

**SHAMS POWER COMPANY**  
**ENGINEERING DIVISION**  
**INSPECTION & CORROSION SECTION**  
**SHAMS 1**

**LOCATION : R1QJA78AC001**  
**KKS : R1QJA78AC001**  
**GRADE & CLASSIFICATION : 2**

**CERTIFICATE OF INSPECTION**

The equipment detailed below was examined in accordance with the SHAMS code of practice for plant inspection,

**ITEM : Ullage heat exchanger-1**

**LOCATION : SHAMS Plant**

**TYPE OF INSPECTION : Major**

**DATE OF INSPECTION : March, 2020**

**PLACE OF INSPECTION : IN-SITU**

**DATE OF LAST INSPECTION : N/A**

**REPORT :**

**1.0. SUMMARY**

The above Ullage heat exchanger-1 was taken off line, isolated, opened, vented & cleaned for major external & internal inspections.

**2.0. SUBJECT**

2.1. This is a horizontal carbon steel shell with 304 L tube bundle.

| Item                  | Shell Side   | Tube side |
|-----------------------|--------------|-----------|
| Design pressure       | 13.2 bar     | 8 bar     |
| Design temperature    | 365C         | 100 C     |
| Operation pressure    | 11 bar       | 5 bar     |
| Operation temperature | 304 C        | 50/62 C   |
| Hydro test pressure   | 18.40 bar    | 10.40 bar |
| Fluid                 | Gases Ullage | water     |
| Material              | A 516 Gr 70  | 304 L     |
| Tube Number           |              | 188 U     |
| Tube diameter         |              | 3/4 inch  |
| Tube thickness        |              | 1.65 mm   |
| Tube length           |              | 5000 mm   |

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The above equipment is/ ~~is not~~ considered suitable for further service under the present operating conditions

**NEXT MAJOR INSPECTION DUE : March 2024**

**INSPECTED: Osman Ismail**

**ENDORSEMENT: 48 MONTHS**

**REVIEWED: Ali Al Masabai**

### **3.0 History**

This Ullage heat exchanger-1 was commissioned in 2013. Periodical inspection records since Oct.'2014 are available.

### **4.0. Scope of Inspection**

4.1 Visual Inspection

4.3 Ultrasonic Thickness survey

### **5.0. CONDITIONS FOUND**

#### **5.1. External (Shell side)**

5.1.1 Accessible parts of painting and insulation found intact without any evidence of painting peel off or blistering and no evidence of any damage for insulation or insulation cover aluminum sheet.

5.1.2 All ladders, stairways and handrails found in satisfactory condition.

5.1.3 All concrete support found in satisfactory condition without evidence of cracking or spalling.

5.1.4 All external piping insulation found in satisfactory condition.

5.1.5 All earthing lugs found in satisfactory condition.

#### **5.2. Internal (Tube side)**

5.2.1 All tubes as could see internal surfaces found satisfactory condition without evidence of corrosion, apart from a considerable amounts of deposits which have cleaned by normal pressure.

5.2.2 All tube to tube sheet welds found in satisfactory condition.

5.3.2 Tube sheet found in satisfactory condition with no evidence of corrosion or mechanical damage

5.3.2 Channel and channel cover all parts found in satisfactory condition with no evidence of corrosion or mechanical damage

### **6.0 NDT**

#### **6.1 Ultrasonic thickness survey**

Ultrasonic thickness measurement was carried out on accessible locations of channel and shell found satisfactory. See attached thickness measurement report.

#### **6.2 Dye – Penetrant test**

Dye – Penetrant test was carried out on tube to tube sheet welds found satisfactory. See attached thickness measurement report.

