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United States Department of the Interior

U.S. GEOLOGICAL SURVEY

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Denver, Colorado 80225

NATIONAL WATER QUALITY LABORATORY TECHNICAL MEMORANDUM 1992.01

March 25, 1992

To: Regional Hydrologists
District Chiefs
Area Assistant Regional Hydrologists
Regional Water-Quality Specialists
District Water-Quality Specialists
Deputy ACH for PC&TS for NAWQA
Chief, Branch of Quality Assurance
Area Assistant Regional Hydrologists for NAWQA
Chiefs, NAWQA Study-Units
Chief, Ocala Project Office
Chief, Yucca Mtn. QA Group
Employees, National Water Quality Laboratory

From: Chief, National Water Quality Laboratory
Branch of Analytical Services

Subject: Technology Transfer.- AVAILABILITY OF EQUIPMENT BLANK WATER FOR
INORGANIC & ORGANIC ANALYSIS

Historically, the USGS has not routinely included field blank samples in field sampling programs. However, recent studies have indicated a need to include field blanks to determine the possible levels of contamination that may occur from: sampling equipment; processing equipment; or shipping, containers, and preservatives. A District project chief stated, "Leaving a documented record of the quality of the data collected to ensure that those who come later can work with what we produce now gives the staff a real sense of belonging to a larger purpose than just the current task at hand."

A requirement of field blank water is that it be free of analytes of interest. Therefore, it must be rigorously and regularly checked for quality. District-produced distilled water is an inappropriate source of field blank water because it has not been rigorously checked for quality (Office of Water Quality (OWQ) Technical Memorandum 92.01).

To meet the need for field blank water, Nancy Driver and Mark Sandstrom of the National Water Quality Laboratory (NWQL) have provided quality-assured blank water for inorganic and organic analyses. The objective is to provide, at a reasonable cost, blank water with no analytes above reporting limits. This will not be possible in all cases, and some lots of blank water might have a few detectable analytes, especially volatile organic compounds. The NWQL has established

separate sources for quality-assured organic and inorganic blank waters because quality-assurance expenses for the organic blank water are much greater than for inorganic water. Thus, to keep the cost of the blank water as low as possible, the organic blank water has not been quality assured for inorganic constituents, and the inorganic blank water has not been quality assured for organic constituents.

This blank water is intended to be used for various types of field blanks and is not intended to be used for general cleaning procedures. District-produced distilled water suitable for use in cleaning procedures is described in OWQ Technical Memorandum 92.01. The blank water is suitable for general use throughout the WRD given the current reporting limits of the NWQL. It will not be suitable when reporting limits are lowered; for example, for trace metal analyses at parts-per-trillion levels. At that time, a suitable lot of blank water will need to be obtained.

INORGANIC BLANK WATER

The inorganic blank water (IBW) is available through the Ocala Lab and will cost \$10.00 per gallon- at least through September 30, 1992. Although an item number appears on the catalog, this number is not an order number. It is a code by which Ocala sorts supply items from their inventory. Items should be ordered by name or description. The IBW will be listed as follows:

XXXFLD IBW (Inorganic Blank).....\$10.00 Gal

IBW X Gal (Or) Inorganic Blank X Gal

If a user is not familiar with Ocala's ordering requirements, the user may request instructions and a catalog via EDOC to their office user ID: OCALAMAN. Also, Ocala prefers orders via EDOC.

