



บริษัท ปตท.สผ. สยาม จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม  
โครงการพัฒนาแหล่งน้ำมันประดู่เผ่าตอนใต้ ระยะที่ 2 แปลงเอส 1 จังหวัดพิษณุโลก และจังหวัดสุโขทัย  
ฉบับเดือนมกราคม – ธันวาคม พ.ศ.2565

## ภาคผนวกที่ 9

### S1 General SSHE Rules and Requirements Procedure



**PTTEP**

PTT Exploration and Production Public Company Limited

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## **S1 General SSHE Rules and Requirements Procedure**

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**Document Code: 13247-PDR-SSHE-505/08-R04**

**September 2021**

**Approval Register**

<b>Document Subject</b>	S1 General SSHE Rules and Requirements Procedure
<b>Document Code</b>	13247-PDR-SSHE-505/08-R04
<b>Document Owner</b>	PS1/S
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<b>Effective Date</b>	September 2021

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<b>Approval Authority</b>	Nattapong Vattanajaroen (PS1)		09 Oct 21

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



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## INTRODUCTION

### 1. PURPOSE

This S1 General SSHE Rules and Requirements demonstrate minimum SSHE requirements that all staff and contractors shall comply with to ensure that the activities are executed safely and cause no harm to personnel, asset environment and reputation.

### 2. SCOPE

The S1 general SSHE rules and requirements is applicable for all staff and contractors working in S1 operation areas.

## REQUIREMENTS

### 3. S1 GENERAL SSHE RULES AND REQUIREMENTS

#### 3.1 SSHE TARGET ZERO INCIDENT

Arise from SSHE management system set the specific number in strategic objective called “**SSHE Target Zero Incident**” which means;

- No personal injury
- No security concern
- No environmental impact such as spill
- No major accident
- No public complaint impact to reputation/image

#### 3.2 ADOPTING THE LIFE-SAVING AND PROCESS SAFETY RULES

The Life-Saving and Process Safety Rules aim at preventing fatalities and process safety incidents. The rules' primary objective is to achieve the Company's aspiration of “Target Zero” and “Nobody gets hurt in our operations”.

Each rule consists of an icon and simple actions that individuals can take to prevent fatalities and loss. The rules are separated into two sets as listed in Figure 1 and Figure 2 below.

Personnel working under S1 operations facilities shall be trained or received appropriate briefing of Life-Saving and Process Safety Rules and shall follow and comply with Life-Saving and Process Safety Rules and other SSHE requirements. Violation of Life-Saving and Process Safety shall be reported to a supervisor or other provided channels such as SOC, HRC, Incident Management System (IMS) etc.

Life-Saving and Process Safety Rules shall be applied in risk assessment activities such as the JSA and Permit to Work meetings.

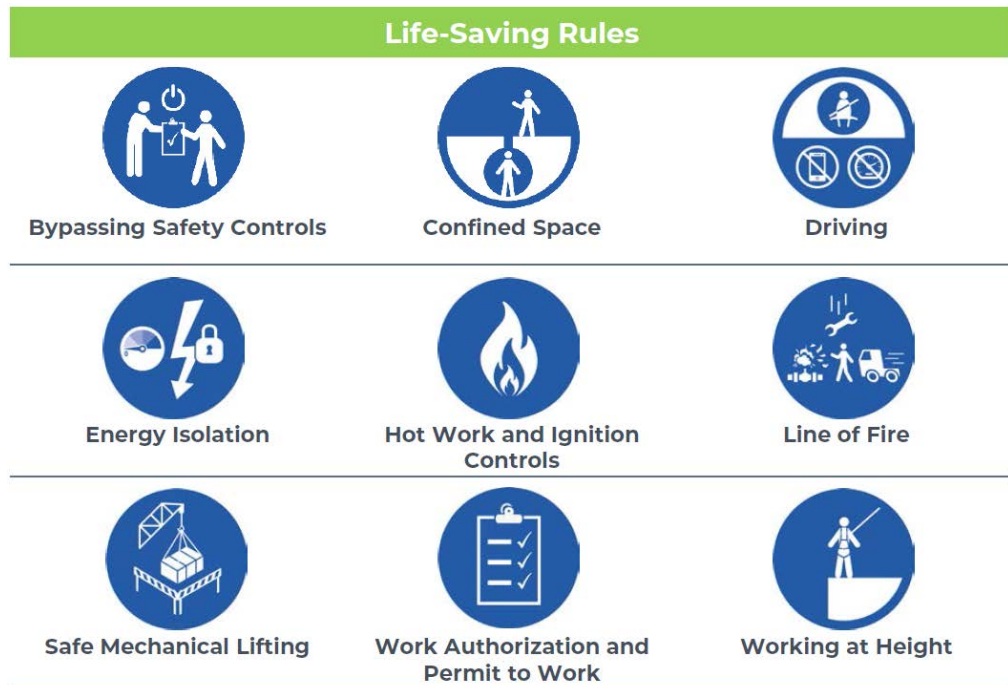


Figure 1: PTTEP Live Saving Rules



Figure 2: PTTEP Process Safety Rules

### 3.3 ACCESS CONTROL AND PERSONAL IDENTIFICATION

Security is a part of SSHE management system that maintain the integrity of people and assets away from crime, robbery and sabotages among social situation. PTTEP staffs, contractors, visitors and concerned person shall follow access control instruction and coordinate with security guard at all entrance gates. Citizen ID card and passport are the primary evident to express themselves and change to the specific ID cards as below pictures.



Figure 3: Type of Identification Card (Staff & Contractor)

### 3.4 SSHE INDUCTION

S1 has established an induction program to welcome every new, newly transferred, and promoted employee to the S1 Asset. SSHE induction program is intended to familiarize these employees with the S1 Organization and to introduce them to the PTTEP Vision and Missions, SSHE Policy and strategic objectives for the development of safe, secured, healthy, and environmentally responsible workforces.

SSHE induction is mandatory for all personnel as describe below and shall take place as soon as is practicably possible after arrival.

- New staffs/contractors who is first time and/or transferring to work at S1 Asset;
- The person who has not been in S1 asset more than 6 months;
- Visitors or business partner who is working within one day.

Once employees have gone through the induction program, they shall receive more in-depth job-related training to prepare them for the work that they will be expected to do. This training shall depend on the duties assigned and the prior education and experience background of each individual.

Apart from the SSHE Induction program, all PTTEP newcomer and contractor personnel who working as organic staff in S1 operations are required to attend the S1 SSHE familiarization Program as specified in S1 SSHE Familiarization Program Procedure.

### 3.5 DRUGS, ALCOHOL AND KRATOM LEAF

It is the employee's responsibility to be fit for work. Employees shall be prohibited from being on company business or locations while impaired by drugs, alcohol or Kratom leaf. Using illegal drugs, alcohol or Kratom leaf, or misusing legal drugs or other substances, will be influenced and reduce their ability to perform their job safely.

Department of Mineral Fuels (DMF) defines drugs, Kratom leaf and alcohol regulation to ensure the person who is performing at concession area must have 0.00 % BAC. If the second test is positive, do not enter to the company's premise for 72 hours and consequentially report to DMF. Disciplinary action in accordance with HR Policy. Such action is also subject to the related local laws.

There are various kinds of alcohol testing are as follows;

- **Pre-employment Testing.**
- **Testing before placement in sensitive position and sensitive areas.**
- **Random and periodic (screening) testing** which is without cause.
- **Testing with cause** after incident taken place if positive result, employee is recommend to leave without pay and may be requested by police authority or under the court-of-law.

### 3.6 INCIDENT REPORTING

PTTEP support and admires the staffs, contractors and involved person to inform near miss, accident and public or environmental complain to the LKU telecommunication room for further notifying to concerned parties and relevant person. All incidents shall be recorded in computerized PTTEP Incident Management System (IMS).

Incident reporting and investigation process shall be followed and compliance with PTTEP Incident Management Standard.

### 3.7 GREEN OFFICE & 5S PROGRAM

S1 receives 'Gold Level' Green Office Award 2020 from the Department of Environmental Quality Promotion. Green Office Award is given to leading organizations that have made efforts to reduce energy consumption, minimize carbon footprint and implement green practices in their offices/operations and sustain a healthy workplace.

5S (Sorting, Setting in Order, Systematic Cleaning, Standardizing, Sustaining) Program is a structured program to systematically achieve well organization, cleanliness and standardization which result in a safer, more efficient and more productive operation. 5S Program is considered as a component of the green office. It is recommended that all personnel adopt the concept of 5S program and integrate it as part of their daily work routine.



Figure 4: 5S during cleaning & completed cleaning

### 3.8 STOP WORK AUTHORITY (SWA)

Stop Work Authority (SWA) is the prevention campaign when unsafe act and unsafe condition are found in workplace.

Stop Work Authority exercise is a tool to monitor SSHE awareness and leadership of staffs and contractor for proactive cultures and dare to stop any non-conformances of safe practice. Example of Stop Work Authority Exercise is illustrated in Appendix A. Stop Work Authority (SWA) Forms, both in Thai & English, are available on S1 Document Database [> SSHE > 10: SSHE Forms](#).

Four factors that can be stopped in personal, tools, equipment and undesirable SSHE practices are as the following diagram.



Figure 5: Stop for Safety (4-STOP)



### 3.9 ROAD SAFETY

Most numbers of S1 asset activities concern to road, traffic hazards which causes the high severity to drivers and passengers. Defensive driving, the foreseen awareness to identify and rapid assess the front sight and decide to control the vehicle safely. Drivers shall adhere as the followings:

- Evaluate yourself and ensure fit to drive in any traffic condition.
- Use BEWAGON technic to check readiness of vehicles.
- Fasten seat belt and do not sit on the undersigned seat from manufacturers.
- Keep baggage in place at provided area to obstruct another vehicles on traffic lane.
- Do not use mobile phone or simultaneous act while driving.
- Keep velocity under that traffic condition and also being compliance to laws, rules and regulations.
- Journey management plan (JMP) shall be done in case the long journey, night driving and heavy load transportation.

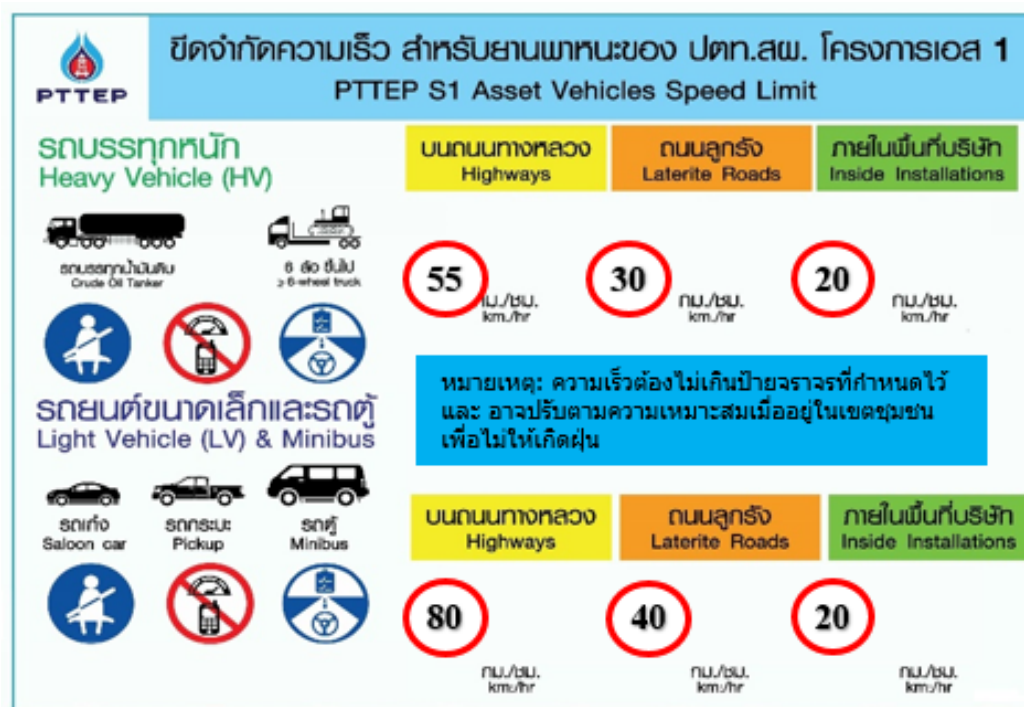


Figure 6: PTTEP S1 Asset Vehicles Speed Limit

### 3.10 WASTE MANAGEMENT

Waste management system which is aligned with Corporate Waste Management Procedure and Notification of Department of Mineral Fuel on Waste Management Standard for Petroleum Facility B.E. 2556.

The hierarchy of waste management is expressed in terms of reduction, reuse, recycling, recovery and finally residue treatment and disposal.



Figure 7: Waste Management Hierarchy

The waste generator shall classify waste into two main categories which are HAZARDOUS WASTE and NON-HAZARDOUS WASTE. Classification of waste process shall begin with identification of waste characteristic and its original source.

Waste management life cycle starts from waste identification from operations, segregation, packaging, labeling, transportation, disposal providers and reporting the inventories.

S1 asset provides containers (bin) of specific type of waste at every part of workplace to meet the proper cleanliness and hygiene.



Figure 8: Examples of Garbage containers (bin) in S1 operations



### 3.11 SMOKING AREA PROVISION

Passive smoking, also known as second-hand smoke or environmental tobacco smoke, is when a person breathes in toxic fumes. The person who never smoked, shall aware the health effects when nearby smoker(s).

Smoking is only allowed in designated smoking areas where is provided for fulltime (24 hours) and specific office hours (07:30 - 16:30 hrs.) as Appendix B. Smoker shall be responsible for cleanliness by throwing away cigarette butts into provided sand bin and also correct type of garbage containers.

In addition, they are not allowed while in Company/Contractor vehicle.

### 3.12 PERSONAL HEALTH AND HYGIENE

Staffs, contractors and concerned parties usually use company's provision of facilities which has personal distancing less than 1 - 2 meters. There may be enormous contamination and epidemiology of virus to harm human's health in workplaces.

S1 SSHE Asset and Corporate Doctors recommend to all facility users shall protect themselves by wearing specific protective equipment, i.e., natural rubber gloves, surgical mask (if preferable) whenever sharing these common facilities.

**Safety boots and safety shoes are not allowed to inside the office, canteen and accommodation** this may be contamination to common facilities or personal illness.





Figure 9: Personal Health Hygiene






Figure 10: Safety boots and shoes prohibited to inside building

## APPENDICES

### APPENDIX A: STOP WORK AUTHORITY (SWA) EXERCISE

	<b>STOP WORK AUTHORITY (SWA) EXERCISE REPORT FORM</b>		Form No.: 10015-SUP-SSHE-FRM-002-R00													
<b>S1</b>																
<b>Part 1: Exercise Planning (แผนการซ้อมการหยุดงาน)</b>																
<b>Subject (เรื่อง):</b> Pretend to use mobile phone in hazardous area		<b>Location (สถานที่):</b> NPG-A														
<b>Activity (กิจกรรม):</b> SSHE Committee Walkabout Audit at NPG-A		<b>Date (วันที่):</b> 11 Feb 2021		<b>Issued by (รายงานโดย):</b> Benjamaporn S.												
<b>Scenario (สถานการณ์การฝึกซ้อม):</b>																
PS1 conducts the SSHE Committee Walkabout Audit at NPG-A with S1 SSHE Committee Members. He brings the mobile phone along to the process area and use it to take a photo while conducting the audit.																
<b>Objective (วัตถุประสงค์):</b>																
<ul style="list-style-type: none"> <li>➢ To observe that worker will apply the stop work authority.</li> <li>➢ To encourage all worker to response the stop work authority for roles and regulations information stop work policy must be held when found any violation.</li> </ul>																
<b>Observer (ผู้สังเกตการณ์):</b>																
<table border="0"> <tr> <td>1) K. Vuthichai Kositnun (PS1/O)</td> <td>7) K. Aungkoon Suphaphot (OTN/W)</td> </tr> <tr> <td>2) K. Nattapong Vattanajaroen (PS1/T)</td> <td>8) K. Bharkbhoom Sripaiboon (OTN)</td> </tr> <tr> <td>3) K. Terawat Hensirisakul (PS1/M)</td> <td>9) K. Jittakorn Thongprom (PS1/P)</td> </tr> <tr> <td>4) K. Teerachai Surahirun (PS1/P)</td> <td>10) K. Surachai Jaipanya (PS1/P)</td> </tr> <tr> <td>5) K. Tammanoon Chaipanyakul (OTN)</td> <td>11) K. Phontakorn Yodchaipeeth (PS1/P)</td> </tr> <tr> <td>6) K. Suthorn Domhom (PS1/S)</td> <td>12) K. Pairat Santiwong (ECM/N)</td> </tr> </table>					1) K. Vuthichai Kositnun (PS1/O)	7) K. Aungkoon Suphaphot (OTN/W)	2) K. Nattapong Vattanajaroen (PS1/T)	8) K. Bharkbhoom Sripaiboon (OTN)	3) K. Terawat Hensirisakul (PS1/M)	9) K. Jittakorn Thongprom (PS1/P)	4) K. Teerachai Surahirun (PS1/P)	10) K. Surachai Jaipanya (PS1/P)	5) K. Tammanoon Chaipanyakul (OTN)	11) K. Phontakorn Yodchaipeeth (PS1/P)	6) K. Suthorn Domhom (PS1/S)	12) K. Pairat Santiwong (ECM/N)
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6) K. Suthorn Domhom (PS1/S)	12) K. Pairat Santiwong (ECM/N)															
<b>Part 2: Exercise Findings and Recommendations (ประเด็นการฝึกซ้อมและข้อเสนอแนะ):</b>																
<b>Item No. (ข้อ)</b>	<b>Finding Descriptions and Figures (รายละเอียดและรูปภาพ)</b>	<b>Recommendations (ข้อเสนอแนะ)</b>	<b>Action Party (ผู้ดำเนินการแก้ไข)</b>	<b>Target Date (วันที่กำหนดเสร็จ)</b>												
1.	Operator who was the area owner did not apply Stop Work Authority immediately while observing PS1 pretend to use the mobile phone in process area.	PS1 recommended all to stop work immediately when found any violation rule and regulation.	All	-												
<b>Exercise pictorial (รูปภาพการซ้อม):</b>																
																

 <b>PTTEP</b>	<b>STOP WORK AUTHORITY (SWA) EXERCISE REPORT FORM</b>	Form No.: 10015-SUP-SSHE-FRM-002-R00
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<b>Summary of Exercise (บทสรุปของการซ้อม):</b> Does the exercise meet the objective? (การซ้อมทบทวนตามวัตถุประสงค์ที่วางไว้หรือไม่?) <input checked="" type="checkbox"/> Yes (ใช่) <input type="checkbox"/> No (ไม่ใช่)			
<b>Part 3: Review and Approve (ทบทวนและอนุมัติ)</b>			
Any additional comments and recommendations (ข้อเสนอแนะและข้อแนะนำอื่น ๆ):			
<b>SWA Role Player</b> (บทบาทสมมติ)  (VP,S1 Production Operation) <b>Date: 11 Feb 21</b>	<b>Prepared and reviewed by:</b> (เตรียมและทบทวนโดย) 1) Nattapong V. 2) Suthorn D. 3) Terawat H. <b>Date: 11 Feb 21</b>	<b>Approved by:</b> (อนุมัติโดย)  (VP,S1 Production Operation) <b>Date: 11 Feb 21</b>	<b>Distributed to (ส่งข้อมูลถึง):</b>  PS1 Staff, PTN SSHE

Note: SWA Role Player/Supervisor or SSHE personnel shall assess and ensure of safety during the SWA exercise.



## APPENDIX B: S1 DESIGNATED SMOKING AREAS

### พื้นที่สูบบุหรี่นอกพื้นที่การผลิตและนอก อาคาร (24 ชั่วโมง)



ด้านข้างตึก 30 ปี



ด้านข้างอาคารที่พักลานกระบือ



ด้านหน้าประตู 2

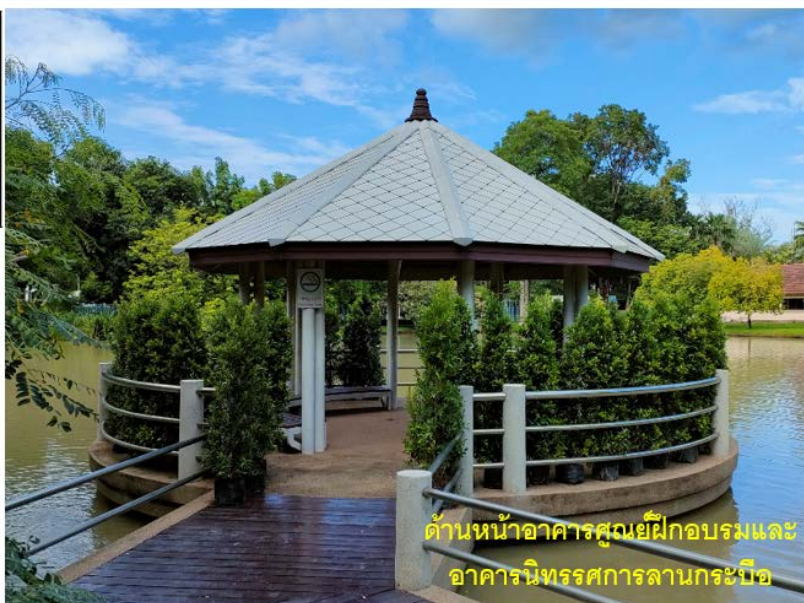


ด้านข้างอาคารแผนกซ่อมบำรุงลานกระบือ



ด้านข้างอาคารจอดรถดับเพลิงลานกระบือ

### พื้นที่สูบบุหรี่นอกพื้นที่การผลิตและนอก อาคาร (เฉพาะเวลาทำการ 07:30-16:30 น.)



ด้านหน้าอาคารศูนย์ฝึกอบรมและ  
อาคารนิทรรศการลานกระบือ

## ROLES AND RESPONSIBILITIES

Roles	Responsibilities
Document Owner	<p>The owner of the VP, Superintendent, SSHE section with responsibilities for:</p> <ul style="list-style-type: none"> <li>■ Issuing S1 SSHE Rules and Regulations and its revisions.</li> <li>■ Ensuring effective implementation of S1 SSHE Rules and Regulations.</li> </ul>
Document Custodian	<p>The custodian of the Standard is the VP, Superintendent, SSHE section, with responsibilities for:</p> <ul style="list-style-type: none"> <li>■ Identifying deficiencies and opportunities for improvements;</li> <li>■ Administrating &amp; analyzing the implementation of S1 SSHE Rules and Regulations Procedure for continual improvements;</li> <li>■ Initiating periodic revisions;</li> <li>■ Maintaining revision history and document status register; and</li> <li>■ Collecting and publishing all approved S1 SSHE Rules and Regulations;</li> </ul>
Document Reviewers	<ul style="list-style-type: none"> <li>■ Document Reviewers shall be relevant Subject Matter Experts (SMEs) or Technical Authorities (TAs), who are nominated by the document owner, based on qualifications, suitability of expertise and work experience.</li> <li>■ Nominated document reviewers shall scrutinize and comment on documents issued during the comment round.</li> <li>■ If there are a number of Departments or Divisions within the Company whereby the same disciplines apply, then reviewers shall be selected from those Departments or Divisions, so that there will be a cross-section of input.</li> </ul>
Document Controller	<ul style="list-style-type: none"> <li>■ Maintains document records, monitors/ reports on document development progress, and manages the approval development process. This will include issuance of document coding when proposals for new documents are issued by Document Custodians.</li> <li>■ Provides the Document Custodian with a unique document code, after a document request has been received, and registered by the administrator.</li> <li>■ Collaborates with the Document Custodian, document author during document development, and with concerned Management to provide document review and update</li> </ul>

Roles	Responsibilities
	<p>information regarding the documentation activities on the Function Group / Division / Department yearly plan</p> <ul style="list-style-type: none"><li>■ Notifies the Document Custodian at least 30 days prior to the scheduled document review date.</li><li>■ Ensures that the currency of SSHE documentation is maintained and accessible on the SSHE Intranet</li></ul>

## DEFINITIONS AND ACRONYMS

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

Term	Definition
Accident	Accident is an incident which has caused in actual injury or harm to people, damage to property, environmental impact, or negative impact to company reputation. Accidents involving injury to personnel may be further classified into: First Aid Cases (FAC), Medical Treatment Cases (MTC), Restricted Work Day Cases (RWDC), Lost time injury (LTI), Fatalities (FAT).
Asset	Refers to an operating Asset, site, or location within a respective Function Group.
Company	PTT Exploration and Production (Public) Co., Ltd. and PTTEP Siam Ltd.
Contractor	Contractor is a person employed by a Contractor or Contractor's Sub-Contractor(s) who is directly involved in execution of prescribed work under a contract with the reporting company.
Corporate	Refers to the PTTEP business groups hierarchically above Asset level, and located in the PTTEP headquarters, Bangkok.
Department	A subgroup within a Function Group, Division or Asset.
Division	A business group may have one or more distinct groups within its hierarchy. These are referred to as Divisions.
Function Group	Refers to a corporate level business group. These may have associated Divisions, Departments, or operational Assets within their hierarchy.
Guidelines	Refers to a corporate level business group. These may have associated Divisions, Departments, or operational Assets within their hierarchy.
Incident	An unplanned event or chain of events, which has resulted in injury or illness, damage to property, environmental impact, or negative impact on company reputation.
Legal professional privilege	A privilege that applies to communications, oral or in writing, made or brought into existence for the dominant purpose of obtaining or giving legal advice or assistance, or for use in existing or anticipated legal proceedings.