### **7.0. Recommendations**

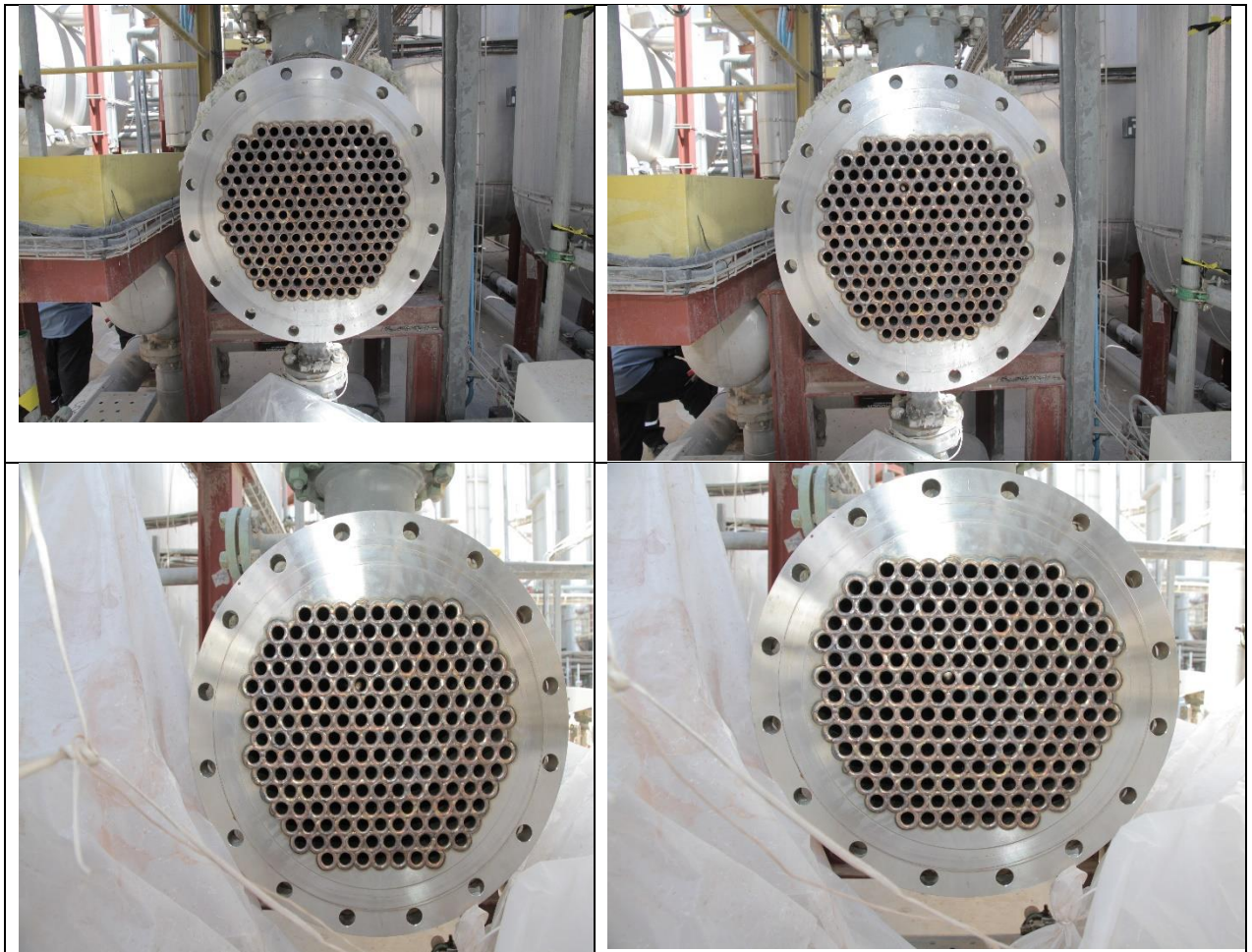
Ullage heat exchanger-1 to be open for inspection after four years as per SHAMS code of practice.

## 8.0 Inspection Grade and Interval

In accordance with the latest revision of SHAMS Code of Practice, this Ullage heat exchanger-1 was endorsed for 48 months under class 2, for next Major Inspection.

**FREQUENCY** : 48 MONTHS.  
**ENDORSEMENT** : 48 MONTHS,  
**GRADE** : 2  
**Next Major Insp. due** : March, 2024

### Photos



Tube sheet, Tube to tube sheet welds and accessible parts of internal tube surfaces

