

Additional Performance Data Associated with Multi-Laboratory Validation of SW-846 Methods 3512 and 8327

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Groundwater % Recovery statistics, 200 ng/L (nom.) concentration¹

Target Analyte	Lab 2 (n=5) % Recovery		Lab 4 (n=5) % Recovery		Lab 5 (n=5) % Recovery		Lab 6 (n=5) % Recovery		Lab 10 (n=5) % Recovery		Lab 11 (n=5) % Recovery		Lab 12 (n=5) % Recovery		Lab 16 (n=5) % Recovery		Summary Statistics All Labs		
	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	\bar{X}^2 (%)	S_w^3 (%)	S_b^4 (%)
	PFBA	90.7	2.3	110	6.7	108	4.3	91.7	2.6	82.3	10.0	93.9	2.3	89.8	5.5	112	7.6	97.2	5.8
PFPeA	107	7.3	109	8.2	113	8.0	96.8	1.6	81.8	2.0	91.6	2.1	91.9	2.9	111	3.9	100	5.2	11.3
PFHxA	89.0	7.5	104	17.1	103	10.6	97.4	1.7	93.7	2.6	93.3	1.7	91.0	2.9	104	14.0	96.9	9.2	6.1
PFHpA	93.0	3.7	105	9.0	106	6.6	96.8	3.3	95.3	5.1	97.4	3.2	91.9	5.5	104	13.7	98.8	7.1	5.7
PFOA	98.8	12.3	107	5.5	111	9.0	97.3	2.4	93.4	3.9	107	2.7	91.2	5.9	111	21.0	102	9.8	7.8
PFNA	93.4	5.9	107	13.5	115	10.3	98.6	1.1	94.8	2.1	106	3.5	90.9	6.2	99.3	11.8	101	8.1	8.1
PFDA	95.7	4.4	104	17.2	109	5.7	95.4	2.7	95.6	5.5	111	7.1	95.3	8.1	110	14.4	102	9.4	7.2
PFUnA	87.0	12.4	101	6.9	115	6.2	100	2.4	89.7	4.0	107	6.0	89.7	7.3	136	15.4	103	8.6	16.4
PFDoA	83.0	3.9	101	3.6	106	5.3	97.4	2.1	91.4	4.0	99.9	5.4	93.5	5.9	150	10.7	103	5.6	20.4
PFTriA	73.2	6.7	103	5.5	124	8.3	95.7	3.0	91.7	4.4	99.6	4.1	87.4	14.7	120	12.4	99.3	8.4	16.6
PFTreA	76.1	6.7	90.3	9.9	99.5	11.0	89.3	4.0	87.8	4.5	100	3.0	83.0	15.2	117	24.7	92.9	12.0	12.6
PFBS	93.1	4.5	108	11.9	109	13.0	98.3	2.7	101	1.7	95.7	2.0	92.3	2.8	107	15.1	101	8.5	6.7
PFPeS	88.9	6.5	108	6.1	103	4.3	102	1.3	98.1	1.0	94.9	2.1	91.0	3.7	109	7.3	99.2	4.7	7.4
PFHxS	98.6	6.8	96.8	6.5	105	5.7	101	1.3	99.4	2.1	98.8	7.8	92.2	3.6	113	7.3	101	5.6	6.0
PFHpS	89.2	5.5	105	9.2	106	4.6	101	2.2	94.9	2.4	110	5.2	92.1	4.6	114	1.6	102	5.0	8.9
PFOS	95.9	8.5	108	11.7	116	7.1	99.8	2.4	99.5	2.0	107	3.8	90.7	5.5	125	5.6	105	6.6	11.1
PFNS	92.3	9.0	106	5.3	121	5.0	103	1.2	92.4	2.8	114	6.7	91.4	5.5	130	7.1	106	5.8	14.3
PFDS	88.0	3.6	100	9.4	121	9.1	97.8	2.0	85.8	2.1	107	4.3	88.2	5.6	130	9.3	102	6.4	16.1
PFOSA	90.8	3.0	99.5	5.4	111	7.1	96.8	1.3	90.0	3.4	93.4	2.7	84.5	2.2	112	3.8	97.3	4.0	10.0
FtS 4:2	91.3	7.7	106	9.0	111	6.6	93.3	2.0	79.4	4.0	92.8	3.4	93.9	7.3	113	6.9	97.6	6.3	11.4
FtS 6:2	94.4	20.4	103	9.1	112	15.7	102	2.8	188	217	38.1	2.8	84.6	7.5	54.4	3.5	97.1	77.4	44.8
FtS 8:2	88.5	13.5	109	16.7	119	10.0	107	3.2	101	8.6	115	4.6	93.0	8.9	109	10.0	105	10.3	10.5
NMeFOSAA	91.7	12.5	104	10.1	133	30.5	94.7	1.4	92.8	3.5	105	3.5	93.0	7.6	112	7.1	103	12.9	14.1
NEtFOSAA	91.3	10.2	111	16.8	155	24.7	96.2	1.7	93.9	4.4	102	3.5	92.7	6.6	120	5.7	108	11.8	21.4

¹% Recovery of each replicate sample was calculated after subtracting the mean unspiked concentration (n=5) by matrix determined at each laboratory

² Pooled mean % recovery across 8 laboratories; For calculation refer to Appendix G Section 3.2.4 (1) of “Protocol for Review and Validation of New Methods for Regulated Organic and Inorganic Analytes in Wastewater Under EPA’s Alternate Test Procedure Program, February 2018”, available at: https://www.epa.gov/sites/production/files/2018-03/documents/chemical-new-method-protocol_feb-2018.pdf. Individual % recoveries were calculated after subtracting the average concentration across unspiked replicates by matrix and laboratory.

³ Within-laboratory standard deviation of % recovery (n= 8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above

⁴ Between-laboratory standard deviation of % recovery (n=8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above.

