CEM-2004

20 YEARS OF OPERATING AND MAINTENANCE EXPERIENCE WITH EMISSIONS MONITORING AND MITIGATION

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Introduction

This paper addresses the operating experience of various aspects of fossil fuel power generation emissions control, monitoring and abatement. Case studies from over 20 years of operating experience will be presented to show how sharing best practices can benefit everyone.

Information Overload

Information Exchange has increased dramatically over the past few decades. The Internet and the proliferation of Web sites and attachments have made it possible to find virtually anything on the Web. This accessibility to information has both an upside and a downside… On the upside - you can find anything… On the downside - it's usually too much!

A recent search on Google for "environmental monitoring" yielded over 4.7 million hits in just under 0.3 seconds! A search for "PM 2.5" yielded over 4.1 million hits. Even with the best of intentions it would take over 32,000 days to briefly (10 seconds per hit) screen hits about environmental monitoring and over 28,000 days to screen hits about PM 2.5. A more practical solution is to join a targeted information exchange society.

Information Exchange Societies

Information exchange societies can provide a Web-based forum for focused information exchange between individuals with similar interests. So instead of looking through millions of Web hits, members of these societies can exchange relevant information in near real time and deal with only a few relevant hits. The key is to join a society that will meet your needs. If your need is for practical day-to-day Operations and Maintenance (O&M) solutions, then you should join a society targeted to meet your O&M needs. Or, if your need is for Research and Development (R&D) then you should join an R&D society.

SCIENTECH's, Fossil Operations & Maintenance Information Society (FOMIS) is one example of a targeted forum. It provides a forum for over 120 electric power generation owner/operators to exchange information on a variety of relevant issues 24 hours a day, 7 days a week. More specifically it provides focused information exchange on relevant O&M issues with over 100,000 Web-hits annually. Today this Society's Web-database has over 30,000 searchable, relevant reports categorized by subject, item and description. This society also provides access to a question and answer forum linking members worldwide. The aim of this society is to facilitate the exchange of information by providing relevant information in a timely fashion.

Benefits of Information Exchange
Benchmarking is a long-standing technique to determine how your organization compares to other similar organizations. Information exchange societies provide a forum for performing benchmarking studies within a relevant group of peers on specific topics. Detailed information can be provided to determine how your performance compares to others. All participants in benchmarking gain valuable information to help determine strategies to optimize overall O&M practices.

Sharing best practices provides an opportunity for everyone to improve their performance. Sharing and discussing various approaches to O&M issues can achieve best practices. In general, the more individuals collaborating in determining the best practice, the better the outcome, provided all participants share a common interest (e.g. O&M). Information exchange societies provide excellent opportunities to achieve best practices.

Case Studies
20 years of operating and maintenance experience with emissions monitoring and mitigation have produced over 2,500 detailed reports in the FOMIS database. Example report subjects include:

Subject	# of Reports
Air Combustion	65
Bag house	70
Burner	232
Combustion Control	120
Environmental	758
FGD	266
Fuel Preparation and Firing	1008
Precipitators	269
Stack	81

Several example case studies are presented to show the benefits of participating in such an information exchange society. Each case study shown represents the combined efforts of the FOMIS group. Each responder provides information to a FOMIS staff member who organizes all the responses into a detailed report. Each report contains individual contact information for follow-up.

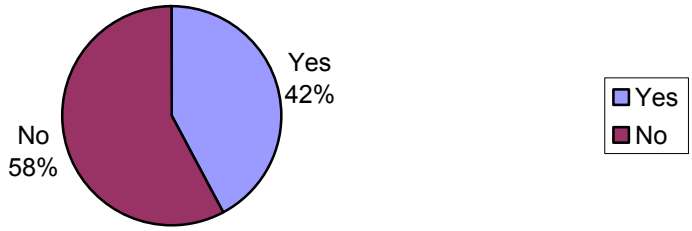
NOTE: Individual contact information has been removed from these Case Studies.

