

**APPENDIX H**

**LIME PILE INFORMATION**

## 2006 Lime Pile (looking south from Lime Specialties Inc. Bldg)



## Year 2000 Lime Pile Photos



PHOTO 19  
AREA D  
FACING NORTHEAST



PHOTO 20  
AREA D  
FACING NORTH TO AREA C



PHOTO 21  
AREA B  
FACING NORTH TO AREA A



PHOTO 22  
AREA B  
FACING NORTHEAST TO AREA A



PHOTO 23  
AREA C  
FACING NORTH



PHOTO 24  
SAMPLE LOCATION A-5





# DUPONT FACILITY



100' 0' 50' 100'  
SCALE

**NOTES:** 1. LOCATIONS ARE APPROXIMATE FOR ILLUSTRATIVE PURPOSES ONLY.  
2. REFERENCED FROM A MAP PROVIDED BY AEROCON PHOTOGRAMMETRIC SERVICES INC., LAKE ODESSA, MICHIGAN, GENERATED FROM SEPTEMBER 13, 2000 AERIAL PHOTOGRAPHY; AND FIELD ACTIVITIES CONDUCTED BY EIKON PERSONNEL ON SEPTEMBER 14, 2000.

## LEGEND:

B-1D  SOIL SAMPLE LOCATION AND DESIGNATION

FIGURE 5			
DEEP BORING LOCATION MAP			
DUPONT MONTAGUE WORKS FACILITY			
6270 WILKES ROAD			
MONTAGUE, MICHIGAN			
PROJ. NO.: 10730600	DATE: 10-16-00	SCALE: AS SHOWN	DRAWN BY/APP. BY: ACD/VCP
Eikon Planning And Design Corp. • 221 Howe Street • P.O. Box 469 • Hackensack, NJ 07640			

Appendix H  
Table 1  
Lime Pile Material vs Industrial Drinking Water Protection

				Sample ID	A-1D-1	A-1D-2	A-2D-1	A-2D-2	A-3D-1	A-3D-2	B-1D-1	B-1D-2	B-2D-1	B-2D-2	C-1D-1	C-1D-2
				Date												
				Top (ft)												
		Total (T)/	Screening	Bottom (ft)												
Analyte	units	Diss. (D)	Criteria	Duplicate #	1	1										
CALCIUM			not avail		490000	510000	520000	520000	530000	500000	420000	520000	470000	510000	520000	500000
CYANIDE	mg/kg	T	4		//	<0.5	//	<0.5	//	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SULFIDE	mg/kg	T	not avail		//	<5	//	5.3	//	10	13	21	33	11	7	5.3
THIOCYANATE			not avail		//	5.8	//	<1.7	//	2.5	2.8	4.1	2.5	4.6	3	3.2
ARSENIC	mg/kg	T	4.6		//	<0.47	//	<0.5	//	<0.49	1.2	<0.5	0.75	<0.47	<0.5	<0.49
BARIUM	mg/kg	T	1300		//	31	//	20	//	32	44	39	44	39	19	24
BERYLLIUM	mg/kg	T	51		//	0.89	//	0.65	//	0.82	0.73	0.68	0.91	0.83	0.82	0.39
CHROMIUM	mg/kg	T	1000000		//	2.3	//	1.5	//	1.2	4	1.3	2.7	1.7	3.8	1.4
COPPER	mg/kg	T	5800		//	5.3	//	3.3	//	4.1	11	3.7	4.4	4.7	3	1.3
NICKEL	mg/kg	T	100		//	15	//	16	//	17	15	17	16	17	18	19
LEAD	mg/kg	T	700		//	<1.0	//	<1.0	//	<1.0	1.4	<1.0	<1.0	<1.0	<1.0	<1.0
ZINC	mg/kg	T	5000		//	3.9	//	<1.0	//	<1.0	11	<1.0	3	<1.0	<1.0	<1.0
YTTRIUM			not avail		//	9.9	//	7.2	//	9.7	8.2	8.9	8.4	9.5	8	5.5

ND= Non Detect

// indicate sample not analyzed fro the specific parameter

Criteria = MDEQ 21B Soil Indust DW Protection #21B 12/2004

^ and shaded cells = Concentration above criteria (NDs [^] assumed to be 50% reporting limit)

