

**U.S. Department of Energy**

**Mixed-Analyte Performance Evaluation Program (MAPEP)**

**MAPEP TEST SESSION 27**

**CLOSING DATE: November 7, 2012 12:00 Noon Mountain Standard Time (MST)  
November 7, 2012 19:00 Coordinated Universal Time (UTC)**

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**Radioactive Decay Correction Date for All Radiological Samples:**

**August 1, 2012 12:00 Mountain Standard Time (MST) or  
August 1, 2012 19:00 Coordinated Universal Time (UTC)**

**PLEASE NOTE THAT THE TURNAROUND TIME FOR REPORTING  
RESULTS IS ABOUT 60 DAYS (domestic labs) to 75 DAYS (international labs)  
FROM THE SHIP DATE**

**PLEASE READ ALL INSTRUCTIONS**

**CAREFULLY BEFORE ANALYZING SAMPLE**

**IMMEDIATELY UPON RECEIPT OF SAMPLES  
CHECK FOR BREAKAGE AND SHIPPING ERRORS;  
SAMPLE REPLACEMENT TAKES AT LEAST  
2 TO 3 DAYS**

# INSTRUCTIONS FOR MAPEP TEST SESSION 27

## 1. MAPEP PERFORMANCE EVALUATION (PE) SAMPLES.

### **Water Sample:**

Domestic laboratories performing radiological/inorganic and organic analyses may receive a one-liter sample bottle for each water matrix (MaW – mixed analyte radiological and inorganic water, XaW – alkaline radiological water, GrW – Gross alpha/beta water, and OrW – semi-volatile organics water sample). Samples are shipped in multiple boxes with various shipping dates. Please allow ample time for all samples to be received before assuming a sample is missing. Participants will be notified by email when a shipment is made. It is critical that radiological and inorganic analyses utilize sample from only the bottle marked for mixed analyte radiological and inorganic analyses (MaW). Radiological analyses with alkaline water (e.g., I-129) must utilize sample from only the bottle marked alkaline radiological water (XaW). Gross alpha/beta analyses must utilize sample from only the bottle marked for gross alpha/beta analyses (GrW). Organic analyses must utilize sample from only the bottle marked for organic analyses (OrW). **Failure to utilize the appropriate sample bottle will yield incorrect results.** Thoroughly mix entire water sample before performing analyses.

### **Soil Sample:**

Most laboratories performing radiological and inorganic analyses will receive one ~300 gram sample jar of soil. The soil contains all targeted radiological and inorganic analytes and is labeled as a mixed analyte soil (MaS).

Laboratories requesting semi-volatile organics in soil will receive two (2) identical sample vials, each containing  $30.0 \pm 0.5$  grams of MAPEP soil. Laboratories must extract the entire volume of soil sample from one vial and calculate the final concentration based on a 30-gram sample of soil. The second vial of soil is sent as a backup, to be used as needed. The soil containing the semi-volatile organics is labeled as organics/pesticides in soil (OrS). **Do not subdivide these samples.**

### **Air Filters (47-mm glass fiber):**

Air filters are spiked with radiological constituents only, i.e., they are not mixed analyte samples. Laboratories performing radiological and gross alpha/beta air filter analyses will receive one to three filter packets, dependent upon the analyses performed. Filters labeled RdF are radiological air filters with multiple radionuclide determinations required. A filter labeled GrF is for gross alpha/beta analyses only. Air filters that require multiple radionuclide determinations (RdF) will come in two filter packets. Each filter packet contains an identically spiked air filter sandwiched between upper and lower non-spiked filters. The spiked side of the middle filter is placed in the packet facing “up” toward the label. The second air filter may be used for screening, the non-sequential determination of Sr-90, gamma-ray spectrometry, or other analytical procedures as needed.

