

QUARTERLY STATUS REPORT

**FAST-RESPONSE ISOTOPIC ALPHA
CONTINUOUS AIR MONITOR (CAM)**

CONTRACT NO. DE-AR26-98FT40365

**Second Quarterly Status Report
For the Period
January 3, 1999 - April 3, 1999**

Date Submitted: April 28, 2000

Contractor:

**Thermo Power Corporation
Advanced Technologies Group
45 First Avenue
P.O. Box 9046
Waltham, MA 02454-9046**

Principal Investigator: Keith D. Patch

Prepared for:

**National Energy Technology Laboratory
U.S. Department of Energy
628 Cochran's Mill Road
P.O. Box 10940, MS 921-143
Pittsburgh, PA 15236**

**Contracting Officer's Representative: Richard P. Bush
Contracting Officer: Randolph L. Kesling
Specialist: Martin J. Byrnes**

ADDITIONAL ASSISTANCE
2000 MAY -1 P 2: 01
USDUE-FE10

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, make any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

Project objective

The objective of this effort is to develop and test a novel Continuous Air Monitor (CAM) instrument for monitoring alpha-emitting radionuclides, using a technology that can be applied to Continuous Emission Monitoring (CEM) of thermal treatment system off gas streams. The CAM instrument will have very high alpha spectral resolution and provide real-time, on-line monitoring suitable for alerting workers of high concentrations of alpha-emitting radionuclides in the ambient air and for improved control of decontamination, dismantlement, and air emission control equipment.

Base Phase I involves the design, development, and preliminary testing of a laboratory-scale instrument. Testing will initially be conducted using naturally-occurring radon progeny in ambient air. In the Optional Phase II, the Base Phase I instrument will be critically evaluated at the Lovelace Respiratory Research Institute (LRRI) with characterized plutonium aerosols; then an improved instrument will be built and field-tested at a suitable DOE site.

Major milestones

- Design criteria and specifications defined — Completed on schedule
- Prototype unit operational
- Performance of prototype unit demonstrated

Accomplishments and technical progressJanuary 1999

A project Kickoff Meeting was held at the Morgantown, West Virginia offices of the DOE Federal Energy Technology Center (FETC) last month (January). The meeting was attended by ten (10) local office personnel, as well as by teleconference with a representative of the Characterization, Monitoring, & Sensor Technology Crosscutting Program (CMST-CP.) The meeting began with a brief background presentation of the related water monitoring technology being

developed under DOE-FETC contract by the contractor. Subsequently, the results to-date of the Design Criteria and Specifications task were presented, as well as the program plans for the remainder of the program's Base Phase I.

Attendees at the Kickoff Meeting agreed with the importance and the desirability of designing a CAM that allows for archiving of the collected particulates, in order to meet the needs of CAM users. In addition, meeting participants were most helpful to the program, by providing additional published needs from around the DOE complex that were related to the project, offering to provide site contacts that might be interested in hosting the Optional Phase II Field Test, and requesting an electronic copy of a project presentation made at last year's Health Physics Society Annual Meeting to disseminate to their contacts across the DOE Complex.

Work on the design criteria and specifications was completed, confirming the preliminary features for a future commercial CAM:

- 18" wide X 12" deep X 10" high (approximately)
- 4 scfm airflow (approximately)
- 30 days (minimum) unattended operation between scheduled film changes .

Such a design was seen as attractive to existing CAM users, as it would simultaneously improve the detection sensitivity of the system while eliminating the use of filter media. Additional drawings were made of this prototype design.

The National Environmental Policy Act (NEPA) documentation for the Phase I activity by subcontractor Lovelace Respiratory Research Institute (LRRRI) was completed, and an electronic copy was submitted to DOE-FETC. Phase I NEPA approval was received for Phase I activity by Thermo Power. The Optional Phase II NEPA approval for both Thermo Power and LRRRI will be sought just before the go-ahead to Phase II, if approved.

The Management Plan was submitted to DOE-FETC in advance of the project kickoff meeting .

February 1999

Following the successful project Kickoff Meeting that was held at the Morgantown, West Virginia offices of the DOE Federal Energy Technology Center (FETC) last month (January), project efforts transitioned to conducting the detailed design and fabrication of the prototype CAM instrument.

The sub-scale manual CAM that will be used for engineering data confirmation was designed, built, and became operational this month. A variety of shakedown tests were conducted, and a number of design modifications were incorporated in the sub-scale unit as a result of these initial tests.

The overall dimensions of the full-scale laboratory prototype were selected to be somewhat larger than the future commercial CAM, in order to provide for operational testing flexibility, and to allow the selection of suitable standard purchased components. Additional design drawings were made of the full-scale prototype, and the selection and ordering of purchased components was begun.

Attendees at the Kickoff Meeting requested an electronic copy of a project presentation made at last year's Health Physics Society Annual Meeting to disseminate to their contacts across the DOE Complex; a copy of the document was sent to all participants.

The National Environmental Policy Act (NEPA) documentation for the Phase I activity by subcontractor Lovelace Respiratory Research Institute (LRRI) was completed in January, and an electronic copy was submitted to DOE-FETC. A paper copy of the LRRI NEPA documentation was requested for submission to FETC. Phase I NEPA approval was received in January for Phase I activity by Thermo Power. The Optional Phase II NEPA approval for both Thermo Power and LRRI will be sought just before the go-ahead to Phase II, if approved.

March 1999

Effort this month concentrated on conducting the detailed design and fabrication of the prototype CAM instrument. The overall dimensions of the full-scale laboratory prototype are somewhat larger than the future commercial CAM, in order to provide for operational testing flexibility, and to allow the selection of suitable standard purchased components. Stainless steel was selected as the

preferred material of construction for the full-scale laboratory prototype, in order to facilitate it's future decontamination. Additional design drawings were made of the full-scale prototype, and the selection and ordering of purchased components continued. The first purchased components were received this month, as were the first in-house custom-fabricated components.

The sub-scale manual CAM being used for engineering data confirmation was operated to produce additional parametric data this month.

Assessment of current status

The project is on schedule. The Cumulative to Date Accrued Cost variance is under spent by 73%, which was caused by under spending in the last four Reporting Periods. This variance is primarily due to cost savings that accrued during the performance of the Design Criteria and Specifications Task, as well as a slight postponement in ordering supplies and components to assemble and test the prototype CAM equipment. The cost savings during the Design Criteria and Specifications Task developed due to the smooth and rapid work conducted with LRR1 during that task, which provided unexpected efficiencies. The postponement in ordering was anticipated, as the contractor was awaiting acceptance of the program plans by DOE at the project kick off meeting (conducted on January 21, 1999 at FETC Morgantown) prior to making the supplies and components purchases. This postponement is not expected to impact the overall schedule or budget of the program. The savings that accrued in the Design Criteria and Specifications Task will be reserved to perform more comprehensive prototype design work and laboratory prototype testing.

Plans for the next two months

A Topical Report will be submitted that summarizes the work conducted during the Design Criteria and Specifications Task.

The Prototype Design and Fabrication Task will be completed.

The Laboratory Prototype Testing Task will begin.

DE-AR26-98FT40365 Second Quarterly January 3, 1999 - April 3, 1999

A paper copy of the LRRRI NEPA Application will be submitted.

The Phase I NEPA approval will be received for Phase I activity by LRRRI.

PI: Keith Patch, Thermo Power Corp. (Advanced Technologies Group),
(781) 622-1022

FETC COR: Richard Bush (412) 386-6426