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3M

October 26, 2004

8EHQ-1004-15987

[redacted]

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Office of Pollution, Prevention and Toxics
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N. W.
Washington, DC 20460
Attention: Section 8(e) Coordinator

Re: **TSCA Section 8(e) Submissions**

Dear Sir/Madam:

3M Company ("3M") requests that EPA place the attached studies in the TSCA Section 8(e) docket. We have included a master index for these studies identifying the study title, test substance and CAS number. A Confidential Business Information (CBI) version of this index and the studies also is being submitted today pursuant to EPA procedures. 3M has not provided CBI substantiation with this submission, but would be willing to do so at the Agency's request.

3M has concluded that data in these studies may not be, strictly speaking, "corroborative" of previously reported or published information as defined in EPA's reporting guidance or otherwise potentially may warrant 8(e) submission based on EPA's reporting guidance.

3M appreciates EPA's attention to this matter. Please contact the undersigned if you have any questions or require further information regarding this submission.

Very truly yours,

8EHQ-05-15987

Katherine E. Reed (9.7.)

Dr. Katherine E. Reed, Ph.D
Staff Vice President
Environmental Technology and Safety Services
(651) 778-4331
kereed@mmm.com

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Matthew Brewer
Direct Dial: 202-637-2304
matthew.brewer@lw.com

555 Eleventh Street, N.W., Suite 1000
Washington, D.C. 20004-1304
Tel: (202) 637-2200 Fax: (202) 637-2201
www.lw.com

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October 29, 2004

VIA FEDEX

Ed Gross
Environmental Protection Agency
Room 6104
EPA East
1200 Pennsylvania Avenue NW
Washington, DC 20460

Re: Supplemental 3M TSCA 8(e) Environmental Submission

Dear Ed:

Pursuant to a telephone conversation with Steve Smith on Friday October 29, enclosed is a study entitled "Ecotoxicological Testing of $CoCl_2.6H_2O$ as Co^{2+} ion (Seed Germination and Root Elongation)," to be added to the 3M TSCA 8(e) submission of October 26, 2004. This study, which consists of a single page of data, should be added to the very end of the documents submitted on October 26. There are two copies of the study, one for the sanitized set and one for the CBI set. There is no CBI in this study, so either copy can be placed in either set.

In addition, one Study, entitled "Microtox Test Results," for the chemical Tolyltriazole, should be removed from the submission, as these data are already known to the EPA. This is the 29th study submitted, and its entry is next to the bottom on page 3 of the indices that accompanied the submission. Because of the addition of one study and removal of another, I've included two new indices to replace the originals, one sanitized for the public set and one with CBI. These indices reflect the changes.

Thank you for your continued assistance. If you have any questions, you can reach me via telephone or email.

Sincerely,

Matthew Brewer

MB:pp

Enclosures: two copies of study, revised sanitized and CBI indices

280508

Master Index to Studies Submitted Under TSCA 8(e) by 3M Company on October 26, 2004
(Confidential Business Information Redacted)

Title	Substance Description	CAS Information
Aquatic Toxicity Data Sheet: 48hr *Daphnia Magna*	1,4-dioxane; heptadecafluoro-1-octanesulfonic acid; linear n-ethyl perfluorooctanesulfonamide; n-ethylperfluorooctanesulfonamidoethyl alcohol; poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(heptadecafluorooctyl)sulfonyl]amino]ethyl]-.omega.-hydroxy-; poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(nonafluorobutyl)sulfonyl]amino]ethyl]-.omega.-hydroxy-; poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(pentadecafluoroheptyl)sulfonyl]amino]ethyl]-.omega.-hydroxy-; poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(tridecafluorohexyl)sulfonyl]amino]ethyl]-.omega.-hydroxy-; poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(undecafluoropentyl)sulfonyl]amino]ethyl]-.omega.-hydroxy-; polyethylene glycol; water	1,4-dioxane (123-91-1); heptadecafluoro-1-octanesulfonic acid (1763-23-1); linear n-ethyl perfluorooctanesulfonamide (4151-50-2); n-ethylperfluorooctanesulfonamidoethyl alcohol (1691-99-2); poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(heptadecafluorooctyl)sulfonyl]amino]ethyl]-.omega.-hydroxy- (29117-08-6); poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(nonafluorobutyl)sulfonyl]amino]ethyl]-.omega.-hydroxy- (68298-79-3); poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(pentadecafluoroheptyl)sulfonyl]amino]ethyl]-.omega.-hydroxy- (68298-81-7); poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(tridecafluorohexyl)sulfonyl]amino]ethyl]-.omega.-hydroxy- (56372-23-7); poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(undecafluoropentyl)sulfonyl]amino]ethyl]-.omega.-hydroxy- (68298-80-6); polyethylene glycol (25322-68-3); water (7732-18-5)
Multigeneration Daphnid Life Cycle Test	1,4-dioxane; heptadecafluoro-1-octanesulfonic acid; linear n-ethyl perfluorooctanesulfonamide; n-ethylperfluorooctanesulfonamidoethyl alcohol; poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(heptadecafluorooctyl)sulfonyl]amino]ethyl]-.omega.-hydroxy-; poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(nonafluorobutyl)sulfonyl]amino]ethyl]-.omega.-hydroxy-; poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(pentadecafluoroheptyl)sulfonyl]amino]ethyl]-.omega.-hydroxy-; poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(tridecafluorohexyl)sulfonyl]amino]ethyl]-.omega.-hydroxy-; poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(undecafluoropentyl)sulfonyl]amino]ethyl]-.omega.-hydroxy-; polyethylene glycol; water	1,4-dioxane (123-91-1); heptadecafluoro-1-octanesulfonic acid (1763-23-1); linear n-ethyl perfluorooctanesulfonamide (4151-50-2); n-ethylperfluorooctanesulfonamidoethyl alcohol (1691-99-2); poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(heptadecafluorooctyl)sulfonyl]amino]ethyl]-.omega.-hydroxy- (29117-08-6); poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(nonafluorobutyl)sulfonyl]amino]ethyl]-.omega.-hydroxy- (68298-79-3); poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(pentadecafluoroheptyl)sulfonyl]amino]ethyl]-.omega.-hydroxy- (68298-81-7); poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(tridecafluorohexyl)sulfonyl]amino]ethyl]-.omega.-hydroxy- (56372-23-7); poly(oxy-1,2-ethanediyl), .alpha.-[2-[ethyl[(undecafluoropentyl)sulfonyl]amino]ethyl]-.omega.-hydroxy- (68298-80-6); polyethylene glycol (25322-68-3); water (7732-18-5)
Aquatic Invertebrate Testing - Alkyltins LR 8024-1	Alkyltins: dibutyltin laurate and dibutyltin-di(2 ethylhexoate)	Dibutyltin laurate (CAS 77-58-7); Dibutyltin-di(2 ethylhexoate) (CAS 2781-10-4)
Aquatic Invertebrate Testing - Decosheen Material (LR-8052)	Decosheen Ribbon Materials and pigments: Decosheen Blue in Green Ceres Blue ZV; Decosheen Gold Paste Pigment; Decosheen Royal Blue, Solvent Blue	Decosheen Blue in Gre[illegible] ZV (CAS 61814-09-3); Decosheen Royal Blue, Solvent Bl[illegible]-6); Decosheen Gold Paste Pigment (CAS Number [illegible]
R Scratch Remover (Fathead Minnow)	55-65% Water; 20-30% Stoddard Solvent; 1-5% Sodium Silicate; 1-5% Potassium Hydroxide; 0.1-3% Nonylphenoxypoly(oxyethylene)ethanol	Water (CAS 7732-18-5); [illegible] Solvent (CAS 8052-41-3); Sodium Silicate (CAS 1344-09-8); Potassium Hydroxide (CAS 1310-58-3); Nonylphenoxypoly(oxyethylene)ethanol (CAS 9016-45-9)
S Scratch Remover (Fathead Minnow)	60-70% Water; 20-30% Stoddard Solvent; 1-5% Sodium Silicate; 0.1-3% Turgitol NP-33	Water (CAS 7732-18-5); Stoddard Solvent (CAS 8052-41-3); Sodium Silicate (CAS 1344-09-8); Turgitol NP-33 (CAS 9016-45-9)
Octanol Water Partition Coefficient	N-methylperfluorooctane sulfonamidoethanol	CAS 24448-09-7