Groundwater % Recovery statistics, 60 ng/L (nom.) concentration¹

Target Analyte	Lab 2 (n=5) % Recovery		Lab 4 (n=5) % Recovery		Lab 5 (n=5) % Recovery		Lab 6 (n=5) % Recovery		Lab 10 (n=5) % Recovery		Lab 11 (n=5) % Recovery		Lab 12 (n=5) % Recovery		Lab 16 (n=5) % Recovery		Summary Statistics All Labs		
	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	\bar{X}^2 (%)	S_w^3 (%)	S_b^4 (%)
	PFBA	88.0	13.7	124	6.7	95.9	11.6	74.7	14.9	87.2	9.3	102	7.7	87.6	7.1	124	34.0	98.0	15.6
PFPeA	97.6	13.1	124	5.5	109	9.5	89.5	4.5	83.5	5.5	98.5	9.5	106	6.9	194	84.1	113	30.7	34.9
PFHxA	85.9	13.4	106	11.3	99.0	13.2	86.5	7.8	99.5	4.1	99.6	7.9	91.0	8.4	92.4	28.3	95.0	13.7	7.1
PFHpA	89.3	15.5	108	8.7	100	7.9	85.7	3.3	94.1	7.2	105	15.4	87.8	6.8	99.7	16.7	96.2	11.2	8.3
PFOA	88.4	21.4	109	6.5	91.6	13.8	91.9	4.4	96.5	5.4	111	12.8	92.1	6.5	111	10.0	98.8	11.4	9.6
PFNA	87.8	12.8	105	12.5	100	10.1	84.9	4.7	90.1	5.6	114	16.8	84.2	8.0	105	21.7	96.5	12.7	11.2
PFDA	85.3	14.6	98.4	13.5	109	11.7	82.7	4.6	96.6	4.8	112	14.2	82.8	11.6	118	35.1	98.2	16.4	14.0
PFUnA	84.7	14.6	91.0	17.6	107	9.2	86.7	4.6	86.5	4.1	104	12.3	87.1	8.1	121	18.7	96.0	12.3	13.2
PFDoA	87.2	19.2	72.6	7.2	106	9.8	84.5	3.3	91.4	4.0	110	16.3	86.2	12.7	146	30.4	98.0	15.4	22.7
PFTriA	75.1	8.6	73.0	7.5	133	13.1	84.6	4.2	91.6	6.6	110	11.4	76.8	5.7	122	24.3	95.8	11.8	23.1
PFTreA	72.8	8.3	68.2	14.4	103	9.1	78.9	7.1	87.6	4.8	123	17.0	74.3	16.9	98.2	23.5	88.2	13.9	18.6
PFBS	92.8	15.4	108	22.2	99.4	13.2	87.9	2.1	104.8	10.2	96.0	8.7	104	21.9	99.0	21.0	99.1	15.9	6.8
PFPeS	81.4	12.3	105	7.6	101	4.8	90.8	2.8	95.5	4.7	101	4.6	90.7	2.5	102	10.9	95.8	7.1	7.8
PFHxS	88.5	15.1	66.8	10.5	103	9.7	93.2	3.4	99.3	7.6	102	23.2	89.7	2.0	117	12.9	94.9	12.3	14.5
PFHpS	82.1	21.9	98.7	15.4	98.7	9.3	90.9	5.3	94.6	5.7	110	12.8	89.8	3.7	116	8.6	97.5	11.8	10.9
PFOS	82.6	13.4	110	21.5	116	10.5	91.7	5.3	98.7	8.9	111	19.7	88.1	4.3	122	14.7	103	13.6	14.3
PFNS	81.4	19.5	87.0	8.3	118	5.2	92.1	5.0	92.8	7.6	126	9.5	86.3	5.9	115	12.2	99.8	10.2	17.0
PFDS	70.1	16.3	86.2	11.1	118	8.9	90.0	5.6	86.5	3.3	114	10.3	82.1	5.4	118	6.1	95.6	9.2	18.3
PFOSA	77.2	10.6	80.0	7.0	93.2	12.0	84.8	5.5	91.0	5.7	100	8.0	81.6	3.5	109	5.6	89.6	7.7	10.9
FtS 4:2	73.1	14.5	97.3	33.6	106	20.8	84.6	4.4	72.5	9.7	95.1	8.2	93.3	4.7	107	15.3	91.0	16.6	13.2
FtS 6:2	80.5	9.2	87.8	19.3	96.6	11.6	90.5	4.5	77.2	42.4	39.6	5.2	86.8	7.1	45.8	6.8	75.6	17.8	21.2
FtS 8:2	82.7	29.4	99.1	7.6	115	29.2	93.6	4.3	98.7	8.8	119	11.3	92.1	11.4	108	30.0	101	19.4	12.1
NMeFOSAA	79.6	17.0	116	29.9	91.7	16.2	83.8	4.3	94.8	5.1	107	19.0	85.2	8.8	110	11.7	96.0	16.1	13.4
NEtFOSAA	72.8	37.1	77.6	18.9	136	36.1	86.4	4.2	97.5	4.5	104	13.4	83.3	7.1	124	14.2	97.6	20.9	22.4

¹% Recovery of each replicate sample was calculated after subtracting the mean unspiked concentration (n=5) by matrix determined at each laboratory

² Pooled mean % recovery across 8 laboratories; For calculation refer to Appendix G Section 3.2.4 (1) of “Protocol for Review and Validation of New Methods for Regulated Organic and Inorganic Analytes in Wastewater Under EPA’s Alternate Test Procedure Program, February 2018”, available at: https://www.epa.gov/sites/production/files/2018-03/documents/chemical-new-method-protocol_feb-2018.pdf. Individual % recoveries were calculated after subtracting the average concentration across unspiked replicates by matrix and laboratory.

³ Within-laboratory standard deviation of % recovery (n= 8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above

⁴ Between-laboratory standard deviation of % recovery (n=8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above.

Reagent water % Recovery statistics, 200 ng/L (nom.) concentration¹

Target Analyte	Lab 2 (n=5) % Recovery		Lab 4 (n=5) % Recovery		Lab 5 (n=5) % Recovery		Lab 6 (n=5) % Recovery		Lab 10 (n=5) % Recovery		Lab 11 (n=5) % Recovery		Lab 12 (n=5) % Recovery		Lab 16 (n=5) % Recovery		Summary Statistics All Labs		
	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	\bar{X}^2 (%)	S_w^3 (%)	S_b^4 (%)
	PFBA	110	8.0	111	7.2	109	8.7	88.4	10.6	65.1	10.5	94.9	4.5	86.3	7.7	107	20.1	96.4	10.6
PFPeA	118	4.5	112	7.1	112	4.4	90.2	4.9	85.4	3.0	86.7	4.9	90.8	3.7	107	2.1	100	4.6	13.1
PFHxA	104	4.7	116	5.4	104	8.7	91.1	5.6	94.2	1.7	92.1	3.0	93.1	6.4	102	18.2	99.5	8.2	8.5
PFHpA	108	4.8	110	7.7	110	3.6	94.5	1.7	97.2	3.0	97.0	3.3	87.4	4.4	107	13.9	101	6.4	8.4
PFOA	111	9.3	110	7.8	115	7.9	93.6	1.7	94.5	1.5	102	5.3	94.4	6.1	114	14.6	104	7.9	9.3
PFNA	106	2.3	113	3.8	118	1.8	95.7	2.0	90.9	3.2	104	3.9	91.0	5.3	110	17.6	104	7.0	10.1
PFDA	106	10.8	116	35.8	119	10.6	98.0	1.6	94.9	3.0	101	2.5	97.1	7.3	111	7.5	106	14.3	9.3
PFUnA	96.9	15.6	107	8.8	119	4.1	99.1	1.9	93.8	3.0	97.5	4.9	89.5	9.9	134	8.9	105	8.3	14.8
PFDoA	90.5	10.0	101	7.3	110	7.5	99.3	3.3	95.6	1.8	100	3.8	93.4	7.0	134	13.6	103	7.7	13.9
PFTriA	85.5	5.6	97.5	21.2	130	12.0	104	3.5	97.8	2.8	101	9.2	84.7	11.3	121	12.2	103	11.2	15.7
PFTreA	84.5	9.7	83.8	21.1	115	12.9	104	3.9	96.5	3.0	111	11.3	88.1	8.6	127	18.5	101	12.6	15.7
PFBS	106	4.9	114	17.1	112	5.2	92.2	4.0	93.4	10.3	90.6	4.3	91.3	2.7	102	14.0	100	9.3	9.4
PFPeS	101	4.4	109	8.2	98.5	8.5	92.1	3.1	97.4	2.1	91.4	3.8	92.5	4.5	110	9.8	99.0	6.2	7.4
PFHxS	106	11.5	97.0	4.1	112	3.2	95.4	0.9	98.9	2.4	94.6	9.7	91.8	3.1	114	10.4	101	6.9	8.3
PFHpS	95.4	7.9	110	3.2	113	5.0	98.4	0.8	95.7	3.9	104	1.7	93.0	5.0	121	7.0	104	4.9	10.1
PFOS	96.8	4.8	113	11.5	118	3.4	98.2	2.3	99.0	2.9	102	4.1	87.3	5.6	119	6.3	104	5.8	11.2
PFNS	104	15.4	102	7.2	126	9.5	98.5	0.9	94.3	1.3	105	3.9	90.8	3.5	129	7.6	106	7.6	13.9
PFDS	96.8	11.8	98.9	5.3	127	13.0	100	2.2	87.6	4.6	102	4.1	89.4	3.9	127	4.4	104	7.2	15.2
PFOSA	88.8	5.0	96.2	7.3	106	1.8	94.3	1.5	87.0	3.0	90.8	4.2	72.9	2.4	101	5.1	92.1	4.2	10.0
FtS 4:2	109	9.0	115	6.1	108	8.1	92.9	4.3	105	4.0	94.0	3.0	96.9	7.9	111	7.3	104	6.5	8.3
FtS 6:2	105	7.3	105	9.4	112	9.6	104	5.2	113	27.7	53.3	34.3	85.3	8.6	60.6	4.7	92.3	17.0	23.5
FtS 8:2	99.7	13.1	109	8.4	126	12.4	105	2.2	111	9.7	111	4.1	90.0	10.1	120	19.2	109	11.1	11.1
NMeFOSAA	102	11.9	98.5	10.8	111	23.6	98.8	1.3	97.2	4.1	92.3	4.9	88.0	4.3	116	14.0	100	11.6	9.2
NEtFOSAA	89.5	11.4	103	30.7	141	23.7	98.9	1.9	99.5	2.4	89.6	3.2	89.6	7.3	121	16.2	104	15.7	18.3

