



Per- and Polyfluoroalkyl Substances (PFAS) Report

How to Interpret my PFAS Laboratory Report and Compare my Results to MassDEP's Maximum Contaminant Level (MCL) for PFAS6

Reading laboratory data reports and interpreting their results can be confusing. This document will help you understand your laboratory report from the sampling of your drinking water for PFAS (per- and polyfluoroalkyl substances) and how the results are used and compared to MassDEP's MCL. Terminology and formatting of reports can vary between laboratories.

Reading the Results of your Lab Report

Lab reports typically have several sections, including: 1) the cover page, 2) definitions/glossary, 3) the case narrative, 4) the client sample results, and 5) several sections relating to laboratory quality assurance/quality control (QA/QC) practices.

In the client sample results section, you will find the analysis performed by the lab, the test results, and notes that indicate any problems encountered. These notes are called "qualifiers". Most labs use a standard set of qualifiers, which are defined and discussed below. The example in Table 1 shows the result for two PFAS as reported in the "Client Sample Results" section of the lab report.

Example Table 1 - showing test results and what the notation means

Analyte	Result	Qualifier	RL	MDL	Units
Perfluorooctanoic Acid (PFOA)	7.5		1.7	0.21	ng/L
Perfluorohexanesulfonic Acid (PFHxS)	ND		1.7	0.14	ng/L

Notes:
RL = reporting limit MDL = method detection limit
ng/L = nanograms per liter (equal to parts per trillion)

ND = the contaminant has not been detected

If a contaminant is not found in a sample, the "result" column in the laboratory report will show "ND" - not detected. ND means the chemical is not present in the sample at a high enough level for the laboratory equipment to detect.

RL or MRL = Minimum Reporting Limit

This is the lowest concentration of the substance tested that can be reported reliably under normal laboratory conditions. This is sometimes also referred to as the limit of quantitation or "LOQ".

MDL = Method Detection Limit

Each laboratory has the ability to detect chemicals down to a certain concentration, known as the MDL or "method detection limit". Anything below the MDL would not have been found because it is below the test equipment's ability to detect it.

In the example above, PFOA was detected at 7.5 ng/L and PFHxS was not detected, meaning PFHxS was not present in the sample above the MDL.



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Data Qualifiers — “J” or “B” next to the result

All laboratory information is reviewed by a chemist to ensure that it meets specific quality criteria. Sometimes “qualifiers” are applied to a sample result to note problems or irregularities that may have occurred during analysis. Most labs use a standard set of these qualifiers. The most common qualifiers found in PFAS laboratory reports are “B” and “J”. When the data have a qualifier, it can mean that there is an issue with the data. These situations often require resampling.

Example Table 2- with data qualifiers

Analyte	Result	Qualifier	RL	MDL	Units
Perfluorohexanesulfonic Acid (PFHxS)	2.1	B	1.7	0.21	ng/L
Perfluorononanoic Acid (PFNA)	0.5	J	1.7	0.22	ng/L
Notes: RL = reporting limit MDL = method detection limit, ng/L = nanograms per liter (equal to parts per trillion)					

“J” qualifier – used to note that the reported concentration is considered estimated.

The “J” qualifier is used whenever the measured concentration is lower than the RL but above the MDL. The “J” qualifier means that the reported result is estimated.

“B” qualifier — means the chemical was found in both the sample and a “blank”.

When chemicals are found in both the blank and the test sample, the reported value is qualified with a “B” to show the uncertainty in the source of the contamination. Such samples must be recollected and reanalyzed. In the example above, PFHxS was detected in the sample at a concentration of 2.1 ng/L but it was also detected in the blank, so it is uncertain whether the contamination was present in the water from the test area or whether it was accidentally introduced by the laboratory or during sample collection. The full lab report should include the results of the blank analysis.

A field **blank** is a sample container filled with distilled water and preservatives at the laboratory and shipped to the sampling site along with an empty bottle. The filled field blank bottle must be opened at the sample site and transferred to the empty bottle. A blank should be non-detect for all chemicals, but because PFAS are commonly found in the environment, low-level detections of PFAS can occur in the blank. If a chemical is detected in both the sample and the blank, it is impossible to determine if the concentration reported is from the test area or some other source.



