# PEI Candlestick (Utility) Flaring Systems

(Theoretical by-products of combustion & destruction efficiency)

This is to certify that all standard PEI designed and manufactured candlestick (utility) type flares are designed in accordance with **40 CFR, §60.18** requirements for non-assisted combustion devices.

The theoretical temperatures of combustion within the flame cone, based on the combustion of 300 Btu/ft$^3$ to 550 Btu/ft$^3$ LHV typical bio-gas, are between 1400$^o$F and 1600$^o$F. While combustion in these types of flares is not completed until the flame has been fully diluted in atmospheric air, the theoretical by-products of combustion are assumed to be a maximum of 0.07 lb/MMBtu $NO_x$, and 0.15 lb/MMBtu CO. The overall, average weighted destruction efficiency of such a device is theoretically a minimum of 98% VOC's, or a maximum of 20 ppm non-methane organics (NMOC's), evaluated as hexane and corrected to 3% oxygen. This theoretical destruction efficiency is supported in an EPA "Air Pollution Technology Fact Sheet" entitled ***EPA-CICA Fact Sheet - Flare*** *(EPA-452/F-03-019)*. Other criteria pollutant emissions are within the guidelines of EPA AP-42 speciated compound listings. While sulphurous compounds (generally $H_2S$) are very efficiently oxidized (generally into $SO_x$ compounds), please note that candlestick flaring systems neither generate nor destroy sulphurs.

The above theoretical performance of PEI flares is only valid if the devices are operated in accordance with the design limitation(s) under which they were provided.

The actual "in field" emissions from a candlestick (utility) flare cannot be accurately measured or monitored because of the immediate dilution of the flame cone to atmosphere, and the continual movement of the central flame cone because of air and wind currents.

For verifiable, field measured by-products of combustion, and verifiable field measured destruction efficiencies, use of a PEI enclosed ground flaring device is recommended.

Respectfully Submitted,

L. H. Conner

Larry H. Conner, VP

1280 County Road 8690 West Plains, MO 65775
Phone (417) 256-2002 Fax (417) 256-2801
www.PerennialEnergy.com PEI@PerennialEnergy.com