The gross alpha/beta air filter will come in one filter packet containing one filter (GrF). The spiked side of the filter is placed in the packet facing “up” toward the label. For gross calibration information, the gross alpha/beta filters are spiked with Th-230 and Sr-90. The RdF and GrF filters are not marked, so carefully note the spiked filters and their orientation before removing them from

the packets. Also note that 47-mm glass fiber air filters are being used for both RdF and GrF samples.

If a gross alpha/beta filter sample is requested, a blank 47-mm glass fiber filter is also provided in a sealed packet. The blank filter can be used for blank subtraction and to prepare a gross alpha/beta filter calibration specific for the MAPEP gross alpha/beta filter unknown. Some participants have already prepared a MAPEP specific gross alpha/beta filter calibration, but others have not. The blank filter is provided for blank subtractions and gross alpha/beta filter calibrations.

### **Vegetation:**

Laboratories that request a vegetation matrix will receive two samples: 1) a large sample of about 95 grams (about 400 mL) of finely milled grass hay spiked with only radiological constituents; 2) a smaller sample of less than 10 grams (about 40 mL) of the same vegetation matrix and identically spiked as the larger sample. The large sample is provided for gamma-ray spectrometry measurements and can be ashed to less than 10 grams for actinide and/or Sr-90 analyses. Other analytical methods that utilize the entire sample may also be useful, but ashing the vegetation is among the simplest. The small sample (less than 10 grams, about 40-mL volume) is provided primarily for those participants that cannot handle the larger sample size for actinide and/or Sr-90 analyses. Again, both the large and small samples are identically spiked for all targeted radionuclides. **The entire sample, whether large or small, must be used for analysis.** Use either the large or small vegetation sample, or use both, but results must be reported on a per sample basis. **Do not subdivide either sample.**

The grass hay is a “real-world” vegetation matrix for environmental analytical services. A relatively large sample size is typically collected to ensure that the sample is representative and to provide adequate counting statistics and/or meet appropriate detection limits. For gamma-ray spectrometry, the vegetation may be compressed to create a slightly smaller geometry (e.g., 350 mL), or the density may be decreased to create a slightly larger geometry (e.g., 450 mL). The specific activity for all results must be **reported in Bq/sample** (i.e., Bq per single large 400-mL sample or Bq per single small 40-mL sample). Since both samples are identically spiked, either sample may be used if the results are reported in Bq/sample.

## 2. SAMPLE DESCRIPTIONS.

Sample descriptions for the water, soil, air filters, and vegetation associated with this study are found toward the end of these instructions. The targeted analytes for each sample matrix are listed on the sample descriptions. Analyze the sample for those analytes identified on the sample description that are within the scope of your routine function, capability, compliance requirements, and/or contractual obligations. Thoroughly mix entire water sample before performing analyses. Report all uncertainties at one standard deviation.

## 3. REPORTING ANALYTICAL RESULTS.

### **REPORTING RADIOLOGICAL ANALYTES:**

Radiological analyses should report results for only the analytes listed on the sample description. Other analytes may be detectable but will not be evaluated. This includes any chemical or spectral interference deliberately added to the sample. Conversely, some of the radiological analytes listed on the sample description may not be detected. Report the actual results obtained for all analyses performed, including negative numbers, even if the radionuclide was not detected (i.e., do not

report results as “Less Than” or “Not Detected”). Small negative values are expected, but a statistically significant negative value is “Not Acceptable” because it implies a real negative activity instead of a random fluctuation about zero. **Do not report a “0.0” (zero) result or uncertainty.** The result and total propagated uncertainty are required for sensitivity evaluations and false positive testing. Failure to report results for requested analyses may result in a “Not Acceptable” performance evaluation if the analysis is within the scope of your routine function, capability, compliance requirements, and/or contractual obligations. Report all results in Becquerels per unit, i.e., Bq/L (water), Bq/kg (soil), Bq/sample (filter and vegetation). Report the total uncertainty at one standard deviation.

