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FYI-00-001378

May 18, 2000

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RECEIVED
OPPT/NOIC**VIA EXPRESS MAIL**

Dr. Charles Auer
Director
Chemical Control Division
Office Of Pollution Prevention And Toxics
United States Environmental Protection Agency
401 M Street, Southwest
Room 403 East Tower (Mail Code 7405)
Washington, D. C. 20460

CONTAINS NO CBI

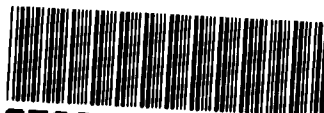
Re: **Information On Perfluorooctane
Sulfonates And Related Compounds**

Dear Charlie:

Pursuant to our recent communications, 3M is enclosing additional information on perfluorooctane sulfonates and related compounds. The enclosed information supplements information submitted to you previously under cover of our April 21, 2000 and May 4, 2000 letters. Again, we are providing this information on a voluntary basis as part of our continuing discussions with EPA regarding fluorochemistry. Please note that some of this information qualifies as confidential business information (CBI); we also have enclosed a sanitized version of CBI documents.

The enclosed information covers perfluorooctane sulfonates and certain related compounds listed in Table 1 of the document entitled: "Sulfonated Perfluorochemicals In The Environment: Sources, Dispersion, Fate And Effects", at 12 (March 1, 2000). Specifically, the information covers the following chemicals:

- ⇒ Perfluorooctane sulfonates, including CAS numbers 1763-23-1 (acid); 29081-56-9 (ammonium salt); 70225-14-8 (DEA salt); 2795-39-3 (potassium-salt); 29457-72-5 (lithium salt).
- ⇒ Perfluorooctanesulfonyl fluoride



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- ⇒ Perfluorooctanesulfonamide
- ⇒ Perfluorooctane sulfonylamido (ethyl) acetate
- ⇒ Perfluorodecanesulfonate
- ⇒ Perfluorohexane sulfonate
- ⇒ N-ethyl perfluorooctanesulfonamide
- ⇒ N-methyl perfluorooctanesulfonamide
- ⇒ N-ethylperfluorooctane sulfonamidoethanol
- ⇒ N-methylperfluorooctane sulfonamidoethanol
- ⇒ N-ethylperfluorooctanesulfonamidoethyl acrylate
- ⇒ N-ethylperfluorooctanesulfonamidoethyl acrylate
- ⇒ N-ethylperfluorooctanesulfonamidoethyl methacrylate
- ⇒ N-methyl perfluorooctanesulfonamidoethyl acrylate

3M has provided you with information on perfluorooctane sulfonates previously under cover of our April 21, 2000 and May 4, 2000 letters. We are enclosing some additional information on perfluorooctane sulfonates located as part of our continuing file search. For each of the foregoing related compounds, the enclosed information includes the following:

- ⇒ Copies of post-1976 studies and certain other information relating to the following environmental science areas: (i) physical and chemical properties; (ii) environmental fate and transport; (iii) environmental monitoring; and (iv) ecotoxicity. For each study, 3M has prepared a summary in the HPV "robust summary" format. 3M already has provided you with a general executive summary addressing each of these areas under cover of our May 4, 2000 letter.
- ⇒ Copies of post-1976 studies and certain other information relating to the following health effects areas: (i) acute toxicity; (ii) genotoxicity; (iii) repeated-dose toxicity; (iv) pharmacokinetics; (v) teratology; and (vi) medical surveillance and epidemiology. 3M has included a detailed index of this information subdivided by each compound.

- ⇒ Lists of all studies in progress and planned studies, along with study protocols or study plans, where available.
- ⇒ A bibliography of pre-1976 studies subdivided by each compound.
- ⇒ A bibliography of acute toxicity studies subdivided by each compound, except that we are providing copies of key acute studies (with reference to the HPV guidance).
- ⇒ A bibliography of published studies in 3M's possession.
- ⇒ An index of studies in 3M's possession believed to be in the FIFRA docket. Please note that this index has been submitted as CBI. 3M already has provided the Agency with a list of all fluorochemical-related submissions made by 3M to the TSCA Section 8(e) docket.

3M is continuing its file review and will supplement the enclosed information as appropriate. As you review this information, we ask that you bear several points in mind:

- ⇒ The enclosed information spans several boxes. We have organized the information in each box with labeled file folders and indices to aid EPA's review. To ensure that you and your staff are able to access the most pertinent information, we also are attaching to this letter the indices covering studies and other information.
- ⇒ Many of the studies refer to the test substance only by a 3M product identification number with a "T", "L" or "FC" prefix. Although analysis of the test substance has been included, where available, it is often not possible to determine from the study report itself the identity of the test substance. Thus, we have used the index to provide this information based on 3M's historical records keyed to the 3M product number to determine the composition of the test substance and have provided specific information on the index, such as percent composition, solvent context, salt form and purity grade. Please note that the term on the index "wide range" refers to a lower purity grade of the compound, and "narrow range" refers to a higher purity grade. Finally, it should be recognized that product formulations have evolved over the years, and thus, some of the test substances do not constitute current products.
- ⇒ We have included some additional studies on perfluorooctane sulfonates located as part of our continuing file review. As we have discussed, we plan to provide you with information on mixtures containing perfluorooctane sulfonates in the near future. Please be advised, however, that we already have provided you with studies and other information on aqueous and/or solvent solutions of

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perfluorooctane sulfonates. As to the foregoing related compounds, the enclosed information likewise includes studies and certain other documents on both the compounds as well as on aqueous and/or solvent solutions of these compounds. We are not providing to you today, however, information on other types of mixtures containing these compounds and would like to discuss such information with you.

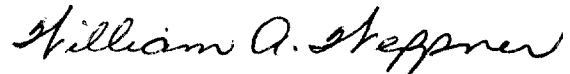
- ⇒ Consistent with the information previously provided on perfluorooctane sulfonates, 3M has not provided you with all analytical chemistry reports on these related compounds. Rather, we have enclosed certain analytical chemistry reports which may prove useful to EPA in interpreting certain studies; understanding the details of analytical chemistry methods; or verifying human and biomonitoring data.
- ⇒ We provided previously under cover of our April 28, 2000 letter to Oscar Hernandez a "Use And Exposure Information Profile" or "UEIP" for perfluorooctane sulfonates. Our present intention is to provide you with completed UEIP forms for these related compounds early next week. 3M needs additional time to clarify industrial hygiene and other release information to ensure that the data is accurate and placed in appropriate context.
- ⇒ The information on perfluorooctane sulfonates sent under cover of our May 4, 2000 letter included documents relating to ongoing mechanistic research by Dr. Ken Wallace of the University of Minnesota. Please note that this research also encompasses these related compounds. In addition, Dr. Marion Anders of the University of Rochester Medical Center is performing comparative metabolism research relating to perfluorooctane sulfonates and these related chemicals; there are not documents yet available relating to this research.

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Charles Auer
May 18, 2000
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3M looks forward to discussing the enclosed information with you and other EPA staff. In the meantime, please do not hesitate to contact me with any questions.

Very truly yours



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Enclosures

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N-EtFOSE Alcohol Bibliography

Synonyms: FM 3422, FM 3923, FM 4635, FM 4120, F 9353, FC-10

Physical/Chemical Properties

Title	Laboratory or Author	Date Completed	Type
Water solubility	3M Env. Lab	11/15/77	Robust summary, relevant pages from "Analytical Methodology on FM 3422"
Letter Report. Boiling Point Information	AScl	11/30/98	Robust summary, letter report
Determination of Vapor Pressure Curve by Dynamic Method for U1463 (Et FOSE)	AScl	11/6/98	Robust summary, final report
Internal Memo - Melting Point of FM-3923 N-Ethyl FOSE Alcohol	3M SMMD Analytical Lab	11/22/99	Robust summary, letter report