< and ND = Non detect at stated reporting limit

Appendix H  
Table 2  
Lime Pile Material vs. Industrial Direct Contact

Analyte	Units	Total (T)/ Diss. (D)	Screening Criteria	Sample ID Date Top (ft) Bottom (ft) Duplicate #	A-1D-1	A-1D-2	A-2D-1	A-2D-2	A-3D-1	A-3D-2	B-1D-1	B-1D-2	B-2D-1	B-2D-2	C-1D-1	C-1D-2
CALCIUM			not avail		1	1										
CYANIDE	mg/kg	T	250		//	<0.5	//	<0.5	//	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SULFIDE	mg/kg	T	not avail		//	<5	//	5.3	//	10	13	21	33	11	7	5.3
THIOCYANATE			not avail		//	5.8	//	<1.7	//	2.5	2.8	4.1	2.5	4.6	3	3.2
ARSENIC	mg/kg	T	37		//	<0.47	//	<0.5	//	<0.49	1.2	<0.5	0.75	<0.47	<0.5	<0.49
BARIUM	mg/kg	T	130000		//	31	//	20	//	32	44	39	44	39	19	24
BERYLLIUM	mg/kg	T	1600		//	0.89	//	0.65	//	0.82	0.73	0.68	0.91	0.83	0.82	0.39
CHROMIUM	mg/kg	T	1000000		//	2.3	//	1.5	//	1.2	4	1.3	2.7	1.7	3.8	1.4
COPPER	mg/kg	T	73000		//	5.3	//	3.3	//	4.1	11	3.7	4.4	4.7	3	1.3
NICKEL	mg/kg	T	150000		//	15	//	16	//	17	15	17	16	17	18	19
LEAD	mg/kg	T	900		//	<1.0	//	<1.0	//	<1.0	1.4	<1.0	<1.0	<1.0	<1.0	<1.0
ZINC	mg/kg	T	630000		//	3.9	//	<1.0	//	<1.0	11	<1.0	3	<1.0	<1.0	<1.0
YTTRIUM			not avail		//	9.9	//	7.2	//	9.7	8.2	8.9	8.4	9.5	8	5.5

// indicate sample not analyzed for the specific parameter

Criteria = MDEQ 27 Soil Direct Contact Indust/Comm II #27 12/2004

^ and shaded cells = Concentration above criteria (NDs[^] assumed to be 50% reporting limit)

< and ND = Non detect at stated reporting limit

**TRADE SECRET**

***Study Title***

H-25080 and H-25103: Static, Acute, 48-Hour EC<sub>50</sub> to  
*Daphnia magna*

Laboratory Project ID: DuPont-8163

**TEST GUIDELINES:** U.S. EPA Pesticide Assessment Guidelines  
Subdivision E, Section 72-2 (1982)

OECD Guideline for Testing Chemicals  
Section 2: Effects on Biotic Systems, No. 202 (1984)

Commission Directive 92/69/EEC  
EEC Method C.2 (1992)

**AUTHOR:** Robert A. Hoke, Ph.D.

**STUDY COMPLETED ON:** March 11, 2002

**PERFORMING LABORATORY:** E.I. du Pont de Nemours and Company  
Haskell Laboratory for Health and Environmental Sciences  
Elkton Road, P.O. Box 50  
Newark, Delaware 19714-0050

**WORK REQUEST NUMBER:** 13903

**STUDY CODE NUMBER:** 296

### CERTIFICATION

I, the undersigned, declare that this report provides an accurate evaluation of data obtained from this study.

