-U	500 Before S-215.7-02	7.93	2.00	U		Jan 19, 2016	7.19	6.79	Jan 02, 2020	7.30	7.20	-0.04	17.54			
		39	418	A-A3-S39-W39-D	500 Before S-215.7-02	7.93	2.00	D		Jan 19, 2016	7.89	7.89	Jan 02, 2020	8.00	8.00	-0.01	20.24			
		39	418	A-A3-S39-W39-W	500 Before S-215.7-02	7.93	2.00	W TFM												
		40	429	A-A3-S39-W40-U	300 After S-215.6-58	7.93	2.00	U		Jan 19, 2016	7.50	7.50	Jan 02, 2020	7.47	7.43	0.04	131.40			
		40	429	A-A3-S40-W40-D	300 After S-215.6-58	7.93	2.00	D		Jan 19, 2016	7.30	7.50	Jan 02, 2020	7.68	7.73	-0.02	19.16			
		40	429	A-A3-S40-W40-W	300 After S-215.6-58	7.93	2.00	W TFM												
		41	440	A-A3-S40-W41-U	2800 After S-215.6-56	7.93	2.00	U		Jan 19, 2016	7.20	7.30	Jan 02, 2020	7.95	8.00	-0.07	20.07			
		41	440	A-A3-S41-W41-D	2800 After S-215.6-56	7.93	2.00	D		Jan 19, 2016	7.90	7.00	Jan 02, 2020	8.78	8.32	-0.13	21.32			
		41	440	A-A3-S41-W41-W	2800 After S-215.6-56	7.93	2.00	W TFM												


		FLOWLINE THICKNESS REPORT																			
Tag No.:		S1-KMGA-NTMC-6-KMGAA-P-CO				Total length (m):				4300				Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):		6				% Inspection:				20				1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:		KMG-AA				No. of section (sections):				5				2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:		KMG-A		NTM-C		Length of section (m):				860				3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:		P		Process		Length of subsection (m):				172				4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:		CO		Crude oil		Total spool (spools):				391				5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL												
		42	451	A-A3-S41-W42-U	2600 Before S-215.6-55	7.93	2.00	U		Jan 19, 2016	7.10	7.49	Jan 02, 2020	7.75	8.20	-0.03	19.39				
		42	451	A-A3-S42-W42-D	2600 Before S-215.6-55	7.93	2.00	D		Jan 19, 2016	7.29	7.99	Jan 02, 2020	8.40	8.45	-0.12	21.59				
		42	451	A-A3-S42-W42-W	2600 Before S-215.6-55	7.93	2.00	W TFM													
		43	462	A-A3-S42-W43-U	2700 Before S-215.6-54	7.93	2.00	U		Jan 19, 2016	7.90	7.30	Jan 02, 2020	7.97	7.38	0.04	150.53				
		43	462	A-A3-S43-W43-D	2700 Before S-215.6-54	7.93	2.00	D		Jan 19, 2016	7.40	7.10	Jan 02, 2020	7.49	7.19	-0.02	17.50				
		43	462	A-A3-S43-W43-W	2700 Before S-215.6-54	7.93	2.00	W TFM													
		44	473	A-A3-S43-W44-U	2500 Before S-215.6-53	7.93	2.00	U		Jan 19, 2016	6.99	7.80	Jan 02, 2020	7.29	8.00	-0.03	17.84				
		44	473	A-A3-S44-W44-D	2500 Before S-215.6-53	7.93	2.00	D		Jan 19, 2016	7.60	7.39	Jan 02, 2020	7.96	8.00	-0.06	20.10				
		44	473	A-A3-S44-W44-W	2500 Before S-215.6-53	7.93	2.00	W TFM													
		45	484	A-A3-S44-W45-U	2500 Before S-215.6-51	7.93	2.00	U		Jan 19, 2016	7.40	7.40	Jan 02, 2020	7.38	7.29	0.03	190.26				
		45	484	A-A3-S45-W45-D	2500 Before S-215.6-51	7.93	2.00	D		Jan 19, 2016	7.30	7.50	Jan 02, 2020	7.18	7.50	0.03	170.77				
		45	484	A-A3-S45-W45-W	2500 Before S-215.6-51	7.93	2.00	W TFM													
		46	495	A-A3-S45-W46-U	2400 Before S-215.6-49	7.93	2.00	U		Jan 19, 2016	7.60	7.40	Jan 02, 2020	7.60	7.38	0.02	218.95				
		46	495	A-A3-S46-W46-D	2400 Before S-215.6-49	7.93	2.00	D		Jan 19, 2016	7.30	7.60	Jan 02, 2020	7.32	7.70	0.01	595.40				
		46	495	A-A3-S46-W46-W	2400 Before S-215.6-49	7.93	2.00	W TFM													
		47	506	A-A3-S46-W47-U	2500 Before S-215.6-47	7.93	2.00	U		Jan 19, 2016	7.70	7.39	Jan 02, 2020	7.71	7.74	-0.03	19.26				
		47	506	A-A3-S47-W47-D	2500 Before S-215.6-47	7.93	2.00	D		Jan 19, 2016	7.20	7.30	Jan 02, 2020	7.54	7.53	-0.01	18.65				
		47	506	A-A3-S47-W47-W	2500 Before S-215.6-47	7.93	2.00	W TFM													
		48	517	A-A3-S47-W48-U	2100 Before S-215.6-45	7.93	2.00	U		Jan 19, 2016	7.59	7.70	Jan 02, 2020	7.39	7.50	0.05	106.62				
		48	517	A-A3-S48-W48-D	2100 Before S-215.6-45	7.93	2.00	D		Jan 19, 2016	7.60	7.09	Jan 02, 2020	7.47	7.30	-0.02	17.88				
		48	517	A-A3-S48-W48-W	2100 Before S-215.6-45	7.93	2.00	W TFM													


	FLOWLINE THICKNESS REPORT																
Tag No.:		S1-KMGA-NTMC-6-KMGAA-P-CO		Total length (m):		4300		Installation date:		Jun 01, 2005		Service life (yrs):		18.67			
Pipe size (in):		6		% Inspection:		20		1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023			
Flowline No.:		KMG-AA		No. of section (sections):		5		2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016			
From-To:		KMG-A		NTM-C		Length of section (m):		860		3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:		P		Process		Length of subsection (m):		172		4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:		CO		Crude oil		Total spool (spools):		391		5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	


Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL								
		49	528	A-A3-S48-W49-U	2000 Before S-215.6-43	7.93	2.00	U		Jan 19, 2016	7.09	7.20	Jan 02, 2020	7.00	7.00	0.02	219.79
		49	528	A-A3-S49-W49-D	2000 Before S-215.6-43	7.93	2.00	D		Jan 19, 2016	7.00	7.90	Jan 02, 2020	7.69	7.80	0.01	463.14
		49	528	A-A3-S49-W49-W	2000 Before S-215.6-43	7.93	2.00	W TFM									
		50	539	A-A3-S49-W50-U	1800 Before S-215.6-41	7.93	2.00	U		Jan 19, 2016	7.30	7.50	Jan 02, 2020	7.27	7.50	0.03	205.15
		50	539	A-A3-S50-W50-D	1800 Before S-215.6-41	7.93	2.00	D		Jan 19, 2016	7.30	7.60	Jan 02, 2020	7.29	7.70	0.05	115.52
		50	539	A-A3-S50-W50-W	1800 Before S-215.6-41	7.93	2.00	W TFM									
		51	550	A-A3-S50-W51-U	1200 Before S-215.6-39	7.93	2.00	U		Jan 19, 2016	6.99	7.50	Jan 02, 2020	7.45	7.90	-0.05	18.38
		51	550	A-A3-S51-W51-D	1200 Before S-215.6-39	7.93	2.00	D		Jan 19, 2016	7.50	7.60	Jan 02, 2020	7.98	8.00	-0.04	20.17
		51	550	A-A3-S51-W51-W	1200 Before S-215.6-39	7.93	2.00	W TFM									
		52	561	A-A3-S51-W52-U	1000 After Sleep	7.93	2.00	U		Jan 19, 2016	7.20	7.20	Jan 02, 2020	8.10	8.00	-0.11	20.24
		52	561	A-A3-S52-W52-D	1000 After Sleep	7.93	2.00	D		Jan 19, 2016	7.80	7.20	Jan 02, 2020	8.20	8.10	-0.07	20.57
		52	561	A-A3-S52-W52-W	1000 After Sleep	7.93	2.00	W TFM									
		53	572	A-A3-S52-W53-U	2800 After S-215.6-37	7.93	2.00	U		Jan 19, 2016	8.10	7.10	Jan 02, 2020	8.00	7.19	0.07	76.18
		53	572	A-A3-S53-W53-D	2800 After S-215.6-37	7.93	2.00	D		Jan 19, 2016	7.79	7.70	Jan 02, 2020	7.80	7.68	0.01	423.80
		53	572	A-A3-S53-W53-W	2800 After S-215.6-37	7.93	2.00	W TFM									
A	A4	54	583	A-A4-S53-W54-U	2200 After S-215.6-36	7.93	2.00	U		Jan 27, 2017	7.40	7.30	Feb 21, 2022	7.93	7.85	-0.02	19.73
		54	583	A-A4-S54-W54-D	2200 After S-215.6-36	7.93	2.00	D		Jan 27, 2017	7.50	7.30	Feb 21, 2022	7.99	7.88	-0.02	19.83
		54	583	A-A4-S54-W54-W	2200 After S-215.6-36	7.93	2.00	W TFM									
		55	594	A-A4-S54-W55-U	2000 After S-215.6-34	7.93	2.00	U		Jan 27, 2017	7.20	7.40	Feb 21, 2022	7.00	7.49	0.04	126.78
		55	594	A-A4-S55-W55-D	2000 After S-215.6-34	7.93	2.00	D		Jan 27, 2017	7.40	7.30	Feb 21, 2022	7.44	7.12	0.04	144.25
		55	594	A-A4-S55-W55-W	2000 After S-215.6-34	7.93	2.00	W TFM									


		FLOWLINE THICKNESS REPORT															
Tag No.: S1-KMGA-NTMC-6-KMGAA-P-CO					Total length (m): 4300			Installation date: Jun 01, 2005			Service life (yrs): 18.67						
Pipe size (in): 6					% Inspection: 20			1st Inspection date: Jan 27, 2020			6th Inspection date: Aug 02, 2023						
Flowline No.: KMG-AA					No. of section (sections): 5			2nd Inspection date: Jan 02, 2021			7th Inspection date: Jan 19, 2016						
From-To: KMG-A			NTM-C		Length of section (m): 860			3rd Inspection date: Feb 21, 2022			8th Inspection date: Jan 27, 2017						
Process: P			Process		Length of subsection (m): 172			4th Inspection date: Dec 08, 2022			9th Inspection date: Jan 16, 2018						
Service: CO			Crude oil		Total spool (spools): 391			5th Inspection date: Feb 11, 2023			10th Inspection: Jan 16, 2019						
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL								
		56	605	A-A4-S55-W56-U	1800 After S-215.6-32	7.93	2.00	U		Jan 27, 2017	7.49	6.39	Feb 21, 2022	7.78	7.00	-0.06	16.86
		56	605	A-A4-S56-W56-D	1800 After S-215.6-32	7.93	2.00	D		Jan 27, 2017	6.39	6.39	Feb 21, 2022	7.00	7.21	-0.06	16.86
		56	605	A-A4-S56-W56-W	1800 After S-215.6-32	7.93	2.00	W TFM									
		57	616	A-A4-S56-W57-U	1300 After S-215.6-30	7.93	2.00	U		Jan 27, 2017	7.40	7.59	Feb 21, 2022	7.38	7.20	0.04	131.00
		57	616	A-A4-S57-W57-D	1300 After S-215.6-30	7.93	2.00	D		Jan 27, 2017	7.19	7.30	Feb 21, 2022	7.15	7.21	0.01	652.92
		57	616	A-A4-S57-W57-W	1300 After S-215.6-30	7.93	2.00	W TFM									
		58	627	A-A4-S57-W58-U	1000 After S-215.6-28	7.93	2.00	U		Jan 27, 2017	7.59	7.79	Feb 21, 2022	8.53	8.23	-0.06	21.01
		58	627	A-A4-S58-W58-D	1000 After S-215.6-28	7.93	2.00	D		Jan 27, 2017	7.39	7.89	Feb 21, 2022	7.83	8.65	-0.04	19.66
		58	627	A-A4-S58-W58-W	1000 After S-215.6-28	7.93	2.00	W TFM									
		59	638	A-A4-S58-W59-U	3000 After S-215.6-27	7.93	2.00	U		Jan 27, 2017	7.50	7.10	Feb 21, 2022	8.18	8.31	-0.06	20.84
		59	638	A-A4-S59-W59-D	3000 After S-215.6-27	7.93	2.00	D		Jan 27, 2017	7.20	7.40	Feb 21, 2022	7.94	8.10	-0.01	20.03
		59	638	A-A4-S59-W59-W	3000 After S-215.6-27	7.93	2.00	W TFM									
		60	649	A-A4-S59-W60-U	1000 Before S-215.6-24	7.93	2.00	U		Jan 27, 2017	6.90	7.30	Feb 21, 2022	7.42	7.95	-0.02	18.28
		60	649	A-A4-S60-W60-D	1000 Before S-215.6-24	7.93	2.00	D		Jan 27, 2017	7.00	7.90	Feb 21, 2022	7.62	8.30	-0.00	18.95
		60	649	A-A4-S60-W60-W	1000 Before S-215.6-24	7.93	2.00	W TFM									
		61	660	A-A4-S60-W61-U	1300 Before S-215.6-22	7.93	2.00	U		Jan 27, 2017	7.29	7.60	Feb 21, 2022	7.37	7.96	-0.01	18.11
		61	660	A-A4-S61-W61-D	1300 Before S-215.6-22	7.93	2.00	D		Jan 27, 2017	7.70	7.70	Feb 21, 2022	7.62	7.76	0.03	202.25
		61	660	A-A4-S61-W61-W	1300 Before S-215.6-22	7.93	2.00	W TFM									
		62	671	A-A4-S61-W62-U	1700 Before S-215.6-20	7.93	2.00	U		Jan 27, 2017	7.40	6.99	Feb 21, 2022	7.44	7.54	-0.04	18.35
		62	671	A-A4-S62-W62-D	1700 Before S-215.6-20	7.93	2.00	D		Jan 27, 2017	6.89	6.89	Feb 21, 2022	6.93	7.12	-0.00	16.63
		62	671	A-A4-S62-W62-W	1700 Before S-215.6-20	7.93	2.00	W TFM									


			FLOWLINE THICKNESS REPORT																			
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:			Jun 01, 2005		Service life (yrs):			18.67		
Pipe size (in):			6			% Inspection:			20			1st Inspection date:			Jan 27, 2020		6th Inspection date:			Aug 02, 2023		
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:			Jan 02, 2021		7th Inspection date:			Jan 19, 2016		
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:			Feb 21, 2022		8th Inspection date:			Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:			Dec 08, 2022		9th Inspection date:			Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:			Feb 11, 2023		10th Inspection			Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL													
		63	682	A-A4-S62-W63-U	2000 Before S-215.6-18	7.93	2.00	U		Jan 27, 2017	6.89	6.99	Feb 21, 2022	7.27	7.18	-0.03		17.47				
		63	682	A-A4-S63-W63-D	2000 Before S-215.6-18	7.93	2.00	D		Jan 27, 2017	6.49	6.59	Feb 21, 2022	7.14	7.00	-0.05		16.86				
		63	682	A-A4-S63-W63-W	2000 Before S-215.6-18	7.93	2.00	W TFM														
		64	693	A-A4-S63-W64-U	2200 Before S-215.6-16	7.93	2.00	U		Jan 27, 2017	7.70	7.50	Feb 21, 2022	7.58	7.82	0.02		255.58				
		64	693	A-A4-S64-W64-D	2200 Before S-215.6-16	7.93	2.00	D		Jan 27, 2017	7.50	8.00	Feb 21, 2022	7.52	8.28	0.04		146.38				
		64	693	A-A4-S64-W64-W	2200 Before S-215.6-16	7.93	2.00	W TFM														
		65	704	A-A4-S64-W65-U	3200 After S-215.6-15	7.93	2.00	U		Jan 27, 2017	7.59	7.80	Feb 21, 2022	8.29	8.18	-0.06		20.84				
		65	704	A-A4-S65-W65-D	3200 After S-215.6-15	7.93	2.00	D		Jan 27, 2017	8.30	7.40	Feb 21, 2022	8.80	7.72	-0.01		19.29				
		65	704	A-A4-S65-W65-W	3200 After S-215.6-15	7.93	2.00	W TFM														
		66	715	A-A4-S65-W66-U	2300 Before S-215.6-12	7.93	2.00	U		Jan 27, 2017	7.40	7.10	Feb 21, 2022	7.89	7.81	0.01		650.51				
		66	715	A-A4-S66-W66-D	2300 Before S-215.6-12	7.93	2.00	D		Jan 27, 2017	7.00	7.70	Feb 21, 2022	7.47	8.30	-0.01		18.45				
		66	715	A-A4-S66-W66-W	2300 Before S-215.6-12	7.93	2.00	W TFM														
		67	726	A-A4-S66-W67-U	3000 Before S-215.6-10	7.93	2.00	U		Jan 27, 2017	7.20	7.50	Feb 21, 2022	7.69	7.33	0.02		315.93				
		67	726	A-A4-S67-W67-D	3000 Before S-215.6-10	7.93	2.00	D		Jan 27, 2017	6.80	6.80	Feb 21, 2022	7.72	7.91	-0.03		19.29				
		67	726	A-A4-S67-W67-W	3000 Before S-215.6-10	7.93	2.00	W TFM														
		68	737	A-A4-S67-W68-U	2700 After S-215.6-09	7.93	2.00	U		Jan 27, 2017	7.29	6.69	Feb 21, 2022	7.51	7.25	-0.05		17.71				
		68	737	A-A4-S68-W68-D	2700 After S-215.6-09	7.93	2.00	D		Jan 27, 2017	6.49	7.09	Feb 21, 2022	7.21	7.50	-0.07		17.57				
		68	737	A-A4-S68-W68-W	2700 After S-215.6-09	7.93	2.00	W TFM														
A	A5	69	748	A-A5-S68-W69-U	2500 After S-215.6-07	7.93	2.00	U		Jan 16, 2018	6.99	6.89	Feb 21, 2022	7.12	6.88	0.00		2001.47				
		69	748	A-A5-S69-W69-D	2500 After S-215.6-07	7.93	2.00	D		Jan 16, 2018	7.09	7.09	Feb 21, 2022	7.15	7.15	-0.01		17.37				
		69	748	A-A5-S69-W69-W	2500 After S-215.6-07	7.93	2.00	W TFM														


			FLOWLINE THICKNESS REPORT														
Tag No.: S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m): 4300			Installation date: Jun 01, 2005		Service life (yrs): 18.67									
Pipe size (in): 6			% Inspection: 20			1st Inspection date: Jan 27, 2020		6th Inspection date: Aug 02, 2023									
Flowline No.: KMG-AA			No. of section (sections): 5			2nd Inspection date: Jan 02, 2021		7th Inspection date: Jan 19, 2016									
From-To: KMG-A		NTM-C	Length of section (m): 860			3rd Inspection date: Feb 21, 2022		8th Inspection date: Jan 27, 2017									
Process: P		Process	Length of subsection (m): 172			4th Inspection date: Dec 08, 2022		9th Inspection date: Jan 16, 2018									
Service: CO		Crude oil	Total spool (spools): 391			5th Inspection date: Feb 11, 2023		10th Inspection: Jan 16, 2019									
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL								
		70	759	A-A5-S69-W70-U	2500 After S-215.6-05	7.93	2.00	U		Jan 16, 2018	6.89	7.29	Feb 21, 2022	6.92	6.98	-0.00	16.59
		70	759	A-A5-S70-W70-D	2500 After S-215.6-05	7.93	2.00	D		Jan 16, 2018	7.09	6.99	Feb 21, 2022	7.04	7.13	-0.00	17.00
		70	759	A-A5-S70-W70-W	2500 After S-215.6-05	7.93	2.00	W TFM									
		71	770	A-A5-S70-W71-U	2500 After S-215.6-03	7.93	2.00	U		Jan 16, 2018	7.59	7.19	Feb 21, 2022	8.14	8.21	-0.10	20.71
		71	770	A-A5-S71-W71-D	2500 After S-215.6-03	7.93	2.00	D		Jan 16, 2018	7.29	7.19	Feb 21, 2022	7.77	7.91	-0.06	19.46
		71	770	A-A5-S71-W71-W	2500 After S-215.6-03	7.93	2.00	W TFM									
		72	781	A-A5-S71-W72-U	2500 After S-215.6-01	7.93	2.00	U		Jan 16, 2018	7.09	6.99	Feb 21, 2022	7.95	7.63	-0.07	18.99
		72	781	A-A5-S72-W72-D	2500 After S-215.6-01	7.93	2.00	D		Jan 16, 2018	7.49	7.59	Feb 21, 2022	8.13	8.00	-0.05	20.24
		72	781	A-A5-S72-W72-W	2500 After S-215.6-01	7.93	2.00	W TFM									
		73	792	A-A5-S72-W73-U	1000 After S-215.5-58	7.93	2.00	U		Jan 16, 2018	6.99	7.59	Feb 21, 2022	7.46	7.58	-0.05	18.41
		73	792	A-A5-S73-W73-D	1000 After S-215.5-58	7.93	2.00	D		Jan 16, 2018	7.79	7.29	Feb 21, 2022	8.61	7.81	-0.06	19.60
		73	792	A-A5-S73-W73-W	1000 After S-215.5-58	7.93	2.00	W TFM									
		74	803	A-A5-S73-W74-U	1000 After S-215.5-56	7.93	2.00	U		Jan 16, 2018	8.09	7.49	Feb 21, 2022	8.00	7.15	0.08	62.12
		74	803	A-A5-S74-W74-D	1000 After S-215.5-56	7.93	2.00	D		Jan 16, 2018	7.69	7.79	Feb 21, 2022	7.42	7.44	0.07	82.33
		74	803	A-A5-S74-W74-W	1000 After S-215.5-56	7.93	2.00	W TFM									
		75	814	A-A5-S74-W75-U	1000 After S-215.5-54	7.93	2.00	U		Jan 16, 2018	7.30	7.30	Feb 21, 2022	7.37	7.00	0.07	68.36
		75	814	A-A5-S75-W75-D	1000 After S-215.5-54	7.93	2.00	D		Jan 16, 2018	7.60	7.60	Feb 21, 2022	7.33	7.16	0.11	48.10
		75	814	A-A5-S75-W75-W	1000 After S-215.5-54	7.93	2.00	W TFM									
		76	825	A-A5-S75-W76-U	1000 After S-215.5-52	7.93	2.00	U		Jan 16, 2018	7.29	7.09	Feb 21, 2022	7.25	7.00	0.02	227.85
		76	825	A-A5-S76-W76-D	1000 After S-215.5-52	7.93	2.00	D		Jan 16, 2018	7.39	7.59	Feb 21, 2022	7.30	7.67	0.02	241.53
		76	825	A-A5-S76-W76-W	1000 After S-215.5-52	7.93	2.00	W TFM									


			FLOWLINE THICKNESS REPORT																			
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:			Jun 01, 2005		Service life (yrs):			18.67		
Pipe size (in):			6			% Inspection:			20			1st Inspection date:			Jan 27, 2020		6th Inspection date:			Aug 02, 2023		
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:			Jan 02, 2021		7th Inspection date:			Jan 19, 2016		
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:			Feb 21, 2022		8th Inspection date:			Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:			Dec 08, 2022		9th Inspection date:			Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:			Feb 11, 2023		10th Inspection			Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL													
		77	836	A-A5-S76-W77-U	500 After S-215.5-50	7.93	2.00	U		Jan 16, 2018	7.69	7.79	Feb 21, 2022	7.30	7.48	0.10	55.74					
		77	836	A-A5-S77-W77-D	500 After S-215.5-50	7.93	2.00	D		Jan 16, 2018	7.59	7.69	Feb 21, 2022	7.21	7.36	0.09	56.23					
		77	836	A-A5-S77-W77-W	500 After S-215.5-50	7.93	2.00	W TFM														
		78	847	A-A5-S77-W78-U	3000 After S-215.5-49	7.93	2.00	U		Jan 16, 2018	7.29	7.09	Feb 21, 2022	7.59	7.80	-0.05	18.85					
		78	847	A-A5-S78-W78-D	3000 After S-215.5-49	7.93	2.00	D		Jan 16, 2018	6.79	6.99	Feb 21, 2022	7.87	7.44	-0.07	18.35					
		78	847	A-A5-S78-W78-W	3000 After S-215.5-49	7.93	2.00	W TFM														
		79	858	A-A5-S78-W79-U	3000 After S-215.5-47	7.93	2.00	U		Jan 16, 2018	7.19	6.99	Feb 21, 2022	7.90	7.81	-0.09	19.60					
		79	858	A-A5-S79-W79-D	3000 After S-215.5-47	7.93	2.00	D		Jan 16, 2018	7.09	7.49	Feb 21, 2022	7.82	7.73	-0.07	19.33					
		79	858	A-A5-S79-W79-W	3000 After S-215.5-47	7.93	2.00	W TFM														
		80	869	A-A5-S79-W80-U	2000 Before S-215.5-44	7.93	2.00	U		Jan 16, 2018	7.29	7.29	Feb 21, 2022	7.54	7.87	-0.03	18.68					
		80	869	A-A5-S80-W80-D	2000 Before S-215.5-44	7.93	2.00	D		Jan 16, 2018	7.19	7.19	Feb 21, 2022	7.71	7.66	-0.05	19.09					
		80	869	A-A5-S80-W80-W	2000 Before S-215.5-44	7.93	2.00	W TFM														
		81	880	A-A5-S80-W81-U	2000 Before S-215.5-42	7.93	2.00	U		Jan 16, 2018	6.99	7.29	Feb 21, 2022	7.07	7.13	-0.01	17.10					
		81	880	A-A5-S81-W81-D	2000 Before S-215.5-42	7.93	2.00	D		Jan 16, 2018	7.09	6.89	Feb 21, 2022	7.06	6.93	-0.00	16.63					
		81	880	A-A5-S81-W81-W	2000 Before S-215.5-42	7.93	2.00	W TFM														
		82	891	A-A5-S81-W82-U	2000 Before S-215.5-40	7.93	2.00	U		Jan 16, 2018	7.39	7.59	Feb 21, 2022	7.31	7.35	0.02	272.23					
		82	891	A-A5-S82-W82-D	2000 Before S-215.5-40	7.93	2.00	D		Jan 16, 2018	7.09	7.59	Feb 21, 2022	7.00	7.17	0.02	227.85					
		82	891	A-A5-S82-W82-W	2000 Before S-215.5-40	7.93	2.00	W TFM														
		83	902	A-A5-S82-W83-U	2000 Before S-215.5-38	7.93	2.00	U		Jan 16, 2018	7.29	7.49	Feb 21, 2022	7.47	7.07	0.05	94.52					
		83	902	A-A5-S83-W83-D	2000 Before S-215.5-38	7.93	2.00	D		Jan 16, 2018	6.99	7.79	Feb 21, 2022	7.00	7.28	0.00	16.86					
		83	902	A-A5-S83-W83-W	2000 Before S-215.5-38	7.93	2.00	W TFM														


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67		
Pipe size (in):			6			% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023		
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016		
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
B	B1	84	913	B-B1-S83-W84-U	2600 Before S-215.5-36	7.93	2.00	U		Jan 16, 2019	7.19	7.29	Feb 11, 2023	7.24	7.34	-0.00	17.67			
		84	913	B-B1-S84-W84-D	2600 Before S-215.5-36	7.93	2.00	D		Jan 16, 2019	7.19	7.29	Feb 11, 2023	7.24	7.34	-0.00	17.67			
		84	913	B-B1-S84-W84-W	2600 Before S-215.5-36	7.93	2.00	W TFM												
		85	924	B-B1-S84-W85-U	3000 Before S-215.5-34	7.93	2.00	U		Jan 16, 2019	7.49	7.49	Feb 11, 2023	7.54	7.54	-0.00	18.68			
		85	924	B-B1-S85-W85-D	3000 Before S-215.5-34	7.93	2.00	D		Jan 16, 2019	7.49	7.09	Feb 11, 2023	7.54	7.14	-0.00	17.34			
		85	924	B-B1-S85-W85-W	3000 Before S-215.5-34	7.93	2.00	W TFM												
		86	935	B-B1-S85-W86-U	2000 After S-215.5-33	7.93	2.00	U		Jan 16, 2019	7.19	6.79	Feb 11, 2023	7.24	6.84	-0.00	16.32			
		86	935	B-B1-S86-W86-D	2000 After S-215.5-33	7.93	2.00	D		Jan 16, 2019	7.19	7.50	Feb 11, 2023	7.24	7.50	-0.00	17.67			
		86	935	B-B1-S86-W86-W	2000 After S-215.5-33	7.93	2.00	W TFM												
		87	946	B-B1-S86-W87-U	1000 After S-215.5-31	7.93	2.00	U		Jan 16, 2019	6.79	7.89	Feb 11, 2023	6.84	7.94	-0.00	16.32			
		87	946	B-B1-S87-W87-D	1000 After S-215.5-31	7.93	2.00	D		Jan 16, 2019	6.99	7.49	Feb 11, 2023	7.04	7.54	-0.00	17.00			
		87	946	B-B1-S87-W87-W	1000 After S-215.5-31	7.93	2.00	W TFM												
		88	957	B-B1-S87-W88-U	900 After S-215.5-29	7.93	2.00	U		Jan 16, 2019	7.00	7.09	Feb 11, 2023	7.05	7.14	0.01	916.75			
		88	957	B-B1-S88-W88-D	900 After S-215.5-29	7.93	2.00	D		Jan 16, 2019	7.09	7.09	Feb 11, 2023	7.14	7.14	-0.00	17.34			
		88	957	B-B1-S88-W88-W	900 After S-215.5-29	7.93	2.00	W TFM												
		89	968	B-B1-S88-W89-U	900 After S-215.5-27	7.93	2.00	U		Jan 16, 2019	7.19	7.20	Feb 11, 2023	7.24	7.25	-0.00	17.67			
		89	968	B-B1-S89-W89-D	900 After S-215.5-27	7.93	2.00	D		Jan 16, 2019	7.09	7.19	Feb 11, 2023	7.14	7.24	-0.00	17.34			
		89	968	B-B1-S89-W89-W	900 After S-215.5-27	7.93	2.00	W TFM												
		90	979	B-B1-S89-W90-U	800 Before S-215.5-25	7.93	2.00	U		Jan 16, 2019	7.29	7.00	Feb 11, 2023	7.34	7.05	0.02	305.58			
		90	979	B-B1-S90-W90-D	800 Before S-215.5-25	7.93	2.00	D		Jan 16, 2019	7.29	6.89	Feb 11, 2023	7.34	6.94	-0.00	16.66			
		90	979	B-B1-S90-W90-W	800 Before S-215.5-25	7.93	2.00	W TFM												


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67		
Pipe size (in):			6			% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023		
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016		
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		91	990	B-B1-S90-W91-U	1000 Before S-215.5-23	7.93	2.00	U		Jan 16, 2019	7.39	6.99	Feb 11, 2023	7.44	7.04	-0.00	17.00			
		91	990	B-B1-S91-W91-D	1000 Before S-215.5-23	7.93	2.00	D		Jan 16, 2019	7.39	6.89	Feb 11, 2023	7.44	6.94	-0.00	16.66			
		91	990	B-B1-S91-W91-W	1000 Before S-215.5-23	7.93	2.00	W TFM												
		92	1001	B-B1-S91-W92-U	1200 Before S-215.5-21	7.93	2.00	U		Jan 16, 2019	7.10	7.50	Feb 11, 2023	7.15	7.55	0.03	186.98			
		92	1001	B-B1-S92-W92-D	1200 Before S-215.5-21	7.93	2.00	D		Jan 16, 2019	7.19	7.00	Feb 11, 2023	7.24	7.05	0.02	305.58			
		92	1001	B-B1-S92-W92-W	1200 Before S-215.5-21	7.93	2.00	W TFM												
		93	1012	B-B1-S92-W93-U	1500 Before S-215.5-19	7.93	2.00	U		Jan 16, 2019	7.09	7.29	Feb 11, 2023	7.14	7.24	-0.00	17.34			
		93	1012	B-B1-S93-W93-D	1500 Before S-215.5-19	7.93	2.00	D		Jan 16, 2019	7.19	7.19	Feb 11, 2023	7.24	7.24	-0.00	17.67			
		93	1012	B-B1-S93-W93-W	1500 Before S-215.5-19	7.93	2.00	W TFM												
		94	1023	B-B1-S93-W94-U	2000 Before S-215.5-17	7.93	2.00	U		Jan 16, 2019	7.70	6.99	Feb 11, 2023	7.75	7.04	-0.00	17.00			
		94	1023	B-B1-S94-W94-D	2000 Before S-215.5-17	7.93	2.00	D		Jan 16, 2019	6.79	7.60	Feb 11, 2023	6.84	7.65	-0.00	16.32			
		94	1023	B-B1-S94-W94-W	2000 Before S-215.5-17	7.93	2.00	W TFM												
		95	1034	B-B1-S94-W95-U	2000 Before S-215.5-15	7.93	2.00	U		Jan 16, 2019	7.39	7.09	Feb 11, 2023	7.44	7.14	-0.00	17.34			
		95	1034	B-B1-S95-W95-D	2000 Before S-215.5-15	7.93	2.00	D		Jan 16, 2019	6.99	6.79	Feb 11, 2023	7.04	6.84	-0.00	16.32			
		95	1034	B-B1-S95-W95-W	2000 Before S-215.5-15	7.93	2.00	W TFM				Aug 02, 2023		6.93	0.06	89.63				
		96	1045	B-B1-S95-W96-U	2500 Before S-215.5-13	7.93	2.00	U		Jan 16, 2019	7.40	7.30	Feb 11, 2023	7.45	7.35	0.02	323.74			
		96	1045	B-B1-S96-W96-D	2500 Before S-215.5-13	7.93	2.00	D		Jan 16, 2019	7.00	7.20	Feb 11, 2023	7.05	7.25	0.01	916.75			
		96	1045	B-B1-S96-W96-W	2500 Before S-215.5-13	7.93	2.00	W TFM												
		97	1056	B-B1-S96-W97-U	4000 After S-215.5-12	7.93	2.00	U		Jan 16, 2019	6.90	7.20	Feb 11, 2023	6.95	7.25	0.03	179.72			
		97	1056	B-B1-S97-W97-D	4000 After S-215.5-12	7.93	2.00	D		Jan 16, 2019	7.39	7.30	Feb 11, 2023	7.44	7.35	0.01	971.21			
		97	1056	B-B1-S97-W97-W	4000 After S-215.5-12	7.93	2.00	W TFM												


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67		
Pipe size (in):			6			% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023		
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016		
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		98	1067	B-B1-S97-W98-U	3000 Before S-215.5-09	7.93	2.00	U		Jan 16, 2019	7.29	7.40	Feb 11, 2023	7.34	7.45	-0.00	18.01			
		98	1067	B-B1-S98-W98-D	3000 Before S-215.5-09	7.93	2.00	D		Jan 16, 2019	7.80	7.00	Feb 11, 2023	7.85	7.05	0.02	305.58			
		98	1067	B-B1-S98-W98-W	3000 Before S-215.5-09	7.93	2.00	W TFM												
		99	1078	B-B1-S98-W99-U	2800 After S-215.5-08	7.93	2.00	U		Jan 16, 2019	7.20	7.60	Feb 11, 2023	7.25	7.65	0.01	953.05			
		99	1078	B-B1-S99-W99-D	2800 After S-215.5-08	7.93	2.00	D		Jan 16, 2019	6.99	7.30	Feb 11, 2023	7.04	7.35	-0.00	17.00			
		99	1078	B-B1-S99-W99-W	2800 After S-215.5-08	7.93	2.00	W TFM					Aug 02, 2023		6.83	0.06	79.83			
		100	1089	B-B1-S99-W100-U	800 Before S-215.5-07	7.93	2.00	U		Jan 16, 2019	6.99	7.39	Feb 11, 2023	7.04	7.44	-0.00	17.00			
		100	1089	B-B1-S100-W100-D	800 Before S-215.5-07	7.93	2.00	D		Jan 16, 2019	7.29	7.50	Feb 11, 2023	7.34	7.55	-0.00	18.01			
		100	1089	B-B1-S100-W100-W	800 Before S-215.5-07	7.93	2.00	W TFM					Aug 02, 2023		7.04	0.05	102.96			
B	B2	101	1100	B-B2-S100-W101-U	1200 Before S-215.5-05	7.93	2.00	U		Jan 27, 2020	7.10	7.30	Feb 11, 2023	7.15	7.35	-0.00	17.37			
		101	1100	B-B2-S101-W101-D	1200 Before S-215.5-05	7.93	2.00	D		Jan 27, 2020	7.10	7.60	Feb 11, 2023	7.15	7.65	-0.01	17.37			
		101	1100	B-B2-S101-W101-W	1200 Before S-215.5-05	7.93	2.00	W TFM					Aug 02, 2023		6.83	0.06	79.83			
		102	1111	B-B2-S101-W102-U	2000 Before S-215.5-03	7.93	2.00	U		Jan 27, 2020	7.30	7.00	Feb 11, 2023	7.35	7.05	-0.00	17.03			
		102	1111	B-B2-S102-W102-D	2000 Before S-215.5-03	7.93	2.00	D		Jan 27, 2020	6.90	7.40	Feb 11, 2023	6.95	7.45	-0.00	16.69			
		102	1111	B-B2-S102-W102-W	2000 Before S-215.5-03	7.93	2.00	W TFM					Aug 02, 2023		7.14	0.04	118.29			
		103	1122	B-B2-S102-W103-U	1000 Before S-215.5-02	7.93	2.00	U		Jan 27, 2020	7.30	7.50	Feb 11, 2023	7.35	7.55	-0.00	18.04			
		103	1122	B-B2-S103-W103-D	1000 Before S-215.5-02	7.93	2.00	D		Jan 27, 2020	7.50	7.60	Feb 11, 2023	7.55	7.65	-0.00	18.72			
		103	1122	B-B2-S103-W103-W	1000 Before S-215.5-02	7.93	2.00	W TFM					Aug 02, 2023		7.57	0.02	281.30			
		104	1133	B-B2-S103-W104-U	1000 Before S-215.4-60	7.93	2.00	U		Jan 27, 2020	7.40	7.60	Feb 11, 2023	7.45	7.65	-0.00	18.38			
		104	1133	B-B2-S104-W104-D	1000 Before S-215.4-60	7.93	2.00	D		Jan 27, 2020	6.90	7.40	Feb 11, 2023	6.95	7.40	-0.00	16.69			
		104	1133	B-B2-S104-W104-W	1000 Before S-215.4-60	7.93	2.00	W TFM					Aug 02, 2023		7.04	0.05	102.96			


