

Acute Toxicity to *Daphnia magna* for FM-3820 (28%
PFOS)

ACUTE TOXICITY TO AQUATIC INVERTEBRATES (E.G., DAPHNIA)

TEST SUBSTANCE

Identity: Perfluorooctanesulfonate; may also be referred to as PFOS or FC-95 or as part of the mixed product FM-3820 (see Remarks).
(1-Octanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-, potassium salt, CAS # 2795-39-3)

Remarks: The test sample is FM-3820, a mixture of the test substance in diethylene glycol butyl ether and water (approximately 24-28% test substance in diethylene glycol butyl ether and water). Calculations were made to adjust test values using the upper limit concentration of the test substance (28%) in the test sample and no adjustment was made for the presence of the diethylene glycol butyl ether or water when noted below. These calculations assumed that all toxicity was due to the presence of the Perfluorooctanesulfonate substance.

METHOD

Method: OECD 202

Test type: Static acute

GLP: Yes

Year Completed: 1991

Species: *Daphnia magna*

Analytical monitoring: DO, pH, Conductivity, and temperature were monitored daily.

Statistical methods: EC₅₀ values calculated, when possible by standard statistical techniques (Stephan, 1983)

Test daphnid source: Obtained from cultures maintained by EnviroSystems Division, Resource Analysts, Inc., Hampton, NH.

Test daphnid age at study initiation: < 24-hours

Test conditions

Dilution water: Well water from wells at EnviroSystems in Hampton, New Hampshire.

Dilution water chemistry:

pH:	7.8*
Conductivity:	1200 umhos/cm*
TOC:	<2.0 mg/L

* Values measured at time of test.

Lighting: Cool white fluorescent lights, intensity 23 uE/s/m². Photoperiod of 16-hours light, 8-hours dark. No transition period noted.

Stock and test solutions preparation: A primary stock solution was prepared in dilution water at 1000 mg/L. The primary stock was proportionally diluted with dilution water to prepare the five test concentrations.

Exposure vessels: 250 mL plastic beakers containing 200 mL of test solution. The approximate depth of test solution was 6 cm.

Number of replicates: Four

Number of daphnids per replicate: Five

Number of concentrations: five plus a negative control

Water chemistry during the study:

Dissolved oxygen range (0 – 48 hours):

8.2 – 8.5 mg/L (control exposure)

8.1 – 8.5 mg/L (150 mg/L exposure)

pH range (0 – 48 hours)

7.8 – 8.6 (control exposure)

7.8 – 8.6 (150 mg/L exposure)

Test temperature range (0 – 48 hours)

20.8 – 21.0°C (control exposure)

20.7 – 20.9°C (150 mg/L exposure)

Conductivity range (0 – 48 hours)

1200 – 1300 umhos/cm (control exposure)

1200 – 1300 umhos/cm (150 mg/L exposure)

Element basis: mortality

RESULTS

Nominal concentrations: Bk control, 25, 40, 60, 100, 150 mg/L

Element values: 24-hour EC_{50} = >150 mg/L (C.I. not calculable)
48-hour EC_{50} = 49 (43-56) mg/L

Perfluorooctanesulfonate concentration adjusted Element value:

24-hour EC_{50} = >42 mg/L

48-hour EC_{50} = 14 mg/L

All element values based on nominal concentrations

Biological observations: Ninety five percent survival occurred in the control exposure. The number of surviving organisms and the occurrence of sublethal effects and immobilization or other sublethal effects were determined visually and recorded initially and after 24 and 48 hours.

Cumulative percent mortality:

Nominal Test Conc., mg/L	24-hours	48-hours
Neg. Control	0	5
25	0	0
40	5	25
60	0	25
100	0	100
150	20	100

Control response: satisfactory

CONCLUSIONS

The test substance 48-hour EC₅₀ for *Daphnia magna* was determined to be 49 mg/L with a 95% confidence interval of 43-56 mg/L. If you assume all toxicity of the mixture is due to the Perfluorooctanesulfonate, the adjusted 48-hour EC₅₀ value is 14 mg/L (49 mg/L X 0.28).

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

DATA QUALITY

Reliability: Klimisch ranking = 2. The study lacks analytical measurement of test substance concentrations in the test solutions and sample purity is not sufficiently characterized. Additionally, data is for a mixture and toxicity cannot be positively attributed to Perfluorooctanesulfonate as the diethylene glycol butyl ether could also contribute to the toxicity. The basic water quality parameters (hardness, alkalinity and calcium/magnesium ratio) were not included in the final report.

REFERENCES

This study was conducted at EnviroSystems Division, Resource Analysts, Incorporated, Hampton, NH at the request of the 3M Company.

OTHER

Last changed: 5/3/00

08/19/1991

ENVIRONMENTAL LABORATORY FINAL REPORT

1

LAB REQUEST NO. H2864

REQUESTOR NAME: EA REINER/SAB
DEPARTMENT: 0535
PROJECT NO: 5918340000
DATE RECEIVED: 11/09/1990
DESC: FC-203 & COMPONENTS

CONTRACT LAB: ESI
CONTRACT LAB COST: \$12,000.00
3M E-L HOURS: 0
EXP COMP DATE: 03/05/1991
DATE COMPLETED: 08/19/1991

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL OR (C.I.)
1		RM 3017	-----		
		*DAPHNIA ACUTE TEST		COMPLETE	
2		RM 8887	-----		
		*DAPHNIA ACUTE TEST		COMPLETE	
3		RM 3021	-----		
		*DAPHNIA ACUTE TEST		COMPLETE	
4		RM 27513	-----		
		*DAPHNIA ACUTE TEST		COMPLETE	
5		FM 4115	-----		
		*DAPHNIA ACUTE TEST		COMPLETE	
6		FM 3820	-----		
		*DAPHNIA ACUTE TEST		COMPLETE	
7		RM 55040	-----		
		*DAPHNIA ACUTE TEST		COMPLETE	
8		RD 199	-----		
		*DAPHNIA ACUTE TEST		COMPLETE	
9		FC 203	-----		
		*DAPHNIA ACUTE TEST		COMPLETE	
10		VW 160390	-----		
		*DAPHNIA ACUTE TEST		COMPLETE	

* = CONTRACT LAB

SUBMITTED BY: _____ DATED: _____

Study Title

Static Acute Toxicity of FM 3820
to the Daphnid, Daphnia magna

Authors

Timothy J. Ward
Robert L. Boeri

Study Completed

March 26, 1991

Performing Laboratory

EnviroSystems Division
Resource Analysts, Incorporated
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Hampton, New Hampshire 03842

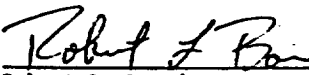
EnviroSystems Study Number 90171-3
Page 1 of 17

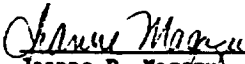
Resource Analysts, Inc., Subsidiary of MILLIPORE

I. GOOD LABORATORY PRACTICE STATEMENT

This study was conducted according to OECD Good Laboratory Practice Regulations. Neither the Study Director nor the sponsor are aware of any circumstances that would affect the integrity of this study.

 3/26/91
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Author and Study Director

 3-27-91
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Coauthor

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II. QUALITY ASSURANCE STATEMENT

Submitted by: EnviroSystems Division
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P.O. Box 2130
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Hampton, New Hampshire 03842

Certification:

Data presented in this report were derived by methods and with materials identified in the section of the report entitled "Methods and Materials." The test was performed in accordance with EnviroSystems Protocol 90171-3 and the Product Registration Aquatic Toxicology Laboratory Standard Operating Procedures Manual. The toxicity test was performed by Ellen Stanford, Jeanne Magazu, Peter Kowalski, Robert Boeri, and Timothy Ward. The original raw data and final report will be archived at Resource Analysts, Inc. for at least 10 years.

All data transcribed from the raw data to the report were checked for accuracy, and all data were verified by Quality Assurance Auditors. Quality assurance audits were performed on

Audit Date	Reported to Study Director	Reported to Management
11/12/90	11/14/90	3/28/91
12/20/90	12/20/90	3/28/91
2/ 8/91	2/ 8/91	3/28/91
3/28/91	3/28/91	3/28/91

Stephanie Beck 3-28-91
Quality Assurance Representative

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V. SUMMARY

The acute toxicity of FM 3820 to the daphnid, Daphnia magna, is described in this final report. The test was conducted for 3M Company for 48 hours during December 18 to 20, 1990, at the EnviroSystems Division of Resource Analysts, Inc. in Hampton, New Hampshire. It was conducted by Ellen Stanford, Jeanne Magazu, Peter Kowalski, Robert Boeri, and Timothy Ward according to the protocol developed for EnviroSystems Study Number 90171-3.

The test was performed under static conditions with five concentrations of test substance and a dilution water control at a temperature of $20 \pm 1^\circ\text{C}$. The dilution water was filtered natural well water collected from wells at Hampton, New Hampshire. Aeration was not employed to maintain dissolved oxygen concentrations above an acceptable level. Nominal concentrations of test substance were: 0 mg/L (control), 25 mg/L, 40 mg/L, 60 mg/L, 100 mg/L, and 150 mg/L. Nominal concentrations were used for all calculations.

Daphnids used in the test were produced from an in-house culture and were less than 24 hours old at the start of the test. After 48 hours of exposure the control daphnids had an average wet weight (blotted dry) of 0.0001 g, resulting in a loading rate of 0.002 g/L. All daphnids were in good condition at the beginning of the study. Exposure of daphnids to the test substance resulted in a 48 hour median effective concentration (EC50) of 49 mg/L FM 3820, with a 95% confidence interval of 43 - 56 mg/L.

VI. INTRODUCTION

This study was sponsored by 3M Company, St. Paul, Minnesota. The objective of the study was to determine the acute toxicity of FM 3820 to the daphnid, a freshwater invertebrate. The report contains sections that describe the methods and materials employed in the study, and the results of the investigation. The report also contains an appendix that presents the water quality data collected during the test.

VII. METHODS AND MATERIALS

TEST SUBSTANCE:

FM 3820 (EnviroSystems Sample Number 2696E) was delivered to EnviroSystems on November 15, 1990. It was contained in a 250 mL plastic bottle that was labelled with the following information: "H 2864-6, FM 3820". The test substance was supplied by 3M Company, St. Paul, Minnesota. Prior to use it was stored in the dark at room temperature. A reserve sample will be archived at EnviroSystems for a minimum of 10 years.

DILUTION WATER:

Water used for acclimation of test organisms and for all toxicity testing was collected from wells at EnviroSystems in Hampton, New Hampshire. Water was stored in 500-gallon polyethylene tanks where it was aerated. Results of chemical analysis of a representative sample of water are presented in Table 1.

TEST ORGANISM:

Juvenile daphnids employed as test organisms were from a single source and were identified using an appropriate taxonomic key. Daphnids used in the test were produced from an in-house culture and were less than 24 hours old at the start of the test. Control daphnids were weighed at the conclusion of the toxicity test. Prior to testing, daphnids were maintained in 100% dilution water under static conditions in 4 liter glass jars. During the 14 day acclimation daphnid cultures were not treated for disease and they were free of apparent sickness, injuries, and abnormalities at the beginning of the test. During the acclimation period 24 hours prior to the test initiation the temperature was 19.0 - 19.8°C. Daphnids were fed yeast/trout chow and/or the freshwater alga Selenastrum capricornutum daily before the test.

Table 1: Chemical characterization of a representative sample of natural well water used as dilution water for toxicity test

Parameter	Unit of Measurement	Reporting Limit	Measured Value
pH	pH units	—	7.8
Conductivity	umhos/cm	—	1200
Organochlorine pesticides	ug/L	2	ND
Organophosphorus pesticides	ug/L	5.0	ND
Polychlorinated biphenyls	ug/L	0.6	ND

Notes: 1. ND = Not detected above the reporting limit.
 2. The pH and conductivity values were determined in a sample of dilution water collected from a control test vessel at the beginning of the toxicity test. Additional chemical parameters were measured in dilution water during October, 1990 as part of routine biannual water quality analysis.

TOXICITY TESTING:

A screening test with the test substance was conducted during December 5 to 7, 1990. Nominal concentrations of test substance were: 0.1, 1.0, 10, 100, and 1,000 mg/L. After 48 hours of exposure there was 0% survival at 1,000 mg/L, 60% survival at 100 mg/L, and 90% or greater survival at all other concentrations.

The definitive toxicity test was performed during December 18 to 20, 1990, according to EnviroSystems Test Protocol 90171-3 (Static, Acute Toxicity Test With FM 3820 And The Daphnid, Daphnia magna), which was signed by the Study Director on November 16, 1990. It is based on procedures of the OECD (1984).

The test was conducted at a target temperature of $20 \pm 1^\circ\text{C}$ with five concentrations of test substance and a dilution water control. A 1,000 mg/L stock solution was prepared by combining 1.0 g of test substance with dilution water and adjusting the final concentration to 1,000 ml without the use of a solvent. Nominal concentrations of the test material were: 0 mg/L (control), 25 mg/L, 40 mg/L, 60 mg/L, 100 mg/L, and 150 mg/L FM 3820.

