

BIODEGRADATION (OECD 301E)

TEST SUBSTANCE

Identity: A mixture containing perfluorooctanesulfonate, which may also be referred to as PFOS, FC-95, or as a component of FC-206CE. (1-Octanesulfonic acid) (CAS # 2795-39-3).

Remarks: The 3M production lot number was 502. The test sample is FC-206CE. Current information indicates it is a mixture of 0.92% PFOS, 15% diethylene glycol butyl ether, 76.09% water, 4% urea, 1.28% Sultone foamer, 1.55% sodium octyl sulfate, 1.05% polyoxyethylene monooctylphenyl ether, 0.06% sodium lauryl sulfate, and 0.05% tolyltriazole.

The following summary applies to a mixture with incompletely characterized concentrations of impurities. Data may not accurately reflect the biodegradability of the fluorochemical component of the test sample.

METHOD

Method: Modified OECD Screening Test, OECD 301E, with DOC Analysis

Test type: Ready Biodegradability

GLP: No

Year Completed: 1989

Analytical monitoring: Dissolved organic carbon (DOC), pH, D.O., and temperature.

Statistical methods: Results were determined by calculation of the % DOC removed as compared to the blank control.

Test organism source: Activated sludge mixed liquor collected from the Metro Wastewater Treatment Plant, St. Paul, MN (Preconditioned for 7 days and restored to original volume prior to use as inoculum).

Test condition:

Dilution water: Millipore Milli-Q™ water

Mineral Nutrient Medium: Nutrient medium per OECD 301E method. Initial pH 7.0.

Stock and test solution preparation: A stock solution was prepared by adding 10 mL of the test substance to one liter of mineral nutrient medium (equivalent to 1300 mg TOC/L). Initial pH 7.3. In order to obtain a final test concentration of 40 mg DOC/L, 18.46 mL of the stock solution was used per 600 mL test volume.

Test vessels: 1000 mL Erlenmeyers containing 600 mL test solution and capped with foam plugs.

Incubator Conditions: Gallenkamp Constant temperature orbital shaker incubator (constant dark conditions)

Temperature: 22 ± 2 °C

Agitation: Shaken continuously at 100 rpm

Number of concentrations: 1 plus sodium benzoate standard (reference standard) and blank, all in duplicate.

Inoculum condition on test initiation: TSS 2227 mg/L (TSS in test flask 1.114 mg/L) and initial pH 5.4.

Element Basis: Decrease in dissolved organic carbon compared to the blanks.

Test substance flask conditions:

pH: Day 0–7.3 (both duplicates), Day 28–5.5 (both duplicates)

D.O.: Day 0–8.1 (both duplicates), Day 28–8.8 (both duplicates)

RESULTS

Nominal concentrations: Blank control, sodium benzoate at ~20 mg DOC/L and test substance at ~40 mg DOC/L.

Element values: 28 Day Degradation – 90% duplicate 1 and 91% duplicate 2. Mean value 91%.

Remarks: Testing was conducted on a mixture as described in the Test Substance Remarks field. The values reported apply to that mixture and not the fluorochemical proportion alone.

CONCLUSIONS

The FC-206CE % biodegradation based on mean DOC removal was 91% after 28 days.

The reference substance obtained 98% degradation, therefore the inoculum used was viable.

Submitter: 3M Company, Environmental Laboratory, P.O. Box 33331, St. Paul, Minnesota, 55133

DATA QUALITY

Reliability: Klimisch ranking 2. Testing meets all criteria for quality testing. However, sample purity was not properly characterized and the study lacks analytical confirmation of the amount of fluorochemical proportion in the solution.

REFERENCES

The study was conducted by the 3M Environmental Laboratory, St. Paul, MN, Lab Request number G1358-2, 1989.

OTHER

Last changed: 6/26/00

001702

Form 1/20/20 4 D P-10

Ready Biodegradability

Lab Request No. 61358

Environmental Lab — Work Sheet

Page _____ of _____

Sample Description

Modified OECD Screening Test 301E

Date: 5-22-89

FC-203 CE lot 519

Analyst: JTB

FC-206 CE lot 502

I Experimental Design

- Two test chemicals, 1 Reference Substance, 1 Blank Control
in duplicate: Run with LR 61800, common controls, reference

- DOC Analyses on Days 0, 1, 3, 7, 14, 21, 27 + 28

II Test Conditions:

Initial volume = 600 ml in 1000 ml flask

Maintain:

pH 7.2 ± 0.2

Temp $22 \pm 2^\circ\text{C}$

D.O. $> 0.5 \text{ mg/L}$

vessels Orbital shaker-incubator, at 100 RPM, in the dark

III Test Substances:

FC-203 CE, lot 519

FC-206 CE, lot 502

IV Reference Substance:

Sodium Benzoate (Benzoic Acid, Sodium Salt; Sigma Chemical Co,
Lot 58E-0036)

Mineral Nutrient Medium + Pre-Conditioning of Inoculum:

See LR 61800, test prep sheets 2 of 5 + 3 of 5 for originals

Ready Biodegradability

Lab Request No. 61358
61800

Sample Description Modified OECD Screening Test 301E
Landfill Stabilized
Foam
 Ref: NB86279: 11

