

FLARES

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BACKGROUND:

FLARES SYSTEMS & REGULATIONS

FLARE SYSTEMS ARE ESSENTIAL SAFETY SYSTEMS USED FOR THE CONTROLLED RELEASE AND SAFE COMBUSTION OF UNDESIRABLE OR EXCESS COMBUSTIBLE GASES AND VAPORS THAT MIGHT OTHERWISE BE RELEASED BY CHEMICAL PROCESS UNITS DUE TO A NUMBER OF OPERATIVE REASONS (E.G., EMERGENCY SHUTDOWN, RELIEF OF EXCESS PRESSURE CAUSED BY PROCESS UPSET CONDITIONS, VENTING FROM EQUIPMENT, SHUTDOWN AND STARTUP PROCEDURES, PROCESS FAILURE). PETROCHEMICAL AND PETROLEUM INDUSTRIES HAVE LONG USED GAS FLARING TO SAFELY AND RAPIDLY MANAGE THE COMBUSTION OF GASEOUS HYDROCARBONS AT A LOCATION REMOVED FROM THE PRESENCE OF WORKERS AND PROCESS EQUIPMENT, WHILE ALSO DECREASING A FACILITY'S ENVIRONMENTAL IMPACT.

There is no single common approach to the practice of flaring, both in terms of guidelines/international best practices and in terms of perception of the issue by the stakeholders. However, industry is certainly incentivized to minimize the amount of gases directed toward flares, as such losses represent lost raw material or lost product. The current European approach, with its use of Best Available Techniques Reference documents (BREFs), supports the use of industrial flaring for the safe release of undesired or excess combustible gases in different industrial contexts. Regulatory agencies in Canada, Norway, the European Union, and the United Kingdom (among others) have enacted flaring regulations to limit flaring within their borders.

In the United States, flares are regulated on the federal level by the EPA, under the authority granted by 40 CFR 60.18, 40 CFR 63.11, and 40 CFR 60.100 and 60.100a for refinery flares. In addition to federal flaring regulations, California has implemented even more stringent requirements for flaring at refineries, which are found in Regulation 12, Rules 11 and 12.

BACKGROUND:

FLARES SYSTEMS & REGULATIONS

NAA permitting is a complex and protracted process that Sage helps navigate. Since ozone is the most common nonattainment pollutant encountered, it will be the focus of this discussion.

OUR SERVICES AND APPROACH:

MEETING FLARING NEEDS

With all of these different regulations to consider, Sage provides various types of services to both national and international facilities to meet flaring needs.

STEP 1 FLARE MONITORING

Sage's flare monitoring plans address the regulatory requirements for flare system monitoring equipment, which are specific to each flare design. By monitoring key parameters, such as gas stream flow rates and composition, heating values, assist gas flow rate, pilot flare presence, and process unit performance, we help facilities identify, respond to, and correct most flaring activities. Monitoring allows for proper flare operation and provides reliable data for emissions calculations, which leads to more accurate accounting of flare emissions. Without proper monitoring, it is difficult to know whether flares and the flare recovery system are performing according to specifications.

Improving the reliability, completeness, and accuracy of flare data is expected to promote flare reduction activities and prioritize potential future investments. We employ many types of monitoring to accomplish these goals, including:

- Volumetric flow rate monitoring
- Flare gas composition monitoring
- Water seal monitoring
- Knock-out drum monitoring
- Pilot, purge, and sweep gas monitoring
- Assist gas flow rate monitoring
- Supplemental gas flow rate monitoring

Once data is collected, we assess the current state of the facility's monitoring plan and offer suggestions for improvements to ensure that the flares are operating within the specified design parameters, thus significantly decreasing the likelihood of a regulatory surprise.

STEP 2 FLARE MAPPING

Often, a detailed analysis of contributions to the flare header has not been performed for a facility. A flare mapping survey is the first step in identifying contributors and determining the magnitude of those contributions. Mapping requires a detailed P&ID review and covers routine operations and typical variations of process control (operator manual mode or process control schemes), maintenance, start-up, shutdown, and emergency situations.

OUR SERVICES AND APPROACH:

MEETING FLARING NEEDS

We accomplish flare mapping using the Flare Documentation, Minimization, and Analysis Tool (DMAT), which Sage developed to provide a framework to systematically assess and qualitatively categorize and rank the various process-related contributions to the flare header. We populate this tool with information obtained through interviews with unit personnel, general process data received, and extensive drawing and field reviews. This allows us to not only identify and document all the potential sources of materials to the flare headers, but to also concurrently seek out minimization opportunities.

STEP 3 FLARE MINIMIZATION

A Flare Minimization Plan assesses the options available to a facility to reduce the amount of flare gas that actually reaches the flare tip. Flare minimization enhances a facility's environmental performance and may improve its economic performance through beneficial use of previously flared gases. The Flare Minimization Plan focuses on developing a technologically and economically feasible control strategy to reduce flare emissions, and then implementing those strategies with appropriate methods and procedures.

We provide a site-specific Flare Minimization Plan that includes two key principle programs: a Preventative Program and a Reactive Program.

Preventative Program

A Preventative Program aims to reduce the amount of flare gas sent to the flare header. The program includes the flare mapping process, an analysis of flaring events, and a review of operational procedures to identify alternative procedures that will redirect flare gases from the flare header.

Reactive Program

A Reactive Program aims to identify alternative uses for flare gases once they are in the flare header. The program includes the assessment for the addition of or increasing the capacity of flare gas recovery. Once the ability to recover gases from the flare header has been identified, the program also analyzes beneficial uses of those recovered gases.

ADDITIONAL SERVICES

In conjunction with these basic service offerings, Sage also aids in project coordination, work plan development, onsite data gathering, updating written procedures, developing Flare Management Plans, design support of flare gas recovery systems, and Consent Decree support.

SUMMARY:

FLARING ISSUES & SAGE'S OFFERINGS

Facilities active in the oil refining, oil and gas exploration, and petrochemical industries are faced with a wide array of requirements related to how they use flares to ensure a safe operational environment and to mitigate the environmental impact of their waste gases. Each facility is unique and requires tailored compliance options. Flare monitoring plans help to ensure that a facility's flares are operating at maximum efficiency, while a flare mapping survey seeks to identify sources of flare gas and account for their contributions to flaring incidents. Finally, a Flare Minimization Plan seeks to combine the monitoring plan with the mapping survey in order to reduce flaring incidents and implement a flare gas recovery system.