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Master Index to Studies Submitted Under TSCA 8(e) by 3M Company on October 26, 2004
(Confidential Business Information Redacted)

Title	Substance Information	CAS Information
CoCl2.6H2O as Co2+ Toxicity to Microtox Reagent	Cobalt (as Co2+ ion) (CoCl2.6H2O)	CAS 7791-13-1
Activated Sludge Respiration Inhibition Test on CoCl2.6H2Q as Co ion	Cobalt (as Co2+ ion) (CoCl2.6H2O)	CAS 7791-13-1
Acute Toxicity of CoCl2.6H20 as Co ion to Daphnia magna under Static Exposure Conditions	Cobalt (as Co2+ ion) (CoCl2.6H2O)	CAS 7791-13-1
Acute Toxicity of CoCl2.6H20 as Co ion to Fathead Minnow under Static Exposure Conditions	Cobalt (as Co2+ ion) (CoCl2.6H2O)	CAS 7791-13-1
Freshwater Algae Growth Inhibition Test	Cobalt (as Co2+ ion) (CoCl2.6H2O)	CAS 7791-13-1
Daphnia magna 21-Day Chronic Reproduction Study	N-ethylperfluorooctane sulfonamidoethanol	CAS 1691-99-2
Plant Growth Effects of [ ]	[ ]	[ ]
Final Report (*Daphnia* and Microtox)	Monomethyl ether of hydroquinone	CAS 150-76-5
Microtox Test Results	2 Ethylhexyl Acrylate; Isooctyl Acrylate Monomer; 2-Methylbutyl acrylate; Methyl isoamyl acrylate; Isooctyl Acrylate	2 Ethylhexyl Acrylate (CAS 103-11-7); Isooctyl Acrylate Monomer (CAS 29590-42-9) 2-Methylbutyl acrylate (CAS 44914-03-6); Methyl isoamyl acrylate (CAS 18993-92-1); Isooctyl Acrylate (CAS 29590-42-9)
Phytotoxicity Test Results	[ ]	[ ]

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Title	Substance Identification	CAS Information
Plant Toxicity Comparison, Young Seedling Growth	[ ]	[ ]
Ceriodaphnia dubia Survival and Reproduction exposed to Opequon Creek Water Spiked with BETZ 1110 Polymer (November 4, 1987 sample) for seven days under static renewal conditions	BETZ 1110: Non-3M Product - Chemical composition not provided to 3M by manufacturer	MSDS provided by manufacturer states product is "not hazardous" and not "considered to be a carcinogen"
Ceriodaphnia dubia Survival and Reproduction exposed to Opequon Creek Water Spiked with Betz 1138 Polymer (November 4, 1987 sample) for seven days under static renewal conditions	BETZ 1138: Non-3M Product - Chemical composition not provided to 3M by manufacturer	MSDS provided by manufacturer states product is "not hazardous" and not "considered to be a carcinogen"
Toxicity of 1,6 - Hexanediol Diacrylate to *Daphnia magna*	1,6 Hexanediol diacrylate	CAS 13048-33-4
Daphnia magna Chronic Bioassay Under Static Renewal Conditions	Methyl isoamyl acrylate	CAS 18993-92-1
Estimating the Chronic Toxicity of Nalclear 7177 to *Ceriodaphnia* Survival and Reproduction Using Short-Term Tests	Nalclear 7177 wastewater treatment acrylamide/acrylate polymer - Chemical composition not provided to 3M by manufacturer	CAS Information not provided to 3M by manufacturer
Acute Toxicity of Isooctyl Acrylate to *Daphnia magna*	Isooctyl Acrylate Monomer	CAS 29590-42-9
Static Acute Toxicity of [ ] to the Daphnid, *Daphnia magna*	Tolyltriazole	CAS 29385-43-1
Static Acute Toxicity of [ ] to the Alga, *Selenastrum capricornutum*	Tolyltriazole	CAS 29385-43-1
Static Acute Toxicity of [ ] to the Daphnid, *Daphnia magna*	[ ]	[ ]
Static Acute Toxicity of [ ] to the Fathead Minnow, *Pimephales promelas*	[ ]	[ ]
Static Acute Toxicity of [ ] to the Daphnid, *Daphnia magna*	water; propylene-tetrafluoroethylene polymer; tert-butyl alcohol	water (7732-18-5); propylene-tetrafluoroethylene polymer (27029-05-6); tert-butyl alcohol (75-65-0)