Environmental Lab - Work Sheet

Page _____ of _____

Date: 5-22-89/5-23-8Analyst: SAB

Mineral Nutrient Medium Preparation

	Salt	Stock soln conc, mg/L	Medium conc. mg/L
A	KH_2PO_4	8.500	8.5
	K_2HPO_4	21.750	21.75
	Na_2HPO_4	26.640	26.64
	NH_4Cl	20.000	20.0
B	$\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$	22.500	22.5
C	$\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$	36.430	36.43
D	$\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$	250	0.25
E	$\text{MnSO}_4 \cdot \text{H}_2\text{O}$	30.23	0.03023
	H_3BO_3	57.2	0.0572
	$\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$	42.8	0.0428
	$(\text{NH}_4)_6\text{Mo}_7\text{O}_{27} \cdot 4\text{H}_2\text{O}$	36.85	0.03685
	FeCl_3	30	0.030
	EDTA	70	0.070
Solution E (above) sterilized by membrane filtration (0.020um)			
F	Yeast Extract	150	0.150

Added 1.0 ml each of Solutions A to F per liter Milli-Q water.
 Prepared in two 6.0 L volumetrics; Combined for 12 L Medium
 Initial pH medium = 7.0

Ready Biodegradability

Environmental Lab — Work Sheet

Lab Request No. 61358
61800Sample Description Modified O.D. Screening Test 301F
Landfill Stabilized Foam

Page _____ of _____

Date: 5-23-89Ref: NB 86279:11Analyst: SABPre-conditioning of Microbial Inoculum

- Obtained Activated Sludge Mixed Liquor from Metro Waste Treatment Plant, St Paul, MN 5-16-89. Initial pH = 7.2
- Poured through 1.00 mm Stainless Steel Sieve
- Poured one liter into Imhoff Settling Cone
- Allowed to settle ~ 2-Hour; siphoned off clear supernatant
- Resuspended remaining solids (~ 400 ml) in mineral nutrient medium. Total volume = 1.0 Liter. Initial pH = 7.0; T.S.S. = 2687 mg/L
- Placed in one-liter beaker, aerated with filtered building air
- Allowed to aerate 7-Days; brought up to volume with Milli-Q water to replace that lost by evaporation.
- After 7-Days, poured through 1.00 mm Stainless Steel Sieve, Discarded first 200 ml.
- Inoculum pH = 5.4
- Total Suspended Solids = 2227 mg/L

Inoculation of Test Flasks:

0.5 ml / L Test medium
= 0.3 ml / 600 ml

In Test flask $\frac{0.5 \text{ ml}}{\text{Liter}} \times \frac{2.227 \text{ mg}}{\text{ml}} = 1.114 \text{ mg T.S.S. / L}$

E-107-620 4 D (2-79)

Ready Biodegradability

Environmental Lab — Work Sheet

Sample Description Modified OECD Screening Test 301E

FC-203CE Lot 519

FC-206CE Lot 502

Lab Request No. G1358

Page _____ of _____

Date: 5-23-89

Analyst: SHB

Test Solutions Preparation

FC-203CE Lot 519

TOC = 220,000 mg/L Each 1.0 ml = 220 mg TOC

Stock Soln.: 10 ml / L Mineral Nutrient medium = 2200 mg TOC / L

pH = 7.3

1 ml = 2.2 mg TOC

In test flask - want 40 mg DOC / L

40 mg / L = 18.18 ml Stock / L

2.2 mg / ml = 10.91 ml Stock / 600 ml

FC-206CE Lot 502

TOC = 130,000 Each 1 ml = 130 mg TOC

Stock Soln.: 10 ml / L Mineral Nutrient Medium = 1300 mg TOC / L

pH = 7.6

1.0 ml Stock = 1.3 mg TOC

In test flask - want 40 mg DOC / L

40 mg / L = 30.77 ml Stock / L

1.3 mg / ml = 18.46 ml Stock / 600 ml

Form 10620 & D PWD

Ready Biodegradability

Lab Request No. G1358

Environmental Lab — Work Sheet

Page _____ of _____

Sample Description Modified OECD Screening Test 301 EDate: 5-23-89

FC-203 CE Lot 519

Analyst: SJB

C-206 CE Lot 502

Bioreactor Preparation

Test Substance	Amount Added Per Flask	ml Mineral Nutrient Added	ml Microbial Inoculum Added	Milli-Q water Added	Total Mixture Volume ml
FC-203 CE	10.91	+ 576.64	+ 0.3	+ 12.15	= 600
FC-206 CE	18.46	+ 569.09	+ 0.3	+ 12.15	= 600
Blank Control (1)	0	+ 587.55	+ 0.3	+ 12.15	= 600
Reference Sub. (1) Sodium Benzoate	20.6	+ 587.55	+ 0.3	+ 12.15	= 600

(1) Controls + reference substance, shared with LR 61800

All Test Solutions Prepared in duplicate.

After each prepared, withdrawn ~ 50 ml & filtered through a 0.2 um Millipore filter that had been boiled in three changes of Milli-Q water; filter & apparatus were flushed, under vacuum by three ~ 200 ml aliquots of Milli-Q water prior to filtration. The first ~ 20 ml was set aside for pH determination, remainder immediately analyzed for DOC.

Test vessels capped with foam plugs, level marked on flasks, & placed in a constant temp (21°C) orbital shaker-incubator, in the dark.

