



**WHERE
MEASUREMENT
BEGINS**

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A Double “MACT ATTACK”

The second in a series of U.S. EPA Maximum Achievable Control Technology (MACT) rules, targeting Electric Generating Units (EGU), is imminent. The first MACT regulation to pass was the Portland Cement MACT, which went in effect in September, 2010. The second is planned for December 16, 2011 and is focused on coal and oil-fired power plants. Both MACT regulations share common features, challenges and likely outcomes, viz:

- ◆ They have three (3) year compliance schedules,
- ◆ Hazardous Air Pollutants (HAPs) including mercury (Hg), acid gases (HCl), particulate matter (PM), and Total Hydro Carbons (THC – for the Portland Cement Plants) will need to be controlled and continuously monitored.
- ◆ Significant investments will be required at EGU’s and Portland Cement plants. Some plants will likely be mothballed or permanently closed, as their age, the economic return on large pollution control and monitoring investments, their competitiveness in the market place, etc. will dictate this.
- ◆ Owner/Operators and equipment and service suppliers will need to partner to achieve timely compliance while navigating a steep learning curve.

Compliance with MACT rules should improve air and water quality and reduce negative health impacts.

How Can Tekran Help?

Tekran is prepared to assist you in navigating these new rules. Here’s what we bring to the table.

Challenge	Tekran Solutions
New Parameters of Hg, PM, HCl, THC	Tekran has proven solutions for each parameter with a common heated sample transport and delivery system for Hg, THC and HCl
Lower Emissions Levels	Only Tekran has proven Low-Level mercury measurements accuracy and traceability (ask us for third-party test results)
New Reporting Requirements	Tekran can provide custom reporting for 30-day rolling averages, pollution control equipment economic optimization, etc.
Comprehensive Start up, Training and Ongoing Support (Parts, Service, NIST Traceability)	Tekran offerings include full-time service programs, dial up diagnostics, 24-hour parts service response, and NIST traceability hardware and software.

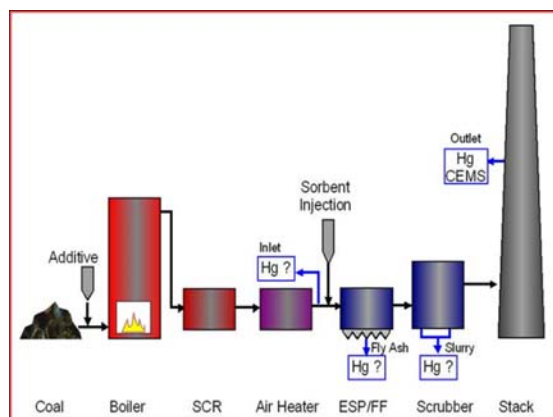
Additional perspectives on the MACT Rules can be found at
<http://www.andovertechnology.com/images/december%202011.pdf>

Time is of the Essence

There’s a lot to do in a short period of time. Benchmarking plant emissions and assessing the performance of candidate pollution control equipment and/or operating strategies will take many months. Tekran has assisted many owner/operators and pollution control equipment providers in this process. ***We can help; contact us at (865) 688-0688.***

Abatement Optimization

Tekran is currently supporting researchers, suppliers and owners of pollution control equipment for mercury abatement. Research and evaluation of technologies is occurring in laboratory and field applications including pilot studies, slip-stream and full-scale scenarios. Abatement technologies and research include activated carbon injection (ACI), brominated compounds applied in pre-combustion coal-feeders, custom catalysts for oxidizing and capture of mercury, chemically impregnated fabric filter (AKA “baghouses”) media, and wet scrubber chemistry optimization.



**Mercury Abatement and Monitoring Opportunities
Coal-fired Power Plant**

Tekran is currently supporting mercury monitoring and abatement research evaluations on numerous processes including, but not limited to *coal-fired power plants, Portland cement production facilities, waste-to-energy plants, and mineral processing plants (e.g. gold, iron/taconite, steel).*

New Generation - Tekran Model 2537X

Based on the successful Model 2537 platform, the completely updated and redesigned Tekran 2537X instrument provides secure network access for remote operation, control, data downloads and much more. The Tekran Model 2537 has been a workhorse for automated air measurements for over 15 years and we're excited to offer even more functionality, control and advanced features. It is compatible with all of the current 2537 modular components such as the Model 1130/1135.



For more information, browse to <http://www.tekran.com/introducing-tekran-2537x-analyzer/> or contact us at lab-air-info@tekran.com.