Term	Definition
Loss of Primary Containment	<p>An unplanned or uncontrollable release of any material from containment, including non-toxic and non-flammable materials (e.g. steam, hot condensate, nitrogen, compressed CO2 or compressed air).</p> <p>Primary containment refers to pipes, vessels, tanks etc ) see 7.3 for details of Tier 1 and Tier 2 in SSHE-106-STD-600 SSHE Incident Management Standard(.</p>
Near Miss	<p>Near Miss is an Incident which potentially could have resulted in actual injury or illness, damage to property, environmental impact or negative impact to company reputation.</p> <p>Note: As a professional judgment and general rule of thumb when determining if an incident is a Near Miss or Property damage, the criteria that Near Miss is an incident where no loss has occurred, should be used.</p>
Non- Conformance	A failure to comply with a requirement of company SSHE Management System (SSHE MS) and/or national and international laws and regulations.
Occupational Illness	<p>Any abnormal condition or disorder, other than one resulting from an occupational injury, caused by exposure to environmental factors associated with employment. Occupational illness may be caused by inhalation, absorption, ingestion of, or direct contact with the hazard, as well as exposure to physical and psychological hazards. It will generally result from prolonged or repeated exposure. Examples: back problems/ lower limb disorders, cancer and malignant blood disease, infectious disease (food poisoning, malaria etc.) , mental ill health; noise induced hearing loss, silicosis, asbestosis, allergic bronchitis, asthma, synovitis, tenosynovitis, heat exhaustion, radiation exposure.</p>
Occupational Injury	Any injury such as a cut, fracture, sprain, amputation etc. which results from a work-related activity or from an exposure involving a single incident in the work environment, such as deafness from explosion, one- time chemical exposure, back disorder from a slip/trip, insect or snake bite.
Performing Authority (PA)	The person who applies for a Work Permit, usually the foreman or supervisor responsible for the planning and execution of the work. The Applicant may be the person who will carry out the work.
Permit to Work System (PTW)	The Company's formal documented system by which safe working limits are set for authorized work.

Term	Definition
Procedures	Procedures define steps in identifying SSHE practices within PTTEP. They are specific, actions- orientated and describe processes, in compliance with SSHE Standards. Implementation of Procedure is mandatory.
Road Traffic Accident	An Incident which has involved a vehicle and which has resulted in Injury, illness and/ or damage ( loss) to people, assets, the environment or the Company's reputation.
SHE MS Standards	Mandatory requirements to ensure SSHE Policy compliance. Implementation of SSHE MS/Standards is mandatory throughout PTTEP.
Specifications	Specifications refer to PTTEP Internal Engineering Standards, which are incorporated into the PTTEP Engineering and General Specification (PEGS) System.
Spill	<p>Spill is any loss of containment that reaches the environment, irrespective volume of quantity recovered. Examples include but not limited to condensate spill, diesel fuel or oil spill; aviation fuel spill, process chemical spill, and etc. Spill of produced water are excluded.</p> <p>Intentional discharges of drilling cutting and fluids during drilling activities are not considered as pollution/ spill but an accidental release of drilling fluids to the sea must be reported as a spill.</p>
SSHE Policy	The highest level document containing a formal statement of principles that identifies expectations of PTTEP in managing SSHE.
Staff	Staff is a person employed by and on the payroll of the reporting company, including corporate and management personnel specifically involved in E&P industry. Persons employed under short-service contracts are included as Company employees provided they are paid directly by the company.
Supporting documents	Associated documents supporting the implementation of SSHE MS. These documents shall be consistent with SSHE Policy, Standards and Procedures. Example of Supporting Documents includes: SSHE plans, regulations, International and national technical references, minutes of meetings, SSHE risk assessment and monitoring records, etc.
Unsafe Act	An act by personnel or an unsafe condition which violates either written or unwritten common sense safety rules or procedures.
Work Related Activity	A work-related activity is an activity in a work environment, which is or ought to be subject to management controls.
Work Site	Any Company managed construction, maintenance or operating site outside the boundaries of a Production Site. (Includes road tanker operations and Contractors' yards, where such yards have been established specifically to serve the Company.)

Acronyms	Description
5S	Sorting, Setting in Order, Systematic Cleaning, Standardizing, Sustaining
ALARP	As Low As Reasonably Practicable
ECM/N	Engineering
IMS	Incident Management System
JSA	Job Safety Analysis
OLG/M	Material Yard
OTN/W	Well Services
PS1	VP, S1 Production Operations
PS1/L	Manager, Land Acquisition, Permits, and Operations Services Section
PS1/M	Superintendent, Maintenance
PS1/O	Manager, Oil Movement and Transportation
PS1/P	Superintendent, Production
PS1/S	Superintendent, SSHE
PS1/T	Manager, Production Operations Support
PTW	Permit To Work
SSHE	Safety, Security, Health and Environment
SSHE MS	Safety, Security, Health and Environment Management System

## REFERENCES

Document Code	Document Title
<b>PTTEP SSHE Controlling Documents</b>	
1038-STD-SSHE-000-R05	SSHE Management System
11038-STD-SSHE-301-R02	Corporate Oversight of SSHE MS Standard
11038-STD-SSHE-401-R06	SSHE Risk Management Standard
11038-STD-SSHE-601-R07	Incident Management Standard
11038-STD-SSHE-501-R05	Emergency and Crisis Management Standard
SSHE-106-PDR-521	Waste Management Procedure
2148-GDL-SSHE-603/00/01-R01	5S ( Sorting, Setting in Order, Systematic Cleaning, Standardizing, Sustaining) Guideline
11038-GDL-SSHE-507/00/06-R01	Drugs and Alcohol Guideline
11038-STD-SSHE-508-R06	Management of Change Standard
11038-STD-SSHE-510-R02	Life-Saving and Process Safety Rules Standard
12148-PDR-SSHE-505/42-R00	Permit to Work Procedure
10015-SUP-SSHE-FRM-002-R00	Stop Work Authority (SWA) Exercise
<b>Other Reference Documents</b>	
<a href="https://europeanlung.org/">https://europeanlung.org/</a>	Passive Smoking

## REVISION HISTORY

Rev.	Description of Revision
<b>0</b>	<b>Authorized by: DSO, Date: September 2010</b> ■ New document
<b>1</b>	<b>Authorized by: DSO, Date: May 2014</b> ■ Revised document
<b>2</b>	<b>Authorized by: DSO, Date: September 2014</b> ■ Revised document
<b>3</b>	<b>Authorized by: PNO, Date: December 2016</b> ■ Revised document
<b>4</b>	<b>Authorized by: PS1, Date: September 2021</b> ■ Revised the current S1 Quality and SSHE Standards. ■ Added the meaning of “SSHE Zero Target Incident”. ■ Canceled SSHE work category such as PTW, JSA, Working in Confined Space, Working at High, Security Management which can be easily seen in Corporate and Site SSHE OP, Standard and Guideline. ■ Updated the new SSHE Campaigns and Practices for users such as Life-Saving Rules, Process Safety Rules, Green Office, 5S, SWA Exercise. ■ Added the new topic of Personal Health and Hygiene to prevent the enormous contamination and dangerous virus epidemiology. ■ Added S1 House’s Rule such as safety shoes prohibited inside buildings and smoking at company’s designated areas. ■ Updated Roles, Responsibilities, Definitions, Acronyms, Abbreviated Departments/Sections and References which are appropriated to current status.



บริษัท ปตท.สผ. สยาม จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม  
โครงการพัฒนาแหล่งน้ำมันประดู่เผ่าตอนใต้ ระยะที่ 2 แปลงเอส 1 จังหวัดพิษณุโลก และจังหวัดสุโขทัย  
ฉบับเดือนมกราคม – ธันวาคม พ.ศ.2565

**ภาคผนวกที่ 10**  
**เอกสารบันทึกการตรวจสอบสุขภาพประจำปี**

# สรุปผลการตรวจสุขภาพประจำปี 2565 ของพนักงานผู้ปฏิบัติงานโครงการ S1

มีข้อมูลและรายละเอียดของผลการตรวจสุขภาพดังนี้

1. จำนวนพนักงาน S1 ที่ปฏิบัติงานที่ฐานปฏิบัติการ S1 ทั้งหมด 356 คน เข้ารับการตรวจร่างกายทั้งหมด 100 %

2. โดยเข้ารับบริการการตรวจร่างกายแยกตามสถานพยาบาลที่บริษัทได้ดำเนินการประสานงานไว้แล้ว ดังนี้

- เครือโรงพยาบาลกรุงเทพฯ จำนวน 348 คน คิดเป็น 97.75 %
- โรงพยาบาลวิภาวดี จำนวน 7 คน คิดเป็น 1.97 %
- โรงพยาบาลอื่นๆ จำนวน 1 คน คิดเป็น 0.28 %

3. จากจำนวนผู้เข้ารับการตรวจร่างกายจำนวน 356 คน แบ่งตามช่วงอายุ ตามแผนการตรวจร่างกายของบริษัทได้ ดังนี้

- ช่วงอายุน้อยกว่า 35 ปี มีจำนวน 71 คน คิดเป็น 19.94 %
- ช่วงอายุตั้งแต่ 35 ปี ถึง 44 ปี มีจำนวน 172 คน คิดเป็น 48.31 %
- ช่วงอายุตั้งแต่ 45 ปีขึ้นไป มีจำนวน 113 คน คิดเป็น 31.74 %

4. ผลการตรวจสุขภาพ

4.1 ผลการตรวจสุขภาพทั่วไป

- มีภาวะความดันโลหิตสูง จำนวน 51 คน คิดเป็น 14.33 % โดยความรุนแรงของระดับความดันโลหิตที่พบอยู่ในระดับต่ำทั้งหมด โดยจากการติดตาม พนักงานได้เข้ารับคำแนะนำในการปฏิบัติตัวและติดตามโรคเรียบร้อยแล้ว
- มีภาวะระดับน้ำตาลในเลือดสูงเกินเกณฑ์มาตรฐานโรคเบาหวาน จำนวน 14 คน คิดเป็น 3.93 % โดยจากการติดตามพนักงานได้เข้ารับคำแนะนำในการปฏิบัติตัวและติดตามการรักษาอย่างต่อเนื่องแล้ว
- มีภาวะไขมันในเส้นเลือดสูง จำนวน 229 คน คิดเป็น 64.33 % โดยมีความรุนแรงของระดับไขมันในเลือดสูง เป็น ดังนี้
  - ไขมันในเลือดสูง ความรุนแรงระดับต่ำ จำนวน 112 คน คิดเป็น 31.5 % (ของผู้เข้ารับการตรวจร่างกาย) โดยจากการติดตาม พนักงานได้เข้ารับคำแนะนำในการปฏิบัติตัวและติดตามโรคแล้ว
  - ไขมันในเลือดสูง ความรุนแรงระดับกลาง จำนวน 74 คน คิดเป็น 20.8 % (ของผู้เข้ารับการตรวจร่างกาย) โดยจากการติดตาม พนักงานได้เข้ารับคำแนะนำในการปฏิบัติตัวและติดตามโรคแล้ว และมีพนักงานบางส่วนแพทย์ประจำโรงพยาบาลได้พิจารณาให้รับประทานยาเพื่อรักษาโรค
  - ไขมันในเลือดสูง ความรุนแรงระดับสูง จำนวน 43 คน คิดเป็น 12.1 % (ของผู้เข้ารับการตรวจร่างกาย) แพทย์ประจำโรงพยาบาลได้พิจารณาให้รับประทานยาเพื่อรักษาโรคและติดตามรักษาต่อเนื่อง

- การตรวจคัดกรองภาวะวัณโรคปอดจากการเอกซเรย์ปอดประจำปี พบลักษณะเอกซเรย์ผิดปกติที่เข้าได้กับการวินิจฉัยวัณโรคปอด จำนวน 1 ท่าน โดยได้มีการส่งปรึกษาอายุรแพทย์โรคทางเดินหายใจและรักษาตามมาตรฐานการรักษาวัณโรคปอดเรียบร้อยแล้ว ขณะนี้พนักงานสามารถกลับมาปฏิบัติงานได้ตามปกติ และได้มีการสืบสวนข้อมูลการระบาด ไม่พบว่ามีการเจ็บป่วยไปยังเพื่อนร่วมงานและคนใกล้ชิดในครอบครัว

#### 4.2 ด้านอาชีวอนามัย

- การตรวจหาสารเบนซีนในปัสสาวะ (ยึดฐานข้อมูลจาก S1 Health risk assessment ) พนักงานเข้ารับการตรวจ 217 คน คิดเป็น 100% โดยผลพบค่าเบนซีนผิดปกติเกินเกณฑ์มาตรฐาน 1 คน ซึ่งพนักงานได้เข้ารับการสืบค้นไม่พบว่าเกิดจากการทำงานและเก็บปัสสาวะซ้ำพบว่าค่ากลับมาอยู่ในเกณฑ์ปกติ
- การตรวจหาสารไซลีนในปัสสาวะ (ยึดฐานข้อมูลจาก S1 Health risk assessment ) พนักงานเข้ารับการตรวจ 4 คน คิดเป็น 100% โดยพบว่าผลปกติทุกคน
- การตรวจหาสารเฮกเซนในปัสสาวะ (ยึดฐานข้อมูลจาก S1 Health risk assessment ) พนักงานเข้ารับการตรวจ 4 คน คิดเป็น 100% โดยพบว่าผลปกติทุกคน
- การตรวจหาสารโทลูอีนในปัสสาวะ (ยึดฐานข้อมูลจาก S1 Health risk assessment ) พนักงานเข้ารับการตรวจ 66 คน คิดเป็น 100% โดยพบว่าผลปกติทุกคน
- การตรวจสมรรถภาพการไต่ยืน (ยึดฐานข้อมูลจาก S1 Health risk assessment ) มีผลการตรวจ 196 คน คิดเป็น 100 % พบผลผิดปกติและทำการตรวจซ้ำทั้งหมด 70 คน โดยผลการตรวจซ้ำพบว่าผลสมรรถภาพการไต่ยืนกลับมาปกติ/คงเดิมจากปีก่อนหน้า 14 คน โดยยังคงผิดปกติ 56 คน ซึ่งจากการสืบค้นและติดตามความผิดปกติพบว่า ไม่เกี่ยวข้องกับการทำงานอย่างชัดเจน แต่ทางทีมแพทย์ยังคงติดตาม พนักงานอย่างใกล้ชิดต่อไป





บริษัท ปตท.สผ. สยาม จำกัด

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รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม  
โครงการพัฒนาแหล่งน้ำมันประดู่เฒ่าตอนใต้ ระยะที่ 2 แปลงเอส 1 จังหวัดพิษณุโลก และจังหวัดสุโขทัย  
ฉบับเดือนมกราคม – ธันวาคม พ.ศ.2565

## ภาคผนวกที่ 11

Maintenance and Inspection Management



PTT Exploration and Production Public Company Limited

# **S1 Production Operations**

## **Maintenance Guideline**

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### **Maintenance and Inspection Management**

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**Document Code: 13245-GDL-1-S1M-ALL-MMS-002-R04**

**October 2022**



Document Register	
Document Title:	Maintenance and Inspection Management
Document Code:	13245-GDL-1-S1M-ALL-MMS-002-R04
Document Author:	Terawat Hensirisakul; EDP-ALG <i>Terawat H</i> Apisak Sri-Amorntham; PS1/M <i>Apisak</i>
Department/Division:	
Effective Date:	October 2022

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Document Approval			
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Approval Authority:	Nattapong Vattanajaroen		02/11/22

This document shall be reviewed every 5 years from the date of approval or revised earlier if necessary.



Document Change History		
Date	Revision	Description of Change
	0	New issue
26-Apr-04	1	Issued after company ownership change
26-Sep-06	1.1	2 Yearly review
30-Jul-09	1.2	Change document no. from A72 to SMNT
28-Mar-13	2	<ul style="list-style-type: none"><li>Reformatted document</li><li>Aligned with new PTTEP SSHE MS, ISO14001:2022 and OHSAS18001:2007 requirement</li><li>Updated organizational indicators from JGO to DSO</li></ul>
30-Sep-16	3	<ul style="list-style-type: none"><li>Reformatted to corporate template</li><li>Updated organizational indicators</li></ul>
02-Oct-22	4	<ul style="list-style-type: none"><li>Renamed from “Maintain Wells and Facilities” to “Maintenance and Inspection Execution Management”</li><li>Renumbering per new S1 document numbering</li><li>Combine contents from SMNT-PN-01, 02, 03 and 04 into one document per 2021 OTR-RAI audit findings</li></ul>

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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.

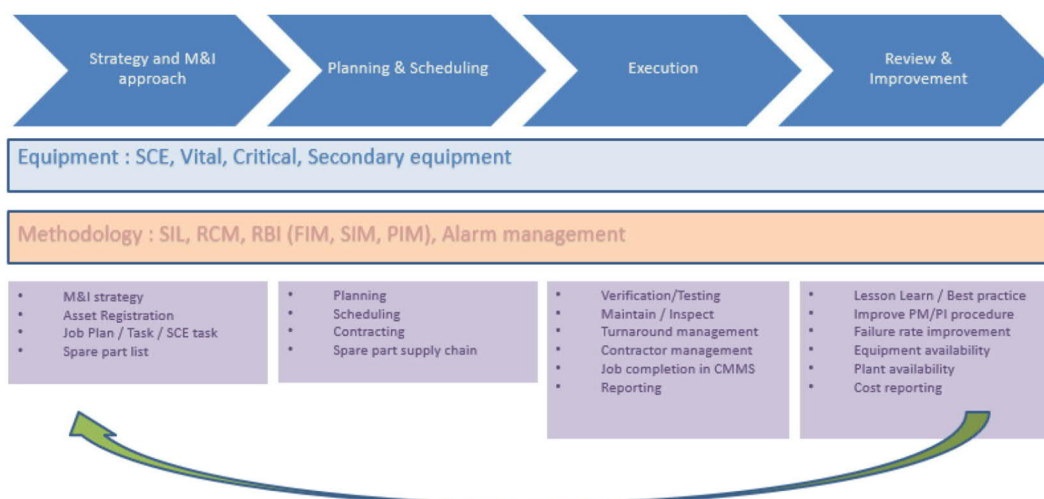


Figure 1 – Maintenance and Inspection Management



## 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 1<sup>st</sup> 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

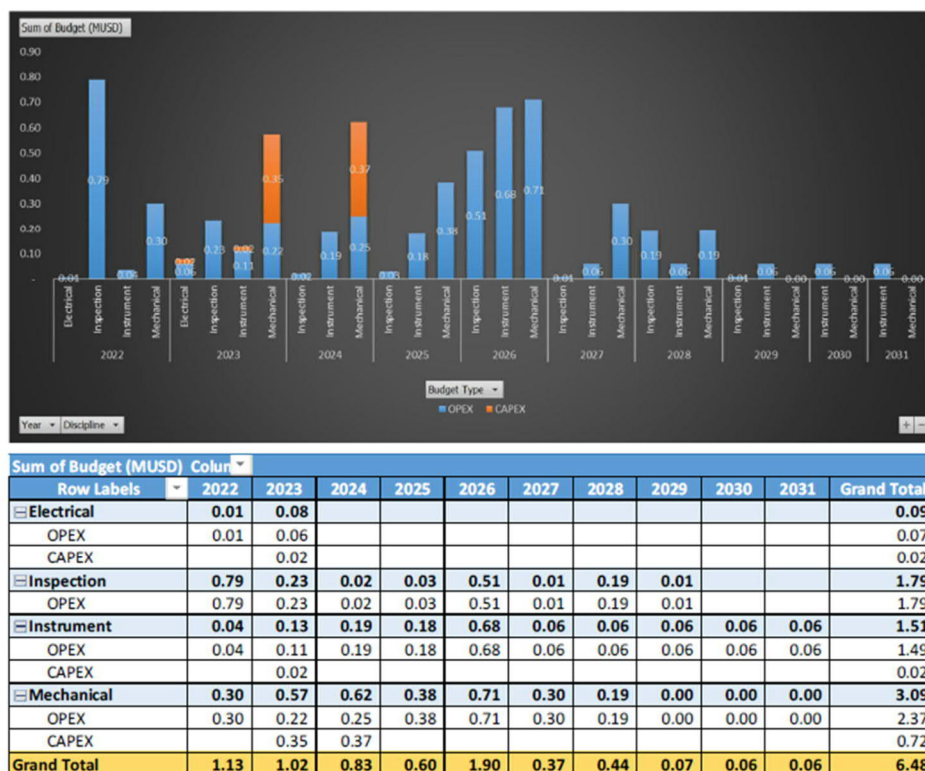
Maintenance Reference Plan (MRP) is another set of maintenance and inspection tasks look ahead in high level for 5-10 years magnitude of time scale, associated OPEX/CAPEX, implications for the plant and equipment. MRP incorporates all constraints and business requirements underlying with equipment current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

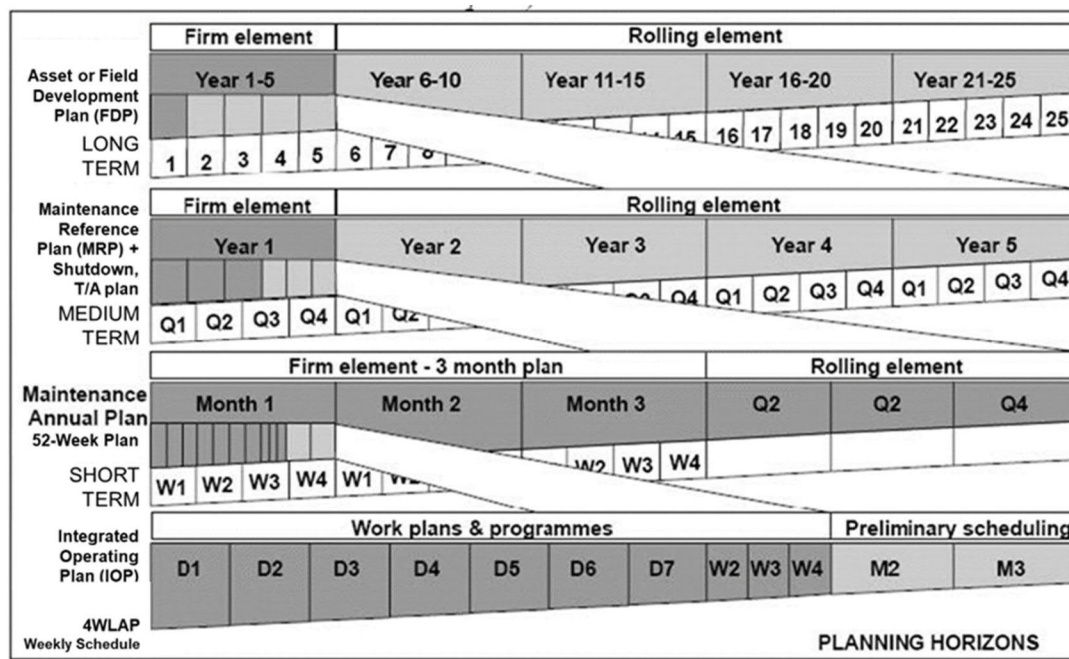


Figure 4 – Hierarchy of Maintenance and Inspection Plans

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 1<sup>st</sup> 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, 1<sup>st</sup> 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							
Departm	Period	Location	Activities	Start Date	Finish Dat	Duration	
PS1/M	Aug-22	F/STN	PM ME (ENGINE + COMPRESSOR 1Y) 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-3950 2M	28-Aug-22	28-Aug-22	4 hrs.	
PS1/M	Aug-22	F/STN	PM ME (ENGINE 6Y + COMPRESSOR 1Y) 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 1Y) K-3400 - Plan 29 August - 02 September 2022 total 5 days.	29-Aug-22	2-Sep-22	5 Days	
PS1/M	Aug-22	F/STN	P-2401-A, THREE MONTHLY, PREVENTIVE MAINTENANCE	3-Aug-22	3-Aug-22	4 hrs.	
PS1/M	Aug-22	F/STN	P-2402-A, THREE MONTHLY, PREVENTIVE MAINTENANCE	4-Aug-22	4-Aug-22	4 hrs.	
PS1/M	Aug-22	LKU-B	P-117A, THREE MONTHLY, PREVENTIVE MAINTENANCE (WS-B)	4-Aug-22	4-Aug-22	4 hrs.	
PS1/M	Aug-22	LKU-B	P-117B, THREE MONTHLY, PREVENTIVE MAINTENANCE (WS-B)	4-Aug-22	4-Aug-22	4 hrs.	
PS1/M	Aug-22	LKU-B	P-115A, THREE MONTHLY, PREVENTIVE MAINTENANCE (WS-B)	3-Aug-22	3-Aug-22	4 hrs.	
PS1/M	Aug-22	LKU-B	P-115B, THREE MONTHLY, PREVENTIVE MAINTENANCE (WS-B)	3-Aug-22	3-Aug-22	4 hrs.	
PS1/M	Aug-22	LKU-E	P-145-A, THREE MONTHLY, PM (WS-E)	4-Aug-22	4-Aug-22	4 hrs.	
PS1/M	Aug-22	LKU-E	P-145-B, THREE MONTHLY, PM (WS-E)	4-Aug-22	4-Aug-22	4 hrs.	
PS1/M	Aug-22	LKU-E	P-142-A, PREVENTIVE MAINTENANCE (WS-E)	4-Aug-22	4-Aug-22	4 hrs.	
PS1/M	Aug-22	LKU-E	P-143-A, PREVENTIVE MAINTENANCE (WS-E)	4-Aug-22	4-Aug-22	4 hrs.	
PS1/M	Aug-22	PTT-NGV	A-8000, YEARLY, PREVENTIVE MAINTENANCE	3-Aug-22	5-Aug-22	3 Days	
PS1/M	Aug-22	PTO-A	PTO-A GAS METERING 80-FPTR-652 YEARLY CALIBRATION	7-Aug-22	7-Aug-22	8 hrs.	
PS1/M	Aug-22	STN-A	STN-A GAS METERING 68-FPTR-657A/B and 68-FPTR-658A/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 PM	9-Aug-22	10-Aug-22	2 Days	
PS1/M	Aug-22	F/STN	T-306 CALIBRATION AND PREVENTIVE MAINTENANCE	11-Aug-22	11-Aug-22	8 hrs.	
PS1/M	Aug-22	NGV	OMA_NGV Online Moisture Analyser	3-Aug-22	3-Aug-22	8 hrs.	
PS1/M	Aug-22	BPR	BPR 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	NPG-A	PM IN NPG-A, ESD/OSD function test 1Y	11-Aug-22	11-Aug-22	2 hrs.	
PS1/M	Aug-22	NPG-E	PM IN NPG-E, ESD/OSD function test 1Y	18-Aug-22	18-Aug-22	2 hrs.	
PS1/M	Aug-22	LKU-M	PM IN LKU-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 + RGB	10-Aug-22	14-Aug-22	5 Days	
PS1/M	Aug-22	F/STN	PM ME+EL+IN K-5801B 1YPM	5-Aug-22	7-Aug-22	3 Days	
PS1/M	Aug-22	F/STN	PM EL K-5804C 2500 HRS PM	8-Aug-22	8-Aug-22	8 hrs.	

