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EDDY CURRENT INSPECTION REPORT

The test results in this report were accomplished through the following method. A primary circuit (the test coil) induces eddy currents into a secondary circuit (the test material). Variations in the test material change the test coil's inductive reactance and effective resistance, producing indications on the instrument display. With the eddy current instrument we utilize, the coil assembly is connected to the instrument via a bridge circuit. At the start of the test, the instrument operator balances the bridge to provide a reference signal. During testing, the dis play provides a readout of bridge imbalance caused by interaction of the coil with the test material. Impedance plane display instruments show variation of both inductive reactance and resistance during testing.

DATE TEST **PERFORMED:** 3/30/21

TEST SITE: EKP Spurlock
Unit #1 FWH-5
Maysville, KY

EQUIPMENT TESTED

Manufacturer: Foster Wheeler

Type: Feedwater heater

S/N #: 44-5844-4

I.D.: FWH-5

Tubes Tested: 1213

Tube Length: U-Bend straight's

Test End: West

Tube Supports: N/A

TUBE IDENTIFICATION (As shown on Map)

Tube Numbering: Heater Rows: Left to Right.

TESTED MATERIAL SPECIFICATIONS

Material Type: ASTM 304 Stainless steel

Tube O.D.: .625"

Tube I.D.: .555"

Wall Thickness: .035"

TEST PROCEDURE UTILIZED: Procedure No. ET-1 for non-finned, integral finned and continuous finned tubing. (Customer Information only)

TESTING EQUIPMENT IDENTIFICATION

Eddy Current Instrument:

MFG:	Zetec
MIN:	MIZ 27
SIN:	046

Probes Used: Corstar 480

A & B Outputs: Differential bobbin-type that is self-referencing coils consisting of two coils electrically connected to oppose each other. This design allows for maximum detection of small abrupt discontinuities and other variations in the test material.

C& D Outputs: Absolute coil configuration being two coils wound perpendicular to each other and 180 degrees out of phase allowing for detection of gradual discontinuities and other variations in the test material.

Calibration Standard Used: Certified 304 *SIS* .625" tube standard with ASME flaws 100% to 20% MFG by Ecutec. *SIN* – euo0685

INSTRUMENT SET-UP

• Channel Mix 1/3	Diff. Test Frequency	300/150	KH
• Channel 1	Diff. Test Frequency	300	KH
• Channel 3	Diff. Test Frequency	150	KH
• Channel 4	Abs. Test Frequency	100	KH
• Amplification of Signal		6	Db

TEST DISCLAIMER

As the end tube sheets are approached by the test probe, signals resulting from the permeability variations increasingly mask the Eddy Current signal variations. Permeability thus limits effective penetration of Eddy Currents into the test material. This condition will not detect any wall loss in the tubes during the first 4 to 6 inches.

CALIBRATION PROCEDURE

A calibration procedure is performed prior to the beginning of an inspection on all sections of a piece of equipment. The procedure we follow is outlined in Article 8, Appendix 1 of the American Society of Mechanical Engineers (ASME). This procedure is detailed under paragraphs 1860 through 1865. The calibration tube standards we set up all instruments on are ASME certified with certification papers and as-built drawings available for your review. The tube standard used on each inspection shall match the test material based on the following criteria, metal alloy, OD size and wall thickness.

TEST REPORT & RECOMMENDATIONS

Heater:

1213 tubes in this section were tested for the following discontinuities on the inside (ID) and outside (OD) surface of the test material: corrosive pitting or general corrosion, transverse and/or radial cracks, erosion, tube dents and bulges as well as tube support wear.

There were 121 tubes found to have a discontinuity or anomaly whose shape, size and location could make it detrimental to useful service and which may exceed the accept/reject criteria of the manufacture specifications.

We recommend the removal of all tubes from service due to wall loss (most likely caused by a pit) that was greater than 60% deep. However, this decision is the sole responsibility of the owner. The physical location of these tubes can be easily found on the Tube Map enclosed.

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SUMMARY:

We recommend that a future test be performed within the next 5 years. In order to prevent tube failure, and maintain the integrity of the equipment, periodic eddy current testing should be performed.