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO				Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):			6				% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:			KMG-AA				No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		105	1144	B-B2-S104-W105-U	1000 Before S-215.4-58	7.93	2.00	U		Jan 27, 2020	7.40	7.10	Feb 11, 2023	7.45	7.15	-0.00	17.37			
		105	1144	B-B2-S105-W105-D	1000 Before S-215.4-58	7.93	2.00	D		Jan 27, 2020	7.80	7.30	Feb 11, 2023	7.85	7.35	-0.00	18.04			
		105	1144	B-B2-S105-W105-W	1000 Before S-215.4-58	7.93	2.00	W TFM												
		106	1155	B-B2-S105-W106-U	3000 Before S-215.4-56	7.93	2.00	U		Jan 27, 2020	7.10	7.70	Feb 11, 2023	7.15	7.75	-0.00	17.37			
		106	1155	B-B2-S106-W106-D	3000 Before S-215.4-56	7.93	2.00	D		Jan 27, 2020	6.90	7.30	Feb 11, 2023	6.95	7.35	-0.00	16.69			
		106	1155	B-B2-S106-W106-W	3000 Before S-215.4-56	7.93	2.00	W TFM												
		107	1166	B-B2-S106-W107-U	1000 Before S-215.4-54	7.93	2.00	U		Jan 27, 2020	7.40	7.60	Feb 11, 2023	7.45	7.65	0.01	475.82			
		107	1166	B-B2-S107-W107-D	1000 Before S-215.4-54	7.93	2.00	D		Jan 27, 2020	7.30	7.40	Feb 11, 2023	7.35	7.45	-0.00	18.04			
		107	1166	B-B2-S107-W107-W	1000 Before S-215.4-54	7.93	2.00	W TFM												
		108	1177	B-B2-S107-W108-U	1500 Before S-215.4-52	7.93	2.00	U		Jan 27, 2020	7.00	6.90	Feb 11, 2023	7.05	6.95	-0.00	16.69			
		108	1177	B-B2-S108-W108-D	1500 Before S-215.4-52	7.93	2.00	D		Jan 27, 2020	7.40	7.40	Feb 11, 2023	7.45	7.45	-0.00	18.38			
		108	1177	B-B2-S108-W108-W	1500 Before S-215.4-52	7.93	2.00	W TFM												
		109	1188	B-B2-S108-W109-U	2000 Before S-215.4-50	7.93	2.00	U		Jan 27, 2020	7.80	7.50	Feb 11, 2023	7.85	7.50	0.00	18.55			
		109	1188	B-B2-S109-W109-D	2000 Before S-215.4-50	7.93	2.00	D		Jan 27, 2020	7.20	7.30	Feb 11, 2023	7.25	7.35	-0.00	17.71			
		109	1188	B-B2-S109-W109-W	2000 Before S-215.4-50	7.93	2.00	W TFM												
		110	1199	B-B2-S109-W110-U	2000 Before S-215.4-48	7.93	2.00	U		Jan 27, 2020	7.80	7.50	Feb 11, 2023	7.85	7.55	-0.00	18.72			
		110	1199	B-B2-S110-W110-D	2000 Before S-215.4-48	7.93	2.00	D		Jan 27, 2020	7.50	7.70	Feb 11, 2023	7.55	7.70	-0.00	18.72			
		110	1199	B-B2-S110-W110-W	2000 Before S-215.4-48	7.93	2.00	W TFM												
		111	1210	B-B2-S110-W111-U	3000 Before S-215.4-46	7.93	2.00	U		Jan 27, 2020	7.00	7.60	Feb 11, 2023	7.05	7.65	-0.00	17.03			
		111	1210	B-B2-S111-W111-D	3000 Before S-215.4-46	7.93	2.00	D		Jan 27, 2020	7.30	7.50	Feb 11, 2023	7.35	7.55	-0.00	18.04			
		111	1210	B-B2-S111-W111-W	3000 Before S-215.4-46	7.93	2.00	W TFM												


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67		
Pipe size (in):			6			% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023		
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016		
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		112	1221	B-B2-S111-W112-U	2500 Before S-215.4-44	7.93	2.00	U		Jan 27, 2020	7.70	7.30	Feb 11, 2023	7.75	7.35	-0.00	18.04			
		112	1221	B-B2-S112-W112-D	2500 Before S-215.4-44	7.93	2.00	D		Jan 27, 2020	7.10	7.60	Feb 11, 2023	7.15	7.65	-0.00	17.37			
		112	1221	B-B2-S112-W112-W	2500 Before S-215.4-44	7.93	2.00	W TFM												
		113	1232	B-B2-S112-W113-U	2800 Before S-215.4-42	7.93	2.00	U		Jan 27, 2020	7.40	7.30	Feb 11, 2023	7.45	7.35	0.01	467.09			
		113	1232	B-B2-S113-W113-D	2800 Before S-215.4-42	7.93	2.00	D		Jan 27, 2020	7.40	7.30	Feb 11, 2023	7.45	7.35	0.02	280.25			
		113	1232	B-B2-S113-W113-W	2800 Before S-215.4-42	7.93	2.00	W TFM												
		114	1243	B-B2-S113-W114-U	3000 Before S-215.4-40	7.93	2.00	U		Jan 27, 2020	7.50	7.50	Feb 11, 2023	7.55	7.55	-0.00	18.72			
		114	1243	B-B2-S114-W114-D	3000 Before S-215.4-40	7.93	2.00	D		Jan 27, 2020	7.60	7.30	Feb 11, 2023	7.65	7.35	0.00	1401.26			
		114	1243	B-B2-S114-W114-W	3000 Before S-215.4-40	7.93	2.00	W TFM												
		115	1254	B-B2-S114-W115-U	2000 After S-215.4-39	7.93	2.00	U		Jan 27, 2020	6.70	7.30	Feb 11, 2023	6.75	7.35	-0.00	16.02			
		115	1254	B-B2-S115-W115-D	2000 After S-215.4-39	7.93	2.00	D		Jan 27, 2020	6.70	7.00	Feb 11, 2023	6.75	7.05	-0.00	16.02			
		115	1254	B-B2-S115-W115-W	2000 After S-215.4-39	7.93	2.00	W TFM												
		116	1265	B-B2-S115-W116-U	2000 After S-215.4-37	7.93	2.00	U		Jan 27, 2020	7.60	7.10	Feb 11, 2023	7.65	7.15	-0.00	17.37			
		116	1265	B-B2-S116-W116-D	2000 After S-215.4-37	7.93	2.00	D		Jan 27, 2020	7.00	7.90	Feb 11, 2023	7.05	7.95	0.00	1322.68			
		116	1265	B-B2-S116-W116-W	2000 After S-215.4-37	7.93	2.00	W TFM												
		117	1276	B-B2-S116-W117-U	1000 After S-215.4-35	7.93	2.00	U		Jan 27, 2020	7.50	7.70	Feb 11, 2023	7.55	7.75	0.00	1453.64			
		117	1276	B-B2-S117-W117-D	1000 After S-215.4-35	7.93	2.00	D		Jan 27, 2020	7.60	7.30	Feb 11, 2023	7.65	7.35	0.00	1401.26			
		117	1276	B-B2-S117-W117-W	1000 After S-215.4-35	7.93	2.00	W TFM												
B	B3	118	1287	B-B3-S117-W118-U	600 Before S-215.4-33	7.93	2.00	U		Jan 19, 2016	7.30	7.10	Jan 02, 2020	7.40	7.20	0.03	155.19			
		118	1287	B-B3-S118-W118-D	600 Before S-215.4-33	7.93	2.00	D		Jan 19, 2016	7.30	7.10	Jan 02, 2020	7.40	7.21	0.02	245.51			
		118	1287	B-B3-S118-W118-W	600 Before S-215.4-33	7.93	2.00	W TFM												


		FLOWLINE THICKNESS REPORT															
Tag No.:		S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):		4300		Installation date:		Jun 01, 2005		Service life (yrs):		18.67		
Pipe size (in):		6			% Inspection:		20		1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023		
Flowline No.:		KMG-AA			No. of section (sections):		5		2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016		
From-To:		KMG-A		NTM-C		Length of section (m):		860		3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:		P		Process		Length of subsection (m):		172		4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:		CO		Crude oil		Total spool (spools):		391		5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL								
		119	1298	B-B3-S118-W119-U	1000 After S-215.4-32	7.93	2.00	U		Jan 19, 2016	7.79	7.40	Jan 02, 2020	7.29	7.30	0.03	152.79
		119	1298	B-B3-S119-W119-D	1000 After S-215.4-32	7.93	2.00	D		Jan 19, 2016	7.40	7.60	Jan 02, 2020	7.40	7.50	0.01	483.48
		119	1298	B-B3-S119-W119-W	1000 After S-215.4-32	7.93	2.00	W TFM									
		120	1309	B-B3-S119-W120-U	2600 After S-215.4-30	7.93	2.00	U		Jan 19, 2016	7.20	7.20	Jan 02, 2020	7.39	7.20	0.01	465.58
		120	1309	B-B3-S120-W120-D	2600 After S-215.4-30	7.93	2.00	D		Jan 19, 2016	7.30	7.50	Jan 02, 2020	7.10	7.40	0.05	100.88
		120	1309	B-B3-S120-W120-W	2600 After S-215.4-30	7.93	2.00	W TFM									
		121	1320	B-B3-S120-W121-U	2700 After S-215.4-28	7.93	2.00	U		Jan 19, 2016	7.49	7.39	Jan 02, 2020	7.56	7.46	-0.01	18.41
		121	1320	B-B3-S121-W121-D	2700 After S-215.4-28	7.93	2.00	D		Jan 19, 2016	6.90	7.39	Jan 02, 2020	7.08	7.09	0.01	379.03
		121	1320	B-B3-S121-W121-W	2700 After S-215.4-28	7.93	2.00	W TFM									
		122	1331	B-B3-S121-W122-U	2700 Before S-215.4-27	7.93	2.00	U		Jan 19, 2016	7.60	7.40	Jan 02, 2020	7.50	7.76	0.03	164.15
		122	1331	B-B3-S122-W122-D	2700 Before S-215.4-27	7.93	2.00	D		Jan 19, 2016	7.50	7.40	Jan 02, 2020	7.39	7.90	0.10	53.03
		122	1331	B-B3-S122-W122-W	2700 Before S-215.4-27	7.93	2.00	W TFM									
		123	1342	B-B3-S122-W123-U	2500 Before S-215.4-26	7.93	2.00	U					Jan 02, 2020	8.00	7.99	-0.00	20.20
		123	1342	B-B3-S123-W123-D	2500 Before S-215.4-26	7.93	2.00	D					Jan 02, 2020	8.00	7.50	0.03	186.71
		123	1342	B-B3-S123-W123-W	2500 Before S-215.4-26	7.93	2.00	W TFM									
		124	1353	B-B3-S123-W124-U	2800 After S-215.4-24	7.93	2.00	U		Jan 19, 2016	7.30	7.30	Jan 02, 2020	7.26	7.28	0.02	336.39
		124	1353	B-B3-S124-W124-D	2800 After S-215.4-24	7.93	2.00	D		Jan 19, 2016	7.50	7.30	Jan 02, 2020	7.48	7.18	0.04	144.93
		124	1353	B-B3-S124-W124-W	2800 After S-215.4-24	7.93	2.00	W TFM									
		125	1364	B-B3-S124-W125-U	2800 After S-215.4-22	7.93	2.00	U		Jan 19, 2016	7.39	7.60	Jan 02, 2020	7.20	8.00	0.05	108.27
		125	1364	B-B3-S125-W125-D	2800 After S-215.4-22	7.93	2.00	D		Jan 19, 2016	7.40	7.60	Jan 02, 2020	7.36	7.68	0.04	141.15
		125	1364	B-B3-S125-W125-W	2800 After S-215.4-22	7.93	2.00	W TFM									


			FLOWLINE THICKNESS REPORT															
Tag No.: S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m): 4300			Installation date: Jun 01, 2005		Service life (yrs): 18.67										
Pipe size (in): 6			% Inspection: 20			1st Inspection date: Jan 27, 2020		6th Inspection date: Aug 02, 2023										
Flowline No.: KMG-AA			No. of section (sections): 5			2nd Inspection date: Jan 02, 2021		7th Inspection date: Jan 19, 2016										
From-To: KMG-A		NTM-C	Length of section (m): 860			3rd Inspection date: Feb 21, 2022		8th Inspection date: Jan 27, 2017										
Process: P		Process	Length of subsection (m): 172			4th Inspection date: Dec 08, 2022		9th Inspection date: Jan 16, 2018										
Service: CO		Crude oil	Total spool (spools): 391			5th Inspection date: Feb 11, 2023		10th Inspection: Jan 16, 2019										
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL									
		126	1375	B-B3-S125-W126-U	1800 After S-215.4-21	7.93	2.00	U		Jan 19, 2016	8.09	7.80	Jan 02, 2020	7.90	7.80	0.01	519.30	
		126	1375	B-B3-S126-W126-D	1800 After S-215.4-21	7.93	2.00	D		Jan 19, 2016	7.00	7.40	Jan 02, 2020	7.00	7.00	0.03	149.22	
		126	1375	B-B3-S126-W126-W	1800 After S-215.4-21	7.93	2.00	W TFM										
		127	1386	B-B3-S126-W127-U	1400 After S-215.4-19	7.93	2.00	U		Jan 19, 2016	7.40	7.10	Jan 02, 2020	7.48	7.40	-0.02	18.21	
		127	1386	B-B3-S127-W127-D	1400 After S-215.4-19	7.93	2.00	D		Jan 19, 2016	7.10	7.50	Jan 02, 2020	7.00	7.50	0.03	149.22	
		127	1386	B-B3-S127-W127-W	1400 After S-215.4-19	7.93	2.00	W TFM										
		128	1397	B-B3-S127-W128-U	2200 After S-215.4-17	7.93	2.00	U		Jan 19, 2016	7.30	7.60	Jan 02, 2020	7.42	7.68	-0.00	18.28	
		128	1397	B-B3-S128-W128-D	2200 After S-215.4-17	7.93	2.00	D		Jan 19, 2016	7.00	7.70	Jan 02, 2020	7.05	7.42	0.01	904.30	
		128	1397	B-B3-S128-W128-W	2200 After S-215.4-17	7.93	2.00	W TFM										
		129	1408	B-B3-S128-W129-U	2900 After S-215.4-15	7.93	2.00	U		Jan 19, 2016	7.29	7.50	Jan 02, 2020	7.00	7.44	0.07	68.21	
		129	1408	B-B3-S129-W129-D	2900 After S-215.4-15	7.93	2.00	D		Jan 19, 2016	7.10	7.50	Jan 02, 2020	7.00	7.48	0.03	149.22	
		129	1408	B-B3-S129-W129-W	2900 After S-215.4-15	7.93	2.00	W TFM										
		130	1419	B-B3-S129-W130-U	3000 After S-215.4-13	7.93	2.00	U		Jan 19, 2016	7.00	7.40	Jan 02, 2020	7.08	7.23	0.04	142.14	
		130	1419	B-B3-S130-W130-D	3000 After S-215.4-13	7.93	2.00	D		Jan 19, 2016	7.20	7.50	Jan 02, 2020	7.31	7.60	0.01	528.25	
		130	1419	B-B3-S130-W130-W	3000 After S-215.4-13	7.93	2.00	W TFM										
		131	1430	B-B3-S130-W131-U	3000 After S-215.4-11	7.93	2.00	U		Jan 19, 2016	7.30	7.59	Jan 02, 2020	7.00	7.40	0.08	65.94	
		131	1430	B-B3-S131-W131-D	3000 After S-215.4-11	7.93	2.00	D		Jan 19, 2016	7.19	7.60	Jan 02, 2020	7.10	7.50	0.02	224.18	
		131	1430	B-B3-S131-W131-W	3000 After S-215.4-11	7.93	2.00	W TFM										
		132	1441	B-B3-S131-W132-U	2800 Before S-215.4-10	7.93	2.00	U		Jan 19, 2016	7.10	7.49	Jan 02, 2020	7.71	7.56	-0.01	18.75	
		132	1441	B-B3-S132-W132-D	2800 Before S-215.4-10	7.93	2.00	D		Jan 19, 2016	7.70	7.39	Jan 02, 2020	7.62	7.52	-0.01	18.62	
		132	1441	B-B3-S132-W132-W	2800 Before S-215.4-10	7.93	2.00	W TFM										


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO				Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):			6				% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:			KMG-AA				No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		133	1452	B-B3-S132-W133-U	3000 After S-215.4-07	7.93	2.00	U		Jan 19, 2016	7.60	7.60	Jan 02, 2020	7.60	7.60	0.01	501.39			
		133	1452	B-B3-S133-W133-D	3000 After S-215.4-07	7.93	2.00	D		Jan 19, 2016	7.09	7.59	Jan 02, 2020	7.20	7.60	-0.01	17.54			
		133	1452	B-B3-S133-W133-W	3000 After S-215.4-07	7.93	2.00	W TFM												
B	B4	134	1463	B-B4-S133-W134-U	2300 After S-215.4-06	7.93	2.00	U		Jan 27, 2017	7.39		Feb 21, 2022	7.34	7.24	0.03	177.16			
		134	1463	B-B4-S134-W134-D	2300 After S-215.4-06	7.93	2.00	D		Jan 27, 2017	7.19		Feb 21, 2022	7.12	7.57	0.01	370.92			
		134	1463	B-B4-S134-W134-W	2300 After S-215.4-06	7.93	2.00	W TFM												
		135	1474	B-B4-S134-W135-U	1300 Before S-215.4-04	7.93	2.00	U		Jan 27, 2017	6.79	7.29	Feb 21, 2022	7.21	7.51	-0.04	17.57			
		135	1474	B-B4-S135-W135-D	1300 Before S-215.4-04	7.93	2.00	D		Jan 27, 2017	6.49	6.99	Feb 21, 2022	7.09	7.15	-0.06	17.17			
		135	1474	B-B4-S135-W135-W	1300 Before S-215.4-04	7.93	2.00	W TFM												
		136	1485	B-B4-S135-W136-U	1500 Before S-215.4-02	7.93	2.00	U		Jan 27, 2017	7.09	7.29	Feb 21, 2022	7.50	7.25	-0.01	17.71			
		136	1485	B-B4-S136-W136-D	1500 Before S-215.4-02	7.93	2.00	D		Jan 27, 2017	6.59	7.19	Feb 21, 2022	7.56	7.70	-0.10	18.75			
		136	1485	B-B4-S136-W136-W	1500 Before S-215.4-02	7.93	2.00	W TFM												
		137	1496	B-B4-S136-W137-U	3000 After S-215.4-01	7.93	2.00	U		Jan 27, 2017	7.19	6.99	Feb 21, 2022	7.39	7.47	-0.04	18.18			
		137	1496	B-B4-S137-W137-D	3000 After S-215.4-01	7.93	2.00	D		Jan 27, 2017	6.59	7.19	Feb 21, 2022	7.25	7.20	-0.06	17.54			
		137	1496	B-B4-S137-W137-W	3000 After S-215.4-01	7.93	2.00	W TFM												
		138	1507	B-B4-S137-W138-U	2700 After S-215.3-59	7.93	2.00	U		Jan 27, 2017	6.09	6.99	Feb 21, 2022	6.85	7.21	-0.07	16.36			
		138	1507	B-B4-S138-W138-D	2700 After S-215.3-59	7.93	2.00	D		Jan 27, 2017	6.69	6.79	Feb 21, 2022	6.91	7.11	-0.02	16.56			
		138	1507	B-B4-S138-W138-W	2700 After S-215.3-59	7.93	2.00	W TFM												
		139	1518	B-B4-S138-W139-U	2500 After S-215.3-57	7.93	2.00	U		Jan 27, 2017	7.00	7.00	Feb 21, 2022	7.51	7.19	0.02	249.04			
		139	1518	B-B4-S139-W139-D	2500 After S-215.3-57	7.93	2.00	D		Jan 27, 2017	7.20	7.40	Feb 21, 2022	7.43	7.67	0.03	202.65			
		139	1518	B-B4-S139-W139-W	2500 After S-215.3-57	7.93	2.00	W TFM												


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67		
Pipe size (in):			6			% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023		
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016		
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		140	1529	B-B4-S139-W140-U	4000 Before S-215.3-54	7.93	2.00	U		Jan 27, 2017	7.59	7.69	Feb 21, 2022	7.59	7.68	0.00	5632.88			
		140	1529	B-B4-S140-W140-D	4000 Before S-215.3-54	7.93	2.00	D		Jan 27, 2017	7.30	7.69	Feb 21, 2022	7.30	7.62	0.03	178.02			
		140	1529	B-B4-S140-W140-W	4000 Before S-215.3-54	7.93	2.00	W TFM												
		141	1540	B-B4-S140-W141-U	2600 After S-215.3-53	7.93	2.00	U		Jan 27, 2017	6.39	6.89	Feb 21, 2022	6.91	7.00	-0.05	16.56			
		141	1540	B-B4-S141-W141-D	2600 After S-215.3-53	7.93	2.00	D		Jan 27, 2017	6.69	6.89	Feb 21, 2022	7.23	7.03	-0.03	16.96			
		141	1540	B-B4-S141-W141-W	2600 After S-215.3-53	7.93	2.00	W TFM												
		142	1551	B-B4-S141-W142-U	1900 After S-215.3-51	7.93	2.00	U		Jan 27, 2017	6.59	6.99	Feb 21, 2022	7.10	7.66	-0.05	17.20			
		142	1551	B-B4-S142-W142-D	1900 After S-215.3-51	7.93	2.00	D		Jan 27, 2017	6.99	6.49	Feb 21, 2022	7.53	7.08	-0.06	17.13			
		142	1551	B-B4-S142-W142-W	1900 After S-215.3-51	7.93	2.00	W TFM												
		143	1562	B-B4-S142-W143-U	1800 After S-215.3-49	7.93	2.00	U		Jan 27, 2017	6.89	6.79	Feb 21, 2022	7.34	7.13	-0.03	17.30			
		143	1562	B-B4-S143-W143-D	1800 After S-215.3-49	7.93	2.00	D		Jan 27, 2017	6.59	6.89	Feb 21, 2022	7.32	7.09	-0.05	17.17			
		143	1562	B-B4-S143-W143-W	1800 After S-215.3-49	7.93	2.00	W TFM												
		144	1573	B-B4-S143-W144-U	1200 After S-215.3-47	7.93	2.00	U		Jan 27, 2017	7.30	7.70	Feb 21, 2022	8.01	8.13	-0.06	20.27			
		144	1573	B-B4-S144-W144-D	1200 After S-215.3-47	7.93	2.00	D		Jan 27, 2017	7.70	7.60	Feb 21, 2022	7.85	7.82	-0.00	19.63			
		144	1573	B-B4-S144-W144-W	1200 After S-215.3-47	7.93	2.00	W TFM												
		145	1584	B-B4-S144-W145-U	1500 After S-215.3-44	7.93	2.00	U		Jan 27, 2017	7.59	7.79	Feb 21, 2022	7.71	7.54	0.01	561.89			
		145	1584	B-B4-S145-W145-D	1500 After S-215.3-44	7.93	2.00	D		Jan 27, 2017	7.49	7.60	Feb 21, 2022	7.66	7.68	-0.02	19.09			
		145	1584	B-B4-S145-W145-W	1500 After S-215.3-44	7.93	2.00	W TFM												
		146	1595	B-B4-S145-W146-U	1000 After S-215.3-42	7.93	2.00	U		Jan 27, 2017	7.20	7.50	Feb 21, 2022	7.67	7.69	0.01	439.50			
		146	1595	B-B4-S146-W146-D	1000 After S-215.3-42	7.93	2.00	D		Jan 27, 2017	7.50	7.70	Feb 21, 2022	7.91	8.47	-0.00	19.93			
		146	1595	B-B4-S146-W146-W	1000 After S-215.3-42	7.93	2.00	W TFM												


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO				Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):			6				% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:			KMG-AA				No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		147	1606	B-B4-S146-W147-U	600 Before S-215.3-40	7.93	2.00	U		Jan 27, 2017	7.20	7.50	Feb 21, 2022	8.25	8.21	-0.02	20.94			
		147	1606	B-B4-S147-W147-D	600 Before S-215.3-40	7.93	2.00	D		Jan 27, 2017	7.10	7.20	Feb 21, 2022	7.68	7.91	-0.04	19.16			
		147	1606	B-B4-S147-W147-W	600 Before S-215.3-40	7.93	2.00	W TFM												
		148	1617	B-B4-S147-W148-U	5000 Before S-215.3-38	7.93	2.00	U		Jan 27, 2017	7.10	7.60	Feb 21, 2022	7.65	7.92	-0.00	19.06			
		148	1617	B-B4-S148-W148-D	5000 Before S-215.3-38	7.93	2.00	D		Jan 27, 2017	7.50	7.50	Feb 21, 2022	8.06	7.97	0.00	2005.27			
		148	1617	B-B4-S148-W148-W	5000 Before S-215.3-38	7.93	2.00	W TFM												
		149	1628	B-B4-S148-W149-U	2200 After S-215.3-36	7.93	2.00	U		Jan 27, 2017	7.40	7.50	Feb 21, 2022	7.98	8.00	-0.01	20.17			
		149	1628	B-B4-S149-W149-D	2200 After S-215.3-36	7.93	2.00	D		Jan 27, 2017	7.30	7.20	Feb 21, 2022	7.82	7.74	-0.01	19.36			
		149	1628	B-B4-S149-W149-W	2200 After S-215.3-36	7.93	2.00	W TFM												
B	B5	150	1639	B-B5-S149-W150-U	2000 Before S-215.3-34	7.93	2.00	U		Jan 16, 2018	7.29	7.09	Feb 21, 2022	7.84	7.45	-0.04	18.38			
		150	1639	B-B5-S150-W150-D	2000 Before S-215.3-34	7.93	2.00	D		Jan 16, 2018	7.09	7.29	Feb 21, 2022	7.60	7.87	-0.05	18.89			
		150	1639	B-B5-S150-W150-W	2000 Before S-215.3-34	7.93	2.00	W TFM												
		151	1650	B-B5-S150-W151-U	2000 After S-215.3-33	7.93	2.00	U		Jan 16, 2018	7.39	7.70	Feb 21, 2022	7.26	7.05	0.08	60.92			
		151	1650	B-B5-S151-W151-D	2000 After S-215.3-33	7.93	2.00	D		Jan 16, 2018	7.30	7.49	Feb 21, 2022	7.32	7.24	0.02	298.07			
		151	1650	B-B5-S151-W151-W	2000 After S-215.3-33	7.93	2.00	W TFM												
		152	1661	B-B5-S151-W152-U	2000 After S-215.3-31	7.93	2.00	U		Jan 16, 2018	7.20	7.50	Feb 21, 2022	7.01	6.97	0.06	88.63			
		152	1661	B-B5-S152-W152-D	2000 After S-215.3-31	7.93	2.00	D		Jan 16, 2018	7.90	7.29	Feb 21, 2022	6.98	6.88	0.10	48.82			
		152	1661	B-B5-S152-W152-W	2000 After S-215.3-31	7.93	2.00	W TFM												
		153	1672	B-B5-S152-W153-U	2000 After S-215.3-29	7.93	2.00	U		Jan 16, 2018	7.19	7.29	Feb 21, 2022	7.29	7.07	0.03	173.28			
		153	1672	B-B5-S153-W153-D	2000 After S-215.3-29	7.93	2.00	D		Jan 16, 2018	7.29	7.29	Feb 21, 2022	7.43	7.51	-0.01	18.31			
		153	1672	B-B5-S153-W153-W	2000 After S-215.3-29	7.93	2.00	W TFM												


			FLOWLINE THICKNESS REPORT																
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):			6			% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:			KMG-A		NTM-C	Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process	Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil	Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL										
		154	1683	B-B5-S153-W154-U	600 After S-215.3-27	7.93	2.00	U		Jan 16, 2018	8.00	7.90	Feb 21, 2022	7.67	7.63	0.07	85.52		
		154	1683	B-B5-S154-W154-D	600 After S-215.3-27	7.93	2.00	D		Jan 16, 2018	7.30	7.00	Feb 21, 2022	7.09	7.28	0.06	90.84		
		154	1683	B-B5-S154-W154-W	600 After S-215.3-27	7.93	2.00	W TFM											
		155	1694	B-B5-S154-W155-U	2500 After S-215.3-26	7.93	2.00	U		Jan 16, 2018	7.39	7.69	Feb 21, 2022	7.17	7.23	0.05	96.38		
		155	1694	B-B5-S155-W155-D	2500 After S-215.3-26	7.93	2.00	D		Jan 16, 2018	7.30	7.40	Feb 21, 2022	7.04	7.27	0.06	79.50		
		155	1694	B-B5-S155-W155-W	2500 After S-215.3-26	7.93	2.00	W TFM											
		156	1705	B-B5-S155-W156-U	3000 After S-215.3-24	7.93	2.00	U		Jan 16, 2018	7.19	7.49	Feb 21, 2022	7.35	7.24	-0.00	17.67		
		156	1705	B-B5-S156-W156-D	3000 After S-215.3-24	7.93	2.00	D		Jan 16, 2018	7.60	7.49	Feb 21, 2022	7.43	7.40	0.02	246.08		
		156	1705	B-B5-S156-W156-W	3000 After S-215.3-24	7.93	2.00	W TFM											
		157	1716	B-B5-S156-W157-U	2000 After S-215.3-22	7.93	2.00	U		Jan 16, 2018	7.49	7.59	Feb 21, 2022	7.42	7.21	0.07	76.31		
		157	1716	B-B5-S157-W157-D	2000 After S-215.3-22	7.93	2.00	D		Jan 16, 2018	7.50	7.79	Feb 21, 2022	7.03	7.21	0.11	43.89		
		157	1716	B-B5-S157-W157-W	2000 After S-215.3-22	7.93	2.00	W TFM											
		158	1727	B-B5-S157-W158-U	Under Ground	7.93	2.00	U		Jan 17, 2013	7.30	7.50	Jan 16, 2018	7.29	7.49	0.00	2645.00		
		158	1727	B-B5-S158-W158-D	Under Ground	7.93	2.00	D		Jan 17, 2013	10.70	10.40	Jan 16, 2018	10.69	10.39	0.00	4195.00		
		158	1727	B-B5-S158-W158-W	Under Ground	7.93	2.00	W TFM											
		159	1738	B-B5-S158-W159-U	Under Ground	7.93	2.00	U		Jan 17, 2013	10.70	10.60	Jan 16, 2018	9.80	10.59	0.16	48.75		
		159	1738	B-B5-S159-W159-D	Under Ground	7.93	2.00	D		Jan 17, 2013	8.10	7.60	Jan 16, 2018	8.09	7.59	0.00	2795.00		
		159	1738	B-B5-S159-W159-W	Under Ground	7.93	2.00	W TFM											
		160	1749	B-B5-S159-W160-U	Under Ground	7.93	2.00	U											
		160	1749	B-B5-S160-W160-D	Under Ground	7.93	2.00	D											
		160	1749	B-B5-S160-W160-W	Under Ground	7.93	2.00	W TFM											


			FLOWLINE THICKNESS REPORT																
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):			6			% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:			KMG-A		NTM-C	Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process	Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil	Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL										
		161	1760	B-B5-S160-W161-U	Under Ground	7.93	2.00	U											
		161	1760	B-B5-S161-W161-D	Under Ground	7.93	2.00	D											
		161	1760	B-B5-S161-W161-W	Under Ground	7.93	2.00	W TFM											
		162	1771	B-B5-S161-W162-U	Under Ground	7.93	2.00	U											
		162	1771	B-B5-S162-W162-D	Under Ground	7.93	2.00	D											
		162	1771	B-B5-S162-W162-W	Under Ground	7.93	2.00	W TFM											
		163	1782	B-B5-S162-W163-U	Under Ground	7.93	2.00	U											
		163	1782	B-B5-S163-W163-D	Under Ground	7.93	2.00	D											
		163	1782	B-B5-S163-W163-W	Under Ground	7.93	2.00	W TFM											
		164	1793	B-B5-S163-W164-U	400 After S-215.3-19	7.93	2.00	U		Jan 16, 2018	7.39	6.99	Feb 21, 2022	7.26	6.97	0.00	1019.19		
		164	1793	B-B5-S164-W164-D	400 After S-215.3-19	7.93	2.00	D		Jan 16, 2018	9.30	8.79	Feb 21, 2022	8.46	8.75	0.08	80.29		
		164	1793	B-B5-S164-W164-W	400 After S-215.3-19	7.93	2.00	W TFM											
		165	1804	B-B5-S164-W165-U	500 Before S-215.3-18	7.93	2.00	U		Jan 16, 2018	9.40	9.89	Feb 21, 2022	9.48	9.02	0.09	75.77		
		165	1804	B-B5-S165-W165-D	500 Before S-215.3-18	7.93	2.00	D		Jan 16, 2018	7.50	7.49	Feb 21, 2022	7.54	7.50	0.00	18.55		
		165	1804	B-B5-S165-W165-W	500 Before S-215.3-18	7.93	2.00	W TFM											
		166	1815	B-B5-S165-W166-U	1200 After S-215.3-17	7.93	2.00	U		Jan 16, 2018	7.39	7.79	Feb 21, 2022	7.39	7.64	0.00	4905.64		
		166	1815	B-B5-S166-W166-D	1200 After S-215.3-17	7.93	2.00	D		Jan 16, 2018	7.59	7.79	Feb 21, 2022	7.23	7.28	0.09	59.58		
		166	1815	B-B5-S166-W166-W	1200 After S-215.3-17	7.93	2.00	W TFM											
C	C1	167	1826	C-C1-S166-W167-U	1000 After S-215.3-15	7.93	2.00	U		Jan 16, 2019	7.29	7.10	Feb 11, 2023	7.34	6.66	0.11	43.15		
		167	1826	C-C1-S167-W167-D	1000 After S-215.3-15	7.93	2.00	D		Jan 16, 2019	7.29	7.59	Feb 11, 2023	7.34	7.64	-0.00	18.01		
		167	1826	C-C1-S167-W167-W	1000 After S-215.3-15	7.93	2.00	W TFM											


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67		
Pipe size (in):			6			% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023		
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016		
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		168	1837	C-C1-S167-W168-U	1000 After S-215.3-13	7.93	2.00	U		Jan 16, 2019	7.10	7.29	Feb 11, 2023	7.15	7.34	0.01	934.90			
		168	1837	C-C1-S168-W168-D	1000 After S-215.3-13	7.93	2.00	D		Jan 16, 2019	7.20	7.30	Feb 11, 2023	7.25	7.35	0.02	317.68			
		168	1837	C-C1-S168-W168-W	1000 After S-215.3-13	7.93	2.00	W TFM												
		169	1848	C-C1-S168-W169-U	800 After S-215.3-11	7.93	2.00	U		Jan 16, 2019	6.80	7.39	Feb 11, 2023	6.85	7.44	0.02	293.48			
		169	1848	C-C1-S169-W169-D	800 After S-215.3-11	7.93	2.00	D		Jan 16, 2019	7.19	7.29	Feb 11, 2023	7.24	7.34	-0.00	17.67			
		169	1848	C-C1-S169-W169-W	800 After S-215.3-11	7.93	2.00	W TFM												
		170	1859	C-C1-S169-W170-U	500 After S-215.3-09	7.93	2.00	U		Jan 16, 2019	7.59	7.29	Feb 11, 2023	7.64	7.34	-0.00	18.01			
		170	1859	C-C1-S170-W170-D	500 After S-215.3-09	7.93	2.00	D		Jan 16, 2019	6.99	7.69	Feb 11, 2023	7.04	7.74	-0.00	17.00			
		170	1859	C-C1-S170-W170-W	500 After S-215.3-09	7.93	2.00	W TFM												
		171	1870	C-C1-S170-W171-U	2700 Before S-215.3-07	7.93	2.00	U		Jan 16, 2019	7.20	7.40	Feb 11, 2023	7.25	7.45	0.03	190.61			
		171	1870	C-C1-S171-W171-D	2700 Before S-215.3-07	7.93	2.00	D		Jan 16, 2019	7.30	7.39	Feb 11, 2023	7.35	7.44	0.01	971.21			
		171	1870	C-C1-S171-W171-W	2700 Before S-215.3-07	7.93	2.00	W TFM												
		172	1881	C-C1-S171-W172-U	1000 Before S-215.3-06	7.93	2.00	U		Jan 16, 2019	7.49	7.29	Feb 11, 2023	7.54	7.34	-0.00	18.01			
		172	1881	C-C1-S172-W172-D	1000 Before S-215.3-06	7.93	2.00	D		Jan 16, 2019	7.29	7.39	Feb 11, 2023	7.34	7.44	-0.00	18.01			
		172	1881	C-C1-S172-W172-W	1000 Before S-215.3-06	7.93	2.00	W TFM												
		173	1892	C-C1-S172-W173-U	600 After S-215.3-05	7.93	2.00	U		Jan 16, 2019	7.39	7.59	Feb 11, 2023	7.44	7.64	-0.00	18.35			
		173	1892	C-C1-S173-W173-D	600 After S-215.3-05	7.93	2.00	D		Jan 16, 2019	7.59	7.59	Feb 11, 2023	7.64	7.64	-0.00	19.02			
		173	1892	C-C1-S173-W173-W	600 After S-215.3-05	7.93	2.00	W TFM												
		174	1903	C-C1-S173-W174-U	1500 Before S-215.3-03	7.93	2.00	U		Jan 16, 2019	7.29	7.59	Feb 11, 2023	7.34	7.64	-0.00	18.01			
		174	1903	C-C1-S174-W174-D	1500 Before S-215.3-03	7.93	2.00	D		Jan 16, 2019	7.29	6.99	Feb 11, 2023	7.34	7.04	-0.00	17.00			
		174	1903	C-C1-S174-W174-W	1500 Before S-215.3-03	7.93	2.00	W TFM												


