BAT Assessment VCU – BAT 13 of LVOC BAT Conclusions

Introduction

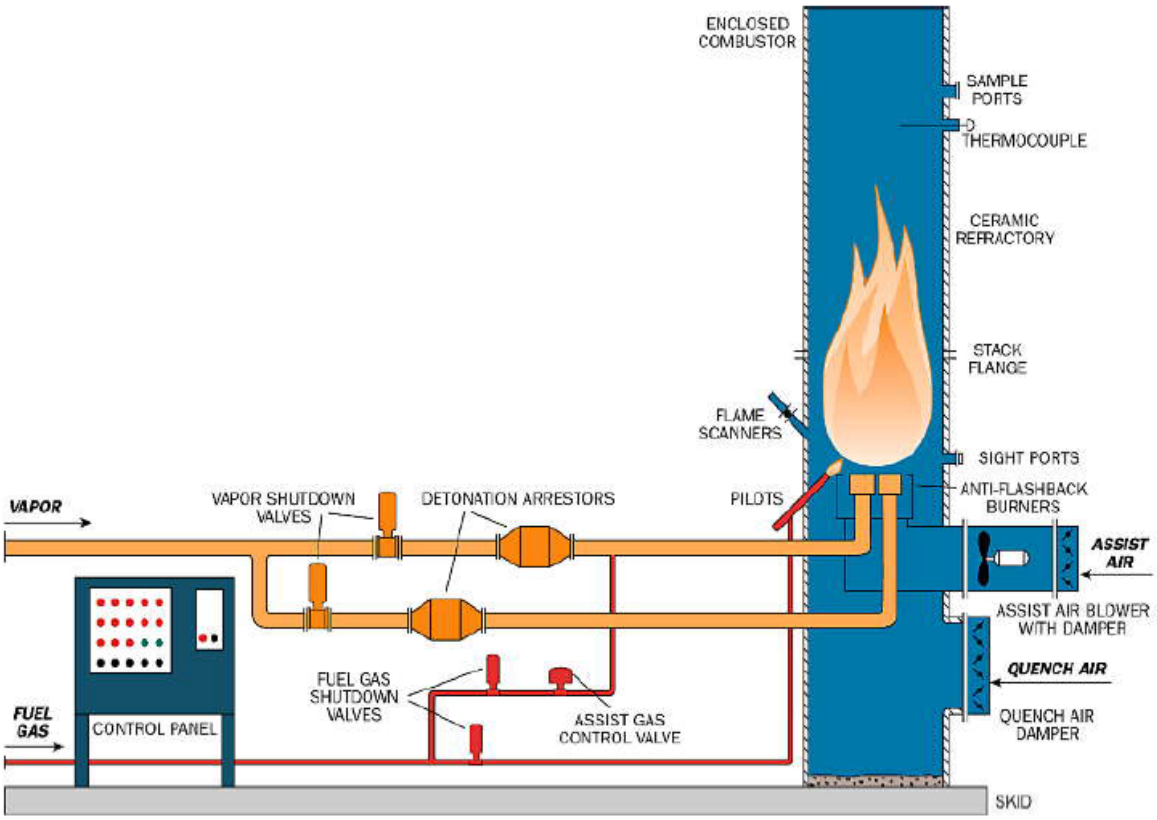
The proposed Vapour Combustion System (VCS) is designed to safely, efficiently, and effectively control hydrocarbon emissions from vapours generated during truck loading operations.

VCU Design

The vapours flow from tanker loading through the vapour header to the VCU. Vapours pass through a detonation arrestor and flow control valve/shut-off valve and are then introduced into the combustor through the anti-flashback burners. As the vapours are combusted, the PLC regulates the gas firing by adjusting the assist gas control valve and quench air damper to maintain the operating temperature in the stack at the desired set-point to meet emission levels. As such their positions, and assist fuel gas consumption, are determined by the vapour flow rate and vapour hydrocarbon content. Typically, with volatile high heat release vapours from gasoline no additional fuel gas firing is required during normal operation as it is approximately 10% HC concentration.

With increasing vapour flow and/or heat release (HR) the assist gas firing will be reduced to minimum when the vapour HR is capable of maintaining the stack temperature set point. With further increasing of HR the temperature control loop will control/open stack damper and air will be admitted into the combustion chamber for quenching. The assist gas control valve will be automatically driven to minimum position.

The Vapour Combustion Unit (VCU) consists of an enclosed combustor stack and a VCU skid. The VCU will be located within the Fermentation area of the plant. The stack will be 12m high with a 1.2m diameter.



There are two (2) burner stages in the stack. The first stage has one (1) 6” anti-flashback burner. The second stage has two (2) 6” anti-flashback burners.
Two sample ports, sight glass and various instrument and component connections and lifting lugs are provided for the stack.

Control System

The primary operator interface for the operation of the VCU will be at the control panel, which will include the necessary lights, buttons and switches. The VCU will be controlled by a safety programmable logic controller. Independent controllers will be provided for the fuel gas and quench air, which will allow a lower temperature set point to be used for the fuel gas. The system will meet BS-EN-746-2:2010 Industrial thermos processing equipment. Safety requirements for combustion and fuel handling systems.

Proposed flows and emissions

The designed operating load ‘loading gasoline in wagons case’ will operate with a flow rate of 121.7Nm^3/hr, the manufacture John Zink has determined that emissions of VOCs will be less than 2Kg/hr with a destruction efficiency of 98%.

Considering all the above we believe this demonstrates how emissions to air will be reduced in relation to BAT in using an appropriate combination of techniques identified within BAT 13 of LVOC BAT Conclusions.