TITLE :	Impact on T2S			Chapter:	3
				Section:	Burn Heat Flow Corrode
	02	Added low LHV load case	HOU	TC	04/09/2026
Doc. Control	01	First issue	HOU	TC	21/04/2026
	Rev.	*Description*	*Auth.*	*App.*	*Date*

INTRODUCTION

This document is part of a wider collection, together forming the assessment report on equipment and functions checks for the load increase at Avonmouth Erf.

The assessment particularly addressed hereinafter is impact on T2s under an increase in load to 126%.

EXECUTIVE SUMMARY

The results confirm that the requirement of the WID is met for each of the loads considered up to 126%. Extrapolating from this basis, we can deduct that the criterion is met at every load in between the design reference and 126%.

The same conclusion applies with the lower LHV case, at 8,900 kJ/kg.

REFERENCED DATA

- Boiler Model Avonmouth L1 load 93.4 tph_20260415_v0
- Boiler Model Avonmouth L1_Load 83,2 tph_20260220_v0
- Boiler Model Avonmouth L2 load 93.4 tph_20260415_v0

ASSESSMENT

Waste-To-Energy facilities are required to comply with the following statement:

> "*The gas resulting from the incineration of waste must be raised, after the last injection of combustion air, in a controlled and homogeneous fashion and even under the most unfavourable conditions, to a temperature of at least 850 °C for at least two seconds*" [Art. 50.2 Directive 2010/75/EU - WID].

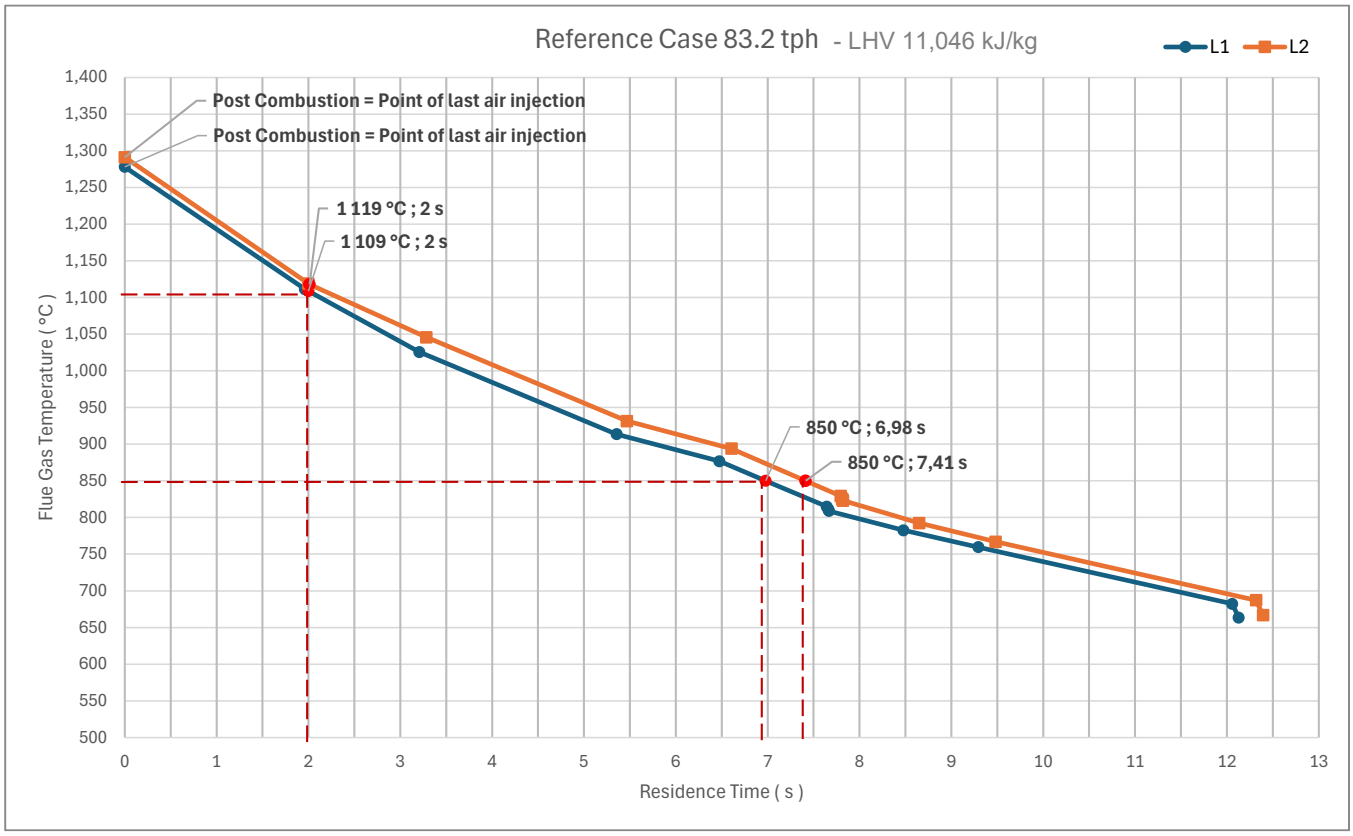
With the plan to increase the boiler load at the plant, this document reports on the compliance check, using a numerical model previously developed and adjusted to the specific operating conditions at the plant, of this criterion at the planned increased load.