		FLOWLINE THICKNESS REPORT															
Tag No.:		S1-KMGA-NTMC-6-KMGAA-P-CO				Total length (m):		4300		Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):		6				% Inspection:		20		1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:		KMG-AA				No. of section (sections):		5		2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:		KMG-A		NTM-C		Length of section (m):		860		3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:		P		Process		Length of subsection (m):		172		4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:		CO		Crude oil		Total spool (spools):		391		5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL								
		175	1914	C-C1-S174-W175-U	1500 Before S-215.3-01	7.93	2.00	U		Jan 16, 2019	7.50	7.49	Feb 11, 2023	7.55	7.54	-0.00	18.68
		175	1914	C-C1-S175-W175-D	1500 Before S-215.3-01	7.93	2.00	D		Jan 16, 2019	7.09	7.49	Feb 11, 2023	7.14	7.54	-0.00	17.34
		175	1914	C-C1-S175-W175-W	1500 Before S-215.3-01	7.93	2.00	W TFM									
		176	1925	C-C1-S175-W176-U	1500 Before S-215.2-59	7.93	2.00	U		Jan 16, 2019	7.09	7.50	Feb 11, 2023	7.14	7.55	-0.00	17.34
		176	1925	C-C1-S176-W176-D	1500 Before S-215.2-59	7.93	2.00	D		Jan 16, 2019	7.30	7.39	Feb 11, 2023	7.35	7.44	0.01	971.21
		176	1925	C-C1-S176-W176-W	1500 Before S-215.2-59	7.93	2.00	W TFM									
		177	1936	C-C1-S176-W177-U	2000 Before S-215.2-57	7.93	2.00	U		Jan 16, 2019	7.19	7.39	Feb 11, 2023	7.24	7.44	-0.00	17.67
		177	1936	C-C1-S177-W177-D	2000 Before S-215.2-57	7.93	2.00	D		Jan 16, 2019	7.39	7.59	Feb 11, 2023	7.44	7.64	-0.00	18.35
		177	1936	C-C1-S177-W177-W	2000 Before S-215.2-57	7.93	2.00	W TFM									
		178	1947	C-C1-S177-W178-U	2500 Before S-215.2-55	7.93	2.00	U		Jan 16, 2019	7.10	6.99	Feb 11, 2023	7.15	7.04	-0.00	17.00
		178	1947	C-C1-S178-W178-D	2500 Before S-215.2-55	7.93	2.00	D		Jan 16, 2019	7.10	7.10	Feb 11, 2023	7.15	7.15	0.03	186.98
		178	1947	C-C1-S178-W178-W	2500 Before S-215.2-55	7.93	2.00	W TFM									
		179	1958	C-C1-S178-W179-U	3000 Before S-215.2-53	7.93	2.00	U		Jan 16, 2019	7.20	6.99	Feb 11, 2023	7.25	7.04	-0.00	17.00
		179	1958	C-C1-S179-W179-D	3000 Before S-215.2-53	7.93	2.00	D		Jan 16, 2019	6.99	7.10	Feb 11, 2023	7.04	7.15	-0.00	17.00
		179	1958	C-C1-S179-W179-W	3000 Before S-215.2-53	7.93	2.00	W TFM									
		180	1969	C-C1-S179-W180-U	3000 Before S-215.2-51	7.93	2.00	U		Jan 16, 2019	6.99	7.39	Feb 11, 2023	7.04	7.44	-0.00	17.00
		180	1969	C-C1-S180-W180-D	3000 Before S-215.2-51	7.93	2.00	D		Jan 16, 2019	7.10	7.39	Feb 11, 2023	7.15	7.39	0.02	311.63
		180	1969	C-C1-S180-W180-W	3000 Before S-215.2-51	7.93	2.00	W TFM									
		181	1980	C-C1-S180-W181-U	2800 After S-215.2-50	7.93	2.00	U		Jan 16, 2019	7.10	7.19	Feb 11, 2023	7.15	7.24	0.01	934.90
		181	1980	C-C1-S181-W181-D	2800 After S-215.2-50	7.93	2.00	D		Jan 16, 2019	7.30	7.09	Feb 11, 2023	7.35	7.14	-0.00	17.34
		181	1980	C-C1-S181-W181-W	2800 After S-215.2-50	7.93	2.00	W TFM									


			FLOWLINE THICKNESS REPORT															
Tag No.: S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m): 4300			Installation date: Jun 01, 2005			Service life (yrs): 18.67									
Pipe size (in): 6			% Inspection: 20			1st Inspection date: Jan 27, 2020			6th Inspection date: Aug 02, 2023									
Flowline No.: KMG-AA			No. of section (sections): 5			2nd Inspection date: Jan 02, 2021			7th Inspection date: Jan 19, 2016									
From-To: KMG-A		NTM-C	Length of section (m): 860			3rd Inspection date: Feb 21, 2022			8th Inspection date: Jan 27, 2017									
Process: P		Process	Length of subsection (m): 172			4th Inspection date: Dec 08, 2022			9th Inspection date: Jan 16, 2018									
Service: CO		Crude oil	Total spool (spools): 391			5th Inspection date: Feb 11, 2023			10th Inspection: Jan 16, 2019									
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL									
		182	1991	C-C1-S181-W182-U	2700 After S-215.2-48	7.93	2.00	U		Jan 16, 2019	7.20	7.09	Feb 11, 2023	7.25	7.14	-0.00	17.34	
		182	1991	C-C1-S182-W182-D	2700 After S-215.2-48	7.93	2.00	D		Jan 16, 2019	7.00	7.19	Feb 11, 2023	7.05	7.24	0.02	305.58	
		182	1991	C-C1-S182-W182-W	2700 After S-215.2-48	7.93	2.00	W TFM										
C	C2	183	2002	C-C2-S182-W183-U	2000 After S-215.2-46	7.93	2.00	U		Jan 27, 2020	7.00	7.50	Feb 11, 2023	7.05	7.55	0.03	188.95	
		183	2002	C-C2-S183-W183-D	2000 After S-215.2-46	7.93	2.00	D		Jan 27, 2020	6.90	7.20	Feb 11, 2023	6.95	7.25	-0.00	16.69	
		183	2002	C-C2-S183-W183-W	2000 After S-215.2-46	7.93	2.00	W TFM										
		184	2013	C-C2-S183-W184-U	2000 After S-215.2-44	7.93	2.00	U		Jan 27, 2020	7.60	7.40	Feb 11, 2023	7.65	7.45	-0.00	18.38	
		184	2013	C-C2-S184-W184-D	2000 After S-215.2-44	7.93	2.00	D		Jan 27, 2020	7.60	7.20	Feb 11, 2023	7.65	7.25	-0.00	17.71	
		184	2013	C-C2-S184-W184-W	2000 After S-215.2-44	7.93	2.00	W TFM										
		185	2024	C-C2-S184-W185-U	1500 After S-215.2-42	7.93	2.00	U		Jan 27, 2020	6.90	7.00	Feb 11, 2023	6.95	7.05	0.03	144.05	
		185	2024	C-C2-S185-W185-D	1500 After S-215.2-42	7.93	2.00	D		Jan 27, 2020	7.10	6.80	Feb 11, 2023	7.15	6.85	-0.00	16.36	
		185	2024	C-C2-S185-W185-W	1500 After S-215.2-42	7.93	2.00	W TFM										
		186	2035	C-C2-S185-W186-U	1500 After S-215.2-40	7.93	2.00	U		Jan 27, 2020	7.20	6.80	Feb 11, 2023	7.25	6.85	-0.00	16.36	
		186	2035	C-C2-S186-W186-D	1500 After S-215.2-40	7.93	2.00	D		Jan 27, 2020	6.90	6.90	Feb 11, 2023	6.95	6.95	-0.00	16.69	
		186	2035	C-C2-S186-W186-W	1500 After S-215.2-40	7.93	2.00	W TFM										
		187	2046	C-C2-S186-W187-U	1500 After S-215.2-38	7.93	2.00	U		Jan 27, 2020	7.10	7.20	Feb 11, 2023	7.15	7.25	0.04	122.63	
		187	2046	C-C2-S187-W187-D	1500 After S-215.2-38	7.93	2.00	D		Jan 27, 2020	7.50	7.40	Feb 11, 2023	7.55	7.45	0.01	475.82	
		187	2046	C-C2-S187-W187-W	1500 After S-215.2-38	7.93	2.00	W TFM										
		188	2057	C-C2-S187-W188-U	1000 After S-215.2-36	7.93	2.00	U		Jan 27, 2020	7.20	7.00	Feb 11, 2023	7.25	7.05	0.00	1322.68	
		188	2057	C-C2-S188-W188-D	1000 After S-215.2-36	7.93	2.00	D		Jan 27, 2020	7.20	7.00	Feb 11, 2023	7.25	7.05	0.01	440.89	
		188	2057	C-C2-S188-W188-W	1000 After S-215.2-36	7.93	2.00	W TFM										

		FLOWLINE THICKNESS REPORT															
Tag No.:		S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):		4300		Installation date:		Jun 01, 2005		Service life (yrs):		18.67		
Pipe size (in):		6			% Inspection:		20		1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023		
Flowline No.:		KMG-AA			No. of section (sections):		5		2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016		
From-To:		KMG-A		NTM-C	Length of section (m):		860		3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017		
Process:		P		Process	Length of subsection (m):		172		4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018		
Service:		CO		Crude oil	Total spool (spools):		391		5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019		
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL								
		189	2068	C-C2-S188-W189-U	1000 After S-215.2-34	7.93	2.00	U		Jan 27, 2020	7.70	7.10	Feb 11, 2023	7.75	7.15	0.06	79.35
		189	2068	C-C2-S189-W189-D	1000 After S-215.2-34	7.93	2.00	D		Jan 27, 2020	7.90	7.60	Feb 11, 2023	7.95	7.65	0.02	295.97
		189	2068	C-C2-S189-W189-W	1000 After S-215.2-34	7.93	2.00	W TFM									
		190	2079	C-C2-S189-W190-U	500 After S-215.2-32	7.93	2.00	U		Jan 27, 2020	7.20	7.00	Feb 11, 2023	7.25	7.05	0.23	21.68
		190	2079	C-C2-S190-W190-D	500 After S-215.2-32	7.93	2.00	D		Jan 27, 2020	9.10	8.50	Feb 11, 2023	9.15	8.55	-0.02	22.09
		190	2079	C-C2-S190-W190-W	500 After S-215.2-32	7.93	2.00	W TFM									
		191	2090	C-C2-S190-W191-U	1500 After S-215.2-32	7.93	2.00	U		Jan 27, 2020	9.60	10.20	Feb 11, 2023	9.65	10.25	-0.02	25.80
		191	2090	C-C2-S191-W191-D	1500 After S-215.2-32	7.93	2.00	D		Jan 27, 2020	7.80	7.30	Feb 11, 2023	7.85	7.35	0.25	21.56
		191	2090	C-C2-S191-W191-W	1500 After S-215.2-32	7.93	2.00	W TFM									
		192	2101	C-C2-S191-W192-U	1000 After S-215.2-30	7.93	2.00	U		Jan 27, 2020	6.60	7.00	Feb 11, 2023	6.65	7.24	-0.00	15.68
		192	2101	C-C2-S192-W192-D	1000 After S-215.2-30	7.93	2.00	D		Jan 27, 2020	6.90	7.20	Feb 11, 2023	6.95	7.10	-0.00	16.69
		192	2101	C-C2-S192-W192-W	1000 After S-215.2-30	7.93	2.00	W TFM									
		193	2112	C-C2-S192-W193-U	900 After S-215.2-28	7.93	2.00	U		Jan 27, 2020	7.20	7.30	Feb 11, 2023	7.25	7.35	0.02	275.01
		193	2112	C-C2-S193-W193-D	900 After S-215.2-28	7.93	2.00	D		Jan 27, 2020	7.40	7.50	Feb 11, 2023	7.45	7.55	0.00	1427.45
		193	2112	C-C2-S193-W193-W	900 After S-215.2-28	7.93	2.00	W TFM									
		194	2123	C-C2-S193-W194-U	500 After S-215.2-26	7.93	2.00	U		Jan 27, 2020	7.60	7.10	Feb 11, 2023	7.65	7.15	-0.00	17.37
		194	2123	C-C2-S194-W194-D	500 After S-215.2-26	7.93	2.00	D		Jan 27, 2020	7.40	7.00	Feb 11, 2023	7.45	7.05	-0.00	17.03
		194	2123	C-C2-S194-W194-W	500 After S-215.2-26	7.93	2.00	W TFM									
		195	2134	C-C2-S194-W195-U	500 After S-215.2-24	7.93	2.00	U		Jan 27, 2020	7.00	7.70	Feb 11, 2023	7.05	7.75	-0.00	17.03
		195	2134	C-C2-S195-W195-D	500 After S-215.2-24	7.93	2.00	D		Jan 27, 2020	7.00	7.20	Feb 11, 2023	7.05	7.25	0.01	440.89
		195	2134	C-C2-S195-W195-W	500 After S-215.2-24	7.93	2.00	W TFM									


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO				Total length (m):				4300		Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):			6				% Inspection:				20		1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:			KMG-AA				No. of section (sections):				5		2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:			KMG-A		NTM-C		Length of section (m):				860		3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):				172		4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):				391		5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		196	2145	C-C2-S195-W196-U	500 Before S-215.2-22	7.93	2.00	U		Jan 27, 2020	7.00	6.90	Feb 11, 2023	7.05	6.95	0.03		185.21		
		196	2145	C-C2-S196-W196-D	500 Before S-215.2-22	7.93	2.00	D		Jan 27, 2020	6.90	7.10	Feb 11, 2023	6.95	7.15	0.03		185.21		
		196	2145	C-C2-S196-W196-W	500 Before S-215.2-22	7.93	2.00	W TFM												
		197	2156	C-C2-S196-W197-U	600 Before S-215.2-20	7.93	2.00	U		Jan 27, 2020	6.70	7.40	Feb 11, 2023	6.75	7.45	-0.00		16.02		
		197	2156	C-C2-S197-W197-D	600 Before S-215.2-20	7.93	2.00	D		Jan 27, 2020	8.00	7.40	Feb 11, 2023	7.52	7.45	-0.00		18.38		
		197	2156	C-C2-S197-W197-W	600 Before S-215.2-20	7.93	2.00	W TFM												
		198	2167	C-C2-S197-W198-U	800 Before S-215.2-18	7.93	2.00	U		Jan 27, 2020	6.70	7.00	Feb 11, 2023	6.75	7.05	0.00		1244.11		
		198	2167	C-C2-S198-W198-D	800 Before S-215.2-18	7.93	2.00	D		Jan 27, 2020	6.80	7.00	Feb 11, 2023	6.85	7.05	0.01		423.43		
		198	2167	C-C2-S198-W198-W	800 Before S-215.2-18	7.93	2.00	W TFM												
		199	2178	C-C2-S198-W199-U	1000 Before S-215.2-16	7.93	2.00	U		Jan 27, 2020	7.40	7.80	Feb 11, 2023	7.45	7.80	-0.02		18.38		
		199	2178	C-C2-S199-W199-D	1000 Before S-215.2-16	7.93	2.00	D		Jan 27, 2020	6.90	7.20	Feb 11, 2023	6.95	7.25	0.04		117.86		
		199	2178	C-C2-S199-W199-W	1000 Before S-215.2-16	7.93	2.00	W TFM												
C	C3	200	2189	C-C3-S199-W200-U	2500 After S-215.2-14	7.93	2.00	U		Jan 19, 2016	7.30	7.10	Jan 02, 2020	7.31	7.29	0.02		225.54		
		200	2189	C-C3-S200-W200-D	2500 After S-215.2-14	7.93	2.00	D		Jan 19, 2016	7.30	7.70	Jan 02, 2020	7.30	7.20	0.03		205.72		
		200	2189	C-C3-S200-W200-W	2500 After S-215.2-14	7.93	2.00	W TFM												
		201	2200	C-C3-S200-W201-U	400 Before S-215.2-14	7.93	2.00	U		Jan 19, 2016	7.20	7.30	Jan 02, 2020	7.35	7.46	0.01		958.02		
		201	2200	C-C3-S201-W201-D	400 Before S-215.2-14	7.93	2.00	D		Jan 19, 2016	9.09	9.49	Jan 02, 2020	9.00	9.60	0.02		307.70		
		201	2200	C-C3-S201-W201-W	400 Before S-215.2-14	7.93	2.00	W TFM												
		202	2211	C-C3-S201-W202-U	1800 Before S-215.2-14	7.93	2.00	U		Jan 19, 2016	9.59	9.49	Jan 02, 2020	9.42	8.82	0.17		40.27		
		202	2211	C-C3-S202-W202-D	1800 Before S-215.2-14	7.93	2.00	D		Jan 19, 2016	7.20	7.20	Jan 02, 2020	7.31	7.21	0.02		245.51		
		202	2211	C-C3-S202-W202-W	1800 Before S-215.2-14	7.93	2.00	W TFM												


			FLOWLINE THICKNESS REPORT															
Tag No.: S1-KMGA-NTMC-6-KMGAA-P-CO					Total length (m): 4300				Installation date: Jun 01, 2005				Service life (yrs): 18.67					
Pipe size (in): 6					% Inspection: 20				1st Inspection date: Jan 27, 2020				6th Inspection date: Aug 02, 2023					
Flowline No.: KMG-AA					No. of section (sections): 5				2nd Inspection date: Jan 02, 2021				7th Inspection date: Jan 19, 2016					
From-To: KMG-A			NTM-C		Length of section (m): 860				3rd Inspection date: Feb 21, 2022				8th Inspection date: Jan 27, 2017					
Process: P			Process		Length of subsection (m): 172				4th Inspection date: Dec 08, 2022				9th Inspection date: Jan 16, 2018					
Service: CO			Crude oil		Total spool (spools): 391				5th Inspection date: Feb 11, 2023				10th Inspection: Jan 16, 2019					
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL									
		203	2222	C-C3-S202-W203-U	800 After S-215.2-12	7.93	2.00	U		Jan 19, 2016	7.30	7.60	Jan 02, 2020	7.30	7.30	0.03	158.18	
		203	2222	C-C3-S203-W203-D	800 After S-215.2-12	7.93	2.00	D		Jan 19, 2016	7.30	7.30	Jan 02, 2020	7.20	7.29	0.03	155.19	
		203	2222	C-C3-S203-W203-W	800 After S-215.2-12	7.93	2.00	W TFM										
		204	2233	C-C3-S203-W204-U	1000 After S-215.2-10	7.93	2.00	U		Jan 19, 2016	7.00	7.10	Jan 02, 2020	7.00	7.10	0.02	223.84	
		204	2233	C-C3-S204-W204-D	1000 After S-215.2-10	7.93	2.00	D		Jan 19, 2016	7.30	7.50	Jan 02, 2020	7.00	7.50	0.08	65.94	
		204	2233	C-C3-S204-W204-W	1000 After S-215.2-10	7.93	2.00	W TFM										
		205	2244	C-C3-S204-W205-U	1300 After S-215.2-08	7.93	2.00	U		Jan 19, 2016	7.70	7.20	Jan 02, 2020	7.50	7.20	0.01	465.58	
		205	2244	C-C3-S205-W205-D	1300 After S-215.2-08	7.93	2.00	D		Jan 19, 2016	7.70	7.50	Jan 02, 2020	7.70	7.00	0.13	39.56	
		205	2244	C-C3-S205-W205-W	1300 After S-215.2-08	7.93	2.00	W TFM										
		206	2255	C-C3-S205-W206-U	1200 After S-215.2-06	7.93	2.00	U		Jan 19, 2016	7.20	7.10	Jan 02, 2020	7.43	7.20	0.02	232.79	
		206	2255	C-C3-S206-W206-D	1200 After S-215.2-06	7.93	2.00	D		Jan 19, 2016	7.30	7.50	Jan 02, 2020	7.33	7.52	0.03	176.75	
		206	2255	C-C3-S206-W206-W	1200 After S-215.2-06	7.93	2.00	W TFM										
		207	2266	C-C3-S206-W207-U	1400 After S-215.2-04	7.93	2.00	U		Jan 19, 2016	7.30	7.70	Jan 02, 2020	7.34	7.45	0.02	298.82	
		207	2266	C-C3-S207-W207-D	1400 After S-215.2-04	7.93	2.00	D		Jan 19, 2016	7.40	7.50	Jan 02, 2020	7.51	7.50	0.00	18.55	
		207	2266	C-C3-S207-W207-W	1400 After S-215.2-04	7.93	2.00	W TFM										
		208	2277	C-C3-S207-W208-U	1400 After S-215.2-02	7.93	2.00	U		Jan 19, 2016	6.69	7.39	Jan 02, 2020	6.77	7.40	-0.01	16.09	
		208	2277	C-C3-S208-W208-D	1400 After S-215.2-02	7.93	2.00	D		Jan 19, 2016	7.30	7.79	Jan 02, 2020	7.30	7.60	0.01	474.53	
		208	2277	C-C3-S208-W208-W	1400 After S-215.2-02	7.93	2.00	W TFM					Dec 08, 2022		7.55	0.02	256.05	
		209	2288	C-C3-S208-W209-U	1500 After S-215.1-60	7.93	2.00	U		Jan 19, 2016	7.69	7.49	Jan 02, 2020	7.53	7.40	0.02	237.37	
		209	2288	C-C3-S209-W209-D	1500 After S-215.1-60	7.93	2.00	D		Jan 19, 2016	8.09	7.20	Jan 02, 2020	7.46	7.35	0.01	958.02	
		209	2288	C-C3-S209-W209-W	1500 After S-215.1-60	7.93	2.00	W TFM					Dec 08, 2022		7.45	0.03	199.06	


			FLOWLINE THICKNESS REPORT															
Tag No.: S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m): 4300				Installation date: Jun 01, 2005		Service life (yrs): 18.67									
Pipe size (in): 6			% Inspection: 20				1st Inspection date: Jan 27, 2020		6th Inspection date: Aug 02, 2023									
Flowline No.: KMG-AA			No. of section (sections): 5				2nd Inspection date: Jan 02, 2021		7th Inspection date: Jan 19, 2016									
From-To: KMG-A		NTM-C	Length of section (m): 860				3rd Inspection date: Feb 21, 2022		8th Inspection date: Jan 27, 2017									
Process: P		Process	Length of subsection (m): 172				4th Inspection date: Dec 08, 2022		9th Inspection date: Jan 16, 2018									
Service: CO		Crude oil	Total spool (spools): 391				5th Inspection date: Feb 11, 2023		10th Inspection: Jan 16, 2019									
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL									
		210	2299	C-C3-S209-W210-U	2100 After S-215.1-58	7.93	2.00	U		Jan 19, 2016	7.30	7.20	Jan 02, 2020	7.28	7.20	0.03	155.19	
		210	2299	C-C3-S210-W210-D	2100 After S-215.1-58	7.93	2.00	D		Jan 19, 2016	7.30	7.39	Jan 02, 2020	7.20	7.40	0.03	205.72	
		210	2299	C-C3-S210-W210-W	2100 After S-215.1-58	7.93	2.00	W TFM					Dec 08, 2022		7.00	0.05	94.26	
		211	2310	C-C3-S210-W211-U	2500 After S-215.1-56	7.93	2.00	U		Jan 19, 2016	6.90	7.30	Jan 02, 2020	7.00	7.22	0.01	447.67	
		211	2310	C-C3-S211-W211-D	2500 After S-215.1-56	7.93	2.00	D		Jan 19, 2016	7.70	6.90	Jan 02, 2020	7.71	7.00	0.00	16.86	
		211	2310	C-C3-S211-W211-W	2500 After S-215.1-56	7.93	2.00	W TFM					Dec 08, 2022		7.55	0.02	256.05	
		212	2321	C-C3-S211-W212-U	2700 After S-215.1-54	7.93	2.00	U		Jan 19, 2016	7.29	7.29	Jan 02, 2020	7.20	7.30	0.02	228.58	
		212	2321	C-C3-S212-W212-D	2700 After S-215.1-54	7.93	2.00	D		Jan 19, 2016	7.59	7.39	Jan 02, 2020	7.60	7.20	0.05	108.27	
		212	2321	C-C3-S212-W212-W	2700 After S-215.1-54	7.93	2.00	W TFM					Dec 08, 2022		7.45	0.03	199.06	
		213	2332	C-C3-S212-W213-U	3000 After S-215.1-52	7.93	2.00	U		Jan 19, 2016	7.30	7.20	Jan 02, 2020	7.34	7.50	0.02	298.82	
		213	2332	C-C3-S213-W213-D	3000 After S-215.1-52	7.93	2.00	D		Jan 19, 2016	7.39	7.70	Jan 02, 2020	7.49	7.69	-0.01	18.52	
		213	2332	C-C3-S213-W213-W	3000 After S-215.1-52	7.93	2.00	W TFM					Dec 08, 2022		7.45	0.03	199.06	
		214	2343	C-C3-S213-W214-U	3000 After S-215.1-50	7.93	2.00	U		Jan 19, 2016	7.00	7.19	Jan 02, 2020	7.00	7.20	0.02	223.84	
		214	2343	C-C3-S214-W214-D	3000 After S-215.1-50	7.93	2.00	D		Jan 19, 2016	7.19	7.70	Jan 02, 2020	7.20	7.70	0.00	17.54	
		214	2343	C-C3-S214-W214-W	3000 After S-215.1-50	7.93	2.00	W TFM					Dec 08, 2022		7.55	0.02	256.05	
C	C4	215	2354	C-C4-S214-W215-U	2600 Before S-215.1-49	7.93	2.00	U		Jan 27, 2017	7.60	7.49	Feb 21, 2022	7.73	8.00	-0.02	19.33	
		215	2354	C-C4-S215-W215-D	2600 Before S-215.1-49	7.93	2.00	D		Jan 27, 2017	7.60	7.70	Feb 21, 2022	7.74	7.85	-0.00	19.36	
		215	2354	C-C4-S215-W215-W	2600 Before S-215.1-49	7.93	2.00	W TFM										
		216	2365	C-C4-S215-W216-U	800 After S-215.1-47	7.93	2.00	U		Jan 27, 2017	7.89		Feb 21, 2022	7.90	7.86	0.01	990.58	
		216	2365	C-C4-S216-W216-D	800 After S-215.1-47	7.93	2.00	D		Jan 27, 2017	7.99		Feb 21, 2022	7.74	7.69	0.06	96.18	
		216	2365	C-C4-S216-W216-W	800 After S-215.1-47	7.93	2.00	W TFM										


	FLOWLINE THICKNESS REPORT														
Tag No.:		S1-KMGA-NTMC-6-KMGAA-P-CO		Total length (m):		4300		Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):		6		% Inspection:		20		1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:		KMG-AA		No. of section (sections):		5		2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:		KMG-A NTM-C		Length of section (m):		860		3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:		P		Length of subsection (m):		172		4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:		CO Crude oil		Total spool (spools):		391		5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	


Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL								
		217	2376	C-C4-S216-W217-U	800 After S-215.1-45	7.93	2.00	U		Jan 27, 2017	7.10	7.10	Feb 21, 2022	7.76	7.81	-0.03	19.43
		217	2376	C-C4-S217-W217-D	800 After S-215.1-45	7.93	2.00	D		Jan 27, 2017	7.10	7.20	Feb 21, 2022	7.63	7.76	-0.00	18.99
		217	2376	C-C4-S217-W217-W	800 After S-215.1-45	7.93	2.00	W TFM									
		218	2387	C-C4-S217-W218-U	1000 After S-215.1-43	7.93	2.00	U		Jan 27, 2017	6.99	6.59	Feb 21, 2022	7.39	7.18	-0.06	17.47
		218	2387	C-C4-S218-W218-D	1000 After S-215.1-43	7.93	2.00	D		Jan 27, 2017	6.49	5.79	Feb 21, 2022	7.11	6.45	-0.06	15.01
		218	2387	C-C4-S218-W218-W	1000 After S-215.1-43	7.93	2.00	W TFM									
		219	2398	C-C4-S218-W219-U	1300 After S-215.1-41	7.93	2.00	U		Jan 27, 2017	6.79	6.79	Feb 21, 2022	7.40	7.45	-0.06	18.21
		219	2398	C-C4-S219-W219-D	1300 After S-215.1-41	7.93	2.00	D		Jan 27, 2017	6.89	6.79	Feb 21, 2022	7.19	7.24	-0.04	17.50
		219	2398	C-C4-S219-W219-W	1300 After S-215.1-41	7.93	2.00	W TFM									
		220	2409	C-C4-S219-W220-U	1500 After S-215.1-39	7.93	2.00	U		Jan 27, 2017	6.69	7.19	Feb 21, 2022	7.13	7.36	-0.04	17.30
		220	2409	C-C4-S220-W220-D	1500 After S-215.1-39	7.93	2.00	D		Jan 27, 2017	6.59	6.99	Feb 21, 2022	7.12	7.21	-0.05	17.27
		220	2409	C-C4-S220-W220-W	1500 After S-215.1-39	7.93	2.00	W TFM									
		221	2420	C-C4-S220-W221-U	500 After S-215.1-37	7.93	2.00	U		Jan 27, 2017	6.49	6.99	Feb 21, 2022	7.17	7.77	-0.07	17.44
		221	2420	C-C4-S221-W221-D	500 After S-215.1-37	7.93	2.00	D		Jan 27, 2017	6.39	6.69	Feb 21, 2022	7.12	7.21	-0.07	17.27
		221	2420	C-C4-S221-W221-W	500 After S-215.1-37	7.93	2.00	W TFM									
		222	2431	C-C4-S221-W222-U	700 After S-215.1-35	7.93	2.00	U		Jan 27, 2017	6.79	6.39	Feb 21, 2022	7.31	7.19	-0.08	17.50
		222	2431	C-C4-S222-W222-D	700 After S-215.1-35	7.93	2.00	D		Jan 27, 2017	6.59	6.49	Feb 21, 2022	7.11	7.13	-0.06	17.23
		222	2431	C-C4-S222-W222-W	700 After S-215.1-35	7.93	2.00	W TFM									
		223	2442	C-C4-S222-W223-U	1000 After S-215.1-33	7.93	2.00	U		Jan 27, 2017	6.69	6.89	Feb 21, 2022	7.22	7.27	-0.05	17.61
		223	2442	C-C4-S223-W223-D	1000 After S-215.1-33	7.93	2.00	D		Jan 27, 2017	6.79	6.49	Feb 21, 2022	7.31	7.12	-0.06	17.27
		223	2442	C-C4-S223-W223-W	1000 After S-215.1-33	7.93	2.00	W TFM									


			FLOWLINE THICKNESS REPORT														
Tag No.: S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m): 4300			Installation date: Jun 01, 2005			Service life (yrs): 18.67								
Pipe size (in): 6			% Inspection: 20			1st Inspection date: Jan 27, 2020			6th Inspection date: Aug 02, 2023								
Flowline No.: KMG-AA			No. of section (sections): 5			2nd Inspection date: Jan 02, 2021			7th Inspection date: Jan 19, 2016								
From-To: KMG-A		NTM-C	Length of section (m): 860			3rd Inspection date: Feb 21, 2022			8th Inspection date: Jan 27, 2017								
Process: P		Process	Length of subsection (m): 172			4th Inspection date: Dec 08, 2022			9th Inspection date: Jan 16, 2018								
Service: CO		Crude oil	Total spool (spools): 391			5th Inspection date: Feb 11, 2023			10th Inspection Jan 16, 2019								
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL								
		224	2453	C-C4-S223-W224-U	1200 After S-215.1-31	7.93	2.00	U		Jan 27, 2017	6.49	6.59	Feb 21, 2022	7.45	7.31	-0.08	17.91
		224	2453	C-C4-S224-W224-D	1200 After S-215.1-31	7.93	2.00	D		Jan 27, 2017	6.79	6.39	Feb 21, 2022	7.36	7.14	-0.07	17.34
		224	2453	C-C4-S224-W224-W	1200 After S-215.1-31	7.93	2.00	W TFM									
		225	2464	C-C4-S224-W225-U	1500 After S-215.1-29	7.93	2.00	U		Jan 27, 2017	6.89	6.99	Feb 21, 2022	7.40	7.30	-0.04	17.88
		225	2464	C-C4-S225-W225-D	1500 After S-215.1-29	7.93	2.00	D		Jan 27, 2017	6.79	6.49	Feb 21, 2022	7.26	7.12	-0.06	17.27
		225	2464	C-C4-S225-W225-W	1500 After S-215.1-29	7.93	2.00	W TFM									
		226	2475	C-C4-S225-W226-U	1800 After S-215.1-27	7.93	2.00	U		Jan 27, 2017	6.89	7.19	Feb 21, 2022	7.00	7.38	-0.01	16.86
		226	2475	C-C4-S226-W226-D	1800 After S-215.1-27	7.93	2.00	D		Jan 27, 2017	6.39	6.59	Feb 21, 2022	7.15	7.02	-0.06	16.93
		226	2475	C-C4-S226-W226-W	1800 After S-215.1-27	7.93	2.00	W TFM									
		227	2486	C-C4-S226-W227-U	2000 After S-215.1-25	7.93	2.00	U		Jan 27, 2017	6.69	6.49	Feb 21, 2022	7.40	7.28	-0.08	17.81
		227	2486	C-C4-S227-W227-D	2000 After S-215.1-25	7.93	2.00	D		Jan 27, 2017	6.29	6.79	Feb 21, 2022	7.09	6.27	0.00	1082.71
		227	2486	C-C4-S227-W227-W	2000 After S-215.1-25	7.93	2.00	W TFM									
		228	2497	C-C4-S227-W228-U	2300 After S-215.1-23	7.93	2.00	U		Jan 27, 2017	6.89	6.49	Feb 21, 2022	7.64	7.24	-0.07	17.67
		228	2497	C-C4-S228-W228-D	2300 After S-215.1-23	7.93	2.00	D		Jan 27, 2017	6.39	6.69	Feb 21, 2022	7.03	7.34	-0.06	16.96
		228	2497	C-C4-S228-W228-W	2300 After S-215.1-23	7.93	2.00	W TFM									
		229	2508	C-C4-S228-W229-U	2000 After S-215.1-21	7.93	2.00	U		Jan 27, 2017	6.69	7.09	Feb 21, 2022	6.98	6.96	-0.03	16.73
		229	2508	C-C4-S229-W229-D	2000 After S-215.1-21	7.93	2.00	D		Jan 27, 2017	6.89	6.49	Feb 21, 2022	6.95	7.00	-0.04	16.69
		229	2508	C-C4-S229-W229-W	2000 After S-215.1-21	7.93	2.00	W TFM									
		230	2519	C-C4-S229-W230-U	3000 After S-215.1-19	7.93	2.00	U		Jan 27, 2017	6.89	6.79	Feb 21, 2022	7.54	6.44	0.07	64.33
		230	2519	C-C4-S230-W230-D	3000 After S-215.1-19	7.93	2.00	D		Jan 27, 2017	6.39	6.79	Feb 21, 2022	6.78	6.75	-0.03	16.02
		230	2519	C-C4-S230-W230-W	3000 After S-215.1-19	7.93	2.00	W TFM									


