

## HyNet Hydrogen Production Plant 1 – Technical Note

### EPR RESPONSE – 5b - BAT for the combustion of PSA tail gas – NOx Abatement

#### Summary

##### Background

Table 3-14, which addresses BAT for Combustion, states that the Feed Fired Heater and the Steam Boiler “have been designed to meet a NOx emissions limit of 80 mg/Nm<sup>3</sup> without the need for De-NOx systems (either Selective Catalytic Reduction [SCR] or Selective Non-catalytic Reduction [SNCR]).”

##### Problem Statement

BAT for NOx control/abatement.

Provide a technical justification, supported by appropriate evidence such as technical narrative / guarantees provided by perspective combustion equipment manufacturers approached during the design, to confirm that low NOx burners are sufficient to achieve the proposed emission limit for NOx (i.e. 80 mg/Nm<sup>3</sup> at 3% oxygen on a dry basis), when burning the H<sub>2</sub> rich PSA tail gas and to confirm that the use of selected catalytic reduction is not necessary in this case to meet BAT.

#### Response

##### Summary

Kent received proposals for the Feed Fired Heaters from two (2) vendors during the FEED stage:

- Verga Engineering
- BIHL

Kent received proposals for the MP Steam Boilers from two (2) vendors during the FEED stage:

- Rentech
- Macchi

All Vendors were asked to confirm that they can achieve the proposed emission limit for NOx: 80 mg/Nm<sup>3</sup> at 3% oxygen on a dry basis when burning H<sub>2</sub> rich gas. This is without catalytic reduction. Verga Engineering, BIHL and Rentech replied with the following:

**Verga Engineering:** Confirmed.

**BIHL:** This is a tight limit and we initially offered as 148 mg/Nm<sup>3</sup>. We have delivered high H<sub>2</sub>-fired, ultra-low NOx burners on past projects which were within this value, but if you go for a preheated combustion air solution it will negatively impact the NOx. I would say it is potentially feasible at this stage, but would need to be investigated further with the burner vendors once the heater design condition's fixed.

**Rentech:** We confirm that we can achieve the proposed emission limit for NOx: 80 mg/Nm<sup>3</sup> at 3% oxygen on a dry basis when burning H<sub>2</sub>-rich gas without catalytic reduction. Simple flue gas recirculation (FGR) will be the means to reduce the uncontrolled NOx to the permit level.

Macchi has not provided a response yet.

##### Updates to Design

None required. The emission limits are in the design documentation and a vendor will be selected that can meet these requirements in detailed design.