Vessels shaken at 100 RPM

Lab Request No. 61800, 61358

Environmental Lab — Work Sheet

Page 1 of

Sample Description
Landfill Stabilized Foam,
FC 203CE,
FC 206CE

Date: 5-23-89

Temperature in Gallenkamp
Constant Temp. Orbital Incubator (Room #1)

Analyst: SABModified OECD Screening Test 301EIncubator Settings: 100 RPM, 21°C, No light

<u>Date</u>	<u>Initials</u>	<u>Temp. C°</u>	<u>Date</u>	<u>Initials</u>	<u>Temp. C°</u>
5-23-89	SAB	21			
5-24-89	SAB	21			
5-25-89	SAB	22			
5-26-89	SAB	21			
5-29-89	SAB	22			
5-30-89	SAB	21			
5-31-89	SAB	21			
6-1-89	SAB	21			
6-2-89	SAB	21			
6-5-89	SAB	21			
6-6-89	SAB	21			
6-7-89	SAB	21			
6-8-89	SAB	21			
6-9-89	SAB	21			
6-12-89	SAB	21			
6-13-89	SAB	21			
6-14-89	SAB	21			
6-15-89	SAB	21			
6-16-89	SAB	21			
6-19-89	SAB	21			
6-20-89	SAB	21			

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Form 10620 B D PWO

Ready Biodegradability

Lab Request No. G1358

Environmental Lab — Work Sheet

Page 1 of 1

Sample Description

OECD Modified Screening Test - 301F

Date: 5-33-89

FC-203CE

Analyst: SHB

FC-206CE

Test Flask Conditions

	Day 0 5-23-89		Day 1 5-24-89		Day 3 5-26-89		Day 7 5-30-89		Day 14 6-6-89		Day 21 6-13-89		Day 27 6-19-89		Day 28 6-20-89	
	pH	DO mg/L	pH	DO mg/L	pH	DO mg/L	pH	DO	pH	DO	pH	DO	pH	DO	pH	DO
FC 203 I	7.2	8.1	6.5, 8.2		6.3, 8.2		6.3 9.0		6.0 7.6		6.1 8.9		5.8 8.9		5.9 8.8	
FC 203 II	7.2	8.1	6.5, 8.1		6.2, 8.2		6.0 8.9		6.1 7.8		6.0 5.9		5.8 5.8		5.7 5.9	
FC 206 I	7.3	8.1	6.5, 8.1		6.3, 8.3		6.1 8.8		6.3 7.9		5.5 9.0		5.6 9.7		5.5 8.8	
FC 206 II	7.3	8.1	6.5, 8.2		6.3, 8.3		6.0 8.9		6.2 8.0		5.5 9.0		5.5 3.7		5.5 3.8	

001703

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READY BIODEGRADABILITY

Test Substance FC-206CE Lot 502Test Concentration 40 mg DOC/LInoculum Source Metro Waste Treatment Plant Mixed Liquor St Paul, MN

Concentration of suspended solids in inoculum

fresh (in mineral medium) _____

pre-conditioned (restored to original volume) 2.227 g/LCarbon DeterminationsCarbon Analyzer = Dohrmann^R Xertex

Inoculum Used: Fresh/Pre-conditioned

Medium	Flask Analyses	Time of incubation (days)								(mg/L)
		0	1	3	7	14	21	27	28	
Blank	1	A ₁	0.268	1.438	0.047	0.030	0.171	0.049	0.015	0.030
		A ₂	0.311	1.888	0.071	0.011	0.105	0.007	0.025	0.035
	A, mean		0.290	1.913	0.059	0.021	0.138	0.028	0.020	0.033
	2	B ₁	0.401	0.086	0.008	0.000	0.049	0.008	0.245	0.024
		B ₂	0.352	0.156	0.040	0.025	0.019	0.023	0.040	0.019
		B, mean		0.377	0.121	0.024	0.013	0.034	0.016	0.143
	bk = $\frac{A, \text{mean} + B, \text{mean}}{2}$		0.334	1.017	0.042	0.017	0.086	0.022	0.082	0.028

Test Chemical	1	C ₁	36.52	34.97	32.08	29.59	4.184	3.028 4.674	3.110	3.685
		C ₂	36.93	34.99	32.12	29.74	4.190	3.188 4.819	3.043	3.694
		C, mean	36.73	34.98	32.10	29.67	4.187 4.187	3.108 5.0	3.077	3.690
	2	D ₁	35.45	36.35	32.99	29.88	2.448	1.981	3.027	3.252
		D ₂	35.94	36.28	32.97	30.07	3.070	2.033	2.850	3.290
		D, mean	35.70	36.32	32.98	29.98	3.009	2.007	2.939	3.271

Evaluation of raw data

Flask No.

