

# May 2017 Outage Report

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## **A. Executive summary**

The planned outage was completed at an estimated cost of \$420,000 and required 7 days of downtime for Boiler Outage. There were no safety incidents and no environmental incidents. It took twenty-six loads of sand roll offs to empty the boiler bed. All work and findings were routine and lessons learned on removing bed thermocouples. (Bed thermocouples are easier to remove from the boiler side than under the boiler.) Normal wear in the fuel feed system was minor, most wear at the metering/robbing screws. Noticed some bent tubes in the secondary super heater sections, Valmet to report findings on in their report.

AVP tested all boiler safety's and inspected, repaired and reworked various valves for us during the outage. All valves were calibrated and verified by IC/E Techs with the heart tool. Thirteen expansion joints were replaced due to wear with a better material, all ducts were inspected and found in good condition. All fans were inspected along with bottom of stack entry door and upper stack entry door. All of them found in very good condition.

Five areas of duct system were vacuumed along with bottom ash that had to be dumped under boiler. Used five Adler boxes for cleanup, three for bottom ash, and two for fly ash. Used one baker tank for the ZDS system for processing.

EMI testing by (Dobel), findings/recommendations were repaired by our IC/E Techs and Mechanical Techs. Inspected all the connections for looseness and proper assembly and torque values were made. Many connections assembly were loose. Still looking for proper filter recommendation to order the anti-static oil filter for the turbine lube oil system.

Emmerson performed the six-year generator step-up maintenance and relay testing, NERC testing. And the DC load testing also.

TAW tested all large motors during the outage.

## **B. Boiler Report by Valmet**

Waiting on report from Valmet

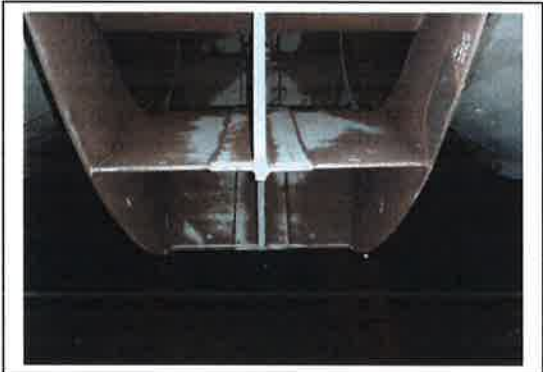
**1. Fans inspections**

All Fans were visually inspected by Tommy Gardner / Tim Stanford and Huck Murray. No visible cracks or dents found. All Fans free of rust and water intrusion, no ash or sand found in fans housing. All fans with internal linkage inspected too.

**ID Fan/FGR/PA/Secondary Fan:**



**ID FAN**



**ID FAN**



**FGR FAN**



**PA FAN**

**FGR FAN**



**PA FAN**



**SECONDARY FAN**



**SECONDARY FAN**



**ID FAN DAMPERS - WEST**

## 2. Duct inspections

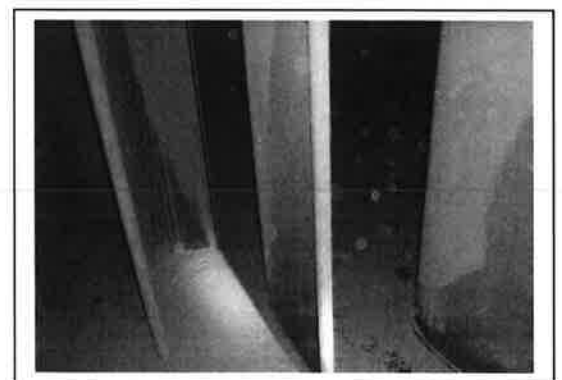
- All ducts inspected for cracks and water intrusion, only the outlet SCR expansion joints had water intrusion. The economizer ducts seconded pass, fifth floor top side had ash present. Vacuumed. The hydro beams had boiler sand present. Vacuumed. The inlet duct to the bag-house had fly ash present. Vacuumed.
- The inlet ducts on both bag-house had large amounts of fly ash. Vacuumed. Some hopper vanes had to be vacuumed out along with the hoppers. Vacuumed.
- The inlet expansion joints had water intrusion and were sealed with heat resistant RTV. Sealed by Tim Stanford.