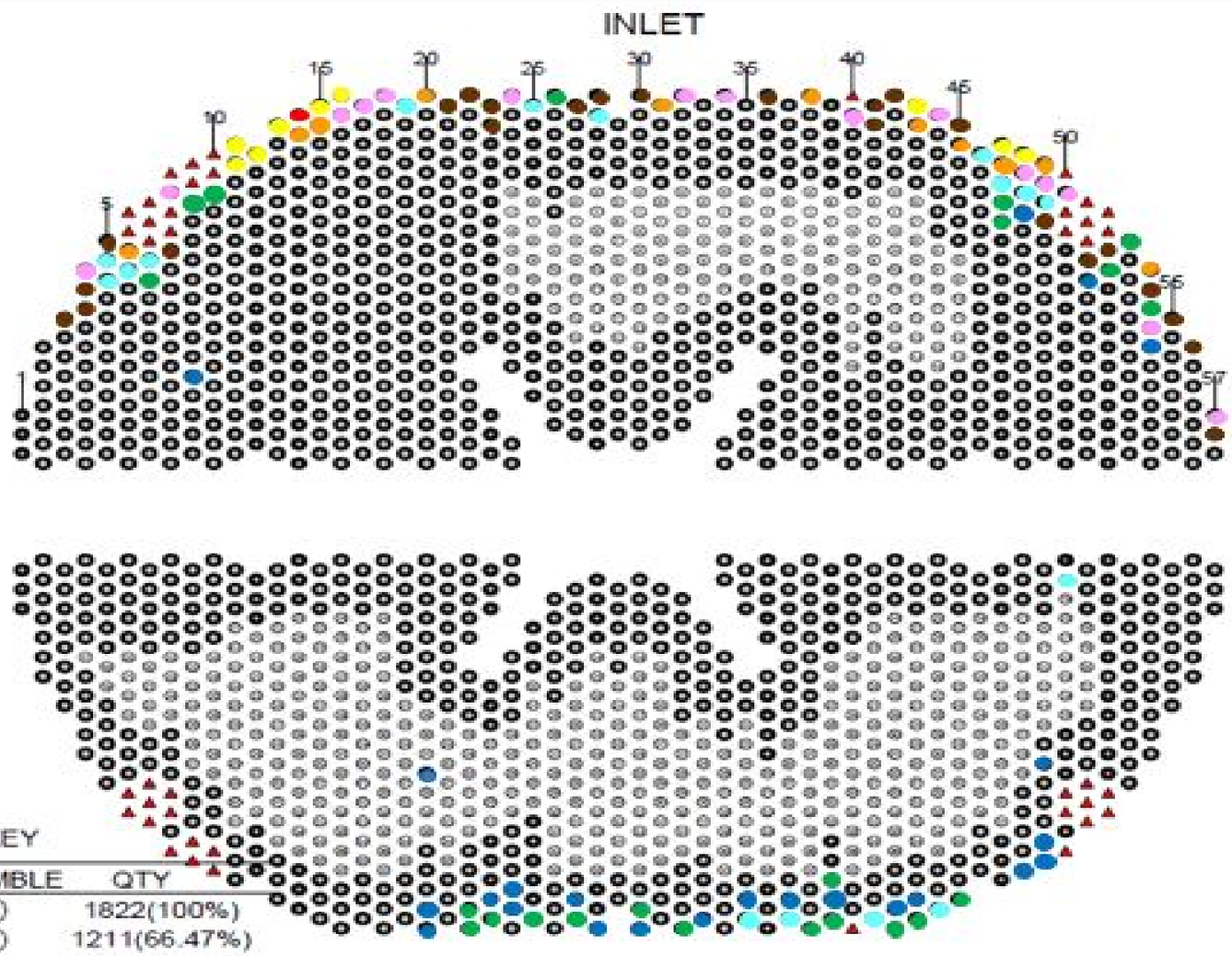
Test Performed by:

Dean Stokke Level III Field Technician

FW Heater 5

Tested From: Fixed

Eddy Current Testing



LEGEND KEY

DESCRIPTION	SYMBLE	QTY
Tube Count		1822(100%)
Total Tested		1211(66.47%)
NDD		1090(59.82%)
20 - 29%	2	23(1.26%)
30 - 39%	3	22(1.21%)
40 - 49%	4	16(0.88%)
50 - 59%	5	24(1.32%)
60 - 69%	6	15(0.82%)
70 - 79%	7	11(0.60%)
80 - 89%	8	9(0.49%)
90% - Thru Wall	9	1(0.05%)
Obstructed		0(0%)
Previously Plugged		42(2.31%)
Dent		0(0%)
Retest Bad Data		0(0%)

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Company: EKP	Qty of Tubes: 1822
Location: Sperlock	Material: 304 SS
Unit: Unit 1	Size: .75" x .035"
Date: 03-28-21	Analyst: Dean Stokke

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