284 Sheffield Street
Mountainside, NJ 07092

SDG NARRATIVE

USEPA
SDG # YE8F8
CASE # 51955
CONTRACT # 68HERH20D0011
SOW# SFAM01.1
LAB NAME: Alliance Technical Group, LLC
LAB CODE: ACE
LAB ORDER ID # Q1135
MODIFIED ANALYSIS # 3152.0

A. Number of Samples and Date of Receipt

18 Soil and 01 Water samples were delivered to the laboratory intact on 01/18/2025, 01/22/2025

B. Parameters

Test requested for Metals CLP12= Aluminum, Calcium, Iron, Magnesium, Potassium, Sodium & Mercury.

Test requested for Metals CLP MS = Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Vanadium, Zinc.

Test requested for Metals CLP MS FULL = Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Strontium, Thallium, Vanadium, Zinc.

C. Cooler Temp

Indicator Bottle**: Presence/**Absence

Cooler: 2.3^{o}C, 2.1^{o}C, 1.2^{o}C, 1.9^{o}C, 2.0^{o}C, 1.8^{o}C, 2.2^{o}C,2.5^{o}C

D. Detail Documentation (related to Sample Handling Shipping, Analytical Problem, Temp of Cooler etc):

Issue : The COC indicates that water sample YE8H7 should be analyzed by ICP-AES, but water samples are scheduled for ICP-MS analysis. Please advise on how the laboratory may proceed.

E. Corrective Action taken for above:

Resolution : Per Region 9, proceed with analyzing sample YE8H7 by ICP-MS as scheduled. The laboratory should note the issue in the SDG Narrative and proceed with the analysis of the samples.

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F. Analytical Techniques:

All analyses were based on CLP Methodology by method SFAM01.1.

Inter Element correction factors (IECs) are determined annually and correction factor are applied during ICP-AES analysis.

G. Calculation:

Calculation for ICP-AES Soil Sample:

Conversion of Results from mg/L or ppm to mg/kg (Dry Weight Basis):

$$\text{Concentration (mg/kg)} = C \times \frac{Vf}{W \times S} \times DF$$

Where,

C = Instrument value in ppm (The average of all replicate exposures)
Vf = Final digestion volume (mL)
W = Initial aliquot amount (g) (Sample amount taken in prep)
S = % Solids / 100 (Fraction of Percent Solids)
DF = Dilution Factor

Example Calculation For Sample YE8F5 For Aluminum:

If C = 194.5363 ppm
Vf = 100 ml
W = 1.30 g
S = 0.959(95.9/100)
DF = 1

$$\text{Concentration (mg/kg)} = 194.5363 \times \frac{100}{1.30 \times 0.959} \times 1$$

$$= 15604.0988 \text{ mg/kg}$$

$$= 16000 \text{ mg/kg (Reported Result with Signification)}$$

Calculation for ICP-MS Soil Sample:

Conversion of Results from µg /L or ppb to mg/kg :

$$\text{Concentration (mg/kg)} = C \times \frac{Vf}{W \times S} \times DF / 1000$$

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Where,

C = Instrument value in ppb (The average of all replicate integrations)
Vf = Final digestion volume (mL)
W = Initial aliquot amount (g) (Fraction of Sample amount taken in prep)
S = % Solids / 100 (Fraction of Percent Solids)
DF = Dilution Factor

Example Calculation For Sample YE8F5 For Antimony :

If C = 0.56 ppb
Vf = 500 ml
W = 1.25 g
S = 0.959(95.9/100)
DF = 1

$$\text{Concentration (mg/kg)} = 0.56 \times \frac{500}{1.25 \times 0.959} \times 1 / 1000$$

$$= 0.23357 \text{ mg/kg}$$

$$= 0.23 \text{ mg/kg (Reported Result with Signification)}$$

Calculation for ICP-MS Water Sample:

$$\text{Concentration or Result (µg/L)} = C \times \frac{Vf}{Vi} \times DF$$

Where,

C = Instrument value in ppb (The average of all replicate integrations)
Vf = Final digestion volume (mL)
Vi = Initial aliquot amount (mL) (Sample amount taken in prep)
DF = Dilution Factor

Example Calculation For Sample YE8H7 For Manganese:

If C = 0.37 ppb
Vf = 50 ml
Vi = 50 ml
DF = 1

$$\text{Concentration or Result (µg/L)} = 0.37 \times \frac{50}{50} \times 1$$

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= 0.37 µg/L

= 0.37 µg/L (Reported Result with Signification)

Calculation for Hg Soil Sample:

Conversion of Results from µg /L or ppb to mg/kg :

$$\text{Concentration (mg/kg)} = C \times \frac{Vf}{W \times S} \times DF / 1000$$

Where,

C = Instrument response in µg/L from the calibration curve.
Vf = Final prepared (absorbing solution) volume (mL)
W = Initial aliquot amount (g) (Fraction of Sample amount taken in prep)
S = % Solids / 100 (Fraction of Percent Solids)
DF = Dilution Factor

Example Calculation For Sample YE8F5:

If C = 0.4536 ppb
Vf = 100 mL
W = 0.56g
S = 0.959(95.9/100)
DF = 1

$$\text{Concentration (mg/kg)} = 0.4536 \times \frac{100}{0.56 \times 0.959} \times 1 / 1000$$

