ACUTE TOXICITY TO FISH

TEST SUBSTANCE

Identity: A mixture containing perfluorooctanesulfonate, which may also be referred to as PFOS, FC-95, or as a component of FC-201. (1-Octanesulfonic acid, perfluoroalkyl sulfonate salts (5) + (5140P)) (CAS # 2795-39-3)

Remarks: The 3M production lot number was Lot 1. The test sample is FC-201. Its purity was not sufficiently characterized, though current information indicates it is a mixture of 6% PFOS, 36% diethylene glycol butyl ether, 36.44% water, 12% Sultone foamer, 9% sodium octyl sulfate, 0.5% sodium lauryl sulfate, and 0.06% benzotriazole.

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

METHOD:

Method: Not given.
Type: Static acute
GLP: No
Year completed: 1975
Species: *Pimephales promelas*
Supplier: Not given.
Analytical monitoring: Temperature, pH, and DO
Exposure period: 96-hours
Statistical methods: LC_{50} values calculated using graphic interpolation, recalculated using probit analysis.
Test fish age: Juveniles
Length and weight: Average length = 2 in.
Average weight = 1.5 g (wet)
Loading: Not given.
Pretreatment: None.
Test conditions:
Dilution water: Carbon filtered St. Paul city water, St. Paul, MN
Dilution water chemistry: Not given.
Lighting: Not given.
Stock and test solution preparation: Not given.
Concentrations dosing rate: Once
Stability of the test chemical solutions: Not noted
Exposure vessels: Not given.
Number of replicates: 1
Number of fish per replicate: Not given.
Number of concentrations: five plus a blank control
Water chemistry during the study:

pH range (0-96 hours):
7.0 – 7.0 (control exposure)
6.8 – 6.9 (750 mg/L exposure)*
Temperature range (0-96 hours):
69 - 70 °F
Dissolved oxygen range (0-96 hours):
4.7 – 5.6 mg/L (control exposure)
4.0 – 5.0 mg/L (750 mg/L exposure)*

* 750 mg/L (second highest concentration) exposure values used because the highest concentration used resulted in total mortality by 72 hours.

RESULTS

Nominal concentrations: Bk control, 100, 250, 500, 750, and 1,000 mg/L
Element values: 96-hour LC50 = 526 (397 – 631) mg/L

Element values based on nominal concentrations

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 test substance 96-hour LC_{50} for fathead minnow was determined to be 526 mg/L with a 95% confidence interval of 397 to 631 mg/L.

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

DATA QUALITY

Reliability: Klimisch ranking 3. Testing lacks record of methodology used. The sample purity was not properly characterized and the study lacks analytical confirmation of the amount of fluorochemical proportion in the solution.

REFERENCES

The test was conducted by the 3M Company, Environmental Laboratory, St. Paul, MN, Lab Request number 2563, 1975.

OTHER

Last changed: 6/26/00

FORM 10620-PWO

cc: LAB REQUEST BOOK – 42-5W

File: TDB

Water and Wastewater

REQUEST FOR LABORATORY WORK Lab Request No. 2563

TO: ENVIRONMENTAL ENGINEERING LABORATORY – BUILDING 53-6N

Requestor	Lab Personnel
Name: Dale Bacon Request Date 1-6-75	Date Rec'd. Sample:
Project No. ____ Prob. No. ____ Code # ____	Analyst: MTE
Description: FC-Samples	Y ____ B ____ P ____
Sample Date: ____ Date Needed: ____	Date Completed: 1-17-75
Hold Sample For ____ Days Est. Time: ____ Hrs.	Hrs. Spent: 15

See

Sample Description	FC-201	FC-203A	FC-208	FC-225	FC-9
Total Hardness, mg/l as $CaCO_3$					
Calcium Hardness, mg/l as $CaCO_3$					
"P" Alkalinity, mg/l as $CaCO_3$					
"M" Alkalinity, mg/l as $CaCO_3$					
pH					
Sulfate, mg/l as SO_4					
Nitrate, mg/l as NO_3					
Chloride, mg/l as Cl					
Silica, mg/l as SiO_2					
Fluoride, mg/l as F					
Ortho Phosphate, mg/l as P					
Total Phosphate, mg/l as P					
Total Chromium, mg/l as Cr					
Hex. Chromium, mg/l as Cr					
Total Cyanide, mg/l as CN					
Ferrocyanide, mg/l as CN					
Iron, mg/l as Fe					
Manganese, mg/l as Mn					
Surfactant, mg/l as LAS					
Phenol, mg/l					
BOD, mg/l					
COD, mg/l (Short, Long, Dilute)					
Total Suspended Solids, mg/l					
Volatile Suspended Solids, mg/l					
Turbidity, mg/l Silica					
Total Solids, mg/l					
Total Volatile Solids, mg/l					
Conductivity, mhos					
Total Bacteria, No./100 ml					
Total Coliform, No./100 ml					
Fecal Coliform, No./100 ml					
Fecal Streptococcus, No./100 ml					
Ammonia Nitrogen, mg/l as N					
Kjeldahl Nitrogen, mg/l as N					
Oil and Grease, mg/l					
Bioassay, 96 hour LC50 *	500 PPM	300 PPM	600 PPM	250 PPM	200

Comments: * Static test.