Environmental Fate and Transport

Title	Laboratory or Author	Completion Date	Type
Tech Report - Biodegradation Studies of Fluorocarbons, Request for Laboratory work - BOD/COD, Memo - Chronological Review of Biodegradation Studies on FM3422, Tech Report - Biodegradation Studies of Fluorocarbons - II. (Robust summary for 4 documents)	3M Env. Lab	8/12/76, July, 1977, 8/12/77, 1/9/78	Robust summary, 2 technical reports, work request, review document
Tech Report - Bioconcentration of FM3422 in Bluegill Sunfish and in Channel Catfish, Tech Report - Aquatic Fate of a Fluorochemical: FM 3422	3M Env. Lab	5/17/1977, 10/14/77, 3/8/93	Robust summary, 2 technical reports, critique by J.W. Gillett (Cornel)
Tech Notebook copies - Analytical from fish bioconcentration studies	G. Vraspir	1/15/76 - 2/1/78	???
Alkaline hydrolysis	3M Env. Lab	11/15/77	Robust summary, relevant pages from "Analytical Methodology on FM 3422"
Pilot studies on soil adsorption	3M Env. Lab	10,13,78, 5/19/93, 12/30/75, 3/7/77, 4/12/77, 5/9/77	Robust summary, page from technical notebook, critique from S. Boyd (MSU) and 2 pages of data summaries.
Evaluation of the Bioconcentration Potential of FM 3422	3M Env. Lab	8/16/78	Robust summary, critique from G.W. Gillett (Cornell), technical report
Tech Report - Adsorption of FM-3422 on Soil	3M Env. Lab	9/1/78	Robust summary, critique from S. Boyd (MSU), technical report

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Environmental Fate and Transport

Title	Laboratory or Author	Completion Date	Type
Tech Report - Analysis for Fluorochemicals in Bluegill Fish	3M Env. Lab	5/1/79	Robust summary, critique from J.W. Gillett (Cornell), technical report
Tech Report - Bioaccumulation of Fluorochemicals in Tenn. River, Tech Report - Fluorochemicals in Tennessee River Fish.	3M Env. Lab	5/22/79, 12/28/79, 3/8/93	Robust summary, 2 technical reports, critique from J.W. Gillett (Cornell)
Technical Report - Photolysis of FM 3422 on Soil	3M Env. Lab	12/10/79	Robust summary, technical report, critique from S. Boyd, MSU
Tech Report - FM-3422 Photolysis Study using Simulated Sunlight	3M Ag. Products Lab	8/11/81	Robust summary, technical report

Summary Reports

Title	Laboratory or Author	Completion Date	Type
Tech Report - Analytical Methodology on FM 3422	3M Env. Lab	11/15/77	Technical report., Critique by S. Boyd (MSU) Exerpts from this report appended to solubility and alkaline hydrolysis robust summaries.
Tech Report - Analytical Methodology and Support	3M Env. Lab	1/17/79	Technical report. Exerpts from this report appended to solubility, alkaline hydrolysis, volatility, distribution coefficient, soil adsorption, biodegradation, and fish chronic toxicity robust summaries.

Ecotoxicity Elements

Title	Laboratory or Author	Completion Date	Type
The Effects of Continuous Aqueous Exposure to 78.01 on Hatchability of Eggs and Growth and Survival of Fry of Fathead Minnow (<i>Pimephales promelas</i>), Summary of Histopathological Examinations of Fathead Minnow (<i>Pimephales promelas</i>) Exposed to 78.01 for 30 Days..	EG&G Bionomics	June, 1978, Sept. 1978	Robust summary, 2 technical reports, excerpt from Tech Report - Analytical Methodology and Support (1/17/79)
Tech Report - Multi-Phase Algal Assay Test Method.	3M Env. Lab	12/30/81	Robust summary, technical report.

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N-MeFOSE Alcohol

Synonyms: FM 3925, L4528, L-4309, PPA-791, PPA-790 (Me & Et FOSE mix) cc 796-10, FM 3974, cc 796-3

Physical/Chemical Properties

Title	Laboratory or Author	Date Completed	Type
Tech Report - Solubility of FM 3925	3M Env. Lab	1/8/79, 1/17/79	Robust summary, tech report, excerpt from Tech report - Analytical Methodology and Support, 1/17/79

Environmental Fate and Transport

Title	Laboratory or Author	Completion Date	Type
Tech Report - Biodegradation Studies on FM 3925, Tech Report - Chemical Oxygen Demand of FM 3925	3M Env Lab	1/8/79, 1/8/79	Robust summary, 2 technical reports
Tech Report - Distribution coefficient of FM 3925 in n-Octanol/Water	3M Env. Lab	1/10/79	Robust summary, technical report
Tech Report - Adsorption of FM-3925 on Soil	3M Env. Lab	3/22/79, 5/19/93	Robust summary, critique from S. Boyd (MSU), technical report
Tech Report - Bioaccumulation of Fluorochemicals in Tenn. River Fish, Tech. Report - Fluorochemicals in Tennessee River Fish, Ar No. 7238 - Determination of Fluorinated Alcohols in Fish Extracts	3M Env. Lab	5/22/79, 12/28/79, 10/23/79	Robust summary, critique from J.W. Gillett (Cornell), 3 technical reports

Summary Reports

Title	Laboratory or Author	Completion Date	Type
None			

Ecotoxicity Elements

Title	Laboratory or Author	Completion Date	Type
Tech Report - Aquatic Toxicity Studies: FM 3925	3M Env. Lab	1/8/79	Robust summaries for fish and daphnia, copies of data sheets, technical report

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N-Ethylperfluorooctanesulfonamide = Ethyl Amide

Synonyms: EtFOSA, EtPOSA, U1464, FX-12, F6309

Physical/Chemical Properties

Title	Laboratory or Author	Date Completed	Type
Determination of Vapor Pressure curve by dynamic Method for U1464 (ET POSA)	ASCI Corporation	11/6/98	Robust summary, final report
Letter Report. Boiling Point Information	ASCI Corporation	11/30/98	Robust summary, letter report

Environmental Fate and Transport

Title	Laboratory or Author	Date Completed	Type
Technical Report - Bioaccumulation of Fluorochemicals in Tenn. River Fish, Technical. Report - Fluorochemicals in Tennessee River Fish	3M Env. Lab	5/22/79, 12/28/79	Robust summary, 2 technical reports, 1 critique from J.W. Gillett of Cornell (3/8/93)
Environmental Laboratory Final Report for BOD/COD	3M Env. Lab	6/12/84	Robust summary, copy of lab report

Ecotoxicity Elements

Title	Laboratory or Author	Date Completed	Type
Fathead minnow static acute toxicity test - FX-12	3M Env. Lab	4/6/84	Robust summary, data sheets
Daphnia magna static acute toxicity test - FX-12	3M Env. Lab	4/8/84	Robust summary, data sheets
Acute Toxicity of U1464 to <i>Ceriodaphnia dubia</i>	ASCI Corporation	5/4/98	Robust summary, final report
Acute Toxicity of U1464 to Larval Fathead Minnow (<i>Pimephales promelas</i>)	ASCI Corporation	5/4/98	Robust summary, final report
Inhibition of U1464 for Activated Sludge Respiration Inhibition	ASCI Corporation	5/15/98	Robust summary, final report
Acute Toxicity of U1464 to <i>Daphnia magna</i>	ASCI Corporation	5/20/98	Robust summary, final report

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POSF

Synonyms: FX-8

Physical/Chemical Properties

Title	Laboratory or Author	Date Completed	Type
Water solubility estimate (screen)	3M Env. Lab	5/11/84, 3/1/93	Robust summary, critique by E. Tucker, lab worksheets

Environmental Fate and Transport

Title	Laboratory or Author	Completion Date	Type
Environmental Aspects of POSF	3M Env. Lab	9/1/83	Technical report
Reappraisal of POSF Environmental Fate	3M Env. Lab	12/15/83	Technical report

Summary Reports

Title	Laboratory or Author	Completion Date	Type
None			

Ecotoxicity Elements

Title	Laboratory or Author	Completion Date	Type
96-hour Toxicity to Fathead Minnow	3M Env. Lab	4/6/84	Robust summary, data sheets
7-Minute Exposure Activated Sludge Toxicity Test	3M Env. Lab	5/10/84	Robust summary, data sheets

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Methyl FOSEA

Physical/Chemical Properties

Title	Laboratory or Author	Date Completed	Type
Study of Stability of MeFOSEA in Aqueous Buffers Using Gas Chromatography with Atomic Emission Detection	3M Env. Lab	6/14/99	Robust Summary and Technical Report

Environmental Fate and Transport

Title	Laboratory or Author	Date Completed	Type
Determination of the Partition Coefficient (N-Octanol/Water) of T-5969.4	3M Env. Lab	11/9/94	Robust Summary and Technical Report

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Ethyl FOSEA

Synonyms: FX-13, B1228, D-1

Physical/Chemical Properties

Title	Laboratory or Author	Date Completed	Type
Determination of Physico-chemical Properties of Sample D-1	Mitsubishi Chemical Safety Institute Ltd., Yokohama, Japan	2/14/96	Robust summary, final report

Environmental Fate and Transport

Title	Laboratory or Author	Completion Date	Type
Ready biodegradability of FX-13 (BOD/COD)	3M Env. Lab	4/26/84	Robust summary, copies of data sheets
Ready Biodegradability Test of D-1	Mitsubishi Chemical Safety Institute Ltd., Yokohama, Japan	10/31/95	Robust summary, final report
Bioaccumulation Study of Sample D-1 with Carp (<i>Cyprinus carpio</i>)	Mitsubishi Chemical Safety Institute Ltd., Yokohama, Japan	11/30/95	Robust summary, final report

Ecotoxicity Elements

Title	Laboratory or Author	Completion Date	Type
Acute toxicity of FX-13 to fathead minnow	3M Env. Lab	4/1/84	Robust summary, copies of data sheets.