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67		
Pipe size (in):			6			% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023		
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016		
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
C	C5	231	2530	C-C5-S230-W231-U	2000 After S-215.1-17	7.93	2.00	U		Jan 16, 2018	7.10	7.79	Feb 21, 2022	7.24	7.67	0.01	794.85			
		231	2530	C-C5-S231-W231-D	2000 After S-215.1-17	7.93	2.00	D		Jan 16, 2018	7.40	7.50	Feb 21, 2022	7.41	7.10	0.07	69.72			
		231	2530	C-C5-S231-W231-W	2000 After S-215.1-17	7.93	2.00	W TFM					Aug 02, 2023		7.14	0.04	118.29			
		232	2541	C-C5-S231-W232-U	2000 After S-215.1-15	7.93	2.00	U		Jan 16, 2018	7.49	6.99	Feb 21, 2022	7.57	7.18	-0.02	17.47			
		232	2541	C-C5-S232-W232-D	2000 After S-215.1-15	7.93	2.00	D		Jan 16, 2018	6.99	7.09	Feb 21, 2022	7.23	7.24	-0.03	17.64			
		232	2541	C-C5-S232-W232-W	2000 After S-215.1-15	7.93	2.00	W TFM					Aug 02, 2023		6.72	0.07	70.92			
		233	2552	C-C5-S232-W233-U	3000 After S-215.1-13	7.93	2.00	U		Jan 16, 2018	7.30	7.79	Feb 21, 2022	7.52	7.69	0.01	627.99			
		233	2552	C-C5-S233-W233-D	3000 After S-215.1-13	7.93	2.00	D		Jan 16, 2018	7.30	7.19	Feb 21, 2022	7.09	7.18	0.02	208.76			
		233	2552	C-C5-S233-W233-W	3000 After S-215.1-13	7.93	2.00	W TFM					Aug 02, 2023		7.14	0.04	118.29			
		234	2563	C-C5-S233-W234-U	3000 After S-215.1-11	7.93	2.00	U		Jan 16, 2018	7.39	7.19	Feb 21, 2022	7.61	7.18	0.00	2124.51			
		234	2563	C-C5-S234-W234-D	3000 After S-215.1-11	7.93	2.00	D		Jan 16, 2018	7.19	7.19	Feb 21, 2022	7.11	6.93	0.06	77.77			
		234	2563	C-C5-S234-W234-W	3000 After S-215.1-11	7.93	2.00	W TFM					Aug 02, 2023		6.93	0.06	89.63			
		235	2574	C-C5-S234-W235-U	3000 After S-215.1-09	7.93	2.00	U		Jan 16, 2018	7.60	7.30	Feb 21, 2022	7.27	7.36	0.04	145.35			
		235	2574	C-C5-S235-W235-D	3000 After S-215.1-09	7.93	2.00	D		Jan 16, 2018	7.10	7.30	Feb 21, 2022	7.19	7.38	0.00	4723.61			
		235	2574	C-C5-S235-W235-W	3000 After S-215.1-09	7.93	2.00	W TFM					Aug 02, 2023		7.04	0.05	102.96			
		236	2585	C-C5-S235-W236-U	3000 After S-215.1-07	7.93	2.00	U		Jan 16, 2018	7.19	7.39	Feb 21, 2022	7.39	7.63	-0.02	18.18			
		236	2585	C-C5-S236-W236-D	3000 After S-215.1-07	7.93	2.00	D		Jan 16, 2018	7.19	6.79	Feb 21, 2022	7.36	6.98	-0.02	16.80			
		236	2585	C-C5-S236-W236-W	3000 After S-215.1-07	7.93	2.00	W TFM					Aug 02, 2023		6.82	0.06	78.95			
		237	2596	C-C5-S236-W237-U	2500 After S-215.1-06	7.93	2.00	U		Jan 16, 2018	7.29	7.59	Feb 21, 2022	7.91	8.12	-0.07	19.93			
		237	2596	C-C5-S237-W237-D	2500 After S-215.1-06	7.93	2.00	D		Jan 16, 2018	7.49	7.29	Feb 21, 2022	7.99	7.97	-0.07	20.13			
		237	2596	C-C5-S237-W237-W	2500 After S-215.1-06	7.93	2.00	W TFM												


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67		
Pipe size (in):			6			% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023		
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016		
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		238	2607	C-C5-S237-W238-U	2500 After S-215.1-04	7.93	2.00	U		Jan 16, 2018	7.39	7.49	Feb 21, 2022	8.57	8.35	-0.10	21.42			
		238	2607	C-C5-S238-W238-D	2500 After S-215.1-04	7.93	2.00	D		Jan 16, 2018	6.89	6.99	Feb 21, 2022	8.22	8.05	-0.13	20.40			
		238	2607	C-C5-S238-W238-W	2500 After S-215.1-04	7.93	2.00	W TFM												
		239	2618	C-C5-S238-W239-U	4000 Before S-215.1-01	7.93	2.00	U		Jan 16, 2018	7.39	7.19	Feb 21, 2022	8.90	8.59	-0.15	22.23			
		239	2618	C-C5-S239-W239-D	4000 Before S-215.1-01	7.93	2.00	D		Jan 16, 2018	7.29	7.49	Feb 21, 2022	8.76	8.81	-0.16	22.80			
		239	2618	C-C5-S239-W239-W	4000 Before S-215.1-01	7.93	2.00	W TFM												
		240	2629	C-C5-S239-W240-U	2500 Before S-215-03	7.93	2.00	U		Jan 16, 2018	7.99	7.69	Feb 21, 2022	8.82	8.56	-0.09	22.12			
		240	2629	C-C5-S240-W240-D	2500 Before S-215-03	7.93	2.00	D		Jan 16, 2018	9.59	6.69	Feb 21, 2022	10.25	9.87	-0.35	26.54			
		240	2629	C-C5-S240-W240-W	2500 Before S-215-03	7.93	2.00	W TFM												
		241	2640	C-C5-S240-W241-U	500 Before S-215-03	7.93	2.00	U		Jan 16, 2018	9.40	7.79	Feb 21, 2022	9.71	9.90	-0.21	26.00			
		241	2640	C-C5-S241-W241-D	500 Before S-215-03	7.93	2.00	D		Jan 16, 2018	7.79	7.59	Feb 21, 2022	8.86	8.44	-0.09	21.72			
		241	2640	C-C5-S241-W241-W	500 Before S-215-03	7.93	2.00	W TFM												
		242	2651	C-C5-S241-W242-U	3000 Before S-215-01	7.93	2.00	U		Jan 16, 2018	7.40	7.90	Feb 21, 2022	7.14	7.59	0.06	81.08			
		242	2651	C-C5-S242-W242-D	3000 Before S-215-01	7.93	2.00	D		Jan 16, 2018	7.60	7.99	Feb 21, 2022	7.68	7.83	0.00	2584.79			
		242	2651	C-C5-S242-W242-W	3000 Before S-215-01	7.93	2.00	W TFM												
		243	2662	C-C5-S242-W243-U	2500 Before S-214-52	7.93	2.00	U		Jan 16, 2018	7.19	6.99	Feb 21, 2022	7.47	6.95	0.01	507.54			
		243	2662	C-C5-S243-W243-D	2500 Before S-214-52	7.93	2.00	D		Jan 16, 2018	7.09	7.39	Feb 21, 2022	7.12	7.73	-0.00	17.27			
		243	2662	C-C5-S243-W243-W	2500 Before S-214-52	7.93	2.00	W TFM												
		244	2673	C-C5-S243-W244-U	2500 Before S-214-50	7.93	2.00	U		Jan 16, 2018	6.89	7.39	Feb 21, 2022	7.22	7.24	-0.04	17.61			
		244	2673	C-C5-S244-W244-D	2500 Before S-214-50	7.93	2.00	D		Jan 16, 2018	7.19	7.29	Feb 21, 2022	7.48	7.81	-0.03	18.48			
		244	2673	C-C5-S244-W244-W	2500 Before S-214-50	7.93	2.00	W TFM												


			FLOWLINE THICKNESS REPORT																			
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:			Jun 01, 2005		Service life (yrs):			18.67		
Pipe size (in):			6			% Inspection:			20			1st Inspection date:			Jan 27, 2020		6th Inspection date:			Aug 02, 2023		
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:			Jan 02, 2021		7th Inspection date:			Jan 19, 2016		
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:			Feb 21, 2022		8th Inspection date:			Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:			Dec 08, 2022		9th Inspection date:			Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:			Feb 11, 2023		10th Inspection			Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL													
		245	2684	C-C5-S244-W245-U	2500 Before S-214-48	7.93	2.00	U		Jan 16, 2018	7.59	7.39	Feb 21, 2022	7.70	7.06	0.08		62.89				
		245	2684	C-C5-S245-W245-D	2500 Before S-214-48	7.93	2.00	D		Jan 16, 2018	7.29	7.59	Feb 21, 2022	7.65	7.51	-0.02		18.58				
		245	2684	C-C5-S245-W245-W	2500 Before S-214-48	7.93	2.00	W TFM														
		246	2695	C-C5-S245-W246-U	2000 After S-214-47	7.93	2.00	U		Jan 16, 2018	6.99	7.09	Feb 21, 2022	7.21	6.98	0.00		2042.48				
		246	2695	C-C5-S246-W246-D	2000 After S-214-47	7.93	2.00	D		Jan 16, 2018	9.29	9.59	Feb 21, 2022	9.76	9.67	-0.04		25.87				
		246	2695	C-C5-S246-W246-W	2000 After S-214-47	7.93	2.00	W TFM														
		247	2706	C-C5-S246-W247-U	3000 After S-214-47	7.93	2.00	U		Jan 16, 2018	10.29	8.79	Feb 21, 2022	10.07	9.71	-0.10		26.00				
		247	2706	C-C5-S247-W247-D	3000 After S-214-47	7.93	2.00	D		Jan 16, 2018	7.20	7.39	Feb 21, 2022	7.27	7.70	0.01		368.96				
		247	2706	C-C5-S247-W247-W	3000 After S-214-47	7.93	2.00	W TFM														
D	D1	248	2717	D-D1-S247-W248-U	2700 After S-214-46	7.93	2.00	U		Jan 16, 2019	7.19	7.59	Feb 11, 2023	7.24	7.64	-0.00		17.67				
		248	2717	D-D1-S248-W248-D	2700 After S-214-46	7.93	2.00	D		Jan 16, 2019	7.39	7.99	Feb 11, 2023	7.44	8.00	-0.00		18.35				
		248	2717	D-D1-S248-W248-W	2700 After S-214-46	7.93	2.00	W TFM														
		249	2728	D-D1-S248-W249-U	2000 After S-214-44	7.93	2.00	U		Jan 16, 2019	7.39	6.89	Feb 11, 2023	7.44	6.94	-0.00		16.66				
		249	2728	D-D1-S249-W249-D	2000 After S-214-44	7.93	2.00	D		Jan 16, 2019	7.29	7.09	Feb 11, 2023	7.34	7.14	-0.00		17.34				
		249	2728	D-D1-S249-W249-W	2000 After S-214-44	7.93	2.00	W TFM														
		250	2739	D-D1-S249-W250-U	2900 Before S-214-42	7.93	2.00	U		Jan 16, 2019	7.49	7.19	Feb 11, 2023	7.54	7.24	-0.00		17.67				
		250	2739	D-D1-S250-W250-D	2900 Before S-214-42	7.93	2.00	D		Jan 16, 2019	7.69	7.19	Feb 11, 2023	7.74	7.24	-0.00		17.67				
		250	2739	D-D1-S250-W250-W	2900 Before S-214-42	7.93	2.00	W TFM														
		251	2750	D-D1-S250-W251-U	1000 Before S-214-40	7.93	2.00	U		Jan 16, 2019	6.99	6.59	Feb 11, 2023	7.04	6.64	-0.00		15.65				
		251	2750	D-D1-S251-W251-D	1000 Before S-214-40	7.93	2.00	D		Jan 16, 2019	7.19	7.19	Feb 11, 2023	7.24	7.24	-0.00		17.67				
		251	2750	D-D1-S251-W251-W	1000 Before S-214-40	7.93	2.00	W TFM														


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO				Total length (m):				4300		Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):			6				% Inspection:				20		1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:			KMG-AA				No. of section (sections):				5		2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:			KMG-A		NTM-C		Length of section (m):				860		3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):				172		4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):				391		5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		252	2761	D-D1-S251-W252-U	1300 Before S-214-38	7.93	2.00	U		Jan 16, 2019	6.80	7.09	Feb 11, 2023	6.85	7.14	0.03	176.09			
		252	2761	D-D1-S252-W252-D	1300 Before S-214-38	7.93	2.00	D		Jan 16, 2019	7.30	7.29	Feb 11, 2023	7.35	7.34	-0.00	18.01			
		252	2761	D-D1-S252-W252-W	1300 Before S-214-38	7.93	2.00	W TFM												
		253	2772	D-D1-S252-W253-U	1500 Before S-214-36	7.93	2.00	U		Jan 16, 2019	7.20	7.00	Feb 11, 2023	7.25	7.05	0.02	305.58			
		253	2772	D-D1-S253-W253-D	1500 Before S-214-36	7.93	2.00	D		Jan 16, 2019	7.09	7.19	Feb 11, 2023	7.14	7.24	-0.00	17.34			
		253	2772	D-D1-S253-W253-W	1500 Before S-214-36	7.93	2.00	W TFM												
		254	2783	D-D1-S253-W254-U	1500 Before S-214-34	7.93	2.00	U		Jan 16, 2019	7.20	7.30	Feb 11, 2023	7.25	7.35	0.03	190.61			
		254	2783	D-D1-S254-W254-D	1500 Before S-214-34	7.93	2.00	D		Jan 16, 2019	7.20	7.20	Feb 11, 2023	7.25	7.25	0.02	317.68			
		254	2783	D-D1-S254-W254-W	1500 Before S-214-34	7.93	2.00	W TFM												
		255	2794	D-D1-S254-W255-U	2000 Before S-214-32	7.93	2.00	U		Jan 16, 2019	7.39	7.30	Feb 11, 2023	7.44	7.35	0.01	971.21			
		255	2794	D-D1-S255-W255-D	2000 Before S-214-32	7.93	2.00	D		Jan 16, 2019	7.19	7.49	Feb 11, 2023	7.24	7.54	-0.00	17.67			
		255	2794	D-D1-S255-W255-W	2000 Before S-214-32	7.93	2.00	W TFM												
		256	2805	D-D1-S255-W256-U	2400 Before S-214-30	7.93	2.00	U		Jan 16, 2019	7.29	7.99	Feb 11, 2023	7.34	8.04	-0.00	18.01			
		256	2805	D-D1-S256-W256-D	2400 Before S-214-30	7.93	2.00	D		Jan 16, 2019	6.99	7.29	Feb 11, 2023	7.04	7.34	-0.00	17.00			
		256	2805	D-D1-S256-W256-W	2400 Before S-214-30	7.93	2.00	W TFM												
		257	2816	D-D1-S256-W257-U	2500 Before S-214-28	7.93	2.00	U		Jan 16, 2019	7.50	7.39	Feb 11, 2023	7.55	7.44	-0.00	18.35			
		257	2816	D-D1-S257-W257-D	2500 Before S-214-28	7.93	2.00	D		Jan 16, 2019	7.19	7.59	Feb 11, 2023	7.24	7.64	-0.00	17.67			
		257	2816	D-D1-S257-W257-W	2500 Before S-214-28	7.93	2.00	W TFM												
		258	2827	D-D1-S257-W258-U	2500 Before S-214-26	7.93	2.00	U		Jan 16, 2019	7.59	7.19	Feb 11, 2023	7.64	7.24	-0.00	17.67			
		258	2827	D-D1-S258-W258-D	2500 Before S-214-26	7.93	2.00	D		Jan 16, 2019	6.99	6.79	Feb 11, 2023	7.04	6.84	-0.00	16.32			
		258	2827	D-D1-S258-W258-W	2500 Before S-214-26	7.93	2.00	W TFM												


		FLOWLINE THICKNESS REPORT															
Tag No.:		S1-KMGA-NTMC-6-KMGAA-P-CO				Total length (m):		4300		Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):		6				% Inspection:		20		1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:		KMG-AA				No. of section (sections):		5		2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:		KMG-A		NTM-C		Length of section (m):		860		3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:		P		Process		Length of subsection (m):		172		4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:		CO		Crude oil		Total spool (spools):		391		5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL								
		259	2838	D-D1-S258-W259-U	2500 Before S-214-24	7.93	2.00	U		Jan 16, 2019	7.40	7.30	Feb 11, 2023	7.45	7.35	0.01	971.21
		259	2838	D-D1-S259-W259-D	2500 Before S-214-24	7.93	2.00	D		Jan 16, 2019	7.00	6.69	Feb 11, 2023	7.05	6.74	-0.00	15.99
		259	2838	D-D1-S259-W259-W	2500 Before S-214-24	7.93	2.00	W TFM									
		260	2849	D-D1-S259-W260-U	2700 Before S-214-22	7.93	2.00	U		Jan 16, 2019	6.99	7.40	Feb 11, 2023	7.04	7.45	-0.00	17.00
		260	2849	D-D1-S260-W260-D	2700 Before S-214-22	7.93	2.00	D		Jan 16, 2019	7.20	6.99	Feb 11, 2023	7.25	7.00	0.00	16.86
		260	2849	D-D1-S260-W260-W	2700 Before S-214-22	7.93	2.00	W TFM									
		261	2860	D-D1-S260-W261-U	2700 Before S-214-20	7.93	2.00	U		Jan 16, 2019	7.10	7.20	Feb 11, 2023	7.15	7.25	0.01	934.90
		261	2860	D-D1-S261-W261-D	2700 Before S-214-20	7.93	2.00	D		Jan 16, 2019	7.00	6.89	Feb 11, 2023	7.05	6.94	-0.00	16.66
		261	2860	D-D1-S261-W261-W	2700 Before S-214-20	7.93	2.00	W TFM									
		262	2871	D-D1-S261-W262-U	3000 After S-214-18	7.93	2.00	U		Jan 16, 2019	7.30	7.20	Feb 11, 2023	7.35	7.25	0.03	190.61
		262	2871	D-D1-S262-W262-D	3000 After S-214-18	7.93	2.00	D		Jan 16, 2019	7.10	7.49	Feb 11, 2023	7.15	5.90	0.29	13.24
		262	2871	D-D1-S262-W262-W	3000 After S-214-18	7.93	2.00	W TFM									
D	D2	263	2882	D-D2-S262-W263-U	2500 After S-214-17	7.93	2.00	U		Jan 27, 2020	7.10	7.40	Feb 11, 2023	7.15	7.45	0.02	269.78
		263	2882	D-D2-S263-W263-D	2500 After S-214-17	7.93	2.00	D		Jan 27, 2020	6.90	7.00	Feb 11, 2023	6.95	7.05	-0.00	16.69
		263	2882	D-D2-S263-W263-W	2500 After S-214-17	7.93	2.00	W TFM									
		264	2893	D-D2-S263-W264-U	2500 After S-214-15	7.93	2.00	U		Jan 27, 2020	6.90	7.40	Feb 11, 2023	6.95	7.45	-0.00	16.69
		264	2893	D-D2-S264-W264-D	2500 After S-214-15	7.93	2.00	D		Jan 27, 2020	6.70	6.80	Feb 11, 2023	6.75	6.85	0.00	1244.11
		264	2893	D-D2-S264-W264-W	2500 After S-214-15	7.93	2.00	W TFM									
		265	2904	D-D2-S264-W265-U	2000 After S-214-13	7.93	2.00	U		Jan 27, 2020	7.00	7.40	Feb 11, 2023	7.05	7.45	-0.00	17.03
		265	2904	D-D2-S265-W265-D	2000 After S-214-13	7.93	2.00	D		Jan 27, 2020	6.80	7.00	Feb 11, 2023	6.85	7.05	-0.00	16.36
		265	2904	D-D2-S265-W265-W	2000 After S-214-13	7.93	2.00	W TFM									


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67		
Pipe size (in):			6			% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023		
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016		
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		266	2915	D-D2-S265-W266-U	1500 After S-214-11	7.93	2.00	U		Jan 27, 2020	7.40	7.50	Feb 11, 2023	7.45	7.55	0.00	1427.45			
		266	2915	D-D2-S266-W266-D	1500 After S-214-11	7.93	2.00	D		Jan 27, 2020	6.60	6.90	Feb 11, 2023	6.65	6.95	0.00	1217.92			
		266	2915	D-D2-S266-W266-W	1500 After S-214-11	7.93	2.00	W TFM												
		267	2926	D-D2-S266-W267-U	1500 After S-214-09	7.93	2.00	U		Jan 27, 2020	6.90	6.60	Feb 11, 2023	6.95	6.65	0.03	135.32			
		267	2926	D-D2-S267-W267-D	1500 After S-214-09	7.93	2.00	D		Jan 27, 2020	7.10	6.50	Feb 11, 2023	7.15	6.55	0.04	108.34			
		267	2926	D-D2-S267-W267-W	1500 After S-214-09	7.93	2.00	W TFM												
		268	2937	D-D2-S267-W268-U	1000 After S-214-07	7.93	2.00	U		Jan 27, 2020	7.40	7.20	Feb 11, 2023	7.45	7.25	-0.00	17.71			
		268	2937	D-D2-S268-W268-D	1000 After S-214-07	7.93	2.00	D		Jan 27, 2020	7.30	7.50	Feb 11, 2023	7.35	7.55	0.02	280.25			
		268	2937	D-D2-S268-W268-W	1000 After S-214-07	7.93	2.00	W TFM												
		269	2948	D-D2-S268-W269-U	500 Before S-214-05	7.93	2.00	U		Jan 27, 2020	6.90	6.90	Feb 11, 2023	6.95	6.95	0.04	117.86			
		269	2948	D-D2-S269-W269-D	500 Before S-214-05	7.93	2.00	D		Jan 27, 2020	7.20	7.20	Feb 11, 2023	7.25	7.25	0.03	196.44			
		269	2948	D-D2-S269-W269-W	500 Before S-214-05	7.93	2.00	W TFM												
		270	2959	D-D2-S269-W270-U	500 Before S-214-04	7.93	2.00	U		Jan 27, 2020	7.10	7.30	Feb 11, 2023	7.15	7.35	0.00	1348.88			
		270	2959	D-D2-S270-W270-D	500 Before S-214-04	7.93	2.00	D		Jan 27, 2020	6.90	6.70	Feb 11, 2023	6.95	6.75	-0.00	16.02			
		270	2959	D-D2-S270-W270-W	500 Before S-214-04	7.93	2.00	W TFM												
		271	2970	D-D2-S270-W271-U	1000 Before S-214-02	7.93	2.00	U		Jan 27, 2020	7.20	7.30	Feb 11, 2023	7.25	7.35	-0.00	17.71			
		271	2970	D-D2-S271-W271-D	1000 Before S-214-02	7.93	2.00	D		Jan 27, 2020	7.40	6.90	Feb 11, 2023	7.45	6.95	-0.00	16.69			
		271	2970	D-D2-S271-W271-W	1000 Before S-214-02	7.93	2.00	W TFM												
		272	2981	D-D2-S271-W272-U	1000 Before S-213-48	7.93	2.00	U		Jan 27, 2020	7.40	7.60	Feb 11, 2023	7.45	7.65	-0.00	18.38			
		272	2981	D-D2-S272-W272-D	1000 Before S-213-48	7.93	2.00	D		Jan 27, 2020	7.00	7.40	Feb 11, 2023	7.05	7.45	0.03	188.95			
		272	2981	D-D2-S272-W272-W	1000 Before S-213-48	7.93	2.00	W TFM												


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO				Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):			6				% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:			KMG-AA				No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		273	2992	D-D2-S272-W273-U	2000 Before S-213-46	7.93	2.00	U		Jan 27, 2020	7.40	7.20	Feb 11, 2023	7.45	7.25	-0.00	17.71			
		273	2992	D-D2-S273-W273-D	2000 Before S-213-46	7.93	2.00	D		Jan 27, 2020	7.30	7.00	Feb 11, 2023	7.35	7.05	-0.00	17.03			
		273	2992	D-D2-S273-W273-W	2000 Before S-213-46	7.93	2.00	W TFM												
		274	3003	D-D2-S273-W274-U	2000 Before S-213-44	7.93	2.00	U		Jan 27, 2020	7.70	7.60	Feb 11, 2023	7.75	7.20	0.13	39.57			
		274	3003	D-D2-S274-W274-D	2000 Before S-213-44	7.93	2.00	D		Jan 27, 2020	7.50	6.90	Feb 11, 2023	7.55	6.95	0.05	99.73			
		274	3003	D-D2-S274-W274-W	2000 Before S-213-44	7.93	2.00	W TFM												
		275	3014	D-D2-S274-W275-U	2500 Before S-213-42	7.93	2.00	U		Jan 27, 2020	7.50	6.80	Feb 11, 2023	7.55	6.85	-0.00	16.36			
		275	3014	D-D2-S275-W275-D	2500 Before S-213-42	7.93	2.00	D		Jan 27, 2020	7.10	7.20	Feb 11, 2023	7.15	7.25	0.00	1348.88			
		275	3014	D-D2-S275-W275-W	2500 Before S-213-42	7.93	2.00	W TFM												
		276	3025	D-D2-S275-W276-U	3000 Before S-213-40	7.93	2.00	U		Jan 27, 2020	7.20	7.50	Feb 11, 2023	7.25	7.55	-0.00	17.71			
		276	3025	D-D2-S276-W276-D	3000 Before S-213-40	7.93	2.00	D		Jan 27, 2020	7.00	7.00	Feb 11, 2023	7.05	7.05	-0.00	17.03			
		276	3025	D-D2-S276-W276-W	3000 Before S-213-40	7.93	2.00	W TFM												
		277	3036	D-D2-S276-W277-U	3000 Before S-213-38	7.93	2.00	U		Jan 27, 2020	7.10	7.00	Feb 11, 2023	7.15	7.05	0.00	1322.68			
		277	3036	D-D2-S277-W277-D	3000 Before S-213-38	7.93	2.00	D		Jan 27, 2020	7.10	7.10	Feb 11, 2023	7.15	7.15	-0.00	17.37			
		277	3036	D-D2-S277-W277-W	3000 Before S-213-38	7.93	2.00	W TFM												
		278	3047	D-D2-S277-W278-U	2500 After S-213-37	7.93	2.00	U		Jan 27, 2020	7.20	7.30	Feb 11, 2023	7.25	7.35	-0.00	17.71			
		278	3047	D-D2-S278-W278-D	2500 After S-213-37	7.93	2.00	D		Jan 27, 2020	7.20	7.20	Feb 11, 2023	7.25	7.25	-0.00	17.71			
		278	3047	D-D2-S278-W278-W	2500 After S-213-37	7.93	2.00	W TFM												
D	D3	279	3058	D-D3-S278-W279-U	2600 Before S-213-35	7.93	2.00	U		Jan 19, 2016	7.49	7.49	Jan 02, 2020	7.50	7.50	0.00	18.55			
		279	3058	D-D3-S279-W279-D	2600 Before S-213-35	7.93	2.00	D		Jan 19, 2016	7.19	7.50	Jan 02, 2020	7.25	7.20	-0.00	17.54			
		279	3058	D-D3-S279-W279-W	2600 Before S-213-35	7.93	2.00	W TFM												


			FLOWLINE THICKNESS REPORT																
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):			6			% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:			KMG-A		NTM-C	Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process	Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil	Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL										
		280	3069	D-D3-S279-W280-U	2500 Before S-213-33	7.93	2.00	U		Jan 19, 2016	7.49	7.29	Jan 02, 2020	7.45	7.30	0.00	17.88		
		280	3069	D-D3-S280-W280-D	2500 Before S-213-33	7.93	2.00	D		Jan 19, 2016	7.39	7.40	Jan 02, 2020	7.40	7.29	0.03	209.28		
		280	3069	D-D3-S280-W280-W	2500 Before S-213-33	7.93	2.00	W TFM											
		281	3080	D-D3-S280-W281-U	2000 Before S-213-31	7.93	2.00	U		Jan 19, 2016	7.00	7.30	Jan 02, 2020	7.17	7.45	0.01	356.07		
		281	3080	D-D3-S281-W281-D	2000 Before S-213-31	7.93	2.00	D		Jan 19, 2016	7.39	6.60	Jan 02, 2020	7.31	7.29	0.01	430.58		
		281	3080	D-D3-S281-W281-W	2000 Before S-213-31	7.93	2.00	W TFM											
		282	3091	D-D3-S281-W282-U	3000 Before S-213-30	7.93	2.00	U		Jan 19, 2016	7.50	7.79	Jan 02, 2020	7.58	7.69	0.02	227.09		
		282	3091	D-D3-S282-W282-D	3000 Before S-213-30	7.93	2.00	D		Jan 19, 2016	8.09	7.70	Jan 02, 2020	8.00	6.62	0.27	16.92		
		282	3091	D-D3-S282-W282-W	3000 Before S-213-30	7.93	2.00	W TFM											
		283	3102	D-D3-S282-W283-U	3000 Before S-213-28	7.93	2.00	U		Jan 19, 2016	7.59	7.09	Jan 02, 2020	7.50	7.35	-0.03	18.04		
		283	3102	D-D3-S283-W283-D	3000 Before S-213-28	7.93	2.00	D		Jan 19, 2016	7.40	7.30	Jan 02, 2020	7.40	7.36	0.04	141.15		
		283	3102	D-D3-S283-W283-W	3000 Before S-213-28	7.93	2.00	W TFM											
		284	3113	D-D3-S283-W284-U	2800 Before S-213-26	7.93	2.00	U		Jan 19, 2016	7.20	6.99	Jan 02, 2020	7.20	7.00	0.00	16.86		
		284	3113	D-D3-S284-W284-D	2800 Before S-213-26	7.93	2.00	D		Jan 19, 2016	7.60	7.60	Jan 02, 2020	7.29	7.70	0.08	67.51		
		284	3113	D-D3-S284-W284-W	2800 Before S-213-26	7.93	2.00	W TFM											
		285	3124	D-D3-S284-W285-U	2700 Before S-213-24	7.93	2.00	U		Jan 19, 2016	7.19	7.29	Jan 02, 2020	7.37	7.35	-0.02	18.04		
		285	3124	D-D3-S285-W285-D	2700 Before S-213-24	7.93	2.00	D		Jan 19, 2016	7.50	7.60	Jan 02, 2020	7.40	7.52	0.04	120.87		
		285	3124	D-D3-S285-W285-W	2700 Before S-213-24	7.93	2.00	W TFM											
		286	3135	D-D3-S285-W286-U	2600 Before S-213-22	7.93	2.00	U		Jan 19, 2016	7.19	7.39	Jan 02, 2020	7.00	7.50	0.05	104.11		
		286	3135	D-D3-S286-W286-D	2600 Before S-213-22	7.93	2.00	D		Jan 19, 2016	7.40	6.90	Jan 02, 2020	7.50	7.60	0.00	18.55		
		286	3135	D-D3-S286-W286-W	2600 Before S-213-22	7.93	2.00	W TFM											


		FLOWLINE THICKNESS REPORT															
Tag No.:		S1-KMGA-NTMC-6-KMGAA-P-CO				Total length (m):		4300		Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):		6				% Inspection:		20		1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:		KMG-AA				No. of section (sections):		5		2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:		KMG-A		NTM-C		Length of section (m):		860		3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:		P		Process		Length of subsection (m):		172		4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:		CO		Crude oil		Total spool (spools):		391		5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL								
		287	3146	D-D3-S286-W287-U	2600 Before S-213-20	7.93	2.00	U		Jan 19, 2016	7.29	7.20	Jan 02, 2020	7.20	7.35	0.01	465.58
		287	3146	D-D3-S287-W287-D	2600 Before S-213-20	7.93	2.00	D		Jan 19, 2016	7.60	7.50	Jan 02, 2020	7.61	7.00	0.13	39.56
		287	3146	D-D3-S287-W287-W	2600 Before S-213-20	7.93	2.00	W TFM									
		288	3157	D-D3-S287-W288-U	2200 Before S-213-18	7.93	2.00	U		Jan 19, 2016	7.29	7.49	Jan 02, 2020	7.30	7.60	0.00	17.88
		288	3157	D-D3-S288-W288-D	2200 Before S-213-18	7.93	2.00	D		Jan 19, 2016	7.59	7.30	Jan 02, 2020	7.80	7.50	0.01	492.44
		288	3157	D-D3-S288-W288-W	2200 Before S-213-18	7.93	2.00	W TFM									
		289	3168	D-D3-S288-W289-U	2100 Before S-213-16	7.93	2.00	U		Jan 19, 2016	7.50	7.09	Jan 02, 2020	7.54	7.00	0.02	219.79
		289	3168	D-D3-S289-W289-D	2100 Before S-213-16	7.93	2.00	D		Jan 19, 2016	7.29	7.29	Jan 02, 2020	7.28	7.00	0.07	68.21
		289	3168	D-D3-S289-W289-W	2100 Before S-213-16	7.93	2.00	W TFM									
		290	3179	D-D3-S289-W290-U	500 After S-213-14	7.93	2.00	U		Jan 19, 2016	7.79	7.19	Jan 02, 2020	7.80	7.20	0.00	17.54
		290	3179	D-D3-S290-W290-D	500 After S-213-14	7.93	2.00	D		Jan 19, 2016	7.10	7.00	Jan 02, 2020	7.10	7.20	0.02	228.31
		290	3179	D-D3-S290-W290-W	500 After S-213-14	7.93	2.00	W TFM									
		291	3190	D-D3-S290-W291-U	2000 Before S-213-13	7.93	2.00	U		Jan 19, 2016	7.29	6.99	Jan 02, 2020	7.30	7.00	0.00	16.86
		291	3190	D-D3-S291-W291-D	2000 Before S-213-13	7.93	2.00	D		Jan 19, 2016	7.69	6.99	Jan 02, 2020	7.70	7.00	0.00	16.86
		291	3190	D-D3-S291-W291-W	2000 Before S-213-13	7.93	2.00	W TFM									
		292	3201	D-D3-S291-W292-U	1500 Before S-213-12	7.93	2.00	U		Jan 19, 2016	7.30	7.30	Jan 02, 2020	7.19	7.20	0.03	149.90
		292	3201	D-D3-S292-W292-D	1500 Before S-213-12	7.93	2.00	D		Jan 19, 2016	7.40	7.39	Jan 02, 2020	7.40	7.40	0.00	18.21
		292	3201	D-D3-S292-W292-W	1500 Before S-213-12	7.93	2.00	W TFM									
D	D4	293	3212	D-D4-S292-W293-U	1300 After S-213-09	7.93	2.00	U		Jan 27, 2017	6.79	6.19	Feb 21, 2022	7.47	6.89	-0.07	16.49
		293	3212	D-D4-S293-W293-D	1300 After S-213-09	7.93	2.00	D		Jan 27, 2017	7.39	6.89	Feb 21, 2022	7.75	7.50	-0.06	18.55
		293	3212	D-D4-S293-W293-W	1300 After S-213-09	7.93	2.00	W TFM									


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO				Total length (m):				4300		Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):			6				% Inspection:				20		1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:			KMG-AA				No. of section (sections):				5		2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:			KMG-A		NTM-C		Length of section (m):				860		3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):				172		4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):				391		5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		294	3223	D-D4-S293-W294-U	1100 After S-213-07	7.93	2.00	U		Jan 27, 2017	7.30	6.69	Feb 21, 2022	7.08	6.96	-0.03	16.73			
		294	3223	D-D4-S294-W294-D	1100 After S-213-07	7.93	2.00	D		Jan 27, 2017	7.19	6.99	Feb 21, 2022	7.61	7.48	-0.05	18.48			
		294	3223	D-D4-S294-W294-W	1100 After S-213-07	7.93	2.00	W TFM												
		295	3234	D-D4-S294-W295-U	800 After S-213-05	7.93	2.00	U		Jan 27, 2017	7.30	7.20	Feb 21, 2022	7.88	7.81	-0.02	19.60			
		295	3234	D-D4-S295-W295-D	800 After S-213-05	7.93	2.00	D		Jan 27, 2017	7.20	7.20	Feb 21, 2022	7.68	8.00	-0.03	19.16			
		295	3234	D-D4-S295-W295-W	800 After S-213-05	7.93	2.00	W TFM												
		296	3245	D-D4-S295-W296-U	700 After S-213-03	7.93	2.00	U		Jan 27, 2017	7.49		Feb 21, 2022	7.94	7.98	-0.04	20.03			
		296	3245	D-D4-S296-W296-D	700 After S-213-03	7.93	2.00	D		Jan 27, 2017	7.69		Feb 21, 2022	7.79	7.85	-0.01	19.53			
		296	3245	D-D4-S296-W296-W	700 After S-213-03	7.93	2.00	W TFM												
		297	3256	D-D4-S296-W297-U	1500 Before S-212-47	7.93	2.00	U		Jan 27, 2017	6.80	7.20	Feb 21, 2022	7.67	7.41	-0.02	18.25			
		297	3256	D-D4-S297-W297-D	1500 Before S-212-47	7.93	2.00	D		Jan 27, 2017	6.80	7.00	Feb 21, 2022	7.30	6.67	0.05	88.79			
		297	3256	D-D4-S297-W297-W	1500 Before S-212-47	7.93	2.00	W TFM												
		298	3267	D-D4-S297-W298-U	2500 After S-212-46	7.93	2.00	U		Jan 27, 2017	7.70	7.60	Feb 21, 2022	7.80	7.51	0.03	191.46			
		298	3267	D-D4-S298-W298-D	2500 After S-212-46	7.93	2.00	D		Jan 27, 2017	7.30	7.69	Feb 21, 2022	7.38	7.80	0.00	2710.64			
		298	3267	D-D4-S298-W298-W	2500 After S-212-46	7.93	2.00	W TFM												
		299	3278	D-D4-S298-W299-U	500 Before S-212-44	7.93	2.00	U		Jan 27, 2017	6.79	6.89	Feb 21, 2022	7.19	7.22	-0.04	17.50			
		299	3278	D-D4-S299-W299-D	500 Before S-212-44	7.93	2.00	D		Jan 27, 2017	6.79	6.19	Feb 21, 2022	7.58	6.93	-0.07	16.63			
		299	3278	D-D4-S299-W299-W	500 Before S-212-44	7.93	2.00	W TFM												
		300	3289	D-D4-S299-W300-U	1800 Before S-212-43	7.93	2.00	U		Jan 27, 2017	6.19	6.79	Feb 21, 2022	7.20	7.35	-0.10	17.54			
		300	3289	D-D4-S300-W300-D	1800 Before S-212-43	7.93	2.00	D		Jan 27, 2017	6.89	6.99	Feb 21, 2022	7.63	7.19	-0.03	17.50			
		300	3289	D-D4-S300-W300-W	1800 Before S-212-43	7.93	2.00	W TFM												