The Tekran Model 1360 CEM Permeation Source

The recent federal **EPA NIST Traceability Requirements** for HgCEMS have been adopted by all U.S. states that have active mercury monitoring programs. This protocol imposes ongoing requirements to ensure that all certified elemental mercury calibrators operating in the field continue to generate accurate concentrations.

Options for Periodic Calibrator Checks

The EPA offers **four** alternatives for the periodic field validation of elemental mercury generators. Operators must compare the output of each of their CEM elemental generators to one of the following independent mercury sources to ensure that their generator has not shifted by more than 5% ($\pm 0.5 \mu\text{g}/\text{m}^3$) from the certified mercury concentration.

1. Field Reference Generator (Quarterly)
2. Permeation Tube (Monthly or weekly)
3. Sorbent Tube (Quarterly)
4. Hg Gas Cylinder (Quarterly)

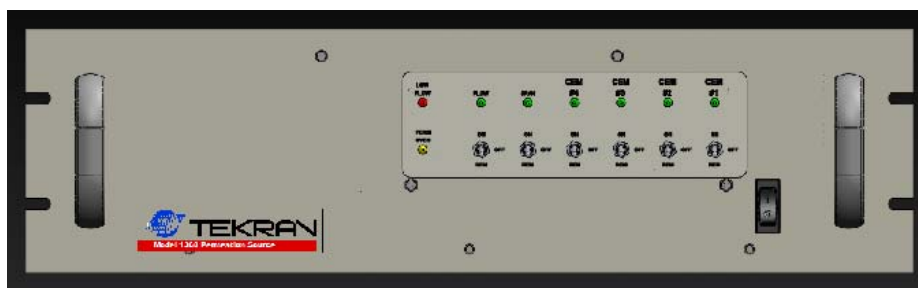
With the exception of the **Permeation Tube** option, all of the above choices entail considerable extra costs and disruptions to normal CEM operation. Hauling a Method 30B sampler, mercury gas tank, or a certified calibrator to every site **four times per year** is a major inconvenience.

Tekran's HgCEMS customers have a significant advantage over other CEM users. On Tekran HgCEMS, each mercury analyzer contains its own internal permeation source. Performing the required generator quality check is simply a matter of scheduling a slightly modified **Daily Span Check** automated sequence. The testing process is entirely automated and does not result in any additional missing data. Tekran's newest Rev 2 CEM operating software automates the collection, reporting and alarming of all perm ratio test results.

In response to requests from customers of other manufacturers' CEM systems, Tekran has announced the **Model 1360 CEM Permeation Source**. This 5¼" rack mounted module is installed in a CEM system shelter and left powered on at all times. The system can provide 500 ml/min of constant elemental mercury span gas at a fixed concentration. The source can be controlled from front panel switches or via rear panel contact closures and can automatically test up to four CEM systems located within one shelter.

Tekran has been building mercury permeation sources since 1993 and has more experience with this technology than any other supplier. We have demonstrated that our perm sources are extremely stable and have confirmed that our permeation tubes have maintained constant emission rates for more than 15 years. The calculated life of a mercury perm tube is well over 100 years.

The **Model 1360** extends one of the benefits of owning a Tekran HgCEM system to other users. Other issues such as stability, sensitivity and freedom from cross sensitivities to other compounds still require our full HgCEM system.



Tekran Supports GMOS in Rome

The [Global Mercury Observatory System \(GMOS\)](#) is a 5-year project funded by the European Commission to establish a world-wide system for the measurement of atmospheric mercury in ambient air and precipitation samples. There are numerous “Partners” in GMOS from many countries. The coordination of the project is being done by the CNR Institute of Atmospheric Pollution Research in Rome.



Speciation System at the CNR site in Rome. Tekran was joined by and worked side-by-side with Mark Olson of the North American [Atmospheric Mercury Network \(AMNet\)](#). There is a productive collaboration between AMNet and GMOS. There were 25 attendees in all from countries such as South Africa, Cape Verde, Argentina and Suriname to name a few.

The GMOS program relies heavily on the [Tekran 2537B Automated Mercury Monitor](#) coupled with the [Tekran 1130](#) and [Tekran 1135](#) modules to measure air mercury speciation at ground based locations and during ocean cruises. In order to support GMOS, Tekran staff helped to organize and conduct a 3-day training session on the Tekran 2537-1130-1135 Atmospheric Mercury



Aftermarket Support

Tekran places a premium on aftermarket support. Helping our customers is key to our success. A significant portion of Tekran is dedicated to service, training and remote support. A common accolade we receive is “Your service and support are second to none”. We plan on keeping it that way.