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Perfluorodecanesulfonate, Ammonium Salt (PFDS)

Synonyms: FC-120, FC-121, LR J2904

Physical/Chemical Properties

Title	Laboratory or Author	Date Completed	Type
None Available			

Environmental Fate and Transport

Title	Laboratory or Author	Date Completed	Type
BOD/COD Testing Results FC-120	Pace Incorporated, Minneapolis, MN	12/4/91	Robust summary, lab report
BOD/COD Testing Results FC-121-X	Pace Laboratories, Inc, Minneapolis, MN	11/3/87	Robust summary, lab report

Summary Reports

Title	Laboratory or Author	Date Completed	Type
None available			

Ecotoxicity Elements

Title	Laboratory or Author	Completion Date	Type
Toxicity of FC-121-X to Microtox	3M Env. Lab	1987	Robust summary, test summary sheet
Toxicity of FC-121-X to activated sludge	3M Env. Lab	10/30/87	Robust summary, test summary sheet
Acute Toxicity of E2566-1 to <u>Daphnia magna</u> (FC-121-X)	ABC Laboratories, Columbia, MO	1/9/88	Robust summary, final report
Acute Toxicity of E2566-1 to Fathead Minnow (<u>Pimephales promelas</u>)	ABC Laboratories, Columbia, MO	1/15/88	Robust summary, excerpts from final report
Static Acute Toxicity of FC-120 to the Fathead Minnow, <u>Pimephales promelas</u>	EnviroSystems Division, Resource Analysts, Inc. Hampton, NH	March, 1992	Robust summary, final report

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Static Acute Toxicity of FC-120 to the Daphnid, <i>Daphnia magna</i>	EnviroSystems Division, Resource Analysts, Inc. Hampton, NH	Feb., 1992	Robust summary, final report
OECD Activated Sludge Respiration Inhibition Test #209 - Toxicity of FC-120	3M Env. Lab	3/9/92	Robust summary, data sheets
Microbics' Microtox Test - FC-120	3M Env. Lab	4/20/92	Robust summary, data sheets

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Perfluorooctane sulfonylamido(ethyl)acetate = PFOSAA

Synonyms: FC-109, FC-109-X, FC-128, FC-129, E2113, E2566-2, R1904

Physical/Chemical Properties

Title	Laboratory or Author	Date Completed	Type
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Environmental Fate and Transport

Title	Laboratory or Author	Date Completed	Type
Tech. Report - Fate of Fluorochemicals in the Environmental (sic) (Warburg respirometer method for biodegradation of FC-128)	3M Env. Lab	8/12/76	Robust summary, technical report
Ready Biodegradability of FC-128 - BOD/COD	3M Env. Lab	7/8/77	Robust summary, copies of data sheets
Tech report - Analysis for Fluorochemicals in Bluegill Fish	3M Env. Lab	5/1/79	Robust summary, technical report
Ready biodegradability of FC-127 - BOD/COD	3M Env. Lab	8/19/81	Robust summary, copies of data sheets
Ready biodegradability of FC-109-X - BOD/COD	Pace Laboratories, Minneapolis, MN	12/31/87	Robust summary, copy of computer results from archives

Summary Reports

Title	Laboratory or Author	Date Completed	Type
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Ecotoxicity Elements

Title	Laboratory or Author	Completion Date	Type
Acute toxicity of FC-128 to fathead minnow	3M Env. Lab	5/18/74	Robust summary, copies of data sheets
Acute toxicity of FC-128 to fathead minnow	3M Env. Lab	6/29/74	Robust summary, copies of data sheets
Acute toxicity of FC-128 to fathead minnow	3M Env. Lab	8/26/77	Robust summary, copies of data sheets
Acute toxicity of FC-127 to fathead minnow	3M Env. Lab	7/24/81	Robust summary, copies of data sheets
Toxicity of FC-127 to activated sludge respiration	3M Env. Lab	8/14/81	Robust summary, copies of data sheets

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Ready Biodegradability: "Modified OECD Screening Test" for Fluorad FC-129	RCC, Itingen, Switzerland	9/19/84	Robust summary, memo about study reliability, final report
Microbics Microtox Toxicity Test - FC-109-X	3M Env. Lab	10/15/87	Robust summary, copies of data sheets
Activated Sludge Respiration Inhibition - FC-109-X	3M Env. Lab	10/30/87	Robust summary, copies of data sheets
Acute Toxicity of E2566-2 to <i>Daphnia magna</i>	ABC Laboratory, Columbia, MO	1/9/88	Robust summary, final report
Acute Toxicity of E2566-2 to Fathead Minnow (<i>Pimephales promelas</i>)	ABC Laboratory, Columbia, MO	1/12/88	Robust summary, final report
Biodegradation (methylene blue active substance)	Pace Laboratories, Inc., Minneapolis, MN	2/15/89	Robust summary, computer report, copies of data sheets
Acute Toxicity of R1904 to <i>Daphnia magna</i>	ASCI Corporation, Duluth, MN	6/17/97	Robust summary, final report
Growth Inhibition of R1904 for Green Alga (<i>Selenastrum capricornutum</i>)	ASCI Corporation, Duluth, MN	6/18/97	Robust summary, final report
Acute Toxicity of R1904 to Fathead Minnow (<i>Pimephales promelas</i>)	ASCI Corporation, Duluth, MN	6/27/97	Robust summary, final report
Microbics Microtox Toxicity Test - FC-129	ASCI Corporation, Duluth, MN	7/9/97	Robust summary, copies of data sheets
Inhibition of R1904 for Activated Sludge Respiration	ASCI Corporation, Duluth, MN	7/10/97	Robust summary, final report
R1904 BOD Report for 3M Company	ASCI Corporation, Duluth, MN	Jul-97	Robust summary, final report

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**Expected Completion Dates for
Degradation and Transport Studies in Progress**

Photolysis

Chemistry	buffer/H ₂ O ₂	humic material	soils	Fe ₂ O ₃	TiO ₂
POSF	October, 2000	October, 2000	October, 2000	October, 2000	October, 2000
FOSA	August, 2000	August, 2000	August, 2000	August, 2000	August, 2000
N-EtFOSA	August, 2000	August, 2000	Not applicable	Not applicable	Not applicable
N-MeFOSA	December, 2000	December, 2000	Not applicable	Not applicable	Not applicable
N-EtFOSE					
Alcohol	July, 2000	July, 2000	July, 2000	July, 2000	July, 2000
N-MeFOSE					
Alcohol	February, 2001	February, 2001	Not applicable	Not applicable	Not applicable
N-EtFOSEA	September, 2000	September, 2000	Not applicable	Not applicable	Not applicable

Hydrolysis

Chemistry	buffers	soils
POSF	December, 2000	Not applicable
FOSA	August, 2000	Not applicable
N-EtFOSA	August, 2000	Not applicable
N-MeFOSA	September, 2000	Not applicable
N-EtFOSE		
Alcohol	July, 2000	July, 2000
N-MeFOSE		
Alcohol	September, 2000	Not applicable
N-EtFOSEA	September, 2000	Not applicable

