

# CORROSION MONITORING SURVEY REPORT

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## Qatar Energy (QE) Halul Island & PS-3 Offshore Platforms

**Contract No:** LC241047A0

**Survey Period:** July 8 - August 25, 2025

**Report Date:** December 2025

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Field	Details
Project	Corrosion Coupon Retrieval & ER Probe Monitoring
Location	PS-3 & Halul Island, Qatar
Client	Qatar Energy (QE)
Contractor	Axess-Corrosion / Petromech

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# 1. Executive Summary

This report presents the findings of the Corrosion Monitoring Survey conducted at Qatar Energy (QE) offshore facilities, specifically the PS-3 platforms and Halul Island locations. The survey was conducted between July 8 and August 25, 2025, under Contract No. LC241047A0.

## 1.1 Key Findings

- Total Corrosion Coupons Processed:** 212 coupons across all locations
- Coupons Successfully Retrieved:** 122 (57.5%)
- Laboratory Analysis Completed:** 98 coupons (46.2%)
- ER Probe Readings Recorded:** 36 probe locations at PS-3
- New Coupons Installed:** Multiple locations serviced with new C1018 carbon steel coupons

## 1.2 Summary Statistics by Location

Location	Total	Received	Completed	Pending
PS-3 & Halul Island	90	76	75	15
PS-2	39	27	27	12
PS-4	28	21	21	7
PS-1	32	--	--	--
Various Stations	20	15	15	5
<b>Grand Total</b>	<b>209</b>	<b>139</b>	<b>138</b>	<b>39</b>

## 1.3 Overall Assessment

The corrosion monitoring survey was successfully completed with the retrieval and analysis of corrosion coupons from the majority of accessible locations. The survey revealed generally acceptable corrosion rates at most locations, with specific areas requiring continued monitoring or remedial action.

## 2. Introduction

### 2.1 Background

Corrosion monitoring is a critical aspect of integrity management for offshore oil and gas facilities. Qatar Energy operates numerous offshore platforms in the Arabian Gulf, including the PS-3 complex and Halul Island facilities. Regular corrosion monitoring helps ensure safe and reliable operation of these assets by identifying areas of accelerated metal loss before they become integrity concerns.

### 2.2 Purpose of the Survey

The primary objectives of this corrosion monitoring survey were to:

1. Retrieve installed corrosion coupons from designated monitoring locations
2. Conduct visual inspection and weight loss analysis of retrieved coupons
3. Record electrical resistance (ER) probe readings at all probe locations
4. Replace expired ER probes with new units
5. Install new corrosion coupons for continued monitoring
6. Identify any locations requiring remedial action or enhanced monitoring

### 2.3 Report Structure

- **Chapter 3:** Scope of Work – Details the planned activities
  - **Chapter 4:** Field Services – Describes the execution of field activities
  - **Chapter 5:** General Observations – Presents field observations
  - **Chapter 6:** Survey Findings – Contains detailed results and data
  - **Chapter 7:** Conclusions – Summarizes key outcomes
  - **Chapter 8:** Recommendations – Provides actionable recommendations
  - **Appendices:** Supporting data and photographic records
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## **3. Scope of Work**

### **3.1 Work Locations**

#### **3.1.1 PS-3 Platform Complex**

- PS-3A Platform (Lower Deck, Production Area)
- PS-3B Platform (Separator Location, Production Manifold, Pig Launcher)
- PS-3C Platform (Riser Platform, NGL Facilities)
- Pipeline Pipe Bridges (PS-3A to PS-3B, PS-3B to PS-3C)

#### **3.1.2 Halul Island Terminal**

- Halul Platform Upper Deck
- Halul Riser New Platform Upper Deck Level 4
- NGL Facilities (Main Deck and Upper Deck)

### **3.2 Equipment and Materials**

<b>Equipment</b>	<b>Purpose</b>
25" RBS Retrieval Tool	High-pressure coupon retrieval
37" RBS Retrieval Tool	Extended reach locations
Checkmate ER Probe Reader	Electrical resistance measurements
Pressure Test Equipment	Integrity verification
Corrosion Coupons (C1018)	Replacement coupons
ER Probes (Type B, D)	Probe replacements

### **3.3 Coupon Types**

Type	Material	Surface Area (in <sup>2</sup> )	Density (g/cm <sup>3</sup> )
3" Strip Coupon	C 1018	5.2	7.86
Disc Coupon	C 1018	2.5	7.86
2" Ladder Coupon	C 1018	3.4	7.86

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## **4. Field Services**

### **4.1 Mobilization and Site Preparation**

Field activities commenced on July 8, 2025, with the survey team arriving at PS-3 platform. Initial activities included:

- Completion of platform safety inductions
- Submission of work permits and Level 2 Job Safety Analysis (JSA)
- Coordination meetings with site safety team, permit controller, and permit authority
- Visual inspection of all coupon and probe locations
- Assessment of scaffolding requirements

## 4.2 Daily Progress Summary

### Phase 1: PS-3 Platform (July 8-25, 2025)

Date	Activities Completed
July 8, 2025	Arrived at PS-3; completed inductions; submitted work permits and JSA; visual inspection of all locations
July 9, 2025	ER Probe readings at 36 locations; commenced coupon retrievals; serviced locations 53-XCC-951, 53-XCC-953
July 13, 2025	Continued coupon retrievals at PS-3C Platform; serviced multiple riser platform locations
July 14, 2025	Coupon retrievals and ER probe replacements at NGL facilities
July 16-17, 2025	Continued operations at Production Manifold and Separator locations
July 18, 2025	Serviced pipeline pipe bridge locations between platforms
July 20-22, 2025	Completed remaining PS-3B and PS-3C locations; probe replacements

### Phase 2: Halul Island & Final PS-3 Work (August 2025)

Date	Activities Completed
August 20, 2025	ER Probe service and corrosion coupon retrieval at multiple locations
August 21, 2025	Continued coupon retrievals; ER probe replacements
August 22, 2025	Multiple coupon locations serviced; probe readings recorded
August 23, 2025	Coupon retrieval operations at remaining accessible locations
August 24, 2025	<b>Work suspended due to rough sea conditions</b>
August 25, 2025	Final coupon retrievals completed; PS-3 work finalized

## 4.3 Work Methods

### 4.3.1 Coupon Retrieval Procedure

1. Verify process conditions and obtain work permit
2. For high-pressure locations (>500 psi), perform back-pressure test
3. Install retrieval tool (25" or 37" RBS tool as required)
4. Extract coupon holder assembly
5. Document coupon condition with photographs
6. Remove coupons from holder; label and package for laboratory
7. Install new pre-weighed coupons
8. Replace all pressure-retaining seals
9. Reinstall holder and verify integrity

### 4.3.2 ER Probe Reading Procedure

1. Connect Checkmate reader to probe access point
  2. Record Check, Div, Metal Loss, and Corrosion Rate readings
  3. Document any anomalies or inconsistent readings
  4. For probes requiring replacement: extract and install new probe
  5. Record baseline readings for new probes
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## 5. General Observations

### 5.1 Equipment Condition

#### 5.1.1 Checkmate ER Probe Reader

During ER probe readings on July 9, 2025, it was observed that readings were inconsistent and required significant time to stabilize. Investigation revealed that the position of the Checkmate cable significantly affected readings, suggesting potential cable deterioration. **The Checkmate unit is approximately 12 years old and is recommended for replacement.**

## 5.1.2 Retrieval Tools

The 25" and 37" RBS retrieval tools performed satisfactorily throughout the campaign. No significant issues were encountered with the pressure-retaining mechanisms.

## 5.2 Access Conditions

Several locations presented access challenges:

Location	Issue	Action Required
53-XCC-1428	Elevated level access	Permanent service platform
53-XCP-1427	Elevated level access	Permanent service platform
6-GC-430036	Protective cover jammed	Scaffolding required
Multiple PS-3C	Structural obstruction	Platform modification

## 5.3 Coupon Condition Observations

The majority of retrieved coupons exhibited the following characteristics:

- Dark coloration consistent with exposure to crude oil environment
- Small amounts of soft, easily removable deposits
- No evidence of severe pitting or localized attack on most coupons
- Weight loss measurements indicate general uniform corrosion

## 5.4 Weather Impact

Work was suspended on August 24, 2025, due to rough sea conditions that prevented safe vessel operations to PS-3. Activities resumed the following day when conditions improved.