Twenty daphnids were randomly and equally distributed among four replicates of each treatment. The test was performed in 250 ml glass beakers that contained 200 ml of test solution (water depth was approximately 6 cm). Test vessels were randomly arranged in an incubator during the 48 hour test (a random numbers table was used to select the location of each vessel). A 16 hour light and 8 hour dark photoperiod was automatically maintained with cool-white fluorescent lights that provided a light intensity of $23 \text{ uEs}^{-1}\text{m}^{-2}$. Aeration was not required to maintain dissolved oxygen concentrations above acceptable levels. Daphnids were not fed during the test.

The number of surviving organisms and the occurrence of sublethal effects and immobilization (inability to swim within 15 seconds after gentle agitation) or other sublethal effects (loss of equilibrium, erratic swimming, loss of reflex, excitability, discoloration, or change in behavior) were determined visually and recorded initially and after 24 and 48 hours. Dead test organisms were removed when first observed. Dissolved oxygen (YSI Model 57 meter; instrument number PRL-3), pH (Beckman model pHI 12 meter; instrument number PRL-4), conductivity (Labcomp SCT meter, instrument number PRL-9), and temperature (ASTM mercury thermometer) were measured and recorded daily in each test chamber that contained live animals.

STATISTICAL METHODS:

Results of the toxicity test were interpreted by standard statistical techniques (Stephan, 1983). The nominal concentration of test substance and the number of organisms killed or immobilized were used by the author to calculate the EC50 values.

VIII. RESULTS

All test vessels appeared clear initially and remained free of insoluble material throughout the test. Biological and water quality data generated by the acute toxicity test are presented in Table 2 and Appendix A, respectively. Ninety five percent survival occurred in the control exposure. Control daphnids had an average wet weight (blotted dry) of 0.0001 g at the end of the test. Loading rate during the toxicity test was approximately 0.0025 g/L. Exposure of daphnids to the reference toxicant sodium dodecyl sulfate resulted in a 48 hour median lethal concentration (LC50) of 15.6 mg/L.

The 24 and 48 hour EC50s for daphnids exposed to FM 3820 are presented in Table 3. Exposure of daphnids to the test substance resulted in a 48 hour EC50 of 49 mg/L FM 3820, with a 95% confidence interval of 43 - 56 mg/L.

Table 2. Survival data from toxicity test

Nominal Concentration (mg/L)	rep.	Number Alive			Number Affected		
		0 hr	24 hr	48 hr	0hr	24hr	48hr
0 (control)	1	5	5	4	0	0	0
	2	5	5	5	0	0	0
	3	5	5	5	0	0	0
	4	5	5	5	0	0	0
25	1	5	5	5	0	0	0
	2	5	5	5	0	0	0
	3	5	5	5	0	0	2
	4	5	5	5	0	0	0
40	1	5	5	3	0	0	0
	2	5	5	5	0	0	0
	3	5	5	3	0	0	1
	4	5	4	4	0	0	0
60	1	5	5	2	0	0	2
	2	5	5	4	0	0	0
	3	5	5	4	0	0	4
	4	5	5	5	0	0	3
100	1	5	5	0	0	0	-
	2	5	5	0	0	0	-
	3	5	5	0	0	0	-
	4	5	5	0	0	0	-
150	1	5	3	0	0	0	-
	2	5	5	0	0	1	-
	3	5	4	0	0	0	-
	4	5	4	0	0	0	-

Note: Affected daphnids were immobilized (unable to swim within 15 seconds after gentle agitation)

Table 3. Median effective concentrations (EC50s) from toxicity test

Exposure period	EC50	95 percent confidence limits	Calculation method
24 hours	>150 mg/L	—	—
48 hours	49 mg/L	43 - 56 mg/L	Probit

IX. REFERENCES

OECD. 1981. Decision of the Council Concerning the Mutual Acceptance of Data in the Assessment of Chemicals. Annex 2. OECD Principles of Good Laboratory Practice. C (81) 30 (Final).

OECD. 1984. Guidelines for Testing of Chemicals. Section 2: Effects on Biotic Systems. Method 202, Daphnid sp., Acute Immobilization Test and Reproduction Test. Adopted April 4, 1984.

Stephan, C.E. 1983. Computer program for calculation of LC50 values. Personal communication.

Appendix A. WATER QUALITY DATA FROM TOXICITY TEST

Table A.1. Conductivity, pH, temperature, and dissolved oxygen concentration measured during toxicity test

Nominal concentration (mg/L)	Rep.	Conductivity (umho/cm)			pH		
		0 hr	24 hr	48 hr	0 hr	24 hr	48 hr
0 (control)	1	1200	1300	1300	7.8	8.2	8.6
	2	1200	1300	1300	7.8	8.2	8.6
	3	1200	1300	1300	7.8	8.2	8.6
	4	1200	1300	1300	7.8	8.2	8.6
25	1	1200	1300	1300	7.8	8.2	8.6
	2	1200	1300	1300	7.8	8.2	8.6
	3	1200	1300	1300	7.8	8.2	8.6
	4	1200	1300	1300	7.8	8.2	8.6
40	1	1200	1300	1300	7.8	8.2	8.6
	2	1200	1300	1300	7.8	8.2	8.6
	3	1200	1300	1300	7.8	8.2	8.6
	4	1200	1300	1300	7.8	8.2	8.6
60	1	1200	1300	1300	7.8	8.2	8.6
	2	1200	1300	1300	7.8	8.2	8.6
	3	1200	1300	1300	7.8	8.2	8.6
	4	1200	1300	1300	7.8	8.2	8.6
100	1	1200	1300	1300	7.8	8.2	8.6
	2	1200	1300	1300	7.8	8.2	8.6
	3	1200	1300	1300	7.8	8.2	8.6
	4	1200	1300	1300	7.8	8.2	8.6
150	1	1200	1300	1300	7.8	8.3	8.6
	2	1200	1300	1300	7.8	8.3	8.6
	3	1200	1300	1300	7.8	8.3	8.6
	4	1200	1300	1300	7.8	8.3	8.6

Table A.1. Continued.

Nominal concentration (mg/L)	Rep.	Temperature (°C)			Dissolved Oxygen (mg/L)		
		0 hr	24 hr	48 hr	0 hr	24 hr	48 hr
0 (control)	1	20.8	20.9	21.0	8.3	8.2	8.5
	2	20.8	21.0	21.0	8.3	8.2	8.5
	3	20.9	20.9	20.8	8.3	8.3	8.5
	4	20.9	20.9	20.9	8.3	8.2	8.5
25	1	20.8	20.8	20.9	8.2	8.2	8.5
	2	20.8	20.9	21.0	8.3	8.2	8.5
	3	20.7	20.8	21.0	8.3	8.1	8.5
	4	20.7	20.9	21.0	8.3	8.1	8.5
40	1	20.9	20.9	20.8	8.2	8.2	8.4
	2	20.8	20.8	20.6	8.2	8.2	8.3
	3	20.9	20.7	20.6	8.3	8.3	8.5
	4	20.9	20.8	20.9	8.3	8.2	8.5
60	1	20.7	20.8	20.9	8.3	8.1	8.0
	2	20.7	20.8	20.9	8.2	8.1	8.3
	3	20.9	20.9	20.9	8.2	8.2	8.3
	4	20.8	20.8	20.9	8.3	8.3	8.4
100	1	20.8	20.9	21.0	8.2	8.1	8.5
	2	20.7	20.8	20.9	8.3	8.1	8.4
	3	20.8	20.8	20.9	8.2	8.3	8.3
	4	20.8	20.9	21.0	8.2	8.2	8.4
150	1	20.9	20.8	20.9	8.3	8.1	8.5
	2	20.7	20.9	20.9	8.2	8.1	8.5
	3	20.8	20.9	20.9	8.2	8.2	8.4
	4	20.8	20.9	20.9	8.2	8.2	8.5

RESOURCE ANALYSTS, INCORPORATED
ENVIROSYSTEMS DIVISION

PRODUCT REGISTRATION LABORATORY
AQUATIC TOXICOLOGY STUDY PROTOCOL

Static Acute Toxicity Test With FM 3820
And The Daphnid, *Daphnia magna*

Sponsor

3M Company
PO Box 33428
St. Paul, Minnesota 55133

Sponsor Approval of Protocol

Ann A. Beach

Date 11/8/90

Testing Facility

EnviroSystems Division
Resource Analysts, Inc.
1 Lafayette Road
Hampton, NH 03842

Estimated Test Initiation Date: October, 1990

Estimated Test Completion Date: December, 1990

Study Director: Timothy J. Ward

Study Director Approval of Protocol

Timothy J. Ward

Date 11/10/90

THIS IS A CERTIFIED
TRUE COPY.

SIGNATURE CAB DATE 3/27/91

61 pages

1.0 TITLE

Static Acute Toxicity Test With FM 3820 And The Daphnid, *Daphnia magna*

2.0 PURPOSE

To determine the 24 hour and 48 hour median effective concentrations (EC50s) of the test substance to the daphnid, when exposed for 48 hours under static conditions.

3.0 TEST MATERIAL

3.1 The test substance and related stability and purity data will be supplied by the sponsor. Test material will be stored at room temperature in the original shipping container unless alternate storage conditions are requested by the sponsor. Handling of the test material will be in accordance with information contained in the sponsor-supplied Material Safety Data Sheet and RAI Standard Operating Procedure 01-02-1106. A subsample of test substance (approximately 1 gram) will be removed from the original container and transferred to a glass vial for archiving. All unused test substance will be returned to the sponsor.

3.2 Calculations are based on nominal concentrations of the test substance. Test substance stock solutions are prepared in deionized or dilution water without the use of a solvent (carrier) if possible. If a solvent is required, dimethylformamide, triethylene glycol, or acetone will be used. The concentration of solvent will be limited to 100 mg/L.

4.0 TEST SPECIES

4.1 The selection of test species is determined by the sponsor. Healthy juveniles (free from known diseases) from a single source will be used to initiate the test. They will be obtained from an in-house culture with a known history and will be less than 24 hours old at the initiation of the test. The wet weight of control organisms will be determined at the end of the test.

4.2 Identification of the test animals shall be verified using appropriate taxonomic keys.

5.0 PRETEST OBSERVATIONS AND PROCEDURES

5.1 Pretest observation data concerning the source, handling procedures, receipt date, disease treatment (if any), health, feeding, and mortality of test animals will be recorded and reported.

5.2 Daphnids will be maintained under static or replacement conditions prior to test initiation in the same water and at the same photoperiod and temperature that will be used for testing. The animals will be fed at least once daily with a mixture of yeast, trout chow, and cerophyl and/or freshwater algae. Daphnid cultures will be maintained in dilution water at test conditions (temperature, hardness, and photoperiod) for at least 14 days prior to testing.

6.0 EXPOSURE CONDITIONS

6.1 The test will be conducted under static conditions, and test media will be supplied only at the beginning of the test.

6.2 Dilution water will be natural ground water. It will be free of measurable concentrations of pesticides. Water will be passed through a <20 micron filter and chemically characterized (at least twice yearly analysis at RAI) prior to use.

6.3 Water temperature will be $20 \pm 1^\circ\text{C}$.

6.4 Dissolved oxygen concentration should be above 70% saturation, but aeration will not be utilized.

6.5 Photoperiod will be automatically controlled and adjusted to 16 hours light and 8 hours dark.

6.6 The test vessels will be 250 ml beakers of that contain 200 ml of test media. The loading rate will be less than 0.5 g/L.

7.0 STUDY CONDUCT

7.1 The results of a range finding investigation and/or previous testing data will be used to select the concentration range for the definitive test. If a range finding test is conducted animals will be exposed to a series of concentrations of test substance plus a control and a solvent control (if required).

7.2 During the definitive test the animals will be exposed for 48 hours to at least five concentrations of test substance plus a control (dilution water without test substance) and a solvent control (if necessary) under static conditions. Test concentrations will be chosen to bracket the anticipated EC50.

7.3 At least 20 animals will be exposed to each treatment. The animals will be exposed in groups of 5 animals per vessel (4 replicates per concentration), each containing 200 ml of solution. The animals will be assigned to randomly positioned test vessels (a random numbers table will be used to choose the position of each test vessel), and they will not be fed.

7.4 Animals will be added to test media after test substance has been added and aeration will not be employed.

7.5 The highest tested concentration will be 1,000 mg/L.

7.6 A toxicity test shall also be conducted with a reference toxicant and the batch of daphnids used for the test.

7.7 Dissolved oxygen concentration, pH, temperature, and conductivity will be measured and recorded at the beginning of the test and daily thereafter in all test vessels, as long as living animals are present in those vessels.

7.8 Mortality and sublethal effects (immobilization) will be recorded at 24 hour intervals during the test. Dead animals will be removed.

7.9 Data Analysis and Statistical Methods

7.9.1 The EC50 values and their 95% confidence intervals will be calculated using mortality and/or immobilization data by the binomial, moving average or probit methods.

8.0 QUALITY ASSURANCE AND QUALITY CONTROL

8.1 The test will be repeated if any of the following conditions occur:

8.1.1 Control survival at the end of the test is less than 90%, or more than 10% of the control daphnids are stressed or immobilized, or any control animals are trapped at the surface.

8.1.2 Temperature in any test vessel is outside of the range of 19 - 21°C.

8.2 The test will be conducted according to OECD Good Laboratory Practice Standards.

8.3 The test will be audited by the Quality Assurance Unit.

8.4 The Study Director will be responsible for reviewing all data and for recording any changes to procedures outlined in this protocol in a protocol amendment. Protocol amendments will be approved by the sponsor.