Master Index to Studies Submitted Under TSCA 8(e) by 3M Company on October 26, 2004
(Confidential Business Information Redacted)

Title	Substance Identification	CAS Information
Isooctyl acrylate: Fish, Acute Toxicity Test	Isooctyl Acrylate Monomer	CAS 29590-42-9
Isooctyl Acrylate: *Daphnia sp.* Acute Immobilization Test	Isooctyl Acrylate Monomer	CAS 29590-42-9
Isooctyl Acrylate: Alga, Growth Inhibition Test	Isooctyl Acrylate Monomer	CAS 29590-42-9
Isooctyl Acrylate: *Daphnia sp.* Reproduction Test	Isooctyl Acrylate Monomer	CAS 29590-42-9
Acute Toxicity of [ ] to the mysid, *Mysidopsis bahia*	[ ]	[ ]
Final Report (Microtox)	[ ]	[ ]
Determination of the Partition Coefficient (N-Octanol/Water) of T-5896 by High Performance Liquid Chromatography (HPLC)	N-methyl perfluorooctane sulfonamido ethanol; N-methyl perfluorooctane sulfonamidethyl acrylate	N-methyl perfluorooctane sulfonamido ethanol (CAS 25268-77-3); N-methyl perfluorooctane sulfonamidethyl acrylate (CAS 24448-09-7)
OECD Activated Sludge Respiration Inhibition Test Results	N-Dodecyltrimethylammonium chloride	CAS = 112-00-5
Final Report (Fish Acute Toxicity)	Mirataine CB (30% Cocamidopropyl betaine = Amides, coco, N-(3-(dimethylamino)propyl), alkylation products with chloroacetic acid, sodium salts, 70% Water and Inerts); Mirataine COB (30% Coco/Oleamidopropyl Betaine = 1-Propanaminium, 3-amino-N-(carboxymethyl)-N,N-dimethyl-, N-coco acyl derivs., inner salt)	Cocamidopropyl betaine (CAS 70851-07-9); Coco/Oleamidopropyl Betaine (CAS 61789-40-0)
A Flow-Through Life-Cycle Toxicity Test With the Saltwater Mysid (*Mysidopsis bahia*)	Perfluorooctane sulfonate	CAS 1763-23-1
Lithium: Alga, Acute toxicity Tests	Lithium Chloride	CAS 7447-41-8
An Early Life-Stage Toxicity Test With the Fathead Minnow (*Pimephales promelas*)	Perfluorooctane sulfonate	CAS 1763-23-1
Lithium: Fish, Acute toxicity Tests	Lithium Chloride	CAS 7447-41-8
Lithium: *Daphnia*, Acute toxicity Tests	Lithium Chloride	CAS 7447-41-8
Summary of Toxicity Testing on OSCl and OSF	Octane sulfonyl chloride and Octane sulfonyl fluoride	Octane sulfonyl fluoride (CAS 7795-95-1), Octane sulfonyl chloride (CAS 4063-63-5)
Toxicity to Microtox Test	Lauryldimethylamineoxide	CAS 1643-20-5

Master Index to Studies Submitted Under TSCA 8(e) by 3M Company on October 26, 2004
(Confidential Business Information Redacted)

Title	Substance Information	CAS Information
Ecotoxicological Testing of CoCl2.6H2O as Co2+ ion (Seed Germination and Root Elongation)	Cobalt (as Co2+ ion) (CoCl2.6H2O)	CAS 7791-13-1

Lithium: *Daphnia*, Acute Toxicity Test
for 3M Lab Request #W2906
OECD Guideline 202
Study Completed February 18, 2000

Prepared by

AScI Corporation
Environmental Testing Laboratory
4444 Airpark Boulevard
Duluth, Minnesota 55811

Submitted to

3M Environmental Technology and Safety Services
935 Bush Avenue
Building 2-3E-09
St. Paul, MN 55144

Submitted March 2000

Sponsor: 3M
Sponsor Study ID# W2906

REPORT APPROVAL

Name (signed): _____ Date: 3/7/00

Name (typed): Joseph Dierkes

Title: Operations Manager

* * * * *

Name (signed): _____ Date: 3/7/00

Name (typed): Alan Mozol

Title: Quality Assurance Manager

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APPENDIX A -- CHEMICAL ANALYSES OF POST-CARBON WATER

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INTRODUCTION

At the request of 3M Environmental Technology and Safety Services (3M), AScI Corporation's Environmental Testing Laboratory (AScI-ETL) conducted a *Daphnia magna* acute toxicity test. Following OECD guidelines, *D. magna* neonates were exposed to the lithium ion for 48 hours and observed for immobilization and survival. Subsequently, the cumulative numbers of dead organisms in the control and test exposures were compared to quantify the test substance effect. The objective of the study was to determine, if possible, the 24-hour and 48-hour 10% and 50% lethal concentrations (LC_{10} and LC_{50}), and 48-hour no observed effect concentration (NOEC) and lowest observable effect concentration (LOEC) of lithium ion for *Daphnia magna*. The study was performed following Office of Economic Cooperation Development (OECD) guidelines. The specific method followed was OECD 202, "*Daphnia sp.*, Acute Immobilization Test."
The following report summarizes results of the 48-hour acute toxicity test performed with lithium ion.

STUDY SUMMARY

The test produced a normal and interpretable concentration response to *D. magna* during the 48-hour acute toxicity test. Control organism survival was acceptable and routine water chemistries obtained from the test were all within physiological acceptable ranges. Nominal lithium ion concentrations were within 16% of 48-hour mean measured concentrations. The table below summarizes the 48-hour statistical endpoints generated from the test.