¹% Recovery of each replicate sample was calculated after subtracting the mean unspiked concentration (n=5) by matrix determined at each laboratory

² Pooled mean % recovery across 8 laboratories; For calculation refer to Appendix G Section 3.2.4 (1) of "Protocol for Review and Validation of New Methods for Regulated Organic and Inorganic Analytes in Wastewater Under EPA's Alternate Test Procedure Program, February 2018", available at: https://www.epa.gov/sites/production/files/2018-03/documents/chemical-new-method-protocol_feb-2018.pdf. Individual % recoveries were calculated after subtracting the average concentration across unspiked replicates by matrix and laboratory.

³ Within-laboratory standard deviation of % recovery (n= 8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above

⁴ Between-laboratory standard deviation of % recovery (n=8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above.

Reagent water % Recovery statistics, 60 ng/L (nom.) concentration¹

Target Analyte	Lab 2 (n=5) % Recovery		Lab 4 (n=5) % Recovery		Lab 5 (n=5) % Recovery		Lab 6 (n=5) % Recovery		Lab 10 (n=5) % Recovery		Lab 11 (n=5) % Recovery		Lab 12 (n=5) % Recovery		Lab 16 (n=5) % Recovery		Summary Statistics All Labs		
	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	\bar{X}^2 (%)	S_w^3 (%)	S_b^4 (%)
	PFBA	103	13.6	119	10.7	112	16.7	85.4	3.3	58.5	17.0	96.3	5.8	75.5	4.7	96.4	20.8	93.1	13.1
PFPeA	104	6.0	120	18.1	111	12.2	87.5	3.5	88.4	9.3	115	16.7	89.3	2.1	117	23.7	104	13.5	13.7
PFHxA	99.8	10.2	111	15.9	105	14.2	90.2	5.2	97.8	12.7	99.2	6.2	87.2	6.9	89.2	16.1	97.4	11.7	8.2
PFHpA	101	8.6	111	8.0	113	4.5	87.8	5.5	94.7	9.1	104	6.0	83.5	5.6	92.6	15.9	98.5	8.6	10.7
PFOA	105	15.0	108	10.2	106	10.8	88.8	2.8	93.8	13.3	110	7.0	84.1	11.9	104	14.9	100	11.4	9.7
PFNA	97.0	9.9	103	5.6	111	9.8	90.0	4.9	93.7	12.9	105	9.2	83.5	7.1	92.6	13.8	97.0	9.6	8.9
PFDA	88.6	7.1	126	31.0	111	22.0	92.6	5.4	97.8	11.6	108	10.2	82.1	9.7	110	19.0	102	16.6	14.4
PFUnA	87.8	9.7	87.2	15.4	123	15.5	92.7	3.9	93.5	11.9	106	3.4	83.9	10.2	118	23.5	98.9	13.2	14.7
PFDoA	81.2	19.0	73.0	15.1	106	19.1	91.7	5.8	95.9	10.5	103	12.2	85.3	13.0	131	32.3	95.8	17.5	17.9
PFTriA	77.9	12.4	78.8	18.0	120	19.2	93.6	5.5	100	11.1	111	11.0	76.0	14.1	125	15.6	97.7	14.0	19.3
PFTreA	66.3	12.7	73.3	26.3	108	22.5	92.4	8.7	97.9	11.0	111	7.7	80.4	11.5	135	9.2	95.5	15.1	22.6
PFBS	94.6	11.6	102	16.4	96.5	9.7	87.0	5.4	91.7	16.1	92.4	8.9	89.1	3.0	88.6	11.7	92.7	11.3	4.9
PFPeS	98.4	11.5	107	8.9	99.4	6.0	88.3	3.4	96.6	11.0	95.6	4.9	88.6	4.2	100	11.3	96.8	8.3	6.2
PFHxS	99.3	11.2	68.2	13.6	111	14.5	92.9	5.8	100	12.4	99.3	9.1	87.9	4.4	104	10.8	95.3	10.8	12.9
PFHpS	95.7	16.5	104	10.4	107	13.0	92.8	5.8	95.4	9.1	112	8.9	88.4	4.9	115	16.8	101	11.5	9.5
PFOS	90.5	5.0	112	35.3	113	11.6	92.8	3.5	98.0	9.1	102	15.9	74.9	5.0	117	14.7	100	15.8	14.0
PFNS	80.4	10.2	103	4.5	121	13.4	92.9	4.9	97.2	4.8	113	8.1	87.4	3.0	119	18.9	102	9.9	14.9
PFDS	84.5	9.7	84.0	11.4	117	22.0	94.9	6.9	91.4	9.7	106	6.8	84.4	5.0	119	16.3	97.7	12.2	14.6
PFOSA	78.6	6.1	88.5	12.7	96.0	7.0	83.8	3.5	86.9	7.0	97.3	7.7	74.7	3.0	95.7	12.7	87.7	8.2	8.4
FtS 4:2	93.7	18.5	110	31.2	103	14.1	90.4	6.5	97.0	10.7	100	9.6	91.8	7.1	102	14.8	98.5	15.9	6.5
FtS 6:2	100	20.0	98.2	16.0	99.3	17.8	96.2	7.0	128	84.3	39.2	6.0	87.9	6.6	35.0	21.0	85.5	32.9	32.0
FtS 8:2	96.3	9.3	95.6	17.0	109	12.9	103	6.5	119	15.4	115	10.5	92.7	8.4	110	16.6	105	12.6	9.6
NMeFOSAA	100	15.3	92.3	29.3	120	25.6	93.0	3.1	101	11.6	95.4	10.0	84.6	10.1	103	12.6	98.6	16.8	10.5
NEtFOSAA	88.6	9.1	71.7	19.6	127	39.9	94.0	5.4	102	14.0	94.7	8.8	82.3	12.5	112	12.3	96.5	18.3	17.2

¹% Recovery of each replicate sample was calculated after subtracting the mean unspiked concentration (n=5) by matrix determined at each laboratory

² Pooled mean % recovery across 8 laboratories; For calculation refer to Appendix G Section 3.2.4 (1) of "Protocol for Review and Validation of New Methods for Regulated Organic and Inorganic Analytes in Wastewater Under EPA's Alternate Test Procedure Program, February 2018", available at: https://www.epa.gov/sites/production/files/2018-03/documents/chemical-new-method-protocol_feb-2018.pdf. Individual % recoveries were calculated after subtracting the average concentration across unspiked replicates by matrix and laboratory.

³ Within-laboratory standard deviation of % recovery (n= 8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above

⁴ Between-laboratory standard deviation of % recovery (n=8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above.