Issued by Study Director: \_\_\_\_\_

*Robert A. Hoke*

Robert A. Hoke, Ph.D.  
Associate Director

*11 March 2002*

\_\_\_\_\_  
Date



## TABLE OF CONTENTS

	Page
<b>CERTIFICATION .....</b>	<b>2</b>
<b>STUDY INFORMATION.....</b>	<b>4</b>
<b>STUDY PERSONNEL.....</b>	<b>5</b>
<b>SUMMARY.....</b>	<b>6</b>
<b>INTRODUCTION.....</b>	<b>7</b>
<b>MATERIALS AND METHODS.....</b>	<b>7</b>
A. Test Substance .....	7
B. Test Solution Preparation .....	7
C. Dilution Water.....	7
D. Test Organism Culture .....	8
E. Test Methods .....	8
F. Statistical Analysis .....	9
<b>RESULTS AND DISCUSSION.....</b>	<b>10</b>
A. In-Life Report.....	10
<b>CONCLUSION.....</b>	<b>10</b>
<b>RECORDS AND SAMPLE STORAGE.....</b>	<b>11</b>
<b>REFERENCES .....</b>	<b>11</b>
<b>TABLES .....</b>	<b>12</b>
1. CHEMICAL CHARACTERISTICS OF HASKELL LABORATORY WELL WATER.....	13
2. WATER CHEMISTRY OF THE DILUTION WATER CONTROL AT TEST START .....	14
3. DISSOLVED OXYGEN CONCENTRATION (mg/L) OF H-25080 AND H-25103 TEST SOLUTIONS .....	15
4. pH OF H-25080 AND H-25103 TEST SOLUTIONS.....	16
5. TEMPERATURE (°C) OF H-25080 AND H-25103 TEST SOLUTIONS.....	17
6. IMMOBILITY OF <i>Daphnia magna</i> AT 24 AND 48 HOURS IN AN UNAERATED, STATIC, ACUTE TEST WITH H-25080 AND H-25103 .....	18
7. SUBLETHAL EFFECTS IN <i>Daphnia magna</i> AT 24 AND 48 HOURS IN AN UNAERATED, STATIC, ACUTE TEST WITH H-25080 AND H-25103 .....	19
8. NOMINAL CONCENTRATIONS OF H-25080 AND H-25103 CAUSING IMMOBILITY TO 50% (EC <sub>50</sub> ) OF <i>Daphnia magna</i> AT SPECIFIC TIME INTERVALS .....	20

## STUDY INFORMATION

**Substance Tested:**

Garden lime

Synonyms/Codes:

- Dolomitic limestone
- H-25103
- 99C 158 (Espoma Co. Lot No.)

Haskell Number: 25103

Composition: Garden lime

Known Impurities: Not supplied by the sponsor

Physical Characteristics: White/gray solid

**Substance Tested:**

Hydrated Lime

Synonyms/Codes:

- Calcium Hydroxide (Montague)
- H-25080

Haskell Number: 25080

Composition: Hydrated Lime

Known Impurities: Not supplied by the sponsor

Physical Characteristics: White/gray solid

Stability: The test substance appeared to be stable under the conditions of the study; no evidence of instability was observed.

Sponsor: E.I. du Pont de Nemours and Company  
Wilmington, Delaware 19898  
U.S.A.

Study Initiated/Completed: September 18, 2001 / (see report cover page)

In-Life Initiated/Completed: November 1, 2001 / November 3, 2001

### **STUDY PERSONNEL**

Study Director: Robert A. Hoke, Ph.D.  
Management: Jeanette M. Erhardt, Ph.D.  
Primary Technician: Daniel J. Peterson, B.S.  
Animal Culturist: Daniel J. Peterson, B.S.

Ecotoxicology Report Preparation: Wanda F. Dinbokowitz

## SUMMARY

The acute toxicity of H-25080 and H-25103 to unfed *Daphnia magna* neonates, less than 24 hours old at test start, was determined in an unaerated, 48-hour, static test. The test was conducted in accordance with the Organisation for Economic Co-Operation and Development (OECD) Guideline for Testing Chemicals: 202; the European Economic Community 92/69 Annex V - Method C.2; and the United States Environmental Protection Agency, Pesticide Assessment Guidelines Subdivision E, 72-2.

The study was conducted with 5 concentrations each of H-25080 and H-25103 and a dilution water control at a mean temperature of 20.0°C (range of 19.9-20.5°C). Four replicates with 5 daphnids per replicate were used per test substance concentration and control.

Exposure of daphnids to nominal H-25080 (Montague) concentrations of 7.5, 15, 30, 60, and 120 mg/L resulted in 5, 5, 5, 10, and 10% immobility at the end of 48 hours. Exposure of daphnids to nominal H-25103 (Garden lime) concentrations of 7.5, 15, 30, 60, and 120 mg/L resulted in 0, 0, 0, 5, and 5% immobility at the end of 48 hours. No immobility was observed in the water control daphnids. The 48-hour EC<sub>50</sub>, based on nominal concentrations of H-25080 and H-25103 and immobility, was greater than 120 mg/L for both test substances.