2<sup>ND</sup>/3<sup>RD</sup> PASS SCREW - WEST

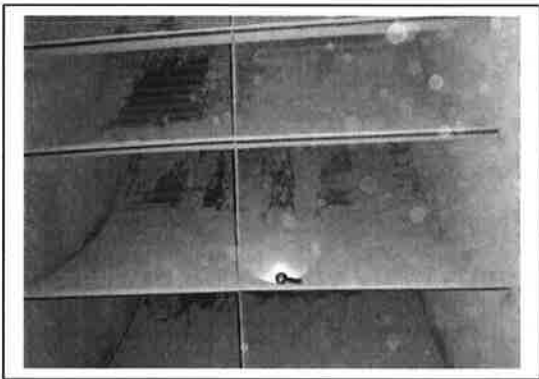


2<sup>ND</sup>/3<sup>RD</sup> PASS SCREW - WEST



**2<sup>ND</sup>/3<sup>RD</sup> PASS SCREW - EAST**

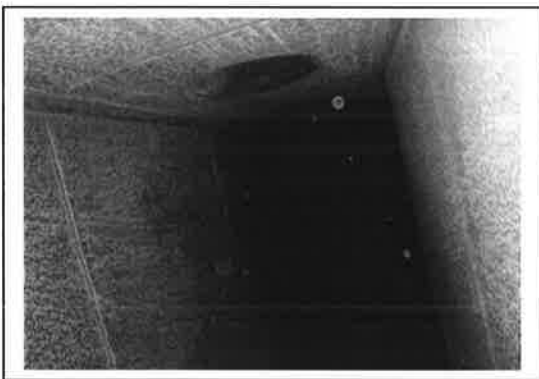
**BOTTOM ECONOMIZER**



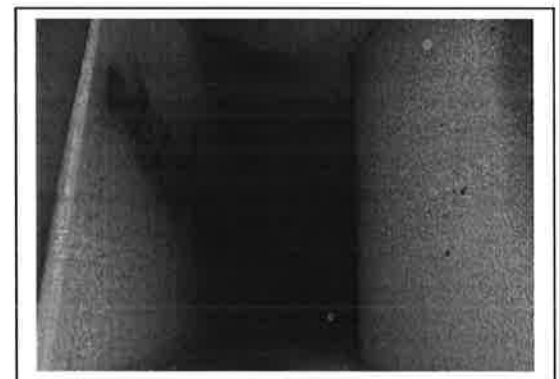
**BOTTOM ECONOMIZER TURN VANES**



**ECON. TUBES – SOUTH BOTTOM**



**ECON. TUBES – SOUTH DUCT**



**ECON. DIRECTIONAL VANES – SOUTH  
BOTTOM**



**HEAT EXCHANGER – TOP SIDE  
ECONOMIZER WEST**

**HEAT EXCHANGER – TOP SIDE  
ECONOMIZER WEST**



**ID FAN DAMPERS – EAST**

**ID FAN DAMPERS - WEST**



**UPPER ECONOMIZER**

**UPPER ECONOMIZER**



**OPEN PORT TO WIRES – UPPER  
ECONOMIZER**



**WIRES SEALED – UPPER  
ECONOMIZER**



**TOP ECONOMIZER DOOR 509**



**TOP ECONOMIZER DOOR 509**



**LOWER INLET – EAST SIDE**

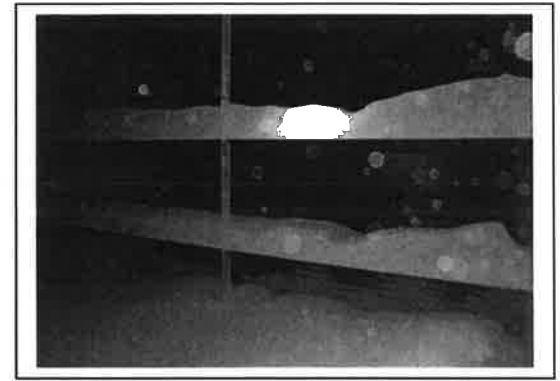


**LOWER INLET – EAST SIDE**





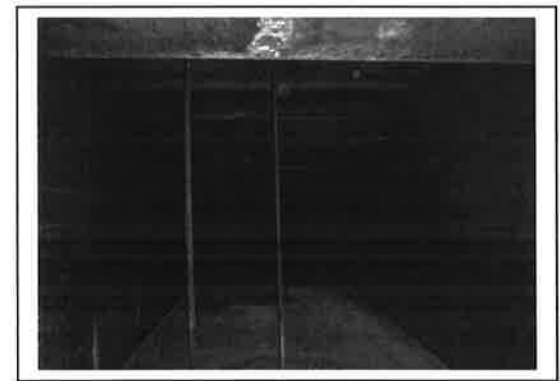
**LOWER INLET – WEST SIDE**



**LOWER INLET – WEST SIDE**



**UPPER DISCHARGE - EAST**



**UPPER DISCHARGE - WEST**

### **3. Expansion joint replacement and inspections**

Replaced 13 expansion joints new and inspected. Visual inspection looked good after unit ran.



**MOISTURE AT EXPANSION JOINT SCR  
EXITING BAG HOUSE**



**MOISTURE AT EXPANSION JOINT SCR  
EXITING BAG HOUSE**

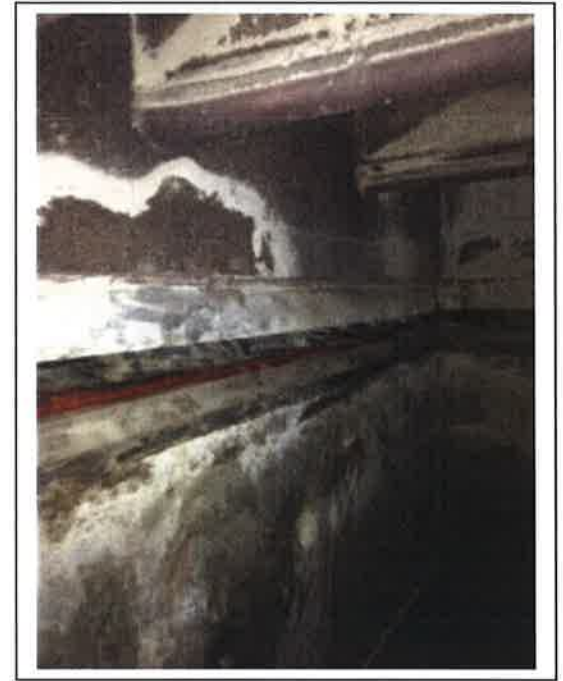


**LEAK OF EXPANSION JOINT  
DISCHARGE BAG HOUSE – EAST  
