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QUARTERLY STATUS REPORT

FAST-RESPONSE ISOTOPIC ALPHA CONTINUOUS AIR MONITOR (CAM)

CONTRACT NO. DE-AR26-98FT40365

Third Quarterly Status Report
For the Period
April 4, 1999 - July 3, 1999

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DISCLAIMER

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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 — Completed on schedule
- Performance of prototype unit demonstrated

Accomplishments and technical progress

April 1999

Effort this month concentrated on continuing 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. Additional design drawings were made of the full-scale prototype, and the selection and ordering of purchased

components continued. Additional purchased components were received this month, as were additional in-house custom-fabricated components. Testing and checkout of full-scale prototype subsystems was completed this month.

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

May 1999

Effort this month concentrated on completing the fabrication, assembly and checkout of the full-scale prototype CAM instrument. All remaining subassemblies were fabricated and assembled in the instrument. Testing and checkout of these remaining subsystems was completed. The prototype CAM instrument became operational, and initial data was taken using the instrument.

Currently, a redesign of the prototype CAM instrument is underway. This redesign includes an improved detector mount, for enhanced alignment of the detectors to the film, and an enhanced film tracking system, to improve alignment of the film to both the ESP and the detectors. Several changes to the film transport system are being made to accommodate the enhanced film tracking system.

Figure 1 illustrates an overall artist's view of the modified full-scale prototype CAM instrument. Visible at the bottom of the figure is a replacement linear positioning slide, which will provide improved vertical alignment of the film within the instrument. The replacement positioning slide is on order, and will be received and installed in the prototype CAM in July. Until that time, the initial low accuracy linear carriage will be used to provide film libration for the instrument.

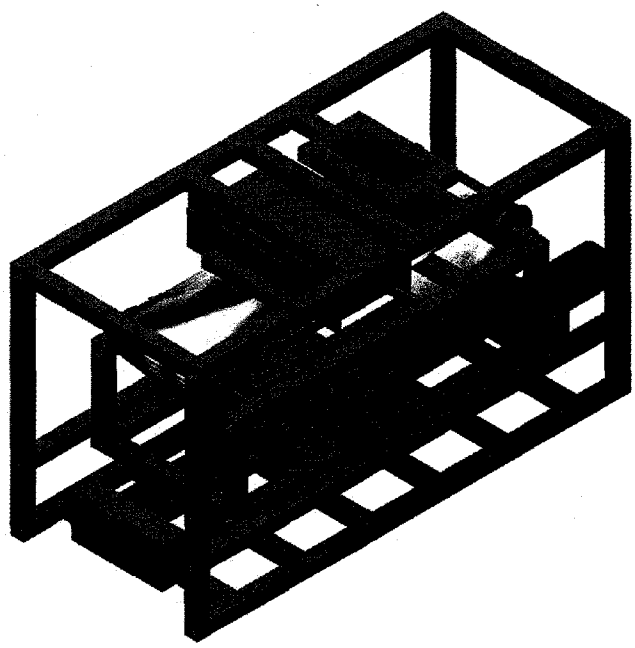

Figure 1 Full Scale Prototype CAM

The prototype CAM instrument will be operated next month to obtain additional performance data while the initial low accuracy linear carriage is installed in the instrument. This data will include variations in various operating parameters, in order to determine the preferred operating conditions for this prototype.

A program review presentation was prepared and presented at the Deactivation and Decommissioning Focus Area FY1999 Mid-Year Review Meeting May 25, 1999.

June 1999

In May, the prototype CAM instrument became operational, and initial data was taken using the instrument. A redesign of the prototype CAM instrument was begun in order to improve the instrument's performance. This redesign includes an improved detector mount, for enhanced alignment of the detectors to the film,

and an enhanced film tracking system, to improve alignment of the film to both the ESP and the detectors. Several changes to the film transport system are being made to accommodate the enhanced film tracking system.

The replacement linear positioning slide and motor, to provide improved vertical alignment of the film within the instrument, were received in June. The remaining components of the replacement positioning slide will be received, and the linear positioning slide will be installed in the prototype CAM in July. Until that time, the initial low accuracy linear carriage will be used to provide film libration for the instrument.

The prototype CAM instrument was operated to obtain performance data with the initial low accuracy linear carriage installed in the instrument. Performance data was obtained for various CAM operational parameters, including different air flow rates and operating voltages.

A presentation was prepared and presented at the Health Physics Society 44th Annual Meeting, Philadelphia, PA, June 27 - July 1, 1999. In addition, informal meetings were held with various DOE CAM end users. For example, the personnel associated with Los Alamos National Laboratory's (LANL) upgrade of their continuous air monitoring system for the Plutonium Facility at Technical Area 55 (TA-55) continue being very interested in the further development of the Fast-Response CAM. LANL was quite interested to learn that our Phase II field test might be performed in their back yard, at the LANL TA-54 LSDDP.

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 LRRI 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.

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

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

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