The numerical model has been previously developed in accordance with design documents and adjusted to meet the recorded operating conditions. As each line have slightly different load cases and foulings, a simulation run is performed for each one. The result in the tables is therefore a range of temperature or time.

The graph plots, for a given boiler load, the flue gas temperatures along the flue gas path, starting from the secondary air injection which is the last injection of air. In other words, it shows the temperature profile of the flue gas starting from the final combustion. The horizontal axis shows the flue gas travel time from that combustion bed and the vertical axis shows the temperature.

RESULTS

This first chart is issued for comparison purposes and shows the situation in the “Reference” conditions defined as the mode of operation as measured in the DCS over the recent year.



The 2nd chart below is at the increased load:

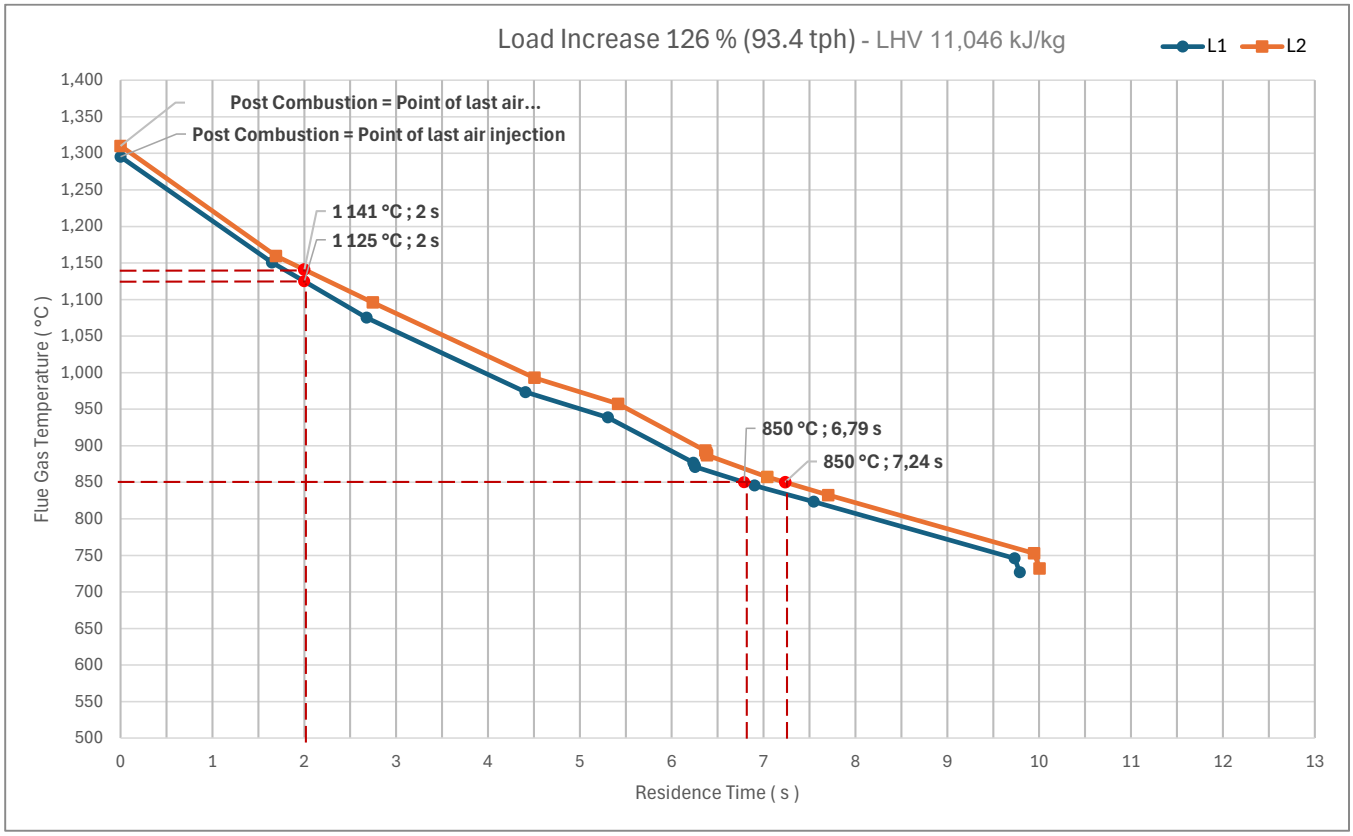