8.5 Original data will be archived at Resource Analysts Inc. for at least 10 years or it will be transferred to the sponsor for archiving.

9.0 REPORT

9.1 An original report will be prepared after review of a draft report by the sponsor. The final report will be signed by the Study Director and staff that conducted the study and prepared the report, and by the Quality Assurance Unit Representative.

9.2 The final report will consist of at least the following information:

- 9.2.1 Title page, including the study title, data requirement, author, study completion date, testing facility, and sponsor.
- 9.2.2 Sponsor-supplied confidentiality claims.
- 9.2.3 Good Laboratory Practice Statement.
- 9.2.4 Certification of Good Laboratory Practices.
- 9.2.5 Table of Contents.
- 9.2.6 Summary of test procedures and results.
- 9.2.7 Introduction.
- 9.2.8 Methods and Materials, including a description of test methods, organisms, dilution water, and statistical techniques.
- 9.2.9 Results, including all data from range-finding and definitive tests, and EC50 values.
- 9.2.10 References.
- 9.2.11 Appendices, including all water quality data.

10.0 REFERENCES

- OECD. 1984. OECD Guidelines for Testing of Chemicals. Section 2: Effects on Biotic Systems. Method 202, Daphnia sp., Acute Immobilisation Test and Reproduction Test. Adopted 4 April 1984.
- U.S. EPA. 1986. 40 CFR Part 797. Toxic Substances Control Act Test Guidelines; Final Rules. Federal Register, Monday, January 6, 1986. Section 797.1300.
- U.S. EPA. 1987. 40 CFR Part 797. Toxic Substances Control Act Test Guidelines; Amendments. Federal Register, Wednesday, May 20, 1987. Section 797.1300.

SUMMARY OF TEST CONDITIONS

Acceptable Species:	<i>Daphnia magna</i>
Test Type:	Static
Test Duration:	48 Hours
Flow Rate:	Not Applicable
Dilution Water:	Natural Ground Water
Age/Size of Test Organisms:	Juveniles; Less Than 24 Hours Old
Acclimation Period:	Continuous
Temperature:	20 ± 1°C
Photoperiod:	16 Hours Light/8 Hours Dark
Light Intensity:	Ambient Laboratory Lighting
Number of Concentrations:	5 or More; less than 1,000 mg/L
Dilution Factor:	≤1.6
Number of Replicates:	4 or More
Number of Organisms/Replicate:	5
Test Vessel Size:	250 ml or larger
Test Vessel Volume:	200 ml or more
Solvent:	Dimethylformamide, Acetone, or Triethylene Glycol. Less than or equal to 100 mg/L
Loading Rate:	<0.5 g/L
Feeding:	None During Exposure
Aeration:	None
Effects Measured:	Death; Immobilization
Test Concentration Analysis:	None
Water Quality Measurements:	DO, pH, Temperature and Conductivity at 0, 24, and 48 Hours
Acceptability Criteria:	≤10% Control Mortality, Stress, or Immobilization Acceptable Temperature Range

90171-3

PRODUCT REGISTRATION LABORATORY SAMPLE RECEIVING LOG

1. RAI Sample Number 2696E
2. Sponsor Name and Address 3M Env. lab
Bldg. 2-3E-09, 935 Bush Ave.
St. Paul, MN 55106
3. Sponsor Sample Identification H 2864-6 FM 3820
4. Sample Container Label Data H 2864-6 FM 3820
5. Date Received 11-15-90 6. Date Photographed _____
7. Method of Shipment Shipped From St. Paul MN
Via FedEx Weekday
8. Description of Shipping Container(s) 1 plastic cooler
(Number, Type, Size)
9. Description of Sample Containers(s) 1 250 ml glass bottle
(Number, Type, Size)
10. Sample Storage Location and Required Storage Conditions prc-15 Perm temp
11. Signature Peter Kowalski Date 11-16-90
12. Notes 12-3-90
13. Date and Location of Archive Sample Removal and Storage Location 11-16-90 prc-15

THIS IS A CERTIFIED
TRUE COPY.
SIGNATURE SPM DATE 12-3-90

90171-3

PRODUCT REGISTRATION LABORATORY TEST SUBSTANCE USAGE LOG

RAI SAMPLE NUMBER 2696E TEST SUBSTANCE FM 3820

ALL WEIGHTS ARE MEASURED IN GRAMS

DATE	INITIAL GROSS WEIGHT	FINAL GROSS WEIGHT	AMOUNT REMOVED	DISPOSITION	BY
11-16-90	453.2 g	452.2	1.0	Archive	PK
12-5-90	452.0g	450.8	1.2	90171-3	ES
12-18-90	450.8g	449.8	1.0	90171-3	ES
THIS IS A CERTIFIED TRUE COPY					
			SIGNATURE <u>SM</u>	DATE <u>01-03-91</u>	

Sample Description: pale yellow liquid

Container Label Information:

H 2864-6 FM 3820

Date Received:

11-15-90

Date Of Return To Sponsor:

THIS IS A CERTIFIED TRUE COPY.
SIGNATURE sm DATE 01-03-91

70171-3

PRODUCT REGISTRATION LABORATORY ORGANISM ACCLIMATION LOG

Species: d. magna

Lot No. 1128901

from lot 1107901

Day of Month	Number of Dead	Food	Feeding Frequency	°C	D.O. (mg/L)	Sal. (ppt)	Notes	By/Date
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28	0	4.5	1X	19.0	✓	NA		ES 11-28-90
29	0	4	1X	20.1	✓	NA		ES 11-29-90
30	0	4	1X	19.3	✓	NA		ES 11-30-90
31								

PROCUREMENT DATA: Age 24 hr. Condition good Date 11/28/90
Source, Collection and/or Transportation Method:

from 1107901, Recycled Culture from ARD 1219891

Number Procured: _____ Notes: shipped on 0600, off 2200

WATER QUALITY: D.O. pH Temp. Salinity Conductivity
mg/L °C ppt umho/cm

At Shipping: _____
At Arrival: _____

ACCLIMATION DATA: Water

Source natural groundwater, 160-180 mg/L

Food and Lot Selenastrea 4-yeast (brow)

Note: Include any observation of disease or abnormal behavior. Use additional sheets if necessary.

PRODUCT REGISTRATION LABORATORY ORGANISM ACCLIMATION LOG

Species: d. magna Lot No. 1128461
from lot 1107461

Day of Month	Number of Dead	Food	Feeding Frequency	°C	D.O. (mg/L)	Sal. (ppt)	Notes	By/Date
1	0	4.5	1x	19.9	✓	NA		ES 12-1-90
2	0	4.5	1x	19.8	✓	NA		ES 12-2-90
3	0	4.5	1x	19.8	✓	NA		ES 12-3-90
4	0	4.5	1x	20.2	✓	NA		ES 12-4-90
5	0	4.5	1x	20.1	✓	NA	Ymag 0052401	ES 12-5-90
6	0	4.5	1x	19.8	✓	NA		ES 12-6-90
7	0	4.5	1x	20.0	✓	NA		Qm 12-7-90
8	0	4.5	1x	20.1	✓	NA		PK 12-8-90
9	0	4.5	1x	20.0	✓	NA		PK 12-9-90
10	0	4.5	1x	19.9	✓	NA		ES 12-10-90
11	0	4.5	1x	19.6	✓	NA		ES 12-11-90
12	0	4.5	1x	19.2	✓	NA		ES 12-12-90
13	0	4.5	1x	19.0	✓	NA		ES 12-13-90
14	0	4.5	1x	19.9	✓	NA		ES 12-14-90
15	0	4.5	1x	20.5	✓	NA		Qm 12-15-90
16	0	4.5	1x	20.8	✓	NA		Qm 12-16-90
17	0	4.5	1x	19.8	✓	NA		ES 12-17-90
18	0	4.5	1x	19.0	✓	NA	704-707-39735	ES 12-18-90
19							DISCARDED	Qm 12-19-90
20								
21								
22							THIS IS A CERTIFIED TRUE COPY.	
23							SIGNATURE <u>SA</u>	DATE <u>01/03/91</u>
24								
25								
26								
27								
28								
29								
30								
31								

* transferred

PROCUREMENT DATA: Age _____ Condition _____ Date _____
 Source, Collection and/or Transportation Method: _____

Number Procured: _____ Notes: _____

WATER QUALITY: D.O. _____ pH _____ Temp. _____ Salinity _____ Conductivity _____
 mg/L _____ °C _____ ppt _____ umho/cm _____
 At Shipping: _____
 At Arrival: _____

ACCLIMATION DATA: Water
 Source _____
 Food and Lot _____
 Note: Include any observation of disease or abnormal behavior. Use additional sheets if necessary.

Resource Analysts Inc. Subsidiary of MILLIPORE

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 90171-3 Sample Number 2166E
Test Substance PM 3820 Test Type: screen ☒ definitive ☐

TEST CONDITIONS

Date 12/5/90 Recorded By P. Heyerd
Test Organism D. magna Lot Number 120590
Test Duration 48 hrs Flow Rate NA - static
Dilution Water natural ground water Salinity/
Hardness 160-180 mg/l
Age and Size of Test Organisms juveniles; 24 hr.
Test Organism Abnormalities, Illness, or Injuries: none ☒ some (note) ☐
Acclimation Period (length at test initiation in days) NA
Temperature 26 ± 1 Incubator Number 12
Photoperiod: time on 0600 time off 2200 Light Intensity 26 uEin
15 Minute Transition Period: Yes ☐ No ☒
Number of Concentrations 5 + control
Dilution Factor 51.6
Number of Replicates 2
Number of Organisms per Replicate 5
Test Vessel Size (L) .250 Test Solution Volume (L) .200
Test Solution Depth (cm) 6
Solvent and Solvent Concentration none
Loading Rate 0.5 ± 0.5 g/l
Feeding none
Dissolved Oxygen Levels > 90%
Effect(s) Measured death; immobilized
Test Concentration Analysis none
Water Quality Measurements DO, pH, temp & cond. at 0, 24, & 48 hrs.

Reviewed by 2/2/91

Resource Analysts, Inc./ KavroSystems Division
Product Registration Laboratory Raw Data

Study Number 90194-3

Sample Number 2696E
2699E (12-12-90)

Test Substance FE 203

Test Type: screen ☒ definitive ☐

STOCK SOLUTION PREPARATION

Percent. active ingredient (% AI) 100%

Nominal Concentrations corrected for % AI? yes ☒ no ☐

Balanced Used for Stock Solution Preparation PRL-1

Preparation Notes:

A 1000 mg/l stock was made. 1.0 g of toxicant
was weighed and brought up to 1000 ml with
dilution water. Stock was mixed and used
as follows:

conc (mg/l)	mls of stock up to 200 mls with dilution w
0	0
.1	.02
1.0	0.2
10	2
100	20
1000	200

Reviewed / TW 2/2/91

Recorded by: E. Stanford

Date 12-5-90

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 90171-3

Sample Number 2690E

Test Substance FM 3820

Test Type: screen ✓ definitive

GENERAL INFORMATION

Notes:

Reviewed TW 2/2/91

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 96171-3 Sample Number 2696E
Test Substance FR 3820 Test Type: screen ☒ definitive ☐

DAPHNID SOLUBILITY

Initiation Date 12-5-90 Test Organism d magna

Test Vessel I.D.	Insoluble Material		
	0 hr	24 hr	48 hr
Control	0	0	0
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
/			
Recorded by	gms	ES	PK
Date:	12-5-90	12-6-90	12-7-90

If no insoluble material is observed enter a zero in the appropriate box.
If insoluble material is observed enter a check mark in the appropriate box and describe the observation below.

Notes: _____

Resource Analysts, Inc. Subsidiary of MUSE-E
Revised / TW 2/2/91

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 96171-3 Sample Number 2696E
Test Substance FA 3820 Test Type: screen ☒ definitive ☐

DAPHNID SURVIVAL AND SUBLETHAL EFFECTS

Page 1 of 2

Initiation Date 12-5-90 Test Organism D. magna

Test Vessel I.D.	Rep.	Number of Live Daphnids			Sublethal effects		
		0 hr	24 hr	48 hr	0 hr	24 hr	48 hr
Control	1	5	5	5	0	0	0
	2	5	5	5	0	0	0
1	1	5	5	5	0	0	0
	2	5	5	5	0	0	0
2	1	5	5	5	0	0	0
	2	5	5	5	0	0	0
3	1	5	5	4	0	0	1
	2	5	5	5	0	0	0
4	1	5	5	3	0	5	3
	2	5	5	3	0	5	3
5	1	5	0	—	0	0	—
	2	5	0	—	0	0	—
	1	/	/	/	/	/	/
	2	/	/	/	/	/	/
Recorded by:		Q/b	ES	PK	ES	ES	PK
Date:		12-5-90	12-6-90	12-7-90	12-5-90	12-6-90	12-7-90

If no sublethal effects are observed enter zero in the appropriate box. If sublethal effects are observed enter the number effected in the appropriate box and describe the observation below.

