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| **Phased Array Ultrasonic Corrosion Mapping Testing report**  **Протокол по результатам проведения коррозионного сканирования с применением фазированных решёток** | | | | | | | | | | | | | | | | | | | | | | | | | |
| **JOB DETAILS / РАБОЧАЯ ИНФОРМАЦИЯ** | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Client**  Заказчик | | | **NCOC N.V.** | | | **Project**  Проект | | | | **ESKENE WEST** | | | | | **Work Location**  Рабочая площадка | | | | | | | | **KUT** | | |
| **JOB DESCRIPTION / ОПИСАНИЕ РАБОТ** | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Brief Description of Job:**  Краткое описание работы: | | | | | | **Encoded Thickness Measurement Survey of inch Lines according to table** | | | | | | | | | | | | | | | | | | | |
| **Control object**  Объект контроля | | | | | | **A1-7300-FW-563-18"-A21** | | | | | | | **Dimension**  Размер | | | | | | | | **18 inch** | | | | |
| **Material:**  Материал: | | | | | | **A333 Gr.6 SMLS** | | | | | | | **Surface Condition:**  Сост. поверхности: | | | | | | | | **Painted** | | | | |
| **Nominal thickness:**  Номинальная толщина: | | | | | | **18” – 9.52 mm** | | | | | | | **Part temperature:**  Температура поверхности: | | | | | | | | **+25°C** | | | | |
| **INSPECTION PROCEDURE / НОРМАТИВНЫЕ ДОКУМЕНТЫ** | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Procedure**  Процедура | | **WI-11-PAUT-L03** | | | | **Standard for testing**  Стандарт по контролю | | | | | **ASME sec V** | | | | | **Standard for item**  Стандарт для ОК | | | | | | | | **ASME B31.3** | |
| **INSPECTION EQUIPMENT / ОБОРУДОВАНИЕ ИНСПЕКЦИОННОГО КОНТРОЛЯ** | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Equipment & Material**  Оборудование и материалы | | | | | | **Manufacturer**  Изготовитель | | | **Serial No**  Серийный № | | | | | **Calibration certificate No**  Поверочный сертификат № | | | | | | | | **Calibration expiry date**  Срок действия поверки | | | |
| **OmniScan MX2** | | | | | | **Olympus** | | | **103488** | | | | | **KZ-01-22-Ж-0312** | | | | | | | | **26.02.2022** | | | |
| **Step wedge calibration blocks**  **5-10-20-40 mm** | | | | | | **Fizpribor** | | | **3255-20** | | | | | **-** | | | | | | | | **-** | | | |
| **EQIPMENT PARAMETERS / ПАРАМЕТРЫ ОБОРУДОВАНИЯ** | | | | | | | | | | | | | | | | | | | **CALIBRATION BLOCK DETAILS / ПАРАМЕТРЫ КАЛИБР-ОГО БЛОКА** | | | | | | |
| **Mode**  Режим | | **Tx/Rx** | | **Filter**  Фильтр | | | **BP 8 MHz** | | | | | **Points quantity**  Количество точек | | | | | | **320** | **Cal block**  Калибровочный блок | | | | | | **Step wedge** |
| **Frequency**  Частота | | **7.5 MHz** | | **Rectifier**  Выпрямитель | | | **FW** | | | | | **No of elements**  Количество элементов | | | | | | **64** | **Material**  Материал | | | | | | **CS** |
| **Energy**  Напряжение | | **40 V** | | **Video filter**  Видео фильтр | | | **On** | | | | | **Element pitch**  Шаг элементов | | | | | | **1 mm** | **Range**  Диапазон | | | | | | **5.0-10.0-20.0-40.0 mm** |
| **Pulse width**  Длительность импульсов | | **65 ns** | | **Averaging**  Усреднение | | | **1** | | | | | **Ref sensitivity**  Опор. чувствительноть | | | | | | **+15 dB** | **Temperature**  Температура | | | | | | **+12°C** |
| **PRF**  Частота импульсов | | **Auto** | | **Velocity**  Скорость | | | **5890 m/s** | | | | | **Scan sensitivity**  Чувствительность при сканировании | | | | | | **+6 dB** | **Correction**  Поправка | | | | | | **n/a** |
| **Probe**  Датчик | | **7.5L64-l4** | | **Wedge**  Призма | | | **HydroFORM** | | | | | **Couplant**  Контактная среда | | | | | | **Water** | **Accuracy**  Точность | | | | | | **±0.1 mm** |
| **SCAN PLAN / ПЛАН СКАНИРОВАНИЯ** | | | | | | | | | | | | | | | | | | | | | | | | | |
| **№ Group**  № группы | **Scan type**  Способ сканирования | | | | **Beam type**  Тип УЗ | | | **Index offset**  Смещение | | | **Active elements**  Кол-во активных эл-в | | | | | | **First element**  Первый элемент | | | **Last element**  Последний элемент | | | | | **Element step**  Шаг элемента |
| **1.** | **Linear** | | | | **Compression** | | | **31.5** | | | **64** | | | | | | **1** | | | **64** | | | | | **1** |