Adsorption/Desorption

Chemistry	
POSF	November, 2000
FOSA	January, 2001
N-EtFOSA	January, 2001
N-MeFOSA	March, 2001
N-EtFOSE	
Alcohol	September, 2000
N-MeFOSE	
Alcohol	March, 2001
N-EtFOSEA	March, 2001

Atmospheric Photolysis

Chemistry	
POSF	August, 2000
FOSA	Not applicable
N-EtFOSA	Not applicable
N-MeFOSA	Not applicable
N-EtFOSE	
Alcohol	September, 2000
N-MeFOSE	
Alcohol	Not applicable
N-EtFOSEA	Not applicable

All studies underway at the 3M Env. lab

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**Laboratory Environmental Studies in Planned
and in Progress**

Chemistry	Study	Conducted By	Expected Completion Date
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Physical/Chemical Properties

N-EtFOSE Alcohol	Solubility in Water - In progress	Wildlife International, Easton, MD	Sept., 2000
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Degradation and Transport

	See next page		
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Ecotoxicology

	None planned		
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**Attachments to Letter to C. Auer dated May 18, 2000
Studies and Other Information on Certain
Perfluorooctane Sulfonate-Related Compounds**

1. POSF	Perfluorooctanesulfonyl fluoride
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Acute Toxicity

- 1) Primary Skin Irritation Test with T-3874 in Albino Rabbits, Pathology and Toxicology, Riker Laboratories, Project No. 0386EB0135, 3M Reference No. T-3874, April 14, 1986
- 2) T-3607 Acute Inhalation Toxicity Test, Bushy Run Research Center, Project No. 47-527, 3M Reference No. T-3607, December 19, 1984
- 3) Acute Oral Toxicity Study – Method, Summary, Pathology and Raw Data Appendix, Hazleton Laboratories America, Inc., Project No. 40703983, October 5, 1984

Genotoxicity

- 1) In Vitro Microbiological Assays of 3M Company Compounds T-2540 CoC and T-2541 CoC, SRI International, Project No. LSC 4442-16, 3M Reference No. T-2541.1 (FC-3452), August, 1979

Ongoing Research/Study Protocols

- 1) Protocol, Pharmacokinetic Study of POSF in Rats, 3M Strategic Toxicology Laboratory, 3M Reference No. T-7098.1

Pre-1976 Studies (bibliography only)

- 1) Skin Irritation and Eye Irritation Study Report, WARF Institute, Inc., Project No. 5091241, 3M Reference No. T-1329, September 9, 1975
- 2) Acute Vapor Inhalation Toxicity Study in Rats, Industrial Bio-Test Laboratories, Project No. 663-07513, 3M Reference No. T-1329, October 23, 1975

**Attachments to Letter to C. Auer dated May 18, 2000
Studies and Other Information on Certain
Perfluorooctane Sulfonate-Related Compounds**

2. FOSA	Perfluorooctanesulfonamide
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Acute Toxicity

- 1) Acute Oral Toxicity Screen with T-3421 in Albino Rats, Safety Evaluation Laboratory, Riker laboratories, Inc., Project No. 0883AR0287, 3M Reference No. T-3421 (KTZ-15), January 17, 1984
- 2) Acute Ocular Irritation Test with T-3421 in Albino Rabbits, Safety Evaluation Laboratory, Riker laboratories, Inc., Project No. 0883EB286, 3M Reference No. T-3421 (KTZ-15), August 24, 1983
- 3) Primary Skin Irritation Test with T-3421 in Albino Rabbits, Safety Evaluation Laboratory, Riker laboratories, Inc., Project No. 0883AR0288, 3M Reference No. T-3421 (KTZ-15), August 9, 1983

Studies in Progress

- 1) Protocol, Feces Method Development Metabolism Study for Perfluorooctanesulfonate Derivatives [N-EtFOSE, PFOS, and FOSA], 3M Strategic Toxicology Laboratory, Study Nos., T-636.17; T-6295.21; T-7132.3; ST-41, In-Life Start Date November 22, 1999, In-Life End Date November 24, 1999
- 2) Protocol, Pharmacokinetic Study of Perfluorooctane Sulfonamide [FOSA] in Rats, 3M Strategic Toxicology Laboratory, Study Nos., T132.2; ST-39, In-Life Start Date October 4, 1999, In-Life End Date November 2, 1999
- 3) Protocol, Cell Proliferation Study with N-Ethyl Perfluorooctanesulfonamido Ethanol (N-EtFOSE; 3M T-6316.11), Perfluorooctane Sulfonic Acid Potassium Salt (PFOS; 3M T-6295.16), and N-Ethyl Perfluorooctanesulfonamide (PFOSA 3M T-7091.1) in Rats, Pathology Associates International, Study No. 1132-100

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3. PFOSAA	Perfluorooctane sulfonylamido (ethyl)acetate
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Acute Toxicity

- 1) Acute Oral Toxicity – Rats, Biosearch, Inc., Project No. 77-1108A, 3M Reference No. T-1983 (FC-128, potassium salt 100%, solid), January 5, 1978
- 2) Acute Oral Toxicity – Rats, Biosearch, Inc., Project No. 77-1127A, 3M Reference No. T-2001 (FC-128), January 6, 1978
- 3) Primary Eye Irritation Study – Rabbits, Biosearch, Inc., Project No. 77-1127A, 3M Reference No. T-2001 (FC-128), January 6, 1978
- 4) Primary Skin Irritation Study – Rabbits, Biosearch, Inc., Project No. 77-1127A, 3M Reference No. T-2001 (FC-128), January 6, 1978
- 5) An Acute Inhalation Toxicity Study of T-2307 CoC in the Rat, Bio/dynamics, Inc., Project No. 78-7186, 3M Reference No. T-2307 (FC-128), February 8, 1979

Additional Acute Toxicity Studies Not Submitted (Bibliography only)

- 1) Acute Oral Toxicity – Rats, Biosearch, Inc., Project No. 78-1191A, 3M Reference No. T-2081 (FC-129, approximately 40-50% in solution), March 2, 1978
- 2) Primary Eye Irritation Study – Rabbits, Biosearch, Inc., Project No. 78-1191A, 3M Reference No. T-2081 (FC-129), March 2, 1978
- 3) Primary Skin Irritation Study – Rabbits, Biosearch, Inc., Project No. 78-1191A, 3M Reference No. T-2081 (FC-129), March 2, 1978
- 4) Acute Oral Toxicity Screen with T-3290CoC in Albino Rats, Safety Evaluation Laboratory, Riker Laboratories, Inc., Project No. 088AR0362, 3M Reference No. T-3290 (40 % K⁺PFOSAA in 3 % EtOH, 17 % IPA and 40 % H₂O, L-6778, F-6873, Lot 501), November 5, 1982
- 5) Primary Skin Irritation Test with T-3290CoC in Albino Rabbits, Safety Evaluation Laboratory, Riker Laboratories, Inc., Project No. 088EB0423, 3M Reference No. T-3290 (40 % K⁺PFOSAA in 3 % EtOH, 17 % IPA and 40 % H₂O, L-6778, F-6873, Lot 501), October 15, 1982
- 6) Acute Ocular Irritation Test with T-3290CoC in Albino Rabbits, Safety Evaluation Laboratory, Riker Laboratories, Inc., Project No. 088EB0424, 3M Reference No. T-

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3290 (40 % K⁺PFOSAA in 3 % EtOH, 17 % IPA and 40 % H₂O, L-6778, F-6873, Lot 501), October 26, 1982

Genotoxicity

- 1) Bacterial Reverse Mutation Test of v-1, Hita Research laboratories, Chemical Biotesting Center, Chemicals Inspection and Testing Institute, Study Code: K01-1815, Report No. T-4663, 3M Reference No. T-6668.1, FC-129 (approximately 40-50% in solution of water and organic solvent), October, 1996
- 2) In Vitro Microbiological Mutagenicity Assays of 3M Company's Compound T-3290CoC, SRI International, Project No. 3145, 3M Reference No. T-3290 (40 % K⁺PFOSAA in 3 % EtOH, 17 % IPA and 40 % H₂O, L-6778, F-6873, Lot 501), November, 1982