All targeted radionuclides determined by a given analytical method must be reported together. Specifically, if Pu-239 is determined by alpha spectrometry, then Pu-238 must also be reported. The same is true for U-238 and U-234 if they are determined by alpha spectrometry. The same alpha spectrum for the first isotope provides information about the second. Similarly, failure to report results for all targeted gamma-emitting radionuclides is "Not Acceptable" if the laboratory reported results for at least one targeted gamma emitter. The same efficiency curve used to determine one gamma emitter can be used to determine the others, and MAPEP is specifically testing the efficiency curve used for these spectrometry measurements. The targeted gamma emitters are Co-57, Cs-134, Cs-137, Mn-54, Zn-65, and Co-60 for radiological air filter and vegetation sample matrices, with the addition of K-40 in the mixed-analyte soil and water matrices. Am-241 is not considered a targeted gamma emitter for reporting purposes, but gamma ray spectrometry can be used for its determination. Also, failure to report the results of a false positive test or sensitivity evaluation for an otherwise reportable radionuclide is “Not Acceptable”. For example, failure to report the results for a Sr-90 false positive test is “Not Acceptable” if Sr-90 was reported within the last two test sessions, and the laboratory historically reports Sr-90 results. For testing purposes, MAPEP defines a result as statistically positive when the  $\text{Result} \div \text{Abs} [\text{Total Uncertainty}] > 3$ . The probability of this occurring by chance alone is less than 1%.

#### **REPORTING INORGANIC ANALYTES:**

Inorganic analyses should report results for only the analytes listed on the sample description. Other analytes may be detectable but will not be evaluated. Conversely, some of the inorganic analytes listed on the sample description may not be detected. Report the actual results obtained, or if applicable, the detection limit value. “Less Than” (<) with an established detection limit is acceptable for reporting results for inorganic analytes. **Do not report a “0.0” (zero) result.** A zero result will be flagged as “Not Acceptable”. Total Uranium, Uranium-238, Uranium-235, and Technetium-99 can be reported when utilizing mass spectrometric techniques under the reporting section for inorganic analytes. Report as mg/L (water), mg/kg (soil), and µg/sample (filter and vegetation) for mass spectrometry results only. Report the total uncertainty, if reported, at one standard deviation.

#### **REPORTING SEMIVOLATILE ORGANIC ANALYTES:**

The performance of participating laboratories that perform semi-volatile organic analyses in water and soil will be evaluated in accordance with the NELAC Performance Criteria as specified in the appropriate Field of Testing (FoT) tables associated with non-potable water (organics in water) and RCRA solids (soils). The semi-volatile organics water standards will be evaluated using the spiked value as the true value “T” (reference value). The acceptance limits for the water standard will be generated utilizing the linear regression line found in the Non-potable water Field of Performance Testing tables. Only those components found in the applicable NELAC tables (Acids, Base-Neutrals and Pesticides) need be reported. Users will notice that in some cases not all the

components are listed on the MAPEP data reporting website (i.e., MAPEP does not include nitrosamines and other highly reactive components).

NOTE: “Less Than” (<) with an established detection limit should be used for reporting results for organic analytes. Less than values signify that the laboratory has calibrated for the component, but was unable to detect it above the stated limit. Values reported as less than a detection limit will be evaluated against the true value. In the absence of a stated detection limit (i.e., the field is left blank), MAPEP will assume a calibration was not performed. Report all results in micrograms per unit, i.e., µg/L (water) and µg/kg (soil). **Do not use CLP reporting flags (U, J, etc.). Do not report a “0.0” (zero) result.** A zero result will be flagged as “Not Acceptable”. Report the total uncertainty, if reported, at one standard deviation.