= 0.08446 mg/kg

= 0.084 mg/kg (Reported Result with Signification)

Calculation for Hg Water Sample:

Concentration or Result (µg/L) = C x DF

Where,

C = Instrument response in µg/L from the calibration curve.
DF = Dilution Factor

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Example Calculation For Mercury:

If C = 0.1811 ppb
DF = 1

Concentration or Result (µg/L) = 0.1811 x 1
= 0.1811 µg/L
= 0.18 µg/L (Reported Result with Signification)

H. QA/ QC

Calibrations met requirements. Interference check met requirements. Blank analyses did not indicate any presence of contamination. Laboratory Control sample was within control limits. Spike sample did meet requirements except for Molybdenum,. Duplicate sample did meet requirements. Serial Dilution did meet requirements except for Aluminum, Calcium, Iron, Magnesium, Arsenic, Sodium.

As per scheduling, pH analysis is required for soil samples and the pH analysis data is provided with hardcopy.

Chemical or physical interference effect was suspected and the data for all affected analytes in the sample received and associated with this serial dilution were flagged.

Collision cell is being used to remove potential interferences. The analytes Na, Mg, Al, K, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, As are being analyzed with collision cell and analytes Be, B, Ca, Ti, Se, Sr, Zr, Mo, Ag, Cd, Sn, Sb, Ba, Tl, Pb, U are being analyzed with Non-Collision Cell. Helium gas is used for the Collision Cell analysis.

Internal Standard Association for ICP-MS analysis.

Target Analyte	Associated Internal Standard
Aluminum	45Sc
Antimony	159Tb
Arsenic	89Y
Barium	159Tb
Beryllium	6Li
Cadmium	159Tb

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Calcium	45Sc
Chromium	45Sc
Cobalt	45Sc
Copper	45Sc
Iron	45Sc
Lead	209Bi
Magnesium	45Sc
Manganese	45Sc
Molybdenum	89Y
Nickel	45Sc
Potassium	45Sc
Selenium	89Y
Silver	159Tb
Sodium	45Sc
Strontium	89Y
Thallium	209Bi
Vanadium	45Sc
Zinc	45Sc

I certify that the data package is in compliance with the terms and conditions of the contract both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Director or his designee, as verified by the following signature.

Signature_____ Name: Nimisha Pandya

Date _____ Title: Document Control Officer

Date: 04/13/2022	**MA:** 3152.0	**Title:** ICP-MS Analysis Plus Molybdenum and Strontium
Method Source: SFAM01.1	**Method:** ICP-MS	
Matrix: Aqueous/Water and Soil/Sediment		

Summary of Modification

The purpose of this modified analysis is to analyze aqueous/water and soil/sediment samples by ICP-MS with the addition of the non-routine analytes Molybdenum (Mo) and Strontium (Sr). Unless specifically modified by this modification, all analyses, Quality Control (QC), and reporting requirements specified in the SOW listed in your current EPA agreement remain unchanged and in full force and effect.

I. Analyte Modifications **Not applicable** ☐

Analyte	CAS Number	CRQL (µg/L)	CRQL (mg/kg)	Spike Added (µg/L)	Spike Added (mg/kg)
Molybdenum (Mo)	7439-98-7	10.0	2.0	200	50
Strontium (Sr)	7440-24-6	2.0	96.0	100	1000

II. Calibration and QC Requirements **Not applicable** ☐

The Laboratory shall:

- Ensure Method Detection Limits have been determined for Molybdenum and Strontium in aqueous/water and soil/sediment matrices by the preparation methods used for the samples that meet all applicable SOW requirements.
- Perform the Initial Calibration with at least one non-blank standard at or below the modified CRQLs, converted to µg/L as necessary.
- Add Mo and Sr to the ICV and CCV at appropriate mid-range concentrations.
- Evaluate the ICB and CCB against the modified CRQLs converted to µg/L as necessary.
- Evaluate the Preparation Blanks using the modified CRQLs.
- Perform the Matrix Spike at the levels specified above. Post-digestion spike requirements are per the SOW.
- Flag the Duplicates based on the modified CRQLs.
- Add Mo and Sr to the LCS at 2 times the appropriate modified CRQLs.
- Not add Sr to the ICS. Use a true value of 0 (zero) and acceptance windows of ±2x the aqueous CRQL, unless a non-zero concentration for Sr has been determined.
- If mass 97 is monitored for Mo, ensure that isobaric interference correction is applied if necessary for levels of Calcium found in samples.

III. Preparation and Method Modifications **Not applicable** ☒

IV. Special Reporting Requirements **Not applicable** ☐

The Laboratory shall:

- Add Molybdenum and Strontium to Form 1.
- Report the "J" and "U" qualifiers in accordance with the requirements in Exhibit B, Section 3.4.3.2.4.2, using the modified CRQLs.
- Ensure that the SDG Narrative is updated as stated in the SOW, including any technical and administrative problems encountered and the corrective action taken. These problems may include

problems encountered during analysis, dilutions, re-analyses or re-preparations performed, and problems with the analysis of samples. Also include a discussion of any SOW Modified Analysis including a copy of the approved modification with the SDG Narrative.