Under 40 CFR Part 63 Subpart CC (MACT CC) implemented via the Refinery Sector Rule (RSR) EPA requires refineries to make strenuous efforts toward flare minimization. And, when regulated material does flow to the flare, the requirement is to achieve a minimum flare efficiency of 96.5% combustion or 98% destruction. These goals will need a lot of planning and equipment changes to achieve. They may be where most of your focus has been in preparing for January 30, 2019.

EPA emphasizes active monitoring and immediate response to maintain the minimum flare combustion efficiency. This emphasis brings with it many new data management and reporting challenges. Following are highlights of requirements that may be much harder to meet if you are not using a full-featured data acquisition system.

1. **15-Minute Block Averages + Documentation of Algorithms**
   - EPA requires key parameters to be measured and reported, including: Net Heating Value of the Combustion Zone (NHVcz), Net Heating Value Dilution Parameter (NHVdil) (when perimeter assist air is used), Flare Tip Velocity (Vtip), Pilot Flame Presence and Visible Emissions (VE), § 63.670(b)-(f).
   - The operating limits for NHVcz, NHVdil, and Vtip are based on 15-minute block averages when regulated material is being routed to the flare for at least 15-minutes. These parameters are calculated from multiple monitored operating parameters including flows (cumulative), temperatures, pressures, and net heating value of the flare vent gas. The management of this data can be challenging since compliance is determined at the end of each 15-minute block. This requires increased capabilities of the data acquisition system.

   - For each of these blocks EPA now also requires you to provide:
     - A copy of the data acquisition system algorithm used to reduce the measured data into the reportable form of the standard and to calculate the applicable averages. § 63.671(i)

   - The compliance average calculations must exclude invalid data (i.e., Out of Control, maintenance, CPMS breakdowns, calibration checks, etc.). You must state if the data acquisition system (DAS) algorithm handles this for you. If it doesn’t, then you must document your procedure for identifying and excluding this data.

   - The ESC DAS excludes invalid data in real-time as it’s acquired. It captures or determines status codes and provides a complete chain of all calculations, data handling and reduction.
Increases in Monitoring = Increases in Quality Control Requirements

You may have to add flow meters, analyzers, temperature and pressure monitors, sometimes in multiples if measuring different streams. This all adds up to much more monitoring equipment for you to maintain.

The ESC DAS provides tools dedicated to monitoring the status of your monitoring systems. Displays, reports, alarms and notifications reduce downtime. They catch flattining, target your maintenance efforts, and make recordkeeping and reporting simpler. We make quality control easier.

Many refineries are opting to use a gas chromatograph or mass spectrometer to determine net heating value of the vent gas. If you are, then the daily calibration checks using the modified PS-9 could be particularly onerous. § 63.671(e) Depending on your supplier, you may also have to use multiple bottles for each calibration check, because of so many gases. The ESC DAS provides test record management, cylinder gas management and report generation. It can also run hands-off, automated calibration checks, which are much safer for the technicians.

Ready Access to Compliance Parameters for Operators

Values from monitored operating parameters must be “readily accessible on site for operational control or inspection”, § 63.671(a)(2). This emphasizes EPA’s intent for active monitoring and response to the monitored compliance values.

The ESC DAS provides many ways of supplying quality assured values to the operators. This can be through displays or directly to the DCS and historian. You can send the quality assured values in real time to the DCS, to let operators control flows manually or automatically. The DAS can also provide alarms and notifications for monitoring system status. These can go to Environmental, Operations, the Controls group, or any combination.

Requirement to Report, Retain and Make Data Available

Periodic reports include emergency flaring events and deviations from the allowed operating limits, § 63.655(g). To make these reports, first you must do daily or weekly review, logging, coding and investigation. When it is time for submission there is more review and compilation. With data dumped from the historian into spreadsheets these processes can be tedious and prone to error. ESC simplifies data review and reporting. Scheduled reports, displays, and automation let you focus on compliance, instead of bookkeeping.

You must keep all reported values for five years, which is pretty straightforward. But, additional data you must retain includes a great deal of contextual information, also, § 63.655(i).

- Each 15-minute block average operating parameter for $V_{tip}, NHV_{vg}, NHV_{cz}, NHV_{dil}$ – 5 years
- All 15 minute block cumulative flows for every flow that feeds into the reported averages -- 5 years
- If multiple monitoring locations feed into any of the flows - those 15 minute block averages -- 2 years
- For compositional analysis - individual component concentrations from each analysis -- 2 years
- For calorimeters - each result -- 5 years
- All Pilot and VE recorded monitoring -- 2 and 3 years, respectively
- Time periods where operating values are outside of limits with regulated material flowing -- 5 years
- Time periods without flare monitoring as described in § 63.670(g) through (j) -- 5 years
- Time periods of flaring without regulated material -- 5 years
- Time periods where vent gas flow exceeds the smokeless capacity -- 5 years

This data must all be available for inspection within 24 hours upon request during the stated period. It presents a storage and access problem solved easily by the ESC DAS, but much harder to accomplish with spreadsheets. With the ESC DAS your data from five years ago is as accessible as data from yesterday.

Emergency Flaring Limits Include Startup, Shutdown, Malfunction

An important consideration is the removal of the startup/shutdown, malfunction exceptions allowing uncontrolled releases. EPA has instead introduced emergency flaring provisions, § 63.670(o).

This is where they put teeth into the limits. EPA intends the imposed operating limits to make most flares behave like the best-performing flares. They are excluding Force Majeure flaring events. But, any other ‘emergency’ flaring events that meet their criteria are considered preventable.

EPA allows very little leeway for getting it right before such events are deemed violations. There is no leeway allowed for events determined to be caused by operator error or poor maintenance. These are automatic violations.

Excellent monitoring and quality control will be needed to react to flaring events and to minimize violations. You will also need excellent recordkeeping to avoid accusations of operator error or poor maintenance. ESC provides the tools you need to track and prove compliance.

Contact sales@envirosys.com to ask more about how ESC can help you meet these challenges.