Percent Degradation after t days

1	$D_1 = 1 - \frac{(C, \text{mean} - bk)}{(C_0, \text{mean} - bk_0)} \times 100$	0	1	3	7	14	21	27	28
			6.7	12	19	89	92	92	90
2	$D_2 = 1 - \frac{(D, \text{mean} - bk)}{(D_0, \text{mean} - bk_0)} \times 100$		0.2	6.9	15	92	94	92	91
			3.5	9.5	17	91	93	92	91
Mean	$D = \frac{D_1 + D_2}{2}$								

001710

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ENVIRONMENTAL LABORATORY
MODIFIED OECD SCREENING TEST 301E

LR 61358-1+2
Date 5-23-89
Analyst STB

READY BIODEGRADABILITY

Test Substance Sodium Benzoate Reference SubstanceTest Concentration 20 mg DOC/L (34.3 mg/L)Inoculum Source Metro Waste Treatment Plant Mixed Liquor St Paul, MN

Concentration of suspended solids in inoculum

fresh (in mineral medium) _____

pre-conditioned (restored to original volume) 2.227 g/LCarbon DeterminationsCarbon Analyzer = Dohrmann^R Xertex

Inoculum Used: Fresh/Pre-conditioned

Medium	Flask Analyses	Time of incubation (days)- (mg/L)									
		0	1	3	7	14	21	27	28		
Blank	1	A ₁	0.268	1.438	0.047	0.030	0.171	0.049	0.015	0.030	
		A ₂	0.311	1.888	0.071	0.011	0.105	0.007	0.025	0.035	
		A, mean	0.290	1.913	0.059	0.021	0.138	0.028	0.020	0.033	
	2	B ₁	0.401	0.086	0.008	0.000	0.049	0.008	0.245	0.024	
		B ₂	0.352	0.156	0.040	0.025	0.019	0.023	0.040	0.019	
		B, mean	0.377	0.121	0.024	0.013	0.034	0.016	0.143	0.022	
	Mean	bk = $\frac{A, \text{mean} + B, \text{mean}}{2}$		0.334	1.017	0.042	0.017	0.086	0.022	0.082	0.028

Test Chemical	1	C ₁	20.61	19.87	0.066	0.748	0.751	0.244	0.395	0.451
		C ₂								
		C, mean	20.64	19.79	0.010	0.523	0.902	0.163	0.392	0.360
	2		20.63	19.83	0.038	0.636	0.827	0.204	0.394	0.406
		D ₁	19.90	20.51	0.015	0.604	0.000	0.287	0.370	0.328
		D ₂	19.75	20.50	0.070	0.583	0.061	0.055	0.341	0.319
		D, mean	19.83	20.51	0.043	0.596	0.031	0.171	0.356	0.324

Evaluation of raw data

Flask No.

Percent Degradation after t days

1	$D_1 = 1 - \frac{(C, \text{mean} - bk)}{(C_0, \text{mean} - bk_0)} \times 100$	0	1	3	7	14	21	27	28
			7.3	100	97	96	99	98	98
2	$D_2 = 1 - \frac{(D, \text{mean} - bk)}{(D_0, \text{mean} - bk_0)} \times 100$		0.02	100	97	100	99	99	98
			3.7	100	97	98	99	99	98
Mean	$D = \frac{D_1 + D_2}{2}$								

001711

OECD Modified Screening Test of Ready Biodegradability 301F

FC-203CE and FC-206CE

Percent Degradation After t Days (% DOC Removal)⁽¹⁾

Test Substance	Day 1	Day 3	Day 7	Day 14	Day 21	Day 27	Day 28
FC-203CE -1	-3.1	-2.1	18	88	88	93	93
FC-203CE -2	-6.1	0.3	12	90	88	90	88
FC-206CE-1	6.7	12	19	89	92	92	90
FC-206CE-2	0.2	6.9	15	92	94	92	91
Sodium Benzoate -1	7.3	100	97	96	99	98	98
Sodium Benzoate -2	0.02	100	97	100	99	99	98

(1)

$$\% \text{ DOC Removal} = \left[1 - \frac{\text{Net DOC, mg/L}}{\text{Net Starting DOC, mg/L}} \right] \times 100$$

LAB REQUEST NO. G1798
REQUESTOR NAME: MTE/EAR
DEPARTMENT: 0535
PROJECT NO: 9970013000
DATE RECEIVED: 05/23/1989
DESC: FC-203 CE AND FC-206 CE BIODEG. DAY 0

CONTRACT LAB(S):
EXP COMP DATE: 05/31/1989
DATE COMPLETED: 06/02/1989
PROJECT LEAD: JW STOCK
PHONE NO: 651-778-6438
3M FAX NO: 651-778-6176

Please run in duplicate.

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1	05/23/89	FC-203 I	-----		
	DOC	DISSOLVED ORGANIC CARBON		40 MG/L	
2	05/23/89	FC-203 II	-----		
	DOC	DISSOLVED ORGANIC CARBON		41 MG/L	
3	05/23/89	FC-206 I	-----		
	DOC	DISSOLVED ORGANIC CARBON		37 MG/L	
4	05/23/89	FC-206 II	-----		
	DOC	DISSOLVED ORGANIC CARBON		36 MG/L	

LAB REQUEST NO. G1797
REQUESTOR NAME: MTE/EAR
DEPARTMENT: 0535
PROJECT NO: 9970013000
DATE RECEIVED: 05/23/1989
DESC: LANDFILL STAB FOAM BIODEG. DAY 0

CONTRACT LAB(S):
EXP COMP DATE: 05/31/1989
DATE COMPLETED: 06/02/1989
PROJECT LEAD: JW STOCK
PHONE NO: 651-778-6438
3M FAX NO: 651-778-6176

Please run all samples in duplicate.