The results are summarized as follows:

Nominal concentrations of H-25080 and H-25103	dilution water control, 7.5, 15, 30, 60, and 120 mg/L
48-hour EC <sub>50</sub> based on nominal concentrations	H-25080 (Montague) > 120 mg/L H-25103 (Garden lime) > 120 mg/L

## INTRODUCTION

The objective of this study was to assess the acute toxicity of H-25080 (Montague) and H-25103 (Garden lime) to unfed *Daphnia magna* neonates, less than 24 hours old at test start, during an unaerated, static, 48-hour test.

## MATERIALS AND METHODS

### A. Test Substance

The test substance, H-25080, was supplied by the sponsor. The test substance, H-25103, was purchased from Southern States Supply, Newark, Delaware.

No determination was made of the solubility or stability of H-25080 and H-25103 in Haskell Laboratory Well Water (HLWW).

### B. Test Solution Preparation

Test substance solutions were prepared by direct addition of H-25080 and H-25103 to 1 liter of dilution water. All test solutions, including the water control, were stirred for 2 hours prior to use. The control and 7.5, 15, and 30 mg/L test substance solutions of both test substances were clear and colorless. The 60 mg/L test substance concentrations of both test substances were slightly cloudy while both 120 mg/L test concentrations were cloudy and white in color. Undissolved test material was present on the bottom of the 60 and 120 mg/L test solution beakers of both test substances at 24 and 48 hours.

### C. Dilution Water

Dilution water originated from the Haskell Laboratory well which is 378-feet deep and is cased and sealed to bedrock. The hardness of the HLWW is adjusted to approximately 100-140 mg/L as CaCO<sub>3</sub> by the flow-proportioned addition of CaCl<sub>2</sub>. The HLWW is then aerated, passed through a green sand filter to remove iron, and filtered through 50-, 10-, and 5-μm filters to remove particulates. The water is heated or chilled as appropriate and distributed through aged polyvinyl chloride piping. The dilution water is analyzed twice yearly for major anions and cations, metals, total organochlorine and organophosphate pesticides, and polychlorinated biphenyls (Table 1). The dilution water meets OECD<sup>(1)</sup> and ASTM<sup>(2)</sup> specifications.



## D. Test Organism Culture

*Daphnia magna* were reared at Haskell Laboratory in 1000-mL Pyrex<sup>®</sup> beakers (8-10 per beaker) which contained 1000 mL of aerated, filtered HLWW held at 20.4°C. Daphnids were fed on a daily basis with a yeast, cereal leaves and trout chow (YCT) mixture (standardized to 1800 mg/L total solids) and the green alga, *Selenastrum capricornutum*, at a rate of 62,500 cells/mL of culture medium. The combination of YCT and alga is equivalent to 0.1-0.2 mg total organic carbon per daphnid. Neonates used in this test were less than 24 hours old and were collected from the 5<sup>th</sup> to 7<sup>th</sup> brood of 16-22 day old parent daphnids. Sickness, injury, and abnormalities were not seen and ephippia were not being produced by the parent daphnids. Adult immobility did not exceed 3% in the cultures used for testing during the 48-hour pretest period. *Daphnia magna* were identified by labels on the culture beakers and test chambers.

## E. Test Methods<sup>(1,3,4)</sup>

Five nominal concentrations of each test substance and a dilution water control were used in this study. Nominal concentrations of H-25080 and H-25103 of 7.5, 15, 30, 60, and 120 were chosen for the definitive test based on the results of a preliminary rangefinding study (see Results and Discussion).

Pyrex<sup>®</sup> beakers (250-mL) containing 200 mL of test solution (6.5-cm test solution depth) were used as test chambers. Four replicate test chambers were used per test concentration with 5 daphnids in each chamber (20 daphnids per concentration). The test chambers were covered with a glass plate during the test. Random numbers were used to assign test concentrations to the test chambers and position of test concentrations in the water bath.

*Daphnia magna* neonates, less than 24 hours old, were used in this study. Daphnids were assigned to the test chambers using random numbers. Addition of daphnids to test solutions was initiated about 130 minutes after mixing of the test solutions was completed. Observations of test organisms were made daily. The criterion for the effect (immobility) was a lack of reaction to application of a gentle stimulus. Daphnids were not fed during the test.

A recirculating water bath was used to maintain mean temperature in the test chambers during the 48-hour test at approximately 20.0°C with a range of 19.9 to 20.5°C (Table 5). In addition, a continuously-recording thermometer was used to check for temperature variation in the water bath. A photoperiod of 16 hours light (approximately 500 - 823 Lux) and 8 hours darkness was employed which included 30 minutes of transitional light (31 - 190 Lux) preceding and following the 16-hour light interval.