Pharmacokinetic Studies

- 1) 28 Dermal Percutaneous Absorption Study with FC-128 in Albino Rabbits, Safety Evaluation laboratory, Riker Laboratories, Inc., Project No. 0979AB0629, 3M Reference No. T-3991, March 15, 1981
- 2) 28 Day Dermal Percutaneous Absorption Study with FC-129 in Albino Rabbits, Safety Evaluation laboratory, Riker Laboratories, Inc., Project No. 0979AB0627, 3M Reference No. T-3989, March 14, 1981
- 3) Final Report – Analytical Study: Single-Dose Dermal Absorption / Toxicity Study of T-6051 and T-6054 in Rabbits, 3M Environmental Laboratory, Study No. ADMT-013195.1, in vivo Study Reference No. HWI 6329-133 (Hazleton Wisconsin, Inc.), 3M Reference Nos. T-6051 (FC-129 treated fabric) and T-6054 (FC-129 solution), November 22, 1995
- 4) Final Report, Analytical Report and Single-Dose Intravenous Pharmacokinetic Study of T-6054 in Rabbits, 3M Environmental Technology & Services, In-Vivo Study Reference No. HWI#6329-138, Study No. AMDT-122094.2, 3M Reference No. FC-129, November 22, 1995

Studies in Progress

- 1) Corporate Toxicology Study Outline, FC-129 Preliminary ADME Screen in Rats, 3M Strategic Toxicology Laboratory, July, 1998

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Pre-1976 Studies (bibliography only)

- 1) Skin and Eye Irritation Assay Report, WARF Institute, Project No. 2031046, 3M Reference No. FC-128, April 24, 1962 (plus December 29, 1966 letter containing individual eye scores)

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4. PFDS	Perfluorodecanesulfonate
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Acute Toxicity

- 1) Final Report, Acute Dermal Toxicity Study in Rabbits, Hazelton Laboratories America, Inc., 3M Reference No. T-4102, Sample No. T837389-410 754, January 21, 1988
- 2) Final Report, Acute Oral Toxicity Study in Rats, Hazelton Laboratories America, Inc., 3M Reference No. T-4102, Sample No. T837389-410 754, January 25, 1988
- 3) Final Report, Primary Eye Irritation/Corrosion Study in Rabbits, Hazelton Laboratories America, Inc., 3M Reference No. T-4102, Sample No. T837389-410 754, January 20, 1988
- 4) Final Report, Primary Dermal Irritation/Corrosion Study in Rabbits, Hazelton Laboratories America, Inc., 3M Reference No. T-4102, Sample No. T837389-410 754, January 21, 1988

Genotoxicity

- 1) Mutagenicity Test with T-6357 in the *Salmonella – Escherichia coli* / Mammalian-Microsome Reverse Mutation Assay, Corning Hazleton, Inc. (CHV), Project No. 17387-0-409, 3M Reference No. T-6357, FC-120, April 1, 1996
- 2) Mutagenicity Test on T-6357 in an In Vivo Mouse Micronucleus Assay, Corning Hazleton, Inc. (CHV), Project No. 17387-0-409, 3M Reference No. T-6357, FC-120, April 23, 1996

Pharmacokinetic Studies

- 1) Final Report, Analytical Report and Single-Dose Dermal Absorption / Toxicity Study of T-6052 in Rabbits, Hazleton Wisconsin, Inc., Project No. HWI 6329-135, 3M Reference No. FC-120, T-6052 (0.02 % in water), November 20, 1995
- 2) Single-Dose Dermal Intravenous Pharmacokinetic Study of T-6052 in Rabbits, Hazleton Wisconsin, Inc., Project No. HWI 6329-134, 3M Reference No. T-6052 (0.02 % in water), November 20, 1995

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Pre-1976 Studies (bibliography only)

- 1) Acute Oral Toxicity Study with T-1019 in Male Albino Rats, Industrial Bio-Test Laboratories, Inc., Project No. 601-05394, 3M Reference No. T-1019, August 6, 1974
- 2) Skin Irritation, Eye Irritation, Acute Oral LD50, WARF Institute, Inc., Project No. 4053863, 3M Reference No. T-992, May 24, 1974
- 3) Acute Oral Cholinesterase Study with T-1019 in Male Albino Rats, Industrial Bio-Test Laboratories, Inc., Project No. 601-05394, 3M Reference No. T-1019, August 6, 1974

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5. PFHS	Perfluorohexane sulfonate
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See confidential submission under letter of May 15, 2000 from Dr. John L. Butenhoff for one item including PFHS data

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6. N-EtFOSA	N-ethyl perfluorooctanesulfonamide
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Acute Toxicity

- 1) Final Report, Acute Ocular Irritation Test with T-3608 in Albino Rats, Riker Laboratories, Inc., 3M Reference FX-12, Study No. 0984EB0367, September 5, 1984
- 2) Final Report, Primary Skin Irritation Test with T-3608 in Albino Rats, Riker Laboratories, Inc., 3M Reference FX-12, Study No. 0984EB0368, August 13, 1984
- 3) Final Report, Acute Oral Toxicity Screen with T-3066CoC in Albino Rats, Riker Laboratories, Inc., 3M Ref. No. FX-12, Study No. 0981AR0146, July 13, 1981

Acute Toxicity Studies Not Submitted (Bibliography Only)

- 1) Final Report, Acute Oral Toxicity Study of T-6684 in Rats (OECD Guidelines), Corning Hazelton Inc., 3M Ref. No. L-14394 (slurry), Study No. CHW 61101149, January 31, 1997
- 2) Final Report, Primary Dermal Irritation/Corrosion Study of T-6684 in Rats (OECD Guidelines), Corning Hazelton Inc., 3M Ref. No. L-14394 (slurry), Study No. CHW 61101150, January 31, 1997
- 3) Final Report, Primary Eye Irritation/Corrosion Study of T-6684 in Rats (OECD Guidelines), Corning Hazelton Inc., 3M Ref. No. L-14394 (slurry), Study No. CHW 61101151, January 31, 1997

Genotoxicity

- 1) Final Report, Protocol and two amendments, Mutagenicity Test on T-6294 in an In Vivo Mouse Micronucleus Assay, Corning Hazelton, Inc., Study No. 1785-0-455, May 10, 1996

Previously submitted with May 4, 2000 letter, Advanced Bioanalytical Services, Inc., Analytical Report, Additional Characterization of Metabolites of T-6292, T-6293 and T-6294 from Rat and Human Hepatocytes by TurboIonSpray LC/MS and LC/MS/MS. Semi-Quantitative Analysis of T-6295 in Rat and Human Hepatocytes Incubated with T-6292, T-6293 and T-6294 by LC/MS/MS, January 28, 1998, Report 98AGKP01.3M

**Attachments to Letter to C. Auer dated May 18, 2000
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Mechanistic

- 1) T. J. Cross and R. G. Schnellmann, Mechanism of Toxicity of a Unique Pesticide N-Ethylperfluorooctane Sulfonamide (NEPFOS), and its metabolite perfluorooctane Sulfonamide (PFOS) to Isolated Rabbit Renal Cortical Mitochondria (RCM), Abstract from 1989 Society of Toxicology Meeting

Previously submitted with May 4, 2000 letter - Qualitative Investigation of the In Vitro Metabolism of T-6292 (n-ethyl FOSE), T-6293 (n-ethyl FOSE phosphate diammonium salt(ester)), T-6294 (n-ethyl perfluorooctane sulfonamide) and T-6295 (perfluorooctane sulfonate) by Rat and Human Hepatocytes Using Ion Spray LC/MS and LC/MS/MS, Advanced Bioanalytical Services, Inc., [Preliminary] Analytical Report, Report 96ADEM01.3M, November 12, 1996

Previously submitted with May 4, 2000 letter - Advanced Bioanalytical Services, Inc., Analytical Report, Additional Characterization of Metabolites of T-6292, T-6293 and T-6294 from Rat and Human Hepatocytes by TurboIonSpray LC/MS and LC/MS/MS. Semi-Quantitative Analysis of T-6295 in Rat and Human Hepatocytes Incubated with T-6292, T-6293 and T-6294 by LC/MS/MS, January 28, 1998, Report 98AGKP01.3M

Analytical

- 1) Analytical and Research Properties – 3M Industrial Hygiene Laboratory, January 1993

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6. N-EtFOSA	N-ethyl perfluorooctanesulfonamide
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Bibliography Showing Studies in 3M's Possession Believed To Be In FIFRA Docket.

