

4/20/93

MEMORANDUM
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER
OFFICE OF WATER RESOURCES MANAGEMENT

SUBJECT: OWRM Guidance Memorandum No. 93 - 008
DEQ Water Division Water Purification Systems Contaminants

TO: Regional Directors

FROM: Larry Lawson, P.E. *Larry B. Lawson*
Director, Office of Water Resources Management

DATE: April 20, 1993

COPIES: Bob Burnley, Water Resources Managers, Technical Services
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Bob Potts, Dave Clark - DCLS

Organic contaminants have been irregularly detected in quality control blanks submitted to DCLS using water from the Water Division's regional offices' water purification systems. The compounds are usually present at concentrations no greater than DCLS's method detection limits. While some of the contaminants are suspected to originate within the water purification systems, a few are probably introduced after the purified water is dispensed, and some may be present in the water feeding the systems.

Carbon disulfide has been detected in some volatiles samples. This may be a product of sodium thiosulfate/acid preservation of the samples. Because no chlorine should be present in the purified water, Na₂S₂O₃ should not be needed to preserve the blanks. If CS₂ is detected in your blank, check to see if it was Na₂S₂O₃ preserved.

Several regional offices have intermittently produced the same contaminants in their quality control blanks, usually at concentration levels near DCLS's detection limits. The impurities probably originated within the systems. Possible contamination sources include resin manufacture, tubing and filter core materials, and solvent rinse of the filters. Purified water is very aggressive, and water remaining stagnant in the systems even overnight can leach substances from system components or desorb compounds back into the water. The following contaminants have been detected in some blanks from at least three regional offices.

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|---|---|
| Extractables analysis,
base/neutrals fraction: | 2-(2-butoxyethoxy)-ethanol,
butylated hydroxytoluene |
| Volatiles analysis: | 2,6-bis(1,1-dimethylethyl)-4-methyl-phenol
tetrahydrofuran, benzene, chlorobenzene,
toluene, 2-butanone |

Because impurities are detected irregularly and usually at concentrations near detection limits, we will try to avoid the enormous expense of upgrading the water systems with a few simple procedures to minimize contaminants. Please be specially careful to follow these procedures before taking water samples in which contaminants must be held to a critically low level.

1. **Before using the system or taking a quality control sample, flush the system for one to two minutes at a flow of ≤ 1 gallon per minute.** This ensures that freshly purified water is collected and is especially important when very pure water is needed, such as for blank samples.

2. **Water should be flushed through the systems at least several times a week at ≤ 1 gallon per minute for several minutes,** especially if the systems are used infrequently. You can use the flush water in automobile radiators or steam irons.

These procedures are already in place, but not all users may be aware of them. Attached is a notice that can be posted at the deionized water tap to ensure all users are aware of the recommended procedures.

Care should be taken to minimize water contamination after collection. Tubing attached to faucets, plastic gloves, chemical preservatives and airborne substances including fumes and dust can contribute impurities to the water.

The water purification systems will be serviced in the next couple months. Please have your staff submit a complete set of deionized water quality control samples within a few weeks of the tank exchange. A sample set should be analyzed after each maintenance exchange. The systems should be flushed as described above before taking the samples. Attached is a table listing the samples and procedures for preserving and submitting them to DCLS.

Please send Lisa McMillan a copy of any data showing detectable impurities in water from the regional office purification systems. This will help her track problems with the systems.

Your comments on or questions about the water systems are welcomed. Please do not hesitate to contact Lisa at (804)-527-5181. Thanks!

Deionized Water Quality Control Sample Set

<u>LABORATORY</u>	<u>CONTAINER</u>	<u>PARAMETERS</u>	<u>PRESERVATION</u>
Non-Metals	1 qt. plastic cubitainer	Chloride, sulfate, pH, alkalinity, conductivity	ice;
	1 qt. plastic cubitainer	TOC, EDTA hardness	ice, H ₂ SO ₄ to pH < 2;
Nutrients	1 qt. plastic cubitainer	nitrate, nitrite, silica, orthophosphate, ammonia	ice;
Metals	1 250 ml plastic bottle	all metals	HNO ₃ to pH < 2, ice;
Volatile Organics	2-40 ml vials	Volatile organics	ice;
	+ 2-40 ml vials	Volatile aromatics	HCl to pH < 2, ice;
Extractable Organics	1 liter wide mouth amber glass (T)	Base/neutrals and acids	ice;
Pesticides in water	1 liter glass bottle (T)	Pesticides and herbicides	ice

(T) = teflon lined lid required.

Prepare laboratory tags and sheets by the following procedures:

Laboratory Sheets

1. Submit the samples on No. 4 Laboratory sheets.
2. Designate Region as "027" so WQA will receive the results. You can add a block for your unit code to also receive a copy of the results.
3. Fill in the date and time.
4. Identify who collected the sample.
5. Under station description, identify the sample as "DI reagent water" and indicate your regional office if you did not add it to the unit code.
6. Check off the parameters to be tested.

Laboratory tags

1. Fill in the date and time.
2. Identify the Unit Code as "027".
3. Fill in the Lab/Container ID.
4. Indicate any chemical preservatives used.
5. Remark at bottom of tag the station description from the lab sheet, i.e. "DI reagent water" and your regional office.

**FLUSH THE D.I. SYSTEM FOR 1 - 2 MINUTES
AT A FLOW OF <1 GALLON PER MINUTE
BEFORE USING FOR VERY PURE WATER NEEDS,
AND SEVERAL TIMES A WEEK WHEN
THE SYSTEM IS USED INFREQUENTLY.**

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