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White – Environmental Engrg. Lab Canary – Environmental Engrg. Lab Pink – Environmental Engrg. Lab Goldenrod – Requesters Copy

3M Carbonless

740101

ENVIRONMENTAL ENGINEERING LABORATORY
AQUATIC TOXICITY WORK SHEET

Assume 10 fish at each conc

Type Test 96 Hours - Static

Material Tested FC-201

Test Organism Fathead Minnow

Avg. Weight 1.5g Avg. Size 2 Inches

Date Started 1-7-75

Date Completed 1-11-75

Time Started 2:00 PM

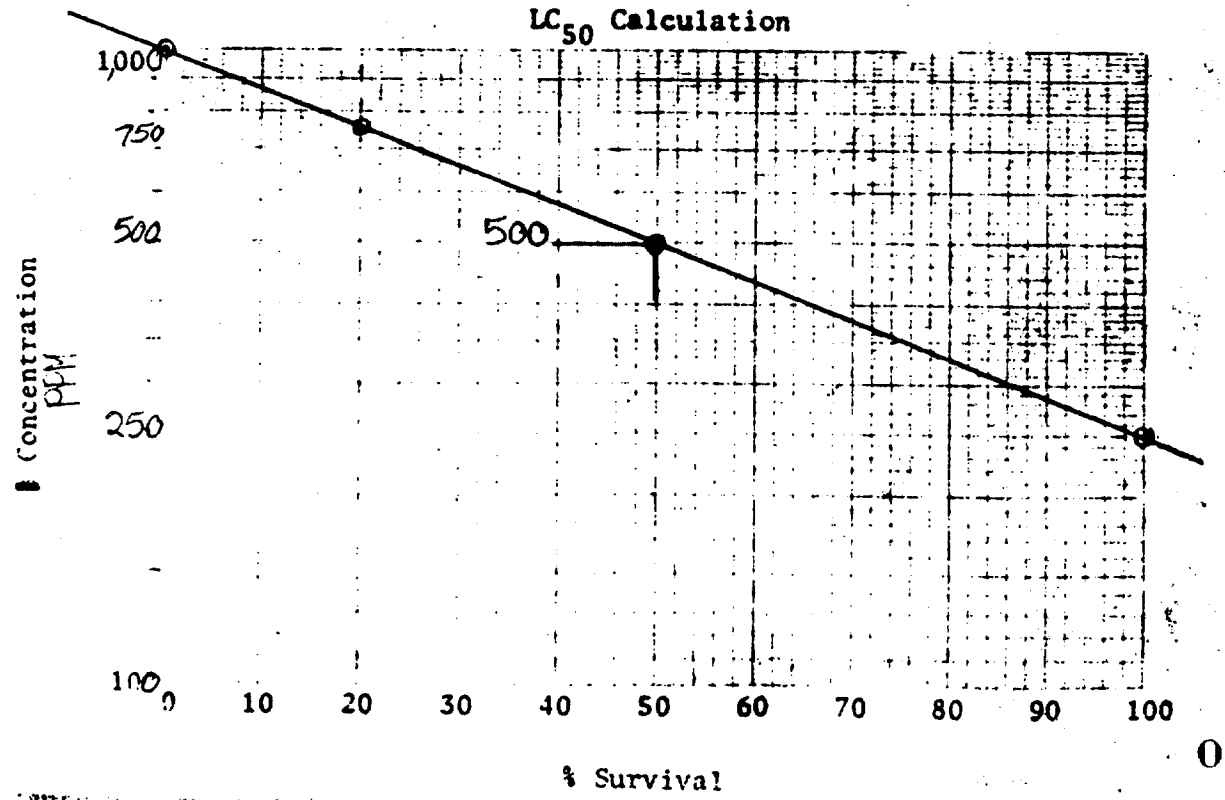
Plotted LC_{50} 500 PPM

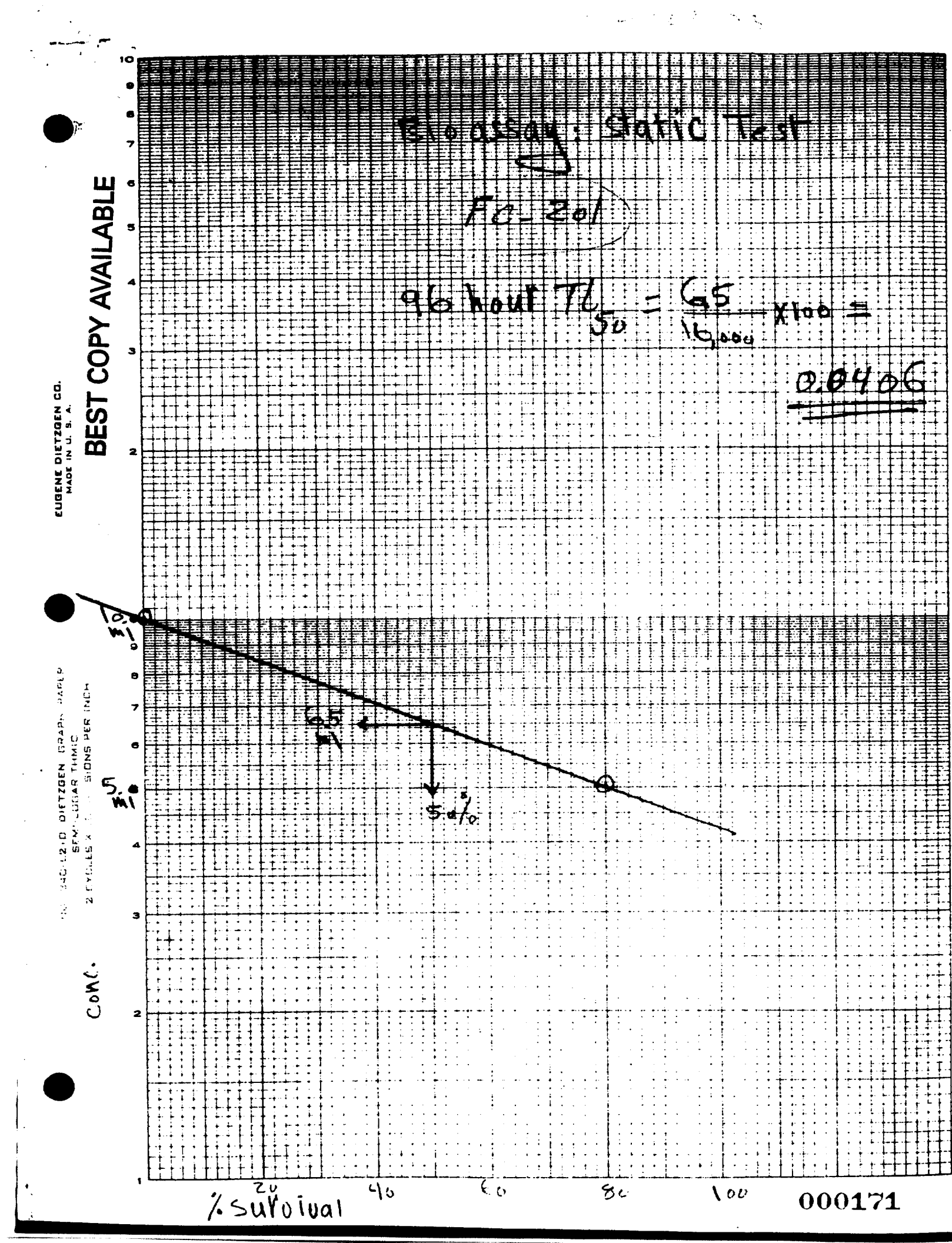
Dilution Water Carbon Filtered - St. Paul City Water

