Test Overview

Client:	GE Water
Address:	4636 Somerton Road Trevose, PA 19053
Contact:	Ms. [redacted]
Telephone #:	[redacted]
Product Name:	DCA-268
Lab I.D. #:	122013-4
Physical State:	Liquid
Solubility in Water:	Complete
Specific Gravity:	1.203
Date Received:	20 December 2013
Testing Date(s):	17 – 19 January 2014
Test/Method:	*Daphnia magna* 48-Hour Definitive Toxicity Test, EPA 821-R-02-012, Test Method 2021.0 and *Conducting Acute Toxicity Tests on Test Materials with Fishes, Macroinvertebrates, and Amphibians, ASTM* E-729-96.
Result Summary:	See Tables

DATA SUMMARY

Concentrations (mg/L as nominal)	Survival (%)
Control	100
625	100
1,250	95
2,500	5**
5,000*	0**
10,000*	0**

* Due to acidic nature of product, adjusted test solution pH to within 6.5 to 9.0 S.U.
** Statistically lower than the control (P=0.05)

TEST RESULTS

NOEC	1,250 mg/L
48-Hour LC_{50}	1,768 (1,521 – 2,055)* mg/L

* 95% Confidence Interval

QC REFERENCE

These test data met the method specified quality control requirements for a valid test. Except where noted below, no deviations from the reported test method were noted.

- After test initiation, the test solution pH in the 2,500 mg/L concentration dropped to pH 5.8 at the 24 and 48 hour testing period. The pH in the 5,000 and 10,000 mg/L test concentrations remained above pH 6.5 for the entire test duration.

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ERM Testing Method

Daphnia magna – 48-Hour Acute Toxicity Test

Upon sample receipt, a range finding test was conducted to determine the test concentrations for the reported definitive test. Based on the range finding test, a definitive test consisting of a minimum of five test concentrations and a control were prepared (see Appendix A – Table 1 for specific methods for test solution preparation). Control and dilution water consisted of reconstituted moderately hard water. When the product to be tested lowers the test solution pH below 6.5 or raises it above 9.0, the test solution pH is adjusted within the 6.5 to 9.0 range using either hydrochloric acid or sodium hydroxide.

Daphnia magna used to initiate this test were obtained from in-house cultures and were less than 24-hours old at test initiation. Test organisms were maintained in 100 percent control water (reconstituted moderately hard water) prior to test initiation.

The 48-Hour Definitive Test was conducted using 30-milliliter (mL) disposable polystyrene containers containing 25 mL of control water or appropriate test solution. Five test organisms were randomly introduced into each test chamber with four replicate chambers per treatment. A fifth replicate was prepared without test organisms and maintained for water chemistry purposes only. Organisms were not fed during the test. Organism survival was determined daily by enumerating live *Daphnia magna* in each test chamber. Survival was defined as any body or appendage movement.

The test was conducted at a temperature of 20 ± 1 degrees Celsius (°C) under fluorescent lighting with a photoperiod of 16 hours light/8 hours dark and a light intensity range of 25-59 foot-candles. Water quality measurements were performed on all control and test solutions prior to test initiation and on selected treatments daily thereafter, as indicated in the raw data (Appendix A - Table 2).

Following termination of the 48-Hour Definitive Test, No Observed Effect Concentration (NOEC) and a 48-hour LC_{50} with corresponding 95 percent confidence interval were calculated, where possible. The NOEC value was determined using the statistically appropriate method. The LC_{50} value estimate was determined by using one of the following statistical methods: graphical, Spearman-Karber, Trimmed Spearman-Karber, or Probit. The method selected for reporting test results was determined by the characteristics of the data; that is, the presence or absence of 0 and 100 percent mortality and the number of concentrations in which mortalities between 0 and 100 percent occurred. All statistical analyses were performed using the CETIS™ Version 1.8.7.15 software program.

The reference toxicant, sodium chloride, was used to monitor the sensitivity of the test organisms and the precision of the testing procedure. Acute reference toxicant tests are performed at least monthly and the resulting LC_{50} values are plotted to determine if the results are within prescribed limits (Appendix A - Standard Reference Toxicant Data). If the LC_{50} of a particular reference toxicant test does not fall within the expected range of ± two standard deviations from the mean for a given test organism, the sensitivity of that organism and the overall credibility of the test system is suspect.

Reference:

USEPA, 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, 5th Ed. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA-821-R-02-012.

ASTM. 2000. Standard Guide for Conducting Acute Toxicity Tests on Test Materials with Fishes, Macroinvertebrates, and Amphibians. E729-96. In Annual book of ASTM Standards, Vol. 11.05, West Conshohocken, PA.