REDACTED

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Perfluorooctane Sulfonate-Related Compounds**

7. N-MeFOSA	N-methyl perfluorooctanesulfonamide
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Acute Toxicity

- 1) Acute Oral Toxicity – Method, Summary, Pathology QAU Report, Hazleton Laboratories America, Inc., Project No. 50503499, 3M Reference No. T-3752 (F-7075-4, water-washed, acid washed), July 12, 1985, with Protocol
- 2) Primary Dermal Irritation – Method, Summary, Pathology QAU Report, Hazleton Laboratories America, Inc., Project No. 50503500, 3M Reference No. T-3752 (F-7075-4, water-washed, acid washed), June 24, 1985, with Protocol
- 3) Primary Eye Irritation – Method, Summary, Pathology QAU Report, Hazleton Laboratories America, Inc., Project No. 50503501, 3M Reference No. T-3752 (F-7075-4, water-washed, acid washed), June 24, 1985, with Protocol
- 4) Acute Oral Toxicity – Method, Summary, Pathology; Primary Dermal Irritation – Method, Summary; Primary Eye Irritation – Method, Summary; QAU Report; Raw Data Appendix, Hazleton Laboratories America, Inc., Project No. 50202473, 3M Reference No. T-3727 (F-10034, Lot 7, distilled wide-range), May 7, 1985, with Protocol
- 5) Acute Oral Toxicity Screen with T-3065CoC in Albino Rats, Riker Laboratories, Inc., Experiment No. 0981AR0145, May 15, 1981

Genotoxicity

- 1) In Vitro Microbiological Mutagenicity Assays of T-3752, SRI International, Project No. LSC-3145, 3M Reference No. T-3752 (F-7075-4, water-washed, acid washed), June, 1985
- 2) In Vitro Microbiological Mutagenicity Assays of T-3727, SRI International, Project No. LSC-3145, 3M Reference No. T-3727 (F-10034, Lot 7, distilled wide-range), March, 1985

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8. N-EtFOSE alcohol	N-ethyl perfluorooctane sulfonamidoethanol
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Acute Toxicity

- 1) Corrected Final Report, Acute Inhalation Toxicity Study in Rats, 3M Reference No. T-2991IT, Hazelton Laboratories America, Inc., Study No. 154-157, February 2, 1981

Genotoxicity

- 1) Final Report, Mutagenicity Test on T-5710 in an *In Vivo* Rat Micronucleus Assay, Hazelton Washington, Inc., Study No. 15516-0-454, April 23, 1993
- 2) Final Report, Genotoxicity Test on T-5710.1 in the In Vivo/In Vitro Unscheduled DNA Synthesis and Cell Proliferation in Rat Liver Cells, Hazelton Washington, Inc., Study No. 15516-0-494, September 14, 1993
- 3) Final Report, Mutagenicity Test on T-6292 in an *In Vivo* Mouse Micronucleus Assay, Hazelton Washington, Inc., Study No. 17384-0-455, May 2, 1996, with Protocol and Protocol amendments
- 4) Evaluation of the Mutagenic Activity of T-6906 in an In Vitro Mammalian Cell Gene Mutation Test with L5178Y Mouse Lymphoma Cells, NOTOX Study No. 223458, 3M Reference No. FM-3923
 - a) Final Report, December 22, 1998 (see letter below)
 - b) Letter from Steve R. Haworth, Ph.D., Covance Laboratories, reviewing the NOTOX study and concluding it was technically inadequate and should be repeated
Note: 3M is repeating the study

Repeated-Dose Toxicity

- 1) Final Report, Ninety Day Subacute Rat Toxicity Study on FM-3422, International Research and Development Corporation, Study No. 137-086, November 10, 1978

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- 2) Final Report, Ninety Day Subacute Rhesus Monkey Toxicity Study, on FM-3422, International Research and Development Corporation, Study No. 137-088, January 16, 1979
- 3) Two-Year Dietary Study
 - a) Report, Volumes 1-5, Two Year Oral (Diet) Toxicity / Carcinogenicity Study of Fluorochemical FM-3924 in Rats, Riker Laboratories, Inc., Study No. 0281CR0012, August 29, 1987, Conducted during April 1981 - May 1983
 - b) Report Amendment No. 1, Two Year Oral (Diet) Toxicity / Carcinogenicity Study of Fluorochemical FM-3924 in Rats, Riker Laboratories, Inc., Study No. 0281CR0012, October 25, 1988
 - c) Xenos Letter dated May 24, 1991 with attachment: 3M Response to FDA Letter of December 10, 1990 [re 2 year cancer study], Food Additive Petition Nos. 0B4197 and 0B4206
 - d) Pathology Review of Reported Tumorigenesis in a Two Year Study of FM-3924 in Rats, Pathology Associates International, November 25, 1998
 - e) Analytical on retained sample
 - f) Review by Dr. William H. Butler of Two Year (Diet) Toxicity / Carcinogenicity Study of Fluorochemical FM 3924 in Rats
- 4) Ongoing 2-Year Study
 - a) Summary Report of Week 53, 104-Week Dietary Carcinogenicity Study with Narrow Range (98.1%) N-Ethyl Perfluorooctanesulfonamido Ethanol in Rats, 3M Reference No. T-6316.1, Covance Laboratories, 6329-212 and -228 (draft final report expected fall 2000)

Pharmacokinetic Studies

- 1) Synthesis and Characterization of N-Ethyl FOSE ¹⁴C, Riker Laboratories, March 17, 1981
- 2) Final Report, Absorption and Biotransformation of N-Ethyl FOSE and Tissue Distribution and Elimination of Carbon-14 after Administration of N-Ethyl FOSE - ¹⁴C in Feed, Riker Laboratories, Inc., January 19, 1983

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Previously submitted with May 4, 2000 letter - Advanced Bioanalytical Services, Inc., Analytical Report, Additional Characterization of Metabolites of T-6292, T-6293 and T-6294 from Rat and Human Hepatocytes by TurboIonSpray LC/MS and LC/MS/MS. Semi-Quantitative Analysis of T-6295 in Rat and Human Hepatocytes Incubated with T-6292, T-6293 and T-6294 by LC/MS/MS, January 28, 1998, Report 98AGKP01.3M

Mechanistic

- 1) Final Report, Analysis of T-5877 in a Cell Proliferation Assay in Rat Liver Cells, Hazelton Washington, Inc., Study No. 154-208, 3M Reference T-5877 (wide range ethyl FOSE), FM-3924, Lot 547, L-13202, November 1, 1994, with Protocol and Protocol Addendum, Key to FC Alcohol Tox Samples (including 5877), and Analytical data

Teratology

- 1) Oral (Gavage) Developmental Toxicity Study of N-EtFOSE in Rats
 - a) Final Report, Oral (Gavage) Developmental Toxicity Study of N-EtFOSE in Rats, 3M Reference No. T-6316.7, December 17, 1998
 - b) Summary N-Etfose Rat Teratology, Oral (Gavage) Developmental Toxicity Study of N-EtFOSE in Rats, 3M Reference No. T-6316.7
- 2) Oral (Stomach Tube) Developmental Toxicity Study of N-EtFOSE in Rabbits
 - a) Final Report, Oral (Stomach Tube) Developmental Toxicity Study of N-EtFOSE in Rabbits, 3M Reference No. T-6316.8, January 11, 1999
 - b) Summary N-EtFOSE Rabbit Teratology, Oral (Stomach Tube) Developmental Toxicity Study of N-EtFOSE in Rabbits, 3M Reference No. T-6316.8
- 3) Teratology Studies of T-2999 (FM-3924) in Rabbits