Figure 6 – 3-Month Activity Plan



### 5.2.3 2 Week Work Schedule

Derived from the firm plan for 1<sup>st</sup> 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

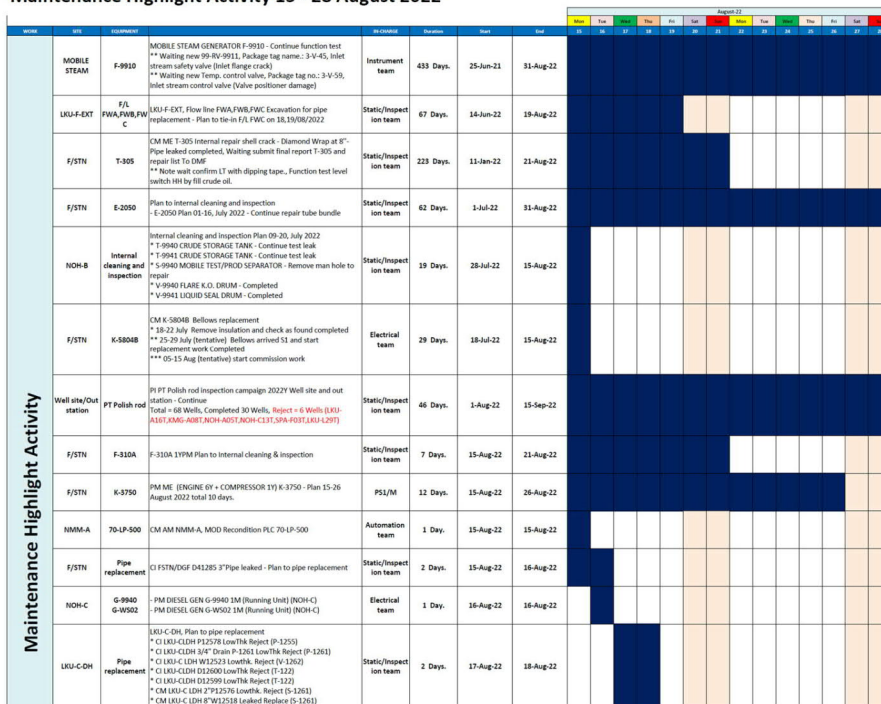


Figure 7 – 2-Week Work Schedule

### 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.



Item	Notification No.	Work Order No.	Location	Equipment	Job description	Type	Start date	Completed Date	Status	In-charge
1	100419325	500397412	Crude plant	SI-40-DC-01.ASY	PM EL 40-DC-01 Battery Room 2M	PM	4/Aug/22	4/Aug/22	Plan	Electrical team
2	100419315	500397402	Crude plant	SI-PWD-LSWG	PM EL 40-HV-02 & 40-LV-01 Cabin SWGR 2M	PM	4/Aug/22	4/Aug/22	Plan	Electrical team
3	100419317	500397404	Crude plant	SI-PWD-LSWG	PM EL 50-HV-01 Green Building SWGR 2M	PM	4/Aug/22	4/Aug/22	Plan	Electrical team
4	100419318	500397405	Crude plant	SI-PWD-LSWG	PM EL 50-HV-02 Green Building SWGR 2M	PM	4/Aug/22	4/Aug/22	Plan	Electrical team
5	100380412	500362162	Well site	SI-LKU-C067.PK	CL LKU-C M/F C067 / Elbow Drain Reject - Plan to M/F replacement	CI	4/Aug/22	4/Aug/22	Plan	Inspection team
6	100410502	500389375	Well site	Flow line	Flow line inspection at 8"-BL-XWA by TFM and take photo. ( RTJ No.SI-RTJ-Maint-00021)	PI	4/Aug/22	6/Aug/22	Plan	Inspection team
7	100406084	500388687	Well site	Flow line	Flow line inspection at 3"-BL-GGA by TFM and take photo. ( RTJ No.SI-RTJ-Maint-00021)	PI	4/Aug/22	6/Aug/22	Plan	Inspection team
8	100376469	500353384	Well site	Flow line	Flow line inspection at 3"-TRT-AGA by UTM / MFL and take photo. ( RTJ No.SI-RTJ-Maint-00021)	PI	2/Aug/22	6/Aug/22	In progress	Inspection team
9	100376196	500358111	Well site	Flow line	Flow line inspection at 6"-BL-FXA by UTM / MFL and take photo. ( RTJ No.SI-RTJ-Maint-00021)	PI	30/Jul/22	5/Aug/22	In progress	Inspection team
10	100377059	500358974	Well site	Flow line	Flow line inspection at 8"-BL-DWE by UTM / MFL and take photo. ( RTJ No.SI-RTJ-Maint-00021)	PI	3/Aug/22	5/Aug/22	In progress	Inspection team
11	100366997	500449112	Well site	Flow arm & Manifold	Flow arm /Manifold 3 Month at NMM-F by VT,UTM and take photo. ( RTJ No.SI-RTJ-Maint-00020)	PI	4/Aug/22	5/Aug/22	Plan	Inspection team
12	100365711	500348235	Well site	Flow arm & Manifold	Flow arm /Manifold 3 Month at TYI-A by VT,UTM and take photo. ( RTJ No.SI-RTJ-Maint-00020)	PI	4/Aug/22	5/Aug/22	Plan	Inspection team
13	100375726	500357641	Well site	Flow arm & Manifold	Flow arm /Manifold 3 Month at NMM-H by VT,UTM and take photo. ( RTJ No.SI-RTJ-Maint-00020)	PI	2/Aug/22	5/Aug/22	In progress	Inspection team
14	100419272	500397359	Well site	NGV	PM IN GAS METERING A-8000 1M - Continue meter run#1	PM	3/Aug/22	5/Aug/22	In progress	Instrument Team
15	100423061	500401058	Well site	NSG-A	PM IN NSG-A, ESD/OSD function test 1Y	PM	4/Aug/22	4/Aug/22	Plan	Instrument Team
16	100419349	500397436	Well site	SI-LKU-M06.PK	P-4406, 4M, BEAM PUMP PM (WS-M06T)	PM	4/Aug/22	4/Aug/22	Plan	Artificial Lift Team
17	100419510	500397597	Well site	SI-LKU-M09.PK	PM EL BEAM PUMP P-4409 (LKU-M09) 4M	PM	4/Aug/22	4/Aug/22	Plan	Artificial Lift Team
18	100419511	500397598	Well site	SI-LKU-M12.PK	PM EL BEAM PUMP P-4412 (LKU-M12) 4M	PM	4/Aug/22	4/Aug/22	Plan	Artificial Lift Team
19	100419512	500397599	Well site	SI-LKU-M14.PK	PM EL BEAM PUMP P-4414 (LKU-M14) 4M	PM	4/Aug/22	4/Aug/22	Plan	Artificial Lift Team
20	100428871	500406272	Well site	SI-LKU-Z08.PK	PM EL ESP VSD PANEL LKU-Z08 6M	PM	4/Aug/22	4/Aug/22	Plan	Artificial Lift Team
21	100428872	500406273	Well site	SI-LKU-Z18.PK	PM EL ESP VSD PANEL LKU-Z18 6M	PM	4/Aug/22	4/Aug/22	Plan	Artificial Lift Team
22	100428873	500406274	Well site	SI-LKU-Z39.PK	PM EL ESP VSD PANEL LKU-Z39 6M	PM	4/Aug/22	4/Aug/22	Plan	Artificial Lift Team
23	100423084	500401081	Well site	LKU-E	PM ME PCP P-145A 3M	PM	4/Aug/22	4/Aug/22	Plan	Mechanical team
24	100423027	500401024	Well site	LKU-E	PM ME+EL+IN HSP P-142 1Y	PM	4/Aug/22	4/Aug/22	Plan	Mechanical team
25	100423039	500401036	Well site	LKU-E	PM ME+EL+IN HSP P-143 1Y	PM	4/Aug/22	4/Aug/22	Plan	Mechanical team
26	100423086	500401083	Well site	LKU-E	PM ME+EL+IN PCP P-145B 1Y	PM	4/Aug/22	4/Aug/22	Plan	Mechanical team
27	100423070	500401067	Well site	SI-P-5501A.PK	PM ME+EL+IN Vertical Inline Pump P-5501A 1Y - Repair mechanical seal leak	PM	4/Aug/22	4/Aug/22	Plan	Mechanical team
28	100423064	500401061	Well site	SI-P-5501B.PK	PM ME+EL+IN Vertical Inline Pump P-5501B 1Y	PM	4/Aug/22	4/Aug/22	Plan	Mechanical team
29	100423022	500401019	Well site	LKU-B	PM ME PCP P-115A 3M	PM	4/Aug/22	4/Aug/22	Plan	Mechanical team
30	100423012	500401009	Well site	LKU-B	PM ME PCP P-115B 3M	PM	4/Aug/22	4/Aug/22	Plan	Mechanical team
31	100423013	500401010	Well site	LKU-B	PM ME PCP P-117A 3M	PM	4/Aug/22	4/Aug/22	Plan	Mechanical team
32	100423041	500401038	Well site	LKU-B	PM ME PCP P-117B 3M	PM	4/Aug/22	4/Aug/22	Plan	Mechanical team
33	100419332	500397419	Well site	SI-W-TRTC-AUT	PM TRT-C AUTOMATION - RTU AND LOCAL CONT	PM	3/Aug/22	4/Aug/22	In progress	Automation team
34	100415041	500393377	Well site	LKU-D-DH	PM EL WS-D Duty GROUND RESISTANCE 1Y	PM	4/Aug/22	4/Aug/22	Plan	Electrical team
35	100415038	500393374	Well site	LKU-D-DH	PM EL WS-D Duty TRANSFORMER 1Y	PM	4/Aug/22	4/Aug/22	Plan	Electrical team
36	100420799	500398860	Well site	LKU-D-DH	PM EL WS-D Duty OUTDOOR LIGHTING 12M	PM	4/Aug/22	4/Aug/22	Plan	Electrical team
37	100320424	500305619	Well site	LKU-D-DH	PM EL INSPECTION EX-PROOF EQ. LKU-D-DH 1Y	PM	3/Aug/22	4/Aug/22	In progress	Electrical team

Item	Notification No.	Work Order No.	Location	Equipment	Job description	Type	Start date	Completed Date	Status	In-Charge
1	100419330	500397417	Crude plant	SI-20-DC-01.ASY	PM EL 20-DC-01A/B Battery Room 2M	PM	3/Aug/22	3/Aug/22	Completed	Electrical team
2	100419333	500397410	Crude plant	SI-50-DCU-01.ASY	PM EL 50-DCU-01 Battery Room 2M	PM	3/Aug/22	3/Aug/22	Completed	Electrical team
3	100419324	500397411	Crude plant	SI-60-DCU-01.ASY	PM EL 60-DCU-01 Battery Room 2M	PM	3/Aug/22	3/Aug/22	Completed	Electrical team
4	100419329	500397416	Crude plant	SI-70-DCU-01.ASY	PM EL 70-DCU-01/02 Battery Room 2M	PM	3/Aug/22	3/Aug/22	Completed	Electrical team
5	100419331	500397418	Crude plant	SI-L-COM-UTL	PM EL 55-UPS-02 Battery Room 2M	PM	3/Aug/22	3/Aug/22	Completed	Electrical team
6	-	-	Crude plant	Glycol	CM IN New glycol 43-LT-4304 reading error - Flushing column level transmitter, Change parameter level offset from 8 cm. to 4 cm., Change parameter threshold from 40 to 60, Change parameter damping value from 10 s. to 2 s., Confirm reading 43-LT-4304 compare 43-LT-4303 normal	CM	3/Aug/22	3/Aug/22	Completed	Instrument Team
7	-	-	Crude plant	A-2500	CM IN A-2500, 03-LT-2524 and 03-LT-2520 Reading different - Continue check and investigation	CM	3/Aug/22	3/Aug/22	Completed	Instrument Team
8	100423075	500401072	Crude plant	SI-P-3801/2.PK	PM ME+EL+IN VS P-3801 1Y	PM	3/Aug/22	3/Aug/22	Completed	Mechanical team
9	100423078	500401075	Crude plant	SI-P-3801/2.PK	PM ME+EL+IN VS P-3802 1Y	PM	3/Aug/22	3/Aug/22	Completed	Mechanical team
10	100423081	500401078	Crude plant	SI-P-2401.PK	PM ME Twin Screw Pump P-2401 3M	PM	3/Aug/22	3/Aug/22	Completed	Mechanical team
11	100423082	500401079	Crude plant	SI-P-2402.PK	PM ME Twin Screw Pump P-2402 3M	PM	3/Aug/22	3/Aug/22	Completed	Mechanical team
12	100426030	500413669	Crude plant	SI-G-2350.PK	CM ME E-2350 Clean up sight glass - Clean up sight glass completed	CM	3/Aug/22	3/Aug/22	Completed	Mechanical team
13	-	-	Crude plant	DAF Unit	CM DAF Unit pipe PVC leaked - Remove PVC pipe for repair by welding at maintenance workshop and reinstall	CM	1/Aug/22	3/Aug/22	Completed	Mechanical team
14	-	-	Crude plant	Crude loading	CM ME Z-317 Handle valve seeping - Replace internal part and check leak completed	CM	3/Aug/22	3/Aug/22	Completed	Mechanical team
15	-	-	Crude plant	K-3600	CM ME K-3600 Cyl 1R,2R Abnormal noise - Replace hydraulic filter & valve rack adjustment.	CM	3/Aug/22	3/Aug/22	Completed	Mechanical team
16	100419480	500397567	Well site	SI-LKU-CB01.PK	PM EL BEAM PUMP P-3701 (LKU-CB01) 4M	PM	3/Aug/22	3/Aug/22	Completed	Artificial Lift Team
17	100419481	500397568	Well site	SI-LKU-CB08.PK	PM EL BEAM PUMP P-3708 (LKU-CB08) 4M	PM	3/Aug/22	3/Aug/22	Completed	Artificial Lift Team
18	100419479	500397566	Well site	SI-LKU-CB10.PK	PM EL BEAM PUMP P-3710 (LKU-CB10) 4M	PM	3/Aug/22	3/Aug/22	Completed	Artificial Lift Team
19	100419373	500397460	Well site	SI-LKU-DD03.PK	P-6303, 4M, BEAM PUMP PM (WSSD-03T)	PM	3/Aug/22	3/Aug/22	Completed	Artificial Lift Team
20	100419363	500397450	Well site	SI-LKU-DD06.PK	P-6306, 4M, BEAM PUMP PM (WSSD-06T)	PM	3/Aug/22	3/Aug/22	Completed	Artificial Lift Team
21	100419383	500397470	Well site	SI-LKU-DD07.PK	P-6307, 4M, BEAM PUMP PM (WSSD-07T)	PM	3/Aug/22	3/Aug/22	Completed	Artificial Lift Team
22	100428868	500406269	Well site	SI-LKU-Z03.PK	PM EL ESP VSD PANEL LKU-Z03 6M	PM	3/Aug/22	3/Aug/22	Completed	Artificial Lift Team
23	100428869	500406270	Well site	SI-LKU-Z11.PK	PM EL ESP VSD PANEL LKU-Z11 6M	PM	3/Aug/22	3/Aug/22	Completed	Artificial Lift Team
24	100428870	500406271	Well site	SI-LKU-Z15.PK	PM EL ESP VSD PANEL LKU-Z15 6M	PM	3/Aug/22	3/Aug/22	Completed	Artificial Lift Team
25	-	-	Well site	NGP-A09T	CM EL NGP-A09T, BP Trip VSD Failure - Replace VSD 1 set, Under observation	CM	3/Aug/22	3/Aug/22	Completed	Artificial Lift Team
26	100419439	500397526	Well site	SI-W-TRTC-AUT	PM IN TRC-2 AUTOMATION RTU & LOCAL CONTR	PM	3/Aug/22	3/Aug/22	Completed	Automation team
27	100419332	500397419	Well site	SI-W-TRTC-AUT	PM TRT-C AUTOMATION - RTU AND LOCAL CONTR	PM	3/Aug/22	3/Aug/22	In progress	Automation team
28	100415214	500393550	Well site	OHL	PM EL ALI OHL VISUAL INSPECTION 1M (Trim branches of tree and install snake guard OHL-1.6)	PM	1/Aug/22	31/Aug/22	In progress	Electrical team
29	100320424	500305619	Well site	LKU-D-DH	PM EL INSPECTION EX-PROOF EQ. LKU-D-DH 1Y	PM	3/Aug/22	3/Aug/22	In progress	Electrical team
30	100415042	500393378	Well site	LKU-D-DH	PM EL WSD Duty LIGHTNING PROTECT INSP 1Y	PM	3/Aug/22	3/Aug/22	Completed	Electrical team
31	-	-	Well site	LKU-L	* CL LKU-L P1922 LowThk. Reject - Pipe replacement completed * CL LKU-L P1926 LowThk. Reject - Pipe replacement completed	CI	3/Aug/22	3/Aug/22	Completed	Inspection team
32	100365729	500348253	Well site	Flow arm & Manifold	Flow arm /Manifold 3 Month at NMM-F by VT,UTM and take photo. ( RTJ No.SI-RTJ-Maint-00020)	PI	2/Aug/22	3/Aug/22	Completed	Inspection team
33	100377111	500359027	Well site	Flow arm & Manifold	Flow arm /Manifold 3 Month at NMM-A by VT,UTM and take photo. ( RTJ No.SI-RTJ-Maint-00020)	PI	2/Aug/22	3/Aug/22	Completed	Inspection team
34	100410553	500389420	Well site	Flow line	Flow line inspection at 8"-FSTN-WA by TFM and take photo. ( RTJ No.SI-RTJ-Maint-00021)	PI	3/Aug/22	3/Aug/22	Completed	Inspection team
35	100419272	500397359	Well site	NGV	PM IN GAS METERING A-8000 1M - Meter run#2 completed	PM	3/Aug/22	5/Aug/22	In progress	Instrument Team

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.



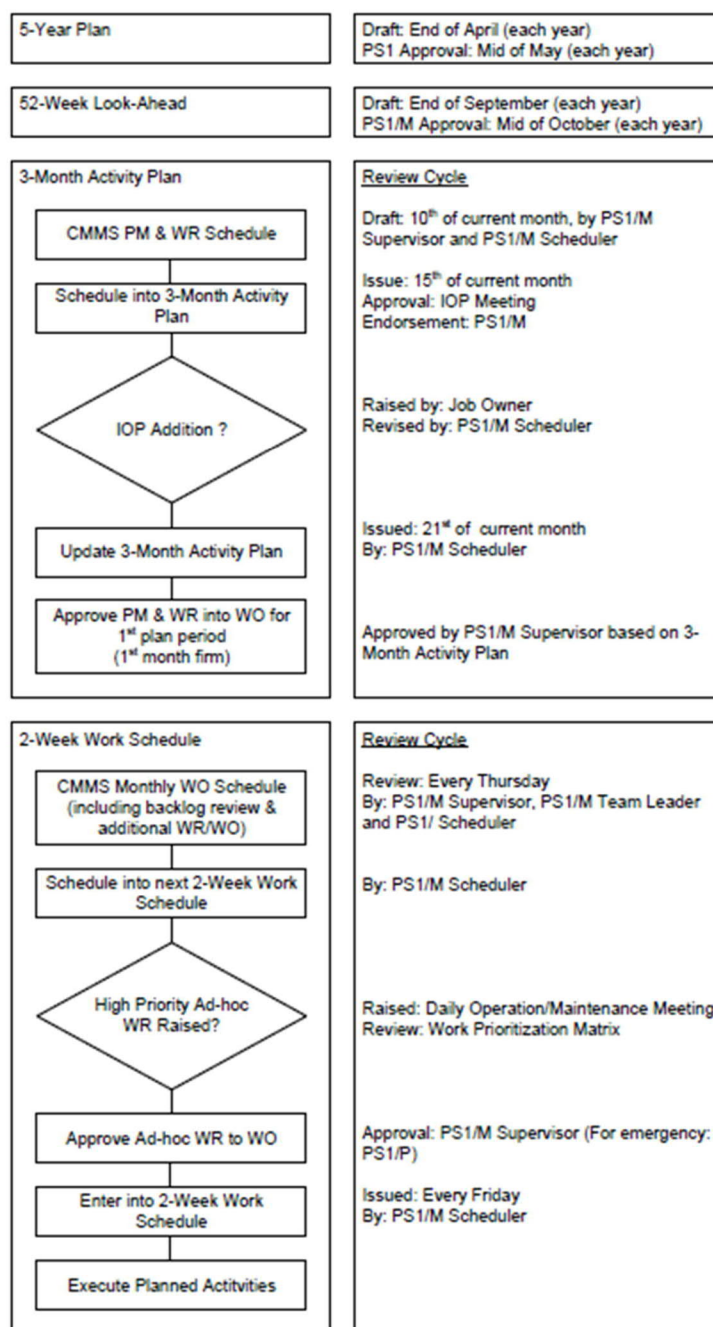


Figure 10 – Planning and Scheduling Process

### 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 changes 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 10<sup>th</sup> 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 15<sup>th</sup> 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.

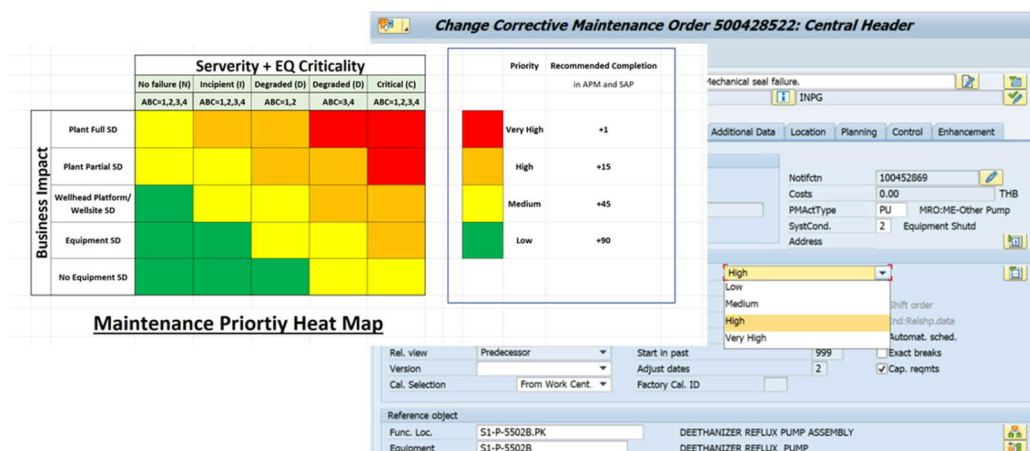


Figure 11 – Risk Based Priority corresponded to recommended completion date

## 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.



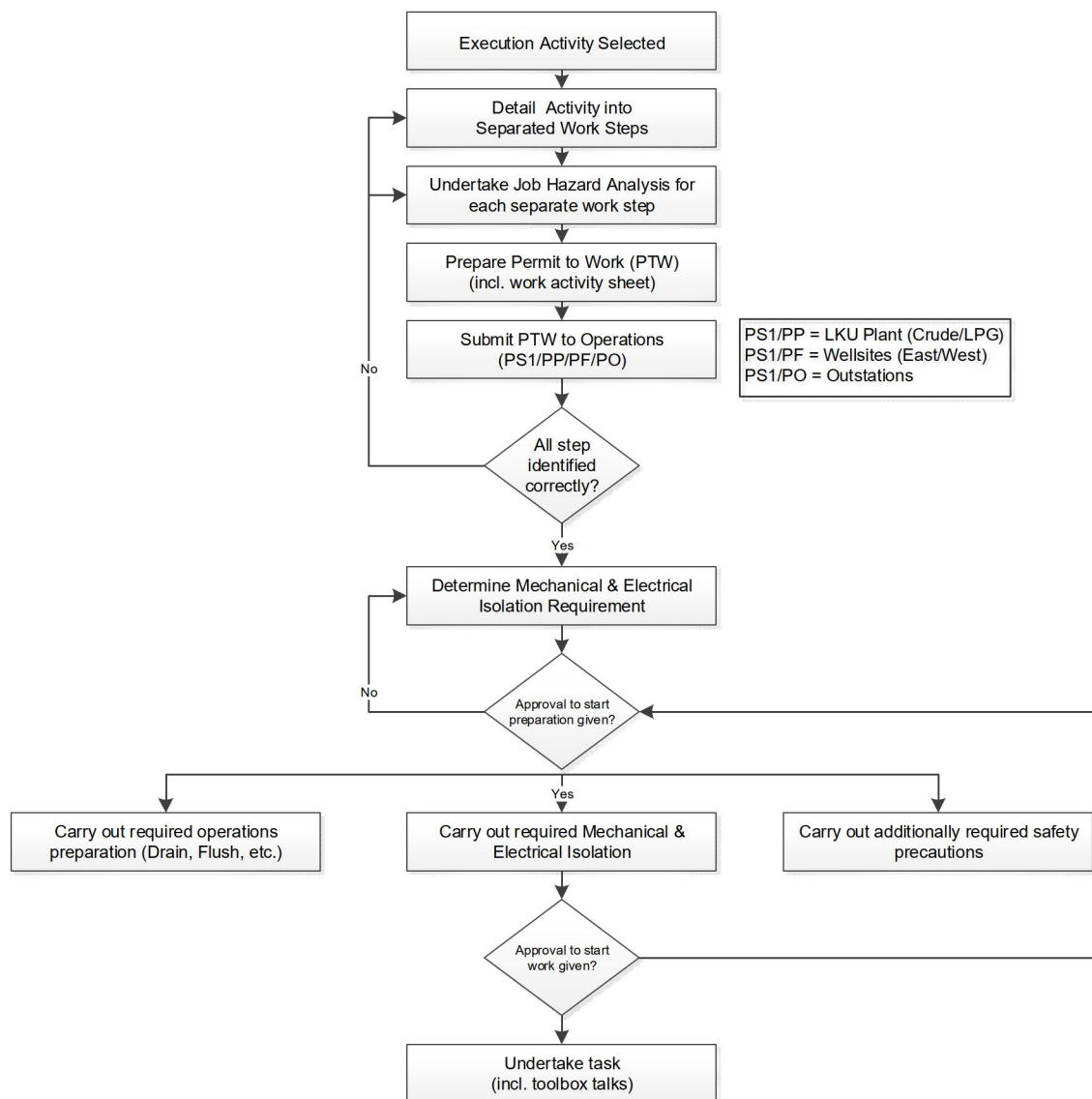


Figure 12 – Site Preparation and Integrity Assurance

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
<b>Notes:</b> <ol style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>Standard forms for toolbox talks to be used.</li> </ol>		

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.

