

Certificate No : 2022-PTR-COR-15-03

Date : November 23rd, 2022



CERTIFICATE OF ACCOMPLISHMENT

This is to certify that

EDWARD SINAGA

ID NUMBER : PTR-COR-015-03

has finished & completed the Final Project of our training

CORROSION ENGINEER

SUBJECT : CORROSION PREVENTION & CONTROL PLANNING FOR OIL GAS/INDUSTRIAL PLANT

Trainer : Sofyan Yusuf, S.Si, M.Si, Senior Corrosion Engineer

Held by **PETROS OIL GAS TRAINING**, November 15th to 22nd, 2022 covering the subjects as listed on the back page



Certificate Validation

A handwritten signature in black ink, appearing to read "Heru Prasadia, ST".

Heru Prasadia, ST
Director

CORROSION ENGINEER TRAINING

SUBJECT : CORROSION PREVENTION & CONTROL PLANNING FOR OIL GAS/INDUSTRIAL PLANT

1 BASIC THEORY

Basic Corrosion Mechanism
Corrosion in Oil & Gas Topside Facilities
Introduction of International Code/Standard (NACE - ASME - API - NORSOK)
Introduction of Corrosion Monitoring System
Introduction of Corrosion Inhibition System
CO₂ Corrosion Rate Calculation - Theoretical

2 PLANNING OF CATHODIC PROTECTION SYSTEM IN OIL & GAS FACILITIES

Basic Theory of Cathodic Protection
Flowchart of Cathodic Protection Selection for Sacrificial Anodes & Impressed Current
Calculation of Impressed Current Cathodic Protection
Calculation of Sacrificial Anodes Cathodic Protection

3 PLANNING OF CORROSION MONITORING SYSTEM IN OIL & GAS PLANT

Flowchart of Corrosion Monitoring System Selection
Corrosion Coupon System
Reviews HMB-PFD- P&ID
Introduction of Corrosion Coupon Devices
Determination for location of Corrosion Coupon Monitoring
Schedule for Corrosion Coupon Exchange
Weight Loss Calculation for Corrosion Coupon & Actual Corrosion Rate
Corrosion Rate Anomaly in Coupon
Corrosion Probe System
Reviews HMB-PFD- P&ID
Introduction of Corrosion Probe System Devices
Determination for Location of Corrosion Probe Monitoring
Schedule for Corrosion Probe Exchange
Determination of Probe's Corrosion Rate
Corrosion Rate Anomaly in Probe

4 PLANNING OF CORROSION MITIGATION SYSTEM IN OIL & GAS PLANT

Flowchart of Corrosion Mitigation System Selection
Chemical Inhibitor System
Reviews HMB-PFD- P&ID
Selection of Chemical Inhibitor
Calculation of Inhibitor Dosage, Filling Schedule, Pump Rate
Selection of Injection point for Chemical Inhibitor
Calculation of Efficiency & Availability for Chemical Inhibitor
Theoretical Calculation of Corrosion Rate for Chemical Inhibitor

5 FAILURE ANALYSIS

Flowchart OF Failure Analysis - Case Study
Visual examination
Scanning Microscope Electron (SEM) Examination
X-Ray Diffraction (XRD) Examination
NDT Inspection Summary
Operation Data Overview
Calculation of CO₂ Corrosion
Corrosion Coupon Data Verification
Cathodic Protection Reading Verification
Laboratory Testing
Calculation of Erosional Velocity API 14E
Calculation of Reynold Number
Chemical Injection Verification
Analysis of Root Cause
Conclusion & Recommendation

6 FINAL PROJECT :

Corrosion Prevention & Control Planning Working Plan
for "X" Gas Plant