Surface water % Recovery statistics, 200 ng/L (nom.) concentration¹

Target Analyte	Lab 2 (n=5) % Recovery		Lab 4 (n=5) % Recovery		Lab 5 (n=5) % Recovery		Lab 6 (n=5) % Recovery		Lab 10 (n=5) % Recovery		Lab 11 (n=5) % Recovery		Lab 12 (n=5) % Recovery		Lab 16 (n=5) % Recovery		Summary Statistics All Labs		
	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	\bar{X}^2 (%)	S_w^3 (%)	S_b^4 (%)
	PFBA	85.0	6.8	109	7.3	113	5.7	76.4	14.0	64.2	5.8	93.6	2.8	87.4	6.4	93.3	18.3	90.2	9.7
PFPeA	98.6	3.7	115	3.6	113	4.9	109	1.6	83.7	4.1	88.3	4.5	88.7	3.1	100	4.0	99.5	3.8	11.9
PFHxA	91.9	3.4	109	8.0	111	10.7	102	2.5	92.4	2.7	95.4	3.3	94.4	8.4	95.6	13.2	98.9	7.6	7.4
PFHpA	98.8	4.0	108	7.1	110	4.0	102	3.2	96.3	4.6	99.0	5.1	90.7	1.9	95.1	11.6	100	5.9	6.4
PFOA	98.6	10.7	110	7.4	111	5.1	103	4.0	92.8	1.6	107	4.5	89.1	8.8	109	6.8	103	6.7	8.3
PFNA	95.0	9.7	110	9.0	117	5.9	108	3.4	92.3	2.9	107	7.1	83.1	8.4	95.4	12.9	101	8.1	11.2
PFDA	91.7	8.3	108	16.4	116	2.1	107	5.3	96.2	4.9	108	6.9	90.8	7.9	109	16.2	104	9.8	9.3
PFUnA	94.1	10.5	106	6.7	123	2.8	105	5.0	90.6	2.8	99.1	4.6	88.7	7.7	118	13.9	103	7.7	12.4
PFDoA	74.6	5.7	105	7.4	118	5.3	105	2.7	91.7	4.0	102	3.5	83.0	7.9	131	21.9	101	9.3	18.3
PFTriA	75.4	7.9	110	3.5	128	8.5	100	3.0	92.6	2.7	102	1.9	78.4	10.9	109	12.8	99.4	7.5	17.2
PFTreA	73.7	8.3	102	13.7	114	5.8	90.4	4.2	90.3	2.1	111	2.8	74.6	10.0	97.3	8.8	94.1	7.9	14.9
PFBS	93.8	3.7	115	13.7	112	7.6	96.6	2.7	98.2	1.3	94.6	5.7	89.8	2.0	94.1	11.2	99.2	7.3	9.0
PFPeS	86.4	6.4	111	4.8	106	3.5	99.1	1.9	95.1	1.9	96.7	3.5	89.8	1.0	105	6.5	98.7	4.2	8.4
PFHxS	99.7	7.2	104	9.6	110	7.1	99.1	1.0	96.3	2.3	101	5.5	90.8	2.9	109	7.0	101	6.0	6.5
PFHpS	86.1	7.7	103	5.3	112	2.8	101	1.4	93.3	2.4	106	3.0	91.2	2.6	109	15.3	100	6.6	9.1
PFOS	94.2	4.0	103	12.7	119	5.6	101	2.0	98.3	1.5	108	4.1	90.7	3.7	112	9.2	103	6.4	9.4
PFNS	99.1	15.6	109	9.9	125	5.2	101	0.9	93.2	2.7	112	3.1	88.6	1.6	117	8.0	106	7.5	12.2
PFDS	80.0	11.0	103	3.3	126	9.0	99.2	1.8	85.7	1.8	107	2.7	85.3	3.0	115	8.0	100	6.1	15.9
PFOSA	90.4	3.4	95.1	5.6	104	5.1	93.9	1.1	88.9	3.1	93.6	2.9	84.0	2.3	103	5.9	94.2	4.0	6.9
FtS 4:2	83.3	10.7	107	10.6	113	3.2	118	22.2	93.6	6.8	95.1	3.4	94.7	6.4	104	6.1	101	10.4	11.5
FtS 6:2	106	12.6	102	5.6	103	4.7	125	26.6	74.8	10.1	39.8	2.3	84.8	10.0	54.4	3.2	86.2	11.9	28.6
FtS 8:2	95.7	13.6	103	20.9	130	14.0	118	13.6	105	9.8	107	4.4	93.1	9.3	103	10.4	107	12.8	12.1
NMeFOSAA	89.7	11.6	106	21.3	135	23.2	101	2.4	95.4	3.3	101	4.2	87.3	8.0	109	13.3	103	13.2	14.9
NEtFOSAA	92.5	11.8	108	9.6	149	12.2	102	3.3	97.2	4.4	97.2	3.1	88.2	7.1	110	11.9	105	8.7	19.1

¹% Recovery of each replicate sample was calculated after subtracting the mean unspiked concentration (n=5) by matrix determined at each laboratory

² Pooled mean % recovery across 8 laboratories; For calculation refer to Appendix G Section 3.2.4 (1) of “Protocol for Review and Validation of New Methods for Regulated Organic and Inorganic Analytes in Wastewater Under EPA’s Alternate Test Procedure Program, February 2018”, available at: https://www.epa.gov/sites/production/files/2018-03/documents/chemical-new-method-protocol_feb-2018.pdf. Individual % recoveries were calculated after subtracting the average concentration across unspiked replicates by matrix and laboratory.

³ Within-laboratory standard deviation of % recovery (n= 8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above

⁴ Between-laboratory standard deviation of % recovery (n=8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above.

