PERFORMANCE TESTING OF MULTI-METAL CONTINUOUS EMISSIONS MONITORS

TECHNOLOGY NEED

Many of the currently available continuous emissions monitors (CEMs) cannot meet all of the DOE Technical Requirements or all of the new U.S. Environmental Protection Agency (EPA) Performance Specifications. The purpose of this project is, primarily through testing and evaluation, to accelerate the commercial availability of CEMs that meet EPA Performance Specifications and the DOE Technical Requirements specified by the Mixed Waste Characterization, Treatment, and Disposal Focus Area (MWFA). The work is to be conducted in collaboration with DOE, EPA, and other federal agencies participating in the work of the Interagency CEM Coordination Committee. The emissions of concern are particulate matter, mercury, multi-metals, organics, poly;chlorinated dioxins/furans, and radionuclides.

This project supports participation in the work of the DOE Environmental Management (DOE-EM) and Interagency CEM Working Groups providing technical and implementation support as required to:

- Accelerate the commercial availability of continuous emissions monitors (CEMs) that meet EPA Performance Specifications and the Technical Requirements specified by the MWFA.
- Address documented CEM Working Group goals approved by the MWFA and CMST-CP Program Managers.

TECHNOLOGY DESCRIPTION

CEMs are tested in the field under controlled conditions to determine their operational performance and ability to meet DOE-EM goals. This program is helping to develop a consensus document detailing the strategies that need to be implemented to meet DOE-EM goals.

BENEFITS

Continuous emissions monitoring of hazardous and mixed waste thermal treatment processes is desired for verification of emission compliance, process control, and public safety perception. The proposed EPA Maximum Achievable Control Technology (MACT) rule will likely include limits on mercury emissions. DOE incinerators need to have a reliable method of measuring and monitoring their stack emissions for mercury. CEM technology, once proven reliable and accurate, will fulfill this need.

CAPABILITIES/LIMITATIONS

The proposed EPA definition of a CEM requires continuous process sampling, but allows the analysis to be conducted in a batch operation. The batch analysis must be completed on-site and be integral to the CEM. The CEM should provide a concentration value for the species of interest at least once every three hours. The response time of the CEM (i.e., the time interval between the start of a step change in the monitored system and the time when the monitor output reaches 95% of the final value) should be less than two minutes. For CEMs utilizing batch analyses, the delay between the end of the sampling time and reporting of the sample analysis should be no greater than one hour. Also, there should be no greater than a five-minute gap in sampling when the sample collection media is changed. Thus, a CEM should be able to continuously sample facility emissions, and have as close to real-time reporting of effluent concentrations as possible.

In addition to requirements for sampling and data reporting, the CEM must have detection limits low enough to assure compliance with the eventual regulatory limits for specific species of interest. Based on the results of extended duration testing at the Holnam Inc. cement kiln in Holly Hill, South Carolina, mercury (Hg) CEMs are not ready for widespread deployment. It appeared that the stack conditions were

too aggressive for the CEMs to survive for very long without intervention and repair. It is believed the CEM would survive longer under more benign conditions, such as those at a DOE-owned incinerator.

COLLABORATION/TECHNOLOGY TRANSFER

The purpose of this task is to accelerate the commercial availability of continuous emissions monitors (CEMs) that meet EPA Performance Specifications and the Technical Requirements specified by the MWFA. The program is being conducted in collaboration with DOE-EM (CMST and MWFA), EPA (OSW, OAQPS, and ORD), and other federal agencies participating in the work of the Interagency CEM Coordination Committee.

For all testing to date funded by DOE and/or jointly funded by EPA, the vendors have contributed their systems and support personnel gratis in exchange for the opportunity to test their systems under real-world conditions. This is expected to continue.

ACCOMPLISHMENTS

Work planned for FY 1998 includes:

- Prepare and deliver a summary briefing on the joint EPA/DOE extended duration tests of particulate matter and mercury CEMs to the Interagency CEM Technology Development Coordination Committee and Working Group.
- Prepare and deliver a draft test plan for testing one or more Hg CEMs at an operating DOE hazardous waste treatment facility. The test plan will identify the test site and the committed test CEMs.
- Complete testing of one or more Hg CEMs at an operating DOE hazardous waste treatment facility.
- The CEMs may remain in the field for monthly testing to determine long-term performance of these instruments. A report will be issued to summarize the periodic Relative Accuracy Test Audit (RATA) results.
- Delivery of an updated CEM strategy document to CMST, MWFA, and the working group to include sections on mercury, multi-metals, polychlorinated dioxins and furans, radionuclides, CEM status, and control and compliance strategies. A draft document has been issued for review and comment regarding mercury and dioxin control strategies.

TECHNICAL TASK PLAN (TTP) INFORMATION

TTP No./Title: SR17C231(Rev.1, May 1998) - Demonstration of Emerging Continuous Emissions Monitors

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The CMST CP tests continuous emissions monitors to determine their operational performance and ability to meet goals.

Long-term tests and evaluations of mercury and particulate matter continuous emissions monitors are conducted by CMST-CP experts.