

MR 46040

AR 226-1005

NOTE TO FILE - AR 226

15pp

DATE: March 28, 2001

FROM: Karen Lannon

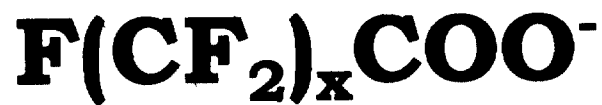
SUBJECT: 3/26/01 Perfluoroalkanoic acids

Rich Purdy, an independent toxicologist, gave the attached presentation to EPA on March 26, 2001. The meeting attendee list is also attached.

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OPTIC
2001 APR -2 AM 10:58

Contain NO CBI

Perfluoro fatty acids



From:

- **Perfluorooctanoic acid
(PFOA)**
- **Perfluoro telomer alcohols
 $\text{F}(\text{CF}_2)_x\text{CH}_2\text{CH}_2\text{OH}$**
- **Perfluoro telomer
sulfonates**
- **Perfluoro telomer iodides**

Contain NO CBI

Perfluorooctanoic acid (PFOA)

Not a Problem like PFOS:

- **Not as bioaccumulative**
- **Not as toxic**
- **Not Found in wildlife
tissues or human blood**

Contain 117

Or is it?

- **Relative Toxicity**

- **In a PFOS rat reproduction study the LOEL for the dams was 48 ppm liver (0569)**
- **In a rat PFOA feeding study the female LOEL was 0.3 ppm liver (0445)**

- **Wildlife PFOA Levels**

- **0.04 ppm in California sea lion liver (0962)**
- **0.18 ppm in albatross liver (0962)**

- **Detection limits high**

- **Little homologue monitoring**

**28 day rat gavage dosing
followed by 28 days depuration
(0951)**

3mg/kg/day PFOS

30mg/kg/day telomer alcohol

Depuration phase data

<u>Chemical</u>	<u>Day 1</u>	<u>Day 14</u>	<u>Day 28</u>
PFOS	377	240	191
Telomer alcohol			
PFOA	0.164	0.016	0
C10	1.7	1.4	2.2
C12	0.12	0.08	0.1

**Perfluoro fatty acids
look like PFOS:**

**Electronegative rods with a
negative charge at one end**

**Are they in the same
class?**

Similarities:

- 1. Extremely Persistent**
- 2. Surfactants-less than monolayer.**
- 3. Bioaccumulation**

Mechanism:

Enterohepatic recycling
(0008 & 0449)

- 4. Mechanism of Toxicity**
 - a. Mitochondrial**
Uncoupling (0167 & 0169)
 - b. Wasting Syndrome**
 - i. PFOS**

1. 53 wk feeding
(0956)

2. 7 day feeding

(Haughom and Spydevold)

3. 90 day feeding
(0139)

4. Rabbit 13 day
gavage (0949)

5. Fish ?

6. Quail 5 day
feeding (0953)

7. 90 day rhesus
(0137)

8. 26 wk Cynomolgus
(0957 and 0958)

ii. PFOA

1. 13 wk feeding
study (0449)

2. 7 day feeding
(Haughom and Spydevold)

3. 50 mg/kg 14
days (Cook et al 1992)

4. carcinogenicity study (0437)

- c. Upregulate aromatase**
- d. Lower Cholesterol**
- e. Not Carcinogenic**

Contain NO CBI

Other Possible Class Members:



P=1.0



P=0.3 Alpha dihydro perfluoro fatty acids



0.95



P=1.0



P=1.0



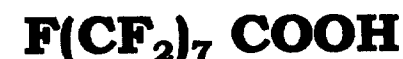
P=.05 Alpha monohydro perfluoro fatty acids.