Test Overview

Client:	GE Water
Address:	4636 Somerton Road Trevose, PA 19053
Contact:	Ms. [redacted]
Telephone #:	[redacted]
Test Material:	DCA-268
Lab I.D. #:	122013-4
Physical State:	Liquid
Solubility in Water:	Complete
Specific Gravity:	1.203
Date Received:	20 December 2013
Testing Date(s):	15 – 19 January 2014
Test/Method:	*Pimephales promelas*, 96-Hour Definitive Toxicity Test, Test Method 2000.0, EPA 821-R-02-012 and *Conducting Acute Toxicity Tests on Test Materials with Fishes, Macroinvertebrates, and Amphibians*, ASTM E-729-96.
Result Summary:	See Tables

DATA SUMMARY

Concentrations (mg/L as nominal)	Survival (%)
Control	100
625	100
1,250	100
2,500	100
5,000*	80**
10,000*	5**

* Due to acidic nature of product, adjusted test solution pH to within 6.5 to 9.0 S. U.
** Statistically lower than the control (P=0.05)

TEST RESULTS

NOEC	2,500 mg/L
96-Hour LC_{50}	6,325 (5,420 – 7,469)* mg/L

* 95% Confidence Interval

QC REFERENCE

These test data met the method specified quality control requirements for a valid test. Except where noted below, no deviations from the reported test method were noted.

- After test initiation, the test solution pH in the 2,500 mg/L concentration dropped to pH 6.2 on Day 3 and to pH 5.9 at the termination of the test. The pH in the 5,000 and 10,000 mg/L test concentrations remained above pH 6.5 for the entire test duration.

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ERM Testing Method

Pimephales promelas – 96-Hour Acute Toxicity Test

Upon sample receipt, a range finding test was conducted to determine the test concentrations for the reported definitive test. Based on the range finding test, a definitive test consisting of a minimum of five test concentrations and a control were prepared (see Appendix A – Table 1 for specific methods for test solution preparation). Control and dilution water consisted of reconstituted moderately hard water. When the product to be tested lowers the test solution pH below 6.5 or raises it above 9.0, the test solution pH is adjusted within the 6.5 to 9.0 range using either hydrochloric acid or sodium hydroxide.

Pimephales promelas used to initiate this test were obtained from in-house cultures and were 1 to 14 days old at test initiation. Test organisms were maintained in 100 percent control water (reconstituted moderately hard water) prior to test initiation.

The 96-Hour Definitive Test was conducted using 300 to 500 milliliter (mL) disposable polypropylene containers containing 250 ml of control water or appropriate test solution. Ten test organisms were randomly introduced into each test chamber with two replicate chambers per treatment. Each *Pimephales promelas* test chamber was fed 0.1 mL of a concentrated suspension of less than 24-hour old live brine shrimp nauplii (*Artemia* sp.) several hours prior to the 48-hour testing period.

At the 48-hour testing period, test solutions were renewed by replacing approximately 90 percent of the old solution with fresh control water or appropriate test solution. Prior to renewal of test solutions, uneaten and dead brine shrimp, along with other debris, were removed from the bottom of the test chambers. Organism survival was determined daily by enumerating live *Pimephales promelas* in each test chamber. Survival was defined as any body movement after gentle prodding.

The test was conducted at a temperature of 20 ± 1 °C under fluorescent lighting with a photoperiod of 16 hours light and 8 hours dark. Water quality measurements were performed on all control and test solutions prior to test initiation and on selected treatments daily thereafter, as indicated in the raw data (Appendix A - Table 2).

Following termination of the 96-Hour Definitive Test, No Observed Effect Concentration (NOEC) and a 96-hour LC_{50} with corresponding 95 percent confidence interval were calculated, where possible. The NOEC value was determined using the statistically appropriate method. The LC_{50} value estimate was determined by using one of the following statistical methods: graphical, Spearman-Karber, Trimmed Spearman-Karber, or Probit. The method selected for reporting test results was determined by the characteristics of the data; that is, the presence or absence of 0 and 100 percent mortality and the number of concentrations in which mortalities between 0 and 100 percent occurred. All statistical analyses were performed using the CETIS™ Version 1.8.7.15 software program.

The reference toxicant, sodium chloride, was used to monitor the sensitivity of the test organisms and the precision of the testing procedure. Acute reference toxicant tests are performed at least monthly and the resulting LC_{50} values are plotted to determine if the results are within prescribed limits (Appendix A - Standard Reference Toxicant Data). If the LC_{50} of a particular reference toxicant test does not fall within the expected range of ± two standard deviations from the mean for a given test organism, the sensitivity of that organism and the overall credibility of the test system is suspect.

Reference:

USEPA, 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, 5th Ed. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA-821-R-02-012.

ASTM. 2000. Standard Guide for Conducting Acute Toxicity Tests on Test Materials with Fishes, Macroinvertebrates, and Amphibians. E729-96. In Annual book of ASTM Standards, Vol. 11.05, West Conshohocken, PA.