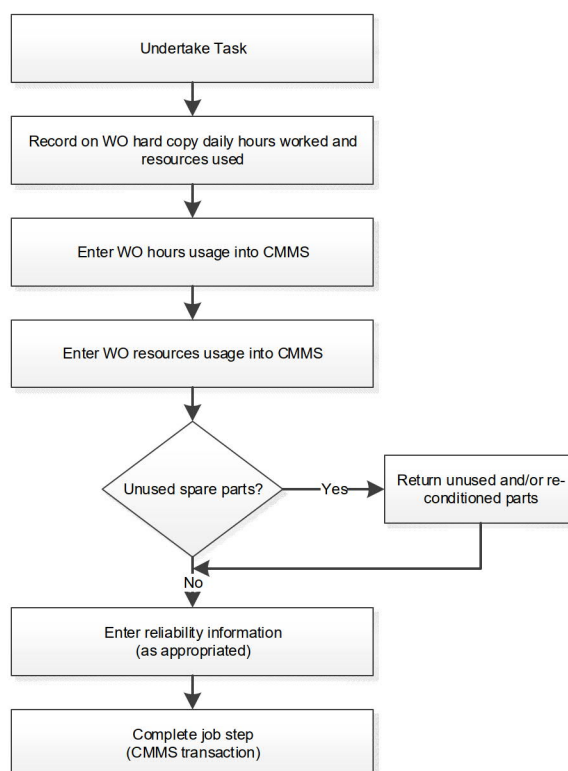


Figure 13 – Hand-over Preparation Process

#### 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 OEMS 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"> <li>Investigate and plan of a document structure and its contents</li> <li>Create and/or update a document as planned</li> <li>Report to Document Owner on the progress of the work on a document</li> <li>Issue draft revision of a document for review, and embed all comments made by Document Reviewers to the document</li> </ul>
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"> <li>Identify deficiencies or potential improvements</li> <li>Initiate periodic revision</li> <li>Maintain revision history and document status register</li> </ul>
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"> <li>Issue this document and its revisions</li> </ul>
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"> <li>Review the document contents to ensure adequate quality</li> <li>Provide comments and/or suggestions on document issued</li> </ul>



## 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
<b>PTTEP internal references</b>	
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
<b>International codes and standards, provincial legislation, and other references</b>	
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  
โครงการพัฒนาแหล่งน้ำมันประดู่เผ่าตอนใต้ ระยะที่ 2 แปลงเอส 1 จังหวัดพิษณุโลก และจังหวัดสุโขทัย  
ฉบับเดือนมกราคม – ธันวาคม พ.ศ.2565

## ภาคผนวกที่ 12

Flowline and Well Gas Lift Line



**PTT Exploration and Production Public Company Limited**

**PTTEP Procedure**

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# **FLOWLINE AND WELL GAS LIFT LINE**

**Document No: SMNT-MS-M-05**

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**Revision No: 05**



# PTT Exploration and Production Public Company Limited

APPROVAL REGISTER	
Document Title:	FLOWLINE AND WELL GAS LIFT LINE
Document Reference No:	SMNT-MS-M-05
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Revision History			
Rev	Description of Revision	Authorised by	Date
1	New issue Issued after company ownership change		25/03/2008
2	Change document No. A72 to SMNT		28/08/2009
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	18/10/2010
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



## PTT Exploration and Production Public Company Limited

Document Approvals			
		Signature	Date
<b>Author:</b>	Samatcha Panthuvichien		18 AUG 2016
<b>Document Owner:</b>	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

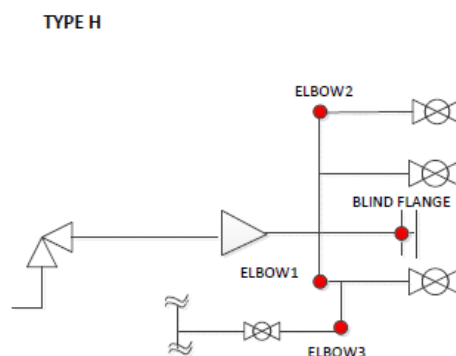
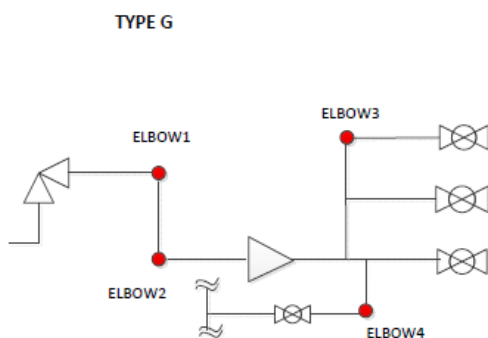
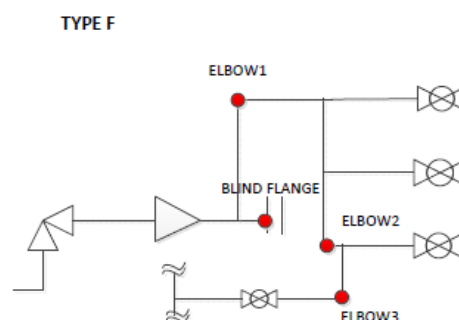
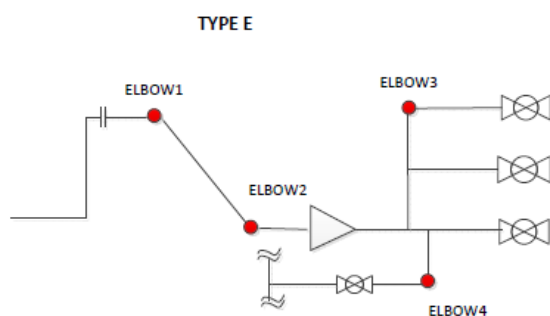
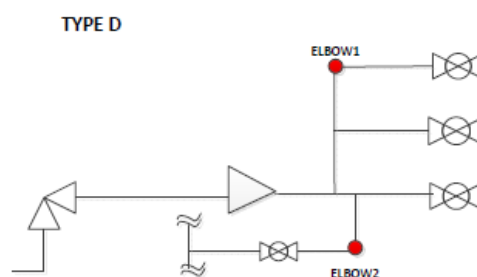
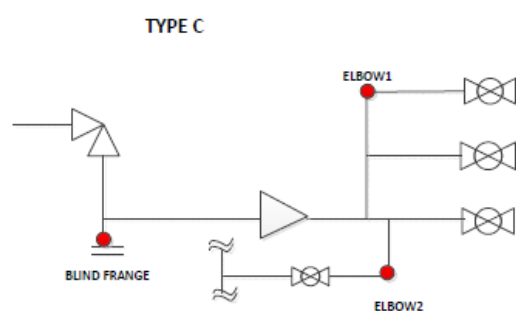
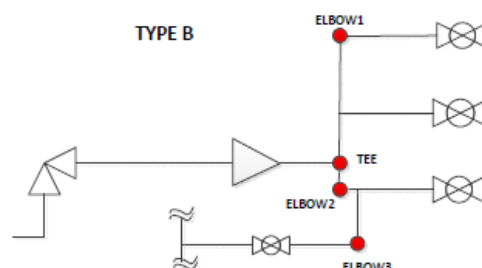
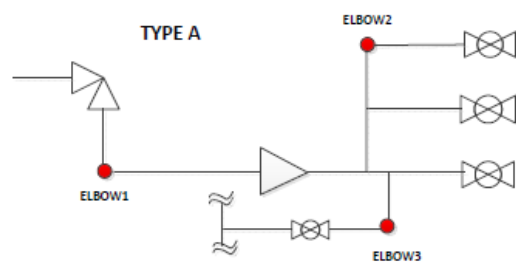
A standard well flowline consist of the following sections:

- 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

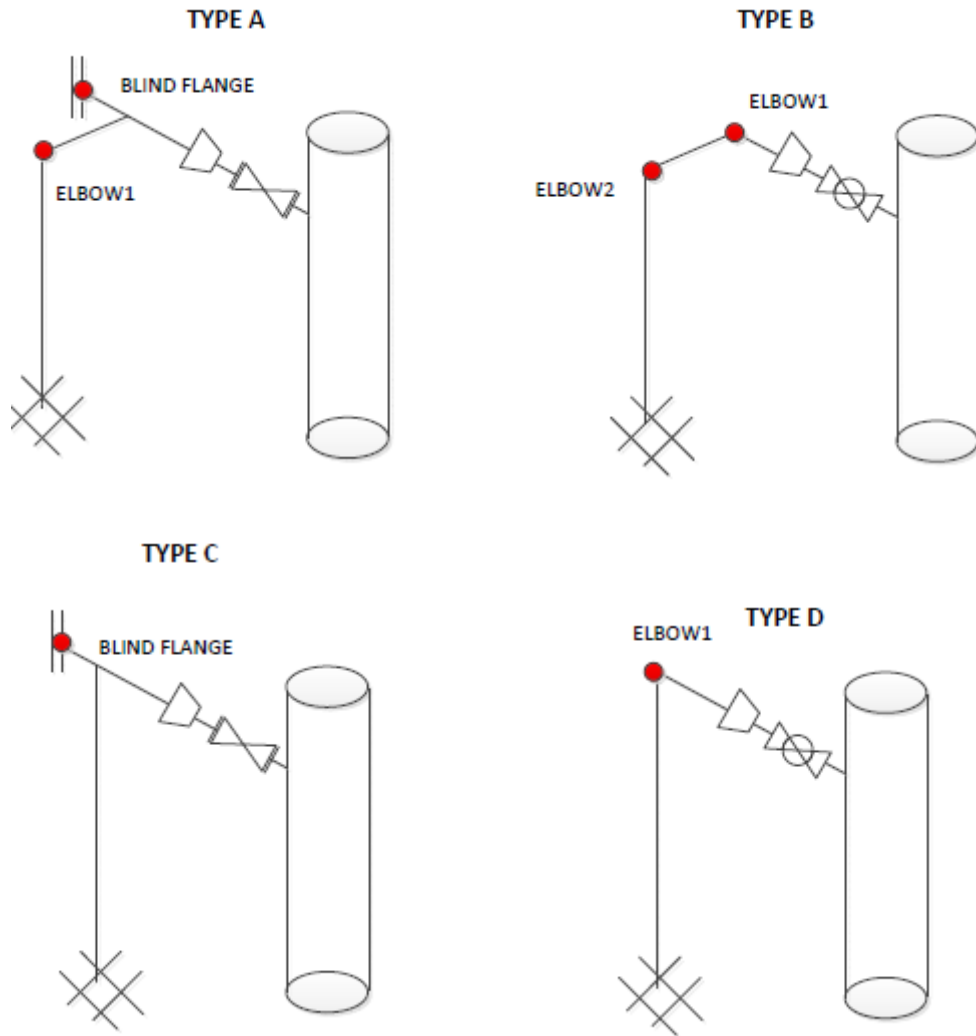
NPS (in)	SCH	OD (mm)	WT (mm)
1	80	33.4	4.55
2	80	60.3	5.54
3	80	88.9	7.62
3	160	88.9	11.13



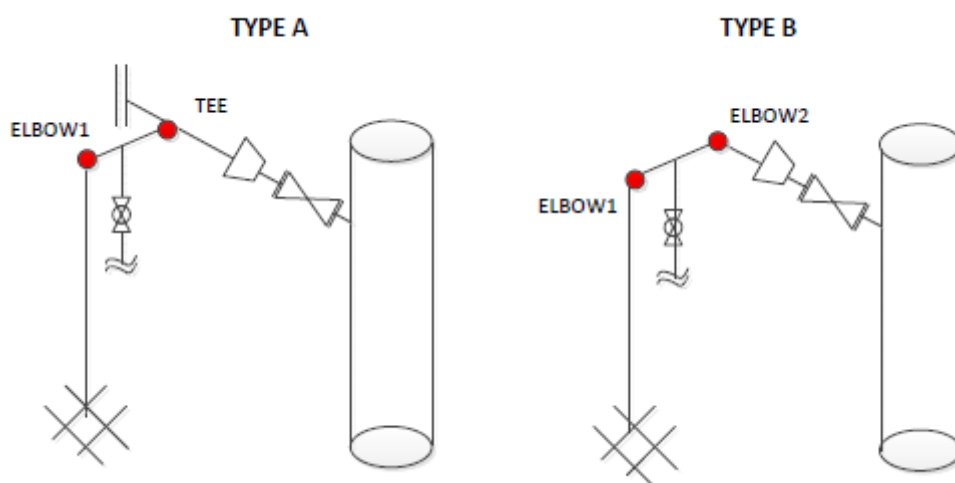
## 7.2 APPENDIX I: THICKNESS MONITORING LOCATION GUIDELINE

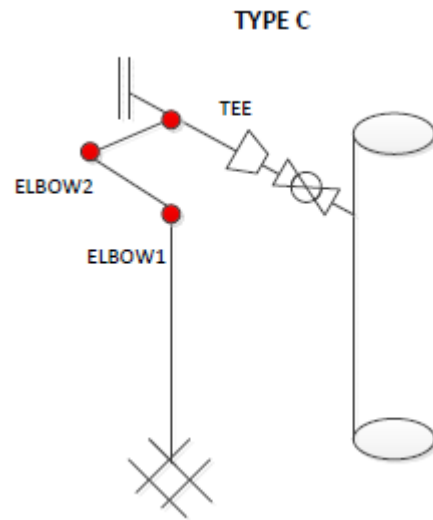


Manifold Thickness Monitoring Location



Crude Flowline Monitoring Location





Water Flowline Monitoring Location





บริษัท ปตท.สผ. สยาม จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม  
โครงการพัฒนาแหล่งน้ำมันประดู่เผ่าตอนใต้ ระยะที่ 2 แปลงเอส 1 จังหวัดพิษณุโลก และจังหวัดสุโขทัย  
ฉบับเดือนมกราคม – ธันวาคม พ.ศ.2565

## ภาคผนวกที่ 13

เอกสารการตรวจสอบแนวท่อ (X-ray) และการทดสอบ  
แรงดันน้ำ (Hydrostatic Test)



REPORT No.: RT-TS-001/2021

PAGE No. 1 OF 1

CLIENT: PTTEP Siam Limited

LOCATION :	WSM 10 F/STN
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PROJECT : 10" MA GAS FLOWLINE FROM WSM TO F/STN (REVISE PLS.PHASE II )

JOB No.: FL21/012

PROCEDURE NO.(REV): PTTEP/THC18-5127/RTG-2008AP Rev.0 (Date:13-08-20)

DATE /TIME OF TEST : June 14, 2021

REF. CODE/STD: ASME V Article 2

REQUEST No.	3044/21, BI No. E-14B0201
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WORK INSTRUCTION : WI-RT

## EQUIPMENT, MATERIALS &amp; 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:	26.18 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): 16		
LOCATION MAKER PLACEMENT <input type="checkbox"/> SOURCE SIDE <input checked="" type="checkbox"/> FILM SIDE				

## PART IDENTIFICATION &amp; INFORMATION...

ISO/DWG No.:	10" MA FL	LINE/SPOOL/PART ID:	-
MATERIAL:	API 5L X42+API 5L X42	NOMINAL PIPE SIZE (Inch)	10 Inch
WELDING PROCESS:	GTAW+SMAW	MATERIAL THICKNESS: (mm.)	15.88 mm.
WELD THICKNESS :	19.08 mm.	REINFORCEMENT :	1.6+1.6 mm.
SENSITIVITY REQUIRED:	ESSNTIAL 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: ☐ PREPARED EDGE ☐ AFTER REPAIR ☐ BEFORE P.W.H.T ☐ AFTER P.W.H.T  
☒ AS WELDED ☐ AS ROLLED ☒ BEFORE HYDROTEST ☐ AFTER HYDROTEST ☐ OTHER.....

ACCEPTANCE CRITERIA: Section 9.3 of API 1104  
(Referred to in 9.3.1 through 9.3.13 acceptance standards for radiographic testing)

[illegible]

ABBREVIATION:

AI : Accumulation of Imperfection

BT : Burn-Through

C : Crack

CP : Cluster Porosity

ESI: Elongated Slag Inclusions

EU: External Undercut

HB : Hollow-Bead Porosity

IC : Internal Concavity

UCP: Inadequate Cross

IF : Incomplete Fusion

IED: Incomplete Fusion

IP: Inadequate Penetration w/o bath 1st

REVIEWED BY CLIENT: ☒

**Note: Material Specification**

IPD: Inadequate Penetration due to High Low





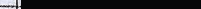
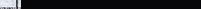
ISI : Isolated Slag Inclusions

IU : Internal Undercut

No : No Significant CI

P: Individual Or Scattered Pores

Ti: Tungsten Inclusion

AUTHORIZATION...	INTERPRETED/EVALUATED:	REVIEWED BY CLIENT:	CA (3rd Party) or Agency:	REVIEWED AND APPROVED:	OTHER COMMENTS:
SIGNED:			N/A		
NAME:	Mangkorn S. Pongthong		-	Chairat Jaitang	
METHOD (LEVEL):	PCN RTH (NO. 323213)		-	PTTEP ECM QA/QC	
COMPANY:	THAI NDT PCL.		-		
DATE OF ISSUE :	June 15, 2021	Date ..... 15 JUN 2021	-	15 JUN 2021	



REPORT No.: RT-TS-002/2021

PAGE No. 1 OF 1

LOCATION :	WSM to F/STN
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JOB No.:	FL21/012
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DATE /TIME OF TEST : June 15, 2021

REQUEST No.	3044/21, BI No. E-14B0201
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EQUIPMENT, MATERIALS &amp; OPERATION PARAMETERS..

PART IDENTIFICATION & INFORMATION...

STATE OF EXAMINATION: ☐ PREPARED EDGE ☐ AFTER REPAIR ☐ BEFORE P.W.H.T ☐ AFTER P.W.H.T  
☒ AS WELDED ☐ AS ROLLED ☒ BEFORE HYDROTEST ☐ AFTER HYDROTEST ☐ OTHER....

[illegible]

**Note : Material Specification**

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

AUTHORIZATION...	INTERPRETED/EVALUATED:	REVIEWED BY CLIENT:	ICA (3 rd Party) or Agency:	REVIEWED AND APPROVED BY OWNER
SIGNED:			N/A	
NAME:	Mangkorn S.		-	
METHOD (LEVEL):	PCN.R.II (NO. 323213)		-	
COMPANY:	THAI NDT PCL.	Ampon Gritwatt	-	
DATE OF ISSUE :	June 16, 2021	Date : JUN 2021	-	



	<b>INSPECTION REPORT</b> <b>RADIOGRAPHIC EXAMINATION</b>				REPORT No.: RT-TS-004/2021																																																																																																																																																														
					PAGE No. 1 OF 1																																																																																																																																																														
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DENSITOMETER S/N: 06014787		% OF EXAM: 100		NO OF FILM / FOLDER: 1 OF 1																																																																																																																																																															
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<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">WELD/Joint/RADIOGRAPH IDENTIFICATION...</th> <th colspan="2">DISCONTINUITY</th> <th colspan="2">JUDGEMENT</th> <th rowspan="2">Sensitivity</th> <th rowspan="2">Remark</th> </tr> <tr> <th>COUPON No.</th> <th>WELD JOINT TYPE</th> <th>WELDER NO</th> <th>FILM INTVL-NO</th> <th>TYPE</th> <th>SIZE (mm.)</th> <th>ACCEPT</th> <th>REJECT</th> </tr> </thead> <tbody> <tr> <td rowspan="3">J.223</td> <td rowspan="3">BW</td> <td>TW 662</td> <td>A-B</td> <td>NO</td> <td>-</td> <td>ACCEPT</td> <td>-</td> <td>1.3%</td> <td></td> </tr> <tr> <td>TW 661</td> <td>B-C</td> <td>NO</td> <td>-</td> <td>ACCEPT</td> <td>-</td> <td>1.3%</td> <td></td> </tr> <tr> <td></td> <td>C-D</td> <td>P</td> <td>Ø0.5 mm.</td> <td>ACCEPT</td> <td>-</td> <td>1.3%</td> <td></td> </tr> <tr> <td rowspan="3">J.224</td> <td rowspan="3">BW</td> <td>TW 662</td> <td>A-B</td> <td>NO</td> <td>-</td> <td>ACCEPT</td> <td>-</td> <td>1.3%</td> <td></td> </tr> <tr> <td>TW 661</td> <td>B-C</td> <td>ESI</td> <td>L= 4.0 mm.</td> <td>ACCEPT</td> <td>-</td> <td>1.3%</td> <td></td> </tr> <tr> <td></td> <td>C-D</td> <td>NO</td> <td>-</td> <td>ACCEPT</td> <td>-</td> <td>1.3%</td> <td></td> </tr> <tr> <td rowspan="3">J.225</td> <td rowspan="3">BW</td> <td>TW 662</td> <td>A-B</td> <td>NO</td> <td>-</td> <td>ACCEPT</td> <td>-</td> <td>1.3%</td> <td></td> </tr> <tr> <td>TW 661</td> <td>B-C</td> <td>NO</td> <td>-</td> <td>ACCEPT</td> <td>-</td> <td>1.3%</td> <td></td> </tr> <tr> <td></td> <td>C-D</td> <td>P</td> <td>Ø0.5 mm.</td> <td>ACCEPT</td> <td>-</td> <td>1.3%</td> <td></td> </tr> <tr> <td rowspan="3">J.226</td> <td rowspan="3">BW</td> <td>TW 662</td> <td>A-B</td> <td>NO</td> <td>-</td> <td>ACCEPT</td> <td>-</td> <td>1.3%</td> <td></td> </tr> <tr> <td>TW 661</td> <td>B-C</td> <td>P</td> <td>Ø1.5 mm.</td> <td>ACCEPT</td> <td>-</td> <td>1.3%</td> <td></td> </tr> <tr> <td></td> <td>C-D</td> <td>P</td> <td>Ø1.5 mm.</td> <td>ACCEPT</td> <td>-</td> <td>1.3%</td> <td></td> </tr> <tr> <td rowspan="3">J.227</td> <td rowspan="3">BW</td> <td>TW 826</td> <td>A-B</td> <td>NO</td> <td>-</td> <td>ACCEPT</td> <td>-</td> <td>1.3%</td> <td></td> </tr> <tr> <td>TW 825</td> <td>B-C</td> <td>NO</td> <td>-</td> <td>ACCEPT</td> <td>-</td> <td>1.3%</td> <td></td> </tr> <tr> <td></td> <td>C-D</td> <td>NO</td> <td>-</td> <td>ACCEPT</td> <td>-</td> <td>1.3%</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td>D-A</td> <td>NO</td> <td>-</td> <td>ACCEPT</td> <td>-</td> <td>1.3%</td> <td></td> </tr> </tbody> </table>						WELD/Joint/RADIOGRAPH IDENTIFICATION...				DISCONTINUITY		JUDGEMENT		Sensitivity	Remark	COUPON No.	WELD JOINT TYPE	WELDER NO	FILM INTVL-NO	TYPE	SIZE (mm.)	ACCEPT	REJECT	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%		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%		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%		J.226	BW	TW 662	A-B	NO	-	ACCEPT	-	1.3%		TW 661	B-C	P	Ø1.5 mm.	ACCEPT	-	1.3%			C-D	P	Ø1.5 mm.	ACCEPT	-	1.3%		J.227	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%	
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J.223	BW	TW 662	A-B	NO	-	ACCEPT	-	1.3%																																																																																																																																																											
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			C-D	P	Ø0.5 mm.	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%																																																																																																																																																											
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%																																																																																																																																																											
J.226	BW	TW 662	A-B	NO	-	ACCEPT	-	1.3%																																																																																																																																																											
		TW 661	B-C	P	Ø1.5 mm.	ACCEPT	-	1.3%																																																																																																																																																											
			C-D	P	Ø1.5 mm.	ACCEPT	-	1.3%																																																																																																																																																											
J.227	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%																																																																																																																																																											
<b>ABBREVIATION:</b> <div style="display: flex; justify-content: space-between;"> <div>                     AI : Accumulation of Imperfection                      BT : Bum-Through                      C : Crack                      CP : Cluster Porosity                      ESI : Elongated Slag Inclusions                      EU: External Undercut                 </div> <div>                     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                 </div> <div>                     IPD : Inadequate Penetration due to High Low                      ISI : Isolated Slag Inclusions                      IU : Internal Undercut                      No : No Significant Discontinuity                      P: Individual Or Scattered Porosity                      TI: Tungsten Inclusion                 </div> </div>																																																																																																																																																																			
<b>Note : Material Specification</b>																																																																																																																																																																			
AUTHORIZATION...		INTERPRETED/EVALUATED:		CA (3 rd Party) or Agency:																																																																																																																																																															
SIGNED:		[Signature]		N/A																																																																																																																																																															
NAME:		Mangkorn S.		-																																																																																																																																																															
METHOD (LEVEL):		PCN.RI.II (NO. 323213)		-																																																																																																																																																															
COMPANY:		THAI NDT PCL.		-																																																																																																																																																															
DATE OF ISSUE :		June 17, 2021		-																																																																																																																																																															
REVIEWED AND APPROVED BY OWNER																																																																																																																																																																			



PAGE No. 1 OF 1

August 11, 202



REPORT No.: RT-TS-007/2021

PAGE No. 1 OF 1

LOCATION :	WSM to F/STN
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JOB No.:	FL21/012
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DATE /TIME OF TEST : June 17, 2021
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REQUEST No.	3044/21, BI No. E-14B0201
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EQUIPMENT, MATERIALS &amp; OPERATION PARAMETERS...