The cost of the IBW includes the cost of blank water preparation, bottling, labeling and packaging, the cost of supplies and the quality- assurance (QA) analysis. The inorganic blank water was quality-controlled by the NWQL methods with the lowest detection limits available and has the following reported values:

| PARAMETER | LAB CODE | REPORTING LIMIT | REPORTED VALUE | UNITS |
|------------|----------|-----------------|----------------|-------|
| Sb-D | 77 | 1.000 | <1.000 | UG/L |
| Se-D | 87 | 1.000 | <1.000 | UG/L |
| Mo-D | 110 | 1.000 | <1.000 | UG/L |
| As-D | 112 | 1.000 | <1.000 | UG/L |
| Hg-D | 226 | 0.100 | <0.100 | UG/L |
| Ba-D-ICP | 641 | 1.000 | <1.000 | UG/L |
| Fe-D-ICP | 645 | 3.000 | <3.000 | UG/L |
| Sr-D | 652 | 0.500 | <0.500 | UG/L |
| V-D-ICP | 653 | 6.000 | <6.000 | UG/L |
| Be-D-ICP | 655 | 0.500 | <0.500 | UG/L |
| Li-D-ICP | 664 | 4.000 | <4.000 | UG/L |
| Si-D-ICP | 667 | 0.010 | 0.017 | MG/L |
| Zn-D-ICP | 671 | 3.000 | <3.000 | UG/L |
| Ag-D-GF | 723 | 1.000 | <1.000 | UG/L |
| NO2+3-D-LL | 826 | 0.005 | <0.005 | MG/L |
| NO2-D-LL | 827 | 0.001 | 0.009 | MG/L |

| | | | | |
|-------------|------|--------|---------|-------|
| PO4-D-LL | 828 | 0.001 | <0.001 | MG/L |
| P-D-LL | 829 | 0.001 | <0.001 | MG/L |
| NH3-D-LL | 830 | 0.002 | 0.006 | MG/L |
| Ca-D-LL | 831 | 0.010 | <0.010 | MG/L |
| Mg-D-LL | 832 | 0.010 | <0.010 | MG/L |
| K-D-LL | 833 | 0.010 | <0.010 | MG/L |
| Na-D-LL | 834 | 0.010 | <0.010 | MG/L |
| B-D | 1183 | 10.000 | <10.000 | UG/L |
| V-D-AF | 1210 | 1.000 | <1.000 | UG/L |
| Cd-D-GF | 1250 | 0.100 | <0.100 | UG/L |
| Cr-D-GF | 1251 | 0.500 | <0.500 | UG/L |
| Co-D-GF | 1252 | 0.500 | <0.500 | UG/L |
| Cu-D-GF | 1253 | 0.500 | <0.500 | UG/L |
| Pb-D-GF | 1254 | 0.500 | <0.500 | UG/L |
| Mn-D-GF | 1255 | 0.200 | <0.200 | UG/L |
| Ni-D-GF | 1256 | 1.000 | <1.000 | UG/L |
| Zn-D-GF | 1257 | 0.500 | <0.500 | UG/L |
| Br-D-IC-LL | 1258 | 0.010 | <0.010 | MG/L |
| Cl-IC-LL | 1259 | 0.010 | <0.010 | MG/L |
| F-IC-LL | 1260 | 0.010 | <0.010 | MG/L |
| S-IC-LI | 1263 | 0.010 | <0.010 | MG/L |
| Al-DCP-D-LL | 1267 | 1.000 | 1.000 | UG/L |
| pH-LI | 1268 | 0.100 | 5.830 | UNITS |
| SCond-LL | 1269 | 0.500 | 0.780 | UMHOS |
| ALK 2ND DVT | 1270 | 0.500 | 0.500 | MG/L |

The only analytes in the current lot that are above the reporting limit are Si at 0.017 mg/L, NO2 at 0.009 mg/L, and NH3 at 0.006 mg/L. Test data files for each lot of water are currently maintained in the NWQL Quality Management Group.

ORGANIC BLANK WATER

The organic blank water is available in two grades: pesticide-grade blank water (PBW) and volatile-grade blank water (VBW). The VBW is intended to be used as blank water for both semi-volatile and volatile analyses, whereas the PBW is only intended for semi-volatile blank water use.

Both types of organic blank water are available from the NWQL through DENSUPPLY. The water is contained in amber-glass 4-liter (L) bottles and is shipped in cases of four 4-L bottles, or individual 4-L bottles. Smaller quantities of water may be supplied on a custom basis. The cost of the blank water includes cost of water, handling, and QA analysis and will vary according to lot size.