UPPER SIDE**



**REPAIR LEAK OF EXPANSION JOINT  
DISCHARGE BAG HOUSE – EAST  
UPPER SIDE**

**LEAK OF EXPANSION JOINT  
DISCHARGE BAG HOUSE – EAST  
UPPER SIDE**



**REPAIR LEAK OF EXPANSION JOINT  
DISCHARGE BAG HOUSE – EAST  
UPPER SIDE**

#### **4. Bed Thermocouple replacement & inspection**

Three thermocouples were replaced due to overheating or glassing. This happens when the bed the temperature gets high in the corners where they are located. It's been brought to our attention by another vendor that the material is not designed for the high temperature. Recommendation is material made of Inconel. In the process of quoting this material for future remedy with vendor.



**BOILER ASH @ HYDROBEAM**



**BOILER ASH @ HYDROBEAM**



**THERMOCOUPLES**



**THERMOCOUPLES**



**THERMOCOUPLE**



**THERMOCOUPLE**



**THERMOCOUPLE**



**THERMOCOUPLE**



**THERMOCOUPLE**



**BURNERS**



**BURNERS**



**BURNERS**



#### 4. Fuel feed system inspection & repair work

- Inspection of fuel feed system was minor due to limited run time. The most repair work was at the robbing screws on each side of boiler.



**ROBBING SCREW**



**ROBBING SCREW**



**STAINLESS PLATE WEAR**



**STAINLESS PLATE WEAR**

## 5. SCR inspection & Sample module

- The SCR inspection revealed no issues and was very clean and dry. One sample was taken and sent to Cream for analysis. Visual inspection by Tommy Gardner and Tony Gravel.



