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May 3, 2000

Facsimile

Dr. Jennifer Seed
202-260-1279
USEPA Headquarters
Ariel Rios Building
1200 Pennsylvania Avenue, N. W.
Washington, DC 20460

Re: Serum measurements for Argus Studies 418-013 (through lactation) and 418-015 (during gesatation)

Dear Jennifer:

I am including in this fax the two sets of serum perfluorooctanesulfonate measurements from the following two studies:

1. Oral (Gavage) Pharmacokinetic Recovery Study of PFOS in Rats, Argus Laboratories Protocol No. 418-015, 3M Reference No. T-6295.14, *Advanced Bioanalytical Services Study No. FACT-TOX-111*.
2. Oral (Gavage) Pharmacokinetic Study of PFOS in Rats, Argus Laboratories Protocol No. 418-013, 3M Reference No. T-6295.12, *Advanced Bioanalytical Services Study No. FACT-TOX-110*.

The informnation which I have included relates to the analytical studies indicated above in ***bold italics***. Included are pages 10-19 of FACT-TOX-111 and pages 13-23 of FACT-TOX-110. 3M has previously sent the in-life reports and protocols for the analytical phase to the attention of Dr. Hernandez.

I would be happy to meet with you and your EPA colleagues and consultants to provide whatever assistance you may desire in understanding the toxicological information that is being provided.

Please contact me with any questions or if you would like to arrange a meeting.

Sincerely,

John L. Butenhoff, Ph.D., CIH, DABT
Senior Laboratory Manager
Corporate Toxicology
(651) 733-1962

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Table 2: Inter-Assay Precision and Accuracy for PFOS Quality Control Samples in Rat Serum for Study #FACT-TOX-111

Run No.	PFOS Concentration (µg/mL)				
	QC1 0.2	QC2 6	QC3 18	QC4 100 (1 in 10 Dilution)	QC4 100 (1 in 20 Dilution)
1	0.232	6.17	18.2	NA	NA
	0.212	6.28	18.4	NA	NA
	0.210	6.11	18.2	NA	NA
	0.216	5.97	18.2	NA	NA
2	0.216	6.00	18.1	NA	NA
	0.227	6.09	19.0	NA	NA
	0.224	6.07	19.8	NA	NA
	0.219	6.18	18.5	NA	NA
3	0.211	5.97	18.8	116	NA
	0.210	5.84	18.2	114	NA
	0.217	6.07	18.8	113	NA
	0.214	5.99	17.9	106	NA
4	0.222	6.48	19.3	NA	112
	0.233	6.23	19.7	NA	109
	0.214	6.54	19.6	NA	117
	0.225	6.30	18.5	NA	113
Mean	0.219	6.14	18.7	112	113
RSD (%)	3.43	3.08	3.28	3.61	2.78
RE	9.39	2.38	3.86	12.3	12.7

RSD = (SD/Mean) x 100%

RE = [(Mean-Nominal)/Nominal] x 100%

NA: Not applicable.



Table 3: Inter-Assay Precision and Accuracy for PFOS Calibration Standards in Rat Serum for Study #FACT-TOX-111

Run No.	PFOS Concentration (µg/mL)									
	STD1 0.05	STD2 0.1	STD3 0.25	STD4 0.5	STD5 1	STD6 2	STD7 4	STD8 8	STD9 16	STD10 20
1	0.0496	0.0993	0.238	0.493	0.957	2.13	4.39	7.72	16.0	20.4
	0.0513	0.101	0.243	0.491	0.963	2.12	4.38	7.76	15.5	20.0
2	0.0470	0.101	0.244	0.542	0.899	2.03	4.30	7.67	16.0	20.6
	0.0538	0.101	0.244	0.539	0.928	2.03	4.43	7.77	15.8	19.8
3	0.0490	0.105	0.254	0.482	0.980	2.15	4.49	7.80	16.9	20.4
	0.0511	0.0980	0.242	0.487	0.937	2.01	4.39	7.39	15.8	19.2
4	0.0522	0.0950	0.246	0.484	0.953	2.11	4.47	7.59	15.9	20.6
	0.0491	0.104	0.246	0.481	0.958	2.13	4.50	7.89	15.3	20.0
Mean	0.0504	0.100	0.245	0.500	0.947	2.09	4.42	7.70	15.9	20.1
RSD (%)	4.24	3.04	1.80	5.08	2.66	2.67	1.52	1.98	2.98	2.34
RE	0.775	0.425	-2.16	-0.0325	-5.31	4.49	10.5	-3.76	-0.651	0.626

