|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **PHASED ARRAY ULTRASONIC TESTING REPORT** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **JOB DETAILS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Client: | | | **NCOC N.V.** | | | | Project: | | | **ESKENE WEST** | | | | | | | | | | | Work Location: | | | | | **Sour Oil** | | |
| **JOB DESCRIPTION** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brief Description of Job: | | | | | | | **Encoded Thickness Measurement Survey of A1-1900-RO-005-10”-C11-PF** | | | | | | | | | | | | | | | | | | | | | |
| Line No.: | | | | | | | **A1-1900-RO-005-10”-C11-PF** | | | | | | | | Location: | | | | | | **Unit 190** | | | | | | | |
| Material: | | | | | | | **A333 GR.6 SMLS** | | | | | | | | Surface Condition: | | | | | | **Painted** | | | | | | | |
| Nominal thickness | | | | | | | **15.08 mm** | | | | | | | | Diameter | | | | | | **10 inch** | | | | | | | |
| Part temperature | | | | | | | **12 °C** | | | | | | | |  | | | | | |  | | | | | | | |
| **INSPECTION PROCEDURE** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Procedure No: | | | | | **QP-11-PAUT-CM-Q01 REV 02** | | | | | | In accordance with: | | | | | | **ASME sec V** | | | | | In accordance with: | | | | | **Client Specification** | |
| **INSPECTION EQUIPMENT** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S. No | Equipment/  Material Name | | | | | | Manufacturer | | | | | Serial No | | | | | | | Calibration certificate No | | | | | | Calibration Expiry date | | | |
|  | OmniScan MX2 | | | | | | Olympus | | | | | 103704 | | | | | | | BK-01-2110 | | | | | | 12.09.2020 | | | |
|  | Step wedge calibration block | | | | | | Olympus | | | | | 145414 | | | | | | | - | | | | | | - | | | |
| **EQIPMENT PARAMETERS** | | | | | | | | | | | | | | | | | | | | | | | **CALIBRATION BLOCK DETAILS** | | | | | |
| Mode | | | | **Tx/Rx** | | | | Filter | | **None** | | | Points quantity | | | | | **640** | | | | | Cal block | | | | **Step wedge** | |
| Frequency | | | | **7.5 MHz** | | | | Rectifier | | **FW** | | | No of elements | | | | | **64** | | | | | Material | | | | **CS** | |
| Energy | | | | **40 V** | | | | Video filter | | **On** | | | Element pitch | | | | | **1 mm** | | | | | Range | | | | **(6.25-25) mm** | |
| Pulse width | | | | **100 ns** | | | | Averaging | | **1** | | | Ref sensitivity | | | | | **+10 dB** | | | | | Temperature | | | | **12 °C** | |
| PRF | | | | **auto** | | | | Velocity | | **5890 m/s** | | | Scan sensitivity | | | | | **+0 dB** | | | | | Correction | | | | **n/a** | |
| Probe | | | | **Olympus Hydroform** | | | | Wedge | | **n/a** | | | Couplant | | | | | **Water** | | | | | Accuracy | | | | **±0.1 mm** | |
| **SCAN PLAN** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Test Ref | | Scan type | | | | Beam type | | | Index offset | | | | | Start element | | Active elements | | | | First Element | | | | Last Element | | | | Element Step |
|  | | Linear | | | | Compression | | | 30.5 | | | | | 1 | | 64 | | | | 1 | | | | 64 | | | | 1 |

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| **CALIBRATION DETAILS** |
| Calibration on (6.25-12.5-18.75-25) mm step wedge block:    18.65 mm  24.92 mm  6.28 mm  12.46 mm |

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| **DETAILS AND RESULTS** | | |
| Phased Array inspection was carried out on **A1-1900-RO-005-10”-C11-PF.** Scanning areas are mentioned below. All areas were scanned in increments of 50 mm giving an overlap of approx. 11 mm and varied in length and shape to maximise the area covered around the restrictions. The datum points are shown in photos for clarity. These areas were clearly marked with permanent marker to ensure accurate repeatability. The surface condition was good with Minimal loss of Data due to paint peel off on the surface. | | |
| **A1-1900-RO-005-10”-C11-PF** | | |
| **DETAILS AND RESULTS** | |
| **A1-1900-RO-005-10”-C11-PF - DL – 2 Pipe** | |
| IMG_20200304_161650.jpg  0  X axis  Y axis | Data collected with (0 - 600) mm on X-axis. (0 -250) mm on Y-axis. Scanning starts at 20mm from support weld.  Datum point 0 starts approximately at 7 O’ Clock position and finishes at 5 O’ Clock position to proper collection of data and scanned in clockwise direction (South - Top - North). |
|  | |
| The minimum thickness of the Location DL -2 Pipe | |
| ***12 O’ Clock***  ***Y axis***  ***X axis*** | |
| Full scan view with the minimum thickness area of the Location DL -2 Pipe | |

**A1-470-VA-054 – Drain Collector Drum**

| Line number | Description | Ø. inch | Nominal thickness. mm | Location number | Date | Minimum thickness. mm | Maximum thickness. mm | Area of maximum thickness lose | | | | Average thickness. mm |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Start X | End X | Start Y | End Y |
| **A1-1900-RO-005-10”-C11-PF** | PIPE | 10 | 15.08 | DL - 2 | **04 Mar 2020** | 14.70 | 18.12 | 0 | 200 | 0 | 250 | 16.41 |

*Notes:*

1. *According to PA UT corrosion mapping including coating.*

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| Examined by  PAUT Level II cert. No CMS-PAUT-2017/46B | Sudhagar Subramanian  expiry date: 12.04.2022 | Signature: .......................... | Date: 05-Mar-2020 |
| Approved by  PA-UT Level II cert. No. 1A111/16 | Name: Shakunou Andrei  expiry date: 31.12.2020 | Signature: .......................... | Date: 05-Mar-2020 |
| Client Representative: | ………………………….…. | Signature: ..................... | Date: .................. |