PART IDENTIFICATION & INFORMATION...

STATE OF EXAMINATION: ☐ PREPARED EDGE ☐ AFTER REPAIR ☐ BEFORE P.W.H.T ☐ AFTER P.W.H.T  
☒ AS WELDED ☐ AS ROLLED ☒ BEFORE HYDROTEST ☐ AFTER HYDROTEST ☐ OTHER....

[illegible]

Note : Material Specification

Ti: Tungsten Inclusion

F-OP-002 (API) (LKU) Rev.000



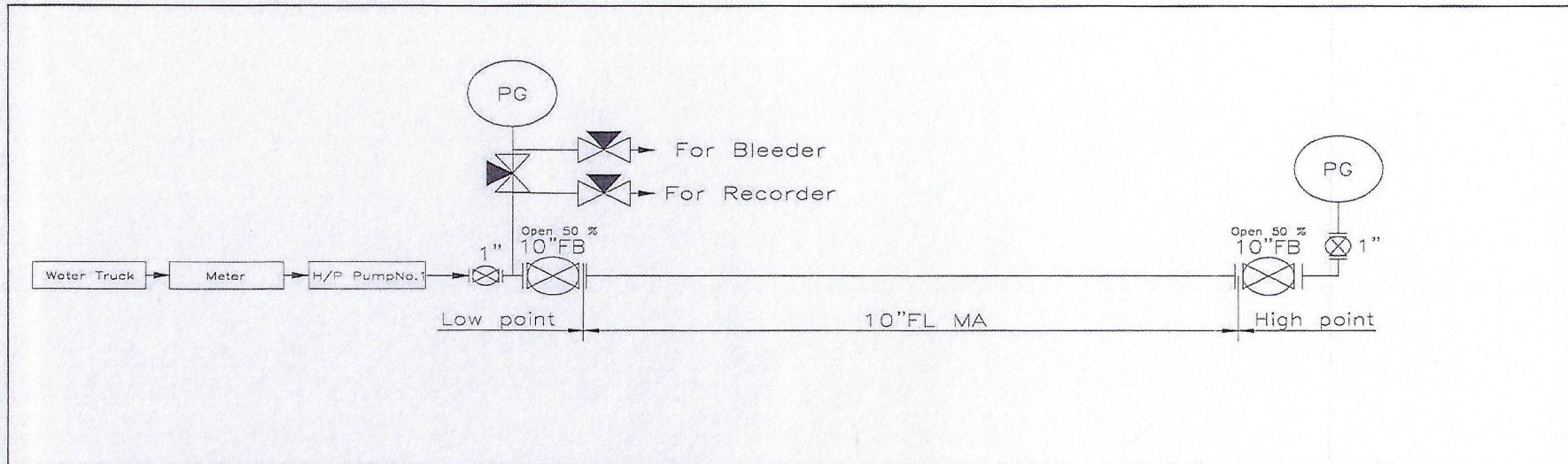


## HYDROSTATIC TEST DIAGRAM FOR PIPELINE

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.)

Design Press.:

ST = 2000x1.25 = 2500 Psi.

Psi

N/A

Psi

N/A

°C

Design Temp.:

Test Press.

Min

2486

Psi

Max

2515

Psi

Test Temp.

Min

N/A

°C

Max

N/A

°C

Test Fluid

Water

Ltr.

Test Fluid Q'T

996.54

Ltr.

Holding Time

2

Hrs.

Pressurization

25% By:

625

Psi

50% By:

1250

Psi

75% By:

1875

Psi

100% By:

2500

Psi

CA (3<sup>rd</sup> Party) or Agency

Appr

Signature

Name

Date

Date: 22 JUN 2021

Signature

Name

Date

N/A

Signature

Name

Date

Chairat Jaitang  
PTTEP ECM QA/QC  
23 JUN 2021




บริษัท ปตท.สผ. สยาม จำกัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม  
โครงการพัฒนาแหล่งน้ำมันประจวบคีรีขันธ์ ระยะที่ 2 แปลงเอส 1 จังหวัดพิษณุโลก และจังหวัดสุโขทัย  
ฉบับเดือนมกราคม – ธันวาคม พ.ศ.2565

## ภาคผนวกที่ 14

เอกสารการตรวจสอบและบำรุงรักษาระบบ  
ท่อลำเลียงปิโตรเลียม (Flowline Inspection)

<div><div>PTTEP</div></div>	<h1>FLOWLINE SUMMARY REPORT</h1>		PS1/M INSPECTION TEAM	
FLOWLINE INFORMATION			NORMAL	
Tag number:	S1-LKUCA -FSTN-6-CAA-P-CO		Report number:	FL-6-CAA-CO-2022-02
Line number:	CAA		Inspection date:	22 มี.ย. 2022
Location: From-To	LKU-CA	FSTN	Inservice date:	01 มี.ย. 2000
P&ID number:	LKU-1-08-037RSV23 & LCA-1-08-002C		API Classification:	2.00
Piping group:	Process		API MII (yrs):	5.00
Service description:	Crude oil		WO number:	500358034
THICKNESS SUMMARY			NORMAL	
CML-TP Number:	B-B3-S66-W67-U		Nominal thickness (mm):	7.92
Distance Description:	726m 726000mm From W67 0mm		Lowest actual thickness (mm):	6.7
Location Description:	1200 After S-106-35		Retirement thickness (mm):	2.00
NPS (inch):	6.00		Selected corrosion rate (mm/yr):	0.00
Material:	API 5L B		Remaining life (yrs):	15.88
CML MII, RL/2 (yrs):	5.00		Next inspection date (NID):	01 มี.ย. 2025
MAWP				
Piping inspection interval (months):			Derate Pressure rec (psig):	
t:ta-2(CRxInterval) (mm):			retired after derate pressure (mm):	
MAWP (psig):			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>- 6" BL-CAA Crude flowline inspection was performed 60% INSP Coverage on subsection 5, 1 &amp; 2 and the overall of this flowline results still in normal thickness with no any significant to low reading thickness or high corrosion rate on this period.</p> <p>The minimum remaining thickness at CML no.A-A2-S19-W19-W is 5.32 mm. with SCR 0.12 mm./yr. &amp; RL is 27.72 yrs.</p> <p>Note; As previous inspection on Feb 22'2022.</p> <p>1.) Subsection no.A4, B1, C1 &amp; D4 of this flowline have weld joint under block culvert shall be plan to inspect.</p> <p>2.) MFL Technique could not be done due to obstruct block culvert on inspection time as detail:</p> <p>-Section A5 at weld no.W35 still under block culvert C-166-02 and Under wrapping = 20 m.</p> <p>-Section D4 at weld no.W147 still under block culvert Not MFL = 10 m</p> <p>3.) External wrapping at weld no.W10 and still in good condition.</p> <p>4.) TFM Techniue was done for confirm internal condition at 39% of weld joints (Totally 78 welds) and found still in normal condition.</p>		<p>- Continue normal flowline 60% inspection (Sub-section 3, 4 &amp; 5) of entire flowline length for plan in next year 2023.(Jun-23)</p> <p>- Plan to extent inspection 20% or Min.10 of welding joint by TFM Technique for detect internal weld metal loss within 12 months.(Feb-23)</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 &amp; weld.</p> <p>- For crude transfer flowlines, the normal maximum operating pressure shall not exceed 500 PSIG.</p> <p>Note: 6"BL-CAA is flowline criticallity ranking 1st by production aspect.</p>		
REQUIRED ACTION				
Temporary repair		Repaint		
Permanent repair		Rerating		
		Derating		
Inspected by:	Manop N.	Date:	09 ก.ค. 2022	
API Inspector reviewed by:	Jirawat C.	Date:	11 ก.ค. 2022	
PTTEP Leader reviewed:	Apichat P.	Date:	24 ก.ค. 2022	






	<h1>FLOWLINE THICKNESS REPORT</h1>	PS1/M INSPECTION TEAM
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Tag No.:	S1-LKUCA -FSTN-6-CAA-P-CO		Total length (m):	2200	Installation date:	01 ឆ.ប. 2000	Service life (yrs):	22.66
Pipe size (in):	6		% Inspection:	20	1st Inspection date:	02 ឆ.ប. 2020	6th Inspection date:	08 ឆ.ប. 2015
Flowline No.:	CAA		No. of section (sections):	5	2nd Inspection date:	15 ឆ.ប. 2021	7th Inspection date:	03 ឆ.ប. 2016
From-To:	LKU-CA	FSTN	Length of section (m):	440	3rd Inspection date:	10 ឆ.ប. 2021	8th Inspection date:	05 ឆ.ប. 2017
Process:	P	Process	Length of subsection (m):	88	4th Inspection date:	22 ក.វ. 2022	9th Inspection date:	06 ឆ.គ. 2018
Service:	CO	Crude oil	Total spool (spools):	201	5th Inspection date:	22 ឆ.ប. 2022	10th Inspection	06 ឆ.ប. 2019


## THICKNESS MEASUREMENT RESULT

[illegible]



				FLOWLINE THICKNESS REPORT													PS1/M INSPECTION TEAM				
Tag No.:				S1-LKUCA -FSTN-6-CAA-P-CO				Total length (m):				2200		Installation date:		01 มิ.ย. 2000		Service life (yrs):		22.66	
Pipe size (in):				6				% Inspection:				20		1st Inspection date:		02 มิ.ย. 2020		6th Inspection date:		08 มิ.ย. 2015	
Flowline No.:				CAA				No. of section (sections):				5		2nd Inspection date:		15 มิ.ย. 2021		7th Inspection date:		03 มิ.ย. 2016	
From-To:				LKU-CA		FSTN		Length of section (m):				440		3rd Inspection date:		10 มิ.ย. 2021		8th Inspection date:		05 มิ.ย. 2017	
Process:				P		Process		Length of subsection (m):				88		4th Inspection date:		22 ก.พ. 2022		9th Inspection date:		06 ส.ค. 2018	
Service:				CO		Crude oil		Total spool (spools):				201		5th Inspection date:		22 มิ.ย. 2022		10th Inspection		06 มิ.ย. 2019	
THICKNESS MEASUREMENT RESULT																					
Section	Subsection	Weld Joint	Distance (m)	CML Name	Location Desc	Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL	Previous Inspection Date	Previous Thickness (mm)		Last Inspection Date	Last Thickness (mm)		SCR (mm/yr)	RL (yrs)	Temporary Repair			
											Top (0)	Bottom (180)		Top (0)	Bottom (180)						
		8	77	A-A1-S7-W8-U	1900 Before S-168-14	7.92	2.00	U		06 ส.ค. 2018	7.49	7.29	22 มิ.ย. 2022	7.38	7.25	0.01	508.86				
		8	77	A-A1-S8-W8-D	1900 Before S-168-14	7.92	2.00	D		06 ส.ค. 2018	7.69	7.69	22 มิ.ย. 2022	7.69	7.69	0.00	5146.10				
		8	77	A-A1-S8-W8-W	1900 Before S-168-14	7.92	2.00	W TFM													
		9	88	A-A1-S8-W9-U	6000 After C-168-11	7.92	2.00	U		06 ส.ค. 2018	7.49	7.39	22 มิ.ย. 2022	7.49	7.39	0.00	4874.62				
		9	88	A-A1-S9-W9-D	6000 After C-168-11	7.92	2.00	D		06 ส.ค. 2018	7.49	7.39	22 มิ.ย. 2022	7.49	7.39	0.00	4874.62				
		9	88	A-A1-S9-W9-W	6000 After C-168-11	7.92	2.00	W TFM													
		10	99	A-A1-S9-W10-U	100 Before C-168-10	7.92	2.00	U		06 ส.ค. 2018	7.39	6.89	22 มิ.ย. 2022	7.39	6.89	0.00	4422.15				
		10	99	A-A1-S10-W10-D	100 Before C-168-10	7.92	2.00	D		06 ส.ค. 2018	7.49	6.89	22 มิ.ย. 2022	7.49	6.89	0.00	4422.15				
		10	99	A-A1-S10-W10-W	100 Before C-168-10	7.92	2.00	W TFM					09 มิ.ย. 2021		7.61	0.01	380.45				
		11	110	A-A1-S10-W11-U	400 Before S-168-08	7.92	2.00	U		06 ส.ค. 2018	7.29	7.30	22 มิ.ย. 2022	7.29	7.30	0.00	4784.13				
		11	110	A-A1-S11-W11-D	400 Before S-168-08	7.92	2.00	D		06 ส.ค. 2018	7.59	6.89	22 มิ.ย. 2022	7.69	6.89	0.00	4422.15				
		11	110	A-A1-S11-W11-W	400 Before S-168-08	7.92	2.00	W TFM					09 มิ.ย. 2021		7.17	0.04	144.91				
		12	121	A-A1-S11-W12-U	400 Before S-168-06	7.92	2.00	U		06 ส.ค. 2018	7.29	7.29	22 มิ.ย. 2022	7.29	7.27	0.01	1021.60				
		12	121	A-A1-S12-W12-D	400 Before S-168-06	7.92	2.00	D		06 ส.ค. 2018	7.79	7.79	22 มิ.ย. 2022	7.79	7.79	0.00	5236.59				
		12	121	A-A1-S12-W12-W	400 Before S-168-06	7.92	2.00	W TFM					09 มิ.ย. 2021		7.35	0.03	197.32				
		13	132	A-A1-S12-W13-U	100 Before S-168-04	7.92	2.00	U		06 ส.ค. 2018	6.69	7.59	22 มิ.ย. 2022	6.69	7.59	0.00	4241.17				
		13	132	A-A1-S13-W13-D	100 Before S-168-04	7.92	2.00	D		06 ส.ค. 2018	6.89	7.19	22 มิ.ย. 2022	6.89	7.19	0.00	4422.15				
		13	132	A-A1-S13-W13-W	100 Before S-168-04	7.92	2.00	W TFM					09 มิ.ย. 2021		7.35	0.03	197.32				
A	A2	14	143	A-A2-S13-W14-U	1200 Before S-168-02	7.92	2.00	U		06 มิ.ย. 2019	6.79	7.29	22 มิ.ย. 2022	6.79	7.29	0.00	3839.87				
		14	143	A-A2-S14-W14-D	1200 Before S-168-02	7.92	2.00	D		06 มิ.ย. 2019	7.19	7.09	22 มิ.ย. 2022	7.19	7.09	0.00	4080.53				
		14	143	A-A2-S14-W14-W	1200 Before S-168-02	7.92	2.00	W TFM					09 มิ.ย. 2021		7.17	0.04	144.91				

				FLOWLINE THICKNESS REPORT													PS1/M INSPECTION TEAM	
Tag No.:		S1-LKUCA -FSTN-6-CAA-P-CO			Total length (m):		2200			Installation date:		01 มิ.ย. 2000		Service life (yrs):		22.66		
Pipe size (in):		6			% Inspection:		20			1st Inspection date:		02 มิ.ย. 2020		6th Inspection date:		08 มิ.ย. 2015		
Flowline No.:		CAA			No. of section (sections):		5			2nd Inspection date:		15 มิ.ย. 2021		7th Inspection date:		03 มิ.ย. 2016		
From-To:		LKU-CA		FSTN	Length of section (m):		440			3rd Inspection date:		10 มิ.ย. 2021		8th Inspection date:		05 มิ.ย. 2017		
Process:		P		Process	Length of subsection (m):		88			4th Inspection date:		22 ก.พ. 2022		9th Inspection date:		06 ส.ค. 2018		
Service:		CO		Crude oil	Total spool (spools):		201			5th Inspection date:		22 มิ.ย. 2022		10th Inspection		06 มิ.ย. 2019		
THICKNESS MEASUREMENT RESULT																		
Section	Subsection	Weld Joint	Distance (m)	CML Name	Location Desc	Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL	Previous Inspection Date	Previous Thickness (mm)		Last Inspection Date	Last Thickness (mm)		SCR (mm/yr)	RL (yrs)	Temporary Repair
											Top (0)	Bottom (180)		Top (0)	Bottom (180)			
		15	154	A-A2-S14-W15-U	1100 Before S-167-37	7.92	2.00	U		06 มิ.ย. 2019	7.09	7.19	22 มิ.ย. 2022	7.09	7.19	0.00	4080.53	
		15	154	A-A2-S15-W15-D	1100 Before S-167-37	7.92	2.00	D		06 มิ.ย. 2019	7.79	7.29	22 มิ.ย. 2022	7.79	7.29	0.00	4240.97	
		15	154	A-A2-S15-W15-W	1100 Before S-167-37	7.92	2.00	W TFM					09 มิ.ย. 2021		7.43	0.02	232.97	
		16	165	A-A2-S15-W16-U	1000 After S-167-35	7.92	2.00	U		06 มิ.ย. 2019	6.69	7.79	22 มิ.ย. 2022	6.69	7.41	0.00	3759.65	
		16	165	A-A2-S16-W16-D	1000 After S-167-35	7.92	2.00	D		06 มิ.ย. 2019	7.20	7.39	22 มิ.ย. 2022	7.20	7.39	0.01	416.88	
		16	165	A-A2-S16-W16-W	1000 After S-167-35	7.92	2.00	W TFM					09 มิ.ย. 2021		7.35	0.03	197.32	
		17	176	A-A2-S16-W17-U	1200 After S-167-34	7.92	2.00	U		06 มิ.ย. 2019	7.59	7.69	22 มิ.ย. 2022	7.59	7.69	0.00	4481.63	
		17	176	A-A2-S17-W17-D	1200 After S-167-34	7.92	2.00	D		06 มิ.ย. 2019	7.29	7.69	22 มิ.ย. 2022	7.29	7.69	0.00	4240.97	
		17	176	A-A2-S17-W17-W	1200 After S-167-34	7.92	2.00	W TFM					09 มิ.ย. 2021		7.35	0.03	197.32	
		18	187	A-A2-S17-W18-U	1000 After S-167-33	7.92	2.00	U		06 มิ.ย. 2019	7.30	7.09	22 มิ.ย. 2022	7.30	7.09	0.00	4080.53	
		18	187	A-A2-S18-W18-D	1000 After S-167-33	7.92	2.00	D		06 มิ.ย. 2019	6.89	7.30	22 มิ.ย. 2022	6.89	7.30	0.00	3920.09	
		18	187	A-A2-S18-W18-W	1000 After S-167-33	7.92	2.00	W TFM					09 มิ.ย. 2021		7.43	0.02	232.97	
		19	198	A-A2-S18-W19-U	1630 After S-167-32	7.92	2.00	U		06 มิ.ย. 2019	7.19	7.29	22 มิ.ย. 2022	7.19	7.29	0.00	4160.75	
		19	198	A-A2-S19-W19-D	1630 After S-167-32	7.92	2.00	D		06 มิ.ย. 2019	7.39	7.29	22 มิ.ย. 2022	7.39	7.29	0.00	4240.97	
		19	198	A-A2-S19-W19-W	1630 After S-167-32	7.92	2.00	W TFM					18 ก.พ. 2022		5.32	0.12	27.72	
		20	209	A-A2-S19-W20-U	1650 After S-167-30	7.92	2.00	U		06 มิ.ย. 2019	7.29	7.39	22 มิ.ย. 2022	7.29	7.39	0.00	4240.97	
		20	209	A-A2-S20-W20-D	1650 After S-167-30	7.92	2.00	D		06 มิ.ย. 2019	7.29	7.59	22 มิ.ย. 2022	7.29	7.59	0.00	4240.97	
		20	209	A-A2-S20-W20-W	1650 After S-167-30	7.92	2.00	W TFM					18 ก.พ. 2022		7.62	0.01	406.87	
		21	220	A-A2-S20-W21-U	1700 After S-167-28	7.92	2.00	U		06 มิ.ย. 2019	7.29	7.29	22 มิ.ย. 2022	7.29	7.29	0.00	4240.97	
		21	220	A-A2-S21-W21-D	1700 After S-167-28	7.92	2.00	D		06 มิ.ย. 2019	6.69	7.60	22 มิ.ย. 2022	6.69	7.54	0.00	3759.65	
		21	220	A-A2-S21-W21-W	1700 After S-167-28	7.92	2.00	W TFM					18 ก.พ. 2022		6.09	0.08	48.53	

				FLOWLINE THICKNESS REPORT													PS1/M INSPECTION TEAM	
Tag No.: S1-LKUCA -FSTN-6-CAA-P-CO					Total length (m): 2200			Installation date: 01 มิ.ย. 2000		Service life (yrs): 22.66								
Pipe size (in): 6					% Inspection: 20			1st Inspection date: 02 มิ.ย. 2020		6th Inspection date: 08 มิ.ย. 2015								
Flowline No.: CAA					No. of section (sections): 5			2nd Inspection date: 15 มิ.ย. 2021		7th Inspection date: 03 มิ.ย. 2016								
From-To: LKU-CA			FSTN		Length of section (m): 440			3rd Inspection date: 10 มิ.ย. 2021		8th Inspection date: 05 มิ.ย. 2017								
Process: P			Process		Length of subsection (m): 88			4th Inspection date: 22 ก.พ. 2022		9th Inspection date: 06 ส.ค. 2018								
Service: CO			Crude oil		Total spool (spools): 201			5th Inspection date: 22 มิ.ย. 2022		10th Inspection 06 มิ.ย. 2019								
THICKNESS MEASUREMENT RESULT																		
Section	Subsection	Weld Joint	Distance (m)	CML Name	Location Desc	Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL	Previous Inspection Date	Previous Thickness (mm)		Last Inspection Date	Last Thickness (mm)		SCR (mm/yr)	RL (yrs)	Temporary Repair
											Top (0)	Bottom (180)		Top (0)	Bottom (180)			
A	A3	22	231	A-A3-S21-W22-U	1500 After S-167-27	7.92	2.00	U		08 มิ.ย. 2015	7.10	7.70	02 มิ.ย. 2020	7.10	7.70	0.01	507.72	
		22	231	A-A3-S22-W22-D	1500 After S-167-27	7.92	2.00	D		08 มิ.ย. 2015	7.19	7.40	02 มิ.ย. 2020	7.20	7.40	0.00	17.57	
		22	231	A-A3-S22-W22-W	1500 After S-167-27	7.92	2.00	W TFM					18 ก.พ. 2022		7.18	0.03	152.02	
		23	242	A-A3-S22-W23-U	1500 After S-167-25	7.92	2.00	U		08 มิ.ย. 2015	7.20	7.40	02 มิ.ย. 2020	7.20	7.30	0.02	258.84	
		23	242	A-A3-S23-W23-D	1500 After S-167-25	7.92	2.00	D		08 มิ.ย. 2015	7.50	7.80	02 มิ.ย. 2020	7.50	7.80	0.03	182.52	
		23	242	A-A3-S23-W23-W	1500 After S-167-25	7.92	2.00	W TFM					18 ก.พ. 2022		7.00	0.04	118.03	
		24	253	A-A3-S23-W24-U	1500 After S-167-22	7.92	2.00	U		08 มิ.ย. 2015	7.30	7.40	02 มิ.ย. 2020	7.30	7.40	0.03	175.88	
		24	253	A-A3-S24-W24-D	1500 After S-167-22	7.92	2.00	D		08 มิ.ย. 2015	7.70	7.70	02 มิ.ย. 2020	7.70	7.70	0.03	189.16	
		24	253	A-A3-S24-W24-W	1500 After S-167-22	7.92	2.00	W TFM					18 ก.พ. 2022		7.26	0.03	173.09	
		25	264	A-A3-S24-W25-U	1500 After S-167-20	7.92	2.00	U		08 มิ.ย. 2015	7.50	7.50	02 มิ.ย. 2020	7.50	7.50	0.01	547.56	
		25	264	A-A3-S25-W25-D	1500 After S-167-20	7.92	2.00	D		08 มิ.ย. 2015	6.90	7.59	02 มิ.ย. 2020	6.90	7.20	0.02	243.90	
		25	264	A-A3-S25-W25-W	1500 After S-167-20	7.92	2.00	W TFM					18 ก.พ. 2022		7.26	0.03	173.09	
		26	275	A-A3-S25-W26-U	1500 After S-167-18	7.92	2.00	U		08 มิ.ย. 2015	7.20	7.30	02 มิ.ย. 2020	7.20	7.30	0.03	172.56	
		26	275	A-A3-S26-W26-D	1500 After S-167-18	7.92	2.00	D		08 มิ.ย. 2015	7.00	7.70	02 มิ.ย. 2020	7.00	7.30	0.04	124.44	
		26	275	A-A3-S26-W26-W	1500 After S-167-18	7.92	2.00	W TFM					18 ก.พ. 2022		7.35	0.03	203.85	
		27	286	A-A3-S26-W27-U	2000 After S-167-16	7.92	2.00	U		08 มิ.ย. 2015	7.50	7.50	02 มิ.ย. 2020	7.50	7.50	0.01	547.56	
		27	286	A-A3-S27-W27-D	2000 After S-167-16	7.92	2.00	D		08 มิ.ย. 2015	6.99	7.70	02 มิ.ย. 2020	6.90	7.20	0.02	271.44	
		27	286	A-A3-S27-W27-W	2000 After S-167-16	7.92	2.00	W TFM					18 ก.พ. 2022		7.00	0.04	118.03	
		28	297	A-A3-S27-W28-U	2000 After S-167-14	7.92	2.00	U		08 มิ.ย. 2015	7.49	7.89	02 มิ.ย. 2020	7.50	7.90	0.00	18.58	
		28	297	A-A3-S28-W28-D	2000 After S-167-14	7.92	2.00	D		08 มิ.ย. 2015	7.59	7.79	02 มิ.ย. 2020	7.60	7.80	0.00	18.92	
		28	297	A-A3-S28-W28-W	2000 After S-167-14	7.92	2.00	W TFM					18 ก.พ. 2022		7.44	0.02	246.14	