PESTICIDE-GRADE BLANK WATER (PBW) \$120.00/case (16 liters)
\$35.00/bottle (4 liters)

VOC-GRADE BLANK WATER (VBW) \$135.00/case (16 liters)
\$40.00/bottle (4 liters)

The PBW is commercially prepared in numbered lots and was quality-controlled by the NWQL by the following analytical schedules to provide the lowest detection limits available:

| Schedule | Compound Class |
|----------|---|
| 1385 | Methylene chloride extractable compounds |
| 1389 | Nitrogen-containing herbicides |
| 1359 | Carbamate insecticides |
| 1399 | Organochlorine compounds & organophosphate pesticides |
| 0079 | Chlorophenoxy acid herbicides |

The current lot was verified to have no analytes above the reporting level (refer to NWQL Laboratory Catalog for the reporting levels for the individual compounds in each analytical schedule).

The VBW is either prepared commercially or at the NWQL in numbered lots. The VBW was quality-controlled by the following analytical schedule in addition to those given above for PBW:

| Schedule | Compound Class |
|----------|----------------------------|
| 1392 | Volatile organic compounds |

The only analytes in the current lot of VBW that were above the reporting limit were methylene chloride (0.4 µg/L) and trichlorotrifluoroethane (0.2 µg/L) (refer to NWQL Laboratory Catalog for the reporting levels for the individual compounds in each analytical schedule).

Test data files for each lot of water are currently maintained in the NWQL Methods Research and Development Program and eventually will be stored in the NWQL Quality Management Program.

VOC trip blanks consist of VBW filled in 40-ml VOC vials at the NWQL when a case of vials is ordered. The user requests the number of trip blanks needed, and trip blanks will be shipped with the order of empty sample vials.

| | |
|-----------------|---------|
| VOC TRIP BLANKS | \$25.00 |
|-----------------|---------|

All prices (especially blank water) will be revised on a regular basis to reflect actual costs and sizes of analyzed lots. Blank water needs to be stored in a location free from obvious sources of contamination. The blank water bottle caps should be kept sealed until use, and blank water cannot be reused after the bottles have been opened.

MONITORING QUALITY OF BLANK WATER

In order to determine if the blank water is degrading on the shelf over time, the Lab will retrieve the blank water analyses sent by Districts to the NWQL for analyses after results are released to the District. The NWQL is setting up an internal QA database to store the blank water data. The blank water results will be evaluated to determine if any constituents are consistently being detected on a nationwide basis that might be the result of contamination during storage at the NWQL or Ocala sites. A NWQL representative (currently Bruce Darnel) will provide ongoing quality control of the blank water, answer District questions regarding collection and interpretation of blank water data, and provide national summaries of blank water data.

BLANK WATER LOG-IN

District personnel need to code the Analytical Services Request (ASR) form with a combination of the following codes in the appropriate sections of Record 2, Analysis level codes; and Record 4, Field values to be added to analysis:

Lab Code Value Description

Record 2

Sample medium Code Q Quality-assurance sample -- Artificial

Sample-type code 2 Blank

Analysis Source code 8 USGS Lab only

Record 4

Blank, type of solution, fixed code value:

99100 10.00 Inorganic blank water

99100 40.00 Pesticide-grade water

99100 50.00 VOC-grade Water

Blank, source of solution, fixed value code:

99101 80.00 Ocala lab (USGS)

99101 110.00 Burdick and Jackson

99101 120.00 J.T. Baker

Lot numbers of the blank water need to be included in Records 5 or 6, Comments, of the ASR form.

For example, the inorganic blank water currently available would be logged in using the following codes: Q, 2, 10.00, and 80.00. Similarly, VBW would use the following codes: Q, 2, 50.00, and 110.00 or 120.00 (the commercial supplier may vary).

If you have any further questions, please call Bruce Darnel (FTS 775-8089 or (303) 467-8089).

Distribution: As noted and FO PO