Endpoint	Based on Mean Measured 48-Hour Conc.
48-Hour LC_{10}	2.4 mg/L
48-Hour LC_{50}	3.6 mg/L
48-Hour NOEC	3.2 mg/L
48-Hour LOEC	5.5 mg/L

TEST METHODS

Range-finding and definitive acute immobilization and lethality tests were conducted under standard static acute test conditions. The range-finding test was conducted to determine the appropriate test concentration range for the definitive test. Test conditions for the definitive test are listed in Table 1. Test conditions for the NaCl reference toxicity test performed concurrently with the study were similar to the lithium ion definitive test. Pertinent additional information from the reference test is contained in Table 2.

The estimated 48-hour LC_{50} based on range-finding test results was approximately 0.5 mg/L; therefore, the definitive test was conducted with a dilution water control and six treatment exposures, each with four replicates.

Test Substance

The lithium ion was obtained from lithium chloride (LiCl). The LiCl was purchased from Sigma Chemical company, Lot#77H00771.

Test Organism

Test organisms were *Daphnia magna* neonates obtained from AScI-ETL's in-house mass cultures. The original culture was obtained from the United States Environmental Protection Agency (USEPA) Environmental Research Laboratory-Duluth, Minnesota. The test organisms did not appear diseased or stressed at test initiation. At the time of the definitive test initiation, the daphnids were <24 hours old.

Dilution Water

Dilution water was dechlorinated City of Duluth tap water (Post Carbon (PC) Water). The tap water was dechlorinated via treatment through two 1.5-cubic foot activated carbon beds. The carbon beds are renewed approximately once per month. The water was vigorously aerated for at least 24 hours before using in the tests. The PC water is analyzed twice per year for elemental contaminants, organochlorine pesticides, and PCBs. The most recent chemical analysis results are included in Appendix A.

Exposure Chambers

Exposure chambers were 250-ml borosilicate glass beakers. Each chamber contained 200 ml of dilution water or test solution. During the test, exposure chambers were kept covered except during biological observations or sampling for chemistry determinations.

Range-Finding Test Performance

The range-finding test was performed using nominal test substance concentrations. The test was performed with two test concentration replicates in a static system. Each test chamber received five *D. magna* via impartial distribution. The range-finding test duration was 48 hours. At each 24-hour test interval, the organisms were observed for lethality.

Definitive Test Performance

The lithium ion test concentrations were prepared by direct addition of LiCl to 3.0 L of dilution water. The nominal 5.1 mg/L lithium ion concentration solution was prepared by addition of 94 mg of LiCl to the dilution water. The amount of LiCl added to the dilution water accounted for the amount of lithium ion in the LiCl reagent. Based on formula weights, the LiCl reagent contained 16.37% lithium. The 3.1 mg/L, 1.9 mg/L, 1.1 mg/L, 0.7 mg/L, and 0.4 mg/L lithium ion nominal concentrations were respectively obtained by using a 0.6 serial dilution scheme of the high test concentration solution. These solutions

were then distributed to each of the four test replicates. Similarly, dilution (control) water was distributed to the four control replicates. Each chamber contained 200 ml of test solution or control water.

Organisms were impartially introduced into each test replicate and monitoring chamber until each contained 5 daphnids. The definitive study contained a total of 24 test chambers and four control chambers.

Physical Test Conditions

The test organisms were not fed during the 48-hour test. During the test, water temperature was maintained at 21 ± 1° C. Daily photoperiod was maintained using cool-white fluorescent lamps for 16-hour light and 8-hour dark periods.

Biological Observations

Test organisms were observed daily for test substance effect. The numbers of daphnids displaying both lethal and sub-lethal adverse effects were counted and documented.

Determination of Water Chemistry Parameters

Intermediate routine water chemistry measurements were obtained from test chamber aliquots. The 0-hour test solutions and dilution water chemistry measurements were taken prior to solution distribution to test replicates. Zero-hour chemistries consisted of pH, temperature, dissolved oxygen concentration, and specific conductivity at each concentration. Total hardness and alkalinity were also measured for the control and high test concentration solutions. Solution aliquots were used for daily measurements of pH, dissolved oxygen, temperature, and conductivity. Test solution pH, temperature, dissolved oxygen, and conductivity were measured directly from the test replicates at test termination after biological observations were completed and samples for test substance quantitation were collected.

Chemical Analyses

The low, mid, and high nominal test substance concentrations were analyzed at test initiation (0 hours) with solutions from each test substance stock solution. The samples were collected prior to distribution into replicate test chambers in pre-cleaned Nalgene® bottles, acidified with HNO_3 to pH <2.0 and chilled before shipment to 3M's analytical laboratory for analysis. Lithium ion concentrations were determined using USEPA Method 200.7. At test termination (48 hours), test substance concentrations were determined for solutions in three of the six test concentrations bracketing the effect concentration and a control chamber.

Statistical Analyses

Acute LC_{50}s were calculated via the Trimmed Spearman-Karber method for determining medium lethal concentrations. Ten percent lethal concentrations were calculated using the USEPA inhibition concentration (ICp) approach. The NOEC and LOEC were determined via the TOXSTAT software package, Version 3.5.

RESULTS AND DISCUSSION

Results of Biological Observations

The survival/mortality observations from the toxicity test are in Table 3. Complete (100%) survival was observed in the control and nominal lithium ion test concentrations of 0.4 mg/L, 0.7 mg/L, 1.1 mg/L, and 1.9 mg/L at the 24-hour test interval. Nominal lithium ion concentration solutions of 3.1 mg/L and 5.1 mg/L supported mean survival of 95% and 25%, respectively at the intermediate test interval. At test termination, complete survival was observed in the control, and test solutions containing nominal lithium ion concentrations of 0.4 mg/L, 0.7 mg/L, and 1.1 mg/L. The 1.9 mg/L nominal concentration supported mean survival of 95%. The live organisms in the control, 0.4 mg/L, 0.7 mg/L, 1.1 mg/L, and

1.9 mg/L nominal concentration solutions appeared normal and were actively swimming throughout the water column. The 3.1 mg/L nominal lithium ion solutions supported mean survival of 70% at test termination. The live organisms in the 3.1 mg/L solutions were observed to be "sluggish" at test termination. All organisms exposed to the high nominal test concentration of 5.1 mg/L were dead by test termination.