Dissolved oxygen concentration, pH, and temperature were measured in all replicates of the control and test substance concentrations. These measurements were taken before daphnids were added at test start and at test end. Total alkalinity, EDTA hardness, and conductivity of the water control was measured before daphnids were added at the beginning of the test. Test solutions were not aerated during the test and were disposed of in an appropriate manner at test end.

## **F. Statistical Analysis**

It was not possible to calculate a 48-hour EC<sub>50</sub> for either test substance due to insufficient immobility during the study.

## RESULTS AND DISCUSSION

### A. In-Life Report

#### 1. Rangefinding Study

A static rangefinding study with 10 daphnids per replicate and 1 replicate per concentration was conducted using a dilution water control and nominal concentrations of 0.1, 1.0, 10, and 100 mg/L of each test substance. At the end of 48 hours, the respective immobility values were 0, 0, 0, and 0% for both H-25080 and H-25103, respectively. The 0.1, 1.0, and 10 mg/L test solutions of both test substances were clear and colorless. The 100 mg/L test solution of each test substance was cloudy and white on day 0. Undissolved test substance was present in the 100 mg/L treatment for both test substances at 24 and 48 hours.

#### 2. Definitive Study

Nominal concentrations for the definitive study were 7.5, 15, 30, 60, and 120 mg/L (5 daphnids per replicate, 4 replicates per concentration). A dilution water control was used in this study.

Dilution water quality was acceptable based on OECD<sup>(1)</sup> and ASTM<sup>(2)</sup> specifications, and contaminant concentrations in the most recent semi-annual dilution water analysis were below levels that could affect the integrity of the study (Table 1). All chemical and physical parameters for the definitive test (Tables 2 - 5) were within expected ranges. Total alkalinity, EDTA hardness, and conductivity of the dilution water control and each test substance concentration at test start ranged from 45 to 56 mg/L CaCO<sub>3</sub>, 96 to 127 mg/L CaCO<sub>3</sub>, and 235 to 280 µmhos/cm, respectively. During the test, dissolved oxygen concentrations ranged from 8.3 to 8.8 mg/L, pH ranged from 7.8 to 10, and mean temperature was 20.0°C with a range of 19.9 to 20.5°C.

Data on daily immobility and sublethal effects are presented in Tables 6 and 7. No immobility or sublethal effects were seen in the dilution water control.

A summary of the EC<sub>50</sub> values and 95% confidence intervals at specific time intervals is presented in Table 8. The 48-hour EC<sub>50</sub> value, based on nominal concentrations of H-25080 and H-25103, was > 120 mg/L for both test substances.

## CONCLUSION

H-25080 and H-25103 were assessed for acute toxicity to unfed *Daphnia magna* neonates, less than 24 hours old, in an unaerated, static, 48-hour test. The 48-hour EC<sub>50</sub> value, based on nominal concentrations of H-25080 and H-25103 and immobility, was > 120 mg/L for both test substances.

## **RECORDS AND SAMPLE STORAGE**

All data and records for analytical characterizations conducted by the sponsor will be archived by the sponsor.

Specimens (if applicable), raw data, and the final report will be retained at Haskell Laboratory, Newark, Delaware, or at Iron Mountain Records Management, Wilmington, Delaware (formerly known as the E.I. du Pont de Nemours and Company Records Management Center).

## **REFERENCES**

1. Organisation for Economic Co-Operation and Development (OECD). Guideline for Testing of Chemicals: 202, 4 April 1984.
2. American Society for Testing and Materials (ASTM). (1988). Standard Guide for Conducting Acute Toxicity Tests with Fishes, Macroinvertebrates, and Amphibians. E 729-88a. Annual Book of ASTM Standards, Vol. 11.04.
3. Zucker, E. (1985). Standard Evaluation Procedure Acute Toxicity Test for Freshwater Invertebrates. EPA-540/9-85-005. U.S. Environmental Protection Agency Office of Pesticide Programs.
4. Official Journal of the European Communities. Annex to Commission Directive 92/69, Method C.2. Acute Toxicity for *Daphnia*, 29-December-1992.