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1	05/23/89	MQ	MQ BLANK		
		DOC	DISSOLVED ORGANIC CARBON	<0.5 MG/L	
2	05/23/89	MEDIUM	NUTRIENT		
		DOC	DISSOLVED ORGANIC CARBON	0.8 MG/L	
3	05/23/89	1ST RINSE	FOAM SOLIDS		
		DOC	DISSOLVED ORGANIC CARBON	2000 MG/L	
4	05/23/89	2ND RINSE	FOAM SOLIDS		
		DOC	DISSOLVED ORGANIC CARBON	540 MG/L	
5	05/23/89	3RD RINSE	FOAM SOLIDS		
		DOC	DISSOLVED ORGANIC CARBON	150 MG/L	
6	05/23/89	4TH RINSE	FOAM SOLIDS		
		DOC	DISSOLVED ORGANIC CARBON	52 MG/L	
7	05/23/89	BLANK 1	CONTROL		
		DOC	DISSOLVED ORGANIC CARBON	<0.5 MG/L	
8	05/23/89	BLANK II	CONTROL		
		DOC	DISSOLVED ORGANIC CARBON	<0.5 MG/L	
9	05/23/89	LEACHATE I	-----		
		DOC	DISSOLVED ORGANIC CARBON	42 MG/L	
10	05/23/89	LEACHATE II	-----		
		DOC	DISSOLVED ORGANIC CARBON	41 MG/L	
11	05/23/89	PRE W-SOLIDS	-----		
		DOC	DISSOLVED ORGANIC CARBON	1.3 MG/L	

06/23/2000

ENVIRONMENTAL LABORATORY
ARCHIVED FINAL REPORT

LAB REQUEST NO. G1802
REQUESTOR NAME: MTE/EAR
DEPARTMENT: 0535
PROJECT NO: 9970013000
DATE RECEIVED: 05/24/1989
DESC: FC-203CE AND FC-206CE BIODEG. DAY 1

CONTRACT LAB(S):
EXP COMP DATE: 06/02/1989
DATE COMPLETED: 06/02/1989
PROJECT LEAD: JW STOCK
PHONE NO: 651-778-6438
3M FAX NO: 651-778-6176

Test shares controls & ref. substance with LR G1800, See LR G1801 for day 1 analysis.

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1		FC-203 I	-----		
	DOC		DISSOLVED ORGANIC CARBON	42 MG/L	
2		FC-203 II	-----		
	DOC		DISSOLVED ORGANIC CARBON	44 MG/L	
3		FC-206 I	-----		
	DOC		DISSOLVED ORGANIC CARBON	35 MG/L	
4		FC-206 II	-----		
	DOC		DISSOLVED ORGANIC CARBON	36 MG/L	

001715

LAB REQUEST NO. G1801
REQUESTOR NAME: MTE/EAR
DEPARTMENT: 0535
PROJECT NO: 9970013000
DATE RECEIVED: 05/24/1989
DESC: LANDFILL STAB FOAM BIODEG. DAY 1

CONTRACT LAB(S):
EXP COMP DATE: 06/02/1989
DATE COMPLETED: 06/02/1989
PROJECT LEAD: JW STOCK
PHONE NO: 651-778-6438
3M FAX NO: 651-778-6176

Please run all samples in duplicate.

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1		BLANK I	CONTROL		
	DOC	DISSOLVED ORGANIC CARBON		1.9 MG/L	
2		BLANK II	CONTROL		
	DOC	DISSOLVED ORGANIC CARBON		<0.5 MG/L	
3		LEACHATE I	-----		
	DOC	DISSOLVED ORGANIC CARBON		40 MG/L	
4		LEACHATE II	-----		
	DOC	DISSOLVED ORGANIC CARBON		39 MG/L	
5		SOLIDS I	WASHED		
	DOC	DISSOLVED ORGANIC CARBON		0.7 MG/L	
6		SOLIDS II	WASHED		
	DOC	DISSOLVED ORGANIC CARBON		1.2 MG/L	
7		LEACH &	SOLIDS I		
	DOC	DISSOLVED ORGANIC CARBON		42 MG/L	
8		LEACH &	SOLIDS II		
	DOC	DISSOLVED ORGANIC CARBON		41 MG/L	
9		REF SUB I	SODIUM BENZ.		
	DOC	DISSOLVED ORGANIC CARBON		20 MG/L	
10		REF SUB II	SODIUM BENZ.		
	DOC	DISSOLVED ORGANIC CARBON		21 MG/L	

06/23/2000

ENVIRONMENTAL LABORATORY
ARCHIVED FINAL REPORT

LAB REQUEST NO. G1820
REQUESTOR NAME: MTE/EAR
DEPARTMENT: 0535
PROJECT NO: 9970013000
DATE RECEIVED: 05/26/1989
DESC: FC-203CE AND FC-206CE BIODEG. DAY 3

CONTRACT LAB(S):
EXP COMP DATE: 06/05/1989
DATE COMPLETED: 06/02/1989
PROJECT LEAD: JW STOCK
PHONE NO: 651-778-6438
3M FAX NO: 651-778-6176