Notes: ES 12-6-90 erratic swimming
PK 12-7-90 pale, lethargic
Reviewed TW 2/2/01

Resource Analysts, Inc. Subsidiary of MILLIPORE

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 90171-3 Sample Number 21410E
Test Substance FM 3820 Test Type: screen ☒ definitive ☐

DAPHNID DISSOLVED OXYGEN CONCENTRATION AND pH

Page 1 of 2

Initiation Date 12-5-90 Test Organism D. magna

Test Vessel I.D.	Rep.	Dissolved Oxygen (mg/L)			pH		
		0 hr	24 hr	48 hr	0 hr	24 hr	48 hr
Control	1	7.3	9.5	9.2	8.4	8.6	8.6
	2	7.4	9.5	9.2	8.4	8.6	8.6
1	1	7.8	9.5	9.0	8.3	8.5	8.6
	2	7.8	9.5	9.0	8.3	8.5	8.6
2	1	7.7	9.5	9.0	8.3	8.5	8.6
	2	7.7	9.5	9.0	8.3	8.5	8.6
3	1	7.7	9.5	9.0	8.3	8.5	8.6
	2	7.7	9.5	9.1	8.3	8.5	8.6
4	1	7.6	9.5	9.0	8.3	8.5	8.6
	2	7.7	9.5	9.0	8.3	8.5	8.6
5	1	7.6	9.5	9.0	8.3	8.5	8.6
	2	7.6	9.5	9.0	8.3	8.5	8.6
	1	/	/	/	/	/	/
	2	/	/	/	/	/	/
Recorded by:		QW	ES	PK	ES	ES	PK
Date:		12-5-90	12-6-90	12-7-90	12-5-90	12-6-90	12-7-90

Notes:

Instrument Number:

PRL-3

Resource Analysts, Inc., Subsidiary of MILLIPORE

Reviewed / JW 2/2/91
PRL-4 @ ES 12-5-90
PRL-9

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 90171-3 Sample Number 2649E
Test Substance FR 3820 Test Type: screen ☒ definitive ☐

DAPHNID TEMPERATURE AND CONDUCTIVITY

Page 1 of 2

Initiation Date 12-5-90 Test Organism D. magna

Test Vessel I.D.	Rep.	Temperature (°C)			Conductivity (umhos/cm)		
		0 hr	24 hr	48 hr	0 hr	24 hr	48 hr
Control	1	20.7	19.6	19.4	1310	1400	1300
	2	20.7	19.6	19.5	1310	1400	1300
1	1	20.8	19.4	19.8	1300	1300	1300
	2	20.7	19.6	19.7	1300	1300	1300
2	1	20.8	19.8	19.8	1310	1300	1300
	2	20.7	20.0	19.6	1300	1300	1300
3	1	20.7	20.2	19.6	1310	1300	1300
	2	20.8	20.2	19.7	1300	1300	1300
4	1	20.7	20.6	20.0	1310	1300	1300
	2	20.7	20.6	20.1	1300	1300	1300
5	1	20.8	20.8	20.0	1310	1300	1300
	2	20.9	20.8	20.1	1300	1300	1300
/	1	/	/	/	/	/	/
	2	/	/	/	/	/	/
Recorded by:		QW	ES	PK	ES	ES	PK
Date:		12-5-90	12-6-90	12-7-90	12-5-90	12-6-90	12-7-90

③ QW 12-5-90

Notes: _____

Reviewed / JW 2/2/91

Instrument Number: 2265

REL-9

Resource Analysts, Inc. Subsidiary of MILLIPORE

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 9017A-3

Sample Number 246-946

Test Substance EC 203

Test Type: screen ☒ definitive

ERROR CODES

1. Misspelled
2. Mathematical Error
3. Wrong Entry
4. Transposition or Sequencing Error (inverted or wrong order)
5. Transcription Change (copy error)
6. Procedural Change
7. Wrong Conclusion
8. Illegible Entry
9. Unnecessary Entry
10. Footnoted Explanation
11. Additional Comment

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number JDS Sample Number 7W3/4/4
Test Substance 10C # 1218901 Test Type: screen definitive ☒

TEST CONDITIONS

Date 12-18-90 Recorded By E. Stanford
Test Organism D. magna Lot Number 1218901
Test Duration 48 hr. Flow Rate NA - static
Dilution Water NATURAL well water Salinity/
Hardness 160-180 mg/l
Age and Size of Test Organisms L24 hr.
Test Organism Abnormalities, Illness, or Injuries: none ☒ some (note)
Acclimation Period (length at test initiation in days) NA
Temperature 20 ± 1 Incubator Number 12
Photoperiod: time on 0600 time off 2200 Light Intensity 23 uEin
15 Minute Transition Period: Yes No ☒
Number of Concentrations 5 - control
Dilution Factor ± 1.0
Number of Replicates 4
Number of Organisms per Replicate 5
Test Vessel Size (L) 0.25 Test Solution Volume (L) 0.20
Test Solution Depth (cm) 6
Solvent and Solvent Concentration NA
Loading Rate ≤ 0.5 g/l
Feeding NA
Dissolved Oxygen Levels > 70%, don't aerate
Effect(s) Measured death, immobilization
Test Concentration Analysis NA
Water Quality Measurements DO, pH, °C, cond. Revised 12/21/90

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number SDS Sample Number TW 2/14/91
Test Substance lot # 1218901 Test Type: screen definitive ✓

RANDOMIZATION INFORMATION

Initiation Date 12-18-90

Test Organism D. magna

Test Vessel I.D.	Rep.	Vessel Location	Rep.	Vessel Location
control	1	5	3	24
	2	16	4	3
1	1	11	3	8
	2	15	4	18
2	1	4	3	6
	2	13	4	14
3	1	2	3	10
	2	23	4	9
4	1	21	3	22
	2	17	4	7
5	1	20	3	19
	2	28	4	12
	1		3	
	2		4	

Recorded by:

ES

Date:

12-18-90

Random Numbers*

88758	66605	33843
35661	42832	16240
26335	03771	46105
60826	74718	56527
95624	98896	13763
83746	47694	06143
27998	42562	63402
82685	34323	74625
18386	13862	09388
23717	13141	23707
18446	83052	31842
66027	75177	47398
51420	96779	54309
27045	62626	73159
13094	17725	14203
92382	62518	17752
16215	50809	49326
09342	14528	64727
38148	79001	03509
23689	09997	72382
25407	37726	73099
25349	69456	19693
02322	77491	56095
15072	33261	99219
27002	31036	85278
66181	83316	40386
09779	01822	45537
10791	07706	87481
74833	55767	31312
17583	24038	83701
45601	46977	39325
60683	33112	65995
29956	81169	18877
91713	84235	75296

* Draw a circle around the section of the random numbers table that is used to position the test vessels. Table of random numbers is from Steel, R.G.D and J.H.Torrie. (1960). Principles and Procedures of Statistics. McGraw-Hill Book Co. New York. Page 428.

Resource Analysts, Inc. Subsidiary of MILLPORE

Reviewed TW 2/2/91

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number SDS

Sample Number NA 24/91

Test Substance 100 # 1218901

Test Type: screen definitive ☒

STOCK SOLUTION PREPARATION

Percent active ingredient (% AI) 100%

Nominal Concentrations corrected for % AI? yes ☒ no ☐

Balanced Used for Stock Solution Preparation PRE-1

Preparation Notes:

A 1000 mg/l stock was made. 1.0 g of SDS was weighed and brought up to 1000 mls with dilution water. Stock solution was mixed and used as follows:

<u>conc mg/l</u>	<u>mls stock brought up to 200 mls w/ dilution water</u>
<u>0</u>	<u>0</u>
<u>1</u>	<u>.2</u>
<u>5</u>	<u>1</u>
<u>10</u>	<u>2</u>
<u>25</u>	<u>5</u>
<u>50</u>	<u>10</u>

Recorded by: E. Stanford

Date 12-18-90

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number SDS

Sample Number NA 12/24/91

Test Substance lot # 1218761

Test Type: screen definitive ☒

GENERAL INFORMATION

Notes:

ES 12-18-90 Test material was added to test vessel at 1415. Test organisms were added to randomly positioned test vessel at 1430.

ES 12-18-90 test vessels were stored in incubator PRL-12

ES 12-20-90 weight of control organisms in g

Control # of organisms in control

1 0.0007

4

2 0.0005

5

3 0.0088

5

4

5

Balance used PRL-2

Wet weight better dry

Reviewed / 12/2/91

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number SDS Sample Number NA 7034191
Test Substance ICC # 1218401 Test Type: screen definitive ☒

DAPHNID SOLUBILITY

Initiation Date 12-18-90 Test Organism D. magna

Test Vessel I.D.	Insoluble Material		
	0 hr	24 hr	48 hr
Control	0	0	0
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
Recorded by	ES	Ym	ES
Date:	12-18-90	12-19-90	12-20-90

If no insoluble material is observed enter a zero in the appropriate box.
If insoluble material is observed enter a check mark in the appropriate box and describe the observation below.

Notes: _____

Reviewed PW 2/2/91 Resource Analysts, Inc. Subsidiary of MILLIPORE

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number SDS Sample Number UA W344a1
Test Substance 1-CEA 128401 Test Type: screen definitive ✓

DAPHNID SURVIVAL AND SUBLETHAL EFFECTS

Page 1 of 2

Initiation Date 12-18-90 Test Organism D. magna

Test Vessel I.D.	Rep.	Number of Live Daphnids			Sublethal effects		
		0 hr	24 hr	48 hr	0 hr	24 hr	48 hr
Control	1	5	5	5	0	0	0
	2	5	5	5	0	0	0
	3	5	4	4	0	0	0
	4	5	5	5	0	0	0
1	1	5	5	3 4	0	0	0
	2	5	5	4	0	0	1
	3	5	5	4	0	0	0
	4	5	5	5	0	0	0
2	1	5	5	5	0	0	0
	2	5	5	4	0	0	0
	3	5	5	5	0	0	0
	4	5	5	5	0	0	2
3	1	5	5	4	0	0	0
	2	5	5	5	0	0	0
	3	5	5	5	0	0	2
	4	5	5	5	0	0	0
Recorded by:		Qm	Qm	ES	Qm	Qm	ES
Date:		12-18-90	12-19-90	12-20-90	12-18-90	12-19-90	12-20-90

ES 12-20-90

Reviewed W2/2/91
Resource Analysts, Inc. Subsidiary of MILLIPORE

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number SDS Sample Number NA 2034/41
Test Substance loc # 1218901 Test Type: screen definitive ✓

DAPHNID SURVIVAL AND SUBLETHAL EFFECTS

Page 2 of 2

Initiation Date 12-18-90 Test Organism d. magna

Test Vessel I.D.	Rep.	Number of Live Daphnids			Sublethal effects		
		0 hr	24 hr	48 hr	0 hr	24 hr	48 hr
4	1	5	5	2	0	0	0
	2	5	5	4	0	0	1
	3	5	5	3	0	0	0
	4	5	5	2	0	0	0
5	1	5	3	0	0	0	0
	2	5	5	0	0	0	0
	3	5	5	0	0	0	0
	4	5	2	0	0	0	0
	1						
	2						
	3						
	4						
Recorded by:		GM	GM	ES	GM	GM	ES
Date:		12-18-90	12-19-90	12-20-90	12-18-90	12-19-90	12-20-90

If no sublethal effects are observed enter zero in the appropriate box. If sublethal effects are observed enter the number effected in the appropriate box and describe the observation below.

Notes: ES 12-20-90 inhibited

Reviewed / TW 2/2/91

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number SDS Sample Number NA 3/4/91
 Test Substance 1st of 2/8901 Test Type: screen definitive ✓

DAPHNID DISSOLVED OXYGEN CONCENTRATION AND pH Page 1 of 2

Initiation Date 12-18-90 Test Organism D. magna

Test Vessel I.D.	Rep.	Dissolved Oxygen (mg/L)			pH		
		0 hr	24 hr	48 hr	0 hr	24 hr	48 hr
Control	1	8.0	8.3	8.2	7.7	8.3	8.5
	2	8.0	8.3	8.2	7.7	8.3	8.5
	3	8.0	8.2	8.4	7.7	8.3	8.5
	4	8.0	8.2	8.4	7.7	8.3	8.5
1	1	8.2	8.0	8.3	7.7	8.3	8.5
	2	8.2	8.1	8.3	7.7	8.3	8.5
	3	8.2	8.1	8.4	7.7	8.3	8.5
	4	8.2	7.8	8.3	7.7	8.3	8.5
2	1	8.2	8.2	8.2	7.7	8.3	8.5
	2	8.4	8.2	8.2	7.7	8.3	8.5
	3	8.3	8.2	8.4	7.7	8.3	8.5
	4	8.3	8.2	8.4	7.7	8.3	8.5
3	1	8.0	8.1	8.2	7.7	8.3	8.5
	2	8.0	8.2	8.3	7.7	8.3	8.5
	3	8.0	8.1	8.3	7.7	8.3	8.5
	4	8.0	8.2	8.3	7.7	8.3	8.5
Recorded by:		QW	QW	QW	QW	QW	QW
Date:		12-18-90	12-19-90	12-20-90	12-18-90	12-19-90	12-20-90

Reviewed /fw 2/2/91
Resource Analysts, Inc. Subsidiary of MILLIPORE

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number SD5 Sample Number _____