		FLOWLINE THICKNESS REPORT															
Tag No.:		S1-KMGA-NTMC-6-KMGAA-P-CO				Total length (m):		4300		Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):		6				% Inspection:		20		1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:		KMG-AA				No. of section (sections):		5		2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:		KMG-A		NTM-C		Length of section (m):		860		3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:		P		Process		Length of subsection (m):		172		4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:		CO		Crude oil		Total spool (spools):		391		5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL								
		301	3300	D-D4-S300-W301-U	2100 Before S-212-41	7.93	2.00	U		Jan 27, 2017	6.39	6.59	Feb 21, 2022	7.24	7.19	-0.08	17.50
		301	3300	D-D4-S301-W301-D	2100 Before S-212-41	7.93	2.00	D		Jan 27, 2017	6.39	6.59	Feb 21, 2022	7.32	7.41	-0.09	17.94
		301	3300	D-D4-S301-W301-W	2100 Before S-212-41	7.93	2.00	W TFM									
		302	3311	D-D4-S301-W302-U	2600 Before S-212-39	7.93	2.00	U		Jan 27, 2017	6.59	6.59	Feb 21, 2022	7.00	7.11	-0.04	16.86
		302	3311	D-D4-S302-W302-D	2600 Before S-212-39	7.93	2.00	D		Jan 27, 2017	6.89	6.89	Feb 21, 2022	7.63	6.94	-0.00	16.66
		302	3311	D-D4-S302-W302-W	2600 Before S-212-39	7.93	2.00	W TFM									
		303	3322	D-D4-S302-W303-U	2500 Before S-212-37	7.93	2.00	U		Jan 27, 2017	5.99	6.39	Feb 21, 2022	6.75	7.39	-0.07	16.02
		303	3322	D-D4-S303-W303-D	2500 Before S-212-37	7.93	2.00	D		Jan 27, 2017	6.89	6.29	Feb 21, 2022	7.58	7.14	-0.08	17.34
		303	3322	D-D4-S303-W303-W	2500 Before S-212-37	7.93	2.00	W TFM									
		304	3333	D-D4-S303-W304-U	3000 Before S-212-35	7.93	2.00	U		Jan 27, 2017	6.79	6.59	Feb 21, 2022	7.34	7.22	-0.06	17.61
		304	3333	D-D4-S304-W304-D	3000 Before S-212-35	7.93	2.00	D		Jan 27, 2017	6.99	6.99	Feb 21, 2022	7.35	7.14	-0.01	17.34
		304	3333	D-D4-S304-W304-W	3000 Before S-212-35	7.93	2.00	W TFM									
		305	3344	D-D4-S304-W305-U	2800 After S-212-34	7.93	2.00	U		Jan 27, 2017	6.39	6.69	Feb 21, 2022	7.12	6.55	-0.01	15.35
		305	3344	D-D4-S305-W305-D	2800 After S-212-34	7.93	2.00	D		Jan 27, 2017	6.89	6.79	Feb 21, 2022	7.48	7.15	-0.03	17.37
		305	3344	D-D4-S305-W305-W	2800 After S-212-34	7.93	2.00	W TFM									
		306	3355	D-D4-S305-W306-U	2600 After S-212-32	7.93	2.00	U		Jan 27, 2017	6.09	6.49	Feb 21, 2022	7.00	7.10	-0.09	16.86
		306	3355	D-D4-S306-W306-D	2600 After S-212-32	7.93	2.00	D		Jan 27, 2017	6.99	6.69	Feb 21, 2022	7.59	7.43	-0.07	18.31
		306	3355	D-D4-S306-W306-W	2600 After S-212-32	7.93	2.00	W TFM									
		307	3366	D-D4-S306-W307-U	2500 After S-212-30	7.93	2.00	U		Jan 27, 2017	5.69	6.99	Feb 21, 2022	6.67	7.56	-0.10	15.75
		307	3366	D-D4-S307-W307-D	2500 After S-212-30	7.93	2.00	D		Jan 27, 2017	6.59	6.29	Feb 21, 2022	7.37	7.16	-0.09	17.40
		307	3366	D-D4-S307-W307-W	2500 After S-212-30	7.93	2.00	W TFM									


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67		
Pipe size (in):			6			% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023		
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016		
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		308	3377	D-D4-S307-W308-U	1500 Before S-212-29	7.93	2.00	U		Jan 27, 2017	6.69	6.29	Feb 21, 2022	7.33	7.13	-0.08	17.30			
		308	3377	D-D4-S308-W308-D	1500 Before S-212-29	7.93	2.00	D		Jan 27, 2017	6.79	6.99	Feb 21, 2022	7.52	7.58	-0.07	18.62			
		308	3377	D-D4-S308-W308-W	1500 Before S-212-29	7.93	2.00	W TFM												
D	D5	309	3388	D-D5-S308-W309-U	1200 After S-212-27	7.93	2.00	U		Jan 16, 2018	7.00	7.00	Feb 21, 2022	7.31	7.25	0.01	955.64			
		309	3388	D-D5-S309-W309-D	1200 After S-212-27	7.93	2.00	D		Jan 16, 2018	7.00	7.50	Feb 21, 2022	7.39	7.70	0.05	119.65			
		309	3388	D-D5-S309-W309-W	1200 After S-212-27	7.93	2.00	W TFM												
		310	3399	D-D5-S309-W310-U	1000 After S-212-25	7.93	2.00	U		Jan 16, 2018	7.09	7.39	Feb 21, 2022	7.18	7.64	-0.01	17.47			
		310	3399	D-D5-S310-W310-D	1000 After S-212-25	7.93	2.00	D		Jan 16, 2018	7.59	7.39	Feb 21, 2022	7.73	7.52	-0.01	18.62			
		310	3399	D-D5-S310-W310-W	1000 After S-212-25	7.93	2.00	W TFM												
		311	3410	D-D5-S310-W311-U	1000 After S-212-23	7.93	2.00	U		Jan 16, 2018	7.59	7.39	Feb 21, 2022	7.51	7.15	0.06	88.01			
		311	3410	D-D5-S311-W311-D	1000 After S-212-23	7.93	2.00	D		Jan 16, 2018	7.49	7.50	Feb 21, 2022	7.11	7.14	0.09	55.15			
		311	3410	D-D5-S311-W311-W	1000 After S-212-23	7.93	2.00	W TFM												
		312	3421	D-D5-S311-W312-U	1000 After S-212-21	7.93	2.00	U		Jan 16, 2018	7.29	7.09	Feb 21, 2022	7.49	7.23	-0.01	17.64			
		312	3421	D-D5-S312-W312-D	1000 After S-212-21	7.93	2.00	D		Jan 16, 2018	7.39	7.19	Feb 21, 2022	7.62	7.25	-0.01	17.71			
		312	3421	D-D5-S312-W312-W	1000 After S-212-21	7.93	2.00	W TFM												
		313	3432	D-D5-S312-W313-U	1000 After S-212-19	7.93	2.00	U		Jan 16, 2018	6.90	7.00	Feb 21, 2022	7.20	7.27	0.02	236.64			
		313	3432	D-D5-S313-W313-D	1000 After S-212-19	7.93	2.00	D		Jan 16, 2018	6.90	7.20	Feb 21, 2022	7.15	7.00	0.05	91.01			
		313	3432	D-D5-S313-W313-W	1000 After S-212-19	7.93	2.00	W TFM												
		314	3443	D-D5-S313-W314-U	3000 After S-212-18	7.93	2.00	U		Jan 16, 2018	7.19	7.29	Feb 21, 2022	7.94	7.76	-0.06	19.43			
		314	3443	D-D5-S314-W314-D	3000 After S-212-18	7.93	2.00	D		Jan 16, 2018	7.19	7.09	Feb 21, 2022	7.59	7.67	-0.05	18.85			
		314	3443	D-D5-S314-W314-W	3000 After S-212-18	7.93	2.00	W TFM												


		FLOWLINE THICKNESS REPORT																
Tag No.:		S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):		4300		Installation date:		Jun 01, 2005		Service life (yrs):		18.67			
Pipe size (in):		6			% Inspection:		20		1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023			
Flowline No.:		KMG-AA			No. of section (sections):		5		2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016			
From-To:		KMG-A		NTM-C	Length of section (m):		860		3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017			
Process:		P		Process	Length of subsection (m):		172		4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018			
Service:		CO		Crude oil	Total spool (spools):		391		5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019			
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL									
		315	3454	D-D5-S314-W315-U	2500 Before S-212-16	7.93	2.00	U		Jan 16, 2018	7.69	7.69	Feb 21, 2022	7.34	7.44	0.09	62.58	
		315	3454	D-D5-S315-W315-D	2500 Before S-212-16	7.93	2.00	D		Jan 16, 2018	7.09	6.59	Feb 21, 2022	7.56	7.07	-0.05	17.10	
		315	3454	D-D5-S315-W315-W	2500 Before S-212-16	7.93	2.00	W TFM										
		316	3465	D-D5-S315-W316-U	1000 Before S-212-15	7.93	2.00	U		Jan 16, 2018	7.69	6.89	Feb 21, 2022	8.63	7.99	-0.12	20.20	
		316	3465	D-D5-S316-W316-D	1000 Before S-212-15	7.93	2.00	D		Jan 16, 2018	7.59	6.89	Feb 21, 2022	8.43	7.59	-0.08	18.85	
		316	3465	D-D5-S316-W316-W	1000 Before S-212-15	7.93	2.00	W TFM										
		317	3476	D-D5-S316-W317-U	1000 Before S-212-14	7.93	2.00	U		Jan 16, 2018	7.40	7.59	Feb 21, 2022	7.43	7.44	0.01	706.01	
		317	3476	D-D5-S317-W317-D	1000 Before S-212-14	7.93	2.00	D		Jan 16, 2018	7.40	7.49	Feb 21, 2022	7.35	7.40	0.02	324.62	
		317	3476	D-D5-S317-W317-W	1000 Before S-212-14	7.93	2.00	W TFM					Aug 02, 2023		7.46	0.03	211.21	
		318	3487	D-D5-S317-W318-U	1000 Before S-212-12	7.93	2.00	U		Jan 16, 2018	6.90	6.89	Feb 21, 2022	7.22	7.08	-0.02	17.13	
		318	3487	D-D5-S318-W318-D	1000 Before S-212-12	7.93	2.00	D		Jan 16, 2018	6.90	6.99	Feb 21, 2022	7.19	7.54	-0.02	17.50	
		318	3487	D-D5-S318-W318-W	1000 Before S-212-12	7.93	2.00	W TFM					Aug 02, 2023		7.14	0.04	118.29	
		319	3498	D-D5-S318-W319-U	1500 Before S-212-10	7.93	2.00	U		Jan 16, 2018	7.49	7.29	Feb 21, 2022	6.99	7.40	0.07	68.22	
		319	3498	D-D5-S319-W319-D	1500 Before S-212-10	7.93	2.00	D		Jan 16, 2018	7.50	7.30	Feb 21, 2022	7.55	7.00	0.07	68.36	
		319	3498	D-D5-S319-W319-W	1500 Before S-212-10	7.93	2.00	W TFM					Aug 02, 2023		7.04	0.05	102.96	
		320	3509	D-D5-S319-W320-U	1500 Before S-212-08	7.93	2.00	U		Jan 16, 2018	7.29	7.29	Feb 21, 2022	7.28	7.55	0.00	2165.52	
		320	3509	D-D5-S320-W320-D	1500 Before S-212-08	7.93	2.00	D		Jan 16, 2018	7.69	7.39	Feb 21, 2022	7.89	7.47	-0.01	18.45	
		320	3509	D-D5-S320-W320-W	1500 Before S-212-08	7.93	2.00	W TFM					Aug 02, 2023		7.14	0.04	118.29	
		321	3520	D-D5-S320-W321-U	2000 Before S-212-06	7.93	2.00	U		Jan 16, 2018	6.99	7.00	Feb 21, 2022	7.13	7.26	-0.01	17.30	
		321	3520	D-D5-S321-W321-D	2000 Before S-212-06	7.93	2.00	D		Jan 16, 2018	7.19	7.19	Feb 21, 2022	7.36	7.57	-0.02	18.08	
		321	3520	D-D5-S321-W321-W	2000 Before S-212-06	7.93	2.00	W TFM					Aug 02, 2023		7.14	0.04	118.29	


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67		
Pipe size (in):			6			% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023		
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016		
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		322	3531	D-D5-S321-W322-U	2000 Before S-212-04	7.93	2.00	U		Jan 16, 2018	7.19	6.99	Feb 21, 2022	7.30	7.06	-0.01	17.07			
		322	3531	D-D5-S322-W322-D	2000 Before S-212-04	7.93	2.00	D		Jan 16, 2018	7.19	7.69	Feb 21, 2022	7.41	7.77	-0.02	18.25			
		322	3531	D-D5-S322-W322-W	2000 Before S-212-04	7.93	2.00	W TFM					Aug 02, 2023		7.25	0.04	140.37			
		323	3542	D-D5-S322-W323-U	2000 Before S-212-02	7.93	2.00	U		Jan 16, 2018	7.09	6.89	Feb 21, 2022	7.32	7.43	-0.05	17.94			
		323	3542	D-D5-S323-W323-D	2000 Before S-212-02	7.93	2.00	D		Jan 16, 2018	7.69	7.19	Feb 21, 2022	8.14	7.34	-0.02	18.01			
		323	3542	D-D5-S323-W323-W	2000 Before S-212-02	7.93	2.00	W TFM												
E	E1	324	3553	E-E1-S323-W324-U	2500 Before S-211-48	7.93	2.00	U		Jan 16, 2019	7.49	7.49	Feb 11, 2023	7.54	7.54	-0.00	18.68			
		324	3553	E-E1-S324-W324-D	2500 Before S-211-48	7.93	2.00	D		Jan 16, 2019	7.29	7.29	Feb 11, 2023	7.34	7.34	-0.00	18.01			
		324	3553	E-E1-S324-W324-W	2500 Before S-211-48	7.93	2.00	W TFM												
		325	3564	E-E1-S324-W325-U	Under Box	7.93	2.00	U												
		325	3564	E-E1-S325-W325-D	Under Box	7.93	2.00	D												
		325	3564	E-E1-S325-W325-W	Under Box	7.93	2.00	W TFM												
		326	3575	E-E1-S325-W326-U	4000 Before S-211-47	7.93	2.00	U		Jan 16, 2019	7.10	7.49	Feb 11, 2023	7.15	7.54	0.01	934.90			
		326	3575	E-E1-S326-W326-D	4000 Before S-211-47	7.93	2.00	D		Jan 16, 2019	7.19	7.50	Feb 11, 2023	7.24	7.55	-0.00	17.67			
		326	3575	E-E1-S326-W326-W	4000 Before S-211-47	7.93	2.00	W TFM												
		327	3586	E-E1-S326-W327-U	2000 After S-211-46	7.93	2.00	U		Jan 16, 2019	7.69	7.49	Feb 11, 2023	7.74	7.54	-0.00	18.68			
		327	3586	E-E1-S327-W327-D	2000 After S-211-46	7.93	2.00	D		Jan 16, 2019	7.09	7.59	Feb 11, 2023	7.14	7.64	-0.00	17.34			
		327	3586	E-E1-S327-W327-W	2000 After S-211-46	7.93	2.00	W TFM												
		328	3597	E-E1-S327-W328-U	1500 Before S-211-44	7.93	2.00	U		Jan 16, 2019	7.20	7.19	Feb 11, 2023	7.25	7.24	-0.00	17.67			
		328	3597	E-E1-S328-W328-D	1500 Before S-211-44	7.93	2.00	D		Jan 16, 2019	6.90	7.30	Feb 11, 2023	6.95	7.35	0.02	299.53			
		328	3597	E-E1-S328-W328-W	1500 Before S-211-44	7.93	2.00	W TFM												


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO				Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):			6				% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:			KMG-AA				No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		329	3608	E-E1-S328-W329-U	1300 After S-211-42	7.93	2.00	U		Jan 16, 2019	7.09	7.29	Feb 11, 2023	7.14	7.34	-0.00	17.34			
		329	3608	E-E1-S329-W329-D	1300 After S-211-42	7.93	2.00	D		Jan 16, 2019	7.19	7.79	Feb 11, 2023	7.24	7.72	-0.00	17.67			
		329	3608	E-E1-S329-W329-W	1300 After S-211-42	7.93	2.00	W TFM												
		330	3619	E-E1-S329-W330-U	1000 After S-211-40	7.93	2.00	U		Jan 16, 2019	6.89	6.99	Feb 11, 2023	6.94	7.04	-0.00	16.66			
		330	3619	E-E1-S330-W330-D	1000 After S-211-40	7.93	2.00	D		Jan 16, 2019	6.79	7.19	Feb 11, 2023	6.84	7.24	-0.00	16.32			
		330	3619	E-E1-S330-W330-W	1000 After S-211-40	7.93	2.00	W TFM												
		331	3630	E-E1-S330-W331-U	500 After S-211-38	7.93	2.00	U		Jan 16, 2019	6.80	7.19	Feb 11, 2023	6.85	7.24	0.02	293.48			
		331	3630	E-E1-S331-W331-D	500 After S-211-38	7.93	2.00	D		Jan 16, 2019	7.09	7.29	Feb 11, 2023	7.09	7.34	0.00	4620.05			
		331	3630	E-E1-S331-W331-W	500 After S-211-38	7.93	2.00	W TFM												
		332	3641	E-E1-S331-W332-U	400 Before S-211-36	7.93	2.00	U		Jan 16, 2019	7.19	7.49	Feb 11, 2023	7.24	7.54	-0.00	17.67			
		332	3641	E-E1-S332-W332-D	400 Before S-211-36	7.93	2.00	D		Jan 16, 2019	7.39	7.49	Feb 11, 2023	7.44	7.54	-0.00	18.35			
		332	3641	E-E1-S332-W332-W	400 Before S-211-36	7.93	2.00	W TFM												
		333	3652	E-E1-S332-W333-U	400 Before S-211-34	7.93	2.00	U		Jan 16, 2019	6.99	7.09	Feb 11, 2023	7.04	7.14	-0.00	17.00			
		333	3652	E-E1-S333-W333-D	400 Before S-211-34	7.93	2.00	D		Jan 16, 2019	7.29	7.20	Feb 11, 2023	7.34	7.25	0.01	953.05			
		333	3652	E-E1-S333-W333-W	400 Before S-211-34	7.93	2.00	W TFM												
		334	3663	E-E1-S333-W334-U	500 Before S-211-32	7.93	2.00	U		Jan 16, 2019	7.10	7.10	Feb 11, 2023	7.15	7.15	0.03	186.98			
		334	3663	E-E1-S334-W334-D	500 Before S-211-32	7.93	2.00	D		Jan 16, 2019	7.30	7.30	Feb 11, 2023	7.35	7.35	0.02	323.74			
		334	3663	E-E1-S334-W334-W	500 Before S-211-32	7.93	2.00	W TFM												
		335	3674	E-E1-S334-W335-U	3000 Before S-211-30	7.93	2.00	U		Jan 16, 2019	7.09	7.20	Feb 11, 2023	7.14	7.25	-0.00	17.34			
		335	3674	E-E1-S335-W335-D	3000 Before S-211-30	7.93	2.00	D		Jan 16, 2019	7.29	7.29	Feb 11, 2023	7.34	7.34	-0.00	18.01			
		335	3674	E-E1-S335-W335-W	3000 Before S-211-30	7.93	2.00	W TFM												


			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67		
Pipe size (in):			6			% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023		
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016		
From-To:			KMG-A		NTM-C		Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		336	3685	E-E1-S335-W336-U	2500 After S-211-29	7.93	2.00	U		Jan 16, 2019	7.19	7.20	Feb 11, 2023	7.24	7.25	-0.00	17.67			
		336	3685	E-E1-S336-W336-D	2500 After S-211-29	7.93	2.00	D		Jan 16, 2019	7.49	7.09	Feb 11, 2023	7.54	7.14	-0.00	17.34			
		336	3685	E-E1-S336-W336-W	2500 After S-211-29	7.93	2.00	W TFM												
E	E2	337	3696	E-E2-S336-W337-U	2000 After S-211-27	7.93	2.00	U		Jan 27, 2020	6.90	7.00	Feb 11, 2023	6.95	7.05	0.06	76.26			
		337	3696	E-E2-S337-W337-D	2000 After S-211-27	7.93	2.00	D		Jan 27, 2020	7.60	7.40	Feb 11, 2023	7.65	7.45	0.03	158.61			
		337	3696	E-E2-S337-W337-W	2000 After S-211-27	7.93	2.00	W TFM												
		338	3707	E-E2-S337-W338-U	2000 After S-211-25	7.93	2.00	U		Jan 27, 2020	7.00	7.40	Feb 11, 2023	7.05	7.45	-0.00	17.03			
		338	3707	E-E2-S338-W338-D	2000 After S-211-25	7.93	2.00	D		Jan 27, 2020	7.10	7.60	Feb 11, 2023	7.15	7.65	-0.00	17.37			
		338	3707	E-E2-S338-W338-W	2000 After S-211-25	7.93	2.00	W TFM												
		339	3718	E-E2-S338-W339-U	1500 After S-211-23	7.93	2.00	U		Jan 27, 2020	6.90	6.70	Feb 11, 2023	6.95	6.75	0.03	177.73			
		339	3718	E-E2-S339-W339-D	1500 After S-211-23	7.93	2.00	D		Jan 27, 2020	6.90	7.40	Feb 11, 2023	6.95	7.45	-0.00	16.69			
		339	3718	E-E2-S339-W339-W	1500 After S-211-23	7.93	2.00	W TFM												
		340	3729	E-E2-S339-W340-U	1000 After S-211-21	7.93	2.00	U		Jan 27, 2020	7.40	7.40	Feb 11, 2023	7.45	7.45	-0.00	18.38			
		340	3729	E-E2-S340-W340-D	1000 After S-211-21	7.93	2.00	D		Jan 27, 2020	7.50	7.70	Feb 11, 2023	7.54	7.75	-0.00	18.68			
		340	3729	E-E2-S340-W340-W	1000 After S-211-21	7.93	2.00	W TFM												
		341	3740	E-E2-S340-W341-U	1000 After S-211-19	7.93	2.00	U		Jan 27, 2020	7.10	7.10	Feb 11, 2023	7.15	7.15	-0.00	17.37			
		341	3740	E-E2-S341-W341-D	1000 After S-211-19	7.93	2.00	D		Jan 27, 2020	7.10	7.10	Feb 11, 2023	7.15	7.15	0.05	103.76			
		341	3740	E-E2-S341-W341-W	1000 After S-211-19	7.93	2.00	W TFM												
		342	3751	E-E2-S341-W342-U	1000 After S-211-17	7.93	2.00	U		Jan 27, 2020	7.10	6.80	Feb 11, 2023	7.15	6.85	0.02	254.06			
		342	3751	E-E2-S342-W342-D	1000 After S-211-17	7.93	2.00	D		Jan 27, 2020	7.30	7.10	Feb 11, 2023	7.35	7.15	-0.00	17.37			
		342	3751	E-E2-S342-W342-W	1000 After S-211-17	7.93	2.00	W TFM												


		FLOWLINE THICKNESS REPORT															
Tag No.:		S1-KMGA-NTMC-6-KMGAA-P-CO				Total length (m):		4300		Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):		6				% Inspection:		20		1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:		KMG-AA				No. of section (sections):		5		2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:		KMG-A		NTM-C		Length of section (m):		860		3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:		P		Process		Length of subsection (m):		172		4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:		CO		Crude oil		Total spool (spools):		391		5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL								
		343	3762	E-E2-S342-W343-U	2500 After S-211-16	7.93	2.00	U		Jan 27, 2020	7.00	7.40	Feb 11, 2023	7.05	7.45	0.00	1322.68
		343	3762	E-E2-S343-W343-D	2500 After S-211-16	7.93	2.00	D		Jan 27, 2020	7.40	7.10	Feb 11, 2023	7.45	7.15	-0.00	17.37
		343	3762	E-E2-S343-W343-W	2500 After S-211-16	7.93	2.00	W TFM									
		344	3773	E-E2-S343-W344-U	3000 After S-211-14	7.93	2.00	U		Jan 27, 2020	6.80	7.80	Feb 11, 2023	6.85	7.79	0.03	181.47
		344	3773	E-E2-S344-W344-D	3000 After S-211-14	7.93	2.00	D		Jan 27, 2020	6.90	7.60	Feb 11, 2023	6.95	7.65	0.00	1296.49
		344	3773	E-E2-S344-W344-W	3000 After S-211-14	7.93	2.00	W TFM									
		345	3784	E-E2-S344-W345-U	3000 After S-211-12	7.93	2.00	U		Jan 27, 2020	7.40	7.00	Feb 11, 2023	7.45	7.05	0.02	264.54
		345	3784	E-E2-S345-W345-D	3000 After S-211-12	7.93	2.00	D		Jan 27, 2020	7.50	7.60	Feb 11, 2023	7.55	7.65	0.00	1453.64
		345	3784	E-E2-S345-W345-W	3000 After S-211-12	7.93	2.00	W TFM				Dec 08, 2022		7.55	0.02	256.05	
E	E3	346	3795	E-E3-S345-W346-U	2000 Before S-211-10	7.93	2.00	U		Jan 19, 2016	7.20	7.39	Jan 02, 2020	7.00	7.22	0.05	98.90
		346	3795	E-E3-S346-W346-D	2000 Before S-211-10	7.93	2.00	D		Jan 19, 2016	7.09	7.09	Jan 02, 2020	7.19	7.10	0.00	17.20
		346	3795	E-E3-S346-W346-W	2000 Before S-211-10	7.93	2.00	W TFM				Dec 08, 2022		7.27	0.04	139.99	
		347	3806	E-E3-S346-W347-U	1000 After S-211-08	7.93	2.00	U		Jan 19, 2016	6.89	7.40	Jan 02, 2020	6.99	7.10	-0.01	16.83
		347	3806	E-E3-S347-W347-D	1000 After S-211-08	7.93	2.00	D		Jan 19, 2016	6.99	7.60	Jan 02, 2020	7.10	7.40	-0.01	17.20
		347	3806	E-E3-S347-W347-W	1000 After S-211-08	7.93	2.00	W TFM				Dec 08, 2022		7.18	0.04	121.08	
		348	3817	E-E3-S347-W348-U	1300 After S-211-06	7.93	2.00	U		Jan 19, 2016	7.30	7.19	Jan 02, 2020	7.45	7.43	-0.03	18.31
		348	3817	E-E3-S348-W348-D	1300 After S-211-06	7.93	2.00	D		Jan 19, 2016	6.99	7.79	Jan 02, 2020	7.25	7.90	-0.03	17.71
		348	3817	E-E3-S348-W348-W	1300 After S-211-06	7.93	2.00	W TFM				Dec 08, 2022		7.73	0.01	502.28	
		349	3828	E-E3-S348-W349-U	1800 After S-211-04	7.93	2.00	U		Jan 19, 2016	7.00	7.00	Jan 02, 2020	7.00	7.00	0.03	149.22
		349	3828	E-E3-S349-W349-D	1800 After S-211-04	7.93	2.00	D		Jan 19, 2016	7.50	7.29	Jan 02, 2020	7.50	7.30	0.00	17.88
		349	3828	E-E3-S349-W349-W	1800 After S-211-04	7.93	2.00	W TFM				Dec 08, 2022		7.27	0.04	139.99	

			FLOWLINE THICKNESS REPORT																
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):			4300			Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):			6			% Inspection:			20			1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:			KMG-AA			No. of section (sections):			5			2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:			KMG-A		NTM-C	Length of section (m):			860			3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process	Length of subsection (m):			172			4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil	Total spool (spools):			391			5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL										
		350	3839	E-E3-S349-W350-U	2000 After S-211-02	7.93	2.00	U		Jan 19, 2016	7.20	7.30	Jan 02, 2020	7.42	7.41	-0.00	18.25		
		350	3839	E-E3-S350-W350-D	2000 After S-211-02	7.93	2.00	D		Jan 19, 2016	7.59	7.69	Jan 02, 2020	7.61	7.62	-0.00	18.92		
		350	3839	E-E3-S350-W350-W	2000 After S-211-02	7.93	2.00	W TFM					Dec 08, 2022		7.27	0.04	139.99		
		351	3850	E-E3-S350-W351-U	2500 After S-211-01	7.93	2.00	U		Jan 19, 2016	7.29	7.59	Jan 02, 2020	7.32	7.39	-0.00	17.94		
		351	3850	E-E3-S351-W351-D	2500 After S-211-01	7.93	2.00	D		Jan 19, 2016	6.90	7.59	Jan 02, 2020	6.97	7.50	0.04	134.84		
		351	3850	E-E3-S351-W351-W	2500 After S-211-01	7.93	2.00	W TFM					Dec 08, 2022		7.45	0.03	199.06		
		352	3861	E-E3-S351-W352-U	2000 Before S-211-01	7.93	2.00	U		Jan 19, 2016	7.00	7.20	Jan 02, 2020	8.19	8.00	-0.07	20.24		
		352	3861	E-E3-S352-W352-D	2000 Before S-211-01	7.93	2.00	D		Jan 19, 2016	7.20	7.40	Jan 02, 2020	8.00	8.30	-0.07	20.24		
		352	3861	E-E3-S352-W352-W	2000 Before S-211-01	7.93	2.00	W TFM											
E	E4	353	3872	E-E4-S352-W353-U	Underground	7.93	2.00	U											
		353	3872	E-E4-S353-W353-D	Underground	7.93	2.00	D											
		353	3872	E-E4-S353-W353-W	Underground	7.93	2.00	W TFM											
		354	3883	E-E4-S353-W354-U	Underground	7.93	2.00	U											
		354	3883	E-E4-S354-W354-D	Underground	7.93	2.00	D											
		354	3883	E-E4-S354-W354-W	Underground	7.93	2.00	W TFM											
		355	3894	E-E4-S354-W355-U	Underground	7.93	2.00	U											
		355	3894	E-E4-S355-W355-D	Underground	7.93	2.00	D											
		355	3894	E-E4-S355-W355-W	Underground	7.93	2.00	W TFM											
		356	3905	E-E4-S355-W356-U	Underground	7.93	2.00	U											
		356	3905	E-E4-S356-W356-D	Underground	7.93	2.00	D											
		356	3905	E-E4-S356-W356-W	Underground	7.93	2.00	W TFM											


			FLOWLINE THICKNESS REPORT														
Tag No.: S1-KMGA-NTMC-6-KMGAA-P-CO					Total length (m): 4300			Installation date: Jun 01, 2005			Service life (yrs): 18.67						
Pipe size (in): 6					% Inspection: 20			1st Inspection date: Jan 27, 2020			6th Inspection date: Aug 02, 2023						
Flowline No.: KMG-AA					No. of section (sections): 5			2nd Inspection date: Jan 02, 2021			7th Inspection date: Jan 19, 2016						
From-To: KMG-A			NTM-C		Length of section (m): 860			3rd Inspection date: Feb 21, 2022			8th Inspection date: Jan 27, 2017						
Process: P			Process		Length of subsection (m): 172			4th Inspection date: Dec 08, 2022			9th Inspection date: Jan 16, 2018						
Service: CO			Crude oil		Total spool (spools): 391			5th Inspection date: Feb 11, 2023			10th Inspection Jan 16, 2019						
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL								
		357	3916	E-E4-S356-W357-U	Underground	7.93	2.00	U									
		357	3916	E-E4-S357-W357-D	Underground	7.93	2.00	D									
		357	3916	E-E4-S357-W357-W	Underground	7.93	2.00	W TFM									
		358	3927	E-E4-S357-W358-U	Underground	7.93	2.00	U									
		358	3927	E-E4-S358-W358-D	Underground	7.93	2.00	D									
		358	3927	E-E4-S358-W358-W	Underground	7.93	2.00	W TFM									
		359	3938	E-E4-S358-W359-U	Underground	7.93	2.00	U									
		359	3938	E-E4-S359-W359-D	Underground	7.93	2.00	D									
		359	3938	E-E4-S359-W359-W	Underground	7.93	2.00	W TFM									
		360	3949	E-E4-S359-W360-U	Underground	7.93	2.00	U									
		360	3949	E-E4-S360-W360-D	Underground	7.93	2.00	D									
		360	3949	E-E4-S360-W360-W	Underground	7.93	2.00	W TFM									
		361	3960	E-E4-S360-W361-U	Underground	7.93	2.00	U									
		361	3960	E-E4-S361-W361-D	Underground	7.93	2.00	D									
		361	3960	E-E4-S361-W361-W	Underground	7.93	2.00	W TFM									
		362	3971	E-E4-S361-W362-U	Underground	7.93	2.00	U									
		362	3971	E-E4-S362-W362-D	Underground	7.93	2.00	D									
		362	3971	E-E4-S362-W362-W	Underground	7.93	2.00	W TFM									
		363	3982	E-E4-S362-W363-U	Underground	7.93	2.00	U									
		363	3982	E-E4-S363-W363-D	Underground	7.93	2.00	D									
		363	3982	E-E4-S363-W363-W	Underground	7.93	2.00	W TFM									

			FLOWLINE THICKNESS REPORT															
Tag No.: S1-KMGA-NTMC-6-KMGAA-P-CO					Total length (m): 4300				Installation date: Jun 01, 2005				Service life (yrs): 18.67					
Pipe size (in): 6					% Inspection: 20				1st Inspection date: Jan 27, 2020				6th Inspection date: Aug 02, 2023					
Flowline No.: KMG-AA					No. of section (sections): 5				2nd Inspection date: Jan 02, 2021				7th Inspection date: Jan 19, 2016					
From-To: KMG-A			NTM-C		Length of section (m): 860				3rd Inspection date: Feb 21, 2022				8th Inspection date: Jan 27, 2017					
Process: P			Process		Length of subsection (m): 172				4th Inspection date: Dec 08, 2022				9th Inspection date: Jan 16, 2018					
Service: CO			Crude oil		Total spool (spools): 391				5th Inspection date: Feb 11, 2023				10th Inspection Jan 16, 2019					
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL									
		364	3993	E-E4-S363-W364-U	Underground	7.93	2.00	U										
		364	3993	E-E4-S364-W364-D	Underground	7.93	2.00	D										
		364	3993	E-E4-S364-W364-W	Underground	7.93	2.00	W TFM										
		365	4004	E-E4-S364-W365-U	Underground	7.93	2.00	U										
		365	4004	E-E4-S365-W365-D	Underground	7.93	2.00	D										
		365	4004	E-E4-S365-W365-W	Underground	7.93	2.00	W TFM										
		366	4015	E-E4-S365-W366-U	Underground	7.93	2.00	U										
		366	4015	E-E4-S366-W366-D	Underground	7.93	2.00	D										
		366	4015	E-E4-S366-W366-W	Underground	7.93	2.00	W TFM										
		367	4026	E-E4-S366-W367-U	2000 Before NTM-01	7.93	2.00	U			Feb 21, 2022	7.36	7.52	0.03	157.39			
		367	4026	E-E4-S367-W367-D	2000 Before NTM-01	7.93	2.00	D			Feb 21, 2022	9.01	9.29	-0.06	23.64			
		367	4026	E-E4-S367-W367-W	2000 Before NTM-01	7.93	2.00	W TFM										
E	E5	368	4037	E-E5-S367-W368-U	1000 Before NTM-C-01	7.93	2.00	U		Jan 16, 2018	9.39	9.39	Feb 21, 2022	9.46	9.25	0.03	212.39	
		368	4037	E-E5-S368-W368-D	1000 Before NTM-C-01	7.93	2.00	D		Jan 16, 2018	7.59	7.49	Feb 21, 2022	7.03	7.19	0.11	44.85	
		368	4037	E-E5-S368-W368-W	1000 Before NTM-C-01	7.93	2.00	W TFM										
		369	4048	E-E5-S368-W369-U	1500 Before NTM-C-03	7.93	2.00	U		Jan 16, 2018	7.39	7.39	Feb 21, 2022	7.58	7.53	-0.01	18.65	
		369	4048	E-E5-S369-W369-D	1500 Before NTM-C-03	7.93	2.00	D		Jan 16, 2018	7.09	7.39	Feb 21, 2022	7.15	6.31	0.19	22.66	
		369	4048	E-E5-S369-W369-W	1500 Before NTM-C-03	7.93	2.00	W TFM										
		370	4059	E-E5-S369-W370-U	1500 Before NTM-C-05	7.93	2.00	U		Jan 16, 2018	7.19	7.49	Feb 21, 2022	7.34	7.62	-0.02	18.01	
		370	4059	E-E5-S370-W370-D	1500 Before NTM-C-05	7.93	2.00	D		Jan 16, 2018	7.29	7.39	Feb 21, 2022	7.30	7.43	0.00	17.88	
		370	4059	E-E5-S370-W370-W	1500 Before NTM-C-05	7.93	2.00	W TFM										

