A HEADACHE FREE FLARING REGULATIONS GUIDEBOOK

Andy Smith and Lance Roberts
ABUTEC LLC

Current, proposed regulations are changing the status quo within the upstream oil and gas industry. By October 2013, it is expected that all storage vessels with a Potential to Emit (PTE) of greater than six tons yearly must install one of three approved control devices: standard flare, enclosed combustor or a vapor recovery device, as proposed by the United States Environmental Protection Agency. The USEPA estimates the upstream and midstream segments of the oil and gas industry account for nearly 40 percent of the air emissions in the United States. As a result, the USEPA has released proposed legislation that places strict regulations on organizations that use storage vessels in their effort to decrease vessel emissions below 6 tons yearly. Due to current lack of regulations regarding storage vessels, the EPA has proposed new regulations commonly referred to as 40 CFR 60, Subpart OOOO (Quad O) and took effect on Oct. 15, 2012, with a one-year compliance phase.

The solution to this legislation is flaring, but what does that mean to you? We must first examine what flaring is and how it benefits an upstream player.

Flaring is a high-temperature oxidation process used to burn combustible components, mostly hydrocarbons, of waste gases from industrial operations. With regard to the oil and gas industry, flaring of storage vessels diminishes waste gas emissions therefore allowing upstream players to become compliant. According to Quad O the standard flare must meet both 40 CFR 60.18 and method 22A (producing no smoke from the device). The New Source Performance Standard (NSPS) in 40 CFR Part 60, Subpart OOOO (Quad O), require all combustion control devices to reduce site emissions to less than 6 tons yearly with a 95 percent destruction device.

There are several choices offered to those seeking compliance. These choices include, pit, pipe or enclosed combustor.

Pit flares are ground level devices that are automatically ignited when gases are released. Pit flares are rated at an average 90 percent destruction efficiency (DRE), but this rating depends upon wind conditions for exact DRE measurements. Some concerns regarding pit flares are the unknown ignition times, and tremendous amounts of radiant heat. Furthermore, users of pit flares have expressed potential safety concerns to site personnel.

Pipe flares, referred to as shop built flares, consist of a pipe elevated above the ground with a small igniter. Pipe flares are non-enclosed flares, meaning the flame is not protected. Testing of pipe flares has indicated several differing opinions of DRE percentages. A study conducted by The Texas Commission of Environmental Quality (TCEQ) entitled 2010 Flare Study, found pipe flare DREs ranging as low as 40 percent due to improper stream, air, assist gas and or wind/igniter issues. Other studies have found DREs ranging from 70 to 80 percent, again depending upon conditions. Pipe flares commonly have trouble staying lit due to environmental and ignition issues, and therefore have the potential to vent harmful, unburned hydrocarbons into the environment.

Enclosed combustors (enclosed flares) are engineered to burn gasses with high efficiency and very low emissions. Because these flares are enclosed, the ignition of the flare is protected and designed to prevent the venting of gasses due to environmental or performance factors. Enclosed combustors operate at an average of 98 percent DRE.

Also included in this legislation are testing requirements. Organizations will be required to have devices tested and retested by an independent third-party organization at regular intervals. Intervals are commonly interpreted as follows, 180 days upon installation and startup and within five-year intervals thereafter or manufacturer provides third party testing.

Due to non-uniformity of state regulations, Quad O will serve as the minimum regulations with state regulations also

applicable. State regulations differ nationwide, requiring that compliance of both federal and state regulations is monitored. As an example, the North Dakota Department of Health Division of Air Quality, Air Pollution Control Permitting and Compliance Guidance manual provide the following guidelines.

- Evaluations of emissions using the guidance will direct what level of control is needed next.
- More efficient pollution control is required for wells emitting higher emissions. Control requirements have been established within this Guidance for tank emissions and emissions from dehydration units, treater flares and pneumatic pumps, pneumatic controllers, truck loading, etc. are also included in this Guidance.
- Equipment at Bakken Pool O&G production facilities may be subject to rules and regulations under 40 CFR Parts 60 and 63. It is the owner/operator's responsibility to determine if equipment is subject to these federal regulations.
- A minimum of a pit flare with 90 percent DRE will be required for tank emission control on all new wells on the first date of production through initial 90 days of operation to ensure adequate control. After 90 days, the organization must move to an enclosed combustor with a 98 percent DRE or a destruction device that meets 40 CFR 60.18 and method 22A.

