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NATIONAL WATER QUALITY LABORATORY TECHNICAL MEMORANDUM 1997.02

----RESPONSE REQUESTED BY JANUARY 1, 1997----

November 25, 1996

To: Water Resources Division

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

Subject: Proposed Replacement or Elimination of NWQL Procedures

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Revision: None

BACKGROUND

In the interests of efficiency and economy, the National Water Quality Laboratory (NWQL) has reviewed all analytical tests performed at the NWQL to determine which procedures could be eliminated, replaced, or contracted to increase efficiency and save money for our customers. Within this Technical Memorandum are proposals to replace or eliminate several NWQL analytical procedures. This proposed action is not final. Over the next 30 days, please examine these proposed changes for impact on your ongoing projects. If you find that these changes are unacceptable, please let me know so that the NWQL can work with you to minimize the impact or to maintain a critical procedure. Following the 30-day comment period, the NWQL will issue a technical memorandum with an effective date for the changes. Although I believe there will be no unacceptable changes in data quality, I am encouraging all NWQL customers to verify this lack of significant impact prior to implementing the proposed procedure.

Thank you for working with us to provide the best possible analytical service at the lowest possible price.

SCOPE

The Inorganic Chemistry Program used the following criteria to set priorities for analytical tests that could be eliminated, replaced, or contracted:

1. Small numbers of submitted samples.
2. Small numbers of customers submitting samples.
3. Availability of similar tests from NWQL or other sources such as contract labs.
4. Analytical procedures that are particularly difficult to set up.
5. Analytical procedures on which the NWQL appears to be losing money.

The NWQL proposes to eliminate the following Low-Level [Low-Ionic Strength (LIS)] tests and replace them with the equivalent regular level tests:

[LIS, low-ionic strength; GFAA, graphite furnace atomic absorption; ICP/MS, inductively coupled plasma/mass spectrometry; DCP, direct-current plasma; ICP, inductively coupled plasma; AA, atomic absorption]

NAME	LAB CODE*	PARAMETER CODE	REPLACE WITH	LAB CODE (PARAM. CODE)
Acidity, LIS	1266	71825 B	Acidity, Regular	1 (71825 A)
Alkalinity, LIS	1270	90410 B	Alkalinity, Regular	70 (90410 A)
Manganese, LIS, GFAA	1257	01056 D	Manganese, ICP/MS	1793 (01056 G)
Nickel, LIS, GFAA	1256	01065 D	Nickel, GFAA or ICP/MS	1562 (01065 F) or 1795 (01065 G)
Cobalt, LIS, GFAA	1252	01035 E	Cobalt, GFAA or ICP/MS	1556 (01035 F) or 1890 (01035 G)
Cadmium, LIS, GFAA	1250	01025 E	Cadmium, GFAA or ICP/MS	1554 (01025 F) or 1788 (01025 G)
Lead, LIS, GFAA	1254	01049 E	Lead, GFAA or ICP/MS	1560 (01049 F) or 1792 (01049 G)
Copper, LIS, GFAA	1253	01040 E	Copper, GFAA or ICP/MS	1558 (01040 F) or 1791 (01040 G)
Chromium, LIS, GFAA	1251	01030 D	Chromium, GFAA or ICP/MS	1936 (01030 I) or 1789 (01030 G)
Zinc, LIS, GFAA	1276	01090 D	Zinc, ICP or ICP/MS	671 (01090 B) or 1798 (01090 G)
Aluminum, LIS, DCP	1267	01106 D	Aluminum, ICP or ICP/MS	2111 (01106 F) or 1784 (01106 G)
Calcium, LIS, ICP	1273	00915 B	Calcium, ICP	659 (00915 D)
Magnesium, LIS, AA	832	00925 A	Magnesium, ICP	663 (00925 C)
Magnesium, LIS, ICP	1274	00925 D	Magnesium, ICP	663 (00925 C)
Sodium, LIS, AA	834	00930 A	Sodium, ICP	675 (00930 C)
Sodium, LIS, ICP	1276	00930 D	Sodium, ICP	675 (00930 C)
Potassium, LIS, AA	0833	00935 A	Potassium, AA	54 (00935 B)

*The lab codes for the eliminated tests will become invalid.

Volatile Dissolved Solids will be eliminated because there have been no requests for this test in over a year. There are insufficient requests to justify maintaining the Volatile Bottom Material Solids test; therefore, it will be offered only as a custom method and priced according to the cost of setup and analysis. NWQL analyzed only 60 samples for total Nitrogen by Antek during 1994. In contrast, many thousands of samples were analyzed by Kjeldahl Nitrogen, on both filtered and unfiltered water. Therefore, NWQL plans to discontinue total Nitrogen by Antek and only offer Kjeldahl Nitrogen. The following three tests will be eliminated:

[ROE, residue on evaporation; diss., dissolved; Vol., volatile; Btm., bottom; TKN, Total Kjeldahl Nitrogen]

NAME	LAB CODE*	PARAMETER CODE	REPLACE WITH	LAB CODE (PARAM. CODE)
Solids, ROE, Volatile, Diss.	229	00520 A	Delete. No Requests.	-
Solids, Vol., Btm. Material	516	00496 A	Custom Analysis Only	-
Nitrogen, Antek	1570	00602 C	Nitrogen, TKN	1688 (00625 C)

*The lab codes for the eliminated tests will become invalid.