## **TABLES**



TABLE 1  
CHEMICAL CHARACTERISTICS OF HASKELL LABORATORY WELL WATER<sup>a</sup>

Parameter	MDL <sup>b</sup>	Analytical Value	Parameter	MDL <sup>b</sup>	Analytical Value
BOD, mg/L	3.6	ND <sup>c</sup>	Lead, mg/L	0.0088	ND
COD, mg/L	1.7	1.9 J <sup>d</sup>	Magnesium, mg/L	0.02	3.6
DOC, mg/L	0.3	0.32 <sup>e</sup>	Manganese, mg/L	0.00062	0.0012 J
TOC, mg/L	0.4	0.78 J	MBAS/LAS, mg/L	0.031	ND
Total Kjeldahl N, mg/L	0.3	0.39 J	Mercury, mg/L	0.000026	ND
Ammonia N, mg/L	0.04	0.11	Nickel, mg/L	0.0016	ND
Turbidity, NTU	0.054	0.172 J	Nitrite, mg/L	0.015	ND
Phenolics, mg/L	0.009	ND	Nitrate, mg/L	0.04	ND
Color, apparent Co/Pt <sup>f</sup>	5.0	ND	Ortho-phosphate, mg/L	0.0028	0.0043 J
Solids			Potassium, mg/L	0.08	2.58
total suspended, mg/L	1.5	ND	Selenium, mg/L	0.0012	ND
Aluminum, mg/L	0.032	ND	Silver, mg/L	0.00014	ND
Antimony, mg/L	0.0059	ND	Sodium, mg/L	0.34	7.82
Arsenic, mg/L	0.0014	ND	Sulfate, mg/L	0.3	6.2
Beryllium, mg/L	0.00064	ND	Sulfide, mg/L	0.022	ND
Boron, mg/L	0.023	0.025 J	Zinc, mg/L	0.0032	0.0202
Bromide, mg/L	0.4	ND	Ca/Mg	NA <sup>g</sup>	11.28
Cadmium, mg/L	0.00015	ND	Na/K	NA	3.03
Calcium, mg/L	0.04	40.6	Volatile priority pollutants, µg/L	1-40	ND
Chloride, mg/L	7.5	57	Acid extractable priority pollutants, µg/L	0.9-19	ND
Chlorine, residual, mg/L	0.03	ND	Base/neutral priority pollutants, µg/L	0.9-19	ND-3 J
Chromium, mg/L	0.00037	0.0007 J	Pesticides/PCBs, µg/L	0.0019-0.28	ND-0.082
Cobalt, mg/L	0.0018	ND	Organophosphate pesticides, µg/L	0.19	ND
Copper, mg/L	0.0011	0.0231			
Cyanide, mg/L	0.004	ND			
Iron, mg/L	0.038	ND			
Fluoride, mg/L	0.08	0.28			

a Sample analyses performed at Lancaster Laboratories, Lancaster, Pennsylvania, date of sample collection 08 May 2001 unless indicated otherwise,

b MDL = minimum detection limit, c ND indicates not detected at the MDL, d A "J" follows analytical values which were greater than the MDL but less than the limit of quantitation, e Value corrected for filter blank, f Units based on cobalt/platinum reference, g NA = not applicable

TABLE 2

WATER CHEMISTRY OF THE DILUTION WATER CONTROL AT TEST START

Nominal Test Substance Concentration (mg/L)	Total Alkalinity (mg/L as CaCO <sub>3</sub> )	EDTA Hardness (mg/L as CaCO <sub>3</sub> )	Conductivity (μmhos/cm)
Water Control	45	116	260
<b>H-25080</b>			
7.5	52	119	270
15	55	127	280
30	56	116	270
60	50	98	235
120	50	96	240
<b>H-25103</b>			
7.5	49	119	270
15	51	118	280
30	50	116	280
60	52	114	280
120	53	117	280

