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Recorders play an essential role in emissions monitoring

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Recorders Play an Essential Role in Emissions Monitoring

PC-BASED RECORDING DEVICES PERFORM MANY OF THE DATA ACQUISITION TASKS REQUIRED BY REGULATORY AGENCIES TODAY, BUT END USERS CONTINUE TO Rely ON TRADITIONAL PAPER-BASED RECORDERS FOR EXTRA COMFORT

by Elizabeth Scheyder, Field Editor

That warm, fuzzy feeling, no matter how far technology allows us to go in digitizing, automating, and computerizing process control, there will always be something to be said for having data recorded in black and white. For many engineers, traditional paper-based chart recorders provide an extra level of confidence. That’s particularly true when you talk to engineers whose responsibilities include continuous emissions monitoring systems (CEMS).

“People like the ability to go up to an instrument and see the reading and see the trend right there, rather than pull it up on a computer some place,” says Dean DeGhetto, a senior associate at Environmental Risk Ltd., Clifton, N.J. “We all still have that need to have a record we can see on paper.”

DeGhetto, an environmental consultant, says his clients generally buy their chart recorders as part of a complete package, bundled with emissions sensing equipment. According to DeGhetto, many engineers continue to use chart recorders in CEMS applications where computer-based monitoring systems are available. It is “more of a [client’s] preference, although some state regulatory agencies may require it,” says DeGhetto.

Mark Bahner, a research environmental engineer with the Research Triangle Institute, Research Triangle Park, N.C., agrees that chart recorders do have a place in today’s high-tech world. Although Bahner primarily relies on computer-based data loggers for CEMS data crunching in his research, he concedes that “we have had some problems downloading data from data loggers, so I can see users having chart recorders just to get a warm and fuzzy feeling that there would be something to fall back on.”

But Bahner has some reservations about the limitations of chart recorders. “In some of the research testing that I did several years ago, I used chart recorders and had to hand-integrate them,” says Bahner.

Product Developments

Chart recorders have come a long way in recent years, and manufacturers offer more and more sophisticated features in their paper-based chart recorders. Tony Porrazza, senior product manager in the product definition group at Honeywell Industrial Automation and Control, Fort Washington, Pa., claims his company’s chart recorders have had basic control capability “from the beginning, in the form of proportional, integral, and derivative (PID) control and alarming.”

Porrazza says the company’s latest focus has been on communication. “We now offer RS-485, RS-232, and modern interfaces, so a recorder can dial up by itself and send its data and summary reports, too.” Honeywell also continues to add advanced mathematical packages to its chart recorders. “Customers want even more capability,” says Porrazza, “and

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we will soon be offering the capability to do C-language programming for a chart recorder.

Portaza admits that chart recorders "have evolved from being a primary form of information gathering. Now they serve a redundant function. This is true in all of the markets that we serve." But that hasn't diminished demand for recorders.

"There is still a stable market for paper-based recorders," says Portaza. "We are selling more and more each year. A chart recorder is a black box like a flight recorder. Users know they are being watched." He also points out that chart recorders can be kept under lock and key, while printers of stored data are intrinsically less tamper-proof. "There always seems to be the desire to have the information being printed in real time on paper," says Portaza.

"Under Part 1 of the Environmental Protection Act, continuous records must be kept of emission levels of NOx, nitrogen oxides, SO2, sulfur dioxide, particulate matter and various other prescribed substances," says Greg Kleinert, product manager at Reasoner's Cheeseman, Newtown, Pa. "You may be allowed to be above certain limits, but you have to be continuously monitoring. This means that anyone who has a boiler, and anyone who has any kind of steamstack, has to have a monitoring system."

However, just keeping the data is not enough. "To satisfy the conditions laid down in the relevant process guidance notes," says Kleinert, "raw measurements of pollution levels must be converted to a specific format." According to Kleinert, his company's chart recorders with continuous emissions monitoring software provide "the economical solution to compliance monitoring and recording of stack emissions" by providing "data handling, normalization, and reporting in one instrument."