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MassDEP Lab Reporting Form

The results appearing on the MassDEP lab reporting form will appear in a somewhat different format than those shown in the examples above. PFAS contaminants are shown in two sections: regulated (PFAS6) and unregulated.

Example Table 3 - from the MassDEP lab reporting form

The units on this form are nanograms per liter (ng/L), equivalent to parts-per-trillion (ppt). Always check the units shown in a lab report.

CAS#	REGULATED PFAS CONTAMINANTS	Result ¹ ng/L	Result ² Qualifier	MCL* ng/L	MDL ng/L	MRL ng/L
1763-23-1	Perfluorooctane Sulfonic Acid (PFOS)	3.0		-	0.40	1.87
335-67-1	Perfluorooctanoic Acid (PFOA)	4.0			0.40	1.87
355-46-4	Perfluorohexane Sulfonic Acid (PFHxS)	ND			0.40	1.87
375-95-1	Perfluorononanoic Acid (PFNA)	1.2	J		0.40	1.87
375-85-9	Perfluoroheptanoic Acid (PFHpA)	ND			0.40	1.87
335-76-2	Perfluorodecanoic acid (PFDA)	ND			0.40	1.87
PFAS6 (sum of PFOS, PFOA, PFHxS, PFNA, PFHpA and PFDA; only include Results at or above the MRL; do not include estimated Results as described by a Result Qualifier in the next column)		7.0		20	-	-
UNREGULATED PFAS CONTAMINANTS						
375-73-5	Perfluorobutane sulfonic acid (PFBS)	ND		-	0.40	1.87
307-55-1	Perfluorododecanoic acid (PFDoA)	ND			0.40	1.87
307-24-4	Perfluorohexanoic acid (PFHxA)	0.98	J		0.40	1.87
376-06-7	Perfluorotetradecanoic acid (PFTA)	ND			0.40	1.87

PFAS6 = 7.0 ng/L which is less than the MCL of 20 ng/L

When summing the 6 regulated PFAS contaminants, do not include qualified "J" values. These values are higher than the MDL but lower than the MRL.

Comparison of Data to the Massachusetts Maximum Contaminant Level (MCL)

In October 2020 MassDEP finalized revisions to the state's drinking water regulations to establish a Massachusetts Maximum Contaminant Level (MMCL) of 20 ppt for the sum of concentrations of the six PFAS compounds in drinking water, called PFAS6. These six PFAS are: perfluorooctane sulfonic acid (PFOS); perfluorooctanoic acid (PFOA); perfluorohexane sulfonic acid (PFHxS); perfluorononanoic acid (PFNA); perfluoroheptanoic acid (PFHpA); and perfluorodecanoic acid (PFDA). Data for six PFAS6 compounds that are J values below the MRL are not included in the PFAS6 (sum of) value. For comparisons to the MMCL the PFAS6 sum value is used.



Massachusetts Department of Environmental Protection - Drinking Water Program

Per- and Polyfluoroalkyl Substances (PFAS) Report For More Information

Contacts:

MassDEP Drinking Water Program, Boston

Program.director-dwp@mass.gov, 617-292--5770

Damon Guterman. Phone: 617-574-6811, email: Damon.Guterman@mass.gov

Margaret Finn. Phone: 617-292-5746. Email: Margaret.Finn@mass.gov

Laboratory Questions:

MassDEP Wall Experiment Station

Dr. Oscar Pancorbo, Director. Phone: 1-978-242-1314, email: Oscar.Pancorbo@mass.gov

To learn more, visit:

MassDEP's PFAS website: <https://www.mass.gov/info-details/per-and-polyfluoroalkyl-substances-pfas>

MassDEP's fact sheet on PFAS for PWS <https://www.mass.gov/doc/per-and-polyfluoroalkyl-substances-pfas-in-public-drinking-water-supplies-questions-and-answers>

U.S. EPA's website <https://www.epa.gov/pfas>

ATSDR's PFAS fact sheet: https://www.atsdr.cdc.gov/pfc/docs/pfas_fact_sheet.pdf