Test Substance 102# 1218901 Test Type: screen definitive ✓

DAPHNID DISSOLVED OXYGEN CONCENTRATION AND pH Page 2 of 2

Initiation Date 12-18-90 Test Organism D. magna

Test Vessel I.D.	Rep.	Dissolved Oxygen (mg/L)			pH		
		0 hr	24 hr	48 hr	0 hr	24 hr	48 hr
4	1	8.2	7.7	8.2	7.7	8.3	8.5
	2	8.2	7.9	8.3	7.7	8.3	8.5
	3	8.2	8.2	8.2	7.7	8.3	8.5
	4	8.4	8.2	8.3	7.7	8.3	8.5
5	1	8.5	8.0	8.3	7.7	8.3	8.5
	2	8.4	8.2	8.3	7.7	8.3	8.5
	3	8.2	8.2	8.2	7.7	8.3	8.5
	4	8.0	8.0	8.2	7.7	8.3	8.5
	1						
	2						
	3						
	4						
Recorded by:		q/m	q/m	q/m	q/m	q/m	q/m
Date:		12-18-90	12-19-90	12-20-90	12-18-90	12-19-90	12-20-90

Notes: _____

Penner / TW 2/2/91

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 505 Sample Number HA TW314141
isc # 1218901
Test Substance _____ Test Type: screen definitive ☒

DAPHNID TEMPERATURE AND CONDUCTIVITY

Page 1 of 2

Initiation Date 12-18-90 Test Organism D. magna

Test Vessel I.D.	Rep.	Temperature (°C)			Conductivity (umhos/cm)		
		0 hr	24 hr	48 hr	0 hr	24 hr	48 hr
control	1	20.9	20.8	20.8	1200	1300	1300
	2	20.8	20.9	20.8	1200	1300	1300
	3	20.7	20.9	20.9	1200	1300	1300
	4	20.8	20.8	20.8	1200	1300	1300
1	1	20.8	20.8	20.8	1200	1300	1300
	2	20.9	20.8	20.8	1200	1300	1300
	3	20.7	20.9	20.8	1200	1300	1300
	4	20.7	20.8	20.8	1200	1300	1300
2	1	20.9	20.8	20.1	1200	1300	1300
	2	20.9	20.9	20.9	1200	1300	1300
	3	20.9	20.8	20.8	1200	1300	1300
	4	20.8	20.8	20.9	1200	1300	1300
3	1	20.9	20.9	20.0	1200	1300	1300
	2	20.9	20.8	20.9	1200	1300	1300
	3	20.8	20.8	20.9	1200	1300	1300
	4	20.9	20.9	20.9	1200	1300	1300
Recorded by:		gm	gm	es	gm	gm	gm
Date:		12-18-90	12-19-90	12-20-90	12-18-90	12-19-90	12-20-90

#2265

Reviewed/TW 2/2/91
Resource Analysts, Inc., Subsidiary of MILLIPORE

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number SDS Sample Number NA TW3/4/91
Test Substance 100 # 1218901 Test Type: screen definitive ✓

DAPHNID TEMPERATURE AND CONDUCTIVITY

Page 2 of 2

Initiation Date 12-18-90 Test Organism D. magna

Test Vessel I.D.	Rep.	Temperature (°C)			Conductivity (umhos/cm)		
		0 hr	24 hr	48 hr	0 hr	24 hr	48 hr
4	1	20.7	20.8	20.7	1200	1300	1300
	2	20.8	20.8	20.7	1200	1300	1300
	3	20.9	20.7	20.6	1200	1300	1300
	4	20.8	20.8	20.8	1200	1300	1300
5	1	20.8	20.9	21.0	1200	1300	1300
	2	20.8	20.8	20.9	1200	1300	1300
	3	20.9	20.8	20.9	1200	1300	1300
	4	20.9	20.9	20.9	1200	1300	1300
	1						
	2						
	3						
	4						
Recorded by:		Qm	Qm	ES	Qm	Qm	Qm
Date:		12-18-90	12-19-90	12-20-90	12-18-90	12-19-90	12-20-90

Notes:

Resource TW 2/2/91

SDS 12/18/90 Kat
injection
2 TW 3/4/91

[illegible]
$$\text{Hardness (mg/L CaCO}_3\text{)} = \frac{\text{ml EDTA titrant} \times \text{mg CaCO}_3 \text{ equivalent}}{\text{x 1000 ml} \div \text{ml sample}}$$

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number SDS

Sample Number PA TW 2/4/91

Test Substance 100% 128901

Test Type: screen definitive ✓

ERROR CODES

1. Misspelled
2. Mathematical Error
3. Wrong Entry
4. Transposition or Sequencing Error (inverted or wrong order)
5. Transcription Change (copy error)
6. Procedural Change
7. Wrong Conclusion
8. Illegible Entry
9. Unnecessary Entry
10. Footnoted Explanation
11. Additional Comment

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 90171-3 Sample Number 2696E
Test Substance FM3820 Test Type: screen definitive ☒

TEST CONDITIONS

Date 12-18-90 Recorded By John P. Stanford
Test Organism d. magna Lot Number 1218901
Test Duration 48 hrs Flow Rate NA
Dilution Water vertical well water Salinity/
Hardness 160-180 mg/L
Age and Size of Test Organisms 24 hr.
Test Organism Abnormalities, Illness, or Injuries: none ☒ some (note) NA
Acclimation Period (length at test initiation in days) NA
Temperature 20±1 Incubator Number 12
Photoperiod: time on 0600 time off 2200 Light Intensity 23 μ Ein
15 Minute Transition Period: Yes NA No ☒
Number of Concentrations 5: Control
Dilution Factor ≤ 1.6
Number of Replicates 24 by 12-18-90
Number of Organisms per Replicate 5
Test Vessel Size (L) 0.25 Test Solution Volume (L) 0.20
Test Solution Depth (cm) 6
Solvent and Solvent Concentration NA
Loading Rate 2.05 g/L
Feeding NOT FED
Dissolved Oxygen Levels > 70% don't aerate
Effect(s) Measured death sublethal effects immobilization
Test Concentration Analysis NA
Water Quality Measurements NO, pH, μ C, cond Revised 7/2/91

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 90-71-3

Sample Number 2146E

Test Substance PM 3820

Test Type: screen definitive ✓

RANDOMIZATION INFORMATION

Initiation Date 12-18-90

Test Organism D. magna

Test Vessel I.D.	Rep.	Vessel Location	Rep.	Vessel Location
control	1	13	3	1
	2	6	4	17
1	1	16	3	15
	2	11	4	14
2	1	2	3	9
	2	10	4	7
3	1	18	3	19
	2	3	4	21
4	1	12	3	22
	2	24	4	8
5	1	5	3	4
	2	23	4	26
	1		3	
	2		4	

Recorded by: ES

Date: 12-18-90

Random Numbers*

88758	66605	33843
35661	42832	16240
26335	03771	46115
60826	74718	56527
95044	98896	13763
83746	47694	06123
27998	42562	63407
82685	32123	74625
18386	13862	10988
21717	13141	22707
18446	83052	30842
66027	75177	47398
51420	96779	54309
27035	62626	73159
13094	17725	14103
92382	62518	17752
16215	50809	49326
09342	14528	64727
38148	79001	03509
23689	19997	72382
25407	37726	73099
25349	69456	19693
02322	77491	56095
15072	33261	99009
27002	31036	85278
66181	83316	40386
09779	01822	45537
10791	07706	87481
74833	55767	31312
17583	23038	83701
45601	46977	39325
60683	33112	65995
29956	81169	18877
91713	84235	75296

* Draw a circle around the section of the random numbers table that is used to position the test vessels. Table of random numbers is from Steel, R.G.D and J.H.Torrie. (1960). Principles and Procedures of Statistics. McGraw-Hill Book Co. New York. Page 428.

Resource Analysts, Inc., Subsidiary of MILLIPORE

Revised TW 2/4/91

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 90171-3

Sample Number 2696E

Test Substance FM 5820

Test Type: screen definitive ☒

STOCK SOLUTION PREPARATION

Percent active ingredient (% AI) 100%

Nominal Concentrations corrected for % AI? yes ☒ no ☐

Balanced Used for Stock Solution Preparation ☐

Preparation Notes:

A 1000 mg/l stock was made ^{1.2 g @ 1000 mg/l} 2.0 g of 2696E
was weighed and brought up to ^{1000 ml @ 1000 mg/l} 2000 ml with
dilution water. Stock solution was mixed and
used as follows:

<u>conc mg/l</u>	<u>mls stock brought up to 200 mls w/ dilution water</u>
0	0
25	5
40	8
60	12
100	20
150	30

Revised TW 2/2/91

Recorded by: E. Stanford

Date 12-18-90

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 90171-3

Sample Number 2696E

Test Substance FM 3820

Test Type: screen definitive

GENERAL INFORMATION

Notes:

control material was added at 1400 hr.
Test organisms were added to randomly
positioned test vessels at 1415 hr.

ES 12-18-90 Test vessels were stored in incubator
PRL-12.

ES 12-20-90 weight of control organisms in g.

Control	# of control organisms
1 0.0004g	4
2 0.0005g	5
3 0.0003g	5
4 0.0003g	5

mean = 0.0001 g TW 2/2/91
Balance PRL-2 was used
Wet weight, blotted dry

Reviewed / TW 2/2/91

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 90141-3 Sample Number 2696E
Test Substance FM 3820 Test Type: screen definitive ✓

DAPHNID SOLUBILITY

Initiation Date 12-18-90 Test Organism D. magna

Test Vessel I.D.	Insoluble Material		
	0 hr	24 hr	48 hr
control	0	0	0
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
Recorded by	Q/W	Q/W	ES
Date:	12-18-90	12-19-90	12-20-90

If no insoluble material is observed enter a zero in the appropriate box.
If insoluble material is observed enter a check mark in the appropriate box and describe the observation below.

Notes: _____

Resource Analysts, Inc. Subsidiary of MILLIFORE

Revised 12/2/91

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 90171-3 Sample Number 2696E

Test Substance FIN 3826 Test Type: screen definitive ✓

DAPHNID SURVIVAL AND SUBLETHAL EFFECTS

Page 1 of 2

Initiation Date 12-18-90 Test Organism D. magna

Test Vessel I.D.	Rep.	Number of Live Daphnids			Sublethal effects		
		0 hr	24 hr	48 hr	0 hr	24 hr	48 hr
Control	1	5	5	4	0	0	0
	2	5	5	5	0	0	0
	3	5	5	5	0	0	0
	4	5	5	5	0	0	0
1	1	5	5	5	0	8	0
	2	5	5	5	0	0	0
	3	5	5	5	0	0	0
	4	5	5	5	0	0	0
2	1	5	5	3	0	0	0
	2	5	5	5	0	0	0
	3	5	5	3	0	6	1
	4	5	4	4	0	0	0
3	1	5	5	2	0	0	2
	2	5	5	4	0	0	0
	3	5	5	4	0	0	4
	4	5	5	5	0	6	3
Recorded by:		G/m	G/m	ES	G/m	G/m	ES
Date:		12-18-90	12-19-90	12-20-90	12-18-90	12-19-90	12-20-90

Reviewed TW 2/2/91
Resource Analysts, Inc., Subsidiary of MILLIPORE

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 90171-3 Sample Number 2696E
Test Substance FR 3820 Test Type: screen definitive ✓

DAPHNID SURVIVAL AND SUBLETHAL EFFECTS

Page 2 of 2

Initiation Date 12-18-90 Test Organism D. magna

Test Vessel I.D.	Rep.	Number of Live Daphnids			Sublethal effects		
		0 hr	24 hr	48 hr	0 hr	24 hr	48 hr
4	1	5	5	0/0	0	0	0
	2	5	5	0	0	0	0
	3	5	5	0	0	0	0
	4	5	5	0	0	0	0
5	1	5	3	0	0	0	0
	2	5	5	0	0	0	0
	3	5	4	0	0	0	0
	4	5	4	0	0	0	0
	1						
	2						
	3						
	4						
Recorded by:		QA	QA	ES	QA	QA	ES
Date:		12-18-90	12-19-90	12-20-90	12-18-90	12-19-90	12-20-90

ES
12-20-90

If no sublethal effects are observed enter zero in the appropriate box. If sublethal effects are observed enter the number effected in the appropriate box and describe the observation below.