**SAMPLE PULL**



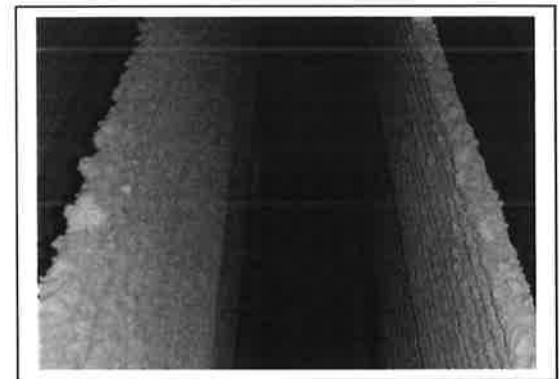
**ASH @ TUBES & BEAMS**

## 6. Secondary Superheated inspection

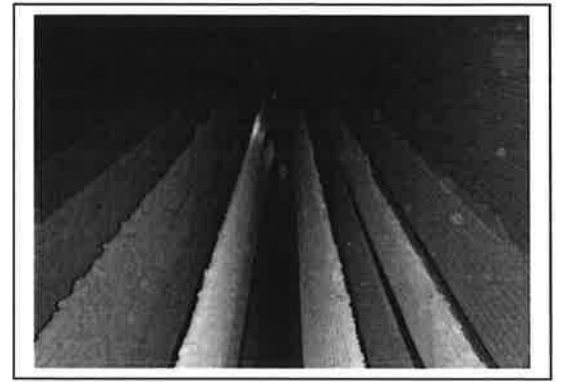
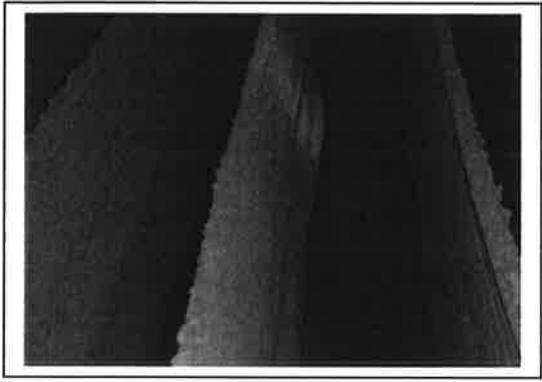
- Inspection revealed some sections of tube binding at top of sections. Valmet to review with their process engineering group.



**SECONDARY BANK**

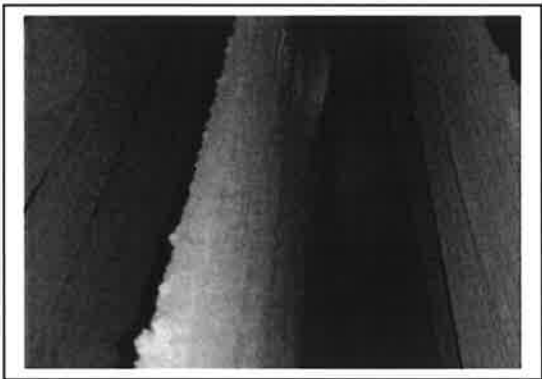


**SECONDARY BANK**





## SECONDARY BANK



SECONDARY BANK

## SECONDARY BANK



SECONDARY BANK

### C. Balance of Plant

1. Large Motors & Switchgear (TAW) Waiting on report from TAW...
  
2. Safety Valves & Misc. Control Valves (AVP& IC/E Techs)
  - Reworked four attemperators valves, BFW Block valve-MOV-1648-30, BFW BY Control valve-HCV-1647-30, SHP-FBV-1135-30 Main steam drain valve, Soot blowing steam supply iso valve rebuild, SHP-VA-1675-016, sbs-Mov-1600-30, BFW-VA-HP-Heater Bypass resurface, BFW-VA-1116-02 hp-1 INLET Pressure seal 10", FWH-LCV-1151-40 Lp1 drain valve, BFW-MOV-1107-30, Test exit drain tank safety's and LP-1 shell side safety/CWS heat exchangers gear box inspections.

3. DCS

- Cleaned up all alarms and loaded critical feed patches and RTAC upgrade By Valmet IT Engineering.

4. Turbine lube oil line replacement and coupling checks, hydraulic line checks, and filter change on Hydeck system. (IC/E & Mechanical Techs)

5. . Zero Liquid Discharge System (Operations & Thompson Services, and(Belzona)

Operations to do report.

6. . (NERC) 2-year generator step up testing by Emmerson

Waiting on Report

7. . GSU relay testing 52-1 and 52-2 by Emmerson

Waiting on Report

8. Tested all Big motors by TAW

Waiting on Report

9. (Doble) EMI testing

Add Report from file.