RSD = (SD/Mean) x 100%

RE = [(Mean-Nominal)/Nominal] x 100%

Table 4: Calibration Curve Statistics for the Determination of PFOS in Rat Serum for Study #FACT-TOX-111

Run No.	Quadratic Coefficient (A)	Linear Coefficient (B)	Intercept (C)	Coefficient of Determination (r^2)
1	-0.0004154	0.1025	-0.0006090	0.9977
2	-0.0005419	0.1001	-0.0004172	0.9959
3	-0.0006070	0.1046	-0.0001313	0.9968
4	-0.0002665	0.1036	-0.0004533	0.9966
Mean	-0.0004577	0.1027	-0.0004027	0.9968

$$y = Ax^2 + Bx + C, \text{ weighted } 1/y^2$$





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Table 5: Concentrations of PFOS in Rat Serum Samples from Study #FACT-TOX-111 Following the 0 mg/kg Dose

Sampling Time (day)	PFOS Concentration (µg/mL)							
	Rat Number*							
	13726	13726P	13727	13727P	13728	13728P	13731	13734
0	0.215	NS	0.121	NS	0.0930	NS	0.0842	0.118
7	0.176	NS	0.0835	NS	0.0711	NS	0.0873	0.0644
14	0.0822	NS	0.0638	NS	0.0530	NS	NS	0.0594
15	0.168	NS	0.0932	NS	0.0605	NS	0.0610	0.0665
21	0.0849	0.0712	0.0587	<LLQ[0.0452]<(0.05)	<LLQ[0.0385]<(0.05)	<LLQ[0.0343]<(0.05)	NS	<LLQ[0.0390]<(0.05)
22	0.0597	NS	0.0517	NS	<LLQ[0.0431]<(0.05)	NS	NS	<LLQ[0.0446]<(0.05)

*Rat Number with a "P" indicates pup sample.

<LLQ = Less than the Lower Limit of Quantitation (0.05 µg/mL).

NS: No sample.

Table 5: (Continued) Concentrations of PFOS in Rat Serum Samples from Study #FACT-TOX-111 Following the 0 mg/kg Dose

Sampling Time (day)	PFOS Concentration (µg/mL)						
	Rat Number*						
	13734P	13735	13735P	13736	13736P	13737	13737P
0	NS	0.0947	NS	0.113	NS	0.0877	NS
7	NS	0.0700	NS	0.108	NS	0.0767	NS
14	NS	<LLQ[0.0492]<(0.05)	NS	<LLQ[0.0474]<(0.05)	NS	0.0553	NS
15	NS	0.0574	NS	0.0693	NS	0.111	NS
21	<LLQ[0.0409]<(0.05)	<LLQ[0.0418]<(0.05)	<LLQ[0.0401]<(0.05)	<LLQ[0.0491]<(0.05)	<LLQ[0.0409]<(0.05)	0.0531	0.0518
22	NS	<LLQ[0.0370]<(0.05)	NS	0.0592	NS	0.0570	NS

*Rat Number with a "P" indicates pup sample.

<LLQ = Less than the Lower Limit of Quantitation (0.05 µg/mL).

NS: No sample.