Notes: ES 12-20-90 immobilized

Reviewed / JW 2/2/91

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 90-11-3 Sample Number 2696E
Test Substance FM 3820 Test Type: screen definitive ✓

DAPHNID DISSOLVED OXYGEN CONCENTRATION AND pH Page 1 of 2

Initiation Date 12-18-90 Test Organism D. magna

Test Vessel I.D.	Rep.	Dissolved Oxygen (mg/L)			pH		
		0 hr	24 hr	48 hr	0 hr	24 hr	48 hr
control	1	8.3	8.2	8.5	7.8	8.2	8.6
	2	8.3	8.2	8.5	7.8	8.2	8.6
	3	8.3	8.3	8.5	7.8	8.2	8.6
	4	8.3	8.2	8.5	7.8	8.2	8.6
1	1	8.3 (3)	8.2	8.5	7.8	8.2	8.6
	2	8.3	8.2	8.5	7.8	8.2	8.6
	3	8.3	8.1	8.5	7.8	8.2	8.6
	4	8.3	8.1	8.5	7.8	8.2	8.6
2	1	8.2	8.2	8.4	7.8	8.2	8.6
	2	8.2	8.2	8.3	7.8	8.2	8.6
	3	8.3	8.3	8.5	7.8	8.2	8.6
	4	8.3	8.2	8.5	7.8	8.2	8.6
3	1	8.3	8.1	8.0	7.8	8.2	8.6
	2	8.2	8.1	8.3	7.8	8.2	8.6
	3	8.2	8.2	8.3	7.8	8.2	8.6
	4	8.3	8.3	8.4	7.8	8.2	8.6
Recorded by:		Qm	Qm	Qm	Qm	Qm	Qm
Date:		12-18-90	12-19-90	12-20-90	12-18-90	12-19-90	12-20-90

Reviewed TW 2/2/91

Resource Analysts, Inc. Subsidiary of MILLIPORE

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 90171-3 Sample Number 2094E
Test Substance FM 3820 Test Type: screen definitive ✓

DAPHNID DISSOLVED OXYGEN CONCENTRATION AND pH

Page 2 of 2

Initiation Date 12-18-90 Test Organism D. magna

Test Vessel I.D.	Rep.	Dissolved Oxygen (mg/L)			pH		
		0 hr	24 hr	48 hr	0 hr	24 hr	48 hr
③ 12-18-90 4	1	8.2	8.1	8.5	7.8	8.2	8.6
	2	8.3	8.1	8.4	7.8	8.2	8.6
	3	8.2	8.3	8.3	7.8	8.2	8.6
	4	8.2	8.2	8.4	7.8	8.2	8.6
5	1	8.3	8.1	8.5	7.8	8.3	8.6
	2	8.2	8.1	8.5	7.8	8.3	8.6
	3	8.2	8.2	8.4	7.8	8.3	8.6
	4	8.2	8.2	8.5	7.8	8.2	8.6
	1						
	2						
	3						
	4						
Recorded by:		Qm	Qm	Qm	Qm	Qm	Qm
Date:		12-18-90	12-19-90	12-20-90	12-18-90	12-19-90	12-20-90

Notes: _____

_____ Reviewed / TW 2/2/91

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 90171-3 Sample Number 21916F
Test Substance FM3820 Test Type: screen definitive ✓

DAPHNID TEMPERATURE AND CONDUCTIVITY

Page 1 of 2

Initiation Date 12-18-90 Test Organism D. magna

Test Vessel I.D.	Rep.	Temperature (°C)			Conductivity (umhos/cm)		
		0 hr	24 hr	48 hr	0 hr	24 hr	48 hr
Control	1	20.8	20.9	21.0	1200	1300	1300
	2	20.8	21.0	21.0	1200	1300	1300
	3	20.9	20.9	20.8	1200	1300	1300
	4	20.9	20.9	20.9	1200	1300	1300
1	1	20.8	20.8	20.9	1200	1300	1300
	2	20.8	20.9	21.0	1200	1300	1300
	3	20.7	20.8	21.0	1200	1300	1300
	4	20.7	20.9	21.0	1200	1300	1300
2	1	20.9	20.9	20.8	1200	1300	1300
	2	20.8	20.8	20.6	1200	1300	1300
	3	20.9	20.7	20.6	1200	1300	1300
	4	20.9	20.8	20.9	1200	1300	1300
3	1	20.7	20.8	20.9	1200	1300	1300
	2	20.7	20.8	20.9	1200	1300	1300
	3	20.9	20.9	20.9	1200	1300	1300
	4	20.8	20.8	20.9	1200	1300	1300
Recorded by:		Gm	gm	Q 86	Qm	gm	Qm
Date:		12-18-90	12-19-90	12-22-90	12-18-90	12-19-90	12-20-90

Reviewed TW 2/2/91

Resource Analysts, Inc. Subsidiary of MILLIPORE

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 90171-3 Sample Number 2696E
 Test Substance FX 3820 Test Type: screen definitive ☒

DAPHNID TEMPERATURE AND CONDUCTIVITY

Page 2 of 2

Initiation Date 12-18-90 Test Organism D. magna

Test Vessel I.D.	Rep.	Temperature (°C)			Conductivity (umhos/cm)		
		0 hr	24 hr	48 hr	0 hr	24 hr	48 hr
4	1	20.8	20.9	21.0	1200	1300	1300
	2	20.7	20.8	20.9	1200	1300	1300
	3	20.8	20.8	20.9	1200	1300	1300
	4	20.8	20.9	21.0	1200	1300	1300
5	1	20.9	20.8	20.9	1200	1300	1300
	2	20.7	20.9	20.9	1200	1300	1300
	3	20.8	20.9	20.9	1200	1300	1300
	4	20.8	20.9	20.9	1200	1300	1300
	1						
	2						
	3						
	4						
Recorded by:		GW	GW	ES	GW	GW	GW
Date:		12-18-90	12-19-90	12-20-90	12-18-90	12-19-90	12-20-90

Notes: _____

Reviewed / TW 2/2/91

HARDNESS DETERMINATION

$$\text{mg CaCO}_3 \text{ equivalent} = 5.0 \text{ ml CaCO}_3 \div \text{ml EDTA}$$

EnviroSystem, Inc. 2000 2000 2000

Resource Analysts, Inc./ EnviroSystems Division
Product Registration Laboratory Raw Data

Study Number 90171-3 Sample Number 21696E
Test Substance PM 3820 Test Type: screen definitive ☒

ERROR CODES

1. Misspelled
2. Mathematical Error
3. Wrong Entry
4. Transposition or Sequencing Error (inverted or wrong order)
5. Transcription Change (copy error)
6. Procedural Change
7. Wrong Conclusion
8. Illegible Entry
9. Unnecessary Entry
10. Footnoted Explanation
11. Additional Comment

-----LC VALUES-----

IT IS IMPORTANT THAT ALL RESULTS BE COMPARED WITH THE ORIGINAL DATA TO SEE IF THE RESULTS SEEM REASONABLE. MOST, IF NOT ALL, METHODS FOR CALCULATING LC50 VALUES PERFORM POORLY WITH SOME SETS OF DATA, ALTHOUGH MANY PRECAUTIONS HAVE BEEN INCORPORATED INTO THIS PROGRAM, SOME QUESTIONABLE RESULTS MAY BE PRINTED WITHOUT A CAUTIONARY STATEMENT.

9071-3
SDS
48HR LC50
TW 2/2/91

-----BINOMIAL TEST-----

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT) LESS THAN 0.001
50	20	20	100	58.8098
25	20	10	50	.1288413
10	20	3	15	.1288413
5	20	3	15	.5908963
1	20	4	20	

THE BINOMIAL TEST SHOWS THAT 10 AND 50 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT

25 CAN BE USED AS AN APPROXIMATE LC50 FOR THIS DATA SET

-----RESULTS CALCULATED USING THE MOVING AVERAGE METHOD-----

LC50 @ TW 2/2/91

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
4	7.809802E-02	15.58225	10.89568	23.84768
3	8.009978E-02	17.89105	13.92568	23.48557
2	.0864314	20.97725	16.68199	25.78795
1	.7002976	25	16.9624	313.4993

AN LC50 CALCULATED USING THE MOVING AVERAGE METHOD MAY NOT BE A VERY GOOD ESTIMATE IF THE SPAN IS MUCH LESS THAN THE NUMBER OF CONCENTRATIONS.

IF ANY HIGHER CONCENTRATION PRODUCES A LOWER PERCENT DEAD THAN A LOWER CONCENTRATION, THE CONFIDENCE LIMIT AS OBTAINED BY THE MOVING AVERAGE METHOD WILL PROBABLY BE TOO CLOSE.

-----RESULTS CALCULATED USING THE PROBIT METHOD-----

ITERATIONS	G	H	CHI-SQUARE	PROBABILITY
4	3.296692	7.061959	21.18588	LESS THAN 0.001

BECAUSE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 1.295843
95 PERCENT CONFIDENCE LIMITS = -1.056992 AND 3.648677

POINT	CONC.	LOWER 95% CONFIDENCE LIMITS	UPPER
-------	-------	-----------------------------	-------

-----LC VALUES-----

IT IS IMPORTANT THAT ALL RESULTS BE COMPARED WITH THE ORIGINAL DATA TO SEE IF THE RESULTS SEEM REASONABLE. FIRST, IF NOT ALL, METHODS FOR CALCULATING LC50 VALUES PERFORM POORLY WITH SOME SETS OF DATA, ALTHOUGH MANY PRECAUTIONS HAVE BEEN INCORPORATED INTO THIS PROGRAM, SOME QUESTIONABLE RESULTS MAY BE PRINTED WITHOUT A CAUTIONARY STATEMENT.

9071-3
48 H2EC50
TW 2/2/91

-----BINOMIAL TEST-----

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
150	20	20	100	LESS THAN 0.001
100	20	20	100	LESS THAN 0.001
60	20	14	70	5.765907
40	20	6	30	5.765907
25	20	0	0	LESS THAN 0.001

THE BINOMIAL TEST SHOWS THAT 25 AND 100 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT

AN APPROXIMATE LC50 OF 48.98977 IS OBTAINED BY NONLINEAR INTERPOLATION BETWEEN 40 AND 60

-----RESULTS CALCULATED USING THE MOVING AVERAGE METHOD-----

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
4	.0422766	50.3058	43.41018	57.25496
3	5.480177E-02	49.29081	43.61243	55.76042
2	.1234816	48.98979	39.82044	56.50342
2	.1234816	48.98979	42.74617	59.71668
1	.6117131	48.98977	37.98345	63.18534

AN LC50 CALCULATED USING THE MOVING AVERAGE METHOD MAY NOT BE A VERY GOOD ESTIMATE IF THE SPAN IS MUCH LESS THAN THE NUMBER OF CONCENTRATIONS.

-----RESULTS CALCULATED USING THE PROBIT METHOD-----

ITERATIONS	G	H	CHI-SQUARE	PROBABILITY
5	.1496121	1	1.004782	.8000948

SLOPE = 7.77544

95 PERCENT CONFIDENCE LIMITS = 4.767922 AND 10.78296

POINT	CONC.	LOWER 95% CONFIDENCE LIMITS	UPPER 95% CONFIDENCE LIMITS
50	49.08664	43.25647	55.85722

EC @ TW 2/2/91
LC 50

91.0604
MATERIAL DESIGNATION: FLUOROCHROMICAL SALT

3M I.D. NUMBER: 41-2600-7082-0; 41-2700-3820-5;
41-2600-7460-8

NFPA DIAMOND CODE: HEALTH: 1 FIRE: 2 REACTIVITY: 0 OTHER: ND
FOR 24-HOUR EMERGENCY INFORMATION ON HEALTH EFFECTS CALL: (612)733-2882

1. INGREDIENTS	CAS NUMBER	%	TLV(R)(UNIT)
DIETHYLENE GLYCOL MONOBUTYL ETHER+	112-34-5	CA 36	NONE
WATER	7732-18-5	CA 36	NONE
FLUOROCHROMICAL SALT	2795-39-3	28	NONE

+SUBJECT TO SECTION 313 SARA TITLE III

2. PHYSICAL DATA

BOILING POINT:	>212 DEG F	SOLUBILITY IN WATER:	SOLUBLE
VAPOR PRESSURE:	<10MMHG	SPECIFIC GRAVITY(H2O=1):	1.08
VAPOR DENSITY(AIR=1):	ND	PERCENT VOLATILE:	72%
EVAPORATION RATE:	ND	VISCOSITY:	<100 CPS
		PH:	10-10.5

APPEARANCE AND ODOR: SLIGHT TINTED LIQUID; BUTYL CARBITOL ODOR

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT(TEST METHOD): 172 DEG F. MIN.(CC)(EST.) FLA.LMT. LEL:ND UEL:ND
EXTINGUISHING MEDIA: FOAM, DRY CHEMICAL, CO2, WATER FOG.
SPECIAL FIRE FIGHTING PROCEDURES: NONE
UNUSUAL FIRE AND EXPLOSION HAZARDS: NONE EXPECTED, BUT SEE ALSO SECTION 7.

4. PRECAUTIONARY INFORMATION

WEAR FULL FACE SHIELD. WEAR IMPERVIOUS GLOVES.

5. HEALTH HAZARD DATA

EYE CONTACT: CAUSES IRRITATION ON CONTACT.
SKIN CONTACT: MAY CAUSE IRRITATION. DRYING AND CRACKING ON PROLONGED OR
REPEATED CONTACT. MAY BE ABSORBED THROUGH THE SKIN.
INHALATION: ***
INGESTION: MODERATELY TOXIC ON INGESTION.
SUGGESTED FIRST AID
EYE CONTACT: IMMEDIATELY FLUSH WITH LARGE AMOUNTS OF WATER FOR AT LEAST TEN
MINUTES AND GET MEDICAL ATTENTION.
SKIN CONTACT: REMOVE CONTAMINATED CLOTHING. LAUNDRY BEFORE RE-USE. WASH
AFFECTED SKIN AREA WITH SOAP AND WATER. DISCARD CONTAMINATED
SHOE AND GLOVES.
INHALATION: ***
INGESTION: GIVE WATER OR MILK AND GET MEDICAL ATTENTION IMMEDIATELY.