Chemical Analytical Results

Lithium ion measured concentrations are in Table 4. Initial (0-hour) mean measured lithium ion concentrations for the low (0.4 mg/L), mid (1.1 mg/L), and high (5.1 mg/L) nominal test solutions were 0.5 mg/L, 1.3 mg/L, and 5.6 mg/L, respectively. Forty-eight-hour mean measured lithium concentrations of the 1.9 mg/L, 3.1 mg/L, and 5.1 mg/L nominal concentrations were 2.2 mg/L, 3.2 mg/L and 5.5 mg/L, respectively. Control exposure lithium ion concentration was measured at test termination and was below detection (<0.05 mg/L). Nominal lithium ion concentrations of 1.9 mg/L, 3.1 mg/L, and 5.1 mg/L were within 16%, 3%, and 8% of the respective mean measured concentrations.

Routine Water Chemistry Results

Tables 5 contains the test solution routine water chemistry values. Test solution pH values ranged from 7.8 to 8.1. No substantial pH differences were observed between the control and lithium exposures. Dissolved oxygen concentrations at test initiation ranged from 8.9 mg/L to 9.1 mg/L. Dissolved oxygen concentrations at test termination ranged from 8.4 mg/L to 8.5 mg/L. The lowest dissolved oxygen concentration measured during the test was 93% of saturation at 21°C.

Specific conductivity values for the test ranged from 135 to 218 µmhos/cm. At test initiation, total hardness values for the control and high test concentration solutions were each 46 mg/L as $CaCO_3$. Measured alkalinity values of the control water and high test concentration solutions were 50 mg/L and 48 mg/L as $CaCO_3$, respectively. Temperatures were maintained at 21.0°C ± 1°C and ranged from 20.6°C to 20.8°C during the test.

Since no mortalities or sub-lethal adverse effects were observed in the control solutions and the test produced an interpretable concentration response, it appears suitable water quality was maintained during the toxicity exposure.

Test Acceptability

Table 6 summarizes the test acceptability results. The toxicity exposure met acceptability criteria for test duration, minimum control organism survival, and minimum dissolved oxygen concentration.

CONCLUSIONS

The test produced a normal and interpretable concentration response to *Daphnia magna* neonates during the 48-hour static acute toxicity test. Zero-percent mortality occurred in the control exposures. Nominal lithium ion concentrations were within 16% of 48-hour mean measured concentrations. Additionally, 0-hour measured test concentrations were within 18% of the 96-hour measured values indicating that test concentrations were maintained throughout the test duration. Statistical endpoints for each test interval are presented in Table 7.

Based on 48-hour measured lithium ion concentrations, the 48-hour NOEC and LOEC was 3.2 mg/L and 5.5 mg/L, respectively. The 48-hour LC_{10} was 2.4 mg/L (95% confidence interval 1.8-2.9 mg/L), and the 48-hour LC_{50} was 3.6 mg/L (95% confidence interval 3.2-4.0 mg/L).

REFERENCES

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West Inc. and University of Wyoming. Toxstat Software Package. Version 3.5. Laramie, Wyoming.

USEPA. 1993. A Linear Interpolation Method for Sublethal Toxicity: The Inhibition Concentration (ICp) Approach. Version 2.0. Environmental Research Laboratory, Duluth, Minnesota.

TABLE 1. Lithium: List of Test Conditions for 48-Hour *Daphnia magna* Acute Toxicity Test

Test Organism	Species: *Daphnia magna.* Age: <24 hours old window). Stock Source: Environmental Research Laboratory, Duluth, Minnesota. Test Organism Source: AScI-ETL in-house mass cultures. Collection Method: Culture. Holding Feeding Frequency: Pooled and fed 2 hours prior to test initiation. Toxicity Test Method: OECD Guideline 202.
Test Substance Definitive Test Dates:	9/21-23/99.
Vehicles or Additives:	None.
Dilution Water:	Dechlorinated City of Duluth, MN, tap water (post carbon (PC) water). The most recent chemical analysis is in the Raw Data Package.
Test Temperature:	21.0 ± 1°C.
Lighting:	Cool-white fluorescent 50-100 ft-candles, 16 hours light, 8 hours darkness daily.
Test Chamber:	250 ml borosilicate glass beakers.
Test Solution Volume:	200 ml.
Replicates per Concentration:	Four test replicates.
Organisms per Replicate:	Five.
Test Substance Introduction:	High test solution prepared via mass addition accompanied by gentle mechanical stirring. Lesser concentrations obtained via serial dilution of the high test concentration solution.
Solution Renewal:	None.

TABLE 2. Lithium: NaCl Reference Test Information

Reference Substance:	NaCl; VWR, Reagent-Grade, Lot #127038-118832.
Reference Substance Test Dates:	9/21-23/99.
Reference Substance 96-Hour LC_{50}:	4.49 g/L; 95% Confidence Interval 3.61-5.58.