**LIQUID PENETRANT EXAMINATION REPORT**

|                                   |                       |                                     |                           |                                    |   |    |   |
|-----------------------------------|-----------------------|-------------------------------------|---------------------------|------------------------------------|---|----|---|
| Report No.:                       | AD / 53580            | Date:                               | 13.03.2020                | Page:                              | 1 | Of | 1 |
| Client :                          | SHAMS POWER COMPANY   | Job No. :                           |                           |                                    |   |    |   |
| Location :                        | MADINAT ZAYED         | Item :                              | VILLAGE HEAT EXCHANGER -1 |                                    |   |    |   |
| Material :                        | SS                    | Ref / Procedure No. :               | INS/ASME/PT/001           |                                    |   |    |   |
| Thickness :                       | VARIOUS               | Revision :                          | 22                        |                                    |   |    |   |
| Surface condition :               | AS WELDED & CLEANED   | Test Temp. :                        | AMBIENT (25°)             |                                    |   |    |   |
| Viewing condition :               | DAY LIGHT (>1076 LUX) | Penetrant Type / Technique :        | VISIBLE SOLVENT REMOVABLE |                                    |   |    |   |
| Penetrant dwell time :            | 10 MIN                | Dev. Time:                          | 10 MIN                    |                                    |   |    |   |
| Date of test :                    | 13.03.2020            | ACCP - Criteria :                   | ASME SEC VIII DIV.1       |                                    |   |    |   |
| Consumables Type & Batch          | MAGNAFLUX             |                                     |                           |                                    |   |    |   |
| <b>Penetrant Remover</b>          |                       | <b>Penetrant</b>                    |                           | <b>Developer</b>                   |   |    |   |
| SKC-S ( BATCH NO-180108) JAN 2021 |                       | SKL-SP2 ( BATCH NO-171201) DEC 2020 |                           | SKD-S2 ( BATCH NO-180102) JAN 2021 |   |    |   |

**Observation & Evaluation :**

# 100% DPT WAS CARRIED OUT ON THE TUBESHEET TO TUBE WELD JOINTS.

# EQUIPMENT NAME :- VILLAGE HEAT EXCHANGER-1 (CONDENSER-1 R1QJA78-AC001)

# PROJECT :- SHAMS OUTAGE MARCH -2020

# NO RELEVANT INDICATION WAS OBSERVED DURING THE TIME OF INSPECTION.

# FOUND ACCEPTABLE AS PER THE SPECIFICATION.

|        |                                     |                          |
|--------|-------------------------------------|--------------------------|
|        | ACCEPT                              | REJECT                   |
| RESULT | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

REPORT FORMAT APPLICABLE ONLY FOR AUH &amp; FUJ FACILITY

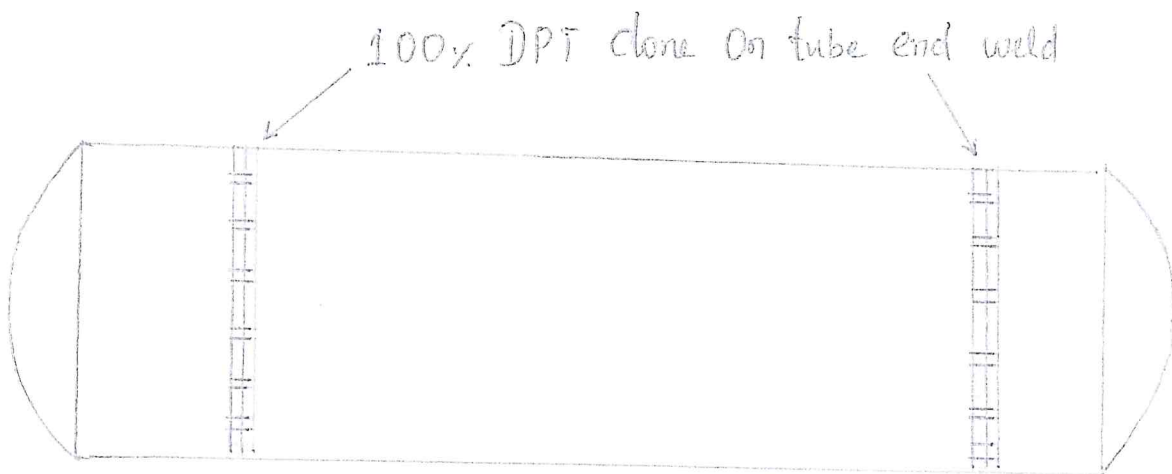
|                            |   |                      |                      |                                     |                                  |
|----------------------------|---|----------------------|----------------------|-------------------------------------|----------------------------------|
| <b>LEVEL II TECHNICIAN</b> |   | <b>CLIENT REP</b>    |                      | <b>AI / TPI</b>                     |                                  |
| Name :                     | VINEETH.P P Paulose   | Name :               |                      | Name :                              |                                  |
| Sign :                     |  | Sign :               |                      | Sign :                              |                                  |
| Date :                     | 13.03.2020  | Date :               |                      | Date :                              |                                  |
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HEAT  
ULLAGE EXCHANGER 1  
R1QJA78AC001

13/03/2020



Penetrant test result:- No defects identified and the material condition is good.