SPILL RESPONSE: OBSERVE PRECAUTIONS FROM OTHER SECTIONS. USE APPROPRIATE
ABSORBENT MATERIAL AS NEEDED IN CLEANUP PROCEDURE. COLLECT
SPILLED MATERIAL. CLEAN UP RESIDUES WITH WATER. PLACE IN AN
APPROVED METAL CONTAINER AND SEAL.
RECOMMENDED DISPOSAL: SEND TO 3M CHEMOLITE PLANT - BLDG. 47, OR TO A 3M
APPROVED CHEMICAL WASTE DISPOSAL FACILITY FOR DISPOSAL.
ENVIRONMENTAL DATA: SEE 'NON-REGULATED CHEMICALS' IN 3M WASTE DISPOSAL
PROCEDURES MANUAL FOR LABELING/MARKING/PACKAGING/SHIPPING
DATA. HAZARDOUS WASTE NUMBER/CODE: NONE

7. REACTIVITY DATA

STABILITY: STABLE (CONDITIONS TO AVOID):
ND

INCOMPATIBILITY: === (MATERIALS TO AVOID):
ND

HAZARDOUS POLYMERIZATION: WON'T OCCUR (CONDITIONS TO AVOID):
NA

HAZARDOUS DECOMPOSITION PRODUCTS: HF.

INFORMATION ON THIS DATA SHEET REPRESENTS OUR CURRENT DATA AND BEST JUDGEMENT
AS TO THE PROPER USE AND HANDLING OF THIS PRODUCT UNDER NORMAL CONDITIONS.

90171-3

PRODUCT REGISTRATION LABORATORY EQUIPMENT INSPECTION LOG

Month December Year 1990

Day of Month	Check if Operation Normal						Deionizer		Notes	By/Date
	Air Bl.	Em. Gen.	FH	HVAC	L&T	Vas. T.S.	Lit	Repl		
1	✓	✓	✓	✓	✓	✓	✓			ES 12-1-90
2	✓	✓	✓	✓	✓	✓	✓			ES 12-2-90
3	✓	✓	✓	✓	✓	✓	✓	✓		ES 12-3-90
4	✓	✓	✓	✓	✓	✓	✓			ES 12-4-90
5	✓	✓	✓	✓	✓	✓	✓			ES 12-5-90
6	✓	✓	✓	✓	✓	✓	✓			QM 12-6-90
7	✓	✓	✓	✓	✓	✓	✓	✓	(32-7-90)	QM 12-7-90
8	✓	✓	✓	✓	✓	✓	✓			ES 12-8-90
9	✓	✓	✓	✓	✓	✓	✓			ES 12-9-90
10	✓	✓	✓	✓	✓	✓	✓	✓	2012-10-90	ES 12-10-90
11	✓	✓	✓	✓	✓	✓	✓			QM 12-11-90
12	✓	✓	✓	✓	✓	✓	✓			QM 12-11-90
13	✓	✓	✓	✓	✓	✓	✓			ES 12-13-90
14	✓	✓	✓	✓	✓	✓	✓			ES 12-14-90
15	✓	✓	✓	✓	✓	✓	✓	✓		QM 12-15-90
16	✓	✓	✓	✓	✓	✓	✓			QM 12-16-90
17	✓	✓	✓	✓	✓	✓	✓			ES 12-17-90
18	✓	✓	✓	✓	✓	✓	✓			QM 12-18-90
19	✓	✓	✓	✓	✓	✓	✓			QM 12-19-90
20	✓	✓	✓	✓	✓	✓	✓	✓		ES 12-20-90
21	✓	✓	✓	✓	✓	✓	✓			QM 12-21-90
22	✓	✓	✓	✓	✓	✓	✓			ES 12-22-90
23	✓	✓	✓	✓	✓	✓	✓			ES 12-23-90
24	✓	✓	✓	✓	✓	✓	✓			ES 12-24-90
25	✓	✓	✓	✓	✓	✓	✓			ES 12-25-90
26	✓	✓	✓	✓	✓	✓	✓			QM 12-26-90
27	✓	✓	✓	✓	✓	✓	✓	✓		ES 12-27-90
28	✓	✓	✓	✓	✓	✓	✓			QM 12-28-90
29	✓	✓	✓	✓	✓	✓	✓			QM 12-29-90
30	✓	✓	✓	✓	✓	✓	✓			QM 12-30-90
31	✓	✓	✓	✓	✓	✓	✓			ES 12-31-90

EQUIPMENT CODES

Air Bl. - Air Blower
 Em. Gen. - Emergency Generator
 L&T - Lights and Timers
 HVAC - Heating, Ventilating and Air Conditioning System
 FH - Fume Hood
 Vas. T.S. - Waste Treatment System
 Deionizer - Check "Lit" if both lights are illuminated, and check "Repl" if the unit was replaced

THIS IS A CERTIFIED TRUE COPY.

SIGNATURE Sam DATE 01-03-91

4 Pags

PRODUCT REGISTRATION LABORATORY EQUIPMENT INSPECTION LOG

Month December Year 1990

Day of Month	Photoperiod (hr:L)						Light Intensity ($\mu\text{Ein}/\text{cm}^2$)						By/Date
	Incubator Number						Incubator Number						
	12	13	14			CR	12	13	14			CR	
1	16	24	16	/	/	16	30	35	26	/	/	13	ES 12-1-90
2	16	24	16	/	/	16	30	35	25	/	/	13	ES 12-2-90
3	16	24	16	/	/	16	30	32	25	/	/	13	ES 12-3-90
4	16	24	16	/	/	16	30	32	25	/	/	14	ES 12-4-90
5	16	24	16	/	/	16	30	35	25	/	/	14	Qm 12-5-90
6	16	24	16	/	/	16	30	35	25	/	/	14	Qm 12-6-90
7	16	24	16	/	/	16	30	45	28	/	/	15	Qm 12-7-90
8	16	24	16	/	/	16	30	42	25	/	/	14	PK 12-8-90
9	16	24	16	/	/	16	30	42	25	/	/	14	PK 12-9-90
10	16	24	16	/	/	16	30	31	26	/	/	12	ES 12-10-90
11	16	24	16	/	/	16	30	33	25	/	/	14	Qm 12-11-90
12	16	24	16	/	/	16	20	35	25	/	/	15	Qm 12-12-90
13	16	24	16	/	/	16	23	38	26	/	/	13	ES 12-13-90
14	16	24	16	/	/	16	20	36	26	/	/	14	ES 12-14-90
15	16	24	16	/	/	16	25	35	25	/	/	14	Qm 12-15-90
16	16	24	16	/	/	16	23	35	25	/	/	14	Qm 12-16-90
17	16	24	16	/	/	16	23	35	26	/	/	14	ES 12-17-90
18	16	24	16	/	/	16	23	35	25	/	/	14	Qm 12-18-90
19	16	24	16	/	/	16	25	35	25	/	/	15	Qm 12-19-90
20	16	24	16	/	/	16	25	35	25	/	/	14	ES 12-20-90
21	16	24	16	/	/	16	25	35	23	/	/	15	Qm 12-21-90
22	16	24	16	/	/	16	24	36	24	/	/	14	ES 12-22-90
23	16	24	16	/	/	16	24	35	25	/	/	16	PK 12-23-90
24	16	24	16	/	/	16	24	36	23	/	/	14	ES 12-24-90
25	16	24	16	/	/	16	24	36	24	/	/	14	ES 12-25-90
26	16	24	16	/	/	16	24	36	24	/	/	14	Qm 12-26-90
27	16	24	16	/	/	16	24	36	24	/	/	15	Qm 12-27-90
28	16	24	16	/	/	16	27	36	24	/	/	15	Qm 12-28-90
29	16	24	16	/	/	16	27	36	24	/	/	15	FW 12-29-90
30	16	24	16	/	/	16	26	35	22	/	/	13	FW 12-30-90
31	16	24	16	/	/	16	23	39	24	/	/	13	ES 12-31-90

EQUIPMENT CODES

CR = culture room

PRODUCT REGISTRATION LABORATORY EQUIPMENT CALIBRATION LOG

Month December

Year 1990

Day of No.	Dissolved Oxygen meter: <u>DO-3</u>			pH meter: <u>PH-4</u>			Conductivity meter: <u>CU-9</u>		Salinity meter: <u> </u>		Refractometer no.: <u>RL-1</u>		By
	°C	Theo	Act	pH 4	pH 7	pH 10	Theo	Act	Theo	Act	Theo	Act	
1	19	9.3	9.3	4.00	7.02	10.05	1.000	1.000			20	20	ES
2	18	9.5	9.5	4.00	7.05	10.05	1.000	1.000			20	20	ES
3	18	9.5	9.5	4.00	7.07	10.05	1.000	1.000			20	20	ES
4	20	9.1	9.1	4.00	7.03	10.05	1.000	1.000			20	20	ES
5	18	9.5	9.5	4.00	7.02	10.05	1.000	1.000			20	20	ES
6	19	9.3	9.3	4.00	7.00	10.05	1.000	1.000			20	20	ES
7	18	9.5	9.5	4.00	7.02	10.05	1.000	1.000			20	20	ES
8	19	9.3	9.3	4.00	7.02	10.05	1.000	1.000			20	20	ES
9	19	9.3	9.3	4.00	7.02	10.05	1.000	1.000			20	20	ES
10	20	9.1	9.1	4.00	7.07	10.05	1.000	1.000			20	20	ES
11	19	9.3	9.3	4.00	7.02	10.05	1.000	1.000			20	20	ES
12	18	9.5	9.5	4.00	7.02	10.05	1.000	1.000			20	20	ES
13	20	9.1	9.1	4.00	7.00	10.05	1.000	1.000			20	20	ES
14	18	9.5	9.5	4.00	7.00	10.05	1.000	1.000			20	20	ES
15	18	9.5	9.5	4.00	7.00	10.05	1.000	1.000			20	20	ES
16	18	9.5	9.5	4.00	7.01	10.05	1.000	1.000			20	20	ES
17	18	9.5	9.5	4.00	7.03	10.05	1.000	1.000			20	20	ES
18	19	9.3	9.3	4.00	7.02	10.05	1.000	1.000			20	20	ES
19	19	9.3	9.3	4.00	7.01	10.05	1.000	1.000			20	20	ES
20	18	9.5	9.5	4.00	7.02	10.05	1.000	1.000			20	20	ES
21	19	9.3	9.3	4.00	7.02	10.05	1.000	1.000			20	20	ES
22	19	9.3	9.3	4.00	7.01	10.05	1.000	1.000			20	20	ES
23	20	9.1	9.1	4.00	7.02	10.05	1.000	1.000			20	20	ES
24	20	9.1	9.1	4.00	7.03	10.05	1.000	1.000			20	20	ES
25	18	9.5	9.5	4.00	7.03	10.05	1.000	1.000			20	20	ES
26	18	9.5	9.5	4.00	7.04	10.05	1.000	1.000			20	20	ES
27	18	9.5	9.5	4.00	7.03	10.05	1.000	1.000			20	20	ES
28	18	9.5	9.5	4.00	7.01	10.05	1.000	1.000			20	20	ES
29	19	9.3	9.3	4.00	7.04	10.05	1.000	1.000			20	20	ES
30	19	9.3	9.3	4.00	7.03	10.05	1.000	1.000			20	20	ES
31	19	9.3	9.3	4.00	7.10	10.05	1.000	1.000			20	20	ES

Theo = theoretical value Act = actual value measured by the instrument

Thermometer calibration:

Measured value (°C)

