09 May 2018

Melanie Stutchbury
Senior Project Officer
Fire & Rescue NSW
1 Amarina Ave
Greenacre NSW 2190

By email to: Melanie.Stutchbury@fire.nsw.gov.au

Our ref: 21/25583 221752

Your ref:

Dear Melanie

Armidale Tourist Park
Private bore sampling results

1 Introduction

Fire and Rescue NSW (FRNSW) engaged GHD Pty Ltd (GHD) to complete sampling of a private groundwater bore located on the Armidale Tourist Park located at 39 Grafton Road, Armidale, NSW.

FRNSW was approached by the owner of Armidale Tourist Park regarding bore water testing on private properties following on from the previous stages of investigations associated with the use of aqueous film forming foams (AFFF) at the FRNSW training facility located at 2-16 Mann Street, Armidale.

1.1 General project background

A preliminary site investigation (PSI) was undertaken by GHD in 2016, the findings of which identified potential sources of per- and poly-fluoroalkyl substances (PFAS) contamination and areas of potential concern. Two stages of environmental investigations were subsequently undertaken over the course of 2017 to investigate the areas of interest identified in the PSI and assess the potential risks to human health and the environment associated with PFAS impacted media. These works included the assessment of properties down-gradient of the FRNSW training site.

The Armidale Tourist Park is located approximately 600 metres northwest of the FRNSW site (Figure 1 attached). Based on the findings of the works undertaken by GHD in 2017, PFAS was reported in groundwater migrating off-site from the FRNSW training facility, however, the extent of the impact was not fully delineated. The private bore on the tourist park was identified by GHD as part of the PSI stage of works as being potentially hydraulically down-gradient of the FRNSW training facility however access was not available to the bore during the site investigations completed in 2017.

1.2 Objective

The objective of this work was to assess whether PFAS is present in the private groundwater bore located at the Armidale Tourist Park.

2 Site inspection and sampling

GHD attended the site on 23 April 2018. Based on discussions with the site manager, GHD understands that the private bore water is used primarily for irrigation of grassed areas throughout the property. In addition, bore water is reportedly used to fill a pond on the caravan park and has been used occasionally to top up levels of the swimming pool. It is not used as a source of drinking water for humans or animals.

GHD collected the following samples:

- One primary sample (GW047498) and one duplicate sample (QA101) were collected from the private bore via the tap which was connected to the bore
- Surface water samples were collected from the pool (ATP_POOL) and pond (ATP_POND)
- One shallow surface soil sample was collected from an area which is reportedly predominantly irrigated using bore water (ATP_SS01)

All samples were collected in accordance with GHD's standard field operating procedures and transferred immediately to appropriate sampling containers provided by the laboratory. Samples were stored under chilled conditions for transfer to the analytical laboratory. Primary and duplicate groundwater samples were selected for analyses for full PFAS suite. Surface water and shallow soil samples were placed on hold pending the results of the groundwater analyses.

3 Results

Concentrations of PFAS in both the primary and duplicate samples were reported below the laboratory limit of reporting (LOR). Based on the laboratory results of sample GW047498, the other collected samples were not analysed.

A copy of the laboratory report is attached to this letter report. The results, reported against relevant screening criteria for the protection of human health, are provided in Table 1.

Table 1 Summary results

	Sum PFOS and PFHxS	PFOA
Drinking water criteria (FSANZ[1])	0.07 µg/L	0.56 µg/L
Recreational water criteria (FSANZ)	0.7 µg/L	5.6 µg/L
Sample result – GW047498	<0.01 µg/L	<0.01 µg/L

[1] Health 2017 *Release of Food Standards Australia New Zealand (FSANZ) report on Perfluorinated chemicals in food Supporting Information.* Australian Government Department of Health, 31 March 20

4 Conclusions

PFAS was not reported in the primary or duplicate groundwater samples collected from the private bore located at the Armidale Tourist Park.

Based on the findings of the previous site investigations completed by GHD during 2017, further stages of assessment were recommended for the FRNSW training site, including additional rounds of groundwater monitoring and surface water and sediment sampling. It is recommended that the private bore located at the tourist park is included in future monitoring events to confirm the findings of these works and assess whether the results are influenced by seasonal variability.

Kind Regards

Jacqui Hallchurch
Technical Director
02 9239 7046

Limitations

This report has been prepared by GHD for FRNSW and may only be used and relied on by FRNSW for the purpose agreed between GHD and the FRNSW as set out in Section 1.2 of this report. GHD otherwise disclaims responsibility to any person other than FRNSW arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report. The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points. Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1811607**	Page	: 1 of 5
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS JACQUI HALLCHURCH	Contact	: Chloe Leong
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: 212558314	Date Samples Received	: 23-Apr-2018 16:05
Order number	:	Date Analysis Commenced	: 27-Apr-2018
C-O-C number	: ----	Issue Date	: 01-May-2018 13:20
Sampler	: TERRY NHAM		
Site	: 21-25583-14 Armidale		
Quote number	: EN/005/17		
No. of samples received	: 5		
No. of samples analysed	: 2		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Franco Lentini		Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW047498	QA101	----	----	----
				Client sampling date / time	23-Apr-2018 00:00	23-Apr-2018 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1811607-001	ES1811607-002	--------	--------	--------
					Result	Result	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	<0.01	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW047498	QA101	----	----	----
				Client sampling date / time	23-Apr-2018 00:00	23-Apr-2018 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1811607-001	ES1811607-002	--------	--------	--------
					Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		<0.01	<0.01	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	<0.01	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	<0.01	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**116**	**103**	----	----	----
13C8-PFOA	----	0.02	%		**113**	**104**	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	130
13C8-PFOA	----	60	130