Test Overview

Client:	GE Water
Address:	4636 Somerton Road Trevose, PA 19053
Contact:	Ms. [redacted]
Telephone #:	[redacted]
Product Name:	DCA-268
Lab I.D. #:	122013-4
Physical State:	Liquid
Solubility in Water:	Complete
Specific Gravity:	1.203
Date Received:	20 December 2013
Testing Date(s):	15 – 19 January 2014
Test/Method:	*Oncorhynchus mykiss*, 96-Hour Definitive Toxicity Test, EPA Testing Method 2019.0, EPA 821-R-02-012 and *Conducting Acute Toxicity Tests on Test Materials with Fishes, Macroinvertebrates, and Amphibians,* ASTM E-729-96.
Result Summary:	See Tables

DATA SUMMARY

Concentrations (mg/L as nominal)	Survival (%)
Control	100
625	100
1,250	100
2,500	100
5,000*	100
10,000*	20**

* Due to acidic nature of product, adjusted test solution pH to within 6.5 to 9.0 S. U.

** Statistically lower than the control (P=0.05)

TEST RESULTS

NOEC	5,000 mg/L
96-Hour LC_{50}	7,711 (6,999 – 8,495)* mg/L

* 95% Confidence Interval

QC REFERENCE

These test data met the method specified quality control requirements for a valid test. Except where noted below, no deviations from the reported test method were noted.

- After test initiation, the test solution pH in the 2,500 mg/L concentration dropped to a low of pH 5.5 on Day 3; the 5,000 mg/L concentration dropped to a low of pH 6.4 on Day 3, and 10,000 mg/L concentration dropped to a low of pH 6.3 on Day 3.

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ERM.

ERM Testing Method

Oncorhynchus mykiss, 96-Hour Acute Toxicity Test

Upon sample receipt, a range finding test was conducted to determine the test concentrations for the reported definitive test. Based on the range finding test, a definitive test consisting of six test concentrations and a control were prepared (see Appendix A – Table 1 for specific methods for test solution preparation). Control and dilution water consisted of reconstituted moderately hard water. When the product to be tested lowers the test solution pH below 6.5 or raises it above 9.0, the test solution pH is adjusted within the 6.5 to 9.0 range using either hydrochloric acid or sodium hydroxide.

Oncorhynchus mykiss used to initiate this test were obtained from the supplier, Thomas Fish Company, Anderson, California. Test organisms were maintained in 100 percent control water (reconstituted moderately hard water) prior to test initiation.

The 96-Hour Definitive Test was conducted using 10 Liter (L) tanks containing 4 liters of control water or appropriate test solution. Ten test organisms were randomly introduced into each test chamber with two replicate chambers per treatment.

At the 48-hour testing period, test solutions were renewed by replacing approximately 90 percent of the old solution with fresh control water or appropriate test solution. Prior to renewal of test solutions, uneaten and dead brine shrimp, along with other debris, were removed from the bottom of the test chambers. Organism survival was determined daily by enumerating live *Oncorhynchus mykiss* in each test chamber. Survival was defined as any body movement after gentle prodding.

The test was conducted at a temperature of 12 ± 1 °C under fluorescent lighting with a photoperiod of 16 hours light and 8 hours dark. Water quality measurements were performed on all control and test solutions prior to test initiation and on selected treatments daily thereafter, as indicated in the raw data (Appendix A - Table 2) The test is aerated when dissolved oxygen (DO) concentrations fall below 6.0 mg/L during testing, or as indicated necessary during rangefinding.

Following termination of the 96-Hour Definitive Test, No Observed Effect Concentration (NOEC) and a 96-hour LC_{50} with corresponding 95 percent confidence interval were calculated, where possible. The NOEC value was determined using the statistically appropriate method. The LC_{50} value estimate was determined by using one of the following statistical methods: graphical, Spearman-Karber, Trimmed Spearman-Karber, or Probit. The method selected for reporting test results was determined by the characteristics of the data; that is, the presence or absence of 0 and 100 percent mortality and the number of concentrations in which mortalities between 0 and 100 percent occurred. All statistical analyses were performed using the CETIS™ Version 1.8.7.15 software program.

The reference toxicant, sodium chloride, was used to monitor the sensitivity of the test organisms and the precision of the testing procedure. An acute reference toxicant test was performed and the resulting LC_{50} values were established (Appendix A - Standard Reference Toxicant Data). If the LC_{50} of a particular reference toxicant test does not fall within the expected range of ± two standard deviations from the mean for a given test organism, the sensitivity of that organism and the overall credibility of the test system is suspect.

Reference:

USEPA, 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, 5th Ed. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA-821-R-02-012.

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