APPLICATIONS

Flare Stacks

The Customer

The Company specializes in manufacturing flares, burners, thermal oxidizers and vapor recovery systems for the refining, petrochemical and chemical industries. They are world renowned for solving difficult environmental and combustion challenges.

The Process

Waste streams are collected from different refining and chemical plant processes and sent to the flare stack for destruction. US EPA code 40 CFR 60.18 states that for optimum destruction efficiency in the flare, the waste stream must have a minimum lower heating value (LHV) of between 200-300 BTU/SCF.

Continuous monitoring of the waste stream is necessary to identify the minimum heating value and ensure proper combustion efficiency. In addition, by identifying the minimum heating value it can be determined whether the waste stream can be used as a standalone fuel source.

The Problem

The Company had a customer where the flare had to handle different waste streams and combinations of waste streams, all with unique compositions ranging from pure methane to waste streams with up to 60% steam or even a waste stream with 50% ammonia and 50% steam mixture. For these cases the flare design system had to be flexible and have the real-time ability to adjust the quantity of assist-gas injected into the waste stream to ensure destruction efficiencies of 98% and higher. The flare could have been designed to simply inject the maximum quantity of assist gas required for a worst case scenario. This method would have resulted in using significantly more assist-gas than was necessary and in doing so increase fuel costs. By using actual measurements, the process could be adjusted in real-time to work with actual conditions optimizing fuel savings. Therefore it was essential to monitor the LHV in real-time to provide the necessary readings for dynamic adjustments.

The Solution

The Company chose the CalorVal to minimize the quantity of assist gas required for the flare stacks by measuring the LHV of the waste gas mixtures to determine the minimum quantity of assist-gas required. These fully heated, stand-alone analyzers feature a micro-combustion type calorimeter and have a uniform response to a wide variety of combustibles, including such gases as ammonia, propylene, ethylene oxide, and BTEX. Its unique design permits accurate measurement and control of multiple gas mixtures under dynamic conditions enabling the use of adaptive assist to be applied to the flares. It provides real-time measurement and quickly responds to the alarm set point and adjusts the assist gas as needed.

The CalorVal not only saved money by reducing the amount of assist gas used, but in conjunction with proper flare design, improved the destruction efficiency of hazardous compounds.

By knowing the lower heating value (LHV) of these various scenarios, the flare is now able to operate economically and flexibly regardless of what chemical is burning. Additional benefits range from a reduction in fuel costs and increased burner efficiency to ensuring safe operations, making sure that combustibles and toxics are completely burned.

Control Instruments Corp
www.controlinstruments.com