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## **6. Survey Findings**

### **6.1 Corrosion Coupon Results - PS-3 Locations**

Tag No.	Location	Coupon ID	Original Weight (g)	Status
53-XCC-1413	PS-3A Lower Deck	MQ039	36.5112	Completed
53-XCC-1413	PS-3A Lower Deck	MQ040	36.8093	Completed
53-XCC-918	Pipe Bridge	ZK885	17.3866	Completed
53-XCC-982	Pipe Bridge	ZK884	17.9588	Completed
53-XCC-949	PS-3B to 3C	MQ005	36.8855	Completed
53-XCC-949	PS-3B to 3C	MQ006	36.8841	Completed
53-XCC-951	Production Line	MQ003	36.8444	Completed
53-XCC-951	Production Line	MQ004	36.9441	Completed
53-XCC-953	Production Line	MQ001	36.9255	Completed
53-XCC-953	Production Line	MQ002	36.9270	Completed
53-XCC-1430	Separator	MQ033	37.0900	Completed
53-XCC-1430	Separator	MQ034	37.0153	Completed
53-XCC-1428	Separator	MQ035	36.7602	Completed
53-XCC-1428	Separator	MQ036	37.0007	Completed
53-XCC-973	Separator	ZK886	17.1545	Completed
53-XCC-971	Separator	MQ049	36.8528	Completed
53-XCC-971	Separator	MQ050	36.8239	Completed
53-XCC-909	Separator	MQ031	36.9129	Completed
53-XCC-909	Separator	MQ032	37.0324	Completed
53-XCC-1001	Pig Launcher	MQ037	36.6161	Completed
53-XCC-1001	Pig Launcher	MQ038	36.9023	Completed
53-XCC-945	Production Manifold	MQ047	36.8085	Completed
53-XCC-945	Production Manifold	MQ048	36.7340	Completed
53-XCC-1143	Riser Platform	MQ000	36.8805	Completed

Tag No.	Location	Coupon ID	Original Weight (g)	Status
53-XCC-1143	Riser Platform	MQ999	36.7790	Completed

## 6.2 ER Probe Readings

Probe ID	Check	Div	M.Loss	CR (mpy)
53-XCP-950	831	177.7	0.71	0
53-XCP-1427	771	76.8	--	--

## 6.3 Coupon Installation Summary

Location	Coupon ID	Weight (g)	Install Date
53-XCC-951	NE590	36.7337	09-07-2025
53-XCC-951	NE591	36.7703	09-07-2025
53-XCC-953	NE588	36.9901	09-07-2025
53-XCC-953	NE589	36.7604	09-07-2025
53-XCC-1428	NE652	36.7398	25-08-2025
53-XCC-1428	NE653	36.8152	25-08-2025

## 6.4 Statistical Summary

Metric	Count	Percentage
Total Planned Locations	212	100%
Coupons Successfully Retrieved	122	57.5%
Laboratory Analysis Completed	98	46.2%
Locations Not Accessible	39	18.4%
Pending Analysis	34	16.0%

## 7. Conclusions

Based on the corrosion monitoring survey conducted at PS-3 and Halul Island facilities, the following conclusions are drawn:

### 7.1 Survey Completion

1. The corrosion monitoring survey was successfully executed between July 8 and August 25, 2025, covering the majority of planned locations at PS-3 platforms and Halul Island.
2. A total of 122 corrosion coupons were successfully retrieved from 212 planned locations, representing a **57.5% retrieval rate**.
3. Laboratory analysis has been completed for 98 coupons (46.2%), with remaining samples pending processing.
4. ER probe readings were recorded at all 36 accessible probe locations at PS-3.

### 7.2 Corrosion Assessment

1. The majority of retrieved coupons showed uniform general corrosion with dark deposits consistent with crude oil exposure.
2. **No evidence of severe pitting corrosion** or localized attack was observed on the inspected coupons.
3. Weight loss measurements indicate corrosion rates within acceptable limits for the operating environment.
4. ER probe readings showed stable corrosion rates at most locations, with some probes requiring replacement due to age.

### 7.3 Equipment and Access

1. The Checkmate ER probe reader exhibited inconsistent readings, likely due to cable degradation after 12 years of service.
2. Several locations (approximately 18.4%) could not be accessed due to:
  3. Elevated positions requiring scaffolding or permanent platforms
  4. Structural obstructions blocking retrieval tool access

5. Jammed protective covers
  6. High-pressure locations (1500 psi) were successfully serviced using appropriate back-pressure testing procedures.
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## 8. Recommendations

### 8.1 Immediate Actions

1. **Replace Checkmate ER Probe Reader:** The current unit is 12 years old and showing signs of cable deterioration affecting reading accuracy. A new unit should be procured before the next survey campaign.
2. **Complete Pending Coupon Analysis:** Expedite laboratory analysis of the remaining 34 coupons to complete the corrosion rate assessment.
3. **Address Jammed Access Fittings:** Location 6-GC-430036 has a jammed protective cover requiring maintenance attention.

### 8.2 Access Improvements

1. **Install Permanent Service Platforms:** Locations 53-XCC-1428 and 53-XCP-1427 require permanent service platforms for safe and efficient access during future surveys.
2. **Structural Modifications:** Review and modify structural elements that obstruct retrieval tool access at certain locations on PS-3C.
3. **Scaffolding Plan:** Develop a pre-survey scaffolding plan for elevated locations to minimize delays during future campaigns.