#### **FOR ALL ANALYTES:**

You are required to report only one result for each appropriate analyte. If the reported result is actually a mean of several replicate analyses, the reported uncertainty should also be the mean of the individual uncertainties. In this scenario, do not propagate the individual uncertainties for the replicate measurements. For example, assume three replicate analyses provided the following results and individual uncertainties: 101 +/- 12, 108 +/- 15, and 110 +/- 16. The mean result is  $(101+108+110)/3=106$  and the mean individual uncertainty is  $(12+15+16)/3=14$ . The reported result and uncertainty is 106 +/- 14. Report the total uncertainty at one standard deviation. MAPEP is interested in the uncertainty typically reported for a single measurement, and therefore requests the mean individual uncertainty if replicate measurements are performed. Please also ensure that the Method Code is entered correctly for each reported result. Method Codes are used in proficiency testing and an inappropriate Method Code may result in a “Not Acceptable” performance evaluation.

Report your results electronically via the MAPEP World Wide Web application at <https://mapep.inl.gov/>. Please ensure that your lab code, points of contact, addresses, and NRC license information are entered correctly in the data entry program. The shipping distribution list and correspondence mailing list will utilize the address and POC information exactly as you enter it here. You are a U.S. Federal Laboratory only if your employees are federal government workers (i.e., EPA, USGS, NRC, etc.). If you are a primary contractor for a DOE National Laboratory you may have a DOE exemption and, if so, enter your DOE contract number.

#### 4. ADDITIONAL INFORMATION.

- 4.1 The laboratory may choose the analytical method.
- 4.2 The amount of sample is limited. The laboratory should use the maximum specific activities and concentration ranges listed on the sample description to select the optimum amount of sample for each analysis to ensure that sufficient sample is available for all of the analyses.
- 4.3 Excess sample or residues shall not be returned to RESL. Do not initiate analysis of the sample if approved waste treatment, storage, or disposal options are not available.

“MAPEP samples are analytical standards or a "product" generated for the purpose of securing and evaluating analytical services; they are not hazardous waste and they are not samples of hazardous waste... Thus, a laboratory participating in the MAPEP is in the process of establishing its eligibility and credentials to do DOE analytical work. It follows, therefore,

that the laboratory is the "generator" of the waste resulting when the samples and the resulting residues are to be discarded." (MEMORANDUM OCC-95-189, Office of Chief Counsel, October 16, 1995)

- 4.4 The reference date for radioactive decay correction for all radiological analyses is **August 1, 2012 12:00 Mountain Standard Time (MST)**; equivalent to **August 1, 2012 19:00 Coordinated Universal Time (UTC)**. Sample-holding time is based upon the receipt date of the sample by the participating laboratory.
- 4.5 Results are due by **November 7, 2012 12:00 Noon Mountain Standard Time (MST)**; equivalent to **November 7, 2012 19:00 Coordinated Universal Time (UTC)**. Late results will not be included in the final report.

Please address any questions to the appropriate point of contact:  
Primary email address: MAPEP@id.doe.gov

Jim Dahlgran (208-526-6243, dahlgrjr@id.doe.gov): data entry and organic analyses;  
Leon Jensen (208-526-4591, jensenll@id.doe.gov): inorganic analyses;  
David Sill (208-526-8031, sillds@id.doe.gov): radiological analyses.

NOTE: Collusion, either between participants or between individual participants and MAPEP, is contrary to professional scientific conduct and serves only to nullify the benefits of proficiency testing. By reporting MAPEP results, you attest to the fact that the reported analytical results were generated by your facility and are not a result of collusion with any other analytical body. Any participant found guilty of collusion will be in breach of conduct and will fail the MAPEP test session for all reported results and may face other adverse actions.

## MAPEP-12-MaW27 WATER SAMPLE DESCRIPTION

The analytes for the MAPEP water, and their maximum specific activities and concentration ranges, are listed in the following tables. Each radiological/inorganic sample contains approximately one liter of 5% (v/v) nitric acid in water. Thoroughly mix entire sample before performing analyses.