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| **CALIBRATION DETAILS (OmniScan MX2) / РЕЗУЛЬТАТЫ КАЛИБРОВКИ** |
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| **INSPECTION DESCRIPTION / ОПИСАНИЕ КОНТРОЛЯ** |
| **Phased Array inspection was carried out on Intermediate Survey of Lines A1-7300-FW-563-18"-A21. The scanning areas are mentioned below for each location. 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 schemes 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.** |

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| **INSPECTION DRAWING / СХЕМА КОНТРОЛЯ** |
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| **A1-7300-FW-563-18"- A21 KE01-A1-730-BU-P-DI-2316-001** |

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| **Location CML-33 (A1-7300-FW-563-18"-A21)** | |
| **0**  **X**  **Y** | **Data collected with 0-1450 mm on X-axis, 550- mm on Y-axis. Datum point is on 20 mm from circumfrential weld on south. Scanning was carried out in clockwise direction related to flow.** |
|  | |
| The minimum thickness of the **Location CML-33 (A1-7300-FW-563-18"-A21)** | |
| SEAM WELD JOINT  **7**  **4**  **1**  **3**  **5**  **6**  **2**  BOTTOM  EAST  TOP  WEST | |
| Full scan view with the minimum thickness area of the **Location CML-33 (A1-7300-FW-563-18"-A21)** | |

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| **INSPECTION RESULTS / РЕЗУЛЬТАТЫ КОНТРОЛЯ** | |
| **Location CML-34 (A1-7300-FW-563-18"-A21)** | |
| **0**  **X**  **Y** | **Data collected with 0-1450 mm on X-axis, 550- mm on Y-axis. Datum point is on 20 mm from circumfrential weld on south. Scanning was carried out in clockwise direction related to flow.** |
|  | |
| The minimum thickness of the **Location CML-34 (A1-7300-FW-563-18"-A21)** | |

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| --- |
| **2**  SEAM WELD JOIT  **8**  **4**  **5**  **3**  **6**    **7**  **9**  **1**  TOP  NORTH  SOUTH  BOTTOM |
| Full scan view with the minimum thickness area of the **Location CML-34 (A1-7300-FW-563-18"-A21)** |

| **INSPECTION RESULTS / РЕЗУЛЬТАТЫ КОНТРОЛЯ** | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Control object**  Объект контроля | **Location number**  Номер точки | **Description**  Описание | **Ø, inch** | **Nominal thickness, mm**  Ном. толщина, мм | **Date** / Дата | **Minimum thickness, mm1**  Мин. толщина, мм | **Maximum thickness, mm1**  Макс. толщина, мм | **Area of maximum thickness loss, mm**  Зона наибольшей потери металла, мм | | | | **Average thickness, mm**  Средняя толщина, MM |
| **Start X**  Старт Х | **End X**  Конец Х | **Start Y**  Старт Y | **End**  **Y**  Конец Y |
| **A1-7300-FW-563-18"- A21**  **KE01-A1-730-BU-P-DI-2316-001** | CML-33 | Pipe | 18 | 9.52 | 06.03.2022 | **N1-6.60** | 9.82 | 900 | 1000 | 75 | 150 | 8.21 |
| **N2-6.62** | 950 | 1000 | 0 | 50 | 8.22 |
| **N3-6.62** | 1300 | 1350 | 100 | 120 | 8.22 |
| **N4-6.62** | 1400 | 1430 | 100 | 120 | 8.22 |
| **N5-6.60** | 1300 | 1320 | 200 | 250 | 8.21 |
| **N6-6.63** | 1120 | 1150 | 220 | 250 | 8.22 |
| **N7-6.60** | 1350 | 1380 | 330 | 350 | 8.21 |
| CML-34 | Pipe | 18 | 9.52 | **N1-6.60** | 9.64 | 500 | 600 | 450 | 550 | 8.12 |
| **N2-6.61** | 500 | 550 | 50 | 70 | 8.12 |
| **N3-6.60** | 100 | 130 | 250 | 280 | 8.12 |
| **N4-6.60** | 1300 | 1320 | 250 | 280 | 8.12 |
| **N5-6.63** | 1300 | 1330 | 250 | 350 | 8.13 |
| **N6-6.60** | 900 | 950 | 300 | 350 | 8.12 |
| **N7-6.60** | 50 | 100 | 370 | 400 | 8.12 |
| **N8-6.63** | 1370 | 1420 | 320 | 370 | 8.13 |
| **N9-6.61** | 50 | 100 | 420 | 470 | 8.12 |
| 1. *Echo to echo UT technique was used.* | | | | | | | | | | | | |

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| Examined by / Контроль провёл: | | Approved by / Протокол утвердил: | | Client representative /  Представитель клиента | |
| Name / ФИО | Kukarski Nikolai | Name / ФИО | Raman Barsukou | Name / ФИО |  |
| Signature / Подпись |  | Signature / Подпись |  | Signature / Подпись |  |
| Date / Дата | 04.03 .2022 | Date / Дата | 04.03.2022 | Date / Дата |  |
| Cert. № /  № серт-та | PAUT Level II  cert.No 0034-35368  exp date: 19.07.2022 | Cert. № /  № серт-та | PAUT Level II  cert. No 1A 354/18  exp date: 31.07.2023 | Cert. № /  № серт-та |  |