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U.S. DEPARTMENT OF ENERGY  
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT  
OFFICE OF QUALITY ASSURANCE

SUPPLIER AUDIT REPORT

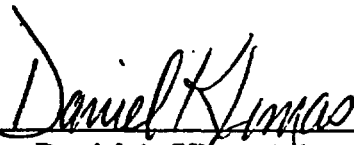
OF

LAWRENCE LIVERMORE NATIONAL LABORATORY  
CENTER FOR ACCELERATOR MASS SPECTROMETRY

LIVERMORE, CALIFORNIA


REPORT NUMBER OQA-SA-97-014  
MARCH 27-28, 1997

Prepared by:



Daniel A. Klimas  
Audit Team Leader  
Office of Quality Assurance

Date:

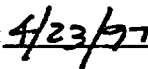


Approved by:



Donald G. Horton  
Director  
Office of Quality Assurance

Date:



## **1.0 EXECUTIVE SUMMARY**

The results of the supplier audit of Lawrence Livermore National Laboratory - Center for Accelerator Mass Spectrometry (LLNL-CAMS) revealed satisfactory implementation of the Quality Assurance (QA) requirements for the Office of Civilian Radioactive Waste Management (OCRWM) activities. The LLNL-CAMS QA Requirements document and implementing technical procedures were in place for the scope of work and implementation was considered to be effective in producing the desired results. LLNL-CAMS analytical services are subcontracted by Beta Analytical, Inc. LLNL-CAMS utilizes accelerator mass spectrometry and Carbon-14 isotopes to analyze expected ages of samples.

There was one unsatisfactory condition identified during the audit that required corrective action. There was no procedure to address the method to document deficiency reporting and corrective action for anomalous samples or data. This was corrected during the audit by the development of an LLNL-CAMS administrative procedures for deficiency reporting.

## **2.0 SCOPE**

The supplier audit was conducted to evaluate the adequacy, implementation, and effectiveness of the LLNL-CAMS QA program for Carbon-14 analysis. This was accomplished by determining if LLNL-CAMS is in compliance with the QA Requirements document and technical procedure approved by the U.S. Geological Survey and the OCRWM Quality Assurance Requirements and Description (QARD) for the specific scope of work. The QA program elements determined to be applicable are: Organization; QA Program; Implementing Documents; Document Control; Control of Measuring and Test Equipment; Corrective Action; QA Records; and Sample Control.

## **3.0 AUDIT TEAM AND OBSERVERS**

Daniel A. Klimas, Audit Team Leader, Office of Quality Assurance (OQA)

## **4.0 PERSONNEL CONTACTED DURING FACILITY AUDIT**

John R. Southon, Chief Scientists, LLNL

## **5.0 SUMMARY OF AUDIT RESULTS**

The LLNL-CAMS QA Requirements document dated October 21, 1996, and technical procedure CAMS-LLNL-IP-1, Revision 0, "14C Mass Spectrometry", address the requirements of the Beta Analytical, Inc. task orders and the applicable elements of the OCRWM QARD for the intended scope of work. The analytical processes described within the technical procedure were in place and implementation was considered to be effective. The method of documenting deficiency reporting and corrective action for

anomalous samples or data was not adequately described in the QA Requirements document or in the technical procedure. This was corrected by the development of an administrative procedure that describes the requirements for identifying, documenting and notifying the submitter of samples or measurements deemed unsuitable for Carbon-14 age determination. There have been no circumstances identified where samples or measurements were determined to be unsuitable for analysis requiring deficiency reporting or corrective action.

## **6.0 DEFICIENCIES/CORRECTED DURING THE AUDIT/RECOMMENDATIONS**

There were no deficiencies issued or recommendations provided as a result of the audit.

### **CORRECTED DURING THE AUDIT**

1. There was no procedure to address the method to document deficiency reporting and corrective action for samples or measurements deemed unsuitable for Carbon-14 analysis. This was corrected by the issuance of administrative procedure, "Deficiency Reporting/Corrective Action" dated April 2, 1997, that describes the requirements for deficiency reporting and corrective action for anomalous samples or data.