	<h1>FLOWLINE THICKNESS REPORT</h1>	PS1/M INSPECTION TEAM
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Tag No.:	S1-LKUCA -FSTN-6-CAA-P-CO		Total length (m):	2200	Installation date:	01 ឆ.ប. 2000	Service life (yrs):	22.66
Pipe size (in):	6		% Inspection:	20	1st Inspection date:	02 ឆ.ប. 2020	6th Inspection date:	08 ឆ.ប. 2015
Flowline No.:	CAA		No. of section (sections):	5	2nd Inspection date:	15 ឆ.ប. 2021	7th Inspection date:	03 ឆ.ប. 2016
From-To:	LKU-CA	FSTN	Length of section (m):	440	3rd Inspection date:	10 ឆ.ប. 2021	8th Inspection date:	05 ឆ.ប. 2017
Process:	P	Process	Length of subsection (m):	88	4th Inspection date:	22 ក.វ. 2022	9th Inspection date:	06 ឆ.គ. 2018
Service:	CO	Crude oil	Total spool (spools):	201	5th Inspection date:	22 ឆ.ប. 2022	10th Inspection	06 ឆ.ប. 2019

## THICKNESS MEASUREMENT RESULT

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	<h1>FLOWLINE THICKNESS REPORT</h1>	PS1/M INSPECTION TEAM
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Tag No.:	S1-LKUCA -FSTN-6-CAA-P-CO		Total length (m):	2200	Installation date:	01 มี.ย. 2000	Service life (yrs):	22.66
Pipe size (in):	6		% Inspection:	20	1st Inspection date:	02 มี.ย. 2020	6th Inspection date:	08 มี.ย. 2015
Flowline No.:	CAA		No. of section (sections):	5	2nd Inspection date:	15 มี.ย. 2021	7th Inspection date:	03 มี.ย. 2016
From-To:	LKU-CA	FSTN	Length of section (m):	440	3rd Inspection date:	10 มี.ย. 2021	8th Inspection date:	05 มี.ย. 2017
Process:	P	Process	Length of subsection (m):	88	4th Inspection date:	22 ก.พ. 2022	9th Inspection date:	06 ส.ค. 2018
Service:	CO	Crude oil	Total spool (spools):	201	5th Inspection date:	22 มี.ย. 2022	10th Inspection	06 มี.ย. 2019

## THICKNESS MEASUREMENT RESULT

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				FLOWLINE THICKNESS REPORT													PS1/M INSPECTION TEAM	
Tag No.: S1-LKUCA -FSTN-6-CAA-P-CO					Total length (m): 2200			Installation date: 01 มิ.ย. 2000		Service life (yrs): 22.66								
Pipe size (in): 6					% Inspection: 20			1st Inspection date: 02 มิ.ย. 2020		6th Inspection date: 08 มิ.ย. 2015								
Flowline No.: CAA					No. of section (sections): 5			2nd Inspection date: 15 มิ.ย. 2021		7th Inspection date: 03 มิ.ย. 2016								
From-To: LKU-CA			FSTN		Length of section (m): 440			3rd Inspection date: 10 มิ.ย. 2021		8th Inspection date: 05 มิ.ย. 2017								
Process: P			Process		Length of subsection (m): 88			4th Inspection date: 22 ก.พ. 2022		9th Inspection date: 06 ส.ค. 2018								
Service: CO			Crude oil		Total spool (spools): 201			5th Inspection date: 22 มิ.ย. 2022		10th Inspection 06 มิ.ย. 2019								
THICKNESS MEASUREMENT RESULT																		
Section	Subsection	Weld Joint	Distance (m)	CML Name	Location Desc	Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL	Previous Inspection Date	Previous Thickness (mm)		Last Inspection Date	Last Thickness (mm)		SCR (mm/yr)	RL (yrs)	Temporary Repair
											Top (0)	Bottom (180)		Top (0)	Bottom (180)			
		43	462	A-A5-S42-W43-U	3000 Before S-166-23	7.92	2.00	U		05 มิ.ย. 2017	7.29	7.00	22 มิ.ย. 2022	7.39	7.18	0.01	431.28	
		43	462	A-A5-S43-W43-D	3000 Before S-166-23	7.92	2.00	D		05 มิ.ย. 2017	7.59	7.59	22 มิ.ย. 2022	7.61	7.63	-0.00	18.95	
		43	462	A-A5-S43-W43-W	3000 Before S-166-23	7.92	2.00	W TFM										
B	B1	44	473	B-B1-S43-W44-U	2200 After S-166-21	7.92	2.00	U		06 ส.ค. 2018	7.59	7.39	22 มิ.ย. 2022	7.82	7.84	-0.05	19.66	
		44	473	B-B1-S44-W44-D	2200 After S-166-21	7.92	2.00	D		06 ส.ค. 2018	6.59	6.49	22 มิ.ย. 2022	6.90	6.88	-0.04	16.48	
		44	473	B-B1-S44-W44-W	2200 After S-166-21	7.92	2.00	W TFM										
		45	484	B-B1-S44-W45-U	Under Box Culvert	7.92	2.00	U										
		45	484	B-B1-S45-W45-D	Under Box Culvert	7.92	2.00	D										
		45	484	B-B1-S45-W45-W	Under Box Culvert	7.92	2.00	W TFM										
		46	495	B-B1-S45-W46-U	2800 After S-166-18	7.92	2.00	U		06 ส.ค. 2018	6.69	6.70	22 มิ.ย. 2022	6.71	6.92	-0.00	15.91	
		46	495	B-B1-S46-W46-D	2800 After S-166-18	7.92	2.00	D		06 ส.ค. 2018	7.30	7.39	22 มิ.ย. 2022	7.67	7.51	-0.01	18.61	
		46	495	B-B1-S46-W46-W	2800 After S-166-18	7.92	2.00	W TFM					10 มิ.ย. 2021		6.83	0.05	93.16	
		47	506	B-B1-S46-W47-U	2500 Before S-166-16	7.92	2.00	U		06 ส.ค. 2018	7.50	7.49	22 มิ.ย. 2022	7.65	7.63	-0.01	19.02	
		47	506	B-B1-S47-W47-D	2500 Before S-166-16	7.92	2.00	D		06 ส.ค. 2018	7.20	7.59	22 มิ.ย. 2022	7.52	7.68	-0.02	18.65	
		47	506	B-B1-S47-W47-W	2500 Before S-166-16	7.92	2.00	W TFM					10 มิ.ย. 2021		7.43	0.02	233.00	
		48	517	B-B1-S47-W48-U	2800 After S-166-14	7.92	2.00	U		06 ส.ค. 2018	7.39	7.59	22 มิ.ย. 2022	7.62	7.85	-0.02	18.99	
		48	517	B-B1-S48-W48-D	2800 After S-166-14	7.92	2.00	D		06 ส.ค. 2018	7.39	7.39	22 มิ.ย. 2022	7.57	7.72	-0.02	18.82	
		48	517	B-B1-S48-W48-W	2800 After S-166-14	7.92	2.00	W TFM					10 มิ.ย. 2021		7.70	0.01	544.77	
		49	528	B-B1-S48-W49-U	2800 After S-166-12	7.92	2.00	U		06 ส.ค. 2018	7.99	7.99	22 มิ.ย. 2022	7.98	7.92	0.02	327.91	
		49	528	B-B1-S49-W49-D	2800 After S-166-12	7.92	2.00	D		06 ส.ค. 2018	7.69	7.39	22 มิ.ย. 2022	7.49	7.51	-0.01	18.55	
		49	528	B-B1-S49-W49-W	2800 After S-166-12	7.92	2.00	W TFM					10 มิ.ย. 2021		7.87	0.00	2468.53	



	<h1>FLOWLINE THICKNESS REPORT</h1>	PS1/M INSPECTION TEAM
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Tag No.:	S1-LKUCA -FSTN-6-CAA-P-CO		Total length (m):	2200	Installation date:	01 ឆ.ប. 2000	Service life (yrs):	22.66
Pipe size (in):	6		% Inspection:	20	1st Inspection date:	02 ឆ.ប. 2020	6th Inspection date:	08 ឆ.ប. 2015
Flowline No.:	CAA		No. of section (sections):	5	2nd Inspection date:	15 ឆ.ប. 2021	7th Inspection date:	03 ឆ.ប. 2016
From-To:	LKU-CA	FSTN	Length of section (m):	440	3rd Inspection date:	10 ឆ.ប. 2021	8th Inspection date:	05 ឆ.ប. 2017
Process:	P	Process	Length of subsection (m):	88	4th Inspection date:	22 ក.វ. 2022	9th Inspection date:	06 ឆ.គ. 2018
Service:	CO	Crude oil	Total spool (spools):	201	5th Inspection date:	22 ឆ.ប. 2022	10th Inspection	06 ឆ.ប. 2019

## THICKNESS MEASUREMENT RESULT

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	<h1>FLOWLINE THICKNESS REPORT</h1>	PS1/M INSPECTION TEAM
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Tag No.:	S1-LKUCA -FSTN-6-CAA-P-CO		Total length (m):	2200	Installation date:	01 มิ.ย. 2000	Service life (yrs):	22.66
Pipe size (in):	6		% Inspection:	20	1st Inspection date:	02 มิ.ย. 2020	6th Inspection date:	08 มิ.ย. 2015
Flowline No.:	CAA		No. of section (sections):	5	2nd Inspection date:	15 มิ.ย. 2021	7th Inspection date:	03 มิ.ย. 2016
From-To:	LKU-CA	FSTN	Length of section (m):	440	3rd Inspection date:	10 มิ.ย. 2021	8th Inspection date:	05 มิ.ย. 2017
Process:	P	Process	Length of subsection (m):	88	4th Inspection date:	22 ก.พ. 2022	9th Inspection date:	06 ส.ค. 2018
Service:	CO	Crude oil	Total spool (spools):	201	5th Inspection date:	22 มิ.ย. 2022	10th Inspection	06 มิ.ย. 2019

## THICKNESS MEASUREMENT RESULT

[illegible]



Tag No.:	S1-LKUCA -FSTN-6-CAA-P-CO		Total length (m):	2200	Installation date:	01 มิ.ย. 2000	Service life (yrs):	22.66
Pipe size (in):	6		% Inspection:	20	1st Inspection date:	02 มิ.ย. 2020	6th Inspection date:	08 มิ.ย. 2015
Flowline No.:	CAA		No. of section (sections):	5	2nd Inspection date:	15 มิ.ย. 2021	7th Inspection date:	03 มิ.ย. 2016
From-To:	LKU-CA	FSTN	Length of section (m):	440	3rd Inspection date:	10 มิ.ย. 2021	8th Inspection date:	05 มิ.ย. 2017
Process:	P	Process	Length of subsection (m):	88	4th Inspection date:	22 ก.พ. 2022	9th Inspection date:	06 ส.ค. 2018
Service:	CO	Crude oil	Total spool (spools):	201	5th Inspection date:	22 มิ.ย. 2022	10th Inspection	06 มิ.ย. 2019

## THICKNESS MEASUREMENT RESULT

[illegible]






Tag No.:	S1-LKUCA -FSTN-6-CAA-P-CO		Total length (m):	2200	Installation date:	01 มี.ย. 2000	Service life (yrs):	22.66
Pipe size (in):	6		% Inspection:	20	1st Inspection date:	02 มี.ย. 2020	6th Inspection date:	08 มี.ย. 2015
Flowline No.:	CAA		No. of section (sections):	5	2nd Inspection date:	15 มี.ย. 2021	7th Inspection date:	03 มี.ย. 2016
From-To:	LKU-CA	FSTN	Length of section (m):	440	3rd Inspection date:	10 มี.ย. 2021	8th Inspection date:	05 มี.ย. 2017
Process:	P	Process	Length of subsection (m):	88	4th Inspection date:	22 ก.พ. 2022	9th Inspection date:	06 ส.ค. 2018
Service:	CO	Crude oil	Total spool (spools):	201	5th Inspection date:	22 มี.ย. 2022	10th Inspection	06 มี.ย. 2019

## THICKNESS MEASUREMENT RESULT

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				FLOWLINE THICKNESS REPORT													PS1/M INSPECTION TEAM	
Tag No.: S1-LKUCA -FSTN-6-CAA-P-CO					Total length (m): 2200			Installation date: 01 มิ.ย. 2000		Service life (yrs): 22.66								
Pipe size (in): 6					% Inspection: 20			1st Inspection date: 02 มิ.ย. 2020		6th Inspection date: 08 มิ.ย. 2015								
Flowline No.: CAA					No. of section (sections): 5			2nd Inspection date: 15 มิ.ย. 2021		7th Inspection date: 03 มิ.ย. 2016								
From-To: LKU-CA			FSTN		Length of section (m): 440			3rd Inspection date: 10 มิ.ย. 2021		8th Inspection date: 05 มิ.ย. 2017								
Process: P			Process		Length of subsection (m): 88			4th Inspection date: 22 ก.พ. 2022		9th Inspection date: 06 ส.ค. 2018								
Service: CO			Crude oil		Total spool (spools): 201			5th Inspection date: 22 มิ.ย. 2022		10th Inspection: 06 มิ.ย. 2019								
THICKNESS MEASUREMENT RESULT																		
Section	Subsection	Weld Joint	Distance (m)	CML Name	Location Desc	Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL	Previous Inspection Date	Previous Thickness (mm)		Last Inspection Date	Last Thickness (mm)		SCR (mm/yr)	RL (yrs)	Temporary Repair
											Top (0)	Bottom (180)		Top (0)	Bottom (180)			
		78	847	B-B5-S77-W78-U	600 Before S-106-14	7.92	2.00	U		05 มิ.ย. 2017	7.39	7.89	22 มิ.ย. 2022	7.39	7.89	0.00	5385.25	
		78	847	B-B5-S78-W78-D	600 Before S-106-14	7.92	2.00	D		05 มิ.ย. 2017	7.49	7.30	22 มิ.ย. 2022	7.49	7.30	0.02	264.76	
		78	847	B-B5-S78-W78-W	600 Before S-106-14	7.92	2.00	W TFM										
		79	858	B-B5-S78-W79-U	2500 Before S-106-13A	7.92	2.00	U		05 มิ.ย. 2017	7.79	6.89	22 มิ.ย. 2022	7.79	6.89	0.00	4885.39	
		79	858	B-B5-S79-W79-D	2500 Before S-106-13A	7.92	2.00	D		05 มิ.ย. 2017	7.30	7.50	22 มิ.ย. 2022	7.30	7.50	0.01	529.53	
		79	858	B-B5-S79-W79-W	2500 Before S-106-13A	7.92	2.00	W TFM					10 มิ.ย. 2021		7.52	0.02	290.16	
		80	869	B-B5-S79-W80-U	500 Before S-106-12	7.92	2.00	U		05 มิ.ย. 2017	7.49	7.70	22 มิ.ย. 2022	7.49	7.70	0.00	5485.22	
		80	869	B-B5-S80-W80-D	500 Before S-106-12	7.92	2.00	D		05 มิ.ย. 2017	7.49	7.50	22 มิ.ย. 2022	7.49	7.50	0.00	5485.22	
		80	869	B-B5-S80-W80-W	500 Before S-106-12	7.92	2.00	W TFM					10 มิ.ย. 2021		7.35	0.03	197.34	
		81	880	B-B5-S80-W81-U	500 Before S-106-10	7.92	2.00	U		05 มิ.ย. 2017	7.40	7.70	22 มิ.ย. 2022	7.40	7.70	0.02	269.76	
		81	880	B-B5-S81-W81-D	500 Before S-106-10	7.92	2.00	D		05 มิ.ย. 2017	6.89	7.90	22 มิ.ย. 2022	6.89	7.90	0.00	4885.39	
		81	880	B-B5-S81-W81-W	500 Before S-106-10	7.92	2.00	W TFM					10 มิ.ย. 2021		7.52	0.02	290.16	
		82	891	B-B5-S81-W82-U	300 Before S-106-08	7.92	2.00	U		05 มิ.ย. 2017	7.79	7.39	22 มิ.ย. 2022	7.79	7.39	0.00	5385.25	
		82	891	B-B5-S82-W82-D	300 Before S-106-08	7.92	2.00	D		05 มิ.ย. 2017	7.29	6.69	22 มิ.ย. 2022	7.29	6.69	0.00	4685.44	
		82	891	B-B5-S82-W82-W	300 Before S-106-08	7.92	2.00	W TFM					10 มิ.ย. 2021		6.43	0.07	62.50	
		83	902	B-B5-S82-W83-U	300 Before S-106-06	7.92	2.00	U		05 มิ.ย. 2017	7.40	7.40	22 มิ.ย. 2022	7.40	7.40	0.02	269.76	
		83	902	B-B5-S83-W83-D	300 Before S-106-06	7.92	2.00	D		05 มิ.ย. 2017	7.40	7.60	22 มิ.ย. 2022	7.40	7.60	0.02	269.76	
		83	902	B-B5-S83-W83-W	300 Before S-106-06	7.92	2.00	W TFM					10 มิ.ย. 2021		7.26	0.03	167.56	
C	C1	84	913	C-C1-S83-W84-U	400 Before S-106-04	7.92	2.00	U		06 ส.ค. 2018	7.19	7.50	22 มิ.ย. 2022	7.11	7.50	0.02	247.64	
		84	913	C-C1-S84-W84-D	400 Before S-106-04	7.92	2.00	D		06 ส.ค. 2018	10.40	10.39	22 มิ.ย. 2022	9.88	9.92	0.13	59.92	
		84	913	C-C1-S84-W84-W	400 Before S-106-04	7.92	2.00	W TFM					10 มิ.ย. 2021		7.09	0.04	128.94	





	<h1>FLOWLINE THICKNESS REPORT</h1>	PS1/M INSPECTION TEAM
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Tag No.:	S1-LKUCA -FSTN-6-CAA-P-CO		Total length (m):	2200	Installation date:	01 ឆ.ប. 2000	Service life (yrs):	22.66
Pipe size (in):	6		% Inspection:	20	1st Inspection date:	02 ឆ.ប. 2020	6th Inspection date:	08 ឆ.ប. 2015
Flowline No.:	CAA		No. of section (sections):	5	2nd Inspection date:	15 ឆ.ប. 2021	7th Inspection date:	03 ឆ.ប. 2016
From-To:	LKU-CA	FSTN	Length of section (m):	440	3rd Inspection date:	10 ឆ.ប. 2021	8th Inspection date:	05 ឆ.ប. 2017
Process:	P	Process	Length of subsection (m):	88	4th Inspection date:	22 ក.វ. 2022	9th Inspection date:	06 ឆ.គ. 2018
Service:	CO	Crude oil	Total spool (spools):	201	5th Inspection date:	22 ឆ.ប. 2022	10th Inspection	06 ឆ.ប. 2019


## THICKNESS MEASUREMENT RESULT


[illegible]


				FLOWLINE THICKNESS REPORT													PS1/M INSPECTION TEAM	
Tag No.: S1-LKUCA -FSTN-6-CAA-P-CO					Total length (m): 2200			Installation date: 01 มิ.ย. 2000		Service life (yrs): 22.66								
Pipe size (in): 6					% Inspection: 20			1st Inspection date: 02 มิ.ย. 2020		6th Inspection date: 08 มิ.ย. 2015								
Flowline No.: CAA					No. of section (sections): 5			2nd Inspection date: 15 มิ.ย. 2021		7th Inspection date: 03 มิ.ย. 2016								
From-To: LKU-CA			FSTN		Length of section (m): 440			3rd Inspection date: 10 มิ.ย. 2021		8th Inspection date: 05 มิ.ย. 2017								
Process: P			Process		Length of subsection (m): 88			4th Inspection date: 22 ก.พ. 2022		9th Inspection date: 06 ส.ค. 2018								
Service: CO			Crude oil		Total spool (spools): 201			5th Inspection date: 22 มิ.ย. 2022		10th Inspection 06 มิ.ย. 2019								
THICKNESS MEASUREMENT RESULT																		
Section	Subsection	Weld Joint	Distance (m)	CML Name	Location Desc	Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL	Previous Inspection Date	Previous Thickness (mm)		Last Inspection Date	Last Thickness (mm)		SCR (mm/yr)	RL (yrs)	Temporary Repair
											Top (0)	Bottom (180)		Top (0)	Bottom (180)			
		92	1001	C-C1-S91-W92-U	2200 Before S-096-21	7.92	2.00	U		06 ส.ค. 2018	10.09	10.79	22 มิ.ย. 2022	10.09	10.76	0.00	7317.93	
		92	1001	C-C1-S92-W92-D	2200 Before S-096-21	7.92	2.00	D		06 ส.ค. 2018	7.39	7.69	22 มิ.ย. 2022	7.39	7.65	0.00	4874.62	
		92	1001	C-C1-S92-W92-W	2200 Before S-096-21	7.92	2.00	W TFM					22 ก.พ. 2022		7.18	0.03	152.10	
		93	1012	C-C1-S92-W93-U	1200 Before S-096-21	7.92	2.00	U		06 ส.ค. 2018	7.40	7.39	22 มิ.ย. 2022	7.40	7.39	0.00	4874.62	
		93	1012	C-C1-S93-W93-D	1200 Before S-096-21	7.92	2.00	D		06 ส.ค. 2018	10.00	10.10	22 มิ.ย. 2022	10.00	9.88	0.08	99.00	
		93	1012	C-C1-S93-W93-W	1200 Before S-096-21	7.92	2.00	W TFM					22 ก.พ. 2022		7.26	0.03	173.17	
		94	1023	C-C1-S93-W94-U	500 After S-096-21	7.92	2.00	U		06 ส.ค. 2018	10.00	9.90	22 มิ.ย. 2022	10.00	9.90	0.02	357.30	
		94	1023	C-C1-S94-W94-D	500 After S-096-21	7.92	2.00	D		06 ส.ค. 2018	7.29	7.40	22 มิ.ย. 2022	7.29	7.40	0.00	4784.13	
		94	1023	C-C1-S94-W94-W	500 After S-096-21	7.92	2.00	W TFM					22 ก.พ. 2022		7.26	0.03	173.17	
		95	1034	C-C1-S94-W95-U	1500 Before S-096-19	7.92	2.00	U		06 ส.ค. 2018	7.89	7.39	22 มิ.ย. 2022	7.89	7.39	0.00	4874.62	
		95	1034	C-C1-S95-W95-D	1500 Before S-096-19	7.92	2.00	D		06 ส.ค. 2018	7.29	7.89	22 มิ.ย. 2022	7.29	7.65	0.00	4784.13	
		95	1034	C-C1-S95-W95-W	1500 Before S-096-19	7.92	2.00	W TFM					18 ก.พ. 2022		7.80	0.01	1049.76	
		96	1045	C-C1-S95-W96-U	1000 Before S-096-17	7.92	2.00	U		06 ส.ค. 2018	7.39	7.49	22 มิ.ย. 2022	7.39	7.49	0.00	4874.62	
		96	1045	C-C1-S96-W96-D	1000 Before S-096-17	7.92	2.00	D		06 ส.ค. 2018	7.59	7.49	22 มิ.ย. 2022	7.59	7.49	0.00	4965.11	
		96	1045	C-C1-S96-W96-W	1000 Before S-096-17	7.92	2.00	W TFM					18 ก.พ. 2022		7.44	0.02	246.14	
C	C2	97	1056	C-C2-S96-W97-U	1800 Before S-096-15	7.92	2.00	U		06 มิ.ย. 2019	7.60	7.09	22 มิ.ย. 2022	7.60	7.09	0.00	4080.53	
		97	1056	C-C2-S97-W97-D	1800 Before S-096-15	7.92	2.00	D		06 มิ.ย. 2019	7.29	7.40	22 มิ.ย. 2022	7.29	7.40	0.00	4240.97	
		97	1056	C-C2-S97-W97-W	1800 Before S-096-15	7.92	2.00	W TFM		10 มิ.ย. 2021		7.26	18 ก.พ. 2022		7.44	-0.26	18.38	
		98	1067	C-C2-S97-W98-U	1500 Before S-096-13	7.92	2.00	U		06 มิ.ย. 2019	7.09	6.99	22 มิ.ย. 2022	7.09	6.99	0.00	4000.31	
		98	1067	C-C2-S98-W98-D	1500 Before S-096-13	7.92	2.00	D		06 มิ.ย. 2019	7.39	7.39	22 มิ.ย. 2022	7.39	7.39	0.00	4321.19	
		98	1067	C-C2-S98-W98-W	1500 Before S-096-13	7.92	2.00	W TFM		10 มิ.ย. 2021		7.43	18 ก.พ. 2022		7.44	-0.01	18.38	


