OWQ WaQI Note

April 10, 2012

Office of Water Quality Water-Quality Information Note 2012.05

Subject: Terms of New USGS tritium/helium-3 Contract

Effective November 1, 2011, a new contract for tritium/helium-3 dating and noble gas analysis was issued by the USGS National Acquisition Branch to The Trustees of Columbia University, NY. The samples are analyzed at the Noble Gas Laboratory, Lamont-Doherty Earth Observatory, Palisades, NY. The contract provides the following analytical services:

Analysis 1

- Specific volume of total dissolved helium, reported in cubic centimeters (cc) at standard temperature and pressure (STP) per gram of water.
- Specific volume of total dissolved neon, reported in cc at STP per gram of water.
- Delta helium-3 of total dissolved helium in water corrected to the date of sample collection. For a sample (s) and atmospheric helium (a), the quantity delta helium-3, $\delta^3He_{s/a} = \delta(^3He/^4He)_{s/a} = (R(^3He/^4He)_s / R(^3He/^4He)_a) - 1$, where the quantity isotope ratio $R(^3He/^4He)_s = N(^3He)_s / N(^4He)_s$, where $N(^3He)_s$ and $N(^4He)_s$ are the number of isotopes (atoms) of ^3He and ^4He, respectively, in the sample. The equivalent isotope ratio of atmospheric helium, $R(^3He/^4He)_a$, is defined as 1.384×10^{-6}. The quantity $\delta(^3He/^4He)_{s/a}$ is reported for the date of extraction of helium from the water sample and is expressed in percent.
- Date of extraction of helium from water sample.
- Associated analytical uncertainty

Analysis 2

- Specific volume of total dissolved helium, reported in cc at STP per gram of water.
- Specific volume of total dissolved neon, reported in cc at STP per gram of water.
- Specific volume of total dissolved argon, reported in cc at STP per gram of water.
- Specific volume of total dissolved krypton, reported in cc at STP per gram of water.
- Specific volume of total dissolved xenon in cc at STP per gram of water.
- Delta helium-3 of total dissolved helium in water corrected to the date of sample collection. For a sample (s) and atmospheric helium (a), the quantity delta helium-3, $\delta^3He_{s/a} = \delta(^3He/^4He)_{s/a} = (R(^3He/^4He)_s / R(^3He/^4He)_a) - 1$, where the quantity isotope ratio $R(^3He/^4He)_s = N(^3He)_s / N(^4He)_s$, where $N(^3He)_s$ and $N(^4He)_s$ are the number of isotopes (atoms) of ^3He and ^4He, respectively, in the sample. The equivalent isotope ratio of atmospheric helium, $R(^3He/^4He)_a$, is defined as 1.384×10^{-6}. The quantity $\delta(^3He/^4He)_{s/a}$ is reported for the date of extraction of helium from the water sample and is expressed in percent.
- Date of extraction of helium from water sample.
- Associated analytical uncertainty

Analysis 3

- Low-level tritium (hydrogen-3, ^3H) concentration of water, reported in tritium units (TU) for date of collection of water sample, as submitted with water sample.
- Associated analytical uncertainty

The delivery schedule and pricing is as follows:

Delivery Schedule and Pricing. (Nov. 1, 2011 - Oct. 31, 2012)

Analysis	Measurement*	reporting unit	Analytical Precision	Turn-around time (months)	Cost	Former schedule or lab code number
1	helium, neon, $\delta(^3He/^4He)$	He, and Ne: $ccSTPg^{-1}$ water; $\delta(^3He/^4He)$ of total dissolved He relative to atmospheric He in percent	He, 1 %; Ne, 2 %; $\delta(^3He/^4He)$, 1 %	4	$487.50	Schedule 1033
2	helium, neon, argon, krypton, xenon, $^3He/^4He$	He, Ne, Ar, Kr, Xe: $ccSTPg^{-1}$ water; $\delta(^3He/^4He)$ of total dissolved He relative to atmospheric He in percent	He, Ar, Kr, 1 %; Ne, Xe, 2 %; $\delta(^3He/^4He)$, 1 %	4	$1,107.50	New
3	Low-level tritium	TU	(3-10 TU) 5 %; (1–3 TU) 10 %; (0.3–1.0 TU) 30 %; (0.1–0.3 TU) 100 %	6	$487.50	Lab Code 2112
1 and 3	helium, neon, $\delta(^3He/^4He)$ with tritium by ^3He in-growth	see above	see above	6	$975.00	Schedule 1033 and Lab Code 2112
2 and 3	helium, neon, argon, krypton, xenon, $\delta(^3He/^4He)$ with tritium by ^3He in-growth	see above	see above	6	$1,595.00	New

* Mass spectrometric

Pricing for Schedule 1033 and Lab Code 2112 in FY12 is unchanged from FY11. The new contract permits analysis of the full suite of noble gases. The results include age interpretation. Samples that were delivered to Lamont-Doherty Earth Observatory on or before 31 August, 2011, with proper login through the USGS Chlorofluorocarbon Laboratory, are being processed normally through the LDEO Laboratory under the previous contract. Samples collected following 31 August, 2011 should be submitted to the Contract Lab under the new contract. Information on requesting sample containers, collection procedures and submittal to the Contract Lab is provided at http://water.usgs/gov/lab. Please contact Julian Wayland (cfc@usgs.gov, 703-648-5847), or Melissa Schomody (mlschom@usgs.gov, 703-648-5833) if you have further questions.

WaQI Notes are archived on the Office of Water Quality web site, http://water.usgs.gov/usgs/owq/WaQI/index.html

Signed,

The Office of Water Quality
April 10, 2012

Distribution: All WRD Employees