### 8.3 Monitoring Program Enhancements

1. **Survey Frequency:** Maintain the current 2-year survey interval for corrosion coupon retrieval and analysis.
2. **ER Probe Program:** Consider more frequent ER probe readings (quarterly or semi-annually) to track corrosion rate trends between coupon surveys.
3. **Data Management:** Implement a centralized database system for tracking coupon installation dates, weights, and analysis results.

4. **Coupon Identification:** Ensure all coupon locations are clearly tagged and documented to prevent "Not Available" designations.

## 8.4 Future Survey Planning

1. Schedule the next corrosion monitoring survey for **mid-2027**.
  2. Coordinate with operations to address access issues before the next survey.
  3. Pre-position scaffolding at known elevated locations.
  4. Ensure adequate weather windows are planned for offshore vessel operations.
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# **Appendices**

## **Appendix A: Corrosion Coupon Locations**

### **PS-3 Platform Coupon Locations**

<b>Tag No.</b>	<b>Line Description</b>	<b>Orientation</b>	<b>Coupon Type</b>
53-XCC-1413	PS-3A Platform Lower deck	Top Mounted 12 O'clock	3" Strip
53-XCC-918	PS-3B to PS-3A Pipe Bridge (Right Side)	Top Mounted 12 O'clock	Disc Coupon
53-XCC-982	PS-3B to PS-3A Pipe Bridge (Right Side)	Top Mounted 12 O'clock	Disc Coupon
53-XCC-985	PS-3B to PS-3A Pipe Bridge (Left Side)	Top Mounted 12 O'clock	Disc Coupon
53-XCC-949	PS-3B to PS-3C Platform Pipe Bridge	Top Mounted 12 O'clock	3" Strip
53-XCC-951	12" Oil Line from Uwainat Header	Top Mounted 12 O'clock	3" Strip
53-XCC-953	12" Oil Line from Uwainat Header	Top Mounted 12 O'clock	3" Strip
53-XCC-1430	PS-3B Separator Location Upper Deck	Top Mounted 12 O'clock	3" Strip
53-XCC-1428	18" Crude inlet to V-5356	Top Mounted 12 O'clock	3" Strip
53-XCC-973	PS-3B Separator Location	Top Mounted 12 O'clock	Disc Coupon
53-XCC-971	PS-3B Separator Location	Side Mounted 3/9 O'clock	3" Strip
53-XCC-909	PS-3B Separator Location	Top Mounted 12 O'clock	Scale Coupon
53-XCC-1001	PS-3B Separator Pig Launcher	Top Mounted 12 O'clock	Scale Coupon
53-XCC-945	PS-3B Production Manifold Upper Deck	Top Mounted 12 O'clock	3" Strip
53-XCC-1143	PS-3C Riser Platform Lower Deck	Bottom Mounted 6 O'clock	3" Strip

## **Appendix B: Daily Progress Reports Summary**

### **July 2025 Reports**

**July 8, 2025 - Initial Mobilization** - Team arrived at PS-3 and completed platform inductions - Work permits and Level 2 JSA submitted for approval - Meetings held with safety team, permit controller, and permit authority - Visual survey completed to confirm location Tag IDs - Equipment delayed due to vessel reallocation to well jacket priority work

**July 9, 2025 - Operations Commenced** - ER Probe readings completed at all 36 probe locations - Coupon retrievals started at 2 high-pressure locations - Locations serviced: 53-XCC-951, 53-XCC-953 - Checkmate cable issues noted during probe readings

### **August 2025 Reports**

**August 24, 2025 - Weather Hold** - Work suspended due to rough sea conditions - Vessel unable to proceed safely to PS-3 - Operations postponed to following day

**August 25, 2025 - Final Operations** - Resumed operations after weather improvement - Heat index caused delayed permit issuance - Completed retrieval at 53-XCC-1428 - Replaced ER probe at 53-XCP-1427 - All pending PS-3 work completed

## **Appendix C: Photographic Record**

*Note: Photographs were taken at each location during coupon retrieval and probe servicing operations. The photographic record includes:*

- Access fitting photographs (before and after service)
- Retrieved coupon/device photographs
- Installed coupon/device photographs
- General area photographs for location reference

*Full photographic records are maintained in the project files and available upon request.*

## Appendix D: Comparison with 2023 Survey

Parameter	2023 Survey	2025 Survey
Survey Duration	July 2023	July-August 2025
Locations Surveyed	PS-3, Halul	PS-3, Halul
Coupons Retrieved	--	122
ER Probes Serviced	36	36
New Probes Installed	Multiple	Multiple

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*End of Report*

*Document prepared by Axess-Corrosion / Petromech  
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