The following individual elemental determinations by atomic absorption (AA) have already been replaced by more efficient multielement inductively coupled plasma (ICP) techniques as announced in NWQL Technical Memorandum 96.04, effective April 1, 1996:

[ICP, inductively coupled plasma; AA, atomic absorption; mg/L, milligram/Liter]

NAME	LAB CODE*	PARAMETER CODE	REPLACE WITH	LAB CODE (PARAM. CODE)
Barium, Filtered Water, AA	7	01005 B	Barium, Filtered Water, ICP	641 (01005 C)
Beryllium, Filtered Water, AA	170	01010 A	Beryllium, Filtered Water, ICP	655 (01010 B)
Cadmium, Filtered Water, AA	126	01025 A	Cadmium, Filtered Water, ICP	673 (01025 D)
Calcium, Filtered Water AA	12	00915 C	Calcium, Filtered Water, ICP	659 (00915 D)
Cobalt, Filtered Water, AA	148	01035 A	Cobalt, Filtered Water, ICP	644 (01035 C)
Copper, Filtered Water, AA	151	01040 A	Copper, Filtered Water, ICP	657 (01040 C)
Iron, Filtered Water, AA	172	01046 C	Iron, Filtered Water, ICP	645 (01046 D)
Lead, Filtered Water, AA	191	01049 A	Lead, Filtered Water, ICP	646 (01049 C)

Lithium, Filtered Water, AA	39	01130 A	Lithium, Filtered Water, ICP	664 (01130 B)
Magnesium, Filtered Water, AA	40	00925 B	Magnesium, Filtered Water, ICP	663 (00925 C)
Manganese, Filtered Water, AA	42	01056 A	Manganese, Filtered Water, ICP	648 (01056 C)
Nickel, Filtered Water, AA	197	01065 A	Nickel, Filtered Water, ICP	721 (01065 E)
Sodium, Filtered Water, AA	59	00930 B	Sodium, Filtered Water, ICP ¹	675 (00930 C)
Strontium, Filtered Water, AA	62	01080 A	Strontium, Filtered Water, ICP	652 (01080 B)
Zinc, Filtered Water, AA	67	01090 A	Zinc, Filtered Water, ICP	671 (01090 B)

*The lab codes for the replaced tests will become invalid.

¹Sodium by ICP is less sensitive than Sodium by AA (detection limits of 0.2 vs. 0.1 mg/L)

The NWQL has replaced the Direct Current Plasma (DCP) atomic emission spectrometric determination of Aluminum (Al) and Boron (B) in filtered water with an ICP determination as specified in NWQL Technical Memorandum 96.10. The DCP lab codes for Al and B will become invalid.

The next table of tests will be available from a contract laboratory through the NWQL. For information on how to submit samples to the contractor, along with additional information such as sample batch size limitations, please contact Bob Brock (RDBROCK) (303) 467-8097. These tests are U.S. Environmental Protection Agency (USEPA) methods that have been available from the NWQL. However, they have been requested infrequently, and it is not economical to maintain them at NWQL.

NAME	LAB CODE*	PARAMETER CODE	REPLACE WITH
Cyanide, Bottom Material	1235	00721 B	Contract
Antimony, Bottom Material	534	01098 A	Contract
Barium, Bottom Material	521	01008 A	Contract
Beryllium, Bottom Material	522	01013 A	Contract
Molybdenum, Bottom Material	523	01063 A	Contract
Strontium, Bottom Material	530	01083 A	Contract
Calcium, Whole Water (USEPA)	324	00916 A	Contract
Magnesium, Whole Water (USEPA)	325	00927 A	Contract
Sodium, Whole Water (USEPA)	326	00929 A	Contract
Potassium, Whole Water (USEPA)	327	00937 A	Contract
Digestion, USEPA, for Ca, Mg, K, Na	124	(preparation procedure only)	Contract

*The lab codes for these tests will become invalid.

The NWQL is now offering USEPA drinking-water methods for 47 organic and 14 inorganic constituents regulated by the State of Colorado. These methods comply with all USEPA drinking-water certification requirements and constitute the NWQL USEPA-approved drinking-water determinations. Certification is performed by the State of Colorado and sanctioned by the USEPA, Region VIII. An NWQL Technical Memorandum on this subject will be published. If there is interest in using these drinking-water methods prior to the release of this memo, please contact Al Driscoll (DRISCOLL), (303) 467-8042.