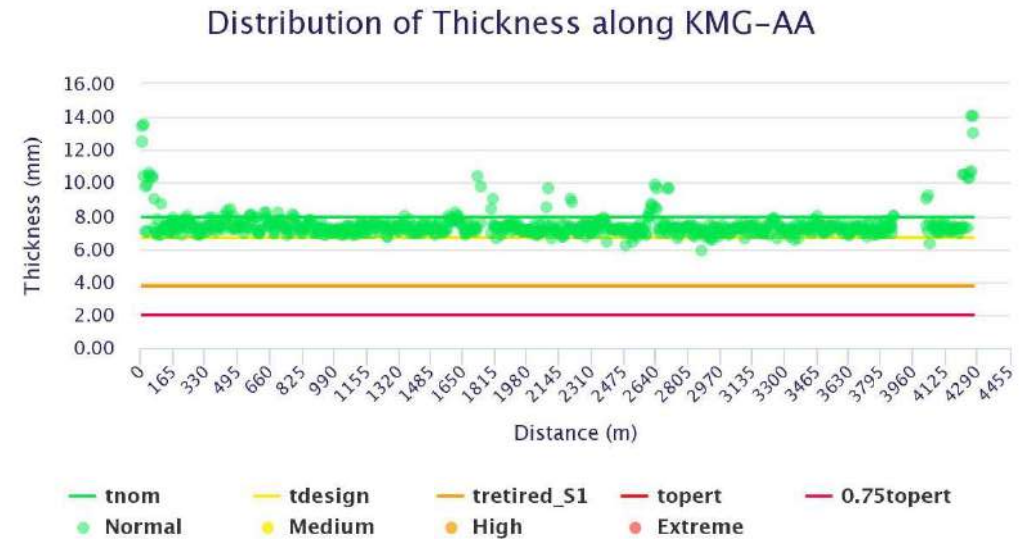
		FLOWLINE THICKNESS REPORT															
Tag No.:		S1-KMGA-NTMC-6-KMGAA-P-CO			Total length (m):		4300		Installation date:		Jun 01, 2005		Service life (yrs):		18.67		
Pipe size (in):		6			% Inspection:		20		1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023		
Flowline No.:		KMG-AA			No. of section (sections):		5		2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016		
From-To:		KMG-A		NTM-C	Length of section (m):		860		3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017		
Process:		P		Process	Length of subsection (m):		172		4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018		
Service:		CO		Crude oil	Total spool (spools):		391		5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019		
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL								
		371	4070	E-E5-S370-W371-U	2000 Before NTM-C-07	7.93	2.00	U		Jan 16, 2018	7.70	8.00	Feb 21, 2022	7.65	7.53	0.04	133.42
		371	4070	E-E5-S371-W371-D	2000 Before NTM-C-07	7.93	2.00	D		Jan 16, 2018	7.09	7.79	Feb 21, 2022	7.02	7.49	0.02	294.13
		371	4070	E-E5-S371-W371-W	2000 Before NTM-C-07	7.93	2.00	W TFM									
		372	4081	E-E5-S371-W372-U	2000 Before NTM-C-09	7.93	2.00	U		Jan 16, 2018	7.49	7.19	Feb 21, 2022	7.59	7.40	-0.02	18.21
		372	4081	E-E5-S372-W372-D	2000 Before NTM-C-09	7.93	2.00	D		Jan 16, 2018	7.29	7.49	Feb 21, 2022	7.25	7.20	0.02	236.97
		372	4081	E-E5-S372-W372-W	2000 Before NTM-C-09	7.93	2.00	W TFM									
		373	4092	E-E5-S372-W373-U	3000 Before NTM-C-11	7.93	2.00	U		Jan 16, 2018	6.89	7.90	Feb 21, 2022	6.95	7.76	-0.01	16.69
		373	4092	E-E5-S373-W373-D	3000 Before NTM-C-11	7.93	2.00	D		Jan 16, 2018	7.69	7.09	Feb 21, 2022	7.37	7.02	0.02	294.13
		373	4092	E-E5-S373-W373-W	3000 Before NTM-C-11	7.93	2.00	W TFM									
		374	4103	E-E5-S373-W374-U	3000 Before NTM-C-13	7.93	2.00	U		Jan 16, 2018	7.19	7.09	Feb 21, 2022	7.52	7.36	-0.03	18.08
		374	4103	E-E5-S374-W374-D	3000 Before NTM-C-13	7.93	2.00	D		Jan 16, 2018	6.79	7.09	Feb 21, 2022	7.08	7.27	-0.03	17.13
		374	4103	E-E5-S374-W374-W	3000 Before NTM-C-13	7.93	2.00	W TFM									
		375	4114	E-E5-S374-W375-U	1000 Before NTM-C-14	7.93	2.00	U		Jan 16, 2018	7.39	7.49	Feb 21, 2022	7.29	7.57	0.02	216.96
		375	4114	E-E5-S375-W375-D	1000 Before NTM-C-14	7.93	2.00	D		Jan 16, 2018	7.99	7.60	Feb 21, 2022	7.61	7.58	0.01	423.21
		375	4114	E-E5-S375-W375-W	1000 Before NTM-C-14	7.93	2.00	W TFM									
		376	4125	E-E5-S375-W376-U	2500 Before NTM-C-16	7.93	2.00	U		Jan 16, 2018	7.59	7.70	Feb 21, 2022	7.27	7.54	0.08	67.54
		376	4125	E-E5-S376-W376-D	2500 Before NTM-C-16	7.93	2.00	D		Jan 16, 2018	7.70	7.59	Feb 21, 2022	7.79	7.57	0.00	1142.23
		376	4125	E-E5-S376-W376-W	2500 Before NTM-C-16	7.93	2.00	W TFM									
		377	4136	E-E5-S376-W377-U	2500 After NTM-C-17	7.93	2.00	U		Jan 16, 2018	7.59	7.19	Feb 21, 2022	7.73	7.18	0.00	2124.51
		377	4136	E-E5-S377-W377-D	2500 After NTM-C-17	7.93	2.00	D		Jan 16, 2018	7.39	6.99	Feb 21, 2022	7.52	7.11	-0.01	17.23
		377	4136	E-E5-S377-W377-W	2500 After NTM-C-17	7.93	2.00	W TFM									

			FLOWLINE THICKNESS REPORT																	
Tag No.:			S1-KMGA-NTMC-6-KMGAA-P-CO				Total length (m):				4300		Installation date:		Jun 01, 2005		Service life (yrs):		18.67	
Pipe size (in):			6				% Inspection:				20		1st Inspection date:		Jan 27, 2020		6th Inspection date:		Aug 02, 2023	
Flowline No.:			KMG-AA				No. of section (sections):				5		2nd Inspection date:		Jan 02, 2021		7th Inspection date:		Jan 19, 2016	
From-To:			KMG-A		NTM-C		Length of section (m):				860		3rd Inspection date:		Feb 21, 2022		8th Inspection date:		Jan 27, 2017	
Process:			P		Process		Length of subsection (m):				172		4th Inspection date:		Dec 08, 2022		9th Inspection date:		Jan 16, 2018	
Service:			CO		Crude oil		Total spool (spools):				391		5th Inspection date:		Feb 11, 2023		10th Inspection		Jan 16, 2019	
Section	Subsection	Weld Joint	Distance (m)			Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL											
		378	4147	E-E5-S377-W378-U	2500 After NTM-C-19	7.93	2.00	U		Jan 16, 2018	7.09	7.09	Feb 21, 2022	7.17	7.49	-0.01	17.44			
		378	4147	E-E5-S378-W378-D	2500 After NTM-C-19	7.93	2.00	D		Jan 16, 2018	7.19	6.99	Feb 21, 2022	7.57	7.01	-0.00	16.90			
		378	4147	E-E5-S378-W378-W	2500 After NTM-C-19	7.93	2.00	W TFM												
		379	4158	E-E5-S378-W379-U	2500 After NTM-C-21	7.93	2.00	U		Jan 16, 2018	7.29	7.49	Feb 21, 2022	7.31	7.36	-0.00	17.91			
		379	4158	E-E5-S379-W379-D	2500 After NTM-C-21	7.93	2.00	D		Jan 16, 2018	7.49	7.49	Feb 21, 2022	7.29	7.07	0.10	49.51			
		379	4158	E-E5-S379-W379-W	2500 After NTM-C-21	7.93	2.00	W TFM												
		380	4169	E-E5-S379-W380-U	2500 Before NTM-C-24	7.93	2.00	U		Jan 16, 2018	7.59	7.79	Feb 21, 2022	7.41	7.39	0.05	110.53			
		380	4169	E-E5-S380-W380-D	2500 Before NTM-C-24	7.93	2.00	D		Jan 16, 2018	7.49	7.19	Feb 21, 2022	7.18	7.34	0.00	2124.51			
		380	4169	E-E5-S380-W380-W	2500 Before NTM-C-24	7.93	2.00	W TFM												
		381	4180	E-E5-S380-W381-U	3000 Before NTM-C-24	7.93	2.00	U		Jan 16, 2018	6.79	7.59	Feb 21, 2022	7.26	7.24	-0.05	17.67			
		381	4180	E-E5-S381-W381-D	3000 Before NTM-C-24	7.93	2.00	D		Jan 16, 2018	7.09	7.69	Feb 21, 2022	7.36	7.21	-0.01	17.57			
		381	4180	E-E5-S381-W381-W	3000 Before NTM-C-24	7.93	2.00	W TFM												
		382	4191	E-E5-S381-W382-U	3000 Before NTM-C-26	7.93	2.00	U		Jan 16, 2018	6.89	6.99	Feb 21, 2022	6.96	7.87	-0.01	16.73			
		382	4191	E-E5-S382-W382-D	3000 Before NTM-C-26	7.93	2.00	D		Jan 16, 2018	7.09	7.29	Feb 21, 2022	7.74	7.29	-0.02	17.84			
		382	4191	E-E5-S382-W382-W	3000 Before NTM-C-26	7.93	2.00	W TFM												
		383	4202	E-E5-S382-W383-U	500 Before S-210-15	7.93	2.00	U		Jan 16, 2018	7.19	7.39	Feb 21, 2022	7.19	7.16	0.01	705.44			
		383	4202	E-E5-S383-W383-D	500 Before S-210-15	7.93	2.00	D		Jan 16, 2018	10.39	10.59	Feb 21, 2022	7.32	7.30	0.75	7.03			
		383	4202	E-E5-S383-W383-W	500 Before S-210-15	7.93	2.00	W TFM												
		384	4213	E-E5-S383-W384-U	1000 Before S-210-17	7.93	2.00	U		Jan 16, 2018	10.39	10.39	Feb 21, 2022	7.38	7.49	0.73	7.33			
		384	4213	E-E5-S384-W384-D	1000 Before S-210-17	7.93	2.00	D		Jan 16, 2018	6.79	7.59	Feb 21, 2022	10.51	10.55	-0.41	28.70			
		384	4213	E-E5-S384-W384-W	1000 Before S-210-17	7.93	2.00	W TFM												

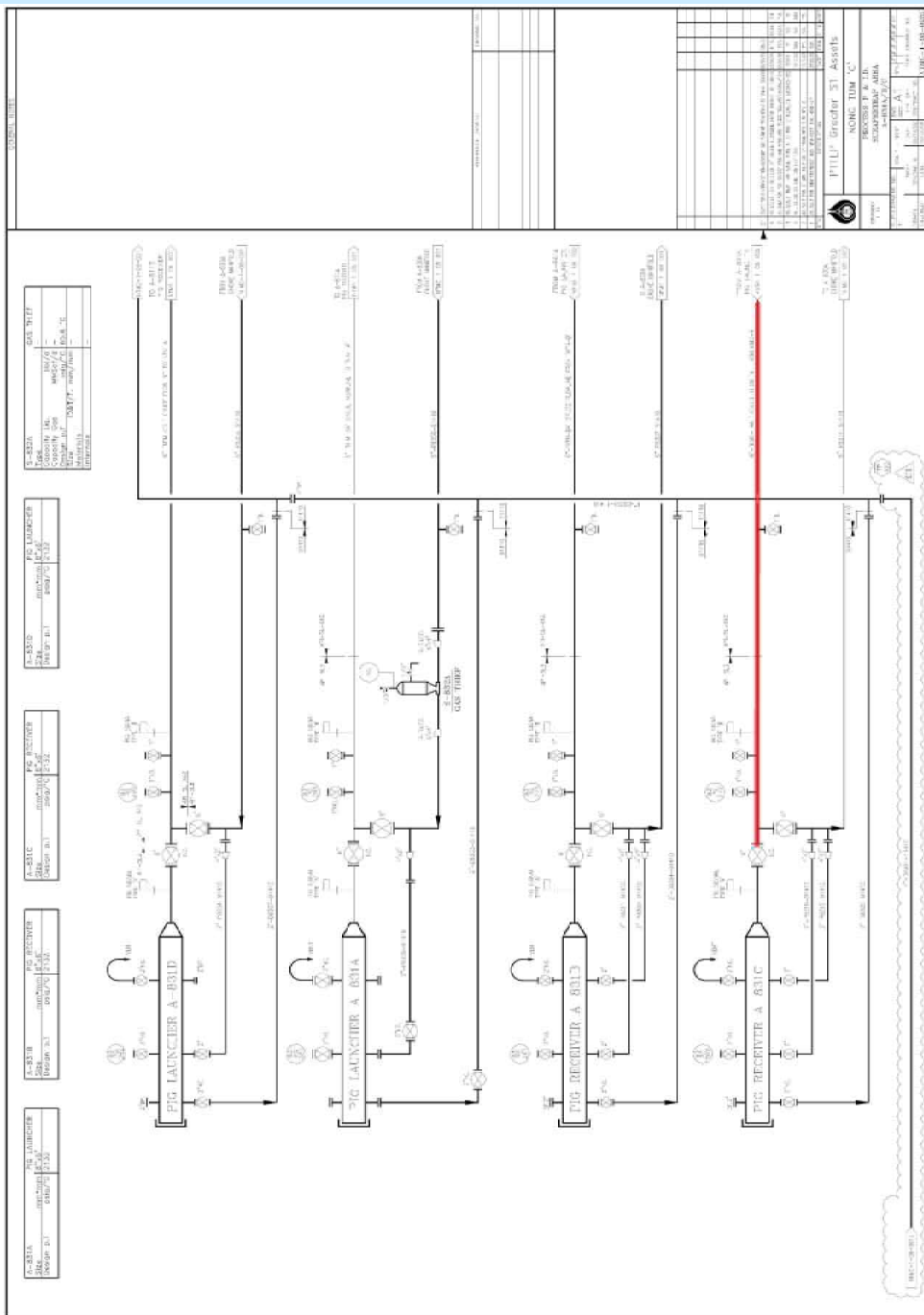
		MINIMUM REMAINING LIFE						PS1/M INSPECTION TEAM
Inspection date	Section	CML Name	Previous Min thickness (mm)	Min thickness (mm)	ST_CR (mm/yr)	LT_CR (mm/yr)	RL (yrs)	Retirement date
Feb 11, 2023	A1	A-A1-S8-W9-U	6.79	6.84	-0.01	-0.00	16.32	Jun 05, 2039
Feb 11, 2023	B1	B-B1-S85-W86-U	6.79	6.84	-0.01	-0.00	16.32	Jun 05, 2039
Feb 11, 2023	C1	C-C1-S170-W170-D	6.99	7.04	-0.01	-0.00	17.00	Feb 06, 2040
Feb 11, 2023	D1	D-D1-S262-W262-D	7.10	5.90	0.29	0.15	13.24	May 05, 2036
Feb 11, 2023	E1	E-E1-S330-W330-D	6.79	6.84	-0.01	-0.00	16.32	Jun 05, 2039
Feb 11, 2023	A2	A-A2-S27-W27-D	6.80	6.85	-0.02	-0.00	16.36	Jun 17, 2039
Feb 11, 2023	B2	B-B2-S114-W115-U	6.70	6.75	-0.02	-0.00	16.02	Feb 14, 2039
Feb 11, 2023	C2	C-C2-S191-W192-U	6.60	6.65	-0.02	-0.00	15.68	Oct 14, 2038
Feb 11, 2023	D2	D-D2-S270-W270-D	6.70	6.75	-0.02	-0.00	16.02	Feb 14, 2039
Feb 11, 2023	E2	E-E2-S339-W339-D	6.90	6.95	-0.02	-0.00	16.69	Oct 18, 2039
Jan 02, 2020	A3	A-A3-S43-W43-D	7.10	7.19	-0.02	-0.02	17.50	Jun 30, 2037
Jan 02, 2020	B3	B-B3-S133-W133-D	7.09	7.20	-0.03	-0.01	17.54	Jul 12, 2037
Jan 02, 2020	C3	C-C3-S207-W208-U	6.69	6.77	-0.02	-0.01	16.09	Jan 30, 2036
Jan 02, 2020	D3	D-D3-S283-W284-U	6.99	7.00	-0.00	0.00	16.86	Nov 08, 2036
Jan 02, 2020	E3	E-E3-S346-W347-U	6.89	6.99	-0.03	-0.01	16.83	Oct 26, 2036
Feb 21, 2022	A4	A-A4-S62-W62-D	6.89	6.93	-0.01	-0.00	16.63	Oct 03, 2038
Feb 21, 2022	B4	B-B4-S137-W138-U	6.09	6.85	-0.15	-0.07	16.36	Jun 27, 2038
Feb 21, 2022	C4	C-C4-S218-W218-D	5.79	6.45	-0.13	-0.06	15.01	Feb 20, 2037
Feb 21, 2022	D4	D-D4-S304-W305-U	6.39	6.55	-0.03	-0.01	15.35	Jun 23, 2037
Feb 21, 2022	E4	E-E4-S367-W367-D		9.01	-0.06	-0.06	23.64	Oct 07, 2045
Feb 21, 2022	A5	A-A5-S69-W70-U	6.89	6.92	-0.01	-0.00	16.59	Sep 21, 2038
Feb 21, 2022	B5	B-B5-S155-W156-U	7.19	7.24	-0.01	-0.00	17.67	Oct 20, 2039
Feb 21, 2022	C5	C-C5-S236-W236-D	6.79	6.98	-0.05	-0.02	16.80	Dec 04, 2038
Feb 21, 2022	D5	D-D5-S321-W322-U	6.99	7.06	-0.02	-0.01	17.07	Mar 13, 2039
Feb 21, 2022	E5	E-E5-S383-W383-D	10.39	7.30	0.75	0.34	7.03	Mar 03, 2029

	<h1>FLOWLINE THICKNESS REPORT</h1>				PS1/M INSPECTION TEAM
	Tag No.: S1-KMGA-NTMC-6-KMGAA-P-CO		Total length (m): 4300	Installation date: Jun 01, 2005	
	Pipe size (in): 6		% Inspection: 20	1st Inspection date: Jan 27, 2020	
	Flowline No.: KMG-AA		No. of section (sections): 5	2nd Inspection date: Jan 02, 2021	
	From-To: KMG-A	NTM-C	Length of section (m): 860	3rd Inspection date: Feb 21, 2022	
	Process: P	Process	Length of subsection (m): 172	4th Inspection date: Dec 08, 2022	
	Service: CO	Crude oil	Total spool (spools): 391	5th Inspection date: Feb 11, 2023	

THICKNESS MEASUREMENT RESULT



P&ID DRAWING



Inspected by:	Pichadchai S. / Benjapong H. / Songchai S.	Date:	Jan 29, 2021
API Inspector reviewed by:	Jirawat C.	Date:	Aug 12, 2023
PTTEP Leader reviewed:	Prawit J.	Date:	Jan 26, 2024

FLOWLINE MAWP REPORT

FLOWLINE MAWP

Tag number:	S1-KMGA-NTMC-6-KMGAA-P-CO	Report number:	FL-6KMG-AA-CO-2021-01
Line number:	KMG-AA	Inspection date:	Jan 02, 2021
Location: From-To	KMG-A	Inservce date:	Jun 01, 2005
P&ID number:	NTMC-1-08-005C & KMG-1-08-005	API Classification:	2
Piping group:	Process	API Mill (yrs):	
Service description:	Crude oil	WO number:	500298959

CML name: D-D1-S262-W262-D

Sub distance: 0

Inspection date: Feb 11, 2023

$$\text{MAWP} = \frac{2tFE Sy}{D}$$

ta: Minimum Actual Thickness	5.90 mm	0.23 inch
D: Outside Diameter	168.28 mm	6.63 inch
F: Design Factor	0.60	0.60
Sy: Specific Minimum Yield Stress (SMYS)	2895.80 barg	42000.00 psig
E: Longitudinal Weld Joint Efficiency	1.00	1.00
CR: Maximum corrosion rate	0.29 mm/yr	0.01 in/yr
Piping inspection interval	1.00 years	12.00 months
t: $ta - 2(CR \times \text{Interval})$	5.31 mm	0.21 inch
MAWP: Maximum allowable working pressure on next inspection interval requirement.	109.67 barg	1590.66 psig
Derating pressure recommended	barg	psig
retired after pressure derating	mm	inch
RL after pressure derating	years	months

Conclusion

- KMG-AA 6" During a Crude flowline, overall thickness reading was still within acceptable range with slightly of internal metal loss & moderate corrosion rate on this period.
The minimum remaining thickness at CML no.D-D1-S262-W262-D is 5.90 m. with SCR 0.29 mm./yr. & RL is 13.24 yrs.(General internal corrosion determined by MFL scanning and UTM)

Recommendation

- Continue normal flowline inspection of flowline length for plan in next year 2024.
- For crude transfer flowlines, the normal maximum operating pressure shall not exceed 500 PSI.

Inspected by:	Jirawat C.	Date:	Feb 11, 2023
API Inspector reviewed by:	Jirawat C.	Date:	Aug 12, 2023
PTTEP Leader reviewed:	Prawit J.	Date:	Jan 26, 2024



บริษัท ปตท.สผ. สยาม จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม
โครงการผลิตปิโตรเลียมแหล่งสิริกิติ์ตอนเหนือและพื้นที่ใกล้เคียง แปลงเอส 1 จังหวัดกำแพงเพชร พิชณุโลก และสุโขทัย
ฉบับเดือนมกราคม - ธันวาคม พ.ศ. 2566

ภาคผนวกที่ 13
Spill Management Plan



PTT Exploration and Production Public Company Limited

Spill Management Plan

Document Code: 12146-PDR-SSHE-501/03-R02

March 2018



Spill Management Plan

12146-PDR-SSHE-501/03-R02

March 2018

Approval Register	
Document Subject	Spill Management Plan
Document Code	12146-PDR-SSHE-501/03-R02
Document Owner	Lawan Pornsakulsakdi (CEN)
Prepared by	Phongthep Borvornyanyong (Engineer, Environment)

Document Custodian			
Name	Title	Signature	Date
	CEN/E		22.03.18

Technical Review			
Name	Title	Signature	Date
	CSA		25/3/18
	CPA		22/3/18
	Manager, SSHE (PDT)		26/03/18
	Senior Engineer, SSHE (OPS)		22/3/18
	Engineer, SSHE (EDE)		22.03.18

Approval		
Name	Signature	Date
Document Owner		28 / 03 / 2018
Approval Authority		30.03.18

THIS DOCUMENT WILL BE REVIEWED EVERY 5 YEARS FROM DATE OF APPROVAL OR REVISED EARLIER IF NECESSARY.

Revision History			
Rev.	Description of Revision	Authorised by	Date
0	New	CSH	Dec 2011
1	Added <ul style="list-style-type: none"> List of approved dispersants in Thailand Request form of dispersant application for approval in Thailand Tier2 Equipment Stockpile Updated <ul style="list-style-type: none"> Role & Responsibility of Corporate and asset during exploration drilling phase Role & Responsibility of Corporate and asset during production drilling phase Role & Responsibility of Corporate and asset for Tier 2 & 3 Equipment Request Tier2 and Tier3 Communication Flow and appendices 	TSH	Dec 2016
2	Updated <ul style="list-style-type: none"> Document title and contents reorganisation. Document code to be aligned with SSHE Documentation Management Standard. Contact number of Thailand and International Authority and Organisation. Added <ul style="list-style-type: none"> Summary of spill management team leader. Minimum requirements of Asset Spill Response Plan preparation, response techniques, consequence analysis, training and exercise. List of Spill Response Equipment under PTTEP and the alliances. 	CSH	Mar 2018

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1. PURPOSE

This Spill Management Plan is developed to outline the preparation of response actions and resources needed for the spill incident. The necessary response actions include the following as a minimum; the requirements of the Asset Spill Response Plan preparation, the response organisation and protocol, the notification and interface between PTTEP Headquarters and the Assets and/or the external agencies including government agencies and other related organisations, resources preparation, including capability assessment and document review and update.

This plan will guide Assets and support functions, i.e. seismic exploration, exploration and production drilling, production and decommissioning activities, including the storage, offloading and logistics support, in preparation and implementation of effective spill response. In some case, bridging document from contractors who provide the main activities to PTTEP is required in order to establish the interface between these organisations as well as ensuring the alignment and prompt response.

This Spill Management Plan is a "PDR" which denotes as a Procedure.

2. SCOPE

This plan applies to all PTTEP Assets and supports functions in preparation and implementation of the effective spill response in all activities of Exploration and Production (E&P) Phases.

Compliance with the requirements described in this plan is mandated for all PTTEP Assets and its Subsidiaries. In the countries where the local regulation exists, this plan shall be read and implemented in conjunction with all relevant regulations, or adopted as a minimum requirement if this plan is more stringent than the regulatory requirements. Where PTTEP is a Joint Venture Partner or Joint Operator under PTTEP operational or financial control, compliance with this document is also mandated where PTTEP has legal obligations on the spill response and management, unless otherwise specified in the operational agreement.

3. REFERENCES

3.1 PTTEP SSHE CONTROLLING DOCUMENTS

Document Number	Document Title
11038-STD-SSHE-000	SSHE Management System
11038-STD-SSHE-520-009	Environmental Management Standard
11038-STD-SSHE-600-011	Incident Management Standard
SSHE-106-STD-340	SSHE Training and Competency Standard
SSHE-106-STD-400	SSHE Risk Management Standard
SSHE-106-STD-500	Emergency and Crisis Management Standard

Document Number	Document Title
SSHE-106-PDR-501	Crisis Management Plan
SSHE-106-PDR-502	Emergency Management Plan
SSHE-106-PDR-521	Waste Management Procedure
SSHE-106-GDL-526	Net Environmental Benefit Analysis Guideline

3.2 OTHER REFERENCE DOCUMENTS

Document Number	Document Title
12145-GDL-004-R02	Crisis Communications Guideline
-	Dispersants: Subsea Application, the International Petroleum Industry Environmental Conservation Association (IPIECA) and International Association of Oil & Gas Producers (IOGP), 2015.
-	Oil Spill Response Field Guides, Oil Spill Response Limited (OSRL), 23 July 2015.
-	Thailand's Oil Spill Protection and Control Plan (แผนป้องกันและขจัดมลพิษทางน้ำเนื่องจากน้ำมันแห่งชาติ, Thai version), Marine Department, the Ministry of Transport Thailand, 6 August 2002.
-	Documents and Guides, The International Tanker Owners Pollution Federation Limited (ITOPF), accessed 2 March 2018, URL: http://www.itopf.com/knowledge-resources/documents-guides
-	Intergovernmental Agreement on the National Plan to Combat Pollution of the Sea by Oil and other Noxious and Hazardous Substances, Australian Maritime Safety Authority, accessed 2 March 2018, URL: https://www.amsa.gov.au/about-us/who-we-work/intergovernmental-agreement-national-plan-combat-pollution-sea-oil-and-other
-	Oil Spill Response Joint Industry Project (OSR-JIP), the International Petroleum Industry Environmental Conservation Association (IPIECA) and International Association of Oil & Gas Producers (IOGP), accessed 2 March 2018, URL: http://www.oilspillresponseproject.org

4. DEFINITIONS

4.1 GENERAL DEFINITIONS

Terminology	Description
Crisis Management Team (CMT)	Asset crisis management team responsible for responding to an actual or potential incident (whether of PTTEP origin or not) be in Local, National or International, on a scale that may become of significant concern to Company business.
Emergency Management Team (EMT)	Asset emergency management team responsible for strategic responses.
Emergency Response Team (ERT)	Site emergency response team responsible for conducting the tactical/in-field responses.
Net Environmental Benefit Analysis (NEBA)	A process used by the spill response organisation or team for making the best response options to minimise impacts of oil spills on people and the Environment.
Planning scenario	Selected scenarios derived from the risk assessment result that is used as the basis for planning of oil spill response. The selection should represent the full range of response challenges and risks against which response strategies and a tiered capability can be defined.
Spill	<p>Any loss of containment that reached the Environment. The spill volume reported should reflect the volume of material that reached the Environment only (i.e. not inclusive of any released volume retained within secondary or other confinement). Reported volume reaching the Environment is irrespective of the quantity recovered (i.e. represents the gross volume reaching the Environment, not a net volume remaining in the Environment).</p> <p>Spills of produced water or process wastewater are excluded. Loss of containment resulting from acts of sabotage (such as theft of oil from pipelines and storage) shall be reported. Loss as a result of "acts of terrorism"/ attacks on infrastructure should not be reported.</p> <p>Intentional discharges of drill cutting (only offshore operations exceed 12 nautical miles) during drilling activities are excluded.</p>

Terminology	Description
Worst credible case discharge	The scenario with the largest release that could reasonably be expected from a facility or operation. Such events may lead to the most severe consequences.

4.2 ORGANISATION AND DEPARTMENTS

Terminology	Description
Corporate	Refers to the PTTEP business groups hierarchically above Asset level, and located in the PTTEP headquarters, Bangkok.
Function Group	Refers to a corporate level business group. These may have associated Divisions, Departments, or operational Assets within their hierarchy.
Division	A business group may have one or more distinct groups within its hierarchy. These are referred to as Divisions.
Asset	Refers to an operating Asset, site, or location within a respective Function Group.
Department	A subgroup within a Function Group, Division or Asset.

4.3 LANGUAGE

May	Indicates a possible course of action
Should	Indicates a preferred course of action
Shall	Indicates a course of action with a mandatory status

4.4 COMMON ACRONYMS

Set out below are common specific terms presented in alphabetical order:

AMOSC	Australian Marine Oil Spill Centre
API	American Petroleum Institute
ART	Arthit Field
CEC	Coastal Energy Company Limited
BCP	Bangchak Petroleum Company Limited
CEN	Environment Management Department
CEN/E	Environmental Applications Section

CEO	Chief Executive Officer
CLG	Legal Division
CMM	Communications Department
CPA	Process Safety and Assurance Department
CRM	Enterprise Risk Management and Internal Control Division
CSA	Safety Management Department
CTEP	Chevron Thailand Exploration and Production Company Limited
CSH	Safety, Security, Health and Environment Division
CMT	Crisis Management Team
CVX	Caltex Thailand
DDPM	Department of Disaster Prevention and Mitigation
DMF	Department of Mineral Fuels
DSV	Drilling Supervisor
E&P	Exploration and Production
EDE	Engineering and Development Group
EMT	Emergency Management Team
ERT	Emergency Response Team
ESI	Environmental Sensitivity Index
ESM	Environmental Sensitivity Maps
EVP	Executive Vice President
FPSO	Floating Production Storage and Offloading
GBN	Greater Bongkot North Field
GBS	Greater Bongkot South Field
GSX	Geoscience and Exploration Group
IC	Incident Commander
IESG	Oil Industry Environmental Safety Group Association
IMO	International Maritime Organisation
IOGP	International Association of Oil & Gas Producers
IPIECA	Global Oil and Gas Industry Association for Environmental and Social Issues

ITOPF	International Tanker Owners Pollution Federation Limited
M&A	Merger and Acquisition
MD	Marine Department, Ministry of Transport
NEBA	Net Environmental Benefit Analysis
OIM	Offshore Installation Manager
OPS	Operations Support Group
OSC	On Scene Commander
OSCT	Oil Spill Combat Team (Indonesia)
OSRL	Oil Spill Response Limited
OSRO	Oil Spill Response Organisation
PCD	Pollution Control Department
PDT	Production Asset Group
PEP	President, Exploration and Production
PIMMAG	Petroleum Industry of Malaysia Mutual AID Group
PTT	PTT Public Company Limited
SCAT	Shoreline Clean-up Assessment Technique
SOPEP	Shipboard Oil Pollution Emergency Plan
SSHE	Safety, Security, Health and Environment
STSC	South Area Sub-committee under Oil Industry Environmental Safety Group Association
SVP	Senior Vice President
VP	Vice President

5. ROLES AND RESPONSIBILITIES

5.1 DOCUMENT OWNER

The owner of the Spill Management Plan is the VP, Environment Management Department, with responsibilities for:

- Approval and issuance of the Procedure and its revisions.
- Ensuring effective implementation of the Procedure.

5.2 CUSTODIAN OF THE DOCUMENT

The custodian of the Spill Management Plan is Manager, Environmental Applications Section, with responsibilities for:

- Identifying deficiencies or potential improvements.
- Initiating periodic revision.
- Maintaining revision history and document status register.

Note: Roles and Responsibilities of relevant personnel shall follow the Emergency and Crisis Management Standard (SSHE-106-STD-500), Emergency Management Plan (SSHE-106-PDR-502), and Crisis Management Plan (SSHE-106-PDR-501).

6. SPILL MANAGEMENT

Generally, spill management in oil and gas exploration and production business is classified based on the 3-Tiered response system in accordance with the International Petroleum Industry Environmental Conservation Association (IPIECA, the Global Oil and Gas Industry Association for Environmental and Social Issues) and International Association of Oil & Gas Producers (IOGP) good practice guide related to oil spill preparedness and response.

Activation of each Tier response and management team is based on the capability of response resources and/or consequences, not correspond to the volume of the spill, as defined below:

- Tier 1:** Asset capability necessary to handle the local spill and/or initial response;
- Tier 2:** Local and National capability to supplement a Tier 1 response; and
- Tier 3:** Global and International capability required due to scale, complexities and/or global potential impact.

PTTEP Assets and support functions could pre-define and document the expected spill volume of each Tier, based on their production scale and the capability of response resources.

Classification of risk level and Tier response shall follow the below documents for more details and definition of severity or impact to people, Environment, Asset and reputation as well as incident management and reporting protocol.

- SSHE Risk Management Standard (SSHE-106-STD-400),
- Emergency and Crisis Management Standard (SSHE-106-STD-500), and
- PTTEP Incident Management Standard (11038-STD-SSHE-600-011).

6.1 SPILL MANAGEMENT ORGANISATION

6.1.1 PTTEP 3-Tiered Response

Figure 1 shows the 3-Tiered spill response organisation as well as necessary internal and external resources. Tier 1 response requires internal resources, whereas Tier 2 and 3 response require National and International resources, respectively. Member of each Tier response team shall refer to the Emergency and Crisis Management Standard (SSHE-106-STD-500).

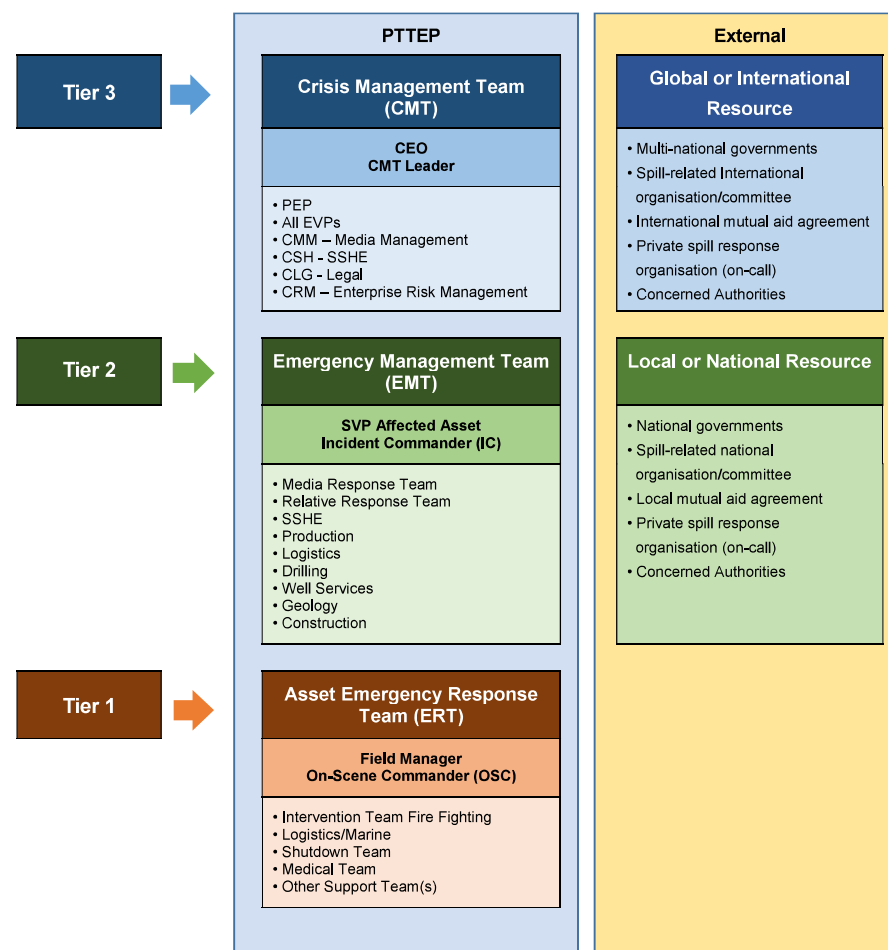


Figure 1: Tier Response Organisation and Resources

6.1.2 Spill Response and Management Team Duty

The different authorized persons of E&P activities in each phase could result in the different designated persons of spill response and management team leader at each Tier response as summarized in Table 1. Although the team leader is nominated depending on the activities, however the team member of each Tier at each phase is commonly the same, except the technical support, as listed in 6.1.1 PTTEP 3-Tiered Response, which their specific duties shall be described in the Asset Spill Response Plan, the Emergency Management Plan (SSHE-106-PDR-502) and the Crisis Management Plan (SSHE-106-PDR-501). The technical support will be requested from each relevant discipline subjected to the incident description.

Table 1: Summary of Team Leaders

Team Leader	Spill Management Team Leader of each E&P Phases			
	Seismic Exploration	Drilling Exploration	Drilling Production	Production
ERT: Tier 1 On-scene Commander	VP under GSX	Drilling Supervisor (DSV)/ Offshore Installation Manager (OIM)		Field Manager
EMT: Tier 2 Incident Commander	SVP of affected Asset (Thailand) Asset Country Manager (Overseas)			
CMT: Tier 3 CMT Leader	CEO or Designated Top Management			
Technical Support	VP/Field Manager of affected Asset	Field Manager of affected Asset/Drilling Contractor		VP of affected Asset
	Depend on an incident situation and shall be requested from the affected Asset.			