Surface water % Recovery statistics, 60 ng/L (nom.) concentration¹

Target Analyte	Lab 2 (n=5) % Recovery		Lab 4 (n=5) % Recovery		Lab 5 (n=5) % Recovery		Lab 6 (n=5) % Recovery		Lab 10 (n=5) % Recovery		Lab 11 (n=5) % Recovery		Lab 12 (n=5) % Recovery		Lab 16 (n=5) % Recovery		Summary Statistics All Labs		
	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	\bar{X}^2 (%)	S_w^3 (%)	S_b^4 (%)
PFBA	78.9	12.9	124	9.2	111	10.7	76.5	24.5	54.2	9.0	85.0	4.1	84.0	12.6	80.8	30.3	86.7	16.4	21.4
PFPeA	84.8	13.2	130	7.7	104	9.2	114	8.3	76.4	6.7	101	16.8	101	8.4	109	6.6	103	10.2	16.6
PFHxA	84.2	11.9	131	24.3	114	28.3	97.4	9.3	89.5	6.1	93.8	6.8	93.7	10.1	82.0	21.6	98.2	16.9	16.6
PFHpA	86.1	13.4	114	15.7	107	12.9	96.8	2.3	84.5	3.6	96.2	6.4	91.4	9.9	88.5	22.3	95.6	12.5	10.4
PFOA	95.7	27.7	111	10.4	113	18.6	104	4.8	84.7	5.3	103	10.9	90.0	9.2	103	11.3	101	14.2	9.8
PFNA	80.7	12.9	105	17.7	109	12.5	104	3.7	82.9	6.5	104	8.0	86.8	6.6	88.5	12.7	95.1	10.9	11.4
PFDA	82.5	8.9	101	31.0	113	10.2	102	5.5	88.1	5.9	104	2.9	82.5	12.9	104	13.8	97.2	14.0	11.3
PFUnA	80.6	15.4	95.3	13.0	104	24.7	104	4.7	80.2	4.8	102	4.1	86.7	13.2	117	29.9	96.3	16.4	13.1
PFDoA	76.7	18.4	76.5	8.0	108	12.9	103	5.6	83.0	2.1	96.7	5.9	83.6	21.8	125	9.5	93.9	12.3	17.0
PFTriA	62.7	16.0	77.7	21.7	124	24.9	98.6	4.7	89.6	6.9	101	4.2	76.9	11.8	108	9.9	92.3	14.4	19.7
PFTreA	52.4	16.5	85.5	13.7	98.5	13.1	84.5	10.3	90.6	5.8	105	6.2	74.1	18.3	79.6	17.9	83.8	13.5	16.1
PFBS	90.5	14.8	110	13.5	99.4	16.6	97.5	4.8	87.8	3.3	90.8	4.8	99.3	12.8	84.3	22.8	94.9	13.3	8.2
PFPeS	77.3	14.8	109	11.2	102	14.0	97.9	3.7	87.2	5.1	94.5	2.9	93.4	8.0	101	15.2	95.3	10.5	9.8
PFHxS	84.6	15.6	114	11.1	108	9.0	95.5	4.0	88.1	4.1	84.3	6.5	94.3	9.0	107	7.1	96.9	9.0	11.4
PFHpS	82.3	20.5	96.4	12.5	102	14.5	99.9	4.9	82.7	3.6	107	4.6	91.2	7.6	111	6.4	96.5	10.9	10.5
PFOS	95.5	18.6	107	26.4	119	14.5	101	3.5	89.2	2.3	101	6.4	97.5	11.1	119	10.1	104	13.8	10.8
PFNS	67.4	5.9	98.4	15.2	119	15.7	99.6	2.4	87.0	4.2	114	8.2	89.2	8.9	120	9.2	99.4	9.8	18.2
PFDS	70.2	11.8	77.6	24.6	116	17.7	101	4.4	82.3	3.1	104	10.1	87.1	10.2	117	15.5	94.4	13.8	17.6
PFOSA	67.0	9.0	68.7	6.3	94.7	9.1	88.6	3.4	76.5	6.1	98.6	22.8	85.6	6.8	101	3.7	85.2	10.2	13.2
FtS 4:2	72.0	17.9	89.2	17.0	113	18.7	106	6.5	79.0	6.4	86.1	6.2	91.9	8.6	101	9.0	92.2	12.4	13.7
FtS 6:2	93.1	15.8	102	28.0	119	12.4	113	10.0	-4.3	18.5	494	1030	85.5	6.9	41.2	6.5	130	363	153
FtS 8:2	75.6	10.3	104	22.3	92.9	26.5	118	12.1	88.4	6.6	104	9.0	83.5	12.0	84.8	7.3	93.9	14.9	13.8
NMeFOSAA	74.0	21.2	94.0	14.3	143	53.7	97.8	1.8	85.5	3.9	92.4	3.6	89.8	8.3	111	21.0	98.5	22.6	20.9
NETFOSAA	75.3	25.7	88.8	37.5	137	20.4	105	2.9	87.1	6.0	91.9	7.4	86.0	9.1	121	12.8	99.0	18.8	20.7

¹% Recovery of each replicate sample was calculated after subtracting the mean unspiked concentration (n=5) by matrix determined at each laboratory

² Pooled mean % recovery across 8 laboratories; For calculation refer to Appendix G Section 3.2.4 (1) of “Protocol for Review and Validation of New Methods for Regulated Organic and Inorganic Analytes in Wastewater Under EPA’s Alternate Test Procedure Program, February 2018”, available at: https://www.epa.gov/sites/production/files/2018-03/documents/chemical-new-method-protocol_feb-2018.pdf. Individual % recoveries were calculated after subtracting the average concentration across unspiked replicates by matrix and laboratory.

³ Within-laboratory standard deviation of % recovery (n= 8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above

⁴ Between-laboratory standard deviation of % recovery (n=8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above.

Wastewater % Recovery statistics, 200 ng/L (nom.) concentration¹

Target Analyte	Lab 2 (n=5) % Recovery		Lab 4 (n=5) % Recovery		Lab 5 (n=5) % Recovery		Lab 6 (n=5) % Recovery		Lab 10 (n=5) % Recovery		Lab 11 (n=5) % Recovery		Lab 12 (n=5) % Recovery		Lab 16 (n=5) % Recovery		Summary Statistics All Labs		
	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	\bar{X}^2 (%)	S_w^3 (%)	S_b^4 (%)
	PFBA	82.0	6.6	110	8.2	109	9.0	77.8	18.3	80.7	9.9	96.4	3.5	92.0	5.2	115	25.0	95.4	12.7
PFPeA	100	6.5	118	4.9	115	6.3	103	6.1	81.3	3.8	86.2	2.0	93.6	3.6	115	10.5	102	6.0	13.8
PFHxA	95.4	3.8	110	9.1	109	9.6	100	6.6	91.1	6.0	95.6	3.7	98.8	5.9	90.0	30.7	98.7	12.5	7.3
PFHpA	95.7	3.4	108	10.3	110	6.0	103	5.0	92.1	4.0	98.4	2.8	94.6	3.7	98.7	21.9	100	9.3	6.4
PFOA	99.6	10.9	107	6.6	114	10.2	107	4.5	89.1	5.2	109	4.6	93.4	6.4	111	11.8	104	8.0	8.8
PFNA	97.3	5.0	107	7.1	115	8.8	106	3.7	90.8	3.9	110	4.7	91.4	10.2	109	18.1	103	8.9	9.0
PFDA	99.3	8.7	113	21.7	119	1.3	112	4.4	93.4	4.0	111	9.7	97.7	15.0	105	13.5	106	11.6	8.9
PFUnA	87.7	8.9	103	11.8	125	3.8	109	6.5	88.2	4.6	103	3.8	91.5	10.8	141	19.4	106	10.0	18.7
PFDoA	81.3	5.3	103	7.3	101	17.5	108	5.8	88.8	4.8	98.5	3.6	88.9	15.0	140	15.0	101	10.7	17.8
PFTriA	69.1	11.3	109	11.4	109	26.4	106	5.4	92.6	5.3	100	4.1	81.8	10.0	119	21.5	98.2	14.1	16.2
PFTreA	69.7	11.0	99.6	15.3	83.6	18.3	89.8	10.1	88.2	4.5	107	6.5	84.5	13.7	113	18.2	91.8	13.1	13.9
PFBS	95.4	7.4	109	7.4	113	7.7	103	5.9	96.8	3.1	92.2	6.7	96.2	2.2	91.2	23.2	99.5	10.0	7.8
PFPeS	93.0	4.4	110	4.7	101	3.3	102	4.7	95.2	3.3	97.6	2.6	93.4	2.8	109	18.0	100	7.3	6.7
PFHxS	101	4.1	115	36.6	115	2.7	103	4.2	97.2	2.4	97.6	4.1	97.3	3.4	119	10.1	106	13.8	9.0
PFHpS	91.9	9.0	107	6.3	115	6.2	102	5.2	95.3	5.9	109	4.0	93.1	5.4	118	7.9	104	6.4	10.1
PFOS	102	10.6	113	6.7	120	4.3	101	15.1	194	145	111	11.8	92.3	7.3	124	7.0	120	51.9	31.8
PFNS	85.5	9.0	106	10.5	112	17.3	103	5.3	92.4	3.0	116	3.2	90.9	5.5	130	11.7	104	9.4	14.7
PFDS	66.7	10.9	101	6.5	92.4	35.6	95.8	3.7	85.8	3.0	107	5.5	89.0	8.2	128	16.2	95.5	15.1	17.5
PFOSA	91.5	2.1	100	3.8	115	1.7	99.2	4.8	88.7	4.0	94.4	1.5	85.8	4.4	114	10.6	98.6	4.9	10.9
FtS 4:2	88.2	5.1	118	10.0	118	8.6	134	16.1	78.7	6.6	99.2	3.2	93.9	5.5	115	16.0	106	10.0	18.6
FtS 6:2	104	8.2	111	12.7	118	13.3	141	18.6	89.5	7.4	41.8	2.5	83.0	9.8	63.4	7.4	93.9	11.0	31.5
FtS 8:2	149	23.5	116	9.7	112	11.0	144	12.3	95.3	11.7	117	1.5	94.0	11.5	120	15.8	118	13.4	19.7
NMeFOSAA	85.1	11.8	110	15.4	110	35.6	101	5.0	90.8	6.2	99.2	3.3	88.0	9.5	116	9.9	100	15.4	11.4
NEtFOSAA	101	6.2	103	10.1	152	16.0	117	5.4	92.0	3.9	96.8	5.7	92.0	7.3	122	13.0	109	9.3	20.2

