Regulating Flow Monitoring

New Developments in Environmental Regulations and the Impact on Flow Monitoring

By Ria Edens, Project Specialist, Fox Thermal Instruments, Inc.

The Impact of the Environmental Movement

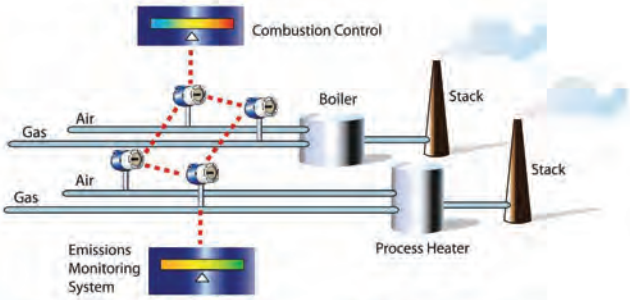
Each year, the list of environmental issues grows and Environmental Non-Governmental Organizations (NGOs) rise to address them. These organizations run a wide range of activities such as organizing volunteer projects, conducting awareness education, bringing lawsuits, and pressuring for environmental legislation. Worldwide, increasing awareness and support at the base level gives the environmental movement more power to influence regulations.

Some international NGOs have become so popular that their member base spans across the globe. In 2009, Greenpeace, for instance, had a global fundraising income of over $290.2 million. To keep this in perspective, the 2010 general government revenue reported by Economy Watch for Belize was $793 million. Big budgets equate to increased involvement, more action and greater influence. This increased influence, in conjunction with growing public pressure for environmental legislation, has resulted in new regulations emerging from a broad range of state, federal and international sources which will continue to impact facilities that emit greenhouse gases (GHGs).

Increased Oversight by Regional, State and Local Agencies

When the US Clean Air Act was signed into law in 1970, most of the responsibility for monitoring was given to regional, state and local agencies. For example, the ambient air quality monitoring program, run by state and local agencies, is a multi-faceted approach to measuring and monitoring criteria pollutants throughout the United States; however, compliance and enforcement has rested mainly on the federal level. Recently, a trend toward more local involvement and accountability is emerging among state and local agencies. In 2004, the State Review Framework (SRF) was established in association with the Environmental Council of the States (ECOS) in order to enhance public transparency regarding enforcement performance at federal and state levels. Every four years, the U.S. Environmental Protection Agency (EPA) and ECOS conduct regional and state reviews, produce individual performance reports and make recommendations for future measures.

States are also becoming more involved in using their local agencies to check other states or regions that directly or indirectly affect pollution levels in their territories. For instance, the EPA recently granted a petition by the New Jersey Department of Environmental Protection (NJDEP) to reduce sulfur dioxide (SO2) emissions from a Pennsylvania power plant by 81 percent over a three-year period. This method of checks-and-balances among states will have a lasting effect on future regulations issued by the EPA.



U.S. Federal Developments in Emissions Monitoring Regulations

From the Top

There has been a dramatic change regarding emissions monitoring within federal facilities, which affects more than 500,000 facilities nationwide. Executive Order 13514, signed by President Obama on October 5, 2009, required Federal agencies to create a 2020 GHG pollution reduction target by January 4, 2010. As a result, by late January of 2010, an official from the White House announced that the federal government will reduce its GHG pollution in federal facilities by 28 percent by the year 2020

(an aggregate of 35 federal agency self-reported targets).

From the EPA: 40 CFR Part 98 Subpart W

On November 8, 2010, the EPA passed the final rule on 40 CFR Part 98 Subpart W Mandatory Greenhouse Gas Reporting for Petroleum and Natural Gas Systems, effective December 30, 2010. This rule requires owners and operators of facilities emitting more than 25,000-metric-tons of CO2 equivalent (CO2e) to monitor and report GHG emissions beginning on January 1, 2011. The following industry segments are covered under the rule:

- Onshore petroleum and natural gas production, basin level reporting;
- Offshore petroleum and natural gas production;
- Onshore natural gas processing plants;
- Onshore natural gas transmission compression;
- Underground natural gas storage;
- Liquefied natural gas (LNG) storage;
- LNG import and export terminals; and
- Natural gas distribution.

Thousands of facilities operating in these industry segments are affected by the rule. The EPA is requiring the use of direct measurement of emissions from several source categories. The direct measurement requirements for fugitives have been defined and it has been determined that thermal mass flowmeters exceed the performance requirements mandated by the rule.

Portable combustion equipment (including leased or contracted compressors, dehydrators, generators, heaters and drilling rigs) in place for over 30 days have also been included in the reporting requirements for Subpart W.

Owners and operators subject to this rule needed to prepare monitoring plans by April 1, 2011. Those plans needed to show their ability to meet the monitoring requirements, which began on January 1, 2011. Reports on 2011 emissions from these facilities are due in March of 2012.