### RADIOLOGICAL CONSTITUENT DESCRIPTION

Analyte	Specific Activity	Analyte	Specific Activity
<sup>241</sup> Am, <sup>238</sup> Pu, <sup>239</sup> Pu, <sup>234</sup> U, <sup>238</sup> U	< 15 Bq/L	<sup>57</sup> Co, <sup>60</sup> Co, <sup>134</sup> Cs, <sup>137</sup> Cs, <sup>55</sup> Fe, <sup>40</sup> K, <sup>63</sup> Ni, <sup>54</sup> Mn, <sup>65</sup> Zn	< 2000 Bq/L
<sup>90</sup> Sr, <sup>99</sup> Tc	< 100 Bq/L	<sup>3</sup> H	<1000 Bq/L

NOTE: The <sup>234</sup>U and <sup>238</sup>U isotopes may not be in equilibrium. Some of the radionuclides listed on the sample description may not be detected, but if included in your sample analyses, the result and total propagated uncertainty must be reported for sensitivity evaluation and/or false positive testing.

### INORGANIC CONSTITUENT DESCRIPTION

Analyte	Concentration Range	Analyte	Concentration Range
As, Cr (Total), Pb, Tl	0.01 – 4.9 mg/L	Sb, Ni, V, Zn	0.01 – 14 mg/L
Be	0.005 – 0.74 mg/L	Co, Cu	0.025 – 24 mg/L
Hg	0.0002 – 0.15 mg/L	Ba	0.01 – 95 mg/L
<sup>238</sup> U, Total U, Cd, Se	0.01 – 1.2 mg/L	<sup>235</sup> U	0.0001 – 0.01 mg/L
<sup>99</sup> Tc	0.0000012 – 0.00016 mg/L		

NOTE: Some of the inorganic constituents listed in the above table may not be present in the sample. Laboratories should report results and associated uncertainties for those constituents quantitated above the minimum concentration range listed for that analyte. For sensitivity evaluation and/or false positive testing, the actual analytical or detection limit values should be reported for those constituents with results found to be less than the lower concentration range. Failure to report analytical results as instructed may result in a false positive or false negative performance evaluation.

## MAPEP-12-XaW27 ALKALINE RADIOLOGICAL WATER SAMPLE DESCRIPTION

The alkaline radiological water is for domestic laboratories only, and contains only I-129 as the target analyte. Other interferences may be present. Each alkaline water sample contains approximately one liter of water. Thoroughly mix entire sample before performing analyses.

### RADIOLOGICAL CONSTITUENT DESCRIPTION

<sup>129</sup> I	< 100 Bq/L
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## MAPEP-12-OrW27 SEMI-VOLATILE ORGANIC WATER SAMPLE DESCRIPTION

Analyte Class	Concentration Range
Acids & Base Neutrals	10 to 200 µg/L
Chlorinated Pesticides	0.5 to 20 µg/L
µg = micrograms	L=liter

NOTE: Potential components and concentration ranges are derived from current NELAC Field of Testing Tables. Sample-holding time is based upon the receipt date of the sample by the participating laboratory.

## MAPEP-12-MaS27 SOIL SAMPLE DESCRIPTION

The analytes for the MAPEP soil, and their maximum specific activities and concentration ranges, are listed in the following tables. Most participants will receive a single sample containing approximately 300 grams of soil. Chemical or spectral interferences may or may not be deliberately added.

### RADIOLOGICAL CONSTITUENT DESCRIPTION

Analyte	Specific Activity	Analyte	Specific Activity
<sup>57</sup> Co, <sup>134</sup> Cs, <sup>137</sup> Cs, <sup>54</sup> Mn, <sup>65</sup> Zn, <sup>60</sup> Co, <sup>40</sup> K	< 4000 Bq/kg	<sup>55</sup> Fe, <sup>63</sup> Ni	< 2000 Bq/kg
<sup>90</sup> Sr, <sup>99</sup> Tc	< 1000 Bq/kg	<sup>241</sup> Am, <sup>238</sup> Pu, <sup>239</sup> Pu <sup>234</sup> U, <sup>238</sup> U	< 300 Bq/kg

NOTE: The <sup>234</sup>U and <sup>238</sup>U isotopes may not be in equilibrium. Some of the radionuclides listed on the sample description may not be detected, but if included in your sample analyses, the result and total propagated uncertainty must be reported for sensitivity evaluation and/or false positive testing.