TABLE 3. Lithium: Acute Toxicity of Lithium Ion to *Daphnia magna*

Nominal Test Substance Concentration (mg/L)	Cumulative Number of Dead Organisms and Percent Mortality[a]	
	24 H	48 H
0 (Control)	0 (0)[ab]	0 (0)
0.4	0 (0)	0 (0)
0.7	0 (0)	0 (0)
1.1	0 (0)	0 (0)
1.9	0 (0)	1 (5)
3.1	1 (5)	6 (30)
5.1	15 (75)	20 (100)

[a] Percentages are in Parenthesis

[b] Percentage Mortality Based on the Mean of Four Replicates

TABLE 4. Lithium: Measured Initial and Final Test Substance Concentrations (mg/L) for *Daphnia magna* 48-Hour Acute Toxicity Test

Test Substance Nominal Conc. (mg/L)	Test Replicate	0 H Measured Conc.	48 H Measured Conc.
	A	NM[a]	<0.05
	B	NM	NM
	C	NM	NM
	D	NM	NM
0 (Control)	Mean	NM	--
	A	0.5[b]	NM
	B	0.5[b]	NM
	C	0.5[b]	NM
	D	0.5[b]	NM
0.4	Mean	0.5[b]	--
	A	NM	NM
	B	NM	NM
	C	NM	NM
	D	NM	NM
0.7	Mean	--	--
	A	1.3[b]	NM
	B	1.3[b]	NM
	C	1.3[b]	NM
	D	1.3[b]	NM
1.1	Mean	1.3[b]	--
	A	NM	2.2
	B	NM	NM
	C	NM	NM
	D	NM	NM
1.9	Mean	--	--
	A	NM	3.2
	B	NM	3.2
	C	NM	NM
	D	NM	NM
3.1	Mean	--	3.2
	A	5.6[b]	5.4
	B	5.6[b]	NM
	C	5.6[b]	5.5
	D	5.6[b]	NM
5.1	Mean	5.6[b]	5.5

Note: Method Detection Limit = 0.05 mg/L

[a] NM = Not Measured

[b] Measured Lithium Ion Concentration of Stock Solution

TABLE 5. Lithium: pH, Dissolved Oxygen Concentration, and Conductivity of Test Solutions from *Daphnia magna* 48-Hour Acute Toxicity Test

Test Substance Nominal Conc. (mg/L)	pH (S.U.)			Dissolved Oxygen (mg/L)			Specific Cond. (µmhos/cm)		
	0-H	24-H	48-H	0-H	24-H	48-H	0-H	24-H	48-H
0 (Control)	7.9	8.0	8.1	8.9	8.3	8.4	136	135	135
0.4	7.9	8.0	8.1	8.9	8.3	8.5	144	143	142
0.7	7.9	8.0	8.1	8.9	8.4	8.5	148	148	147
1.1	7.8	8.0	8.0	8.9	8.4	8.5	155	155	154
1.9	7.8	7.9	8.0	8.9	8.4	8.5	166	166	164
3.1	7.8	7.9	8.0	8.9	8.4	8.5	186	183	186
5.1	7.9	7.9	8.0	9.1	8.4	8.5	218	217	216

TABLE 6. Lithium: Test Acceptability Criteria

Criterion	Results
Test duration must be 48 hours ± 10%.	Test duration was 48 hours ± 10%.
Dissolved oxygen concentration at test termination must be maintained at a minimum of 60% of the air saturation value at test temperature.	The lowest dissolved oxygen concentration measured at test termination was 93% of the saturation value at 21°C.
Less than 10% of the control organisms die or appear to be stressed or diseased during the 96-hour test period.	0% of the control organisms died or appeared diseased during the 96-hour test period.

TABLE 7. Lithium: Statistical Endpoints for *Daphnia magna* 48-Hour Acute Toxicity Test

Endpoint[a]	Value (mg/L)	95% Confidence Intervals (mg/L)
24-Hour LC_{10}	3.4	2.9-3.5
24-Hour LC_{50}	4.5	4.1-5.0
48-Hour LC_{10}	2.4	1.8-2.9
48-Hour LC_{50}	3.6	3.2-4.0
48-Hour NOEC	3.2	Not Applicable
48-Hour LOEC	5.5	Not Applicable

[a] Endpoint Values Determined Using Mean 48-Hour Measured Lithium Concentrations

AScI Corporation
Environmental Testing Laboratory
Submitted to 3M - 3/00
AScI-ETL Study ID# 5010-068

APPENDIX A

CHEMICAL ANALYSES OF POST-CARBON WATER

Sponsor: 3M
Sponsor Study ID# W2906

NORTHERN LAKE SERVICE, INC.
Analytical Laboratory and Environmental Services
400 North Lake Avenue - Crandon, WI 54520
Tel:(715)478-2777 Fax:(715)478-3060

WIS. LAB CERT. NO. 721026460

ANALYTICAL REPORT

NLS PROJECT# 49291
NLS CUST# 01472

Client: ASCI-Duluth Environmental Testing Div.
Attn: Allan Mozol
4444 Air Park Blvd.
Duluth, MN 55811

Project Description: Laboratory Water & Food Analysis
Project Title: 98

Sample ID: Post Carbon NLS#: 207621
Ref. Line 3 of COC 38362 Description: Post Carbon
Collected: 07/26/99 Received: 07/27/99 Reported: 08/31/99

Parameter	Result	Units	LOD	LOQ	Method	Analyzed	Lab
Aluminum, tot. as Al by ICP	0.027	mg/L	0.0074	0.026	EPA 200.7	08/11/99	721026460
Arsenic, tot. as As by furnace AAS	ND	ug/L	1.5	5.4	EPA 206.2	08/20/99	721026460
Cadmium, tot. as Cd by furnace AAS	ND	ug/L	0.13	0.47	EPA 213.2	08/08/99	721026460
Calcium, tot. as Ca by ICP	14	mg/L	0.30	0.30	EPA 200.7	08/11/99	721026460
Chromium, tot. as Cr by furnace AAS	ND	ug/L	0.18	0.64	EPA 218.2	08/10/99	721026460
Copper, tot. as Cu by ICP	ND	ug/L	0.47	1.7	EPA 200.7	08/11/99	721026460
Cyanide, tot. (distilled) as CN	ND	mg/L	0.0032	0.011	EPA 335.4	08/02/99	721026460
Fluoride, as F (unfiltered)	1.1	mg/L	0.010	0.033	EPA 340.1	08/09/99	721026460
Iron, tot. as Fe by ICP	< 0.0027 >	mg/L	0.0010	0.0035	EPA 200.7	08/11/99	721026460
Lead, tot. as Pb by furnace AAS	ND	ug/L	0.46	1.6	EPA 239.2	08/06/99	721026460
Magnesium, tot. as Mg by ICP	2.8	mg/L	0.30	0.30	EPA 200.7	08/11/99	721026460
Mercury, tot. as Hg	ND	ug/L	0.050	0.050	EPA 245.7M	08/04/99	721026460
Nickel, tot. as Ni by ICP	ND	ug/L	0.66	2.3	EPA 200.7	08/11/99	721026460
Potassium, tot. as K	0.49	mg/L	0.11	0.40	EPA 200.7	08/12/99	721026460
Selenium, tot. as Se by furnace AAS	ND	ug/L	1.3	4.6	EPA 270.2	08/10/99	721026460
Silver, tot. as Ag by furnace AAS	ND	ug/L	0.22	0.79	SM 3113B	08/05/99	721026460
Sodium, tot. as Na	8.8	mg/L	0.020	0.020	EPA 200.7	08/11/99	721026460
Solids, tot. susp. (TSS)	ND	mg/L	1.0		EPA 160.2	07/28/99	721026460
Total organic carbon (TOC)	ND	mg/L	1.3		EPA 415.1	08/11/99	737053130
Zinc, tot. as Zn by ICP	ND	ug/L	12	12	EPA 200.7	08/11/99	721026460
Organochlorine Pesticides (water) by EPA 8081	see attached				SW846 8081	08/12/99	721026460
PCBs (water) by EPA 8082	see attached				SW846 8082	08/12/99	721026460
Pesticides by EPA 8141	see attached				SW846 8141	08/07/99	999462640
Organics Extraction for Chlorinated Pest/PCBs	yes				SW846 3500	08/02/99	721026460
Extraction for Nitrogen/Phosphorus Pesticides	yes				SW846 3500	08/02/99	999462640