Test shares controls & ref. sub with LR G1800; See LR G1819 for day 3 analyses

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1		FC 203 I	-----		
	DOC	DISSOLVED ORGANIC CARBON		41 MG/L	
2		FC 203 II	-----		
	DOC	DISSOLVED ORGANIC CARBON		40 MG/L	
3		FC 206 I	-----		
	DOC	DISSOLVED ORGANIC CARBON		32 MG/L	
4		FC 206 II	-----		
	DOC	DISSOLVED ORGANIC CARBON		33 MG/L	

001717

LAB REQUEST NO. G1819
REQUESTOR NAME: MTE/EAR
DEPARTMENT: 0535
PROJECT NO: 9970013000
DATE RECEIVED: 05/26/1989
DESC: LANDFILL STAB. FOAM BIODEG. DAY 3

CONTRACT LAB(S):
EXP COMP DATE: 06/05/1989
DATE COMPLETED: 06/02/1989
PROJECT LEAD: JW STOCK
PHONE NO: 651-778-6438
3M FAX NO: 651-778-6176

Please analyze in duplicate.

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1		BLANK I	CONTROL		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	
2		BLANK II	CONTROL		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	
3		LEACH I	LEACHATE		
	DOC		DISSOLVED ORGANIC CARBON	31 MG/L	
4		LEACH II	LEACHATE		
	DOC		DISSOLVED ORGANIC CARBON	33 MG/L	
5		SOLIDS I	PRE-WASHED		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	
6		SOLIDS II	PRE-WASHED		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	
7		LEACH &	SOLIDS I		
	DOC		DISSOLVED ORGANIC CARBON	30 MG/L	
8		LEACH &	SOLIDS II		
	DOC		DISSOLVED ORGANIC CARBON	33 MG/L	
9		REF SUB I	SODIUM BENZ.		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	
10		REF SUB II	SODIUM BENZ.		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	

LAB REQUEST NO. G1797

CONTINUED

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
12	05/23/89	PRE-W	SOLIDS II		
	DOC		DISSOLVED ORGANIC CARBON	1.1 MG/L	
13	05/23/89	LEACH &	SOLIDS I		
	DOC		DISSOLVED ORGANIC CARBON	43 MG/L	
14	05/23/89	LEACH &	SOLIDS II		
	DOC		DISSOLVED ORGANIC CARBON	43 MG/L	
15	05/23/89	LEACHATE	AS-IS		
	DOC		DISSOLVED ORGANIC CARBON	2000 MG/L	
16	05/23/89	REF SUB I	SODIUM BENZ.		
	DOC		DISSOLVED ORGANIC CARBON	21 MG/L	
17	05/23/89	REF SUB II	SODIUM BENZ.		
	DOC		DISSOLVED ORGANIC CARBON	20 MG/L	

LAB REQUEST NO. G1834
REQUESTOR NAME: MTE/EAR
DEPARTMENT: 0535
PROJECT NO: 9970013000
DATE RECEIVED: 05/30/1989
DESC: FC-203CE AND FC-206CE BIODG. DAY 7

CONTRACT LAB(S):
EXP COMP DATE: 06/09/1989
DATE COMPLETED: 06/02/1989
PROJECT LEAD: JW STOCK
PHONE NO: 651-778-6438
3M FAX NO: 651-778-6176

Test shares controls & ref sub. with LR G1800; see LR G1833 for day 7 analyses

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1		FC 203 I	-----		
	DOC	DISSOLVED ORGANIC CARBON		33 MG/L	
2		FC 203 II	-----		
	DOC	DISSOLVED ORGANIC CARBON		35 MG/L	
3		FC 206 I	-----		
	DOC	DISSOLVED ORGANIC CARBON		30 MG/L	
4		FC 206 II	-----		
	DOC	DISSOLVED ORGANIC CARBON		30 MG/L	

LAB REQUEST NO. G1833
REQUESTOR NAME: MTE/EAR
DEPARTMENT: 0535
PROJECT NO: 9970013000
DATE RECEIVED: 05/30/1989
DESC: LANDFILL STAB. FOAM BIODEG. DAY 7

CONTRACT LAB(S):
EXP COMP DATE: 06/09/1989
DATE COMPLETED: 06/02/1989
PROJECT LEAD: JW STOCK
PHONE NO: 651-778-6438
3M FAX NO: 651-778-6176

Please run in duplicate.

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1		BLANK I	CONTROL		
	DOC	DISSOLVED ORGANIC CARBON		<0.5 MG/L	
2		BLANK II	-----		
	DOC	DISSOLVED ORGANIC CARBON		<0.5 MG/L	
3		LEACH I	-----		
	DOC	DISSOLVED ORGANIC CARBON		29 MG/L	
4		LEACH II	-----		
	DOC	DISSOLVED ORGANIC CARBON		29 MG/L	
5		SOLIDS I	-----		
	DOC	DISSOLVED ORGANIC CARBON		<0.5 MG/L	
6		SOLIDS II	-----		
	DOC	DISSOLVED ORGANIC CARBON		<0.5 MG/L	
7		LEACH + SOLID I			
	DOC	DISSOLVED ORGANIC CARBON		32 MG/L	
8		LEACH + SOLID II			
	DOC	DISSOLVED ORGANIC CARBON		27 MG/L	
9		REF I SODIUM BENZ.			
	DOC	DISSOLVED ORGANIC CARBON		0.5 MG/L	
10		REF II SODIUM BENZ.			
	DOC	DISSOLVED ORGANIC CARBON		0.6 MG/L	