TABLE 3

DISSOLVED OXYGEN CONCENTRATION (mg/L)<sup>Ψ</sup> OF H-25080 AND H-25103 TEST SOLUTIONS

Nominal H-25080 Concentration (mg/L)	0 Hours				48 Hours			
	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>
Water Control	8.3	8.3	8.3	8.3	8.8	8.8	8.8	8.8
7.5	8.4	8.4	8.4	8.4	8.8	8.8	8.8	8.8
15	8.4	8.4	8.4	8.4	8.8	8.8	8.8	8.8
30	8.4	8.4	8.4	8.4	8.8	8.8	8.8	8.8
60	8.4	8.4	8.4	8.4	8.8	8.8	8.8	8.8
120	8.3	8.3	8.3	8.3	8.8	8.8	8.8	8.8
Nominal H-25103 Concentration (mg/L)	0 Hours				48 Hours			
	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>
7.5	8.4	8.4	8.4	8.4	8.7	8.7	8.8	8.8
15	8.4	8.4	8.4	8.4	8.8	8.8	8.8	8.8
30	8.3	8.3	8.3	8.3	8.7	8.8	8.7	8.8
60	8.3	8.3	8.3	8.3	8.8	8.8	8.8	8.8
120	8.3	8.3	8.4	8.3	8.8	8.8	8.8	8.8

Ψ The theoretical dissolved oxygen concentration at 100% saturation is 9.1 mg/L at 20.0°C.

† Replicate test chambers containing 5 daphnids each (total 20 daphnids per concentration) at test start.

TABLE 4  
pH OF H-25080 AND H-25103 TEST SOLUTIONS

Nominal H-25080 Concentration (mg/L)	0 Hours				48 Hours			
	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>
Water Control	7.8	7.8	7.9	7.9	7.8	7.8	7.9	7.9
7.5	8.2	8.2	8.2	8.2	8.0	8.0	8.1	8.1
15	8.6	8.6	8.6	8.6	8.2	8.2	8.2	8.2
30	8.8	8.8	8.8	8.8	8.2	8.2	8.2	8.2
60	9.0	9.0	9.0	9.0	8.2	8.2	8.3	8.3
120	10.0	10.0	10.0	10.0	8.6	8.6	8.6	8.6
Nominal H-25103 Concentration (mg/L)	0 Hours				48 Hours			
	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>
7.5	8.5	8.5	8.5	8.5	8.2	8.2	8.2	8.2
15	8.5	8.5	8.5	8.5	8.2	8.2	8.2	8.2
30	8.4	8.4	8.4	8.4	8.2	8.2	8.2	8.2
60	8.4	8.4	8.4	8.4	8.2	8.2	8.2	8.2
120	8.4	8.4	8.4	8.4	8.2	8.2	8.2	8.2

† Replicate test chambers containing 5 daphnids each (total 20 daphnids per concentration) at test start.

TABLE 5  
TEMPERATURE (°C) OF H-25080 AND H-25103 TEST SOLUTIONS

Nominal H-25080 Concentration (mg/L)	0 Hours				48 Hours			
	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>
Water Control	20.5	20.2	20.1	20.1	20.0	20.0	19.9	19.9
7.5	20.0	20.0	20.1	20.1	20.0	20.0	20.0	20.0
15	20.0	20.1	20.2	20.3	20.0	20.0	20.0	20.0
30	19.9	20.0	20.0	20.1	20.0	19.9	20.0	20.0
60	20.0	20.0	20.1	20.2	19.9	20.0	20.0	20.0
120	20.2	20.2	20.2	20.3	20.0	20.0	20.0	20.0
Nominal H-25103 Concentration (mg/L)	0 Hours				48 Hours			
	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>
7.5	20.2	20.2	20.2	20.2	19.9	19.9	20.0	20.0
15	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
30	20.0	20.1	20.1	20.2	20.0	20.0	20.0	20.0
60	20.0	20.0	20.1	20.1	20.0	20.0	20.0	20.0
120	20.0	20.0	20.1	20.2	20.0	20.0	20.0	20.0

† Replicate test chambers containing 5 daphnids each (total 20 daphnids per concentration) at test start.



TABLE 6

IMMOBILITY OF *Daphnia magna* AT 24 AND 48 HOURS IN AN UNAERATED, STATIC,  
ACUTE TEST WITH H-25080 AND H-25103

Nominal H-25080 Concentration (mg/L)	Number Immobile / Number at Test Start							
	24 Hours				48 Hours			
	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>
Water Control	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5
7.5	0/5	0/5	0/5	0/5	1/5	0/5	0/5	0/5
15	0/5	0/5	0/5	0/5	0/5	0/5	0/5	1/5
30	0/5	0/5	0/5	0/5	0/5	0/5	1/5	0/5
60	0/5	0/5	0/5	0/5	2/5	0/5	0/5	0/5
120	0/5	0/5	0/5	0/5	1/5	0/5	1/5	0/5
Nominal H-25103 Concentration (mg/L)	Number Immobile / Number at Test Start							
	24 Hours				48 Hours			
	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>
7.5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5
15	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5
30	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5
60	0/5	0/5	0/5	0/5	0/5	1/5	0/5	0/5
120	0/5	0/5	0/5	0/5	0/5	1/5	0/5	0/5

<sup>†</sup> Replicate test chambers containing 5 daphnids each (total 20 daphnids per concentration) at test start.