✓ 9/10/99

ANALYTICAL RESULTS: Pesticides by Method 8081 and PCBs by Method 8082

Customer: ASCI-Duluth Environmental Testing Div.
Project Description: Laboratory Water & Food Analysis Project Title: 98
Northern Lake Service Project Number: 49291

Analyte Name	207621 Post Carbon ug/L	DILUTION FACTOR	LOD ug/L	LOQ ug/L
Aldrin	ND	1	0.0097	0.033
Alpha-BHC	ND	1	0.011	0.037
Beta-BHC	ND	1	0.012	0.043
Delta-BHC	ND	1	0.011	0.037
Gamma-BHC	ND	1	0.0094	0.032
Chlordane	ND	1	0.027	0.10
4,4'-DDD	ND	1	0.0098	0.038
4,4'-DDE	ND	1	0.0094	0.032
4,4'-DDT	ND	1	0.015	0.053
Dieldrin	ND	1	0.011	0.036
Endosulfan I	ND	1	0.011	0.037
Endosulfan II	ND	1	0.011	0.039
Endosulfan Sulfate	ND	1	0.015	0.051
Endrin	ND	1	0.013	0.039
Endrin Aldehyde	ND	1	0.013	0.044
Heptachlor	ND	1	0.011	0.039
Heptachlor Epoxide	ND	1	0.0099	0.034
Methoxychlor	ND	1	0.0097	0.033
PCB-1016	ND	1	0.033	0.11
PCB-1221	ND	1	0.32	1.1
PCB-1232	ND	1	0.032	0.11
PCB-1242	ND	1	0.030	0.10
PCB-1248	ND	1	0.028	0.095
PCB-1254	ND	1	0.021	0.069
PCB-1260	ND	1	0.032	0.11
Toxaphene	ND	1	0.23	0.80

Surrogate Recovery on DBC = 105 %

✓ JH 9/10/99

ANALYTICAL RESULTS: Nitrogen/Phosphorous Pesticides by Method 8270

Customer: ASCI-Duluth Environmental Testing Div.
Project Description: Laboratory Water & Food Analysis Project Title: 98
Northern Lake Service Project Number: 49291

Analyte Name	207620 Millipore H2O ug/L	DILUTION FACTOR	LOD ug/L	LOQ ug/L
Atrazine	ND	1	0.029	0.029
Alachlor	ND	1	0.035	0.035
Butylate	ND	1	0.50	0.50
Cyanazine	ND	1	0.060	0.060
EPTC	ND	1	0.046	0.046
Malathion	ND	1	0.075	0.075
Metolachlor	ND	1	0.032	0.032
Metribuzin	ND	1	0.049	0.049
Pendimethalin	ND	1	0.030	0.030
Simazine	ND	1	0.057	0.057
Trifluralin	ND	1	0.075	0.075
Phorate	ND	1	0.038	0.038
Diazinon	ND	1	0.50	0.50
Carbofuran	ND	1	0.50	0.50
Methyl Parathion	ND	1	0.11	0.11
Ethyl Parathion	ND	1	0.10	0.10
Chloryprifos	ND	1	0.028	0.028

Analyte Name	207621 Post Carbon ug/L	DILUTION FACTOR	LOD ug/L	LOQ ug/L
Atrazine	ND	1	0.029	0.029
Alachlor	ND	1	0.035	0.035
Butylate	ND	1	0.50	0.50
Cyanazine	ND	1	0.060	0.060
EPTC	ND	1	0.046	0.046
Malathion	ND	1	0.075	0.075
Metolachlor	ND	1	0.032	0.032
Metribuzin	ND	1	0.049	0.049
Pendimethalin	ND	1	0.030	0.030
Simazine	ND	1	0.057	0.057
Trifluralin	ND	1	0.075	0.075
Phorate	ND	1	0.038	0.038
Diazinon	ND	1	0.50	0.50
Carbofuran	ND	1	0.50	0.50
Methyl Parathion	ND	1	0.11	0.11
Ethyl Parathion	ND	1	0.10	0.10
Chloryprifos	ND	1	0.028	0.028

✓ JA 9/10/99

APPENDIX B

DEFINITIVE TEST DATA

1 of 3

ASci Corporation

TEST Dragna Lithium Rangefinder

DATE 7/14/99

TECHNICIAN DIERKES

ASci Corporation
TEST INFORMATION & RESULTS

Date:	7/14/99
Effluent/Ambient:	Lithium Chloride
Template Number:	NA
Test Dates:	7/14-16/99
Dilution Water:	PC = dechlorinated City of Duluth Tapwater
Test Site:	ASCI
Test Chamber:	1oz plastic
Food:	NONE
Temperature:	21°C
Test Organism/Age:	D. magna <24h