6.2 SPILL NOTIFICATION PROCESS

Initial internal and external notification of spill incident shall follow the protocol and reporting requirements as determined in the Incident Management Standard (11038-STD-SSHE-600-011) which covers the reporting channel, period and organisation to be notified within PTTEP and externally to the government agencies both for Thailand and International Assets. External notification of spill incident occurred within Thailand jurisdiction is summarized in Table 2. Contact numbers of Thailand and International authorities and organisations are provided in Appendix A.

It is the responsibility of the International Assets to determine the in-country notification process of all internal and external communications for all Tiers of spill incidents, including communication with PTTEP Headquarters. The communication protocol shall be documented in the Asset Spill Response Plan. The protocol shall include the communication channel to the authorities, notification timelines to the authorities, and the responsible person who is authorised to initiate the communication. The contact number of authorities in each operating country shall be provided and kept up-to-date.

Table 2: Summary of External Notification for Spill Incident in Thailand

Spill Incident Volume	Notify	Reporting timescale	Reported by
>1 bbl	Department of Mineral Fuels (DMF)	The initial report by phone or e-mail within 24 hrs and followed by the written report within 72 hrs	Safety Management Department
> approx. 149.75 bbls (20 tonnes)	Marine Department (MD) <i>for the spill to water</i> Department of Disaster Prevention and Mitigation (DDPM) <i>for the spill on land</i> PTT Group	The initial report by phone or e-mail within 24 hrs	EMT for Tier 2 and CMT for Tier 3/Safety Management Department

Any updated situation to external media and relatives shall refer to Crisis Communications Guideline (12145-GDL-004-R02) under Corporate Communications and Public Affairs Division.

6.3 SPILL RESPONSE RESOURCES

Spill response resources in this plan are defined as spill response and management plan and other supporting documentation, trained personnel, and sufficient equipment and supplies. The resources may come from local, regional or International sources in accordance with 3-Tiered Classification. These resources shall be identified in the Asset Spill Response Plan based on their operational risk assessment results, regulatory requirements, hydrocarbon amount and characteristic, nearby sensitive area and supporting facility, and planning scenarios.

The agreement or spill response organisation for spill response resources support at each activity for each Tier response is recommended to prepare in advance to ensure the availability of the resources when the spill incident occurred.

6.3.1 Asset Spill Response Plan Preparation

PTTEP Assets and support functions shall prepare and implement the Asset Spill Response Plan and the supporting documents. As noted in section 1, the Asset Spill Response Plan is defined as, either the operating Asset Spill Response Plan or the support functions Spill Response Plan or combination of both. The Asset Spill Response Plan shall be scoped and scaled according to the type of operation undertaken, the level of risk associated with the operations/activities, and in compliance with applicable local and national regulation. The Asset Spill Response Plan shall include the necessary information which helps to assist the Assets and support functions to identify and specify the key processes and resources that are crucial to respond to the spill incidents, both for the initial and subsequent stages.

It is required that PTTEP Assets and support functions shall develop their own Plan separately from the Asset Emergency Response Plan. However, the integration of the Asset Spill Response Plan into the Asset Emergency Response Plan is acceptable, as long as its Plan is comprised of the required structures as listed in Appendix B and updated regularly.

In general, the Asset Spill Response Plan shall include the following essential information as a minimum:

- The governing legislative framework where PTTEP operates;
- A summary of the spill planning scenarios resulted from the risk assessment, SSHE Case, Environmental Impact Assessment, and other relevant documents;
- Response strategy and justification for each scenario;
- Stakeholder engagement and notification Procedure internally and externally;
- Action checklist for key personnel;
- Available Tier 1 resources, including details of location, mobilisation, and response timescales and Procedures;
- Tier 2 mutual aid agreements, including the available resources capability, activation Procedures, indicative response times, as well as mobilisation logistics and Procedures;
- Tier 3 arrangements, including accessing International mutual aid, contracted Oil Spill Response Organisations (OSRO) mobilisation Procedures, resources and response timeframes. Procedures for immigration and customs, and any emergency dispensation information for cross-border movement of personnel, equipment and material;
- Reference to the Source Control Procedures and any other response specific plans, e.g. Well Blowout Contingency Plan, tactical response plans where applicable; and
- Summary of the escalation process and resource integration Procedures for the activation and mobilisation of the identified Tier 2 and Tier 3 resources, if a spill exceeds the response capability at Tier 1.

The above requirements shall be used for development of the Asset Spill Response Plan which shall be complied with the National Oil Spill Response Plan of the country of operation as well as relevant PTTEP Standards and Procedures. The Asset Spill Response Plan shall be reviewed by Corporate SSHE Division for advisory and alignment with this plan and other compulsory documents.

6.3.2 Spill Scenario Consequence Analysis

Based upon the risk assessment results, the Assets and support functions shall identify spill planning scenarios and documented in the Asset Spill Response Plan. Afterwards, the detailed consequence analysis shall be conducted to confirm consequences from the spill risks and identify which environmental and socio-economic resources could be affected, and the degree of sensitivity of those resources, as well as impact mitigation and minimisation, specifically for:

- The worst credible case of spill planning scenario(s) for oil type(s) that potentially have a significant contribution to the risk (high likelihood, high potential discharge volume or low likelihood but high severity); and
- Any additional spill planning scenarios that generate essential planning factors.

Criteria for justification are referred to the SSHE Risk Management Standard (SSHE-106-STD-400).

6.3.2.1 Spill Trajectory Model

The objective of numerical simulation of spill fate and trajectory is to estimate the physical changes which spilled oil undergoes especially offshore or on open waters (i.e. the weathering processes which include evaporation, spreading, natural dispersion, emulsification and shoreline stranding) and its potential pathways, travel times, surface distribution and associated volumes under the prevailing climate.

The spill trajectory model shall be developed to provide the area of impact or consequence for consideration in the environmental and socio-economic severity risk assessment and to guide decisions for a suitable response strategy.

For Domestic offshore Assets, the spill trajectory model has been developed to summarise the possible spill plume trajectory, travelling period from the point of the spill to a shoreline and expected location. The trajectory model may incorporate the sensitive area mapping for evacuation planning, spill response strategy and predicted impact area. This trajectory model is available at PTTEP Corporate SSHE Division Library, SSHE intranet, and PDT SSHE manager office.

Examples of 2 types of spill trajectory modelling output are shown in Figure 3;

- Stochastic models primarily used for contingency planning purposes which apply historical wind and current conditions to simulate multiple spill trajectories that together give a statistical output; and
- Deterministic models typically used in both response and contingency planning scenarios, which utilise a single set of wind and current conditions (for example the most probable) to simulate a single spill trajectory.

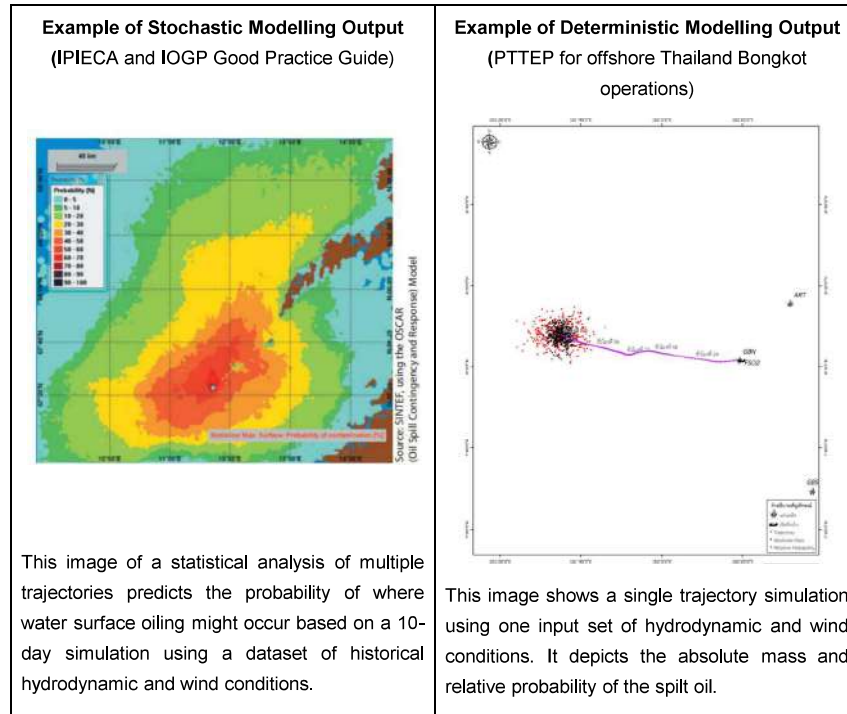


Figure 2: Example of Spill Modelling Output

6.3.2.2 Sensitivity Mapping

Once the Assets and support functions have identified the spill planning scenario, the trajectory of the oil, and how it behaves in the Environment, it is necessary to identify and characterize relevant sensitive resources and receptors within the influence area.

Mapping of ecological and socio-economic resources allows the identification of those which may lie in the trajectory of the spill. Mapping shall be performed within the influence area of the potential spill. The IPIECA, International Maritime Organisation (IMO) and IOGP good practice guidance on sensitivity mapping for oil spill response (2012) provides examples of mapping both ecological and socio-economic resources. Environmental impact assessments and monitoring data can provide valuable input to the mapping of resources and sensitive receptors. With the confidentiality agreement, the E&P companies operating within the same area are encouraged to share information on ecological and socio-economic resources to secure efficient mapping and consistent input.

The assessment of potential consequences should be made for time periods (i.e. monthly, seasonal or yearly) as relevant to the activity or operation that is posing a risk. It is recommended that a full year field activity at least should have a seasonal resolution in the consequence assessment as

this can provide important information and input to risk management and advice on risk-reducing measures for time-limited operations.

Assets and support functions can access to the information, such as the Environmental Sensitivity Index (ESI), Environmental Sensitivity Maps (ESM), etc. which are available from published sources or national database or equivalent. Moreover, Asset and support functions can partially apply the sensitivity map from the Environmental Impact Assessment report. The sensitivity mapping in the boundary of the South China Sea published by Marine Department is currently available at Corporate SSHE Division Library in hard copy. With its sensitivity, this information cannot be posted on the Company share drive or the Company intranet.

6.3.2.3 Net Environmental Benefit Analysis (NEBA)

When considering the suitable response technique, NEBA shall be considered to determine the best response options that are the most effective, feasible and will minimise the impact from the selected planning scenario on the Environment and the community. As such, the Asset Spill Response Plan shall document the following information when selecting the response option:

- Evaluate data - Collect information on the physical characteristics and environmental resources of the area.
- Predict outcomes - Review previous spill case histories and experimental results which are relevant to the area, and to response options which could possibly be used.
- Balance trade-offs - On the basis of previous experience or key studies; predict the likely environmental outcomes if the proposed response is used, and if the area is left for natural recovery.
- Select the best response option - Compare and weigh the advantages and disadvantages of possible response options with those of natural clean-up.

Refer to PTTEP's Net Environmental Benefit Analysis Guideline (SSHE-106-GDL-526) for further details on the application of NEBA.

Assets and support functions shall ensure that the response priorities selected are aligned with the National or regional register of priority areas. Where different protection priority ranking is assigned to a specific resource compared to these National or regional register, justifications for the difference is to be specified.

The requirements of the response technique, waste management and restoration methods are provided in Appendix C. Restoration components may include environmental impact, remediation, environmental and community restoration as well as compensation of financial impact, depending on the incident case.

6.3.3 Spill Response Equipment Preparation

6.3.3.1 Tier 1 - Asset Resources

PTTEP Assets and support functions shall provide and ensure the availability of spill response resources on each location as identified in their planning scenario. The identification of necessary spill response resources shall be documented in the Asset Spill Response Plan. The Assets and support functions representative shall ensure the readiness of the Asset Spill Response Plan and the sufficient equipment and resources for combating spill up to a Tier 1. The Asset ERT member shall be trained to promptly respond and familiar with all available spill response equipment.

For exploration phase either seismic exploration or drilling exploration, Geoscience and Exploration Group (GSX) and/or the project owners of the exploration activities shall prepare the spill response equipment and services from the reliable local contractor as per their contract agreement under advisory of Corporate SSHE Division.

For drilling production, the drilling contractor, with the Asset's support, shall provide on-site spill response equipment and personnel as per their contract agreement to ensure that Tier 1 can be handled. The drilling contractor is responsible for any spills occurring within the boundary of the rig itself, while Asset is responsible for the spills reaching the environment.

In case that the dispersant application is required for Thailand Assets, it is the Asset representative to request the approval from Pollution Control Department (PCD) before use. The request form for approval of dispersant application in Thailand and list of approved dispersants for Thailand Assets is provided in Appendix D and E, respectively. To avoid the delay of dispersant application, the completeness of information and the appropriate volume of dispersant application filled in the form will expedite the approval period. In general, the consideration result would be sent to the requestor within 5 hours after submitting the request to PCD. This process could be different for the International Assets which may require the different approval process in order to comply with the local regulation. Be aware that some dispersant is not permitted to use in some country.

Noted that once the incident reaches Tier 2 and 3, or after activation of EMT and CMT, Corporate SSHE Division will be responsible for the dispersant application approval process.

Should the spill escalate beyond Tier 1 level, additional resources and support are required.

6.3.3.2 Tier 2 – Local and National Resources

For Domestic Asset, Corporate SSHE Division shall provide and seek other available equipment and resources to support in the Asset spill response. These resources shall be included in the Asset Spill Response Plan and this plan may specify equipment and personnel from nearby operators, regional operators, National level regulators or agencies, or OSROs.

Where possible, the Asset and Corporate SSHE Division should make an agreement to ensure the availability and validity of Tier 2 resources by conducting pre-arrangement or exercise in order to test the mobilisation and to secure support to respond to the spill.

PTT Group is a member of the Oil Industry Environmental Safety Group Association (IESG) in Thailand. All PTTEP Assets in Thailand are able to request additional resources and the trained personnel from outsource under IESG's contract via Corporate by using South Area Sub-Committee (STSC) of IESG Spill Response Equipment Request Form as provided in Appendix F and list of IESG available resources stored at Caltex Thailand (CVX) and Shell Depot in Songkhla is shown in Appendix G.

Table 3: Estimated Mobilisation Time for National Assistance from IESG

Asset	IESG Nearest Site	Nearest Airport to PTTEP Assets	In-land Mobilisation time (hrs)	Vessel Mobilisation time (hrs)	Total time (hrs)
ART	Songkhla	Hat Yai	2	16	18
GBN	Songkhla	Hat Yai	2	18	20
GBS	Songkhla	Hat Yai	2	18	20

Further, Assets in Thailand may also request resources from the Marine Department through activation of the National Oil Spill Response Plan. This allows the Asset to have access to the national resource which includes equipment, vessels and technical specialists. PTTEP Assets and support functions are encouraged to identify Tier 2 Resources in the Asset Spill Response Plan for the purpose of pre-assessment whether the available resources are sufficient to handle with Tier 2 Spill or otherwise refer to this plan. When resources from in-country mutual aid agreement are required to respond the spill, the National Oil Spill Response Plan will incorporate with the Company Plan including the Asset Spill Response Plan. The role and responsibility of the emergency response team and support team will be in accordance with both Plans.

For International Asset, it is recognised that some International Assets may also be legally bounded to attain membership for their local Tier 2 Organisations or Contractors as specified by laws and regulations of the country where PTTEP operates (e.g. PIMMAG, OSCT, AMOSC, etc.). All Assets shall adhere to the in-country legislative requirements and ensure the familiarity of the call-out Procedure for the respective Tier 2 Organisations or Contractors.

Similarly to Thailand Assets, the International Assets should ascertain similar processes to access the National resources of the operating country. In case National resources are not capable of or are overwhelmed, the resources from International service contractor is necessary.

6.3.3.3 Tier 3 – Global and International Resources

Currently, the International service provider for PTTEP is the Oil Spill Response Limited (OSRL) Group which PTTEP has access to their resources via PTT Group membership. The OSRL Activation can be done through PTT Group as the following steps, which list of PTTEP Authorised Personnel is provided in Appendix H.

- PTTEP Authorised Personnel shall complete the PTT Group Notification form and Mobilisation Authorisation Form and submit to PTT for their information as provided in Appendix I and J respectively.
- Then, the OSRL Notification and Mobilisation Procedure shall be followed as described in Appendix K. PTTEP Authorised Personnel shall fill out the OSRL Notification Form and Mobilisation Authorisation Form, and submit to OSRL for requesting their services as provided in Appendix L and M, respectively.

Corporate SSHE Division will assist the Asset in securing OSRL resources for their prompt response. OSRL resources available for membership can be found in [OSRL website](https://www.oilspillresponse.com) (<https://www.oilspillresponse.com>).

For planning purpose, the Assets and support functions shall take into account the lead time required for mobilisation of OSRL resources in their Asset Spill Response Plan. However, the global alliance from PTTEP and OSRL requires lead time for internal preparation and logistics arrangement. Table 4 shows the OSRL nearest support site to the nearest airport to PTTEP Asset's location, estimated mobilisation time and flight time from these airports to PTTEP Potential incident locations. Noted that contingency time; e.g. customs clearance and immigration; are not included.

Table 4: Estimated mobilisation time for International assistance from OSRL

Country	OSRL Nearest Site	Nearest Airport to PTTEP Assets	Mobilisation time (hrs)	Flight time (hrs)	Total time (hrs)
Algeria	United Kingdom	Houari Boumediene (Airport D'Alger)	6	9	15
Australia	Singapore	Darwin	5	8	13
Canada	United State of America	Fort Lauderdale, Miami Airport	6	7	13
Mozambique	United Kingdom	Maputo	5	20.5	25.5
Myanmar	Singapore	Yangon	5	4	9
Thailand	Singapore	Suvarnabhumi	5	4	9

6.3.4 Spill Training and Exercise

The Assets and support functions shall develop spill training and exercise programme with consultation from Corporate SSHE Division based on the applicable national and local regulation as well as the requirements stated in this plan and SSHE Training and Competency Standard (SSHE-106-STD-340). The training and exercise programme shall include the personnel with their role and responsibility to manage and respond to the spill incident.

Determining the frequency and number of personnel to be trained in each role and involved in exercises should consider factors such as staff turnover rate, staff rotation to prepare for a prolonged response, and standby requirements for on-duty responders as well as backup staff to support an ongoing response.

In addition to the applicable National and local regulation, Each Asset and support functions shall organise the spill exercise to cover the scenario either for tabletop exercise or equipment deployment as shown in Table 5.

These exercises may be conducted separately or in conjunction with other emergency or crisis exercises as long as it is included the below requirements. The training and exercise programmes and records shall be documented for further tracking and reference. Opportunities for improvement and actions arise from these activities shall be documented and recorded in close-out exercise or audit report to ensure that the actions are being implemented in a timely manner.

Assets and support functions shall also ensure the periodic monitoring of training with expiration date and require refresher is being done and documented properly to ensure the sustainability of personnel's knowledge and competence.

6.3.5 Spill Capability Assessment

Assets and support functions shall plan to conduct the capability assessment, with the consultation of Corporate SSHE Division, on a regular basis in order to assess and ensure that the Asset spill response meets the needs of the operation's risk level. The frequency of the capability assessment depends on the results of risk assessment. The higher risk results are identified, the more frequency of capability assessment shall be. The capability review process is undertaken in line with the IPIECA and IOGP industry good practice Guidelines for a tiered response, and includes the following assessments:

- Review of Oil Spill Response Plans and relevant tactical plans.
- Availability and suitability of oil spill response Tier 1 (onsite) equipment.
- Availability of Tier 2 and Tier 3 equipment.
- Review of logistical arrangements.
- Review of your training and exercise programme.

For an effective Tier 2 and Tier 3 Capability assessment, PTTEP shall utilize the third party to conduct the activities. The assessment results shall identify the gaps and recommendations for improvement of the Asset and Company spill response capability.

The spill capability assessment checklist is provided in Appendix N.

6.3.6 Spill Response and Management Plan Review and Update

Where the National or local regulation dictates a system of review and evaluation for approved plans, it shall take precedence. In the absence of regulatory guidance, the Assets and support functions shall develop and implement a programme for review and ensure the sustained readiness and competency to align at least with document review period or significant deviation.

Table 5: Minimum Requirements for Spill Exercise

Type	Objective	Frequency	Response Team
Notification	Test communication; contact details and notification Procedures as per the Asset Spill Response Plan and this plan.	At least once internal and once with external involvement, per year	ERT, EMT, and/or CMT as necessary
Tabletop Exercises (Duration: 2 to 8 hrs)	Build competency and confidence in the implementation of the spill response and management plan, test the functionality of the plan and emergency response using potential spill scenario. The predetermined set of specific objectives. Involve external agencies including Tier 2 and Tier 3 support, as necessary. No equipment mobilisation required.	At least once internal or once with external involvement, per year	ERT, EMT, and/or CMT as necessary
Equipment Deployment	Deploy Tier 1 equipment to confirm operability as well as the competence of response teams.	At least once per year	ERT (and Contractor – if applicable), with EMT involvement as necessary
Full-scale exercise (Duration: 10 to 14 hrs)	May involve multiple authorities, relevant organisations and jurisdictions, and can validate many elements of preparedness. Test plans and Procedures across the span of Asset's crisis management and emergency response arrangements. Can involve national capability (Tier 2) and regional or International support (Tier 3), i.e. trans-boundary response issues. Includes personnel and resources mobilisation and deployment. The new Merger & Acquisition (M&A) project is included after M&A process is completed.	At least one or two Assets every three years	ERT (and Contractor – if applicable), EMT, or CMT,

The review and update to the Spill Response and Management Plan shall be undertaken when there are any updates from:

- Oil spill risk profile, e.g. new Assets are introduced or additional oil types are identified;
- Oil handling operations/significant changes in the hydrocarbon inventory;
- Response arrangements, including any changes to response contractors;
- Oil spill incident reporting and notification Procedure;
- Sensitive resources;
- Location of operation (e.g. drilling campaigns);
- Lessons learned or feedback from spill response exercises;
- Lessons learned or feedback from actual spill response activities;
- Legislation or regulations in the country of operation;
- International Standards and industry good practices; or
- Relevant PTTEP Corporate Standards and Procedures.

Regardless whether the Spill Response and Management Plan are updated or not for the reasons listed above, this plan shall also be reviewed in its entirety at least every five years to ensure its validity and directions are in alignment with recent good practice, advancements and improvements in equipment and techniques in the industry. Also, to reflect any improved knowledge of the potential response area and sensitivities. Whilst external notification channel and contact details shall be checked at a minimum every year.

Where applicable, if major changes occur that could potentially affect the validity or effectiveness of the Plan, re-submission to the approving authority in the country of operations shall be undertaken as required per local regulations and PTTEP Corporate requirements.

Hard copies of the Asset Spill Response Plan and other relevant documents shall be available at Asset's Emergency Command Centre and PTTEP Headquarters Emergency Management Room.

APPENDIX A: NATIONAL AND INTERNATIONAL AUTHORITIES AND ORGANISATION CONTACT LIST

Organisation	Telephone	Fax
Department of Mineral Fuels	+66(0)2794 3472 +66(0)2794 3474	+66(0) 2794 3362
Department of Disaster Prevention and Mitigation	Hotline 1784	+66(0) 2241 7466 +66(0) 2241 7499
Marine Department	1194 (24 hrs) +66(0)2234 8342 +66(0)2233 1311-8 ext. 330 and 331	+66(0) 2234 3832 +66(0) 2236 1802 +66(0) 2238 3017
Oil Industry Environmental Safety Group Association	+66(0)2239 7955 - 56	+66(0)2239 7917
PTT Command Centre	+66(0)2537-3111/3222/3333	+66(0)2537 3498
OSRL Singapore base	+65 6266 1566	+65 6266 2312

Remark: Updated information will be available in the SSHE intranet.

APPENDIX B: REQUIRED STRUCTURE OF ASSET SPILL RESPONSE PLAN

Notes:

- ✓ = Required
- + = Recommended (may depend on the planning scenario)
- ✗ = Not required

Section	Description	Offshore	Onshore
1. Introduction			
1.1 Objective	Describe the overall purpose of the Spill Response Plan. Include the statement of PTTEP's guiding principles of protecting people, Environment, asset and reputation.	✓	✓
1.2 Scope	A summary description of operations and facilities covered by the Spill Response Plan.	✓	✓
1.3 Interface with Other Plan	Identifies other plans which the Spill Response Plan interfaces with and demonstrate how it integrates with other plans. These plans include, but not limited to: <ul style="list-style-type: none"> Crisis management plan. Emergency management plan. Net Environmental Benefit Analysis Guideline. Environmental Impact Assessment Report. Bridging documents/Well control plans. 	✓	✓
1.4 Document Control	Specifies approval dates and sign-offs by internal management, plan custodian, distribution list, review and update records. Include approvals obtained from authority, if applicable.	✓	✓
2. Notifications And Reporting			
2.1 Internal Notification	A clear written Procedure to immediately notify and report to internal stakeholder and initiate a response showing appropriate response levels, as well as response escalation Procedure. <i>Refer to Spill Management Plan for an example of internal notification Procedure.</i>	✓	✓

Section	Description	Offshore	Onshore
	Includes contact details, notification method (e.g. phone, fax, email, etc.) and team/person responsible for performing the notification. This may be reflected in the form of a flowchart. <i>Refer to Emergency and Crisis Management Standard (SSHE-106-STD-500) for emergency notification Standard.</i>		
2.2 External Notification	A clear written Procedure to notify and report to external stakeholder which needs to be done at the early stage of the incident, i.e. authorities, shareholder, OSROs and other contractors. Includes contact details, notification method (e.g. phone, form, fax, email, etc.) and team/person responsible for performing the notification.	✓	✓
3. Assessments			
3.1 Site Assessment	Provide a checklist/Guideline to conduct initial site safety and spill assessment.	✓	✓
	Key facility information.	✓	✓
	Identification of environmental and socio-economic sensitivities.	✓	✓
	Determining current and forecasted meteorological and hydrodynamic conditions.	✓	✗
3.2 Volume and Trajectory Assessment	A summary or checklist of: <ul style="list-style-type: none"> Spill surveillance methods (aerial surveillance, tracking buoys, etc.). Spill observation and assessment guidance. Spill trajectory and modelling. 	✓	+
3.3 Tier Assessment	Evaluate the scale, Tier level, and impact of the incident (following the National Oil Spill Contingency Plan, if any or as described in this Guideline) as well as the escalation potential.	✓	✓
4. Response Management			
4.1 Response Organisation	The organisation of the response teams (ERT, EMT, CMT) and its relationship with each other. Includes overall responsibility of the team and management of processes and Procedures within each team. Include the response management facility location and activation Procedure. <i>Refer to Emergency Management Plan (SSHE-106-PDR-502) and Incident Management Standard (11038-STD-SSHE-600-011).</i>	✓	✓

Section	Description	Offshore	Onshore
4.2 Roles and Responsibilities	Main role and responsibility of the key personnel in the response team, including action checklist described for each stage of response. <i>Refer to Emergency Management Plan (SSHE-106-PDR-502) and Incident Management Standard (11038-STD-SSHE-600-011).</i>	✓	✓
5. Action Checklist			
Initial action checklists for key personnel in the EMT to establish: <ul style="list-style-type: none"> Initial response priorities and objectives. Initial actions and strategy decision guide. Activation of response management team. Activation and deployment of resources. 		✓	✓
6. Response Strategy			
6.1 Response Strategies	Strategy decision procedure (flow charts, scenario matrix, and NEBA decision consideration), include scenario-specific response strategy summaries and regulatory pre-approvals and/or approval application Procedures, if any. <i>Refer to Section 6.2 Spill Notification Process.</i>	✓	✓
6.2 On Water Response	Offshore and near-shore response capabilities and general tactical plans. <i>Refer to Appendix C: A List of Response Techniques.</i>	✓	✗
6.3 Shoreline Response	Shoreline response capabilities and general tactical plans. <i>Refer to Appendix C: A List of Response Techniques.</i>	+	+
6.4 Inland Response	Inland waterway and onshore response capabilities and general tactical plans. <i>Refer to Appendix C: A List of Response Techniques.</i>	✗	✓
7. Sensitive Areas			
Summary of sensitivities identified in the area as well as the protection priorities. May include maps for ease of reference. This information should be supported by with the Baseline Environmental Settings information in the Reference Material.		✓	✓

Section	Description	Offshore	Onshore
8. Response Resources			
8.1 Tier 1 Capability	A summary and reference to Tier 1 resources inventories including required logistics support, internal contact information (can be referred to Supporting Documentation – Directories), and mobilisation timescale.	✓	✓
8.2 Tier 2 Arrangement	A summary and reference to Tier 2 Arrangement including: <ul style="list-style-type: none"> Contracted resources inventories and services list. Mobilisation Procedure and timeframes. Contact information (can be referred to Supporting Documentation – Directories). Required logistics support. Additional non-contracted resources and services list including government resources, vessels of opportunity, local labour sources and volunteers, and subject matter experts or speciality expertise. Resourcing Procedures for non-contracted services. 	✓	✓
8.3 Tier 3 Arrangement	A summary and reference to Tier 3 arrangements, including accessing International mutual aid, contact information (can be referred to Supporting Documentation – Directories), contracted OSRO mobilisation Procedures, resources and response timeframes. Procedures for immigration and customs, and any emergency dispensation information for cross-border movement of personnel, equipment and material.	✓	✓
9. Supporting Response Element			
9.1 Waste Management Procedure	Provide the procedure for handling oily waste. <i>Refer to Waste Management Procedure (SSHE-106-PDR-521).</i>	✓	✓
9.2 Oiled Wildlife Response	Provide guidance for handling wildlife impacted by oil spill, if any. <i>Refer to Net Environmental Benefit Analysis Guideline (SSHE-106-GDL-526).</i>	+	+

Section	Description	Offshore	Onshore
9.3 Stakeholder Engagement And Communications	Provide guidance for engaging and communicating with Stakeholders. <i>Refer to Crisis Communications Guideline (12145-GDL-004-R02) and Appendix C: A List of Response Techniques.</i>	+	+
9.4 Economic Assessment and Compensation	Provide guidance for conducting economic assessment and compensation. <i>Refer to Appendix C: A List of Response Techniques.</i>	+	+
9.5 Environmental Impact Assessment (Including Sampling)	Provide the procedure for conducting an environmental impact assessment. <i>Refer to Environmental Impact Assessment for Exploration and Production Procedure (SSHE106-PDR-401).</i>	+	+
10. Decontamination			
10.1 Requirement	Summarises Health, Safety, and Environmental requirement for decontamination.	✓	✓
10.2 Decontamination Procedure	Procedure for developing a spill-specific decontamination plan including Standard Procedures for setting up decontamination area, zoning, etc. and list of approved cleaning agents. Provide information on pre-designated decontamination sites, if any.	✓	✓
11. Termination of Response			
11.1 Demobilisation Procedure	Provide the procedure for developing a spill-specific demobilisation plan. Also provide Standard Procedures for demobilising resources, i.e. final equipment and vessel inspections, personnel checkout, resupply of consumables, claims for repairs, a return of hired gear, etc.	✓	✓
11.2 Response Termination	Provide the procedure for establishing treatment endpoints and response termination criteria. Include information regarding the roles with authority to sign off on completed areas and approve termination of the response.	✓	✓
12.3 Response Debrief	Responsibilities and procedures for conducting post-response debrief, conducting post-spill analysis and develop report, etc. Include documentation requirements. <i>Refer to Incident Management Standard (11038-STD-SSHE-600-011)</i>	✓	✓

Section	Description	Offshore	Onshore
Supporting Documentation or Appendices			
Site- Specific Tactical Response Plan	Provide operational maps identifying the sensitivity the site-specific tactical plans that cover the area to be protected, worksite configuration, and other considerations and useful information necessary to facilitate rapid and effective response. <i>Refer to Section 6.3 Spill Response Resources.</i>	+	+
Reference Material	Consist of the justification and other preparedness material including: <ul style="list-style-type: none"> Oil spill risk assessment result and scenario planning, The applicable requirement from international convention, national and local regulations on oil spill response, The operational overview which describes the facility and/or operations (including facility information, oil types and volumes handled, oil properties and weathering data, etc.), Oil spill modelling result, Baseline environmental settings (including meteorological and hydrodynamic information) and socio-economic information, Training and exercise programme, and Plan and equipment review and audit schedule. 	✓	✓
Directories	Provide directories of resources and contact that are potentially needed during response including, external contractors, response organisation, a vessel of opportunity, logistics contractors, etc. This may be updated frequently.	✓	✓

APPENDIX C: A LIST OF RESPONSE TECHNIQUES

Response Technique Options	Requirements
Source Control	<p>Source control techniques are usually linked to other Asset emergency response plans/documents which provide specific actions to stop or minimise the release of oil from the source. Details in the Asset Spill Response Plan or supporting document shall include a description of the interface between the Asset Spill Response Plan and other specific internal/external emergency response documents. For the incident management, the Asset Spill Response Plan should describe how the source control team interface with the spill response team. Where specialised resources are required, the Spill Response Team shall inform EMT/CMT in advance for the availability of these resources.</p> <p>Source control technique shall be considered for the following scenarios:</p> <p><u>For spills originating from the well</u>, source control techniques are linked to Well Blowout/Source Control Contingency Plan which should already detailed the emergency response procedures in the event of an incident involving the well. Specialised resources include vessels and technical specialists who are trained in conducting well control management are often required for such spills. Confirm availability or provide contact of the specialised resources e.g. support vessels equipped with dynamic positioning and cranes with appropriate lifting capacity.</p> <p><u>For spills originating from vessels</u> (e.g. oil tankers, FPSOs, etc.), source control techniques on board are linked with SOPEP which shall be executed by the vessel captain and vessel emergency response team, while on-water spills shall include containment by booming around the source and on-water recovery. Deployment techniques will be the same as At Sea Containment and Recovery. Communication linkage and mobilisation period between spill site and support site are recommended to exercise to ensure the readiness and effectiveness.</p> <p><u>For spills from stationary offshore storage tanks or pipelines</u>, the source control measures shall consider the loss of primary containment. The response techniques are linked to the Asset Emergency Response Procedures to shutdown, contain and recover the spill. Migration of oil from the source is managed with the same techniques as At Sea Containment and Recovery. Communication linkage and mobilisation period between spill site and support site is recommended to exercise to ensure the readiness and effectiveness.</p>

Response Technique Options	Requirements
Source Control (continued)	<u>For spills from onshore storage tanks, pipelines or land transports</u> , the source control measures shall consider the loss of primary containment. The response techniques are linked to the Asset Emergency Response Procedures to shut down, contain and recover the spill. Migration of oil from the source is managed with the same techniques as Inland Response.
Surveillance, Modelling and Visualisation	Description of the surveillance platform (e.g. aircraft, vessels, installations, on-foot, vehicles, subsea) and trained observers to support the implementation of the response technique. If specialist monitoring and/or remote sensing techniques (e.g., satellite imagery, oil detecting radar) are available to supplement surveillance methods, these shall be described in the Asset Spill Response Plan or supporting documentation. However, Safety shall be considered as the first priority when monitoring at the spill site. Remote sensing observation is recommended for Safety issue found while entering the spill area. When spill modelling is intended to be used together with the surveillance capability, the model shall be capable of being recalibrated regularly as new field data is generated. Communication methods to relay information between response teams (strategic (EMT) and tactical/field (ERT) shall be described in a Plan or supporting documentation.
Offshore Dispersant Application Surface and Subsea	Pre-approval from applicable regulators/authorities for the use of surface and/or subsea-applied dispersant, or where no formal pre-approval mechanism exists, seek approval on the basis that such approval may be granted by or at the time of a spill incident response. The authorised person who asks for approval will be indicated in the Asset Spill Response Plan and this plan. Confirm that the capability includes dispersant(s) for surface and/or subsea application that are effective for the oil type(s) included in the selected spill planning scenarios and are identified in the applicable country-approved list of dispersants (if available). Confirm that any applicable country-specific legal and regulatory restrictions on applying dispersant (e.g., water depth, distance from shore) are known, are described in the Asset Spill Response Plan, and that the intended dispersant use complies with those restrictions.

Response Technique Options	Requirements
Offshore Dispersant Application Surface and Subsea (continued)	Confirm local availability of on-site stocks of dispersant to support an initial response to the selected spill planning scenarios and identify supplementary dispersant stocks and supply chains needed to maintain on-going dispersant operations. Exercise the mobilisation period for additional dispersant from support site to spill area. Confirm the means to monitor the effectiveness of the oil-dispersant mix. Confirm the availability of suitable subsea dispersant injection devices and related ancillaries, and the platforms for transport and deployment. The subsea dispersant application technics and details can be found at http://www.ioqp.org/bookstore/product/dispersants-subsea-application/ .
In Situ Burning	Pre-approval from applicable regulators/authorities for the use of in-situ burning, or where no formal pre-approval mechanism exists, seek approval on the basis that such approval may be granted by or at the time of a spill incident response. Consider the weather condition and limitation before burning. Confirm the availability of resources such as vessels and boom designed for burning operations, ignition sources and related ancillaries. Confirm the means to monitor the effectiveness of the burning operations and atmospheric dispersion.
At Sea (Offshore and Nearshore) Containment and Recovery	Describe in the Asset Spill Response Plan or supporting documentation, the availability of specialist and non-specialist resources, including: a) Vessels, booms and skimmers suitable for the prevailing operating conditions and oil characteristics. b) Offshore temporary storage available for recovered oil and water. c) Methods to transfer recovered oil and water and pre-separation. d) Onshore reception and temporary storage facilities for recovered oil and water. e) Surveillance aircraft to locate oil, direct the vessels and monitor effectiveness.