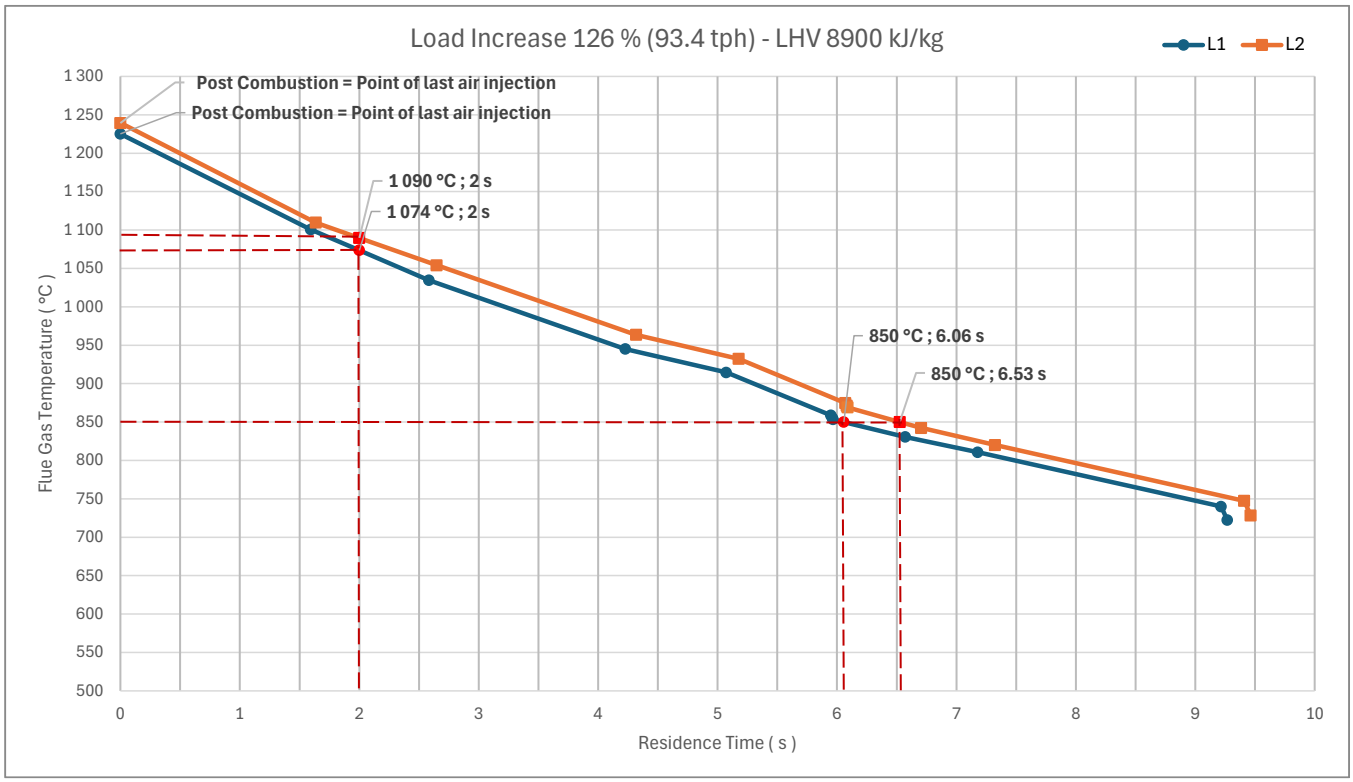
CHART READING

Flue Gas T° 2 s after last air Injection	
Reference	1109 - 1119 °C
Load increase	1125 – 1141 °C

Residence time > 850°C	
Reference	7.0 – 7.5 s
Load increase	6.8 – 7.3 s

The temperature 2 seconds after the last injection of air is estimated at about 1125 to 1141°C, so well above 850°C. This modelling therefore confirms the operation at 126% meets the criteria required by the WID.

ESTIMATION OF T2S WITH A WASTE LHV OF 8900 KJ/G



Flue Gas T° 2 s after last air Injection	
Reference	1 109 – 1 119 °C
Load increase @current average LHV (11,046 kJ/kg)	1 125 – 1 141 °C
Load Increase LHV@8900 kJ/kg	1 074 – 1 090 °C

Residence time > 850°C	
Reference	7.0 – 7.5 s
Load increase @current average LHV (11,046 kJ/kg)	6.8 – 7.3 s
Load Increase LHV@8900 kJ/kg	6.06 – 6.53 s

Even in the low LHV load case, the T2S criterion is confirmed: the temperature 2 seconds after the last injection of combustion air is estimated at approximately 1,074 - 1,090°C, well above the 850°C.