¹% Recovery of each replicate sample was calculated after subtracting the mean unspiked concentration (n=5) by matrix determined at each laboratory

² Pooled mean % recovery across 8 laboratories; For calculation refer to Appendix G Section 3.2.4 (1) of "Protocol for Review and Validation of New Methods for Regulated Organic and Inorganic Analytes in Wastewater Under EPA's Alternate Test Procedure Program, February 2018", available at: https://www.epa.gov/sites/production/files/2018-03/documents/chemical-new-method-protocol_feb-2018.pdf. Individual % recoveries were calculated after subtracting the average concentration across unspiked replicates by matrix and laboratory.

³ Within-laboratory standard deviation of % recovery (n= 8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above

⁴ Between-laboratory standard deviation of % recovery (n=8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above.

Wastewater % Recovery statistics, 60 ng/L (nom.) concentration¹

Target Analyte	Lab 2 (n=5) % Recovery		Lab 4 (n=5) % Recovery		Lab 5 (n=5) % Recovery		Lab 6 (n=5) % Recovery		Lab 10 (n=4) % Recovery		Lab 11 (n=5) % Recovery		Lab 12 (n=5) % Recovery		Lab 16 (n=5) % Recovery		Summary Statistics All Labs		
	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	\bar{X}^2 (%)	S_w^3 (%)	S_b^4 (%)
	PFBA	82.8	7.7	123	11.0	115	17.0	84.5	9.5	76.0	19.8	92.9	11.0	98.4	8.9	96.8	23.3	96.1	14.6
PFPeA	99.6	6.6	122	7.5	124	11.6	99.9	10.9	90.8	15.7	112	15.8	103	13.8	101	9.0	107	11.8	11.6
PFHxA	101	10.0	131	21.9	116	15.2	91.8	9.5	85.8	9.6	90.0	12.0	90.3	12.9	78.4	21.2	97.9	14.8	17.3
PFHpA	98.4	7.3	114	7.5	112	13.1	101	6.9	91.8	2.0	91.6	10.6	97.9	4.7	102	4.0	101	7.8	8.4
PFOA	110	21.4	104	7.9	107	5.8	99.8	6.3	84.5	4.7	95.9	15.5	97.1	8.0	101	10.0	99.8	11.3	7.7
PFNA	91.3	10.3	103	10.1	110	10.1	96.4	8.1	90.2	3.8	104	18.0	92.7	9.6	98.9	18.6	98.3	12.0	6.9
PFDA	97.5	10.2	92.4	24.9	117	17.7	103	9.6	89.5	8.6	96.2	15.1	96.7	21.2	106	24.1	99.8	17.5	8.8
PFUnA	86.3	11.4	83.8	12.3	123	11.3	101	9.2	86.3	7.3	98.6	17.1	89.8	11.2	115	29.2	97.9	15.1	14.3
PFDoA	83.2	9.1	57.4	9.3	97.7	20.0	99.3	7.5	87.8	8.8	98.1	19.7	90.5	10.1	149	24.0	95.4	14.9	25.6
PFTriA	75.9	11.3	75.9	10.3	98.7	29.5	99.8	8.7	93.7	7.0	100	13.1	88.8	14.9	144	39.6	97.1	20.0	21.3
PFTreA	66.0	18.3	58.2	20.7	90.7	26.0	91.0	8.1	90.2	4.4	104	14.3	82.7	15.1	143	21.4	90.7	17.4	25.7
PFBS	105	8.7	110	24.4	111	9.4	97.3	8.5	93.5	1.7	87.4	6.6	102	3.0	92.4	9.5	99.8	11.1	8.6
PFPeS	93.6	11.6	96.6	12.1	100	7.6	100	8.7	90.7	6.8	95.4	2.7	93.0	4.7	99.3	8.4	96.1	8.4	3.6
PFHxS	96.5	10.9	102	5.5	115	12.3	101	10.7	95.8	4.1	81.8	15.5	102	3.3	120	8.4	102	9.7	11.7
PFHpS	95.4	18.0	94.8	15.6	107	11.8	100	8.3	88.9	3.2	101	9.5	94.1	4.8	118	11.0	100	11.3	9.2
PFOS	116	16.4	130	17.2	108	6.0	92.9	10.4	93.9	4.1	95.9	28.5	96.9	6.2	128	7.2	108	14.3	15.2
PFNS	80.8	14.0	90.1	12.0	110	13.3	100	8.0	90.0	2.0	117	2.1	93.5	7.2	121	21.2	100	11.7	14.2
PFDS	80.9	11.5	76.5	10.3	98.9	32.8	93.4	8.9	83.7	5.8	106	7.6	91.0	5.3	128	13.1	94.8	14.5	16.5
PFOSA	88.2	5.2	85.1	7.4	98.5	7.8	91.9	5.4	85.0	5.9	90.5	1.7	88.7	3.1	109	9.2	92.2	6.2	8.2
FtS 4:2	84.9	10.4	98.7	32.3	132	24.8	102	14.7	81.2	3.7	90.4	10.3	93.8	10.0	104	9.0	98.3	16.9	15.7
FtS 6:2	109	6.1	110	18.2	115	24.1	94.3	10.9	107	54.9	39.2	6.5	76.7	11.7	59.6	7.1	88.8	23.2	27.7
FtS 8:2	124	22.5	102	24.5	151	26.6	112	10.5	95.0	14.7	106	4.6	94.0	8.7	98.8	13.8	110	17.4	19.1
NMeFOSAA	93.8	29.1	115	14.0	124	42.6	89.9	6.7	89.3	5.9	87.2	10.8	94.4	7.2	103	12.6	99.5	20.2	13.3
NEtFOSAA	93.9	22.2	74.2	17.1	159	17.6	107	8.2	93.1	7.3	93.6	10.2	95.5	9.4	117	10.4	104	13.8	25.4

¹% Recovery of each replicate sample was calculated after subtracting the mean unspiked concentration (n=5) by matrix determined at each laboratory

² Pooled mean % recovery across 8 laboratories; For calculation refer to Appendix G Section 3.2.4 (1) of “Protocol for Review and Validation of New Methods for Regulated Organic and Inorganic Analytes in Wastewater Under EPA’s Alternate Test Procedure Program, February 2018”, available at: https://www.epa.gov/sites/production/files/2018-03/documents/chemical-new-method-protocol_feb-2018.pdf. Individual % recoveries were calculated after subtracting the average concentration across unspiked replicates by matrix and laboratory.

³ Within-laboratory standard deviation of % recovery (n= 8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above

⁴ Between-laboratory standard deviation of % recovery (n=8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above.