TABLE 7

SUBLETHAL EFFECTS IN *Daphnia magna* AT 24 AND 48 HOURS IN AN UNAERATED,  
STATIC, ACUTE TEST WITH H-25080 AND H-25103

Nominal H-25080 Concentration (mg/L)	Number Affected / Number Alive							
	24 Hours				48 Hours			
	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>
Water Control	1 <sup>d</sup> /5	0/5	0/5	1 <sup>d</sup> /5	1 <sup>d</sup> /5	2 <sup>d</sup> /5	0/5	0/5
7.5	3 <sup>d</sup> /5	1 <sup>d</sup> /5	3 <sup>d</sup> /5	1 <sup>d</sup> /5	1 <sup>d</sup> /4	2 <sup>d</sup> /5	1 <sup>d</sup> /5	2 <sup>d</sup> /5
15	4 <sup>d</sup> /5	0/5	3 <sup>d</sup> /5	1 <sup>d</sup> /5	1 <sup>d</sup> /5	2 <sup>d</sup> /5	2 <sup>d</sup> /5	0/4
30	0/5	5 <sup>d</sup> /5	2 <sup>d</sup> /5	3 <sup>d</sup> /5	0/5	2 <sup>d</sup> /5	0/4	0/5
60	4 <sup>d</sup> /5	2 <sup>d</sup> /5	3 <sup>d</sup> /5	2 <sup>d</sup> /5	0/3	0/5	0/5	0/5
120	2 <sup>d</sup> /5	1 <sup>d</sup> /5	3 <sup>d</sup> /5	0/5	0/4	0/5	0/4	0/5

  

Nominal H-25103 Concentration (mg/L)	Number Affected / Number Alive							
	24 Hours				48 Hours			
	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>	A <sup>†</sup>	B <sup>†</sup>	C <sup>†</sup>	D <sup>†</sup>
7.5	0/5	1 <sup>d</sup> /5	3 <sup>d</sup> /5	1 <sup>d</sup> /5	0/5	1 <sup>d</sup> /5	0/5	0/5
15	2 <sup>d</sup> /5	2 <sup>d</sup> /5	3 <sup>d</sup> /5	2 <sup>d</sup> /5	1 <sup>d</sup> /5	0/5	2 <sup>d</sup> /5	1 <sup>d</sup> /5
30	1 <sup>d</sup> /5	1 <sup>d</sup> /5	2 <sup>d</sup> /5	3 <sup>d</sup> /5	1 <sup>d</sup> /5	0/5	0/5	1 <sup>d</sup> /5
60	1 <sup>d</sup> /5	3 <sup>d</sup> /5	2 <sup>d</sup> /5	1 <sup>d</sup> /5	0/5	1 <sup>d</sup> /4	0/5	1 <sup>a</sup> /5
120	0/5	2 <sup>d</sup> /5	1 <sup>d</sup> /5	1 <sup>d</sup> /5	0/5	2 <sup>d</sup> /4	1 <sup>d</sup> 1 <sup>a</sup> /5	0/5

† Replicate test chambers containing 5 daphnids each (total 20 daphnids per concentration) at test start.

OBSERVATION KEY

- |                                 |   |
|---------------------------------|---|
| a Daphnid lethargic             | d Daphnid floating at surface                             |
| b Daphnid visibly small in size | e Daphnid accidentally crushed by pipette during transfer |
| c Daphnid pale in color         |   |

TABLE 8

NOMINAL CONCENTRATIONS OF H-25080 AND H-25103 CAUSING IMMOBILITY TO  
50% (EC<sub>50</sub>) OF *Daphnia magna* AT SPECIFIC TIME INTERVALS

Time	EC <sub>50</sub> (mg/L)	95% Confidence Intervals <sup>a</sup>	
		Lower	Upper
24 Hours	> 120	-	-
48 Hours	> 120	-	-

a Not calculable