thermometer no.: NBS ^{TX30} 1734 1195 1441 1615 2265 2211 2266 2268 2158 2271

temperature 1 21.5 21.5 21.5 21.4 21.5 21.6 21.5 21.5 21.5 21.5 21.5

temperature 2 1.9 1.9 1.9 1.9 1.9 1.9 2.0 1.9 1.9 1.9 1.9

Therm. # 1620 2121 2166 1622

temp. 1 21.5 21.5 21.5 21.5

temp. 2 1.9 2.0 1.9 1.9

Resource Analysis Inc. Subsidiary of MILLIPORE

PRODUCT REGISTRATION LABORATORY EQUIPMENT INSPECTION LOG

Month December Year 1990

Day of Month	Measure and Record Temp. (°C)															By/Date
	Refrigerator Number (PRL#)					Incubator Number (PRL#)					F R #	C R	R T #			
	11	20				13	12	14			45	149	15			
1	2.7	2.9	/	/	/	2.9	20.6	22.7	/	/	-2	18.2	21.9	ES 12-1-90		
2	2.7	2.7	/	/	/	2.9	20.1	23.7	/	/	-3	17.2	21.2	ES 12-2-90		
3	2.7	3.6	/	/	/	2.0	20.7	23.8	/	/	-3	17.6	21.5	ES 12-3-90		
4	3.5	2.9	/	/	/	2.7	21.0	23.8	/	/	0	19.5	21.5	ES 12-4-90		
5	3.5	3.5	/	/	/	2.3	20.6	22.6	/	/	-2	19.1	21.3	ES 12-5-90		
6	3.6	2.4	/	/	/	2.7	19.8	22.7	/	/	-2	17.9	21.5	QW 12-6-90		
7	3.4	3.6	/	/	/	3.8	20.3	22.8	/	/	-1	15.5	21.7	QW 12-7-90		
8	3.6	3.3	/	/	/	3.9	20.1	22.6	/	/	0	18.6	21.2	PK 12-8-90		
9	3.4	3.5	/	/	/	2.5	20.2	21.6	/	/	0	18.7	21.3	PK 12-9-90		
10	2.1	3.2	/	/	/	2.5	19.7	22.4	/	/	-3	20.8	25.1	ES 12-10-90		
11	2.3	2.6	/	/	/	2.3	19.8	22.1	/	/	2	18.1	21.0	QW 12-11-90		
12	2.2	2.8	/	/	/	2.3	19.5	22.0	/	/	2	19.4	21.9	QW 12-12-90		
13	2.2	2.3	/	/	/	2.5	19.5	21.0	/	/	1	20.1	26.3	ES 12-13-90		
14	2.0	2.7	/	/	/	2.4	20.0	22.0	/	/	-3	19.8	21.9	ES 12-14-90		
15	2.3	2.7	/	/	/	2.5	21.0	22.8	/	/	-1	20.2	25.0	QW 12-15-90		
16	2.5	2.7	/	/	/	2.5	21.0	21.9	/	/	-1	20.0	21.2	QW 12-16-90		
17	2.5	2.9	/	/	/	2.9	19.6	22.9	/	/	-1	20.0	21.8	ES 12-17-90		
18	3.0	3.3	/	/	/	2.5	17.0	13.4	/	/	2	21.6	25.0	QW 12-18-90		
19	2.3	2.7	/	/	/	2.5	19.0	13.1	/	/	2	21.7	21.5	QW 12-19-90		
20	2.0	2.4	/	/	/	2.3	20.0	13.1	/	/	-2	21.4	22.7	ES 12-20-90		
21	2.0	3.0	/	/	/	2.5	19.9	13.1	/	/	-3	21.5	23.6	QW 12-21-90		
22	2.2	3.1	/	/	/	2.0	20.9	20.0	/	/	-2	21.6	22.8	ES 12-22-90		
23	2.4	3.2	/	/	/	2.0	20.7	20.1	/	/	-2	21.4	23.0	ES 12-23-90		
24	2.5	2.9	/	/	/	2.0	18.9	20.0	/	/	-3	21.9	23.2	ES 12-24-90		
25	2.2	3.0	/	/	/	2.0	19.9	19.9	/	/	1	21.5	22.9	ES 12-25-90		
26	2.3	3.5	/	/	/	2.0	19.7	19.6	/	/	-2	21.6	23.7	QW 12-26-90		
27	2.1	3.4	/	/	/	2.0	20.3	19.0	/	/	1	20.8	24.6	QW 12-27-90		
28	2.3	2.2	/	/	/	1.0	20.5	20.0	/	/	-3	21.7	25.0	QW 12-28-90		
29	2.4	3.1	/	/	/	2.0	19.9	19.7	/	/	-4	21.1	23.2	QW 12-29-90		
30	2.4	2.8	/	/	/	2.8	20.5	19.9	/	/	2	21.9	22.5	QW 12-30-90		
31	2.5	3.6	/	/	/	2.8	20.5	19.9	/	/	-1	21.9	22.9	ES 12-31-90		

① 12-1

① PK 12-18-90
On 12-18-90 it was observed that the thermometer vessel was sitting directly over a light bulb. It appears that its location was changed from the shade to over the bulb on 12-10-90 after temperature was recorded. Thermometer returned to shade on 12-18-90.

RE: PRL-13
RJB
12-31-90

EQUIPMENT CODES

RT = room temperature sample storage area
CR = culture room
FR = freezer

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RAI

9071-3

Resource Analysts, Inc.
Subsidiary of AMUPCORP
P.O. Box 778, One Lafayette Road
Hampton, N.H. 03842
(603) 926-7777

Mr. Timothy Ward
EnviroSystems, Incorporated
P.O. Box 778
Hampton, NH 03842

P.O. Number: 2597
Date Received: 08/29/90 (1320)
Lab Number: 23,394
Date Reported: 10/10/90

Attached please find test results for ammonia, total organic carbon, aluminum, arsenic, boron, cadmium, chromium, cobalt, copper, iron, lead, mercury, nickel, silver, zinc, fluoride, total suspended solids, pesticides/PCB's.

Samples were received in acceptable condition.

All samples were prepared and analyzed within the holding times specified in the referenced methods.

Instrumentation used for analysis was calibrated and/or tuned with the appropriate frequency and to the appropriate specifications required by the referenced methods.

Blank contamination was not observed at levels affecting the analytical results.

Matrix effects, as monitored by matrix spike recovery, unusual physical properties and/or surrogate analyte recovery, were not apparent.

Accuracy and precision, as monitored by laboratory control sample analyses, were within laboratory acceptance limits.

RESOURCE ANALYSTS, INCORPORATED

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6 Pages



Authorized Signature

10/10/90

Date

Field Identification: 2597-7
Laboratory Number: 23394-7

Matrix: Water

<u>Parameter</u>	<u>Concentration</u>	<u>Date Analyzed</u>	<u>Method/Ref.</u>
Total Suspended Solids (mg/L)	<10	08/30/90	160.2/1

Field Identification: 2597-8
Laboratory Number: 23394-8

Matrix: Water

<u>Parameter</u>	<u>Concentration</u>	<u>Date Analyzed</u>	<u>Method/Ref.</u>
Ammonia (mg/L as N)	<0.2	09/04/90	350.2/1

Field Identification: 2597-9
Laboratory Number: 23394-9

Matrix: Water

<u>Parameter</u>	<u>Concentration</u>	<u>Date Analyzed</u>	<u>Method/Ref.</u>
Total Organic Carbon (mg/L)	<1.0	08/30/90	415.1/1

Field Identification: 2597-10
Laboratory Number: 23394-10

Matrix: Water

<u>Parameter</u>	<u>Concentration</u>	<u>Date Analyzed</u>	<u>Method/Ref.</u>
Aluminum, total (mg/L)	0.04	09/07/90	3010,6010/2
Arsenic, total (mg/L)	<0.002	09/03/90	7060/2
Boron, total (mg/L)	0.1	09/07/90	3010,6010/2
Cadmium, total (mg/L)	0.0005	09/29/90	3010,6010/2
Chromium, total (mg/L)	<0.002	09/07/90	3010,6010/2
Cobalt, total (mg/L)	<0.008	09/07/90	3010,6010/2
Copper, total (mg/L)	<0.005	09/07/90	3010,6010/2
Iron, total (mg/L)	0.03	09/07/90	3010,6010/2
Lead, total (mg/L)	0.003	09/03/90	3020,7421/2
Mercury, total (mg/L)	0.0002	08/31/90	7470/2
Nickel, total (mg/L)	<0.008	09/07/90	3010,6010/2
Silver, total (mg/L)	<0.0005	09/28/90	3010,6010/2
Zinc, total (mg/L)	<0.005	09/07/90	3010,6010/2

Field Identification: 2597-11
Laboratory Number: 23394-11

Matrix: Water

<u>Parameter</u>	<u>Concentration</u>	<u>Date Analyzed</u>	<u>Method/Ref.</u>
Fluoride (mg/L)	0.10	08/30/90	340.2/1

Field Identification: 2597-14
Laboratory Number: 23394-14

Matrix: Water

<u>Parameter</u>	<u>Concentration</u>	<u>Date Analyzed</u>	<u>Method/Ref.</u>
Total Suspended Solids (mg/L)	<10	08/30/90	160.2/1

Field Identification: 2597-15
Laboratory Number: 23394-15

Matrix: Water

<u>Parameter</u>	<u>Concentration</u>	<u>Date Analyzed</u>	<u>Method/Ref.</u>
Ammonia (mg/L as N)	<0.2	09/04/90	350.2/1

Field Identification: 2597-16
Laboratory Number: 23394-16

Matrix: Water

<u>Parameter</u>	<u>Concentration</u>	<u>Date Analyzed</u>	<u>Method/Ref.</u>
Total Organic Carbon (mg/L)	<2.0	08/30/90	415.1/1

Laboratory number: 23394 -012
Sample Designation: 2597-12
Date Analyzed: 09/08/90
Matrix: WATER

PESTICIDES/PCB'S	CONCENTRATION (ug/L)	DETECTION LIMIT (ug/L)
ALDRIN	BDL	0.06
ALPHA-BHC	BDL	0.06
BETA-BHC	BDL	0.06
GAMMA-BHC	BDL	0.06
DELTA-BHC	BDL	0.06
CHLORDANE	BDL	.6
4,4'-DDT	BDL	.1
4,4'-DDE	BDL	0.06
4,4'-DDD	BDL	.1
DIELDRIN	BDL	0.06
ENDOSULFAN I	BDL	0.06
ENDOSULFAN II	BDL	.1
ENDOSULFAN SULFATE	BDL	.1
ENDRIN	BDL	0.06
ENDRIN ALDEHYDE	BDL	.1
HEPTACHLOR	BDL	0.06
HEPTACHLOR EPOXIDE	BDL	0.06
PCB-1242	BDL	.6
PCB-1254	BDL	.6
PCB-1221	BDL	.6
PCB-1232	BDL	.6
PCB-1248	BDL	.6
PCB-1260	BDL	.6
PCB-1016	BDL	.6
TOXAPHENE	BDL	2
ENDRIN KETONE	BDL	.1
METHOXYCHLOR	BDL	.6

METHOD REFERENCE: 40 CFR PART 136, FRIDAY, OCTOBER 26, 1984
METHOD 608

BDL = Below detection limit

Laboratory Number: 23394-13
Sample Designation: 2597-13
Date Extracted: 09/11/90
Date Analyzed: 10/04/90
Matrix: WATER

PESTICIDES	CONCENTRATION (ug/L)	DETECTION LIMIT (ug/L)
AZINPHOS METHYL	BDL	1.5
BOLSTAR	BDL	0.15
CHLORPYRIFOS	BDL	0.3
COUMAPHOS	BDL	1.5
DEMETON-O	BDL	0.25
DEMETON-S	BDL	0.25
DIAZINON	BDL	0.6
DICHLORVOS	BDL	0.1
DISULFOTON	BDL	0.20
ETHOPROP	BDL	0.25
FENSULFOTHION	BDL	1.5
FENTHION	BDL	0.10
MERPHOS	BDL	0.25
MEVINPHOS	BDL	0.3
NALED	BDL	0.1
PARATHION METHYL	BDL	0.03
PHORATE	BDL	0.15
RONNEL	BDL	0.3
STIROPHOS (TETRACHLORVINPHOS)	BDL	5.0
TOKUTHION (PROTHIOFOS)	BDL	0.5
TRICHLORONATE	BDL	0.15

BDL = BELOW DETECTION LIMIT

METHOD REFERENCE: US EPA METHOD 8140

1 of 3

Resource Analysts, Inc / EnviroSystems Division
Product Registration Laboratory

CHAIN OF CUSTODY FORM

Study Number: 2597	Study Name: Quarterly Water Quality																				
Date Sampled: 8-24-90	Sampled By: PK																				
Notes: See attached Detection Limits																					
Sample Identification	Number and Size of Containers	Remarks	RAI Sample Number																		
2597 -1	1 500ml glass	Ammonia soft well	23394-1																		
" -2	1 250ml glass	TOC "	2																		
" -3	1 500ml plastic	metals "	3																		
" -4	1 500ml plastic	Fluoride "	4																		
" -5	1 1L glass	organochlorine pests + PCBs "	5																		
" -6	1 1L glass	organophosphorus pests "	6																		
" -7	1 125ml plastic	TSS "	7																		
" -8	1 500ml glass	Ammonia Well	8																		
" -9	1 250ml glass	TOC "	9																		
" -10	1 500ml plastic	metals "	10																		
" -11	1 500ml plastic	Fluoride "	11																		
" -12	1 1L glass	organochlorine pests + PCBs "	12																		
" -13	1 1L glass	organophosphorus pests "	13																		
" -14	1 125ml plastic	TSS "	14																		
<table border="1"> <tr> <td>Relinquished by</td> <td>Date</td> <td>Time</td> <td>Received by</td> <td>Date</td> <td>Time</td> </tr> <tr> <td>Pete Konrad</td> <td>8-24-90</td> <td>1320</td> <td>JA Sauer</td> <td>8-24-90</td> <td>1320</td> </tr> <tr> <td>Relinquished by</td> <td>Date</td> <td>Time</td> <td>Received by</td> <td>Date</td> <td>Time</td> </tr> </table>				Relinquished by	Date	Time	Received by	Date	Time	Pete Konrad	8-24-90	1320	JA Sauer	8-24-90	1320	Relinquished by	Date	Time	Received by	Date	Time
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Pete Konrad	8-24-90	1320	JA Sauer	8-24-90	1320																
Relinquished by	Date	Time	Received by	Date	Time																

Resource Analysts, Inc. Subsidiary of ALLPORE

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90171-3

PRODUCT REGISTRATION LABORATORY SAMPLE RECEIVING LOG

1. RAI Sample Number 2696E
2. Sponsor Name and Address 3M Env. lab
Bldg. 2-3E-09 , 935 Bush Ave.
St. Paul , MN 55106
3. Sponsor Sample Identification H 2864-6 FM 3820
4. Sample Container Label Data H 2864-6 FM 3820
5. Date Received 11-15-90 6. Date Photographed 032891-5PM
7. Method of Shipment Shipped From St. Paul MN
Via Fedex Weekday
8. Description of Shipping Container(s) 1 plastic cooler
(Number, Type, Size)
9. Description of Sample Containers(s) 1 250 ml glass bottle
(Number, Type, Size)
10. Sample Storage Location and Required Storage Conditions per-15 Perm temp
11. Signature Peter Kowalski Date 11-16-90
12. Notes _____
13. Date and Location of Archive Sample Removal and Storage Location 11-16-90 per-15

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3 Pgs

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SOP DEVIATION

The photograph of the test substance does
not need to be taken at the time of sample
arrival.

TW 7/30/90

PJB 7-30-90

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J696E 032891-SM

H2864-6 FM 3820

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