06/23/2000

ENVIRONMENTAL LABORATORY
ARCHIVED FINAL REPORT

1

LAB REQUEST NO. G1874
REQUESTOR NAME: MTE/EAR
DEPARTMENT: 0222
PROJECT NO: 9970013000
DATE RECEIVED: 06/06/1989
DESC: FC-203CE & FC-206CE BIODEG DAY 14

CONTRACT LAB(S):
EXP COMP DATE: 06/16/1989
DATE COMPLETED: 06/12/1989
PROJECT LEAD: JW STOCK
PHONE NO: 651-778-6438
3M FAX NO: 651-778-6176

Test shares controls and ref. substance with LR G1800; See LR G1873 for day 14 analyses.

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1		FC 203 I	-----		
	DOC		DISSOLVED ORGANIC CARBON	5.0 MG/L	
2		FC 203 II	-----		
	DOC		DISSOLVED ORGANIC CARBON	4.3 MG/L	
3		FC 206 I	-----		
	DOC		DISSOLVED ORGANIC CARBON	4.2 MG/L	
4		FC 206 II	-----		
	DOC		DISSOLVED ORGANIC CARBON	2.9 MG/L	

001722

LAB REQUEST NO. G1873
REQUESTOR NAME: MTE/EAR
DEPARTMENT: 0222
PROJECT NO: 9970013000
DATE RECEIVED: 06/06/1989
DESC: LANDFILL STAB. FOAM BIODEG. DAY 14

CONTRACT LAB(S):
EXP COMP DATE: 06/16/1989
DATE COMPLETED: 06/12/1989
PROJECT LEAD: JW STOCK
PHONE NO: 651-778-6438
3M FAX NO: 651-778-6176

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1		BALNK I	CONTROL		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	
2		BLANK II	CONTROL		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	
3		LEACH I	-----		
	DOC		DISSOLVED ORGANIC CARBON	1.9 MG/L	
4		LEACH II	-----		
	DOC		DISSOLVED ORGANIC CARBON	3.2 MG/L	
5		SOLIDS I	-----		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	
6		SOLIDS II	-----		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	
7		LEACH +	SOLIDS I		
	DOC		DISSOLVED ORGANIC CARBON	3.8 MG/L	
8		LEACH +	SOLIDS II		
	DOC		DISSOLVED ORGANIC CARBON	3.1 MG/L	
9		REF SUB I	SODIUM BENZ		
	DOC		DISSOLVED ORGANIC CARBON	0.8 MG/L	
10		REF SUB II	SODIUM BENZ		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	

LAB REQUEST NO. G1907
REQUESTOR NAME: MTE/EAR
DEPARTMENT: 0535
PROJECT NO: 9970013000
DATE RECEIVED: 06/13/1989
DESC: FC-203CE AND FC-206CE BIODEG. DAY 21

CONTRACT LAB(S):
EXP COMP DATE: 06/20/1989
DATE COMPLETED: 06/16/1989
PROJECT LEAD: JW STOCK
PHONE NO: 651-778-6438
3M FAX NO: 651-778-6176

Test shares controls & ref. substance with LR G1800, see LR G1906 for day 21 analyses.

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1		FC 203 I	-----		
	DOC		DISSOLVED ORGANIC CARBON	4.7 MG/L	
2		FC 203 II	-----		
	DOC		DISSOLVED ORGANIC CARBON	4.7 MG/L	
3		FC 206 I	-----		
	DOC		DISSOLVED ORGANIC CARBON	3.1 MG/L	
4		FC 206 II	-----		
	DOC		DISSOLVED ORGANIC CARBON	2.0 MG/L	

LAB REQUEST NO. G1906
REQUESTOR NAME: MTE/EAR
DEPARTMENT: 0535
PROJECT NO: 9970013000
DATE RECEIVED: 06/13/1989
DESC: LANDFILL STAB FOAM BIODEG. DAY 21

CONTRACT LAB(S):
EXP COMP DATE: 06/20/1989
DATE COMPLETED: 06/16/1989
PROJECT LEAD: JW STOCK
PHONE NO: 651-778-6438
3M FAX NO: 651-778-6176

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1		BLANK I	CONTROL		
	DOC	DISSOLVED ORGANIC CARBON		<0.5 MG/L	
2		BLANK II	CONTROL		
	DOC	DISSOLVED ORGANIC CARBON		<0.5 MG/L	
3		LEACH I	LEACHATE		
	DOC	DISSOLVED ORGANIC CARBON		2.3 MG/L	
4		LEACH II	LEACHATE		
	DOC	DISSOLVED ORGANIC CARBON		3.1 MG/L	
5		SOLIDS I	-----		
	DOC	DISSOLVED ORGANIC CARBON		<0.5 MG/L	
6		SOLIDS II	-----		
	DOC	DISSOLVED ORGANIC CARBON		<0.5 MG/L	
7		LEACH +	SOLIDS I		
	DOC	DISSOLVED ORGANIC CARBON		2.4 MG/L	
8		LEACH +	SOLIDS II		
	DOC	DISSOLVED ORGANIC CARBON		1.5 MG/L	
9		REF SUB I	SODIUM BENZ.		
	DOC	DISSOLVED ORGANIC CARBON		<0.5 MG/L	
10		REF SUB II	SODIUM BENZ.		
	DOC	DISSOLVED ORGANIC CARBON		<0.5 MG/L	