Table 6: Concentrations of PFOS in Rat Serum Samples from Study #FACT-TOX-111 Following the 0.1 mg/kg Dose

Sampling Time (day)	PFOS Concentration (µg/mL)											
	Rat Number*											
	13739	13739P	13740	13740P	13741	13741P	13744	13744P	13745	13745P	13746	13746P
0	9.78	NS	12.1	NS	11.6	NS	9.88	NS	9.88	NS	11.1	NS
7	9.50	NS	7.85	NS	7.59	NS	9.18	NS	7.40	NS	8.49	NS
14	1.82	NS	1.99	NS	1.51	NS	1.96	NS	2.55	NS	2.03	NS
15	5.88	NS	7.83	NS	6.67	NS	6.04	NS	5.80	NS	6.65	NS
21	1.81	2.34	4.00	2.12	2.69	1.88	3.04	2.29	2.34	1.88	2.84	2.37
22	1.33	NS	1.47	NS	1.19	NS	0.882	NS	1.09	NS	0.945	NS

*Rat Number with a "P" indicates pup sample.

NS: No sample.



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Table 6: (Continued) Concentrations of PFOS in Rat Serum Samples from Study #FACT-TOX-111 Following the 0.1 mg/kg Dose

Sampling Time (day)	PFOS Concentration ($\mu\text{g/mL}$)			
	Rat Number*			
	13748	13748P	13749	13749P
0	10.2	NS	10.7	NS
7	NS	NS	8.61	NS
14	1.35	NS	1.87	NS
15	5.36	NS	8.40	NS
21	3.94	1.74	3.27	2.07
22	0.942	NS	1.22	NS

*Rat Number with a "P" indicates pup sample.

NS: No sample.

Table 7: Concentrations of PFOS in Rat Serum Samples from Study #FACT-TOX-111 Following the 1.6 mg/kg Dose

Sampling Time (day)	PFOS Concentration (µg/mL)											
	Rat Number*											
	13751	13751P	13752	13752P	13753	13753P	13754	13754P	13755	13756	13756P	13758
0	155	NS	164	NS	213	NS	198	NS	191	188	NS	188
7	149	NS	169	NS	157	NS	152	NS	138	158	NS	143
14	21.2	NS	24.1	NS	21.6	NS	21.2	NS	NS	31.0	NS	27.7
15	95.6	NS	109	NS	112	NS	103	NS	125	108	NS	86.9
21	38.5	35.0	34.8	33.9	32.6	28.3	37.1	23.4	112	40.4	47.4	37.0
22	17.1	NS	19.5	NS	18.2	NS	9.48	NS	NS	19.9	NS	14.3

*Rat Number with a "P" indicates pup sample.

NS: No sample.

Table 7: (Continued) Concentrations of PFOS in Rat Serum Samples from Study #FACT-TOX-111 Following the 1.6 mg/kg Dose

Sampling Time (day)	PFOS Concentration (µg/mL)		
	Rat Number*		
	13758P	13759	13759P
0	NS	198	NS
7	NS	133	NS
14	NS	20.4	NS
15	NS	99.4	NS
21	25.6	33.0	26.3
22	NS	15.4	NS

*Rat Number with a "P" indicates pup sample.

NS: No sample.

Table 8: Repeat Analysis of Rat Serum Samples from Study #FACT-TOX-111

Rat Number	Treatment	Time	Original Conc. µg/ml	Original Curve Number	Reason for Reassay	Reassay Conc. µg/ml	Reassay Curve Number	Reported Conc. µg/ml	Reason for Reported Conc.
13753	3	Day 0	>ULQ-222.9138>(200)	3	1	213	4	213	1

>ULQ: Greater than the Upper Limit of Quantitation.

REASONS FOR REASSAY:

1). Run 3 concentration exceeded calibration range.

REASONS FOR REPORTED CONC:

1). Run 4 concentration within calibration range.

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Table 5: Concentrations of PFOS in Rat Serum Samples from Study #FACT-TOX-110 Following the 0 mg/kg Dose

Sampling Time (day)	PFOS Concentration (µg/mL)									
	Rat Number*									
	19501	19502	19503	19504	19504F	19505	19505F	19506	19506F	19507
0	0.112	0.0701	0.0607	0.0514	NS	0.0550	NS	0.309	NS	0.0545
7	0.397	0.0535	NS	0.0926	NS	0.0514	NS	0.219	NS	0.0586
15	0.0803	0.0690	NS	<LLQ[0.0432]<(0.05)	NS	0.0609	NS	0.199	NS	0.0648
21	NS	NS	NS	<LLQ[0.0258]<(0.05)	0.0845	<LLQ[0.0353]<(0.05)	0.0880	0.0820	0.267	<LLQ[0.0247]<(0.05)

<LLQ = Less than the Lower Limit of Quantitation (0.05 µg/mL).