Quad O legislation states the following emission sources include: well completions, pneumatic controllers, equipment leaks from natural gas procession plants, sweetening units at natural gas processing plants, reciprocating compressors, centrifugal compressors and storage vessels which are constructed, modified or reconstructed after August 23, 2011.

Quad O is intended to solve the problem of minimal regulations. The USEPA presents the argument that the reduction of fugitive emissions will ultimately recuperate the cost of Quad O implementation. According to the USEPA's Air Regulations Fact Sheet, it is estimated that revenue from selling gas that was previously wasted will offset the cost of compliance. This estimated revenue ranges between $11 and $19 million when the rules are fully implemented in 2015. The argument developed states; the gas that would have been vented will now go into the pipeline, providing this additional revenue for oil and gas companies.

Now that we have reviewed standard flares and the options available, let's discuss how to choose the appropriate enclosed combustor for your worksite. The selection process is based upon two factors, incoming flow rate, in ft3/hr and gas composition. From gas composition the critical information is BTU (heating) value of the process gas in BTU/ft3. This combined with flow rate will indicate how much energy is generated from the process, or burning rate. Leading manufactures offer options based upon the burning rate. One instance is a model capable of 2,388,400 BTU/hr. If your burning rate is greater than model one's capabilities, a second model offered has a burning capacity of 9,212,400 BTU/hr. It is also important to point out many worksites choose a combination of multiple units to handle burning rates greater than our single units discussed.

As previously noted, testing, retesting as well as monitoring of devices is a component of Quad O legislation. Leading technology offers a solution to further exceed the requirements of Quad O. A data-logging feature allows the user to record and track the performance of our enclosed combustor operations. Not only can data logging technology be integrated into your SCADA or DCS systems, parameters such as temperature, process gas supply pressure and run time are standard logging parameters. Other parameters such as flow rate, valve position and alarm history can also be monitored. Data logging technology allows compliance operations to be monitored and procured with ease. Data can also assist and give insight into patterns in process conditions should any issues in the combustion process arise.

ABUTEC's enclosed technology offers complete enclosed flame, temperature monitoring and control, data logging of key parameters and full automatic operation. ABUTEC's enclosed flares have passed third party testing, exceeding the new Quad O compliance standards with 99 percent DRE. ABUTEC has performed preliminary tests on five models and submitted two models for USEPA certification based upon DRE ranking. Our models surpass the current requirements of the USEPA and this is significant due to the projected raise in percentage from 95 to 98 percent in the coming years regarding DRE.

ABUTEC's Medium and High Temperature Flares meet state and federal regulations burning waste gas at a minimum 99 percent DRE, meaning that almost 100 percent of unburned gas is converted to CO2 and water. This burning process, 21 times cleaner than unburned methane, is smokeless and without smell or light pollution.

Finally, let's take a look at an extreme condition where custom solutions from ABUTEC were used to help our enclosed combustors perform at maximum efficiency. An oil and gas rail loading facility in East Dickenson, ND operates as a transfer site of stored condensate. This condensate is loaded on to rail cars for transport to refineries throughout the United Sates. ABUTEC's services were consulted when a solution was sought that would allow the facility to load their rail cars without the worry of excessively polluting the surrounding environment with gas vapors generated from the transfer process. Also facing ABUTEC were the extreme climate conditions in which our enclosed combustors were needed to operate. Temperatures of -30 degrees Fahrenheit with wind chills of -60 degrees Fahrenheit made controlling the combustion process difficult. Utilizing our onsite support personnel and our remote monitoring capabilities we were able to combat the seeming insurmountable obstacles and provided an enclosed combustion solution that currently operates with a 99 percent DRE.

With low operating costs, and the initial and continual savings from a tested combustion control device, ABUTEC's enclosed combustors are setting the standard for the industry while drastically reducing emissions. ABUTEC, the headache free flaring solution.

REFERENCES

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