

# Certified Reference Material

## Certificate of Traceability

### U.S. Department of Energy Radiological and Environmental Sciences Laboratory

1955 Fremont Avenue, MS 2112

Idaho Falls, Idaho 83415

(208) 526-8031

#### CRM ID: MAPEP 19-MaS41

This Certified Reference Material (CRM) contains a known quantity of analyte(s) in a stable and homogeneous matrix. This material is intended for the calibration of instruments and for the verification of the accuracy and precision of analytical measurements. The reference value listed for each analyte is mathematically derived from a certified value traceable to a national or international standard. The traceability of the CRM is maintained through an unbroken chain of comparisons, all having stated uncertainties, calculated according to ISO and NIST Guidelines.

This CRM was prepared and the reference value(s) were verified by the Radiological and Environmental Sciences Laboratory (RESL). RESL maintains direct traceability to the United States National Institute of Standards and Technology (NIST) through successful participation in the NIST/RESL Radiological Traceability Program. RESL is accredited to ISO/IEC 17025 (2377.01) as a Chemical Testing Laboratory, ISO/IEC 17043 (2377.02) as a Performance Testing Provider, and ISO 17034 (2377.03) as a Reference Material Producer by The American Association for Laboratory Accreditation.



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Senior Technical Manager - Chemistry



**CERTIFIED  
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MATERIAL**

## USDOE-RESL CRM ATTACHMENT

**CRM ID: MAPEP 19-MaS41**

**Matrix: Soil**

**Reference Date: 8/1/2019**

| Radionuclide | Reference Value*        |
|--------------|-------------------------|
| Am-241       | 2.02 +/- 0.04 E0 pCi/g  |
| Co-60        | 2.06 +/- 0.04 E1 pCi/g  |
| Cs-134       | 2.75 +/- 0.05 E1 pCi/g  |
| Cs-137       | 2.13 +/- 0.03 E1 pCi/g  |
| Mn-54        | 2.01 +/- 0.04 E1 pCi/g  |
| Ni-63        | 1.70 +/- 0.03 E1 pCi/g  |
| Pu-238       | 1.41 +/- 0.03 E0 pCi/g  |
| Pu-239       | 1.66 +/- 0.03 E0 pCi/g  |
| Sr-90        | 1.55 +/- 0.03 E1 pCi/g  |
| Tc-99        | 1.60 +/- 0.03 E1 pCi/g  |
| U-234        | 3.13 +/- 0.10 E0 pCi/g  |
| U-235        | 1.47 +/- 0.03 E-1 pCi/g |
| U-238        | 3.15 +/- 0.10 E0 pCi/g  |

\*Uncertainties are reported at coverage factor of k=1.

### Special Instructions for the Proper Use of the CRM

This CRM has been determined to be homogeneous to about 5% with one gram sample sizes at the 95% confidence interval and can be subdivided for analysis. The between aliquant uncertainty is less than the imprecision of the method. The minimum sample size taken for analysis should not be less than one gram.

### Storage and Handling of CRM

The certification of this CRM's Reference Value(s) is valid provided that the CRM is handled and stored properly and that no change in the composition that affects the analytes of interest occurs. This matrix is homogeneous, stable and periodic recertification of this CRM is not required. This certification is nullified if the CRM is damaged, contaminated, or otherwise compromised.

\*The expiration date for the individual radionuclides in this CRM has been determined from analytical data to be in excess of 37 years from the date it was issued. The time this CRM can be used effectively should be based on the half-lives of the radionuclides of interest.

RESL assumes no responsibility for the sampling, handling, preservation or transportation of the CRM by the customer. This CRM should be stored at normal laboratory operating temperatures. If the validity of the CRM becomes questionable or technical assistance is needed please contact RESL.

## **Verification of Certified Reference Activity**

The analyte(s) in this CRM have been verified by alpha spectrometry, liquid scintillation counting and high resolution gamma spectrometry against independent source(s) which are directly traceable to the National Institute of Standards and Technology. If substantive technical changes occur that affect the certification, RESL will notify the original requestor.

## **Hazards**

The below link takes you to the SDS for this material.

<https://www.id.energy.gov/resl/mapep/describe.html>

Certificate Version: 4.0

Preparation Date: 8/1/2019

Certificate Issue Date: 9/30/2020

Expiration Date: See Above\*

END OF CERTIFICATE