Although Kleinert notes that different agencies have different requirements for averages, "in general, they fall into three categories: ruling average, calendar average, and percent within limits." Kleinert also points out that CEMS are not just a concern for companies located in the U.S. "In many countries, the primary responsibility for monitoring the emissions now falls on the pollution rather than the regulator," says Kleinert. "All this adds up to a rapidly growing market for pollution monitoring equipment."

But how do the officials at the regulatory agencies who see CEMS standards feel about the role of paper-based chart recorders? Some individuals are very specific about their preferences, and predict that computers will completely dominate CEMS some day.

Regulators Speak Out

"It is a foregone conclusion that computer-driven monitoring systems are taking over," says Jerry Martin, a spokesman for the California Air Resources Board (CARB), Sacramento, Calif. According to Martin, CARB prefers computer-based systems, "because of the better accuracy and ability to look back over time, and their greater ease of use for tracking systems' emissions and improving them."

In the Los Angeles area—one of the most stringently monitored areas of the country—the South Coast Air Quality Management District's "goal is to have the information transmitted to us over a dedicated phone line into one computer," says Bill Kelly, a spokesman for the Diamond Bar, Calif.-based agency. "Then we would be able to graphically view it and record it on our end." The agency currently has this type of dedicated-line setup with some facilities, but not all.

"There are issues of data security and devices" that still have to be resolved, says Kelly. "But the system goal is supposed to be fairly high-tech." Looking further into the future, Kelly says the South Coast Air Quality Management District "has interest in using predictive emissions monitoring." However, "the issue still not fully settled." To Pennsylvania, "the only reason we use of chart recorders with respect to certified CEM is to record the data on at least the minimum time cycle basis for parameters with short cycle times (e.g., opacity, temperature, etc.)." says Joseph Nazaro, section chief for CEM at the Div of Source Testing and Monitoring in the Bureau of Air Quality, Harrisburg, Pa. "Average for all parameters and minimum cycle time readings for certain parameters are all stored electronically."

In many other regions of the U.S., controls on monitoring methods are not as strict. Terry Blodgett, an engineering specialist at the Texas Natural Resource Conservation Committee, Austin, Texas, says "we don't really care how a company goes about collecting data. We just require that they collect the data, and keep it for at least two years." Each company that reports to the agency "goes through a lot of data reduction at the same time as the paper is still being used."
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before [the commission] sees it."

Blodgett, who recalls his previous work in industry, appreciates the immediacy of paper-based chart recorders. "In a strip chart, you can see the data coming off and you know you have it," he says. "With a data logger, you can be taking data all day, and not realize until the end of the day that you have a problem."

Conservative Approach

Many environmental consultants agree with Blodgett’s conservative approach. For instance, Frank Tringale, senior project manager at HNSR Consulting, Acton, Mass., recommends chart recorders in CEMS systems "where [clients] need to have a validation process to back up their data acquisition systems.

Chart recorders also are useful for providing visual assistance in troubleshooting, Tringale says, and "while they may not be required by an agency, chart recorders are often a customer requirement." Tringale and his associates strongly recommend their use.

Tim Russell, stack sampling manager at Barr Engineering Co., Minneapolis, agrees that the role of paper-based chart recorders has evolved over the years, but they remain an important part of a CEMS system. "Strip chart recorders are no longer serving us in the role of primary data acquisition and recording device," says Russell.

"With a data logger, you can be taking data all day, and not realize until the end of the day that you have a problem."

"We are utilizing strip chart recorders as a backup to our PC-based data acquisition system. Strip charts also act as a handy place to document events with field notes.

The ability to have a piece of paper as an output not only provides immediate confirmation of results, but also provides a way (and a place) to note the timing of significant events which may impact emissions. This way, the timing of the event and the notes are kept right with the data.

"More sophisticated clients are demanding data logging capabilities for instrument-based test methods," says Russell. "I believe that strip chart recorders will continue to serve as backup devices to guard against data loss."

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