LAB REQUEST NO. G1936
REQUESTOR NAME: MTE/EAR
DEPARTMENT: 0535
PROJECT NO: 9970013000
DATE RECEIVED: 06/19/1989
DESC: FC-203CE & FC-206CE BIODEG. DAY 27

CONTRACT LAB(S):
EXP COMP DATE: 06/26/1989
DATE COMPLETED: 06/23/1989
PROJECT LEAD: JW STOCK
PHONE NO: 651-778-6438
3M FAX NO: 651-778-6176

Test shares controls & ref. substance with LR G1800, see LR G1935 for day 27 analyses.

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1		FC-203 I	-----		
	DOC	DISSOLVED ORGANIC CARBON		3.0 MG/L	
2		FC-203 II	-----		
	DOC	DISSOLVED ORGANIC CARBON		4.2 MG/L	
3		FC-206 I	-----		
	DOC	DISSOLVED ORGANIC CARBON		3.1 MG/L	
4		FC-206 II	-----		
	DOC	DISSOLVED ORGANIC CARBON		2.9 MG/L	

LAB REQUEST NO. G1935
REQUESTOR NAME: MTE/EAR
DEPARTMENT: 0535

PROJECT NO: 9970013000

DATE RECEIVED: 06/19/1989

DESC: LANDFILL STAB. FOAM BIODEG. DAY 27

CONTRACT LAB(S):

EXP COMP DATE: 06/26/1989

DATE COMPLETED: 06/23/1989

PROJECT LEAD: JW STOCK

PHONE NO: 651-778-6438

3M FAX NO: 651-778-6176

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1		BLANK I	CONTROL		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	
2		BLANK II	CONTROL		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	
3		LEACH I	LEACHATE		
	DOC		DISSOLVED ORGANIC CARBON	1.8 MG/L	
4		LEACH II	LEACHATE		
	DOC		DISSOLVED ORGANIC CARBON	2.0 MG/L	
5		SOLIDS I	-----		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	
6		SOLIDS II	-----		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	
7		LEACH +	SOLIDS I		
	DOC		DISSOLVED ORGANIC CARBON	2.8 MG/L	
8		LEACH +	SOLIDS		
	DOC		DISSOLVED ORGANIC CARBON	1.9 MG/L	
9		REF SUB I	SODIUM BENZ		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	
10		REF SUB II	SODIUM BENZ		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	

06/23/2000

ENVIRONMENTAL LABORATORY
ARCHIVED FINAL REPORT

1

LAB REQUEST NO. G1941
REQUESTOR NAME: MTE/EAR
DEPARTMENT: 0535
PROJECT NO: 9970013000
DATE RECEIVED: 06/20/1989
DESC: FC-203CE & FC206CE BIODEG DAY 28

CONTRACT LAB(S):
EXP COMP DATE: 06/27/1989
DATE COMPLETED: 06/23/1989
PROJECT LEAD: JW STOCK
PHONE NO: 651-778-6438
3M FAX NO: 651-778-6176

TEST SHARES CONTROLS + REF SUBSTANCE W/ LRG1800, SEE LRG1940 FOR
DAY 28 ANALYSES.

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1		FC 203 I	-----		
	DOC		DISSOLVED ORGANIC CARBON	3.0 MG/L	
2		FC 203 II	-----		
	DOC		DISSOLVED ORGANIC CARBON	4.8 MG/L	
3		FC 206 I	-----		
	DOC		DISSOLVED ORGANIC CARBON	3.7 MG/L	
4		FC 206 II	-----		
	DOC		DISSOLVED ORGANIC CARBON	3.3 MG/L	

001728

LAB REQUEST NO. G1940
REQUESTOR NAME: MTE/EAR
DEPARTMENT: 0535
PROJECT NO: 9970013000
DATE RECEIVED: 06/20/1989
DESC: LANDFILL STAB FOAM BIODEG DAY 28

CONTRACT LAB(S):
EXP COMP DATE: 06/27/1989
DATE COMPLETED: 06/23/1989
PROJECT LEAD: JW STOCK
PHONE NO: 651-778-6438
3M FAX NO: 651-778-6176

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1		BLANK I	CONTROL		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	
2		BLANK II	CONTROL		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	
3		LEACH I	LEACHATE		
	DOC		DISSOLVED ORGANIC CARBON	4.1 MG/L	
4		LEACH II	LEACHATE		
	DOC		DISSOLVED ORGANIC CARBON	4.4 MG/L	
5		SOLIDS I	PRE-WASHED		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	
6		SOLIDS II	PRE-WASHED		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	
7		LEA.+SOLID I	-----		
	DOC		DISSOLVED ORGANIC CARBON	3.7 MG/L	
8		LEA+SOLID II	-----		
	DOC		DISSOLVED ORGANIC CARBON	3.9 MG/L	
9		REF SUB I	Na BENZOATE		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	
10		REF SUB II	Na BENZOATE		
	DOC		DISSOLVED ORGANIC CARBON	<0.5 MG/L	