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Mr. Haley:

At the request of Waste Connections, this letter addresses the operation of enclosed flares with gas streams approaching methane concentrations less than 30% by volume or lower heating value (LHV) of 275 BTU/SCF.

An enclosed flare burns gas inside a protected combustion chamber to destroy compounds such as methane. As methane content in the gas stream declines, the heating value of the gas decreases. With a lower heating value, less heat is released during combustion. Additionally, when the gas has a lower methane concentration, there is typically more carbon dioxide in the gas which further cools the flame since carbon dioxide is not flammable.

If the heat content from the gas is too low, the flame will not be able to heat the stack to its operating temperature. Effective combustion requires three things: sufficient temperature, enough time at that temperature, and good mixing inside the stack. Of these, maintaining temperature is the biggest challenge for low methane streams. An additional concern surrounding low methane applications is flame stability. As the methane content drops, it becomes more difficult to maintain flame stability because continous pilots are not present.

Generally, gas streams with methane content less than 30% by volume or with low flowrates may require auxiliary fuel to reliably start combustion and maintain temperature. A table has been included below to provide additional clarity on the operation of enclosed flares with varying methane concentrations.

Methane %	Approximate Lower Heating Value (BTU/SCF)	Enclosed Flare Meets Operational Requirements for Combustion Without Supplemental Fuel	Requires Supplemental Fuel
50	455	Yes with sufficient flow	No
40	365	Yes with sufficient flow	No
35	320	Yes with sufficient flow	No
30	275	Unreliable independent of flow	Potentially
25	230	Not feasible independent of flow	Yes
20	185	Not feasible independent of flow	Yes

Sincerely,

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