				FLOWLINE THICKNESS REPORT													PS1/M INSPECTION TEAM	
Tag No.:		S1-LKUCA -FSTN-6-CAA-P-CO			Total length (m):		2200		Installation date:		01 มิ.ย. 2000		Service life (yrs):		22.66			
Pipe size (in):		6			% Inspection:		20		1st Inspection date:		02 มิ.ย. 2020		6th Inspection date:		08 มิ.ย. 2015			
Flowline No.:		CAA			No. of section (sections):		5		2nd Inspection date:		15 มิ.ย. 2021		7th Inspection date:		03 มิ.ย. 2016			
From-To:		LKU-CA	FSTN	Length of section (m):		440		3rd Inspection date:		10 มิ.ย. 2021		8th Inspection date:		05 มิ.ย. 2017				
Process:		P	Process	Length of subsection (m):		88		4th Inspection date:		22 ก.พ. 2022		9th Inspection date:		06 ส.ค. 2018				
Service:		CO	Crude oil	Total spool (spools):		201		5th Inspection date:		22 มิ.ย. 2022		10th Inspection		06 มิ.ย. 2019				
THICKNESS MEASUREMENT RESULT																		
Section	Subsection	Weld Joint	Distance (m)	CML Name	Location Desc	Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL	Previous Inspection Date	Previous Thickness (mm)		Last Inspection Date	Last Thickness (mm)		SCR (mm/yr)	RL (yrs)	Temporary Repair
											Top (0)	Bottom (180)		Top (0)	Bottom (180)			
		99	1078	C-C2-S98-W99-U	1500 Before S-096-11	7.92	2.00	U		06 มิ.ย. 2019	7.50	7.20	22 มิ.ย. 2022	7.50	7.20	0.01	416.88	
		99	1078	C-C2-S99-W99-D	1500 Before S-096-11	7.92	2.00	D		06 มิ.ย. 2019	7.39	7.30	22 มิ.ย. 2022	7.39	7.30	0.01	424.90	
		99	1078	C-C2-S99-W99-W	1500 Before S-096-11	7.92	2.00	W TFM					18 ก.พ. 2022		7.09	0.04	133.18	
		100	1089	C-C2-S99-W100-U	1000 Before S-096-09	7.92	2.00	U		06 มิ.ย. 2019	7.39	7.49	22 มิ.ย. 2022	7.39	7.42	0.00	4321.19	
		100	1089	C-C2-S100-W100-D	1000 Before S-096-09	7.92	2.00	D		06 มิ.ย. 2019	7.49	7.69	22 มิ.ย. 2022	7.49	7.65	0.00	4401.41	
		100	1089	C-C2-S100-W100-W	1000 Before S-096-09	7.92	2.00	W TFM					18 ก.พ. 2022		7.26	0.03	173.09	
		101	1100	C-C2-S100-W101-U	1000 Before S-096-07	7.92	2.00	U		06 มิ.ย. 2019	6.99	7.89	22 มิ.ย. 2022	6.99	7.76	0.00	4000.31	
		101	1100	C-C2-S101-W101-D	1000 Before S-096-07	7.92	2.00	D		06 มิ.ย. 2019	7.79	7.50	22 มิ.ย. 2022	7.66	7.62	0.01	563.21	
		101	1100	C-C2-S101-W101-W	1000 Before S-096-07	7.92	2.00	W TFM										
		102	1111	C-C2-S101-W102-U	900 Before S-096-05	7.92	2.00	U		06 มิ.ย. 2019	7.59	7.50	22 มิ.ย. 2022	7.59	7.50	0.01	440.94	
		102	1111	C-C2-S102-W102-D	900 Before S-096-05	7.92	2.00	D		06 มิ.ย. 2019	7.79	7.89	22 มิ.ย. 2022	7.79	7.89	0.00	4642.06	
		102	1111	C-C2-S102-W102-W	900 Before S-096-05	7.92	2.00	W TFM										
C	C3	103	1122	C-C3-S102-W103-U	700 Before S-096-03	7.92	2.00	U		08 มิ.ย. 2015	7.69	7.69	02 มิ.ย. 2020	7.70	7.70	0.00	19.26	
		103	1122	C-C3-S103-W103-D	700 Before S-096-03	7.92	2.00	D		08 มิ.ย. 2015	7.99	6.99	02 มิ.ย. 2020	7.60	7.00	0.00	16.89	
		103	1122	C-C3-S103-W103-W	700 Before S-096-03	7.92	2.00	W TFM					18 ก.พ. 2022		6.82	0.05	95.16	
		104	1133	C-C3-S103-W104-U	900 Before S-096-01	7.92	2.00	U		08 มิ.ย. 2015	7.39	7.59	02 มิ.ย. 2020	7.40	7.60	0.00	18.24	
		104	1133	C-C3-S104-W104-D	900 Before S-096-01	7.92	2.00	D		08 มิ.ย. 2015	6.99	7.49	02 มิ.ย. 2020	7.00	7.50	0.00	16.89	
		104	1133	C-C3-S104-W104-W	900 Before S-096-01	7.92	2.00	W TFM					18 ก.พ. 2022		7.18	0.03	152.02	
		105	1144	C-C3-S104-W105-U	900 Before S-095-60	7.92	2.00	U		08 มิ.ย. 2015	7.59	7.79	02 มิ.ย. 2020	7.30	7.40	0.06	91.12	
		105	1144	C-C3-S105-W105-D	900 Before S-095-60	7.92	2.00	D		08 มิ.ย. 2015	7.59	7.60	02 มิ.ย. 2020	7.20	7.40	0.08	66.48	
		105	1144	C-C3-S105-W105-W	900 Before S-095-60	7.92	2.00	W TFM					18 ก.พ. 2022		7.35	0.03	203.85	



				FLOWLINE THICKNESS REPORT													PS1/M INSPECTION TEAM	
Tag No.: S1-LKUCA -FSTN-6-CAA-P-CO						Total length (m): 2200			Installation date: 01 มิ.ย. 2000		Service life (yrs): 22.66							
Pipe size (in): 6						% Inspection: 20			1st Inspection date: 02 มิ.ย. 2020		6th Inspection date: 08 มิ.ย. 2015							
Flowline No.: CAA						No. of section (sections): 5			2nd Inspection date: 15 มิ.ย. 2021		7th Inspection date: 03 มิ.ย. 2016							
From-To: LKU-CA			FSTN			Length of section (m): 440			3rd Inspection date: 10 มิ.ย. 2021		8th Inspection date: 05 มิ.ย. 2017							
Process: P			Process			Length of subsection (m): 88			4th Inspection date: 22 ก.พ. 2022		9th Inspection date: 06 ส.ค. 2018							
Service: CO			Crude oil			Total spool (spools): 201			5th Inspection date: 22 มิ.ย. 2022		10th Inspection 06 มิ.ย. 2019							
THICKNESS MEASUREMENT RESULT																		
Section	Subsection	Weld Joint	Distance (m)	CML Name	Location Desc	Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL	Previous Inspection Date	Previous Thickness (mm)		Last Inspection Date	Last Thickness (mm)		SCR (mm/yr)	RL (yrs)	Temporary Repair
											Top (0)	Bottom (180)		Top (0)	Bottom (180)			
		106	1155	C-C3-S105-W106-U	700 Before S-095-58	7.92	2.00	U		08 มิ.ย. 2015	7.40	7.39	02 มิ.ย. 2020	7.40	7.40	0.00	18.24	
		106	1155	C-C3-S106-W106-D	700 Before S-095-58	7.92	2.00	D		08 มิ.ย. 2015	7.39	6.69	02 มิ.ย. 2020	7.40	6.60	0.02	254.81	
		106	1155	C-C3-S106-W106-W	700 Before S-095-58	7.92	2.00	W TFM					18 ก.พ. 2022		7.00	0.04	118.03	
		107	1166	C-C3-S106-W107-U	600 Before S-095-56	7.92	2.00	U		08 มิ.ย. 2015	7.49	7.89	02 มิ.ย. 2020	7.20	7.60	0.06	89.40	
		107	1166	C-C3-S107-W107-D	600 Before S-095-56	7.92	2.00	D		08 มิ.ย. 2015	7.09	7.80	02 มิ.ย. 2020	7.00	7.60	0.02	276.99	
		107	1166	C-C3-S107-W107-W	600 Before S-095-56	7.92	2.00	W TFM					10 มิ.ย. 2021		7.35	0.03	197.34	
		108	1177	C-C3-S107-W108-U	600 Before S-095-54	7.92	2.00	U		08 มิ.ย. 2015	7.29	7.50	02 มิ.ย. 2020	7.30	7.50	0.00	17.90	
		108	1177	C-C3-S108-W108-D	600 Before S-095-54	7.92	2.00	D		08 มิ.ย. 2015	7.29	7.49	02 มิ.ย. 2020	7.30	7.50	0.00	17.90	
		108	1177	C-C3-S108-W108-W	600 Before S-095-54	7.92	2.00	W TFM					10 มิ.ย. 2021		7.26	0.03	167.56	
		109	1188	C-C3-S108-W109-U	600 Before S-095-52	7.92	2.00	U		08 มิ.ย. 2015	7.60	7.60	02 มิ.ย. 2020	7.60	7.60	0.01	557.53	
		109	1188	C-C3-S109-W109-D	600 Before S-095-52	7.92	2.00	D		08 มิ.ย. 2015	7.39	7.30	02 มิ.ย. 2020	7.40	7.30	0.01	527.64	
		109	1188	C-C3-S109-W109-W	600 Before S-095-52	7.92	2.00	W TFM					10 มิ.ย. 2021		7.61	0.01	380.50	
C	C4	110	1199	C-C4-S109-W110-U	500 Before S-095-50	7.92	2.00	U		03 มิ.ย. 2016	7.40	7.50	15 มิ.ย. 2021	7.42	7.26	0.03	154.40	
		110	1199	C-C4-S110-W110-D	500 Before S-095-50	7.92	2.00	D		03 มิ.ย. 2016	7.60	7.60	15 มิ.ย. 2021	7.67	7.71	0.01	435.30	
		110	1199	C-C4-S110-W110-W	500 Before S-095-50	7.92	2.00	W TFM					10 มิ.ย. 2021		7.87	0.00	2468.53	
		111	1210	C-C4-S110-W111-U	400 Before S-095-48	7.92	2.00	U		03 มิ.ย. 2016	6.90	7.70	15 มิ.ย. 2021	6.81	7.82	0.03	165.52	
		111	1210	C-C4-S111-W111-D	400 Before S-095-48	7.92	2.00	D		03 มิ.ย. 2016	7.80	7.10	15 มิ.ย. 2021	7.73	7.32	0.04	139.72	
		111	1210	C-C4-S111-W111-W	400 Before S-095-48	7.92	2.00	W TFM					10 มิ.ย. 2021		7.26	0.03	167.56	
		112	1221	C-C4-S111-W112-U	400 Before S-095-46	7.92	2.00	U		03 มิ.ย. 2016	7.40	7.50	15 มิ.ย. 2021	7.42	7.50	0.04	142.35	
		112	1221	C-C4-S112-W112-D	400 Before S-095-46	7.92	2.00	D		03 มิ.ย. 2016	7.10	7.50	15 มิ.ย. 2021	7.04	7.40	0.05	109.34	
		112	1221	C-C4-S112-W112-W	400 Before S-095-46	7.92	2.00	W TFM					10 มิ.ย. 2021		7.61	0.01	380.50	

				FLOWLINE THICKNESS REPORT													PS1/M INSPECTION TEAM	
Tag No.: S1-LKUCA -FSTN-6-CAA-P-CO						Total length (m): 2200				Installation date: 01 มิ.ย. 2000		Service life (yrs): 22.66						
Pipe size (in): 6						% Inspection: 20				1st Inspection date: 02 มิ.ย. 2020		6th Inspection date: 08 มิ.ย. 2015						
Flowline No.: CAA						No. of section (sections): 5				2nd Inspection date: 15 มิ.ย. 2021		7th Inspection date: 03 มิ.ย. 2016						
From-To: LKU-CA			FSTN			Length of section (m): 440				3rd Inspection date: 10 มิ.ย. 2021		8th Inspection date: 05 มิ.ย. 2017						
Process: P			Process			Length of subsection (m): 88				4th Inspection date: 22 ก.พ. 2022		9th Inspection date: 06 ส.ค. 2018						
Service: CO			Crude oil			Total spool (spools): 201				5th Inspection date: 22 มิ.ย. 2022		10th Inspection 06 มิ.ย. 2019						
THICKNESS MEASUREMENT RESULT																		
Section	Subsection	Weld Joint	Distance (m)	CML Name	Location Desc	Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL	Previous Inspection Date	Previous Thickness (mm)		Last Inspection Date	Last Thickness (mm)		SCR (mm/yr)	RL (yrs)	Temporary Repair
											Top (0)	Bottom (180)		Top (0)	Bottom (180)			
		113	1232	C-C4-S112-W113-U	1100 Before S-095-44	7.92	2.00	U		03 มิ.ย. 2016	7.50	7.69	15 มิ.ย. 2021	7.51	7.90	0.02	289.43	
		113	1232	C-C4-S113-W113-D	1100 Before S-095-44	7.92	2.00	D		03 มิ.ย. 2016	7.60	7.30	15 มิ.ย. 2021	7.45	7.72	0.01	1087.85	
		113	1232	C-C4-S113-W113-W	1100 Before S-095-44	7.92	2.00	W TFM					10 มิ.ย. 2021		7.36	0.03	201.24	
		114	1243	C-C4-S113-W114-U	1100 Before S-095-42	7.92	2.00	U		03 มิ.ย. 2016	7.00	7.60	15 มิ.ย. 2021	7.05	7.53	0.05	112.00	
		114	1243	C-C4-S114-W114-D	1100 Before S-095-42	7.92	2.00	D		03 มิ.ย. 2016	7.50	7.40	15 มิ.ย. 2021	7.42	7.20	0.06	86.49	
		114	1243	C-C4-S114-W114-W	1100 Before S-095-42	7.92	2.00	W TFM					10 มิ.ย. 2021		7.26	0.03	167.56	
		115	1254	C-C4-S114-W115-U	1000 Before S-095-40	7.92	2.00	U		03 มิ.ย. 2016	7.50	7.39	15 มิ.ย. 2021	7.40	7.41	0.00	18.24	
		115	1254	C-C4-S115-W115-D	1000 Before S-095-40	7.92	2.00	D		03 มิ.ย. 2016	7.20	7.00	15 มิ.ย. 2021	7.72	7.00	0.03	166.33	
		115	1254	C-C4-S115-W115-W	1000 Before S-095-40	7.92	2.00	W TFM					10 มิ.ย. 2021		7.26	0.03	167.56	
C	C5	116	1265	C-C5-S115-W116-U	1200 Before S-095-38	7.92	2.00	U		05 มิ.ย. 2017	7.39	7.79	22 มิ.ย. 2022	7.39	7.79	0.00	5385.25	
		116	1265	C-C5-S116-W116-D	1200 Before S-095-38	7.92	2.00	D		05 มิ.ย. 2017	6.89	7.80	22 มิ.ย. 2022	6.89	7.70	0.00	4885.39	
		116	1265	C-C5-S116-W116-W	1200 Before S-095-38	7.92	2.00	W TFM					10 มิ.ย. 2021		6.30	0.08	55.80	
		117	1276	C-C5-S116-W117-U	1000 Before S-095-36	7.92	2.00	U		05 มิ.ย. 2017	7.49	7.09	22 มิ.ย. 2022	7.49	7.09	0.00	5085.33	
		117	1276	C-C5-S117-W117-D	1000 Before S-095-36	7.92	2.00	D		05 มิ.ย. 2017	7.50	7.29	22 มิ.ย. 2022	7.50	7.29	0.00	5285.28	
		117	1276	C-C5-S117-W117-W	1000 Before S-095-36	7.92	2.00	W TFM					10 มิ.ย. 2021		6.83	0.05	93.16	
		118	1287	C-C5-S117-W118-U	1000 Before S-095-34	7.92	2.00	U		05 มิ.ย. 2017	7.09	7.99	22 มิ.ย. 2022	7.09	7.95	0.00	5085.33	
		118	1287	C-C5-S118-W118-D	1000 Before S-095-34	7.92	2.00	D		05 มิ.ย. 2017	7.39	7.50	22 มิ.ย. 2022	7.39	7.50	0.00	5385.25	
		118	1287	C-C5-S118-W118-W	1000 Before S-095-34	7.92	2.00	W TFM					10 มิ.ย. 2021		7.26	0.03	167.56	
		119	1298	C-C5-S118-W119-U	1000 Before S-095-32	7.92	2.00	U		05 มิ.ย. 2017	7.09	7.80	22 มิ.ย. 2022	7.09	7.75	0.00	5085.33	
		119	1298	C-C5-S119-W119-D	1000 Before S-095-32	7.92	2.00	D		05 มิ.ย. 2017	7.49	7.60	22 มิ.ย. 2022	7.49	7.49	0.00	5485.22	
		119	1298	C-C5-S119-W119-W	1000 Before S-095-32	7.92	2.00	W TFM					10 มิ.ย. 2021		7.70	0.01	544.77	

				FLOWLINE THICKNESS REPORT													PS1/M INSPECTION TEAM	
Tag No.:		S1-LKUCA -FSTN-6-CAA-P-CO			Total length (m):		2200			Installation date:		01 มิ.ย. 2000		Service life (yrs):		22.66		
Pipe size (in):		6			% Inspection:		20			1st Inspection date:		02 มิ.ย. 2020		6th Inspection date:		08 มิ.ย. 2015		
Flowline No.:		CAA			No. of section (sections):		5			2nd Inspection date:		15 มิ.ย. 2021		7th Inspection date:		03 มิ.ย. 2016		
From-To:		LKU-CA		FSTN	Length of section (m):		440			3rd Inspection date:		10 มิ.ย. 2021		8th Inspection date:		05 มิ.ย. 2017		
Process:		P		Process	Length of subsection (m):		88			4th Inspection date:		22 ก.พ. 2022		9th Inspection date:		06 ส.ค. 2018		
Service:		CO		Crude oil	Total spool (spools):		201			5th Inspection date:		22 มิ.ย. 2022		10th Inspection		06 มิ.ย. 2019		
THICKNESS MEASUREMENT RESULT																		
Section	Subsection	Weld Joint	Distance (m)	CML Name	Location Desc	Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL	Previous Inspection Date	Previous Thickness (mm)		Last Inspection Date	Last Thickness (mm)		SCR (mm/yr)	RL (yrs)	Temporary Repair
											Top (0)	Bottom (180)		Top (0)	Bottom (180)			
		120	1309	C-C5-S119-W120-U	800 Before S-095-30	7.92	2.00	U		05 มิ.ย. 2017	7.59	7.70	22 มิ.ย. 2022	7.59	7.70	0.00	5585.20	
		120	1309	C-C5-S120-W120-D	800 Before S-095-30	7.92	2.00	D		05 มิ.ย. 2017	7.49	7.80	22 มิ.ย. 2022	7.49	7.80	0.00	5485.22	
		120	1309	C-C5-S120-W120-W	800 Before S-095-30	7.92	2.00	W TFM					10 มิ.ย. 2021		7.52	0.02	290.16	
		121	1320	C-C5-S120-W121-U	800 Before S-095-28	7.92	2.00	U		05 มิ.ย. 2017	7.40	7.40	22 มิ.ย. 2022	7.40	7.18	0.04	118.81	
		121	1320	C-C5-S121-W121-D	800 Before S-095-28	7.92	2.00	D		05 มิ.ย. 2017	7.40	6.99	22 มิ.ย. 2022	7.40	6.99	0.00	4985.36	
		121	1320	C-C5-S121-W121-W	800 Before S-095-28	7.92	2.00	W TFM					11 มิ.ย. 2021		7.87	0.00	2468.85	
		122	1331	C-C5-S121-W122-U	800 Before S-095-26	7.92	2.00	U		05 มิ.ย. 2017	7.39	7.70	22 มิ.ย. 2022	7.39	7.70	0.00	5385.25	
		122	1331	C-C5-S122-W122-D	800 Before S-095-26	7.92	2.00	D		05 มิ.ย. 2017	7.39	7.70	22 มิ.ย. 2022	7.39	7.70	0.00	5385.25	
		122	1331	C-C5-S122-W122-W	800 Before S-095-26	7.92	2.00	W TFM					11 มิ.ย. 2021		7.35	0.03	197.37	
D	D1	123	1342	D-D1-S122-W123-U	1000 Before S-095-24	7.92	2.00	U		06 ส.ค. 2018	7.40	7.39	22 มิ.ย. 2022	7.40	7.39	0.00	4874.62	
		123	1342	D-D1-S123-W123-D	1000 Before S-095-24	7.92	2.00	D		06 ส.ค. 2018	7.70	7.40	22 มิ.ย. 2022	7.70	7.40	0.01	488.37	
		123	1342	D-D1-S123-W123-W	1000 Before S-095-24	7.92	2.00	W TFM					11 มิ.ย. 2021		7.09	0.04	128.95	
		124	1353	D-D1-S123-W124-U	700 Before S-095-22	7.92	2.00	U		06 ส.ค. 2018	7.09	7.50	22 มิ.ย. 2022	7.09	7.50	0.00	4603.14	
		124	1353	D-D1-S124-W124-D	700 Before S-095-22	7.92	2.00	D		06 ส.ค. 2018	7.29	7.59	22 มิ.ย. 2022	7.29	7.45	0.00	4784.13	
		124	1353	D-D1-S124-W124-W	700 Before S-095-22	7.92	2.00	W TFM					22 ก.พ. 2022		7.71	0.01	590.85	
		125	1364	D-D1-S124-W125-U	800 Before S-095-20	7.92	2.00	U		06 ส.ค. 2018	7.39	7.40	22 มิ.ย. 2022	7.39	7.40	0.00	4874.62	
		125	1364	D-D1-S125-W125-D	800 Before S-095-20	7.92	2.00	D		06 ส.ค. 2018	7.70	7.19	22 มิ.ย. 2022	7.70	7.19	0.00	4693.63	
		125	1364	D-D1-S125-W125-W	800 Before S-095-20	7.92	2.00	W TFM					22 ก.พ. 2022		7.35	0.03	203.95	
		126	1375	D-D1-S125-W126-U	1500 After S-095-19	7.92	2.00	U		06 ส.ค. 2018	7.29	7.39	22 มิ.ย. 2022	7.29	7.39	0.00	4784.13	
		126	1375	D-D1-S126-W126-D	1500 After S-095-20	7.92	2.00	D		06 ส.ค. 2018	7.29	7.29	22 มิ.ย. 2022	7.29	7.29	0.00	4784.13	
		126	1375	D-D1-S126-W126-W	1500 After S-095-21	7.92	2.00	W TFM					22 ก.พ. 2022		7.71	0.01	590.85	

				FLOWLINE THICKNESS REPORT													PS1/M INSPECTION TEAM				
Tag No.:				S1-LKUCA -FSTN-6-CAA-P-CO				Total length (m):				2200		Installation date:		01 มิ.ย. 2000		Service life (yrs):		22.66	
Pipe size (in):				6				% Inspection:				20		1st Inspection date:		02 มิ.ย. 2020		6th Inspection date:		08 มิ.ย. 2015	
Flowline No.:				CAA				No. of section (sections):				5		2nd Inspection date:		15 มิ.ย. 2021		7th Inspection date:		03 มิ.ย. 2016	
From-To:				LKU-CA		FSTN		Length of section (m):				440		3rd Inspection date:		10 มิ.ย. 2021		8th Inspection date:		05 มิ.ย. 2017	
Process:				P		Process		Length of subsection (m):				88		4th Inspection date:		22 ก.พ. 2022		9th Inspection date:		06 ส.ค. 2018	
Service:				CO		Crude oil		Total spool (spools):				201		5th Inspection date:		22 มิ.ย. 2022		10th Inspection		06 มิ.ย. 2019	
THICKNESS MEASUREMENT RESULT																					
Section	Subsection	Weld Joint	Distance (m)	CML Name	Location Desc	Nominal Thickness (mm)	Retired Thickness (mm)	Up/Down/Weld	MFL	Previous Inspection Date	Previous Thickness (mm)		Last Inspection Date	Last Thickness (mm)		SCR (mm/yr)	RL (yrs)	Temporary Repair			
											Top (0)	Bottom (180)		Top (0)	Bottom (180)						
		127	1386	D-D1-S126-W127-U	700 Before S-095-16	7.92	2.00	U		06 ส.ค. 2018	8.00	6.99	22 มิ.ย. 2022	7.84	6.99	0.00	4512.65				
		127	1386	D-D1-S127-W127-D	700 Before S-095-16	7.92	2.00	D		06 ส.ค. 2018	7.59	7.60	22 มิ.ย. 2022	7.59	7.60	0.00	5055.60				
		127	1386	D-D1-S127-W127-W	700 Before S-095-16	7.92	2.00	W TFM					22 ก.พ. 2022		7.35	0.03	203.95				
		128	1397	D-D1-S127-W128-U	700 Before S-095-14	7.92	2.00	U		06 ส.ค. 2018	7.50	7.19	22 มิ.ย. 2022	7.38	7.09	0.03	197.34				
		128	1397	D-D1-S128-W128-D	700 Before S-095-14	7.92	2.00	D		06 ส.ค. 2018	7.20	7.80	22 มิ.ย. 2022	7.20	7.64	0.01	470.27				
		128	1397	D-D1-S128-W128-W	700 Before S-095-14	7.92	2.00	W TFM					22 ก.พ. 2022		7.18	0.03	152.10				
		129	1408	D-D1-S128-W129-U	3000 After S-095-14	7.92	2.00	U		06 ส.ค. 2018	7.19	7.59	22 มิ.ย. 2022	7.19	7.59	0.00	4693.63				
		129	1408	D-D1-S129-W129-D	3000 After S-095-14	7.92	2.00	D		06 ส.ค. 2018	7.49	7.69	22 มิ.ย. 2022	7.49	7.69	0.00	4965.11				
		129	1408	D-D1-S129-W129-W	3000 After S-095-14	7.92	2.00	W TFM					22 ก.พ. 2022		7.44	0.02	246.27				
D	D2	130	1419	D-D2-S129-W130-U	1700 Before S-095-12	7.92	2.00	U		06 มิ.ย. 2019	7.09	7.59	22 มิ.ย. 2022	7.09	7.59	0.00	4080.53				
		130	1419	D-D2-S130-W130-D	1700 Before S-095-12	7.92	2.00	D		06 มิ.ย. 2019	7.30	7.29	22 มิ.ย. 2022	7.30	7.29	0.00	4240.97				
		130	1419	D-D2-S130-W130-W	1700 Before S-095-12	7.92	2.00	W TFM					22 ก.พ. 2022		7.44	0.02	246.27				
		131	1430	D-D2-S130-W131-U	2000 After S-095-10	7.92	2.00	U		06 มิ.ย. 2019	7.59	7.30	22 มิ.ย. 2022	7.59	7.30	0.02	212.45				
		131	1430	D-D2-S131-W131-D	2000 After S-095-10	7.92	2.00	D		06 มิ.ย. 2019	7.09	7.29	22 มิ.ย. 2022	7.09	7.29	0.00	4080.53				
		131	1430	D-D2-S131-W131-W	2000 After S-095-10	7.92	2.00	W TFM					22 ก.พ. 2022		7.35	0.03	203.95				
		132	1441	D-D2-S131-W132-U	2200 After S-095-08	7.92	2.00	U		06 มิ.ย. 2019	7.49	6.99	22 มิ.ย. 2022	7.49	6.99	0.00	4000.31				
		132	1441	D-D2-S132-W132-D	2200 After S-095-08	7.92	2.00	D		06 มิ.ย. 2019	7.19	7.59	22 มิ.ย. 2022	7.19	7.59	0.00	4160.75				
		132	1441	D-D2-S132-W132-W	2200 After S-095-08	7.92	2.00	W TFM					22 ก.พ. 2022		7.18	0.03	152.10				
		133	1452	D-D2-S132-W133-U	2500 After S-095-06	7.92	2.00	U		06 มิ.ย. 2019	7.49	7.29	22 มิ.ย. 2022	7.49	7.29	0.00	4240.97				
		133	1452	D-D2-S133-W133-D	2500 After S-095-06	7.92	2.00	D		06 มิ.ย. 2019	7.70	7.29	22 มิ.ย. 2022	7.70	7.29	0.00	4240.97				
		133	1452	D-D2-S133-W133-W	2500 After S-095-06	7.92	2.00	W TFM					22 ก.พ. 2022		7.71	0.01	590.85				