P=1.0

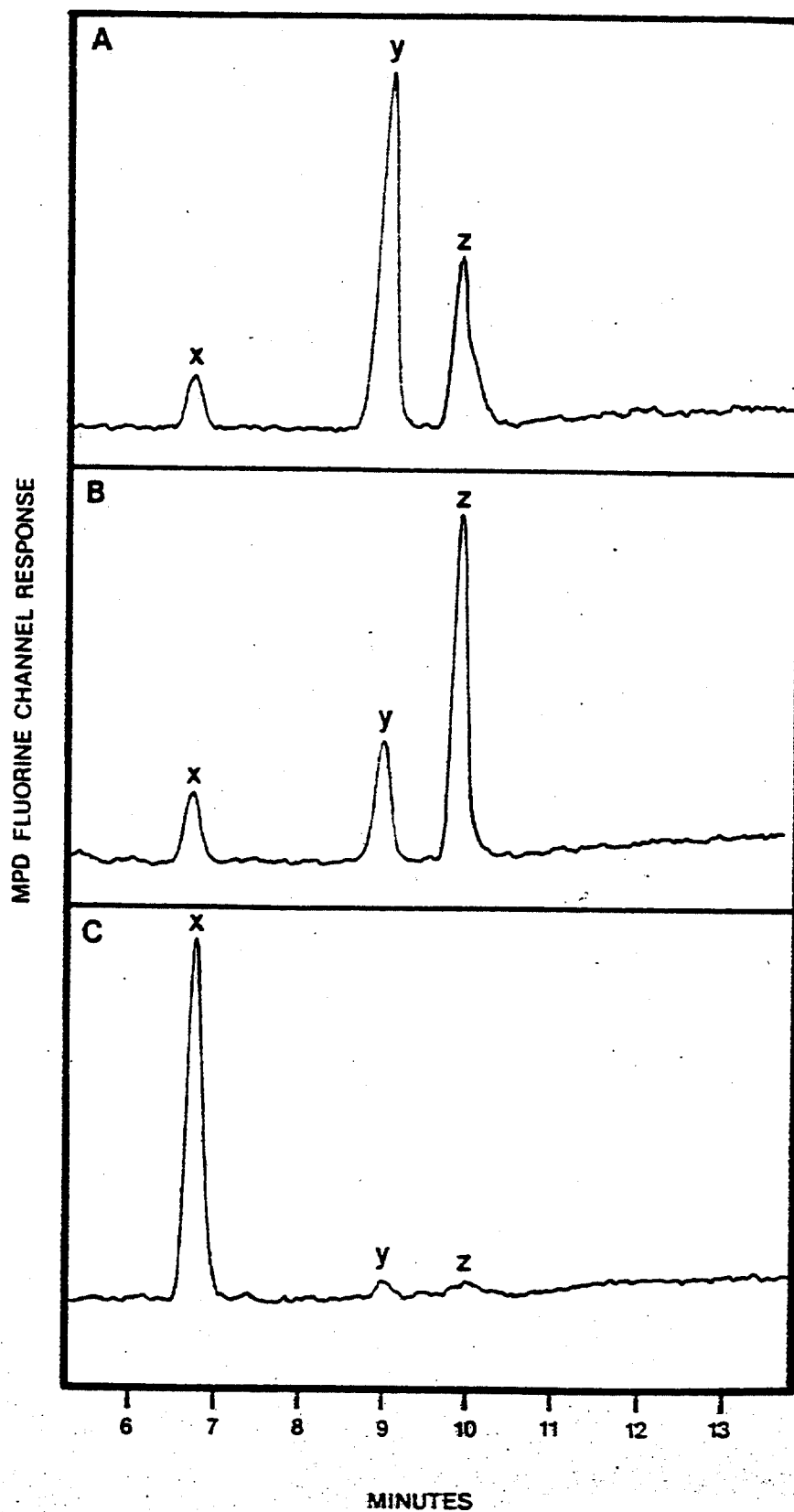


P=?