### INORGANIC CONSTITUENT DESCRIPTION

Analyte	Concentration Range	Analyte	Concentration Range
Co, Cu, Tl, Ni, V, Sb, Zn	1 – 600 mg/kg	Ba	5 – 1900 mg/kg
Ag, As, Cr (Total), Pb	0.2 – 95 mg/kg	Be	0.1 – 50 mg/kg
Cd, Se	0.1 – 19 mg/kg	Hg	0.004 – 3.8 mg/kg
<sup>238</sup> U, Total U	0.1 – 24 mg/kg	<sup>235</sup> U	0.001 – 0.17 mg/kg
<sup>99</sup> Tc	0.000012 – 0.0016 mg/kg		

NOTE: Some of the inorganic constituents listed in the above table may not be present in the sample. Laboratories should report results and associated uncertainties for those constituents quantitated above the minimum concentration range listed for that analyte. For sensitivity evaluation and/or false positive testing, the actual analytical or detection limit values should be reported for those constituents with results found to be less than the lower concentration range. Failure to report analytical results as instructed may result in a false positive or false negative performance evaluation.

**MAPEP-12-OrS27 SEMI-VOLATILE ORGANICS IN SOIL  
SAMPLE DESCRIPTION**

Analyte Class	Concentration Range
Chlorinated pesticides	50 to 500 µg/kg
Acids & Base Neutrals	1000 to 15000 µg/kg
µg = micrograms	kg = kilograms

NOTE: Potential components and concentration ranges are derived from current NELAC Field of Testing Tables. Sample-holding time is based upon the RECEIPT date of the sample by the participating laboratory.

**MAPEP-12-RdF27 RADIOLOGICAL AIR FILTER  
SAMPLE DESCRIPTION**

The analytes for the MAPEP radiological air filters and their maximum specific activities are listed in the following table. Each filter packet contains an identically spiked 47-mm glass fiber air filter sandwiched between upper and lower non-spiked filters. The spiked side of the middle filter is placed in the packet facing “up” toward the label.

**RADIOLOGICAL CONSTITUENT DESCRIPTION**

Analyte	Specific Activity	Analyte	Specific Activity
<sup>241</sup> Am, <sup>238</sup> Pu, <sup>239</sup> Pu, <sup>234</sup> U, <sup>238</sup> U	< 2 Bq/sample	<sup>57</sup> Co, <sup>134</sup> Cs, <sup>137</sup> Cs, <sup>54</sup> Mn, <sup>65</sup> Zn, <sup>60</sup> Co	< 10 Bq/sample
<sup>90</sup> Sr	< 4 Bq/sample		

**INORGANIC CONSTITUENT DESCRIPTION**

Analyte	Concentration Range	Analyte	Concentration Range
<sup>238</sup> U, Total U	0.6 – 160 µg/sample	<sup>235</sup> U	0.004 – 1.2 µg/sample

**MAPEP-12-GrW27 GROSS ALPHA/BETA WATER  
SAMPLE DESCRIPTION**

The maximum specific activity for the MAPEP gross alpha/beta water is listed in the following table. Each sample contains approximately one liter of 5% (v/v) nitric acid in water. Thoroughly mix entire sample before performing analyses.

**RADIOLOGICAL CONSTITUENT DESCRIPTION**

Analyte	Concentration Range
Gross Alpha (Th-230)	< 5 Bq/L
Gross Beta (Sr-90)	< 5 Bq/L

## MAPEP-12-GrF27 GROSS ALPHA/BETA AIR FILTER SAMPLE DESCRIPTION

The maximum specific activity for the MAPEP gross alpha/beta air filter is listed in the following table. The filter packet contains one 47-mm glass fiber filter. The spiked side of the filter is placed in the packet facing “up” toward the label.