*Rat Number with "F" indicates fetal sample.

NS: No sample.

Table 5: (Continued) Concentrations of PFOS in Rat Serum Samples from Study #FACT-TOX-110 Following the 0 mg/kg Dose

Sampling Time (day)	PFOS Concentration (µg/mL)							
	Rat Number*							
	19507F	19508	19509	19509F	19510	19511	19512	19512F
0	NS	0.0548	<LLQ[0.0483]<(0.05)	NS	0.0664	0.0619	<LLQ[0.0449]<(0.05)	NS
7	NS	<LLQ[0.0395]<(0.05)	<LLQ[0.0481]<(0.05)	NS	0.0636	0.250	0.197	NS
15	NS	<LLQ[0.0454]<(0.05)	<LLQ[0.0458]<(0.05)	NS	0.0614	0.176	0.238	NS
21	0.0842	NS	<LLQ[0.0269]<(0.05)	0.102	NS	NS	0.0833	0.219

<LLQ = Less than the Lower Limit of Quantitation (0.05 µg/mL).

*Rat Number with "F" indicates fetal sample.

NS: No sample.

Table 5: (Continued) Concentrations of PFOS in Rat Serum Samples from Study #FACT-TOX-110 Following the 0 mg/kg Dose

Sampling Time (day)	PFOS Concentration (µg/mL)				
	Rat Number*				
	19513	19514	19515	19516	19516F
0	0.0527	<LLQ[0.0500]<(0.05)	<LLQ[0.0443]<(0.05)	0.0559	NS
7	<LLQ[0.0345]<(0.05)	0.0784	<LLQ[0.0488]<(0.05)	<LLQ[0.0447]<(0.05)	NS
15	<LLQ[0.0462]<(0.05)	0.0648	0.0581	<LLQ[0.0328]<(0.05)	NS
21	NS	NS	NS	<LLQ[0.0206]<(0.05)	0.165

<LLQ = Less than the Lower Limit of Quantitation (0.05 µg/mL).

*Rat Number with "F" indicates fetal sample.

NS: No sample.

Table 6: Concentrations of PFOS in Rat Serum Samples from Study #FACT-TOX-110 Following the 0.1 mg/kg Dose

Sampling Time (day)	PFOS Concentration (µg/mL)											
	Rat Number*											
	19517	19518	19518F	19519	19519F	19520	19521	19521F	19522	19523	19523F	19524
0	9.07	9.87	NS	9.37	NS	9.73	11.1	NS	9.32	12.8	NS	10.2
7	8.63	10.3	NS	6.83	NS	NS	8.82	NS	8.19	9.65	NS	10.4
15	11.5	10.7	NS	9.18	NS	NS	14.1	NS	9.57	10.9	NS	9.20
21	NS	6.84	12.1	3.93	8.52	NS	4.93	11.2	NS	5.35	10.2	4.11

*Rat Number with "F" indicates fetal sample.

NS: No sample.

Table 6: (Continued) Concentrations of PFOS in Rat Serum Samples from Study #FACT-TOX-110 Following the 0.1 mg/kg Dose

Sampling Time (day)	PFOS Concentration (µg/mL)										
	Rat Number*										
	19524F	19525	19526	19527	19528	19528F	19529	19529F	19530	19531	19532
0	NS	12.0	9.48	12.0	10.0	NS	11.6	NS	8.48	9.10	10.6
7	NS	9.62	11.2	8.78	7.80	NS	10.3	NS	7.65	7.57	10.1
15	NS	10.0	11.7	8.78	8.04	NS	7.31	NS	11.8	10.4	9.66
21	10.3	NS	NS	NS	6.19	10.8	3.04	10.4	NS	NS	NS

*Rat Number with "F" indicates fetal sample.

NS: No sample.

