

## 2016 ANNUAL ENERGY EFFICIENCY

Tees Valley EfW



### **Tees Valley Energy from Waste Facility**

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Prepared by:  
Barry Fellows  
Plant Manager

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## **1. 0 INTRODUCTION**

This report has been prepared for Suez Tees Valley Energy from Waste Plant lines 1 to 5 and is a review of the energy use within the plant and its optimisation. It references Appendix 2 Energy efficiency checklist of document ISBN 0 11 310154 x (Environment Agency 2002).

In 2016 all lines have had a reasonable performance. Unavoidable interruptions due to tube leaks, refractory delays, generator issues have dented the plant performance. Stripped of chronic losses all lines have shown some good levels of production. Lines 4&5 have been particularly steady.

## **2.0 COMPRESSED AIR**

### **2.1 Compressors**

Line 1&2 compressors ran without any major issues throughout 2016.

Similarly line 3 compressors have performed well in 2016.

Lines 4&5 compressors have performed well in 2016.

The compressor systems on all lines are covered by maintenance contracts by their suppliers.

### **2.2 Distribution**

Continuous monitoring and preventative maintenance (PM) has help deliver an efficient trouble free system.

## **3.0 STEAM SYSTEMS**

The plant is monitored via routine operator led inspections with attention being paid to steam leaks. Leaks identified are repaired either on a permanent basis or temporary basis, until a permanent repair can be implemented.

Hot surfaces, pipe-work and boilers are lagged and this is maintained to a high standard.

Thermographic surveys are conducted to confirm the integrity of the thermal installation and potentially identify any problem areas. In addition regular plant tours are conducted to confirm the integrity of all piping systems and effectively identify steam or media leaks should they occur. This process is carried out on all 5 lines. Where possible improvements are carried out to insulation to ensure a high standard of heat retention efficiency.

#### 4.0 MOTORS AND DRIVES

High efficiency motors have been fitted as standard. Use of variable speed drives is also standard for the large motors. A service contract has been set up with a VSD specialist to ensure swift turnaround of problematic drives.

Line 3 has been supplied from original design with inverter driven water feed pump units, fan drives to primary air fans, induced draught fans and air cooled condenser drives for main steam turbine. There is little further scope for improvement in this area.

Lines 4&5 electrical motors which have been installed are identified as EFF1. All major drives including combustion fans, air cooled condenser and major process pumps have been supplied with variable speed drivers.

Regular maintenance (in accordance with manufacturer's specification) is undertaken at each outage.

PM has meant that motors and drives have ran trouble free for longer periods (note % PM:RM (Reactive maintenance) ratio for 2016 was 87:13).

#### 5.0 LIGHTING

Office lighting is automatically controlled through the use of movement sensors.

On lines 4&5 all plant areas have been designed and installed in accordance with relevant standards with energy efficient tubes and bulbs used in all instances. All plant areas of infrequent access are fitted with motion sensor type light fittings. In addition all rooms within the administration areas are also fitted with motion sensors.

Regular maintenance of plant lighting continues with a view to optimisation where and when appropriate. All lighting is being upgraded to LED.

#### 6.0 BOILERS

A high level of tube thickness survey level is employed at each outage to pro-actively improve boiler on line efficiency. Use of inserts (portions of pipes welded in place of thinning sections) has been successful repair method in areas where thinning has been found.

A new method of grate maintenance and deep cleaning was employed on L1 and L2, which has improved combustion and burn off. This will be used on all future L1 and L2 outages. Grate 1 on lines 1 and 2 has been fitted with bag splitters (knives) and pusher tiles to produce a more consistent feed of waste to the combustion grates. This has proven very successful. Lines 1/2/3 achieved R1 status in 2016.

On lines 4&5 the boilers have been designed so that the efficiency ratio defined according to the R1 efficiency formulae of the Waste Framework Directive is higher than 0.65. In the initial period of plant operation no problems have been experienced although ongoing boiler thickness survey measurements will be deployed to accurately monitor boiler tube corrosion rates.

## **7.0 ENGINEERING SUPPORT**

Technical team support continued through 2016. This was seen at planned and un-planned outages. Project identification and governance is also a positive part the TT play.

## **8.0 OTHER IMPROVEMENTS**

Several continuous improvement activities have taken place across STV in 2016. Line 4 has had a hydraulic ram fitted to the drop off from grate 5 in order to reduce down time from blockages (and therefore use less fuel oil by maintaining production). Improvements to lines 1&2 grates have already been mentioned. Line 3 had new designed super-heaters (4.1/4.2) fitted that stop build up of ash between tubes and therefore are less prone to blockages (fuel saving/better plant availability). Early indications are that the design is proving to be very efficient.