IR. NO: 53580



**BOROSCOPE TESTING REPORT**

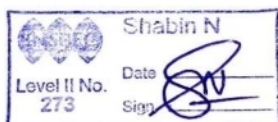
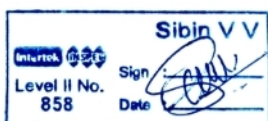
**CLIENT: SHAMS POWER COMPANY**

**CONDENSER-1**

**EQUIPMENT NO: R1QJA78-AC001**

**REPORT No.: INS/BOR/SHAMS/006/2020**

**DATE: 14/03/2020**



**Prepared By:**

**Reviewed By:**

**Reviewed By:**

**Approved By:**

**INTERTEK INSPEC**

**INTERTEK INSPEC**

**CLIENT/TPI**

**CLIENT**

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## **1.0 BOROSCOPY TESTING REPORT**

a) CONDENSER-1 (R1QJA78-AC001) TUBE BUNDLE



**a) CONDENSER-1 (R1QJA78-AC001) TUBE BUNDLE**

## BOROSCOPE TESTING REPORT

|              |                        |                       |               |       |   |    |   |
|--------------|------------------------|-----------------------|---------------|-------|---|----|---|
| Report No.:  | INS/BOR/SHAMS/006/2020 | Date:                 | 14-Mar-20     | Page: | 1 | Of | 1 |
| Client :     | SHAMS POWER COMPANY    | Equipment :           | R1QJA78-AC001 |       |   |    |   |
| Location :   | MADINAT ZAYED          |                       |               |       |   |    |   |
| Item :       | CONDENSER-1            | Type of construction: | U TUBE        |       |   |    |   |
| Equipment :  | OLYMPUS IPLEX FX       | Specification :       |               |       |   |    |   |
| Serial No. : | Y104888                | Photographs :         | ATTACHED      |       |   |    |   |

### Description :-


Boroscope inspection was carried out on CONDENSER-1 (R1QJA78-AC001)

### Observations:-

Refer attachment for details.

### Note:-

The above observations were as per the client who had witness the inspection.



| TECHNICIAN / INSPECTOR  | CLIENT REP.   | AI / TPI  |
|---|---|---|
| <b>Name :</b><br><b>Sign :</b><br><b>Date :</b>   | <b>Name :</b><br><b>Sign :</b><br><b>Date :</b>   | <b>Name :</b><br><b>Sign :</b><br><b>Date :</b>   |
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**BOROSCOPE INSPECTION REPORT**

| ROW-1 TUBE-5  |   | ROW-5 TUBE-10  |   |
|---|---|--|---|
|  |   |  |   |
| Observation:  | No Anomalies found in visual inspection | Observation:   | No Anomalies found in visual inspection |

| ROW-8 TUBE-5  |   | R14T10   |   |
|---|---|--|---|
|  |   |  |   |
| Observation:  | No Anomalies found in visual inspection | Observation:   | No Anomalies found in visual inspection |

**BOROSCOPE INSPECTION REPORT**

|   |   |
|---|---|
| ROW-10 TUBE-7   |   |
| <div><div>AT120D/FF V96</div><div><div>ZOOM X1.0</div><div>BRT 7</div><div>2020/03/14 20:06</div></div><div>R01-C01</div><div>© VMPUS</div></div> |   |
| Observation:  | No Anomalies found in visual inspection |

## **2.0 CERTIFICATE**



INTERNATIONAL INSPECTION SERVICES LTD  
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P. O. BOX 96535, DUBAI, U.A.E.

# CERTIFICATE

Date of Assignment : 02<sup>nd</sup> August 2016  
Certificate No : INS/VT/16/858  
Issue Date : 02<sup>nd</sup> August 2016  
Expiry Date : 01<sup>st</sup> August 2021

*This is to certify*

**Mr. SIBIN V.V**

Has demonstrated his ability successfully in both written and Practical examinations following training in accordance with the INTERTEK-INSPEC written Practice Document No. INS/SNT/WP/01 Revision 00 which is based on ASNT SNT TC 1A – 2000 edition in the following method and level shown below:

**Method : Visual Testing. (Remote Visual Inspection by Fiber Optics)**

**Level : II (Two)**

| RESULTS               | GRADE  |
|-----------------------|--------|
| General Examination   | 85.0%  |
| Specific Examination  | 85.0%  |
| Practical Examination | 86.0%  |
| Total for Average     | 256.0  |
| Composite             | 85.33% |



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NDT Level III

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