### RADIOLOGICAL CONSTITUENT DESCRIPTION

Analyte	Concentration Range
Gross Alpha (Th-230)	< 5 Bq/sample
Gross Beta (Sr-90)	< 5 Bq/sample

## MAPEP-12-RdV27 RADIOLOGICAL VEGETATION SAMPLE DESCRIPTION

The analytes for the MAPEP radiological vegetation and their maximum specific activities are listed in the following table. Laboratories that request a vegetation matrix will receive two samples: 1) a large sample of about 95 grams (about 400 mL) of finely milled grass hay spiked with only radiological constituents; 2) a smaller sample of less than 10 grams (about 40 mL) of the same vegetation matrix and identically spiked as the larger sample. The large sample is provided for gamma-ray spectrometry measurements and can be ashed to less than 10 grams for actinide and/or Sr-90 analyses. The small sample (less than 10 grams, about 40-mL volume) is provided primarily for those participants that cannot handle the larger sample size for actinide and/or Sr-90 analyses. Again, both the large and small samples are identically spiked for all targeted radionuclides. **The entire sample, whether large or small, must be used for analysis.** Use either the large or small vegetation sample, or use both, but results must be reported on a per sample basis. **Do not subdivide either sample.** The specific activity for all results must be **reported in Bq/sample** (i.e., Bq per single large 400-mL sample or Bq per single small 40-mL sample). Since both samples are identically spiked, either sample may be used if the results are reported in Bq/sample.

### RADIOLOGICAL CONSTITUENT DESCRIPTION

Analyte	Specific Activity	Analyte	Specific Activity
$^{241}\text{Am}$ , $^{238}\text{Pu}$ , $^{239}\text{Pu}$ , $^{234}\text{U}$ , $^{238}\text{U}$	< 2 Bq/sample	$^{57}\text{Co}$ , $^{134}\text{Cs}$ , $^{137}\text{Cs}$ , $^{54}\text{Mn}$ , $^{65}\text{Zn}$ , $^{60}\text{Co}$	< 15 Bq/sample
$^{90}\text{Sr}$	< 4 Bq/sample		

### INORGANIC CONSTITUENT DESCRIPTION

Analyte	Concentration Range	Analyte	Concentration Range
$^{238}\text{U}$ , Total U	0.6 – 160 µg/sample	$^{235}\text{U}$	0.004 – 1.2 µg/sample

**MATERIAL SAFETY DATA SHEETS ARE ENCLOSED  
IN THE SAMPLE SHIPPING BOX**



**Department of Energy**  
Idaho Operations Office  
1955 Fremont Ave  
Idaho Falls, Idaho 83415-2112

Radiological and Environmental Sciences Laboratory

August 2012

TO: MAPEP Participants

SUBJECT: Conformity Certificate MAPEP Standards

The MAPEP standards provided for the current test session are accurately described in the associated sample description and Quality Certificate.

The MAPEP standards are not radioactive in accordance with U.S. Department of Transportation regulations.

Sincerely,

A handwritten signature in cursive script that reads "Guy M. Marlette".

Guy M. Marlette  
MAPEP Coordinator



**Department of Energy**  
Idaho Operations Office  
1955 Fremont Ave  
Idaho Falls, Idaho 83415-2112

Radiological and Environmental Sciences Laboratory

August 2012

## **Quality Certificate - MAPEP Standards**

The Radiological and Environmental Sciences Laboratory hereby states that the standards described by MAPEP and delivered to participants in this study have been tested and no fault or discrepancy from that description was found.

Sincerely,

A handwritten signature in cursive script that reads "Guy M. Marlette".

Guy M. Marlette  
MAPEP Coordinator

**END OF INSTRUCTIONS**