The NWQL has substantial technical reservations about the tests for Sulfide and for Hexavalent Chromium in water samples. Both constituents are known to be unstable, and USEPA-approved field-test kits are available from Hach Chemical. The NWQL recommends that these constituents be determined onsite using the Hach field test. NWQL will discontinue the following two tests as laboratory determinations:

NAME	LAB CODE*	PARAMETER CODE	REPLACE WITH
Sulfide, Whole Water	89	00745 A	Field test: Hach #8131
Chromium, Hexavalent, Filtered Water	16	01032 A	Field Test: Hach #8023

*The lab codes for these discontinued tests will become invalid.

The Organic Chemistry Program at the NWQL also examined all analytical tests to determine which could be eliminated, replaced, or sent to contract laboratories. These four tests have been requested fewer than 50 times in 1993 and in 1994. The detection limit for the existing USGS Oil and Grease in Bottom Material method is known to be too high for most purposes, and there is insufficient need to justify a more sensitive (and expensive) test. The two Inorganic Carbon methods involve substantial set-up costs when they are requested. Because of the expense and the small number of requests, NWQL is discontinuing these tests and offering them only by contract. The method for Tannin and Lignin had not been requested for several years but recently has been requested by one District hydrologist; this need is also being met by contract.

NAME	LAB CODE*	PARAMETER CODE	REPLACE WITH
Oil & Grease, Bottom Material	531	00557 A	Contract
Carbon, Inorganic, Whole Water	19	00685 A	Contract
Carbon, Inorganic, Filtered Water	306	00691 A	Contract
Tannin and Lignin	138	32240 A	Contract

*The lab codes for these discontinued tests will become invalid.

The NWQL offers many schedules of pesticides in water that are typically divided into classes of pesticides [organochlorine (OCs), organophosphate (OPs), Atrazine-types, and carbamates] and combinations of classes. Schedules are also offered for either whole-water or filtered water (total or

dissolved). For some classes, such as carbamates, the pesticides reside exclusively in the dissolved fraction because they have high solubilities, but for two classes, OCs and OPs, the solubilities in water are low enough that they will partition into the suspended particulate matter to a large (and variable) extent. The NWQL currently offers four filtered water schedules of OC and OP pesticides and related compounds. These four schedules can recover different concentrations of analytes depending on the amount of particulate matter present, the percent organic carbon on the particles, and the partition coefficients of each analyte. The NWQL offers corresponding schedules for whole-water extractions that have better recoveries of analytes. The whole-water test is less expensive in all cases because the whole-water schedules do not require filtration. Current reporting limits are identical. The NWQL proposes to eliminate the four filtered-water schedules and suggests that its customers use the corresponding whole-water schedule.

The following table lists the four filtered-water schedules to be eliminated and the corresponding whole-water schedules that can be used in replacement. For complete information about these schedules, please see the NWQL 1995 Services Catalog (OFR 95-352, p. 50-52).

Eliminate:	Replace with:
Filtered water Schedule No.*	Whole water Schedule No.
Schedule 1316 (OPs)	Schedule 1319 (OPs)
Schedule 1321 (OCs)	Schedule 1324 (OCs)
Schedule 1331 (OCs + OPs)	Schedule 1334 (OCs + OPs)
Schedule 1361 (PCBs)	Schedule 1364 (PCBs)

*These filtered-water schedules will become invalid.

Finally, NWQL proposes to eliminate Schedule 1359 which measures eight carbamate pesticides in whole-water samples. These pesticides have high water solubilities, so their concentrations are not expected to change because of filtration. Schedule 2050/2051 measures 41 similar pesticides and metabolites in filtered water at much lower detection limits than measured by Schedule 1359. Therefore, now that Schedule 2050/2051 has become a fully approved USGS analytical method, Schedule 1359 will be discontinued. Schedule 2050/2051 costs less than Schedule 1359, includes far more compounds, and has much lower detection limits.

Eliminate:	Replace with:
Schedule 1359* (carbamates)	Schedule 2050/2051

*This schedule will become invalid.

The Radiochemistry Unit has two analytical determinations to be eliminated that have not been requested in several years and which have alternative determinations.

NAME	LAB CODE*	PARAMETER CODE	REPLACE WITH	LAB CODE (PARAM. CODE)
Radium-228 Filtered	850	81366 A	Radium-228 Filtered	1364 (81366 C)
Radon-222	490	82305 A	Radon-222	1369 (82330 B)

*The lab codes for these determinations will become invalid.

The replacement Radium-228 determination uses only 2 liters instead of 7 liters of sample, has the same method detection limit (MDL) (1.0 pCi/L), and is approved by USEPA. The replacement Radon-222 determination is less expensive, is expected to be approved by USEPA, and provides results that are available more quickly. The Radon-222 test to be eliminated uses a fragile, expensive bubbler system and provides lower detection limits than most customers require.

Effect on Data Base: There is no effect on existing data.

Supersedes: None

Key Words: Eliminate Procedures, Trace Metals, Solids, Nitrogen Antek, Sulfide, Hexavalent Chromium, Oil and Grease, Carbon, Filtered, Pesticides, Carbamates, Radium-228, Radon-222

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