LCS % Recovery statistics by Laboratory, 160 ng/L (nom.) concentration

Target Analyte	Lab 2 (n=6) % Recovery		Lab 4 (n=6) % Recovery		Lab 5 (n=6) % Recovery		Lab 6 (n=6) % Recovery		Lab 10 (n=6) % Recovery		Lab 11 (n=6) % Recovery		Lab 12 (n=6) % Recovery		Lab 16 (n=6) % Recovery		Summary Statistics All Labs		
	Mean (%)	Std dev (%)	Mean (%)	Std dev (%)	Mean (%)	Std dev (%)	Mean (%)	Std dev (%)	Mean (%)	Std dev (%)	Mean (%)	Std dev (%)	Mean (%)	Std dev (%)	Mean (%)	Std dev (%)	\bar{X} (%) ²	S_w (%) ³	S_b (%) ⁴
PFBA	101	5.6	98.1	6.5	100	5.3	86.3	4.5	59.3	2.5	94.3	1.6	85.5	5.1	107	10.9	91.5	2.8	14.9
PFPeA	102	7.8	99.3	5.0	106	4.7	88.5	6.8	76.8	2.0	91.3	2.8	90.7	3.6	98.5	8.6	94.1	2.4	9.2
PFHxA	100	9.4	98.8	4.5	104	11.5	86.4	4.8	98.9	3.1	97.1	2.7	91.5	6.8	89.2	19.6	95.8	5.7	6.2
PFHpA	94.8	8.6	99.0	4.0	105	6.6	90.7	4.8	98.9	2.2	98.7	2.8	91.3	5.2	93.2	18.3	96.4	5.2	4.7
PFOA	94.9	12.8	94.1	7.5	116	9.6	92.1	7.1	95.0	2.7	110	4.5	92.7	7.1	109	12.2	101	3.5	9.6
PFNA	101	15.7	101	4.6	125	6.0	92.2	6.6	96.9	5.1	111	4.7	96.5	5.1	98.8	9.6	103	3.8	10.4
PFDA	95.7	13.8	111	16.4	113	7.4	91.8	6.3	102	4.0	107	7.6	95.0	9.2	100	7.6	102	4.1	7.5
PFUnA	90.8	11.1	98.3	7.9	115	9.1	95.5	7.3	95.6	2.7	104	4.8	93.2	10.7	113	15.2	101	3.9	9.1
PFDoA	86.5	12.9	95.9	6.2	121	9.2	94.7	5.7	100	3.1	104	7.3	100.9	10.0	129	21.7	104	5.7	14.1
PFTriA	82.9	9.8	101	8.5	153	21.2	96.7	5.3	103	3.6	111	3.9	98.1	16.2	113	17.8	107	6.8	20.7
PFTreA	73.6	8.3	110	9.9	121	15.3	99.1	7.0	103	4.9	120	7.6	102.0	15.3	99.0	27.2	103	7.2	14.8
PFBS	91.1	7.5	105	10.1	95.5	6.0	90.2	5.9	90.3	4.1	92.6	1.6	91.4	2.6	89.8	20.0	93.2	5.8	5.1
PFPeS	93.9	7.9	99.9	5.2	105	1.7	90.8	4.6	102	2.5	98.5	3.4	93.1	4.7	101	11.6	98.0	3.2	4.9
PFHxS	90.6	4.4	91.9	4.4	110	5.2	92.4	4.7	103	4.2	102	3.8	92.7	3.9	101	8.7	97.9	1.6	6.9
PFHpS	92.7	8.5	98.9	9.3	109	7.4	93.4	5.8	98.6	3.0	112	3.3	93.6	2.2	106	6.3	101	2.6	7.5
PFOS	89.9	5.1	103	8.7	104	7.7	91.8	3.4	105	2.6	107	3.9	91.3	5.7	108	6.8	99.9	2.1	7.5
PFNS	99.8	16.6	103	8.8	126	1.1	95.3	5.3	101	3.1	110	3.2	92.9	5.2	112	11.1	105	5.1	10.6
PFDS	92.0	10.5	97.1	7.1	115	2.8	94.9	3.8	94.8	1.3	104	2.6	92.6	4.5	111	10.5	100	3.6	8.8
PFOSA	92.4	6.0	101	4.9	114	6.3	93.5	4.1	97.1	3.3	98.5	1.9	90.4	3.3	103	4.7	98.7	1.5	7.4
FtS 4:2	100	14.6	88.7	12.1	98.6	9.4	97.7	20.2	103	10.7	95.6	2.2	94.3	6.0	105	11.2	98.0	5.4	5.2
FtS 6:2	99.9	3.8	90.2	11.8	105	6.0	118	26.1	135	31.1	40.0	1.5	85.0	8.1	55.1	8.2	91.1	10.7	31.3
FtS 8:2	90.1	8.6	103	5.2	105	22.5	110	19.3	117	11.9	111	4.8	93.3	9.7	105	14.6	104	6.4	8.9
NMeFOSAA	87.2	7.4	104	12.1	132	11.8	95.6	6.2	107	3.7	98.4	5.1	91.5	9.1	101	10.8	102	3.2	13.6
NEtFOSAA	93.5	7.4	92.2	17.5	129	22.1	98.9	8.0	109	3.8	94.8	2.3	92.7	4.1	106	4.9	102	7.2	12.5

² Pooled mean % recovery across 8 laboratories; For calculation refer to Appendix G Section 3.2.4 (1) of "Protocol for Review and Validation of New Methods for Regulated Organic and Inorganic Analytes in Wastewater Under EPA's Alternate Test Procedure Program, February 2018", available at: https://www.epa.gov/sites/production/files/2018-03/documents/chemical-new-method-protocol_feb-2018.pdf. Individual % recoveries were calculated after subtracting the average concentration across unspiked replicates by matrix and laboratory.

³ Within-laboratory standard deviation of % recovery (n= 8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above

⁴ Between-laboratory standard deviation of % recovery (n=8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above.

Surrogate % Recovery statistics across study sample matrices by Laboratory, 160 ng/L (nom.) concentration

Target Analyte	Lab 2 (n=60) % Recovery		Lab 4 (n=59) ¹ % Recovery		Lab 5 (n=60) % Recovery		Lab 6 (n=59) ¹ % Recovery		Lab 10 (n=59) ¹ % Recovery		Lab 11 (n=60) % Recovery		Lab 12 (n=60) % Recovery		Lab 16 (n=60) % Recovery		Summary Statistics All Labs		
	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	\bar{X}^2 (%)	S_w^3 (%)	S_b^4 (%)
MFPBA	89.3	6.4	105	6.7	106	5.5	91.1	6.2	87.3	11.9	99.1	5.2	91.2	6.9	96.4	15.7	95.6	3.7	7.1
M5PFPeA	94.7	8.1	108	4.4	105	5.8	95.3	5.0	97.7	7.1	92.8	3.3	95.7	3.6	100	5.6	98.6	1.7	5.3
M5PFHxA	87.8	10.8	110	9.6	103	11.8	95.4	4.4	102	4.4	100	3.2	96.6	4.2	84.6	15.1	97.3	4.5	8.2
M4PFHpA	92.4	9.0	110	11.7	104	5.4	96.3	4.5	104	5.8	104	3.4	93.6	4.9	86.1	13.2	98.7	3.6	7.9
M8PFOA	94.5	10.5	107	8.3	106	7.1	97.6	4.5	102	4.6	110	4.4	94.9	7.4	95.1	10.6	101	2.6	6.2
M9PFNA	87.4	10.8	109	9.1	107	4.9	97.8	5.0	102	5.3	118	4.5	94.2	5.7	102	12.0	102	3.0	9.4
M6PFDA	89.2	9.5	109	8.0	110	7.3	99.8	5.7	104	5.9	120	6.8	99.3	10.3	104	12.9	104	2.5	9.0
M7PFUnDA	92.4	13.1	106	7.2	113	9.0	101	5.4	102	5.6	111	6.8	94.1	8.9	108	14.6	103	3.4	7.5
MPFDoDA	83.6	10.3	98.7	6.9	110	6.3	99.5	5.4	99.7	5.6	109	5.8	89.2	11.9	116	21.7	101	5.6	10.8
M2PFTeDA	75.9	10.3	84.2	14.7	105	16	92.2	9.4	101	5.8	120	7.0	89.2	11.8	107	23.7	96.8	5.8	14.2
M3PFBS	84.6	8.6	108	10.3	105	6.8	96.8	4.4	98.2	15.5	98.0	4.7	97.4	2.7	86.2	13.9	96.8	4.6	8.1
M3PFHxS	92.4	8.7	103	9.0	105	4.9	98.6	3.6	105	4.0	110	6.9	96.8	3.1	103	6.2	102	2.3	5.5
M8PFOS	92.3	11.5	103	9.7	113	7.0	99.1	3.6	103	3.6	119	6.9	95.3	4.6	108	8.0	104	2.9	9.0
M8PFOSA	90.6	5.9	98.3	5.4	113	12.2	99.2	3.7	102	4.6	101	3.6	95.2	3.0	105	7.4	101	3.0	6.7
M2-4:2FTS	89.4	11.4	102	46.2	103	8.4	102	18.9	96.9	11.7	94.7	5.9	97.3	4.7	96.9	7.9	97.8	13.6	4.5
M2-6:2FTS	93.2	11.3	105	10.9	105	11.7	108	19	108	12.0	93.1	25.1	95.1	5.7	96.6	8.0	100	6.2	6.5
M2-8:2FTS	95.3	18.0	105	13.2	111	12.4	111	14.8	108	13.0	112	9.9	98.0	7.7	106	9.3	106	3.3	6.2
d3-N-MeFOSAA	83.1	11.0	106	17.2	125	20.6	96.3	5.0	102	5.4	109	11.2	97.4	4.8	102	7.4	103	5.9	12.0
d5-N-EtFOSAA	91.3	16.2	98.6	16.1	130	16.3	102	7.7	103	6.1	104	9.7	95.3	5.2	108	8.6	104	4.7	11.7