	<h1>FLOWLINE THICKNESS REPORT</h1>	PS1/M INSPECTION TEAM
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Tag No.:	S1-LKUCA -FSTN-6-CAA-P-CO		Total length (m):	2200	Installation date:	01 มิ.ย. 2000	Service life (yrs):	22.66
Pipe size (in):	6		% Inspection:	20	1st Inspection date:	02 มิ.ย. 2020	6th Inspection date:	08 มิ.ย. 2015
Flowline No.:	CAA		No. of section (sections):	5	2nd Inspection date:	15 มิ.ย. 2021	7th Inspection date:	03 มิ.ย. 2016
From-To:	LKU-CA	FSTN	Length of section (m):	440	3rd Inspection date:	10 มิ.ย. 2021	8th Inspection date:	05 มิ.ย. 2017
Process:	P	Process	Length of subsection (m):	88	4th Inspection date:	22 ก.พ. 2022	9th Inspection date:	06 ส.ค. 2018
Service:	CO	Crude oil	Total spool (spools):	201	5th Inspection date:	22 มิ.ย. 2022	10th Inspection	06 มิ.ย. 2019

## THICKNESS MEASUREMENT RESULT

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	<h1 style="text-align: center;">FLOWLINE THICKNESS REPORT</h1>	<p style="text-align: center;">PS1/M INSPECTION TEAM</p>
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Tag No.:	S1-LKUCA -FSTN-6-CAA-P-CO		Total length (m):	2200	Installation date:	01 มี.ย. 2000	Service life (yrs):	22.66
Pipe size (in):	6		% Inspection:	20	1st Inspection date:	02 มี.ย. 2020	6th Inspection date:	08 มี.ย. 2015
Flowline No.:	CAA		No. of section (sections):	5	2nd Inspection date:	15 มี.ย. 2021	7th Inspection date:	03 มี.ย. 2016
From-To:	LKU-CA	FSTN	Length of section (m):	440	3rd Inspection date:	10 มี.ย. 2021	8th Inspection date:	05 มี.ย. 2017
Process:	P	Process	Length of subsection (m):	88	4th Inspection date:	22 ก.พ. 2022	9th Inspection date:	06 ส.ค. 2018
Service:	CO	Crude oil	Total spool (spools):	201	5th Inspection date:	22 มี.ย. 2022	10th Inspection	06 มี.ย. 2019

## THICKNESS MEASUREMENT RESULT

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	<h1>FLOWLINE THICKNESS REPORT</h1>	PS1/M INSPECTION TEAM
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Tag No.:	S1-LKUCA -FSTN-6-CAA-P-CO		Total length (m):	2200	Installation date:	01 มี.ย. 2000	Service life (yrs):	22.66
Pipe size (in):	6		% Inspection:	20	1st Inspection date:	02 มี.ย. 2020	6th Inspection date:	08 มี.ย. 2015
Flowline No.:	CAA		No. of section (sections):	5	2nd Inspection date:	15 มี.ย. 2021	7th Inspection date:	03 มี.ย. 2016
From-To:	LKU-CA	FSTN	Length of section (m):	440	3rd Inspection date:	10 มี.ย. 2021	8th Inspection date:	05 มี.ย. 2017
Process:	P	Process	Length of subsection (m):	88	4th Inspection date:	22 ก.พ. 2022	9th Inspection date:	06 ส.ค. 2018
Service:	CO	Crude oil	Total spool (spools):	201	5th Inspection date:	22 มี.ย. 2022	10th Inspection	06 มี.ย. 2019

## THICKNESS MEASUREMENT RESULT

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	<h1>FLOWLINE THICKNESS REPORT</h1>	PS1/M INSPECTION TEAM
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Tag No.:	S1-LKUCA -FSTN-6-CAA-P-CO		Total length (m):	2200	Installation date:	01 มิ.ย. 2000	Service life (yrs):	22.66
Pipe size (in):	6		% Inspection:	20	1st Inspection date:	02 มิ.ย. 2020	6th Inspection date:	08 มิ.ย. 2015
Flowline No.:	CAA		No. of section (sections):	5	2nd Inspection date:	15 มิ.ย. 2021	7th Inspection date:	03 มิ.ย. 2016
From-To:	LKU-CA	FSTN	Length of section (m):	440	3rd Inspection date:	10 มิ.ย. 2021	8th Inspection date:	05 มิ.ย. 2017
Process:	P	Process	Length of subsection (m):	88	4th Inspection date:	22 ก.พ. 2022	9th Inspection date:	06 ส.ค. 2018
Service:	CO	Crude oil	Total spool (spools):	201	5th Inspection date:	22 มิ.ย. 2022	10th Inspection	06 มิ.ย. 2019

## THICKNESS MEASUREMENT RESULT

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	<h1>FLOWLINE THICKNESS REPORT</h1>	PS1/M INSPECTION TEAM
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Tag No.:	S1-LKUCA -FSTN-6-CAA-P-CO		Total length (m):	2200	Installation date:	01 มี.ย. 2000	Service life (yrs):	22.66
Pipe size (in):	6		% Inspection:	20	1st Inspection date:	02 มี.ย. 2020	6th Inspection date:	08 มี.ย. 2015
Flowline No.:	CAA		No. of section (sections):	5	2nd Inspection date:	15 มี.ย. 2021	7th Inspection date:	03 มี.ย. 2016
From-To:	LKU-CA	FSTN	Length of section (m):	440	3rd Inspection date:	10 มี.ย. 2021	8th Inspection date:	05 มี.ย. 2017
Process:	P	Process	Length of subsection (m):	88	4th Inspection date:	22 ก.พ. 2022	9th Inspection date:	06 ส.ค. 2018
Service:	CO	Crude oil	Total spool (spools):	201	5th Inspection date:	22 มี.ย. 2022	10th Inspection	06 มี.ย. 2019

## THICKNESS MEASUREMENT RESULT

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	<h1>FLOWLINE THICKNESS REPORT</h1>	PS1/M INSPECTION TEAM
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Tag No.:	S1-LKUCA -FSTN-6-CAA-P-CO		Total length (m):	2200	Installation date:	01 มี.ย. 2000	Service life (yrs):	22.66
Pipe size (in):	6		% Inspection:	20	1st Inspection date:	02 มี.ย. 2020	6th Inspection date:	08 มี.ย. 2015
Flowline No.:	CAA		No. of section (sections):	5	2nd Inspection date:	15 มี.ย. 2021	7th Inspection date:	03 มี.ย. 2016
From-To:	LKU-CA	FSTN	Length of section (m):	440	3rd Inspection date:	10 มี.ย. 2021	8th Inspection date:	05 มี.ย. 2017
Process:	P	Process	Length of subsection (m):	88	4th Inspection date:	22 ก.พ. 2022	9th Inspection date:	06 ส.ค. 2018
Service:	CO	Crude oil	Total spool (spools):	201	5th Inspection date:	22 มี.ย. 2022	10th Inspection	06 มี.ย. 2019

## THICKNESS MEASUREMENT RESULT

[illegible]



	<h1>FLOWLINE THICKNESS REPORT</h1>	PS1/M INSPECTION TEAM
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Tag No.:	S1-LKUCA -FSTN-6-CAA-P-CO		Total length (m):	2200	Installation date:	01 ឆ.ប. 2000	Service life (yrs):	22.66
Pipe size (in):	6		% Inspection:	20	1st Inspection date:	02 ឆ.ប. 2020	6th Inspection date:	08 ឆ.ប. 2015
Flowline No.:	CAA		No. of section (sections):	5	2nd Inspection date:	15 ឆ.ប. 2021	7th Inspection date:	03 ឆ.ប. 2016
From-To:	LKU-CA	FSTN	Length of section (m):	440	3rd Inspection date:	10 ឆ.ប. 2021	8th Inspection date:	05 ឆ.ប. 2017
Process:	P	Process	Length of subsection (m):	88	4th Inspection date:	22 ក.វ. 2022	9th Inspection date:	06 ឆ.គ. 2018
Service:	CO	Crude oil	Total spool (spools):	201	5th Inspection date:	22 ឆ.ប. 2022	10th Inspection	06 ឆ.ប. 2019

## THICKNESS MEASUREMENT RESULT

[illegible]



	<h1>FLOWLINE THICKNESS REPORT</h1>	PS1/M INSPECTION TEAM
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Tag No.:	S1-LKUCA -FSTN-6-CAA-P-CO		Total length (m):	2200	Installation date:	01 ឆ.ប. 2000	Service life (yrs):	22.66
Pipe size (in):	6		% Inspection:	20	1st Inspection date:	02 ឆ.ប. 2020	6th Inspection date:	08 ឆ.ប. 2015
Flowline No.:	CAA		No. of section (sections):	5	2nd Inspection date:	15 ឆ.ប. 2021	7th Inspection date:	03 ឆ.ប. 2016
From-To:	LKU-CA	FSTN	Length of section (m):	440	3rd Inspection date:	10 ឆ.ប. 2021	8th Inspection date:	05 ឆ.ប. 2017
Process:	P	Process	Length of subsection (m):	88	4th Inspection date:	22 ក.វ. 2022	9th Inspection date:	06 ស.គ. 2018
Service:	CO	Crude oil	Total spool (spools):	201	5th Inspection date:	22 ឆ.ប. 2022	10th Inspection	06 ឆ.ប. 2019

## THICKNESS MEASUREMENT RESULT

[illegible]





	<h1>FLOWLINE THICKNESS REPORT</h1>	PS1/M INSPECTION TEAM
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Tag No.:	S1-LKUCA -FSTN-6-CAA-P-CO		Total length (m):	2200	Installation date:	01 มี.ย. 2000	Service life (yrs):	22.66
Pipe size (in):	6		% Inspection:	20	1st Inspection date:	02 มี.ย. 2020	6th Inspection date:	08 มี.ย. 2015
Flowline No.:	CAA		No. of section (sections):	5	2nd Inspection date:	15 มี.ย. 2021	7th Inspection date:	03 มี.ย. 2016
From-To:	LKU-CA	FSTN	Length of section (m):	440	3rd Inspection date:	10 มี.ย. 2021	8th Inspection date:	05 มี.ย. 2017
Process:	P	Process	Length of subsection (m):	88	4th Inspection date:	22 ก.พ. 2022	9th Inspection date:	06 ส.ค. 2018
Service:	CO	Crude oil	Total spool (spools):	201	5th Inspection date:	22 มี.ย. 2022	10th Inspection	06 มี.ย. 2019

## THICKNESS MEASUREMENT RESULT

[illegible]



Tag No.:	S1-LKUCA -FSTN-6-CAA-P-CO		Total length (m):	2200	Installation date:	01 มี.ย. 2000	Service life (yrs):	22.66
Pipe size (in):	6		% Inspection:	20	1st Inspection date:	02 มี.ย. 2020	6th Inspection date:	08 มี.ย. 2015
Flowline No.:	CAA		No. of section (sections):	5	2nd Inspection date:	15 มี.ย. 2021	7th Inspection date:	03 มี.ย. 2016
From-To:	LKU-CA	FSTN	Length of section (m):	440	3rd Inspection date:	10 มี.ย. 2021	8th Inspection date:	05 มี.ย. 2017
Process:	P	Process	Length of subsection (m):	88	4th Inspection date:	22 ก.พ. 2022	9th Inspection date:	06 ส.ค. 2018
Service:	CO	Crude oil	Total spool (spools):	201	5th Inspection date:	22 มี.ย. 2022	10th Inspection	06 มี.ย. 2019

## THICKNESS MEASUREMENT RESULT

[illegible]

		MINIMUM REMAINING THICKNESS						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
22 มิ.ย. 2022	A1	A-A1-S12-W13-U	6.69	6.69	0.00	0.00	4241.17	31 ธ.ค. 2099
22 มิ.ย. 2022	B1	B-B1-S45-W46-U	6.69	6.71	-0.01	-0.00	15.91	16 พ.ค. 2038
22 มิ.ย. 2022	C1	C-C1-S86-W86-D	6.49	6.49	0.00	0.00	4060.18	31 ธ.ค. 2099
22 มิ.ย. 2022	D1	D-D1-S126-W127-U	6.99	6.99	0.00	0.00	4512.65	31 ธ.ค. 2099
22 มิ.ย. 2022	E1	E-E1-S160-W161-U	6.99	6.99	0.00	0.00	4512.65	31 ธ.ค. 2099
18 ก.พ. 2022	A2	A-A2-S19-W19-W		5.32	0.12	0.12	27.72	01 พ.ย. 2049
22 มิ.ย. 2022	B2	B-B2-S56-W57-U	6.39	6.39	0.00	0.00	3519.00	31 ธ.ค. 2099
22 มิ.ย. 2022	C2	C-C2-S97-W98-U	6.99	6.99	0.00	0.00	4000.31	31 ธ.ค. 2099
22 มิ.ย. 2022	D2	D-D2-S131-W132-U	6.99	6.99	0.00	0.00	4000.31	31 ธ.ค. 2099
22 มิ.ย. 2022	E2	E-E2-S166-W167-U	6.79	6.79	0.00	0.00	3839.87	31 ธ.ค. 2099
02 มิ.ย. 2020	A3	A-A3-S25-W25-D	6.90	6.90	0.00	0.02	243.90	31 ธ.ค. 2099
02 มิ.ย. 2020	B3	B-B3-S68-W68-D	6.90	6.20	0.14	0.00	29.91	23 เม.ย. 2050
02 มิ.ย. 2020	C3	C-C3-S106-W106-D	6.69	6.60	0.02	0.01	254.81	31 ธ.ค. 2099
02 มิ.ย. 2020	D3	D-D3-S137-W138-U	6.70	6.70	0.00	0.07	66.84	19 มี.ค. 2087
02 มิ.ย. 2020	E3	E-E3-S172-W173-U	6.69	6.70	-0.00	0.00	15.88	13 เม.ย. 2036
15 มิ.ย. 2021	A4	A-A4-S33-W34-U	7.40	6.46	0.19	0.15	23.87	24 เม.ย. 2045
15 มิ.ย. 2021	B4	B-B4-S71-W72-U	7.10	7.01	0.02	0.03	172.41	31 ธ.ค. 2099
15 มิ.ย. 2021	C4	C-C4-S110-W111-U	6.90	6.81	0.02	0.03	165.52	31 ธ.ค. 2099
15 มิ.ย. 2021	D4	D-D4-S143-W144-U	7.10	7.14	-0.01	0.02	320.61	31 ธ.ค. 2099
15 มิ.ย. 2021	E4	E-E4-S177-W177-D	7.00	6.97	0.01	0.04	115.35	31 ธ.ค. 2099
22 มิ.ย. 2022	A5	A-A5-S35-W36-U	6.69	6.63	0.01	0.01	389.36	31 ธ.ค. 2099
10 มิ.ย. 2021	B5	B-B5-S82-W82-W		6.43	0.07	0.07	62.50	25 พ.ย. 2083
10 มิ.ย. 2021	C5	C-C5-S116-W116-W		6.30	0.08	0.08	55.80	15 มี.ค. 2077
22 มิ.ย. 2022	D5	D-D5-S154-W154-D	7.00	7.00	0.00	0.02	249.77	31 ธ.ค. 2099
22 มิ.ย. 2022	E5	E-E5-S189-W190-U	7.00	7.00	0.00	0.01	499.54	31 ธ.ค. 2099

		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
22 มิ.ย. 2022	A1	A-A1-S2-W2-D		8.23	-0.01	-0.01	21.05	04 ก.ค. 2043
22 มิ.ย. 2022	B1	B-B1-S45-W46-U	6.69	6.71	-0.01	-0.00	15.91	16 พ.ค. 2038
22 มิ.ย. 2022	C1	C-C1-S84-W85-U	10.40	9.30	0.28	0.14	25.73	09 มี.ค. 2048
11 มิ.ย. 2021	D1	D-D1-S123-W123-W		7.09	0.04	0.04	128.95	31 ธ.ค. 2099
22 มิ.ย. 2022	E1	E-E1-S159-W160-U	7.59	7.38	0.05	0.02	99.33	31 ธ.ค. 2099
18 ก.พ. 2022	A2	A-A2-S19-W19-W		5.32	0.12	0.12	27.72	01 พ.ย. 2049
22 มิ.ย. 2022	B2	B-B2-S59-W59-D	9.79	9.27	0.17	0.07	42.57	06 ม.ค. 2065
18 ก.พ. 2022	C2	C-C2-S97-W97-W	7.26	7.44	-0.26	-0.26	18.38	30 มิ.ย. 2040
27 ก.พ. 2022	D2	D-D2-S135-W135-W		7.09	0.04	0.04	133.33	31 ธ.ค. 2099
22 มิ.ย. 2022	E2	E-E2-S162-W163-U	7.40	7.40	0.00	0.00	18.24	13 ก.ย. 2040
02 มิ.ย. 2020	A3	A-A3-S22-W22-D	7.19	7.20	-0.00	0.00	17.57	21 ธ.ค. 2037
02 มิ.ย. 2020	B3	B-B3-S66-W67-U	6.69	6.70	-0.00	0.00	15.88	13 เม.ย. 2036
02 มิ.ย. 2020	C3	C-C3-S103-W103-D	6.99	7.00	-0.00	0.00	16.89	18 เม.ย. 2037
02 มิ.ย. 2020	D3	D-D3-S136-W137-U	6.79	6.80	-0.00	0.00	16.21	15 ส.ค. 2036
02 มิ.ย. 2020	E3	E-E3-S172-W173-U	6.69	6.70	-0.00	0.00	15.88	13 เม.ย. 2036
15 มิ.ย. 2021	A4	A-A4-S33-W34-U	7.40	6.46	0.19	0.15	23.87	24 เม.ย. 2045
15 มิ.ย. 2021	B4	B-B4-S70-W71-U	7.40	7.13	0.05	0.09	58.85	05 เม.ย. 2080
15 มิ.ย. 2021	C4	C-C4-S114-W115-U	7.39	7.40	-0.00	0.00	18.24	07 ก.ย. 2039
15 มิ.ย. 2021	D4	D-D4-S142-W143-U	7.30	7.62	-0.06	-0.00	18.99	04 มิ.ย. 2040
15 มิ.ย. 2021	E4	E-E4-S175-W176-U	7.30	7.61	-0.06	-0.00	18.95	23 พ.ค. 2040
22 มิ.ย. 2022	A5	A-A5-S37-W37-D	6.89	6.91	-0.00	-0.00	16.59	17 ม.ค. 2039
10 มิ.ย. 2021	B5	B-B5-S82-W82-W		6.43	0.07	0.07	62.50	25 พ.ย. 2083
10 มิ.ย. 2021	C5	C-C5-S116-W116-W		6.30	0.08	0.08	55.80	15 มี.ค. 2077
22 มิ.ย. 2022	D5	D-D5-S153-W154-U	7.20	7.20	0.00	0.06	86.59	31 ธ.ค. 2099
22 มิ.ย. 2022	E5	E-E5-S200-W200-D		10.05	-0.10	-0.10	27.20	26 ส.ค. 2049





# FLOWLINE THICKNESS REPORT

PS1/M  
INSPECTION  
TEAM








Tag No.:	S1-LKUCA -FSTN-6-CAA-P-CO		Total length (m):	2200	Installation date:	01 มิ.ย. 2000
Pipe size (in):	6		% Inspection:	20	1st Inspection date:	02 มิ.ย. 2020
Flowline No.:	CAA		No. of section (sections):	5	2nd Inspection date:	15 มิ.ย. 2021
From-To:	LKU-CA	FSTN	Length of section (m):	440	3rd Inspection date:	10 มิ.ย. 2021
Process:	P	Process	Length of subsection (m):	88	4th Inspection date:	22 ก.พ. 2022
Service:	CO	Crude oil	Total spool (spools):	201	5th Inspection date::	22 มิ.ย. 2022

## THICKNESS MEASUREMENT RESULT

Distribution of Thickness along CAA





	<h1>FLOWLINE VISUAL INSPECTION REPORT</h1>				PS1/M INSPECTION TEAM	
Inspection date:	22 มิ.ย. 2022	Damage mechanism:	Ext-No anomaly found	Severity:	GOOD	
Line No:	CAA	Main component :	Pipe	Reporting by :	Manop N.	
Anomaly point:		WO number :	500358034	Reporting date :	04-07-2022 8:43:48 AM	
<div></div>						
<b>Finding</b> -By visual inspection, this flowline still in good condition. Photo 1. Section B2 Under block culvert from S-166-01 to S-106-47 (W.56 Wrapping) can't MFL inspection.			<b>Recommendation</b> - 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.			
Inspection date:	22 มิ.ย. 2022	Damage mechanism:	Ext-No anomaly found	Severity:	GOOD	
Line No:	CAA	Main component :	Pipe	Reporting by :	Manop N.	
Anomaly point:		WO number :	500358034	Reporting date :	04-07-2022 8:43:49 AM	
<div></div>						
<b>Finding</b> -By visual inspection, this flowline still in good condition. Photo 2. Section D1 Under block culvert from S-095-19 to S-095-16 can't MFL inspection.			<b>Recommendation</b> - 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.			

Inspected by:	Manop N.	Date:	
API Inspector reviewed by:	Jirawat C.	Date:	11 ก.ค. 2022
PTTEP Leader reviewed:	Apichat P.	Date:	24 ก.ค. 2022

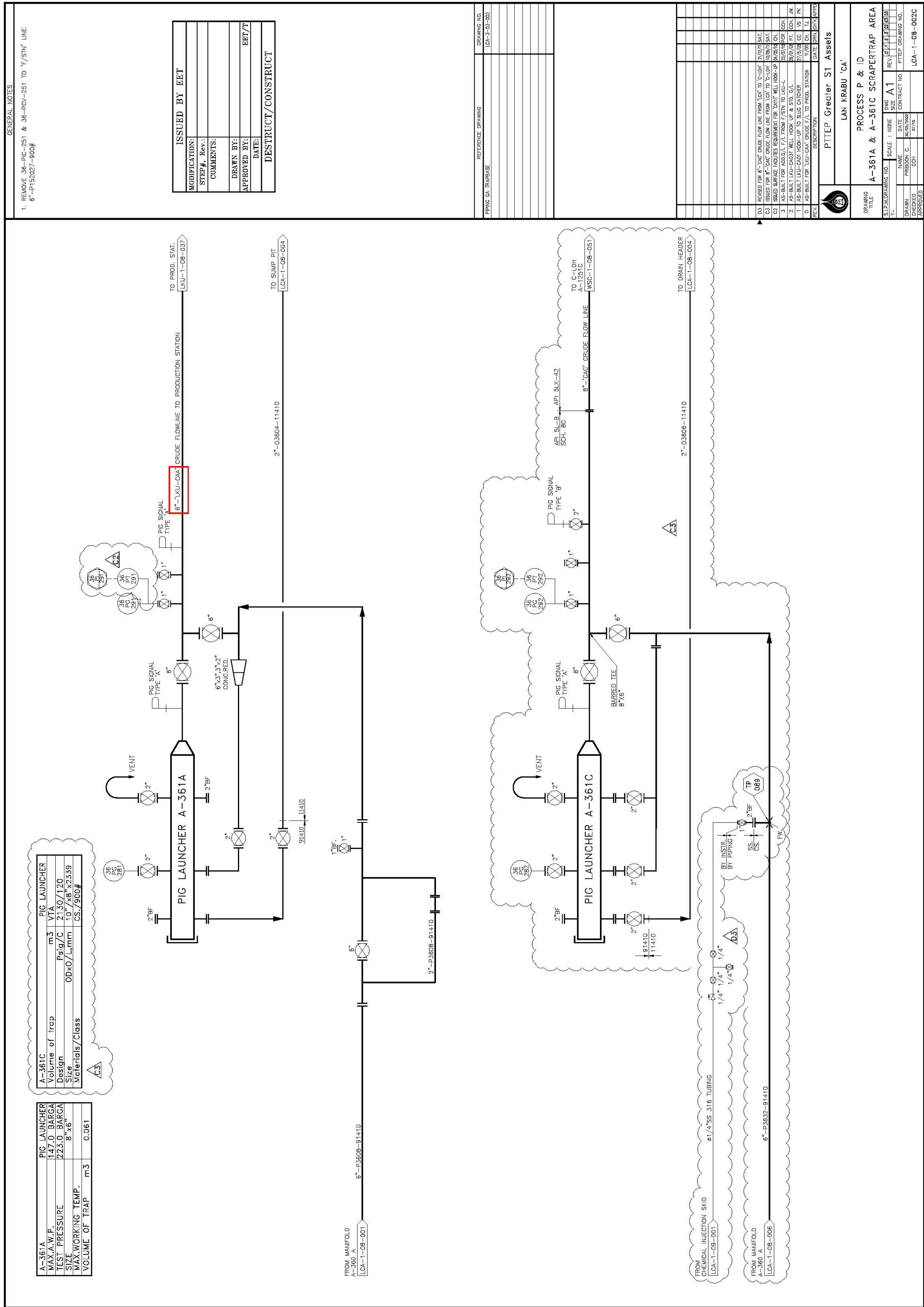




# FLOWLINE P&ID

**PS1/M  
INSPECTION  
TEAM**

## P&ID DRAWING



Inspected by:	LKU Inspection Admin	Date:	10 ก.ย. 2020
API Inspector reviewed by:	Jirawat C.	Date:	11 ก.ค. 2022
PTTEP Leader reviewed:	Apichat P.	Date:	24 ก.ค. 2022

Inspected by:	LKU Inspection Admin	Date:	10 ก.ย. 2020
API Inspector reviewed by:	Jirawat C.	Date:	11 ก.ค. 2022
PTTEP Leader reviewed:	Apichat P.	Date:	24 ก.ค. 2022