Case 1
Subject: Environment
Item: Emissions Monitoring
Description: Continuous Stack Particulate Monitoring

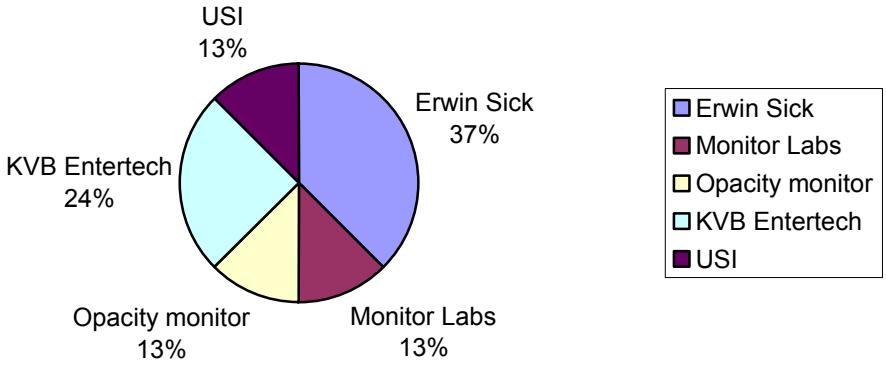
Question:
A. Do your environmental regulations require stack particulate monitoring?
B. What instrument is used for monitoring?
C. How often are you required to measure particulate emissions?

Answers are summarized from 19 responders:

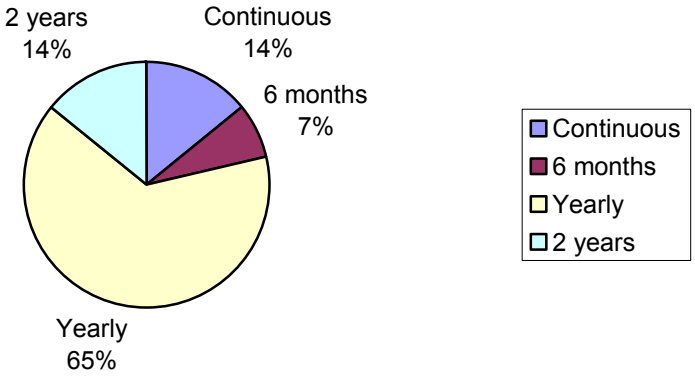
A. Do your environmental regulations require stack particulate monitoring?



B. What instrument is used for particulate monitoring?



C. How often are you required to measure particulate emissions?



Case 2
Subject: Environmental
Item: NOx Control
Description: Monitoring Ammonia Slip

Question:
For those stations with selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR) systems for nitrogen oxide (NOx) control:
A. What methods have been used for monitoring ammonia slip?
B. If an on-line monitor has been used that can reliably measure ammonia in the 5 to 10 parts per million (ppm) range, please give details (manufacturer, model, contact information, etc.)?

Several example replies are shown below.

Responder One:

A. For monitoring NH3 slip from SCR systems there are three approaches:
    a. Monitoring the NH3 content in the ash,
    b. Wet chemical grab sample techniques such as EPA CTM-27, and
    c. Continuous monitors.
B. Yes, there are continuous monitors that should do the job. We have some experience with three of them. They are all insitu analyzers using tunable infrared diode spectroscopy. The three are:
    a. NEO Laser which is from Norway and is sold through Analytical Specialties in Houston (281-488-0409),
    b. Siemens Laser Analytics (Jan Grimbrandt 918-662-7000), and
    c. Unisearch Associates in Canada (Dan Young 905-669-3547).
    NOTE: The Siemens and Unisearch analyzers use fiber optics to bring the laser signal to the duct and thus a single analyzer can measure multiple paths. The Neo mounts the laser on the duct, so a separate analyzer is needed for each line of sight.

Contact *User Name Goes Here, User Phone Number Goes Here, User Email Goes Here**

Responder Two:

A. We use a wet chemistry approach, bubbling flue gas through a 0.1N acid solution. We have found that PRB ash analysis does not provide valid results for ammonia content, as the ammonia content in the ash correlates strongly with the LOI, which varies considerably on our cyclone-fired units.

Contact *User Name Goes Here, User Phone Number Goes Here, User Email Goes Here**

B. We have not identified a suitable online detector. Based on experience with the NOX analyzers, I would be concerned with the reliability of such a unit in a high-ash environment, as well as the inability to readily sample different areas of the catalyst, particularly the areas of lower-than-average NOX where the highest slip levels tend to be on new catalyst. I am trying to justify the need for such a unit, but it is difficult given the slow rate of decline being observed thus far with catalyst reactivity - as compared against the relatively low cost and increased flexibility of performing monthly wet chemistry testing.

Contact *User Name Goes Here, User Phone Number Goes Here, User Email Goes Here**

*User contact information has been deleted from this presentation.

Conclusions
Information overload can be managed effectively by joining a targeted information exchange society. Several case studies, related to environmental monitoring and mitigation, are shown to illustrate how all members of an information exchange society can benefit by sharing best practices.