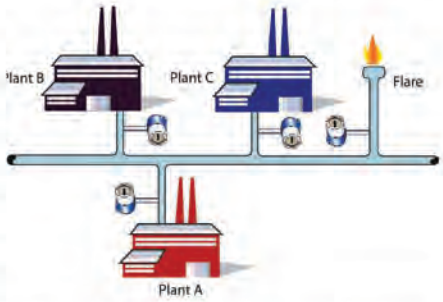
From the EPA: 40 CFR Part 63 Subparts 5D and 5J

On February 21, 2011, the EPA finalized two rules which set reduced limits on the emission of toxic air pollutants from existing and new industrial, commercial, and institutional boilers at major (5D) and area (5J) source facilities. For owners or operators of facilities affected by this rule, it may be necessary to update existing equipment, purchase new equipment, institute a tune-up program, or conduct efficiency performance tests.

Optimization of a combustion process can result in significant savings in fuel costs. Simply put, proper control of the air/fuel ratio to a burner results in better efficiency—the maximum steam output (or heat generated) for the least fuel consumption. Accurate flow measurement and improved control of the natural gas and combustion air is the key to achieving peak efficiency. A wide variety of flow measurement technologies are used in combustion control applications, but the critical factors in selecting the best flowmeter for combustion applications are direct mass flow measurement, accuracy, repeatability, turndown, ease-of-installation, safety and reliability.

International Pressure for Emissions Monitoring

International events, such as the disaster at the Fukushima nuclear power plant, can also influence the decisions of lawmakers. Nuclear accidents cause lasting environmental damage and can lead to many illnesses in people exposed to the radiation leaked from failed nuclear reactors. Already the world is talking about stepping away from plans to rely more heavily on nuclear power as an alternative to coal and oil, as a result of the devastating impact of nuclear accidents.



The UN Environmental Program, the Kyoto Protocol, the Intergovernmental Panel on Climate Change, the European Environmental Agency and other International Organizations are exerting further pressure on member and non-member countries to reduce emission and pollution levels of criteria pollutants. As of today, the U.S. is the only Western country that has not ratified the Kyoto Protocol and begun to adhere to its stringent pollution reduction standards. This has led to criticism and scrutiny of U.S. pollution rates and increasing pressure to ratify it. Domestic political opposition has made this a difficult task and it is unclear if or when the U.S. will ratify it.

Thermal Mass Flowmeters and Environmental Monitoring

Thermal mass flowmeters are an important element of the emissions control process; specifically in the measurement of mass emissions. The thermal flowmeter's accuracy specification exceeds the requirements defined by Title 40, which requires owners or operators of facilities that emit GHGs to monitor and report annual mass emissions.

The thermal flowmeter's most important attribute is its ability to directly measure mass flow rate without temperature and pressure compensation. Because it has no moving parts and can be installed via a single insertion point on a pipe or duct, it is easy to install and maintain. The instrument's broad measurement range also makes it ideal for monitoring very low velocity flow rates, such as those found in vent gas, flare stacks and fugitive emissions applications.

Most thermal flowmeters also incorporate a totalizer and digital communications for interfacing with emissions management systems and can be used to monitor GHG emissions from industrial, institutional and commercial boilers. Thermal mass flowmeters deliver a direct reading of mass flow rate of natural gas and other fuel gases while providing a simple, reliable and cost-effective method for tracking and reporting fuel consumption.

Designed for easy installation in fuel gas and air feed lines, thermal

flowmeters can help you:

- Enhance combustion control
- Analyze demand
- Improve compressor efficiency
- Reduce waste
- Provide accurate reports for sub-metering
- Facilitate custody transfer
- Help resolve billing disputes
- Comply with emissions monitoring regulations

Bottom Line

Increasing pressure from the environmental movement and a growing awareness of our need to reduce energy consumption is driving the demand for smarter, more accurate, real-time fuel gas measurement and emissions monitoring systems. Based on their demonstrated ability to improve process efficiency, reduce fuel costs and streamline accounting procedures, the thermal flowmeter is often the instrument of choice in combustion control applications. Accurate, repeatable measurement of air and gas, at low and varying flow rates, is a critical variable in advanced combustion control. Available in both insertion and inline configurations, thermal flowmeters are designed for use in fuel gas and air feed lines found in process heating and utility operations.

In addition to the primary benefits of direct measurement of mass flow rate, low-flow sensitivity, and fast response, the meter's no-moving parts design also helps reduce maintenance costs. The thermal flowmeter's accuracy specification exceeds the requirements defined by the EPA rule for GHG emissions monitoring and helps provide a reliable, cost-effective solution to the challenges of measuring and reporting total mass flow rates. They are commonly used in applications such as flare and vent gas monitoring, biogas and landfill digester gas monitoring/recovery, and coal mine methane recovery.

About the Author

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