¹ A study sample from labs 4 and 6 with recovery near 200% for all surrogates and a study sample from lab 10 with no recovery of target analytes or surrogates were excluded from this summary; a preparation error was presumed for these samples

² Pooled mean % recovery across 8 laboratories; For calculation refer to Appendix G Section 3.2.4 (1) of "Protocol for Review and Validation of New Methods for Regulated Organic and Inorganic Analytes in Wastewater Under EPA's Alternate Test Procedure Program, February 2018", available at: https://www.epa.gov/sites/production/files/2018-03/documents/chemical-new-method-protocol_feb-2018.pdf. Individual % recoveries were calculated after subtracting the average concentration across unspiked replicates by matrix and laboratory.

³ Within-laboratory standard deviation of % recovery (n= 8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above

⁴ Between-laboratory standard deviation of % recovery (n=8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above.

Surrogate % Recovery statistics across method blank, LCS, and LLOQ verification quality control samples by Laboratory, 160 ng/L (nom.) concentration

Target Analyte	Lab 2 (n=18) % Recovery		Lab 4 (n=15) % Recovery		Lab 5 (n=21) % Recovery		Lab 6 (n=18) % Recovery		Lab 10 (n=18) % Recovery		Lab 11 (n=15) % Recovery		Lab 12 (n=17) % Recovery		Lab 16 (n=18) % Recovery		Summary Statistics All Labs		
	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	Avg (%)	Std dev (%)	\bar{X}^2 (%)	S_w^3 (%)	S_b^4 (%)
MPFBA	97.9	3.4	98.6	4.5	101	5.7	92.4	5.1	71.9	4.7	95.4	3.3	86.4	5.7	102	12.7	93.3	3.0	10.0
M5PFPeA	103	6.8	100	4.2	102	6.5	91.2	5.3	87.8	5.7	91.9	3.9	92.3	4.5	94.8	9.4	95.5	1.8	5.6
M5PFHxA	102	10.7	102	3.8	92.6	12.0	91.2	3.9	101	3.4	97.5	2.1	94.8	5.6	82.1	15.4	95.2	4.9	6.8
M4PFHpA	97.6	8.8	102	7.5	103	4.9	93.6	5.1	103	4.9	102	2.2	91.1	7.0	84.3	15.6	97.0	4.0	6.9
M8PFOA	103	10.8	99.2	4.6	105	7.8	94.2	4.5	103	4.4	106	3.4	94.9	7.4	92.1	13.1	99.7	3.5	5.4
M9PFNA	93.8	10.7	100	5.8	104	5.7	94.5	5.1	101	4.4	113	4.7	93.6	4.8	97.3	13.4	99.5	3.3	6.6
M6PFDA	95.5	6.5	99.2	7.4	114	9.2	95.7	5.6	104	4.4	111	4.0	97.9	11.9	97.7	11.5	102	3.0	7.1
M7PFUnDA	97.0	11.2	101	6.9	112	10.7	98.0	6.4	103	3.3	104	4.6	93.9	7.7	98.1	14.1	101	3.6	5.6
MPFDoDA	88.2	10.0	101	7.1	113	13.7	97.6	6.0	102	4.6	106	3.4	94.4	9.7	109	20.2	102	5.5	8.0
M2PFTeDA	73.5	10.8	105	7.6	110	23.9	98.6	6.8	104	5.8	124	3.9	101	13.2	91.8	19.3	101	7.0	14.5
M3PFBS	93.5	6.4	103	6.1	99.7	4.7	92.4	4.7	92.1	7.6	96.4	4.7	95.0	8.4	84.5	15.7	94.5	3.7	5.5
M3PFHxS	97.6	6.2	96.1	8.5	100	4.0	94.6	3.6	104	2.8	110	6.9	93.7	4.5	97.5	9.0	99.1	2.3	5.4
M8PFOS	98.4	10.4	98.7	7.6	106	6.4	96.0	3.7	103	3.9	117	5.5	93.5	3.0	103	10.0	102	2.8	7.3
M8PFOSA	97.0	4.8	101	6.9	111	13.7	97.0	4.1	102	4.5	101	3.5	92.1	4.5	97.2	6.7	100	3.3	5.5
M2-4:2FTS	101	10.2	105	46.6	95.4	7.5	103	18.0	105	8.2	92.0	4.9	92.4	4.2	93.3	12.9	98.4	13.9	5.7
M2-6:2FTS	99.8	11.6	99.4	11.6	105	10.8	114	22.2	121	18.2	85.6	5.9	92.9	5.8	94.5	14.0	102	5.6	11.5
M2-8:2FTS	94.3	12.3	96	13.7	105	14.1	109	13.9	116	13.9	104	6.8	95.5	7.4	98.5	13.7	103	3.1	7.6
d3-N-MeFOSAA	95.6	9.3	100	16.7	115	22.6	98.1	5.8	105	5.0	99.5	6.3	94.8	4.5	93.8	11.4	101	6.5	7.0
d5-N-EtFOSAA	95.0	13.7	108	14.6	119	18.1	99.9	6.0	110	4.5	96.6	8.2	94.0	4.6	104	9.6	104	5.1	8.7

¹ One QC sample with recovery near 200% for all surrogates was excluded from this summary; a preparation error was presumed for these samples

² Pooled mean % recovery across 8 laboratories; For calculation refer to Appendix G Section 3.2.4 (1) of “Protocol for Review and Validation of New Methods for Regulated Organic and Inorganic Analytes in Wastewater Under EPA’s Alternate Test Procedure Program, February 2018”, available at: https://www.epa.gov/sites/production/files/2018-03/documents/chemical-new-method-protocol_feb-2018.pdf. Individual % recoveries were calculated after subtracting the average concentration across unspiked replicates by matrix and laboratory.

³ Within-laboratory standard deviation of % recovery (n= 8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above

⁴ Between-laboratory standard deviation of % recovery (n=8 laboratories); Refer to calculation in Appendix G Section 3.2.4 (1) in the reference above.