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- a) Final Report, Oral Rangefinder Study of T-2999CoC in Pregnant Rabbits, Safety Evaluation Laboratory, Riker Laboratories, Inc., Study No. 0680RB0019, June 25, 1981
 - b) Final Report and Protocol, Oral Teratology Study of T-2999CoC in Rabbits, Safety Evaluation Laboratory, Riker Laboratories, Inc., Study No. 0681TB0212, 3M Reference No. FM 3924 (88% ethyl FOSE), January 7, 1982
 - c) 3M Internal Correspondence re alcohols being used in Riker studies, from DR Ricker to WC McCormick, dated December 10, 1980
 - d) Analytical Analyses of Suspension of FM-3924, Internal Memo, from TR Mathisen to EG Gortner, dated April 8, 1981
 - e) 3M Internal Correspondence, Analytical Evaluation of FM-3924, dated June 22, 1982
- 4) Oral Teratology Study of FM-3422 in Rats
- a) Final Report, Oral Teratology Study of FM-3422 in Rats, Safety Evaluation Laboratory, Riker Laboratories, Inc., Study No. 0680TR0010, January 22, 1981
 - b) 3M Internal Correspondence re alcohols being used in Riker studies, from DR Ricker to WC McCormick, dated December 10, 1980
- 5) Teratology Studies of T-2999CoC (FM-3924) in Rats
- a) Final Report, Special Lens Oral Teratology Study of T-2999CoC in Rats, Safety Evaluation Laboratory, Riker Laboratories, Inc., Study No. 0680TR0020, 3M Reference No. FM-3924, December 22, 1981
 - b) Final Report and Protocol, Special Lens Oral Teratology Study of T-2999CoC in Two Strains of Rats, Safety Evaluation Laboratory, Riker Laboratories, Inc., Study No. 0681TR0362, July 20, 1982
 - c) 3M Internal Correspondence re alcohols being used in Riker studies, from DR Ricker to WC McCormick, dated December 10, 1980
 - d) Analytical Analyses of Suspension of FM-3924, Internal Memo, from TR Mathisen to EG Gortner, dated April 8, 1981
 - e) 3M internal correspondence re analytical analysis of FM-3924, from EG Gortner to RM Payfer, dated June 22, 1982

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- 6) Memo from EG Lambrecht to Riker Study Files re Fetal Lens Artifact -- Summary of Developments to Date, dated November 6, 1981

Previously submitted to TSCA 8e docket, Final Report, Combined Oral (Gavage) Fertility, Developmental and Perinatal/Postnatal Reproduction Toxicity Study of N-EtFOSE in Rats, 3M Reference No. T-6316.5, June 30, 1999

Note: weight gain effects in F₁ generation currently being reanalyzed. Report may require amendment.

Studies In Progress

- 1) Protocol, N-EtFOSE Bile Method Development in Rats, 3M Strategic Toxicology Laboratory, Study No. T-6316.15; ST-30, In-Life Start Date August 12, 1999, In-Life End Date August 20, 1999
- 2) Protocol, Feces Method Development Metabolism Study for Perfluorooctanesulfonate Derivatives [N-EtFOSE, PFOS, and FOSA], 3M Strategic Toxicology Laboratory, Study Nos., T-636.17; T-6295.21; T-7132.3; ST-41, In-Life Start Date November 22, 1999, In-Life End Date November 24, 1999
- 3) Protocol, Cell Proliferation Study with N-Ethyl Perfluorooctanesulfonamido Ethanol (N-EtFOSE; 3M T-6316.11), Perfluorooctane Sulfonic Acid Potassium Salt (PFOS; 3M T-6295.16), and N-Ethyl Perfluorooctanesulfonamide (PFOSA 3M T-7091.1) in Rats, Pathology Associates International, Study No. 1132-100

Pre-1976 Studies (bibliography only)

- 1) Final Report, Oral LD 50 (4 levels), 3M Reference No. T-961, WARF Institute, Inc., Study No. 4043911, June 12, 1974
- 2) Final Report, Acute Vapor Inhalation Toxicity Study in Rats, 3M Reference No. T-1260, Industrial Bio-Test Laboratories, Inc., July 21, 1975
- 3) Final Report, Acute Vapor Inhalation Toxicity Study in Rats, 3M Reference No. T-1259, Industrial Bio-Test Laboratories, Inc., July 21, 1975
- 4) Final Report, Skin and Eye Irritation Study, WARF Institute, Inc., Study No. 5060080, 3M Reference No. T-1260, June 17, 1975
- 5) Final Report, Skin and Eye Irritation Study, WARF Institute, Inc., Study No. 5060079, 3M Reference No. T-1259, June 17, 1975

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9. N-MeFOSE alcohol	N-methylperfluorooctane sulfonamidoethanol
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Acute Toxicity

- 1) Acute Oral Toxicity – Rats, Biosearch, Inc., 3M Ref. T-2038CoC (L-4309, FC-5160) (75% in 25% CaCO₃), Study No. 78-1161A, Feb. 2, 1978
- 2) Primary Eye Irritation Study – Rabbits, Biosearch, Inc., 3M Ref. T-2038CoC (L-4309, FC-5160) (75% in 25% CaCO₃), Study No. 78-1161A, Feb. 2, 1978
- 3) Primary Skin Irritation Study – Rabbits, Biosearch, Inc., 3M Ref. T-2038CoC (L-4309, FC-5160) (75% in 25% CaCO₃), Study No. 78-1161A, Feb. 2, 1978
- 4) Acute Oral Toxicity Screen with T-2574CoC in Albino Rats, Riker Laboratories, Inc., Experiment 0979AR0037, September 26, 1979

Genotoxicity

- 1) Genotoxicity Test on T-5711.1 in the In Vivo/In Vitro Unscheduled DNA Synthesis and Cell Proliferation Assays in Rat Liver Cells, Hazelton Washington, HWA Study No. 15515-0-494, September 14, 1993, and attached protocol
- 2) Mutagenicity Test on T-5711 in an In Vivo Rat Micronucleus Assay, Hazelton Washington, HWA Study No. 15515-0-454, April 30, 1993, and attached Protocol and memorandum containing analytical data
- 3) Evaluation of the Mutagenic Activity of T-5874 in the Ames Salmonella/Microsome Test (with Independent Repeat), NoTox Project 115932, NoTox Substance 38187, 3M Reference T-5874.1, April 19, 1994
- 4) Evaluation of the Ability of T-5874 to Induce Chromosome Aberrations in Cultured Peripheral Human Lymphocytes (with Independent Repeat), NoTox Project 115919, NoTox Substance 38187, 3M Reference T-5874.2, May 5, 1994
- 5) Evaluation of the Mutagenic Activity of T-5874 in an In Vitro Mammalian Cell Gene Mutation Test with L5178Y Mouse Lymphoma Cells (with Independent Repeat), NoTox Project 115921, NoTox Substance 38187, 3M Reference T-5874.3, April 19, 1994

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Repeated-Dose Toxicity

- 1) 13-Week Dietary Toxicity Study with N-Methyl Perfluorooctanesulfonamide Ethanol (N-MeFOSE, T-6314) in Rats, Covance Study No. 6329-225, 3M Reference No. T6314.1
 - a) Audited Draft Report, May 25, 1999
 - b) Letter from Andrew M. Seacat, Ph.D., Study Monitor, to Peter J. Thomford, Ph.D., Study Director at Covance, regarding errors in draft report

Mechanistic

- 1) Analysis of T-5794 in a Cell Proliferation Assay in Rat Liver Cells, Hazelton Washington, Inc., Final Report, HWA Study No. 154-207, January 26, 1994, and protocol and analytical data
- 2) Analysis of T-5878 in a Cell Proliferation Assay in Rat Liver Cells, Hazelton Washington, Inc., Final Report, HWA Study No. 154-209, November 1, 1994, and protocol and analytical data

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10. N-EtFOSEA	N-ethylperfluorooctane sulfonamidoethyl acrylate
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Acute Toxicity

- 1) Acute Oral Toxicity Screen with T-3493 in Albino Rats, Safety Evaluation Laboratory, Riker Laboratories, Inc., Project No. 0884AR0010, 3M Reference No. T-3943, February 7, 1984
- 2) Primary Skin Irritation Test with T-3493 in Albino Rabbits, Safety Evaluation Laboratory, Riker Laboratories, Inc., Project No. 0884EB0009, 3M Reference No. T-3943, February 7, 1984
- 3) Acute Ocular Irritation Test with T-3493 in Albino Rabbits, Safety Evaluation Laboratory, Riker Laboratories, Inc., Project No. 0884EB0008, 3M Reference No. T-3943, January 24, 1984

Immunotoxicity

- 1) Guinea Pig Maximization – Method, Summary, and Raw Data Appendix, Hazleton Laboratories America, Inc., Project No. 40703984, 3M Reference No. T-3609, October 5, 1984 (plus May 13, 1985 report amendment)