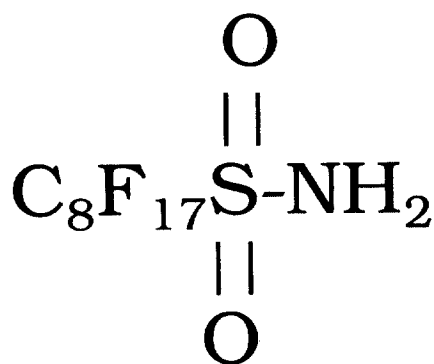
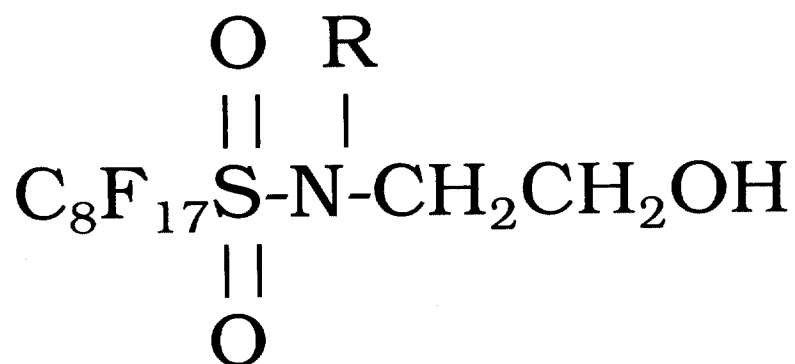
Contain NO CBI

Hagen et al Anal. Biochem. 110 336-343 (1981)



Contain NO GBI

Example of Incomplete Metabolism



PFOSA



PFOS

Contain NO CB!

<u>Species</u>	<u>PFOS</u>	<u>ppb</u> <u>PFOSA</u>	<u>PFHS</u>	<u>PFOA</u>
Liver				
Brandt's cormorant	44-2100	13-94	d	
White pelican	15-1300	<QL	d	
Great blue heron	59-1100	<QL-19	d	
River otter	33-1000	<QL-71	d	<QL
Turtle	90-700	<QL	d	<QL
Polar Bear	173-4500	<QL(10)	nd	<QL(72)
Mink	100-4900	<QL-550	d	<QL(72)
Dolphin	100-400	120-350	d	<QL
Chinook	33-173	<QL(19)	nd	<QL(72)
Lake Whitefish	33-78	<QL(19)	nd	<QL(72)
Brown Trout	<QL-26	<QL(19)	nd	<QL(72)
Muscle				
Carp	43-300	<QL(13)	nd	<QL(36)
Chinook	<QL-190	<QL(13)	nd	<QL(36)
Lake Whitefish	97-170	<QL(13)	nd	<QL(36)

ND=nondetect d=detected QL=Quantitation limit

Propose PFOA same Class as PFOS

- 1. Look alike**
- 2. Surfactants**
- 3. Very persistent**
- 4. Biomagnify via
enterohepatic recirculation**
- 5. Uncouple mitochondria**
- 6. Cause wasting**
- 7. Up-regulate aromatase**
- 8. Reduce serum
cholesterol**
- 9. Not carcinogens**

3/26/01

PerFluoro alkanolic acids

<u>Name</u>	<u>Affil.</u>	<u>Phone No.</u>
Mary Dominiale	CCD	202 260 7768
Karen Lannon	CCD	202 260 2797
ANNETTE WASHINGTON	CCD	(202) 260-5315
Greg Fritz	EETD/ILB	(202) 260-7474
RUSSELL FARRIS	EETD/ICB	(202) 260-1620
John J. Blawie	CEB	202 260 2369
Rose Allison	CCD/NeuChems	202/260-3391
Charlie Auer	CCD	202/260-3749
Flora Chow	CCD	202. 260. 3406
Mary Bestley	CCD	202-260-1769
Jasbir Sarna	EETD/ICB	202-260-1538
Ward Penberthy	CCD CCD	260-1730
Becky Cool	CCD/	202-260-8539
Anna Coutlakis	CCD	202-260-3592
Barbara Leczynski	CCD	202 260 3945
VINCE NABHOLZ	RAD	202. 260. 1271
Rich Purdy	Baldor Furn	715-425-0040

Contain NO CBI