

CERTIFICATE OF ANALYSIS 368356

Client Details

Client	NSW Health
Attention	Kwendy Cavanagh
Address	Locked Bag 2030, ST LEONARDS, NSW, 1590

Sample Details

Your Reference	<u>Gwydir</u>
Number of Samples	5 Water
Date samples received	06/12/2024
Date completed instructions received	06/12/2024

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	09/12/2024
Date of Issue	09/12/2024
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Results Approved By

Sean McAlary, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

PFAS in Water LOW LEVEL Short

Our Reference		368356-1	368356-2	368356-3	368356-4	368356-5
Your Reference	UNITS	Sample 1	Dup 1	Sample 2	Dup 2	Field Blank
Barcode		-	-	-	-	-
Sample Site Code		-	-	-	-	-
Date Sampled		05/12/2024	05/12/2024	05/12/2024	05/12/2024	05/12/2024
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	07/12/2024	07/12/2024	07/12/2024	07/12/2024	07/12/2024
Date analysed	-	07/12/2024	07/12/2024	07/12/2024	07/12/2024	07/12/2024
Perfluorobutanesulfonic acid	µg/L	0.013	0.012	0.012	0.013	<0.001
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.077	0.076	0.076	0.079	<0.001
Perfluorooctanesulfonic acid PFOS	µg/L	0.039	0.039	0.036	0.038	<0.001
Perfluorooctanoic acid PFOA	µg/L	0.003	0.003	0.003	0.003	<0.001
6:2 FTS	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
8:2 FTS	µg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Surrogate ¹³ C ₈ PFOS	%	99	101	98	95	101
Surrogate ¹³ C ₂ PFOA	%	111	108	106	108	108
Extracted ISTD ¹³ C ₃ PFBS	%	96	102	100	103	94
Extracted ISTD ¹⁸ O ₂ PFHxS	%	104	105	108	105	102
Extracted ISTD ¹³ C ₄ PFOS	%	78	79	85	85	84
Extracted ISTD ¹³ C ₄ PFOA	%	88	91	92	89	88
Extracted ISTD ¹³ C ₂ 6:2FTS	%	102	101	107	110	98
Extracted ISTD ¹³ C ₂ 8:2FTS	%	106	109	107	109	115
Total Positive PFHxS & PFOS	µg/L	0.12	0.12	0.11	0.12	<0.001
Total Positive PFOA & PFOS	µg/L	0.042	0.042	0.039	0.041	<0.001
Total Positive PFAS	µg/L	0.13	0.13	0.13	0.13	<0.001

Method ID	Methodology Summary
Org-029	<p>Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3.</p> <p>Analysis is undertaken with LC-MS/MS.</p> <p>PFAS results include the sum of branched and linear isomers where applicable.</p> <p>Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components.</p> <p>Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.</p>

QUALITY CONTROL: PFAS in Water LOW LEVEL Short						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			07/12/2024	[NT]	[NT]	[NT]	[NT]	07/12/2024	[NT]
Date analysed	-			07/12/2024	[NT]	[NT]	[NT]	[NT]	07/12/2024	[NT]
Perfluorobutanesulfonic acid	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	97	[NT]
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	92	[NT]
Perfluorooctanesulfonic acid PFOS	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	98	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	85	[NT]
6:2 FTS	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	102	[NT]
8:2 FTS	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	90	[NT]
Surrogate ¹³ C ₈ PFOS	%		Org-029	106	[NT]	[NT]	[NT]	[NT]	99	[NT]
Surrogate ¹³ C ₂ PFOA	%		Org-029	111	[NT]	[NT]	[NT]	[NT]	105	[NT]
Extracted ISTD ¹³ C ₃ PFBS	%		Org-029	85	[NT]	[NT]	[NT]	[NT]	81	[NT]
Extracted ISTD ¹⁸ O ₂ PFHxS	%		Org-029	93	[NT]	[NT]	[NT]	[NT]	85	[NT]
Extracted ISTD ¹³ C ₄ PFOS	%		Org-029	68	[NT]	[NT]	[NT]	[NT]	66	[NT]
Extracted ISTD ¹³ C ₄ PFOA	%		Org-029	79	[NT]	[NT]	[NT]	[NT]	79	[NT]
Extracted ISTD ¹³ C ₂ 6:2FTS	%		Org-029	90	[NT]	[NT]	[NT]	[NT]	90	[NT]
Extracted ISTD ¹³ C ₂ 8:2FTS	%		Org-029	82	[NT]	[NT]	[NT]	[NT]	79	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.