Genotoxicity

- 1) Chromosomal Aberration Study of Sample D-1 in Cultured Mammalian Cells, Mitsubishi Chemical Safety Institute, Ltd., Study No. 2L162, 3M Reference No. T-6322.3 (FX-13), October 23, 1995
- 2) Mutagenicity Testing of 2-[N-ethyl-N-perfluoroalkyl (C=1~8)sulfonylamino]ethyl acrylate in Bacterial Reverse Mutation Assays, BML, Inc., Study No. 2862, 3M Reference No. T-6322.5 (FX-13), April 24, 1996
- 3) In Vitro Microbiological Mutagenicity Assays of 3M Company's Compound T-3609, SRI International, Project No. LSC-3145, September, 1984

Repeated-Dose Toxicity

- 1) Twenty-Eight-Day Repeated Dose Oral Toxicity Study of Sample D-1 in Rats, Bio-Medical Research Laboratories Co., Ltd., Study No. BMR143C, 3M Reference No. T-6322 (FX-13), February 16, 1993

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11. N-EtFOSEMA	N-ethyl perfluorooctane sulfonamido ethyl methacrylate
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Acute Toxicity

- 1) Acute Oral Toxicity Screen with T-3494 in Albino Rats, Safety Evaluation laboratory, Riker Laboratories, Inc., Project No. 0884AR0013, 3M Reference No. T-3494 (L-1048, FX-14), March 13, 1984
- 2) Primary Skin Irritation Test with T-3494 in Albino Rabbits, Safety Evaluation laboratory, Riker Laboratories, Inc., Project No. 0884EB0012, 3M Reference No. T-3494 (L-1048, FX-14), February 7, 1984
- 3) Acute Ocular Irritation Test with T-3494 in Albino Rabbits, Safety Evaluation laboratory, Riker Laboratories, Inc., Project No. 0884EB0011, 3M Reference No. T-3494 (L-1048, FX-14), January 24, 1984

Immunotoxicity

- 1) Guinea Pig Maximization, Hazleton Laboratories America, Inc., Project No. 40703985, 3M Reference No. T-3610 (NB No. 63601-32, FX-14), October 9, 1984

Genotoxicity

- 1) In Vitro Microbiological Mutagenicity Assays of 3M Company's Compound T-3610, SRI International, Project No. LSC-3145, 3M Reference No. T-3610 (NB No. 63601-32, FX-14), September, 1984

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12. N-MeFOSEA	N-methylperfluorooctane sulfonamidoethyl acrylate
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Genotoxicity

- 1) Evaluation of the Mutagenic Activity of T-5869 in the Ames Salmonella/Microsome Test (with independent repeat), NOTOX, Project No. 115965, 3M Reference No. T-5869.1 (FMZ-3559, Lot 2408, wide-range), April 20, 1994
- 2) Evaluation of the Ability of T-5869 to Induce Chromosome Aberrations in Cultured Human Lymphocytes (with independent repeat), NOTOX, Project No. 115943, 3M Reference No. T-5869.2 (FMZ-3559, Lot 2408, wide-range), June 5, 1994
- 3) Evaluation of the Mutagenic Activity of T-5869 in an In Vitro Mammalian Cell Gene Mutation Test with L5178Y Mouse Lymphoma Cells (with independent repeat), NOTOX, Project No. 115954, 3M Reference No. T-5869.3 (FMZ-3559, Lot 2408, wide-range), April 20, 1994

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13. PFOS	Additional Studies on Perfluorooctane Sulfonate
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Acute Toxicity

- 1) Acute Toxicity Tests for T-T-6684, Didecyldimethylammonium salt of perfluorooctanesulfonate:
 - a) Acute Oral Toxicity Study of T-6684 in Rats (OECD Guidelines), Corning Hazleton, Inc., Project No. CHW 61101149, 3M Reference No. T-6684 January 31, 1997
 - b) Primary Dermal Irritation / Corrosion Study of T-6684 in Rabbits (OECD Guidelines), Corning Hazleton, Inc., Project No. CHW 61101150, 3M Reference No. T-6684 (didecyldimethylammonium salt of perfluorooctanesulfonate), January 10, 1997
 - c) Primary Eye Irritation / Corrosion Study of T-6684 in Rabbits (OECD Guidelines), Corning Hazleton, Inc., Project No. CHW 61101151, 3M Reference No. T-6684 (didecyldimethylammonium salt of perfluorooctanesulfonate), January 28, 1997
- 2) Acute Toxicity Tests for T-5898, lithium perfluorooctane sulfonate, 3M Ref. FC-94:
 - a) Final Report, Acute Oral Toxicity Study of T-5898 in Rats, Hazelton Wisconsin, Study No. 40200468, April 22, 1994
 - b) Final Report, Primary Eye Irritation/Corrosion Study of T-5898 in Rabbits, Hazelton Wisconsin, Study No. 40200469, April 7, 1994
 - c) Final Report, Primary Dermal Irritation/Corrosion Study of T-5898 in Rabbits, Hazelton Wisconsin, Study No. 40200470, March 23, 1994
- 3) Acute Oral Toxicity – Rats, Biosearch, Inc., 3M Reference No. T-1388 (perfluorooctanesulfonic acid), March 4, 1976

Pharmacokinetic Studies

- 1) Draft Report, 5-Daily Dose Dermal Absorption / Toxicity Study of T-6684 in Rabbits, Covance Laboratories, Inc., Study No. 6329-200, 3M Reference No. T-6684 (didecyldimethylammonium salt of perfluorooctanesulfonate, slurry), July 11, 1997

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- 2) Qualitative Investigation of the In Vitro Metabolism of T-6292 (n-ethyl FOSE), T-6293 (n-ethyl FOSE phosphate diammonium salt(ester)), T-6294 (n-ethyl perfluorooctane sulfonamide) and T-6295 (perfluorooctane sulfonate) by Rat and Human Hepatocytes Using Ion Spray LC/MS and LC/MS/MS, Advanced Bioanalytical Services, Inc., [Preliminary] Analytical Report, Report 96ADEM01.3M, November 12, 1996

Teratology

- 1) Memorandum from E. G. Lamprecht re Fetal Rat Lens Artifact – Summary of Developments to Date, Nov. 6, 1981

Analytical

Ion Spray LC/MC Determination of Perfluoro Analytical Standards Provided by 3M Medical Department, Advanced Bioanalytical Services, Inc., No. 95MYHW01.3M, August 30, 1995

Studies in Progress

- 1) Protocol, Feces Method Development Metabolism Study for Perfluorooctanesulfonate Derivatives [N-EtFOSE, PFOS, and FOSA], 3M Strategic Toxicology Laboratory, Study Nos., T-636.17; T-6295.21; T-7132.3; ST-41, In-Life Start Date November 22, 1999, In-Life End Date November 24, 1999
- 2) Protocol, Cell Proliferation Study with N-Ethyl Perfluorooctanesulfonamido Ethanol (N-EtFOSE; 3M T-6316.11), Perfluorooctane Sulfonic Acid Potassium Salt (PFOS; 3M T-6295.16), and N-Ethyl Perfluorooctanesulfonamide (PFOSA 3M T-7091.1) in Rats, Pathology Associates International, Study No. 1132-100

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13. PFOS	Additional Studies on Perfluorooctane Sulfonate
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REDACTED

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3. PFOSAA – Perfluorooctane sulfonylamido (ethyl) acetate

No literature located.

4. PFDS - Perfluorodecanesulfonate

No literature located.

5. PFHS - Perfluorohexanesulfonate

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7. N-MeFOSA – N-methyl perfluorooctanesulfonamide

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8. N-EtFOSE alcohol – N-ethyl perfluorooctane sulfonamidoethanol

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9. N-MeFOSE alcohol – N-methyl perfluorooctane sulfonamidoethanol

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10. N-EtFOSEA – N-ethyl perfluorooctane sulfonamidoethyl acrylate

No literature located.

11. N-EtFOSEMA – N-ethylperfluorooctane sulfonamidoethyl methacrylate

No literature located.

12. N-MeFOSEA – N-methylperfluorooctane sulfonamidoethyl acrylate

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1. POSF	Perfluorooctanesulfonyl fluoride
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- 2) T-3607 Acute Inhalation Toxicity Test, Bushy Run Research Center, Project No. 47-527, 3M Reference No. T-3607, December 19, 1984
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Ongoing Research/Study Protocols

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