Response Technique Options	Requirements
Protection of Sensitive Resources (Offshore, Shoreline and Inland)	Identify environmental and socio-economic sensitivities and agree on priorities for protection with applicable stakeholders and in accordance with regulatory requirements. Information regarding environmental and socioeconomic sensitivity can be found in the environmental impact assessment report. A summary of this and initial response actions shall be presented in the Asset Spill Response Plan or supporting documentation as site-specific tactical response plans.
Shoreline and Inland Assessment	If planning scenarios show there is potential for shoreline oiling, describe in the Asset Spill Response Plan or supporting documentation, the capability for carrying out a Shoreline Clean-up Assessment Technique (SCAT).
Shoreline Clean-up	If planning scenarios show there is potential for shoreline oiling, describe in the Asset Spill Response Plan or supporting documentation the roles and responsibilities for shoreline clean-up operations with national and provincial agencies/authorities. Clean-up resources shall be identified, including potential contractors and sources of plant/labour, etc. Reception and temporary storage facilities for recovered oil and materials shall be described in the Asset Spill Response Plan or supporting documentation. Describe the processes to locate oil, direct the clean-up operations and monitor effectiveness.
Inland Response	If planning scenarios show there is potential for an inland response, whether it is on land or on inland waterway, describe in the Asset Spill Response Plan or supporting documentation, the range of logistical issues that could influence the response implementation (e.g. access, remoteness of operations, special precautions for designated, private and/or sensitive areas) and the availability of resources for the response. The communication system shall be available 24/7 and exercise as scheduled, especially mobile carriers. <u>For spill scenarios at a fixed location (e.g. drilling well pad, storage tank, product pipeline, pump house or other fixed structures):</u> Confirm the availability of specialist and non-specialist resources, including, vehicles, heavy machinery, equipment and tools for the Environment, terrain, and hydrological and geological conditions, above and below ground. Reception and temporary storage facilities for recovered oil and materials shall be described in the Asset Spill Response Plan or supporting documentation.

Response Technique Options	Requirements
Inland Response (continued)	Describe the processes to locate oil, direct the clean-up operations and monitor effectiveness. Specialist and non-specialist equipment to monitor on/below ground and groundwater contamination as determined by the selected spill planning scenarios shall be described, along with the means to measure the quantities of recovered oil and other materials. <u>For spill scenarios on mobile carriers on land (e.g. road/rail tankers):</u> Map out the available resources and critical sensitive area/receptor within the known transportation route. Provide estimated response times of nearest specialist and non-specialist resources, including vehicles, heavy machinery, equipment and tools to respond to different types of Environment, terrain, and hydrological and geological conditions. The processes to locate oil, direct clean-up operations and conduct monitoring programme shall be similar to the processes described for fixed structures.
Oiled Wildlife Response	If planning scenarios identify the potential for oiled wildlife or the presence of endangered or legally-protected species, then identify the available oiled wildlife specialists (whether locally available or internationally available) to respond to the incident. This may be sourced from the relevant government authorities, response organisations or non-governmental organisations. Critical information to be included in the Asset Spill Response Plan or supporting oiled wildlife response plan is the notification Procedures to engage these specialists, arrangements for wildlife protection and the response methodology for oiled wildlife.
Waste Management	Identify any country-specific or local legal and regulatory requirements pertaining to hazardous and non-hazardous waste management (including notification requirements, and how to set up temporary storage areas). Local availability of sufficient waste storage equipment and approved waste contractors for transportation of hazardous wastes shall be identified with contractual agreements for these services in place. Further, the final waste disposal location for each type of waste stream shall be identified with verification that the facility has the capability to accept the estimated volume of waste as identified in the planning scenario. Refer to the PTTEP's Waste Management Procedure for further guidance in waste management Procedure (SSHE-106-PDR-521).

Response Technique Options	Requirements
Waste Management (continued)	A summary of this information shall be presented in the Spill Response Plan or supporting documentation as the site-specific tactical response plans.
Stakeholder Engagement and Communications	Identify stakeholders who share the risk and maintain a database of these stakeholders and their contact information. A programme shall be drawn to conduct regular communication with the stakeholders based on country-specific or local legal requirements and the duration of the operation. The frequency and need of stakeholders' engagement should be specified in the Asset Spill Response Plan or supporting documents for engagement during the planning process or in a response stage.
Economic Assessment and Compensation	Identify environmental and socio-economic sensitivities that may be potentially impacted by a spill from the operations. The Asset Spill Response Plan or supporting documents should include a process for mobilising resources to assess the impacts, to evaluate and to process claims and compensation to impacted communities. This shall include documentation preservation processes and any associated legal requirements of records and data. The general information of socio-economic can be found in environmental impact assessment report related-organisation in operating country.
Environmental Sampling, Monitoring and Assessment	<p>A monitoring programme shall be implemented before, in between and after an accident to aid in decision making, to monitor technique effectiveness or to determine the extent of spill impact to the Environment.</p> <p>Confirm the capability of subject matter experts, qualified sampling organisations and laboratories, and the equipment and logistics required to execute the monitoring programme. This shall include the local compliance requirements for environmental monitoring.</p> <p>The sampling and monitoring Procedures and the resources to support this assessment shall be included in the Asset Spill Response Plan or supporting documents.</p>

APPENDIX D: EXAMPLE OF REQUEST FORM FOR APPROVAL OF DISPERSANT APPLICATION IN THAILAND

กรมควบคุมมลพิษ
คำขออนุญาตใช้สารเคมีจัดการน้ำมัน

เขียนที่.....
วันที่.....เดือน.....พ.ศ.....

เรียน อธิบดีกรมควบคุมมลพิษ

หน่วยงาน.....

ขออนุญาตใช้สารเคมีจัดการน้ำมันชนิด.....
เพื่อจัดการน้ำมันที่รั่วไหลจากสาเหตุ.....
สถานที่เกิดเหตุ.....
พิกัด.....
วันที่เกิดเหตุ.....เดือน.....พ.ศ.....เวลา.....
ชนิดน้ำมันที่รั่วไหล.....ปริมาตร.....ลิตร
น้ำมันรั่วไหลมาแล้ว.....วัน โดยทางหน่วยงานมีความประสงค์ในการใช้สารเคมีจัดการน้ำมันชนิดดังกล่าวข้างต้นเพื่อจัดการน้ำมันบริเวณ.....
จำนวน.....ลิตร โดยวิธี.....

ลงชื่อ.....ผู้ยื่นคำขอ
(.....)
ตำแหน่ง.....

สถานที่ติดต่อของผู้ยื่นคำขอ.....
โทรศัพท์.....โทรสาร.....
Pager.....e-mail.....

สถานที่ติดต่อกรมควบคุมมลพิษ

หมายเลขราชการ	เบอร์โทรศัพท์	เบอร์โทรสาร
กรมควบคุมมลพิษ 92 ซอยพหลโยธิน 7 ถนนพหลโยธิน แขวงสามเสนใน เขตพญาไท กรุงเทพฯ 10400	0 2521 8682 / 0 1898 3594	
โทรศัพท 0 2298 2239, 0 2298 2241-2, 0 2298 2246	รองอธิบดีกรมควบคุมมลพิษ 0 2235 6536 / 0 1638 8018	
โทรสาร 0 2298 2240	รองอธิบดีกรมควบคุมมลพิษ 0 2485 8938 / 0 1442 2661	
e-mail : marpol.mcd@pdd.go.th	ผอ. สำนักจัดการคุณภาพน้ำ 0 2411 1341 / 0 1622 4124	
email : marinerepollution_pcd@yahoo.com	ผอ. ส่วนแหล่งน้ำทะเล 0 2973 4998 / 0-1816-4280	

Remark: Updated information will be available in the SSHE intranet.

APPENDIX E: LIST OF APPROVED DISPERSANTS FOR THAILAND ASSETS

NO.	Product Name	Approved use ¹	Expiry Date	Revised Date	Agency permit ²
1	Accell Clean® DWD	*		18 July 2011	U.S. EPA.
2	Agma DR 379	S B RS	20 June 2021		MMO
3	Ardrox 6120*	*		1 January 2012	AMSA
4	BIODISPERS (FORMERLY PETROBIODISPERS)	*		28 June 2002	U.S. EPA.
5	Caflon OSD	S B RS	20 December 2018		MMO
6	CHEMAX 307 oil spill dispersant	*	-	-	TISI
7	COREXIT® EC9500A	S	12 December 2018	13 April 1994/ 18 December 1995	MMO U.S. EPA. AMSA
8	COREXIT® EC9500B	*	13 July 2020	1 August 2013	U.S. EPA.
9	COREXIT EC9527A (Formerly Corexit 9527)	*		10 March 1978/ 18 December 1995	U.S. EPA.
10	DASIC SLICKGONE NS/ Slickgone NS	S B RS	20 February 2019	4 December 2012	AMSA / MMO
11	DASIC SLICKGONE EW/ Slickgone EW	S B RS	25 April 2018	4 April 2013	AMSA / MMO
12	Dasic Slickgone LTSW*	*		1 January 2012	AMSA
13	De Solv It 1000	S B RS	28 October 2020		MMO
14	Disperep 12	S	13 July 2021		MMO
15	DISPERSIT SPC 1000TM	*		22 April 1999	U.S. EPA.
16	Eflochem OSD	S B RS	7 February 2022		MMO
17	FFT-Solution®	*		1 November 2011	U.S. EPA.
18	Finasol OSR 51	S B RS	27 June 2017	12 November 2014	AMSA
19	Finasol OSR 52	S B RS	18 March 2020	30 January 2003	MMO U.S. EPA. AMSA

NO.	Product Name	Approved use ¹	Expiry Date	Revised Date	Agency permit ²
20	JD-109	*		20 September 2000	U.S. EPA.
21	JD-2000 TM	*		6 August 2001	U.S. EPA.
22	MARE CLEAN 200	*		23 February 1988/ 26 January 1996	U.S. EPA
23	MARINE D-BLUE CLEAN TM	*		23 April 2012	U.S. EPA
24	Micro-Fiton	S B RS	6 August 2019		MMO
25	NEOS AB3000	*		22 April 1985/ 26 January 1996	U.S. EPA.
26	NOKOMIS 3-AA	*		31 July 2008	U.S. EPA
27	NOKOMIS 3-F4	*		4 March 2002	U.S. EPA.
28	OD 4000	S B RS	18 March 2020		MMO
29	Oil Spill Eater II	S B RS	23 January 2020		MMO
30	OSD/LT Oil Spill Dispersant	S B RS	20 June 2016		MMO
31	OSR 4000	S B RS	7 August 2018		MMO
32	Radiagreen OSD	S	19 February 2020		MMO
33	SAF-RON GOLD (a/k/a SF-GOLD DISPERSANT	*		3 January 2005	U.S. EPA.
34	SEA BRAT #4	*		26 November 2002	U.S. EPA.
35	SEACARE ECOSPERSE 52 (see FINASOL OSR 52)	S B RS	25 April 2018	30 January 2003	MMO U.S.EPA
36	Seacare Ecosperse LT23	S B RS	28 October 2018		MMO
37	SEACARE E.P.A. (see Dispersit SPC 1000 TM)	*		22 April 1999	U.S. EPA.
38	Seacare OSD	S B RS	10 May 2018		MMO
39	Seacare OSD2	S B RS	28 October 2018		MMO

NO.	Product Name	Approved use ¹	Expiry Date	Revised Date	Agency permit ²
40	SF-GOLD DISPERSANT (see SAF-RON GOLD)	*		3 January 2005	U.S.EPA
41	Super-dispersant 25	S B RS	17 March 2020		MMO
42	ZI-400	*		16 June 2005	U.S.EPA
43	ZI - 400 OIL SPILL DISPERSANT (see ZI-400)	*		16 June 2005	U.S.EPA

Update at 29 May 2017.

Remark

¹Approved use

- S = Sea
- B = Beach
- RS = Rocky shore
- * = Unidentified

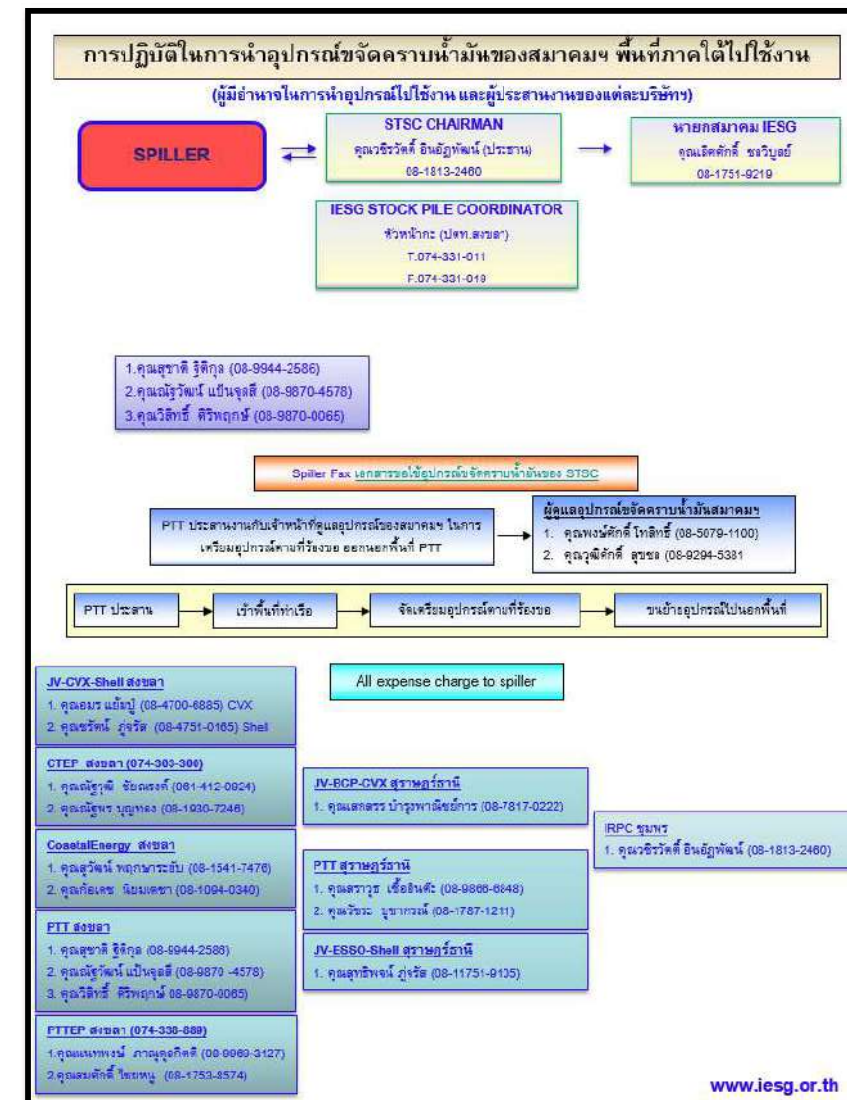
²Reference Agencies

- Marine Management Organisation : MMO
- U.S. Environmental Protection Agency : U.S. EPA
- Australian Maritime Safety Authority : AMSA
- Thai Industrial Standards Institute : TISI

Reference: Pollution Control Department

Remark: Updated information will be available in the SSHE intranet.


APPENDIX F: SPILL RESPONSE EQUIPMENT REQUEST PROCESS AND EXAMPLE FORM



Remark: Updated information will be available in the SSHE intranet and www.iesg.or.th.

APPENDIX G: LIST OF IESG RESOURCES AT SONGKHLA

No.	Equipment	Trade Mark	Model	Quantity	ประเภท
1	Rope Mop Skimmer (OSR-IESG-STSC-001) - Length of 3 metres-150 mm. Diameter Oleophilic - Floating rope mop pully (1) - Kit,2 year operation spares kit (1)	Ro-Clean	OM 200 DP	1 set	Skimmer
2	Weir Skimmer (OSR-IESG-STSC-002) - Spate induced self – priming flow pump (1) - House set (1)	Ro-Clean	Deemi mini-max	1 set	Skimmer
3	Disc Skimmer (OSR-IESG-STSC-003) - Power Pack (1เครื่อง) - Hydraulic hose (2 เส้น) - Discharge/ suction hose (2 เส้น) - Manual (1 เล่ม)	Vikoma	T 12	1 set	Skimmer
4	Floating Suction Head (OSR-IESG-STSC-004)	Vikoma	Delta Head	1 set	Skimmer
5	Vacuum Unit (OSR-IESG-STSC-005-U1&U2) - Hopper (Manual 2 เล่ม)	Vikoma	Powervac	2 sets	Skimmer
6	WB 20 X water pump (OSR-IESG-STSC-010) - สาย Discharge / Suction - Manual (1 เล่ม)	Honda	Wp 20X	1 เครื่อง 2 เส้น	Pump
7	Air Compressor (Electric)	PUMA	XM-2525	1 เครื่อง	Air Compressor
8	Air Boom (Hydraulic) (OSR-IESG-STSC-007-U1&U2) - Type 100 hydraulic reel - Heavy duty PVC reel cover - Tow bridle set - Type "H" Power pack - PB 4000 Air inflator (Manual 5 เล่ม) - Air Tube interconnection - Boom repair kit for sea sentinel boom (2 กล่อง)	Vikoma	Sea Sentinel 400 m	2 ชุด 2 มิน 4 อัน 1 เครื่อง รวม 8 เส้น	Boom
9	Air Boom (Manual) (OSR-IESG-STSC-009) - Reinforced PVC boom bage (8 ถัง) - Tow bridle set (4 อัน)	Vikoma	Sea Sentinel	200 m	Boom
10	Beach Boom (OSR-IESG-STSC-010) - Reinforced PVC boom bage	Vikoma	Shore guardian	100 m	Boom



IESG

ส่วนที่ 1 แบบฟอร์มการขอใช้อุปกรณ์ขจัดคราบน้ำมันของ STSC

วันที่

ถึง ☐ ประธาน STSC โทรศัพท์ 08-1813-2460 โทรสาร 0-7432-1192

☐ นายกสมาคมฯ โทรศัพท์ 08-1751-9219 โทรสาร 0-2239-7917

จาก **จ.สงขลา**

☐ JV-CVX-Shell โทรศัพท์ 074-331-778 โทรสาร 074-331-290

☐ CTEP โทรศัพท์ 074-303-300 โทรสาร 074-321-192

☐ CEC โทรศัพท์ 074-331-027-31 โทรสาร 074-331-029

☐ PTT โทรศัพท์ 074-331-778 โทรสาร 074-331-019

☐ PTTEP โทรศัพท์ 074-338-845 โทรสาร 074-338-890

จ.สุราษฎร์ธานี

☐ JV-CVX-Bangchak โทรศัพท์ 0-7728-3045 โทรสาร 0-7728-2935

☐ JV-ESSO-Shell โทรศัพท์ 0-7722-4121 โทรสาร 077-.....

☐ PTT โทรศัพท์ 0-7728-3978 โทรสาร 0-7728-1081

จ.ชุมพร

☐ IRPC โทรศัพท์ 0-7752-1074 โทรสาร 0-7752-1355

จ.ภูเก็ต

☐ PTT โทรศัพท์ 0-7728-3978 โทรสาร 0-7728-1081

รายการอุปกรณ์ขจัดคราบน้ำมันของ STSC ที่ร้องขอ

.....

การจัดส่ง ☐ Spiller มารับอุปกรณ์เอง

ลงชื่อผู้ร้องขอ

วันที่ เวลา โทรศัพท์/ โทรสาร

ส่วนที่2 แบบตอบรับการร้องขอ

รายละเอียดการสนับสนุนอุปกรณ์

.....

ลงชื่อผู้อนุมัติ

วันที่ เวลา โทรศัพท์/ โทรสาร

จัดทำโดย : คณะกรรมการความปลอดภัยและแก๊สการรั่วไหลของน้ำมัน เขตพื้นที่ภาคใต้ (STSC)

Remark: Updated information will be available in the SSHE intranet and www.iesg.or.th.

No.	Equipment	Trade Mark	Model	Quantity	ประเภท
11.	Flexi Boom (OSR-IESG-STSC-011)	Vikoma	Flexi Boom 900	405 m	Boom
12.	Oil Containment Boom (OSR-IESG-STSC-012)	SK Boom	SK C105U	400 m	Boom
13.	AutoBoom Hydraulic OSR-IESG-STSC-008 - Power Pack 1 set - Roller 1 set - Air inflator 1 set	Lamor Lamor	LPP 7HA B8	200 m	Boom
14.	Anchor System (OSR-IESG-STSC-017)	Abasco	ASB-25	14 Each	Boom Accessories
15.	Tow Bridle (OSR-IESG-STSC-016)	Abasco	TB 25	6 Each	Boom Accessories
16.	Sorbent Boom (OSR-IESG-STSC-013)	Abasco	A-8-10	50 Bundles	Absorbent
17.	Sorbent Sheet (OSR-IESG-STSC-014)	Abasco	A-150	20 Rolls	Absorbent
18.	Temporary Storage (Fast Tank 2000) (OSR-IESG-STSC-018-U1&U2) - Pipe saddle for mumping over tank wall - Ground mat for under tank on rough terrain	Fast Engineering	Fast Tank 2000	2 Sets	Tank
19.	Oil Dispersant OSR-IESG-STSC-015 - AGMA DR 379 Oil Dispersant - Slickgone NS Type 2/3 (200 Liters/ Drum) y.2011	AGMA Slickgone NS	DR 379 Type 2/3	7 ถัง 9 ถัง	Dispersant
20.	Dispersant Spray Set Boat Spray 100 Dual OSR-IESG-STSC-006 - Pump Unit - AFEDO Nozzles - ถังผสมน้ำ	Lamor	BS100DFW-TS	1 Set 1 ใบ	Dispersant Spray
21.	Cargo Basket OSRE-IESG-BU-001,002/2014	Saftrol	Cargo Basket	2 set	Basket
22.	Container 40 feet OSR-IESG-STSC-020	Saim cargo container	Lp 20-005	3 set	Container
23.	Container 20 feet (จำหน่ายแล้ว 1 ชุด 2559 30,000 บาท)	Siam cargo Container	Storage container	1 set	Container
24.	CONTAINER 10 feet (OSRE-IESG-001/2014)	Saftrol	Storage container	1 set	Container
25.	WATER PUMP 11kw OSR-IESG-STSC-021	yanma		1 set	pump
26.	Oil spill Dispersant ;Dasic;slickgone NS -Contain 25L./Pail	Dasic International Limited	Type II/III	32 Pails (800 L)	Dispersant

Remark: Updated information will be available in the SSHE intranet.

APPENDIX H: 2018 PTTEP AUTHORISED PERSONNEL FOR OSRL ACTIVATION

Name	Position/Job Title	Contact No.	Email
	Senior Vice President, Safety, Security, Health & Environment Division		
	Acting EVP., Production Asset Group		
	EVP., Engineering and Development Group		
	Senior VP, Myanmar Asset		
	Vice President, Safety Operation Department		
	Vice President, Environment Management Department		
	Vice President, Australia Asset		
	Manager, SSHE		
	SSHE Manager, Myanmar Asset		
	SSHE Manager, Australia Asset		

Remark: Updated information will be available in the SSHE intranet.

**APPENDIX I: PTT GROUP NOTIFICATION FORM**

PTT Public Company Limited (PTT)

Communication Centre: +66(0)2537 3111/3222/3333/3444 (Tel)
+66(0)2537 3498-9 (Fax)

Oil Spill Response and East Asia Response Limited (OSRL)

Singapore Base: +65 6266 1566 (Tel) +65 6266 2312 (Fax)
Southampton Base: +44 23 8033 1551 (Tel) +44 23 8033 1972 (Fax)

Notification Form – Page 1 of 2

To: PTT Communication Center	Date:
Cc: OSRL	Warning! Ensure telephone contact has been established with the Duty Manager before using Email communication.
From:	Position:
Company:	Contact Number:
Subject: For Your Information	Incident name:
OBLIGATORY INFORMATION REQUIRED – COMPLETE ALL DETAILS	
Name of person in charge	
Position	
Company	
Contact telephone number	
Contact fax number	
Email address	
Spill Details	
Location of spill	
Description of slick (size/direction appearance)	
Latitude / Longitude	
Situation (cross box)	
Date & Time of spill	
Source of spill	
Quantity (if know)	
Spill status (cross box)	
Action taken so far	
Oil type & characteristics	
Name	
Viscosity	
API/SG	
Pour point	
Asphaltene	
Weather	
Wind speed and direction	
Sea state	
Sea temperature	
Tides	
Forecast	



PTT Public Company Limited (PTT)

Communication Centre: +66(0)2537 3111/3222/3333/3444 (Tel)
+66(0)2537 3498-9 (Fax)

Oil Spill Response and East Asia Response Limited (OSRL)

Singapore Base: +65 6266 1566 (Tel) +65 6266 2312 (Fax)
Southampton Base: +44 23 8033 1551 (Tel) +44 23 8033 1972 (Fax)

Notification Form – Page 2 of 2

ADDITIONAL INFORMATION REQUIRED – COMPLETE DETAILS IF KNOW	
Resources at risk	
Clean up resources	
On site / Ordered	
Nearest airport (if know)	
Runway length	
Handling facilities	
Customs	
Handling agent	
Vessel availability	
Equipment deployment	
Recovered oil storage	
Equipment logistics	
Transport	
Secure storage	
Port of embarkation	
Location of command centre	
Other designated contacts	
Special requirements of country	
Security	
Visa	
Medical advise	
Vaccinations	
Others (specify)	
Climate information	

Remark: Updated information will be available in the SSHE intranet.

APPENDIX J: PTT GROUP MOBILISATION AUTHORISATION FORM

Mobilisation Authorisation

To: PTT Communication Center	Date:
Tel: +66 (0) 2537 3111/222/333/444/555	Fax: +66 (0) 2537 3498 - 9
From:	Position:
Company:	Contact Number:
Subject: Mobilisation of OSRL	Incident name:

I, _____ (Name in Block Capitals)
 hereby authorise to request PTT for the activation of OSRL and its resources in connection
 with the oil spill incident of _____ (Name of Ship/Oil Rig or Terminal)
 as of _____ (Time) ON _____ (Date)

OSRL shall work under the direction of:
 Name: _____
 Position: _____
 Company: _____

Signature _____ Position _____
 Company name _____

To: OSRL	Date:
Tel: Singapore Base: +65 6266 1566 Southampton Base: +44 23 8033 1551	Fax: Singapore Base: +65 6266 2312 Southampton Base: +44 23 8033 1972
From: PTT Public Company Limited	Contact Number: +66 (0) 2537 8844/55
Subject: Mobilisation of OSRL	Incident name:

I, _____ (Name in Block Capitals)
 hereby authorize the activation of OSRL and its resources in connection with the oil spill
 incident of _____ (Name of Ship/Oil Rig or Terminal)
 as of _____ (Time) ON _____ (Date)

Signature _____ Position _____
 PTT Public Company Limited

Remark: Updated information will be available in the SSHE intranet.

APPENDIX K: OSRL NOTIFICATION AND MOBILISATION PROCEDURE

OSRL Request Step

PTTEP is a participant member with OSRL, and therefore has immediate access to Tier 3 technical advice, resources and expertise 365 days a year on a 24 hours basis. The following steps should be followed to request for OSRL's support:

1. In the event of an incident, a call should be placed to one of the following numbers. The Duty Manager (DM) will call Client back within 10 minutes of receiving notification of the call.

Emergency Contact (TELEPHONE) Singapore **+65 6266 1566**

Southampton **+44 (0)23 8033 1551**

Emergency Contact (FAX) Singapore **+65 6266 2312**

Southampton **+44 (0)23 8033 1972**

2. Complete the Notification (Appendix L) and Mobilisation Authorisation forms (Appendix M) as necessary, which can be sent to OSRL by fax or email. Under the Participant Member Agreement which governs the mobilisation of resources from OSRL, OSRL must receive official notification to mobilize from one of PTTEP's Nominated Call-out Authorities, summarized in the table on the next page. These are individuals within PTTEP who have been appointed to approve the expenditure of mobilizing Tier 3 equipment.

Remark: Updated information will be available in OSRL website.

APPENDIX L: OSRL NOTIFICATION FORM

OSRL Notification Form

(Initial Incident Information)

Warning! Please telephone the Duty Manager before e-mailing or faxing this form

To	Duty Manager		
OSRL Base	Southampton, UK	Loyang, Singapore	Fort Lauderdale, USA
Telephone	+44 (0)23 8033 1551	+65 6266 1566	+1 954 983 9880
Emergency Fax	+44 (0)23 8072 4314	+65 6266 2312	+1 954 987 3001
Email	dutymanagers@oilspillresponse.com		

Guidance: This information will be used to develop and recommend the most appropriate response strategy. If new information should become available, or the situation changes, please inform the Duty Manager as soon as possible.

Section 1 – Contact Details				
Member Company				
Name of Person Notifying OSRL				
Job Title (Designation)				
Direct Phone Number	Country code		Number	
Mobile Number	Country code		Number	
Fax Number				
Email Address				
Command Centre Address				
Date and Time of Notification	Date and Time		Time Zone	
Section 2 – Location				
Country / Region of Spill				
Latitude of spill (north/south)				
Longitude of Spill (east/west)				
Area Affected	<input type="checkbox"/> Offshore	<input type="checkbox"/> Subsea	<input type="checkbox"/> Shoreline	<input type="checkbox"/> Estuary
	<input type="checkbox"/> Port	<input type="checkbox"/> Harbour	<input type="checkbox"/> Inland	<input type="checkbox"/> River
Other				
Water Depth (if applicable)				
Section 3 – Spill Details				
Date and Time of Spill			Time Zone	
Source of Spill				
Cause of Spill				
Status of Spill	<input type="checkbox"/> Secured	<input type="checkbox"/> Uncontrolled	<input type="checkbox"/> Unknown	
Product Properties	Product Name / Type			
	Specific Gravity	AP		
	Pour Point			
	Wax Content			
	Asphaltene			
Sulphur Content				Assay sheet provided
Viscosity	Reference Temperature		°C	
Type of Release	Instantaneous Release	<input type="checkbox"/>	Volume	
	OR			
Continuous Release	<input type="checkbox"/>	Release Rate		

Section 3 – Spill Details continued				
Description of Observed Spill	Estimated Quantity			State Units
	Size			
	Appearance			
	Direction of Travel			
Section 4 – Weather and Modelling				
Weather forecast provided?		<input type="checkbox"/> Yes	<input type="checkbox"/> No OSRL to source a weather forecast	
e.g. Excel/Word				
Sea Temperature			State Units	
Sea State				
Visibility				
Cloud Base				
Do you require Oil Spill Trajectory Modelling?	<input type="checkbox"/> Surface 2D	<input type="checkbox"/> Sub-surface 3D	<input type="checkbox"/> Not at this time	
Additional time and costs apply				
Sub-surface 3D Modelling Information if requested	Gas to Oil Ratio	m^3/m^3	Release Hole Diameter	m
Section 5 – Safety and Security				
Highlight any known safety or security risks e.g. high levels of H ₂ S, high risk country				<input type="checkbox"/> Not Applicable
Describe security arrangements for OSRL staff				<input type="checkbox"/> Not Applicable
Section 6 – Resources at Risk (if available)				
Environmental or socio-economic sensitivities that may be impacted. Provide the relevant oil spill contingency plan and sensitivity maps if available.				<input type="checkbox"/> Contingency plan included <input type="checkbox"/> Sensitivity maps included
Section 7 – Equipment (if available)				
Equipment already deployed or being mobilised (other than OSRL resources)				
Section 8 – Further Information				

Remark: Updated information will be available in the SSHE intranet and OSRL website.



APPENDIX M: OSRL MOBILISATION AUTHORISATION FORM

Mobilisation Authorisation Form

Please do not hesitate in contacting the duty manager at the earliest opportunity in the event of an incident or potential incident. Please ensure you telephone the Duty Manager before e-mailing or faxing this completed form

Safety and Security

Oil Spill Response Limited's safety policy requires us to work closely with the mobilising party to ensure all aspects of safety and security are addressed for our personnel.

To	Duty Manager		
OSRL Base	Southampton, UK	Loyang, Singapore	Fort Lauderdale, USA
Telephone	+44 (0)23 8033 1551	+65 6266 1566	+1 954 983 9880
Emergency Fax	+44 (0)23 8072 4314	+65 6266 2312	+1 954 987 3001
Email	dutymanagers@oilspillresponse.com		

Details of Authorised Contact		
Incident Name		
Mobilising Company		
Name of Person Authorising OSRL		
Position of Authorising Representative		
Direct Phone Number	Country Code	Number
Mobile Number		
Fax Number		
Email Address		
Invoice Address if available		
Purchase Order Number		

I, the above named Authorising Representative for the Mobilising Company, approve activation of Oil Spill Response Limited and its resources in connection with the above incident under the terms of the Agreement in place between the above stated Company and Oil Spill Response Limited.

Signature:		Date / Time:	
------------	--	--------------	--

If Oil Spill Response Limited personnel are to work under another party's direction please complete details below:

Directing Party's Details	
Company	
Contact Name	
Position in Incident	
Direct Phone Number	
Mobile Number	
Fax Number	
Email Address	

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Page 1 of 1

Remark: Updated information will be available in the SSHE intranet and OSRL website.



APPENDIX N: SPILL CAPABILITY ASSESSMENT CHECKLIST

Process for completion

The 'Self Check' is divided into four sections dealing with each aspect of response preparedness: Management Organisation & Training, Planning, Notification and Mobilization, and Response.

A number of questions are asked to gauge the levels of preparedness particularly in the context of interface with IESG and its members. The aim is to conduct a quick and simple gap analysis of the relationship and identify any actions that should be completed to ensure that IESG and its members resources could be effectively integrated into the response.

Answers to the questions are recorded on a numerical matrix indicating whether the issue is considered to be adequately addressed. Certain aspects are considered critical success factors, and failure in these areas would be material to the ability of IESG and its members to assist the member (spill owner), or more importantly, for the member to be able to respond effectively. The answers should be dependent upon the question context.

Answers	Status
Yes/Satisfactory/this year	1
In need of action/Review/last year	2
No/Unsatisfactory/Before last year	3

Section 1 Management Organisation & Training

It is essential that there is a robust management structure to lead the response to any incident. The members of the response team should be aware of their individual roles and responsibilities and trained in oil spill response. The team should be aware of how IESG and its members interface with their response organisation. The organisation should be regularly exercised.

Management Organisation & Training		1	2	3
Reference document - Spill Response Plan				
M1	Is there a management structure for dealing with an oil spill incident?			
M2	Are all members of the team aware of their individual Roles and Responsibilities?			
M3	Is there a Response management System in place?			
M4	Have all of the team members been trained in oil spill response?			
M5	Have members of the management team been briefed in how IESG and its member operate and their respective responsibilities?			
M6	When was the management team last exercise?			

Section 2 Planning

There should be a contingency plan in place to co-ordinate the response to an oil spill which will bring together various elements of the response, including cleanup equipment. It should be kept up to date and tested on a regular basis. The plan should interface with other adjacent plans. And, should have an appropriate and relevant risk assessment and identify where resources to support tier 1, 2 and 3 response can be accessed.

Planning		1	2	3
Reference document - Spill Response Plan				
P1	Is there a contingency plan in place?			
P2	When was it last review/update?			
P3	When was the plan last exercise?			
P4	Does the plan integrate with IESG response?			
P5	Does the plan interface with national and other adjacent local plans?			
P6	Does the plan risk assessment reflect the scope of the operation and anticipate credible level of IESG and its members' involvement?			
P7	Does the credible Tier 1 spill scenario identified?			
P8	Does the cleanup equipment appropriate with the Tier 1 spill scenario?			
P9	Does the equipment maintenance and test program in place?			
P10	Does the equipment mobilization & deployment logistics been planned and tested?			

Section 3 Notification and Mobilization

An effective response is dependent upon an effective notification and mobilization system to alert the responders. This section deals with the alerting system, and ensures that all parties are aware of the required information and authorities to mobilize the support response from IESG and its members.

Notification and Mobilization		1	2	3
Reference document - Spill Response Plan				
N1	Is there a procedure in place to notify IESG of an incident?			
N2	When was it last review/update? (<i>notification procedure</i>)			
N3	When was the procedure last exercise?			
N4	Is there a procedure in place to mobilize IESG support in the event of an incident?			
N5	When was it last review/update? (<i>mobilization procedure</i>)			
N6	When was the system last exercise?			
N7	Are you aware of the information needed by IESG & members to mobilize a response?			
N8	Are you aware of the advice and information support that can be accessed from IESG?			
N9	Are you aware of the response time likely to be achieved in the event of a call?			

Section 4 Response

In order for IESG and its members to be able to respond effectively with the member (spill owner) there is a need for infrastructure items to support the response. This section deals with these elements.

Response		1	2	3
Reference document - Spill Response Plan				
R1	Is there a safety management plan in place for response operations?			
R2	Have response personnel been trained in the safety aspects of oil spill response?			
R3	Is there a communications system to enable effective co-ordination of the response?			
R4	Have secure equipment stockpile areas been identified?			
R5	Have the logistical arrangements been identified to import and deploy additional equipment delivered by IESG and its members?			
R6	Has a waste management plan been developed for the response operation?			
R7	When was the system last exercise?			

**Action Summary**

Action to be taken		Who	When
Management Organisation & Training			
M1			
M2			
M3			
M4			
M5			
M6			
Planning			
P1			
P2			
P3			
P4			
P5			
P6			
P7			
P8			
P9			
P10			
Notification and Mobilization			
N1			
N2			
N3			
N4			
N5			
N6			
N7			
N8			
N9			
Response			
R1			
R2			
R3			
R4			
R5			
R6			
R7			
TO BE COMPLETED BY BOTH PARTIES.			

Site representative.....

Check by.....

Date.....