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United States Department of the Interior

U.S. GEOLOGICAL SURVEY

Box 25046 M.S. 407

Denver Federal Center

Denver, Colorado 80225

NATIONAL WATER QUALITY LABORATORY TECHNICAL MEMORANDUM 1996.11

June 6, 1996

To: Assistant Chief Hydrologist for Technical Support
Regional Hydrologists
Chief, Office of Water Quality
Assistant Chief, Office of Water Quality
Chief, National Water Information System
Acting Chief, NAWQA
Chief, Office of Ground Water
Assistant Chief, Office of Ground Water
Area Hydrologists
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Employees, National Water Quality Laboratory

From: Peter F. Rogerson, Chief
National Water Quality Laboratory
Branch of Analytical Services

Subject: Changes in reporting of gross alpha and gross beta results

Author: Ann Mullin, Chief, Radchem Unit (303) 467-8235 (AHMULLIN)

Revision: Replaces National Water Quality Laboratory Tech Memo 96.09

The National Water Quality Laboratory (NWQL) has been reporting gross alpha results in micrograms per liter ($\mu\text{g/L}$) and micrograms per gram ($\mu\text{g/g}$) based on a natural uranium curve and in picocuries per liter (pCi/L) and picocuries per gram (pCi/g) based on a Th-230 curve. The gross beta results have been reported in pCi/L and pCi/g based on a Cs-137 curve and in pCi/L and pCi/g based on an Sr-90/Y-90 curve.

The Techniques of Water-Resources Investigations of the U.S. Geological Survey (L.L. Thatcher and others, 1977, Book 5, Part A5) lists, under Residue method R-1120-76:

- Gross alpha, suspended and dissolved, based on a natural uranium curve ($\mu\text{g/L}$)
- Gross beta, suspended and dissolved, based on a cesium-137 curve (pCi/L)
- Gross beta, suspended and dissolved, based on a strontium-90/yttrium-90 curve (pCi/L)

In 1988 gross alpha results were added, suspended and dissolved, based on a thorium-230 curve (pCi/L). It was also during this year that the high solids method was added for gross alpha samples that exceeded 250 mg/L total dissolved solids (TDS).

In 1993, the NWQL discontinued the acceptance of raw unacidified samples for radiochemical analysis. Gross alpha and gross beta, suspended, on field-filtered samples, were then reported in pCi/g , under Schedule 165.

Effective June 1, 1996, the NWQL will change this present policy of reporting as follows:

To be reported	Watstore	Lab Code
Schedule 456		
Gross alpha, dissolved, based on Th-230, pCi/L	4126	1397
Gross beta, dissolved, based on Cs-137, pCi/L	3515	798
Schedule 458, high solids		
Gross alpha, dissolved, based on Th-230, pCi/L	4126	1445
Gross beta, dissolved, based on Cs-137, pCi/L	3515	1360
Schedule 113, bottom material (BTM)		
Gross alpha, BTM, based on Th-230, pCi/g	4125	1520
Gross beta, BTM, based on Cs-137, pCi/g	49962	1522
Schedule 165, suspended		
Gross alpha, suspended, based on Th-230, pCi/g	49960	1854
Gross beta, suspended, based on Cs-137, pCi/g	49964	1856

There are no changes in the schedule numbers to be used when requesting gross alpha and gross beta analyses.

There are several reasons for this change in reporting results:

1. District personnel indicate that the present method of reporting is confusing and misleading. For example, these results are based on calibration self-absorption curves that are prepared using the standards Th-230, natural U, Cs-137, or Sr-90/Y-90. These results do NOT mean that the listed nuclides are present. The new method of reporting should help to clarify the results.
2. The U.S. Geological Survey works closely with other Federal agencies and with the States. Results should be reported in a comparable manner. There is no other State or Federal agency that reports gross alpha on the basis of mass ($\mu\text{g/L}$).

3. At the present time, we receive most of our radioactive standards at no cost from the U.S. Environmental Protection Agency (USEPA) in Las Vegas. With drastic cuts in USEPA's programs, it is likely that we will have to purchase some of these standards in the future. Taking into account the cost of the standards, the time it takes to prepare the calibration curves, and the additional waste disposal costs incurred, it is not cost effective to provide additional results that are unnecessary and seldom used.

Our results will be based on the standards Th-230 and Cs-137 because these are the standards used by USEPA in its cross-check program. This process will produce comparable results.

Whenever comparing results produced by different laboratories for gross alpha and gross beta analysis of the same sample, ALWAYS ask for the nuclide on which the results are based. The NWQL recommends that when results for gross alpha and gross beta are compared between two laboratories, the results should be based on calibration curves using the same nuclide. Otherwise, different results might be caused by different calibration procedures.

Supersedes: NWQL Tech Memo 96.09

Impact on data base: No changes will be made to the existing data

Keywords: alpha, beta, Sr-90/Y-90, Th-230, Cs-137

Distribution: See above plus the Netnews usgs .labnews & .water.quality; WRD Secretaries; Field and Project Offices; Hydrologic Technicians; and <http://www.nwql.cr.usgs.gov/>