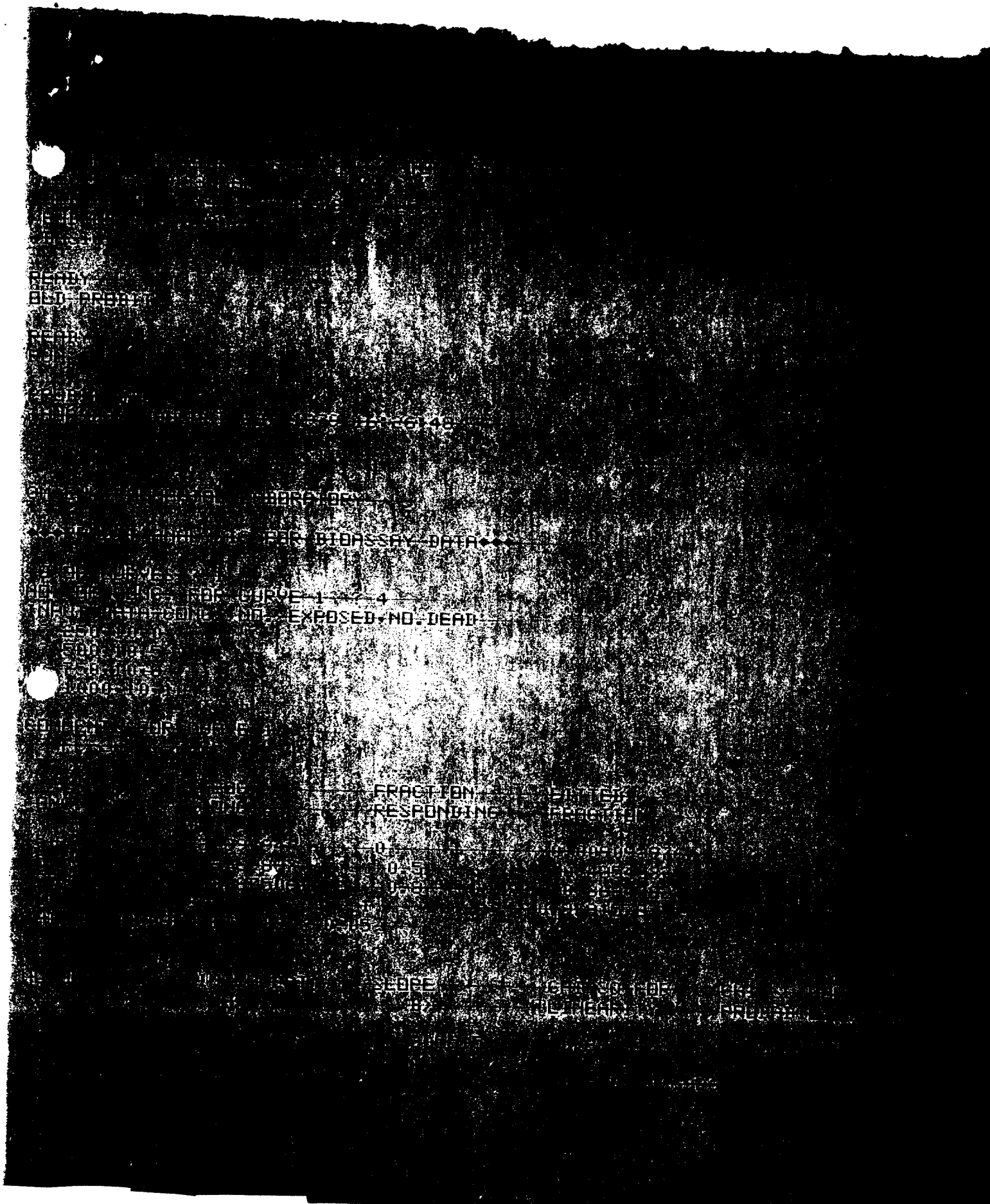
Old probit ⇒ 526 mg/l 95 C.I. 397-631

Conc.	24 hrs % Survival	pH	D.O ppm	48 hrs % Survival	pH	D.O ppm	72 hrs % Survival	pH	D.O ppm	96 hrs % Survival	pH	D.O ppm
Control	100	7.0	5.6	100	7.0	5.3	100	7.0	5.0	100	7.0	4.7
100PPM	100	7.0	5.3	100	7.0	5.1	100	7.0	5.0	100	7.0	4.6
250	100	7.0	5.2	100	7.0	5.0	100	7.0	4.7	100	7.0	4.5
500	100	7.0	5.0	100	6.9	4.9	70	6.9	4.5	50	6.9	4.2
750	90	6.9	5.0	70	6.9	4.7	20	6.9	4.5	20	6.8	4.0
1,000	50	6.9	5.0	20	6.9	4.5	0	6.8	4.0	0	—	—
Average Temperature			69			70			70			70

Comments:




96 hour Assay: Static Test
Fe - 201
96 hour $TL_{50} = \frac{65}{16,000} \times 100 =$
0.0406
EUGENE DIETZGEN CO.
MADE IN U. S. A.
BEST COPY AVAILABLE
Conc.
% survival
20
40
60
80
100
000171



BEST COPY AVAILABLE

Date started: 2-27-73 BIOASSY - FC-201 Lot-1 (1% concentrate)

CONC.	24 hrs % Survival	pH	D.O ppm	48 hrs. % Survival	pH	D.O. ppm	72 hrs. % Survival	pH	D.O. ppm	96 hrs. % Survival	pH	D.O. ppm
Control	100%		6.5	100%		5.0	100%		4.8	100		
5.0ml 11	100%		5.4	100%		3.9	100%		2.0	80%		
10.0ml 12	100%		5.2	0%		3.2	0%	—		0%	—	
15.0ml 13	30%		5.3	0%		2.9	0%	—		0%	—	
20.0ml 14	0%			0%		2.0	0%	—		0%	—	
25.0ml 15	0%			0%		2.0	0%	—		0%	—	

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Screening Test:

1.0ml one Dead Two Dead
4.0ml All Dead All Dead