Tekran services numerous industries including cement, power generation, incineration, and abatement. Each industry has unique HgCEM’s service needs. We customize our training and service programs to meet the individual needs of our customers. We can now customize our service software (unique to Tekran) to the individual market sector and application. Several Tekran customers “mothballed” their 3300 HgCEM’s after the vacature of CAMR. With the pending new rules and other MACT rules fully promulgated (see page 1), resources can quickly become consumed. Careful and strategic planning will be required in order to meet the deadlines. **Let Tekran help you start planning now!**

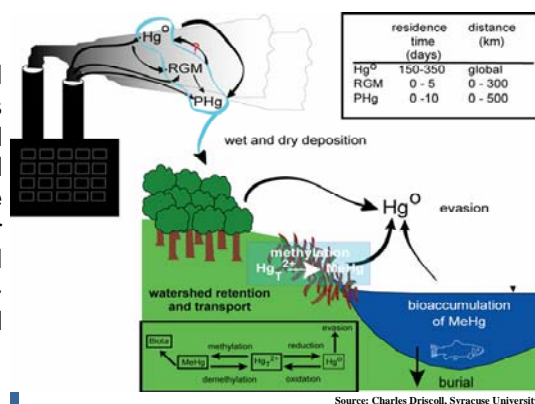
Tekran’s NIST support program continues to grow. Several non-Tekran HgCEMS users are customers in the program along with many Tekran customers. Tekran’s state-of-the-art NIST 2800 unit can produce up to six user calibrators simultaneously.

Tekran Instruments—Monitoring Around the World

Tekran provides trace-level mercury analytical and monitoring technology for a variety of applications including laboratory-based sample analysis, continuous point-source emissions and ambient air monitoring. This article focuses on and highlights the results of an application of Tekran's Ambient Air Mercury Speciation System.

In contrast to most other heavy metals, mercury (Hg) and mercury compounds in the environment exhibit exceptional behaviors including methylation, volatilization and biomagnification. Since mercury is a potent neurotoxin, it is the latter which has spawned particular interest in understanding its production, transport, speciation and fate.

Mercury is emitted into the atmosphere from natural (e.g. volcanic activity) as well as anthropogenic sources (e.g. combustion processes). It is generally accepted that anthropogenic sources of mercury have surpassed natural sources; a trend which may continue with the world-wide increase in coal burning for electric power generating units. Thus, the incentives for additional measurements of atmospheric mercury and the attendant understanding of its transport, conversion and fate, are clear.



Using Tekran's Model 2537 and speciation modules

1130 and 1135, American and Canadian researchers have determined that there are exceptionally high levels of gaseous oxidized mercury (a.k.a. RGM) and particulate-bound mercury in the Arctic. A synthesis of Arctic atmospheric mercury speciation measurements made in 5 countries and the linkages to snow and water has recently been summarized. Analogous research at the German Antarctic Station, Neumayer, has revealed similar patterns, including mercury depletion events (MDE's) after polar sunrise. The German researchers in this program enhanced their study by using the Tekran Ambient Air Mercury Speciation System aboard a research ship near Antarctica.



Arctic Research Vessel, Amundsen, with Tekran 2537 Ambient Mercury Speciation System in the Foreground.

Just recently, compelling gaseous elemental mercury (GEM) measurements at Cape Point, South Africa were reported for the years 2007 to 2008. The Cape Point observations revealed large MDE's at a location outside of the polar region. Also observed were pollution events that were attributed to biomass burning and industrial emissions. The article goes on to explain the observations taking into account the chemistry of the marine boundary layer and transport from the continent. One

specific conclusion suggests that the residence time of GEM in the marine boundary layer could be much shorter than current estimates.

Summary

Continued research is underway to better understand the production, transport and fate of atmospheric mercury species. With hundreds of **Tekran 2537's** deployed around the world, researchers and scientists continue rely on Tekran technology to understand the impacts of atmospheric mercury on the environment.

A Message of Thanks

As 2011 comes to a close, we want to thank our customers and suppliers for their continued support and partnership with Tekran. We continue to invest in and refine our products and services for the future. We know these investments and your partnership will pay off.

We wish you, your families and colleagues a relaxing and joyous holiday season and look forward to 2012 with excitement.



From All of Us at Tekran Instruments Corporation