Table 7: Concentrations of PFOS in Rat Serum Samples from Study #FACT-TOX-110 Following the 0.4 mg/kg Dose

Sampling Time (day)	PFOS Concentration (µg/mL)											
	Rat Number*											
	19533	19533F	19534	19534F	19535	19536	19536F	19537	19538	19539	19540	19541
0	53.9	NS	46.9	NS	50.1	38.6	NS	56.6	46.5	45.2	42.9	44.4
7	44.3	NS	50.0	NS	56.6	36.6	NS	58.4	48.1	44.6	45.8	NS
15	47.3	NS	56.1	NS	48.2	43.3	NS	50.7	53.5	37.2	48.6	NS
21	20.4	42.5	20.5	41.4	NS	16.2	32.2	NS	NS	NS	NS	NS

*Rat Number with "F" indicates fetal sample.

NS: No sample.

Table 7: (Continued) Concentrations of PFOS in Rat Serum Samples from Study #FACT-TOX-110 Following the 0.4 mg/kg Dose

Sampling Time (day)	PFOS Concentration (µg/mL)								
	Rat Number*								
	19542	19543	19543F	19544	19545	19546	19546F	19547	19548
0	45.3	46.3	NS	45.8	47.9	43.5	NS	42.2	57.6
7	40.6	46.1	NS	42.8	NS	46.5	NS	42.2	60.0
15	44.0	43.9	NS	49.1	NS	47.3	NS	43.3	58.0
21	NS	23.0	34.1	NS	NS	35.8	48.4	NS	65.7

*Rat Number with "F" indicates fetal sample.

NS: No sample.

Table 8: Concentrations of PFOS in Rat Serum Samples from Study #FACT-TOX-110 Following the 1.6 mg/kg Dose

Sampling Time (day)	PFOS Concentration (µg/mL)											
	Rat Number											
	19549	19550	19551	19552	19553	19554	19555	19556	19557	19558	19559	19560
0	166	200	184	165	182	203	166	199	198	196	171	200
7	NS	216	NS	NS	160	189	195	186	NS	171	160	171
15	NS	160	NS	NS	135	176	225	202	NS	164	192	215
21	NS	NS	NS	NS	NS	NS	NS	251	NS	NS	237	79.4

NS: No sample.



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Table 8: (Continued) Concentrations of PFOS in Rat Serum Samples from Study #FACT-TOX-110 Following the 1.6 mg/kg Dose

Sampling Time (day)	PFOS Concentration (µg/mL)					
	Rat Number*					
	19560F	19561	19562	19562F	19563	19564
0	NS	193	185	NS	163	185
7	NS	181	179	NS	168	169
15	NS	219	142	NS	183	159
21	131	NS	63.7	102	NS	NS

*Rat Number with "F" indicates fetal sample.

NS: No sample.

Table 9: Concentrations of PFOS in Rat Serum Samples from Study #FACT-TOX-110 Following the 3.2 mg/kg Dose

Sampling Time (day)	PFOS Concentration (µg/mL)											
	Rat Number*											
	19565	19566	19567	19568	19568F	19569	19569F	19570	19571	19571F	19572	19572F
0	370	337	366	339	NS	334	NS	351	348	NS	357	NS
7	392	280	327	340	NS	323	NS	337	371	NS	305	NS
15	345	311	294	336	NS	314	NS	269	308	NS	317	NS
21	NS	NS	NS	241	228	142	176	NS	165	166	123	166

*Rat Number with "F" indicates fetal sample.

NS: No sample.



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Table 9: (Continued) Concentrations of PFOS in Rat Serum Samples from Study #FACT-TOX-110 Following the 3.2 mg/kg Dose

Sampling Time (day)	PFOS Concentration (µg/mL)									
	Rat Number*									
	19573	19574	19575	19576	19577	19577F	19578	19579	19579F	19580
0	364	365	413	383	417	NS	373	387	NS	378
7	343	393	387	NS	395	NS	NS	399	NS	357
15	317	299	284	NS	361	NS	NS	386	NS	323
21	NS	NS	NS	NS	221	226	NS	186	181	NS

*Rat Number with "F" indicates fetal sample.

NS: No sample.