Comments: Lithium Chloride (LiCl) fw = ~~42.367~~ 42.394 g/mole

Li fw = ~~6.939~~ 6.941 g/mole

Cl fw = 35.453

% Li in LiCl = (~~6.939~~ 6.941 / ~~42.367~~ 42.394)(100) = 16.37%

7mg of LiCl diluted to 200ml w/ PC_{H_2O} = 35mg/L

(35mg/L)(16.37%) = 5.7 mg/L as Li

200ml of 5mg/L Li soln prepared by diluting 175ml of 5.7mg/L Li to 200ml (200ml)(5mg/L)(5.7mg/L)$^{-1}$ = 175ml

1mg/L solution obtained by diluting 10ml of the 5mg/L soln. to 50ml (1mg/L)(50ml)(5mg/L)$^{-1}$ = 10ml

0.1mg/L soln obtained by diluting 1ml of the 5mg/L soln to 50ml (0.1mg/L)(50ml)(5mg/L)$^{-1}$ = 1ml

Lithium Chloride: Sigma Chemical Co, Received 11/8/97
Lot # 77H0071, 99% purity

3 of 3

ACUTE DATA FORM

Test Type:	Acute
Test Initiation (Date & Time):	7/14/99 1200
Investigator:	
Sample Log No., Name:	Lithium
Date of Collection:	

Species:	D. magna
Age:	<24h
No. Animals/No. Reps:	5/2
Sources of Animals:	ASCI
Dilution Water/Control:	PC
Test Volume:	20ml
Other Information:	

Concentration (Treatment)	Survival Readings: 24 h	48 h	72 h	96 h
Control	5 5	4 3/4*		
0.1mg/L	5 5	2 3		
1mg/L	5 5	1 1		
5mg/L	0 0	0 0		
	LC_{50} ____ CI ____	LC_{50} ____ CI ____	LC_{50} ____ CI ____	LC_{50} ____ CI ____

Comments: * One Magna Stuck to side of cup

1 of 8

AScI Corporation

TEST Daphnia magna Lithium

DATE 9/21/99

TECHNICIAN(S) [illegible]

ENVIRONMENTAL SAMPLE TEST INFORMATION

Date: 9/21/99

Effluent/Ambient: Lithium

Template Number: NA

Test Dates: 9/21-23/99

Dilution Water: Dechlorinated City of Duluth Tap Water (PC)

Test Site: ASCI-ETD

Test Chamber: 250ml Glass

Food: NONE

Temperature: 21°C ± 1

Test Organism/Age: Daphnia magna <24h

Culture Medium: PC

Comments: Lithium obtained from Lithium Chloride, Sigma Chemical Co. Lot #77H00771

Test concentrations of 0.40mg/L, 0.67mg/L, 1.11mg/L, 1.85mg/L, 3.09mg/L, and 5.14mg/L

Lithium Chloride fw = ~~42.367~~ 42.394 gm/mole, Li fw = ~~6.941~~ 6.941 g/mole, Cl fw = 35.453

% Li in LiCl = (6.941/~~42.367~~ 42.394 g/mole)(100) = ~~16.32%~~ 16.37%

5.14mg/L = (3L)(5.14mg/L as Li)(0.16~~32~~37)$^{-1}$ = 94.8 ~~mg~~ 12 mg

3.09mg/L = (3L)(3.09mg/L as Li)(5.14mg/L as Li)$^{-1}$ = 1.80L diluted to 3L

1.85mg/L = (3L)(1.85mg/L as Li)(3.09mg/L as Li)$^{-1}$ = 1.80L diluted to 3L

1.11mg/L = (3L)(1.11mg/L as Li)(1.85mg/L as Li)$^{-1}$ = 1.80L diluted to 3L

0.67mg/L = (3L)(0.67mg/L as Li)(1.11mg/L as Li)$^{-1}$ = 1.81L diluted to 3L

0.40mg/L = (1L)(0.40mg/L as Li)(0.67mg/L as Li)$^{-1}$ = 0.6L diluted to 1L

0.4mg/L, 0.7mg/L, 1.1mg/L, 1.9mg/L, 3.1mg/L, 5.1mg/L

ACUTE TOXICITY TEST FORM

AScI Study ID#: 5010-068	Sponsor: 3M	Test Substance: Lithium
Test Organism: D. magna	Age: 12-24 hr	Dilution Water: PC
Study Director: DIERKES	In-Life Phase Test Hour: 0 6 12 24 48 72 96	Analyst's Initials: RJ
Today's Date: 9/21/99		Time: 1030

Conc. (mg/L)	Exposure ID# & Rep	# Alive/ # Affected	Obs	DO (mg/L)	pH	Temp. (°C)	Cond. (µmhos/cm)	Alkalinity (as mg $CaCO_3$/L)	Hardness (as mg $CaCO_3$/L)
0	A	5/0		8.9	7.94	20.8	136	50	46
	B	5/0	Look good						
	C	5/0							
	D	5/0							
0.40 (0.4)	A	5/0		8.9	7.88	20.8	144		
	B	5/0							
	C	5/0							
	D	5/0							
0.67 (0.7)	A	5/0		8.9	7.85	20.7	148		
	B	5/0							
	C	5/0							
	D	5/0							
1.11 (1.1)	A	5/0		8.9	7.82	20.8	155		
	B	5/0							
	C	5/0							
	D	5/0							
1.85 (1.9)	A	5/0		8.9	7.80	20.8	160		
	B	5/0							
	C	5/0							
	D	5/0							

Parameter	Comments:	Mean±SD
Minimum DO as % satn'	100%	
Test Organisms Length (mm)		
Test Organisms Weight (g)		

Note: Obs = Observation codes for test organisms and test solutions are on the reverse side of this page.

(OVER)

ACUTE TOXICITY TEST FORM

ASci Study ID#: 5010-068	Sponsor: 3M	Test Substance: Lithium
Test Organism: D. magna	Age: 12-24 h	Dilution Water: PC
Study Director: DIERKES	In-Life Phase Test Hour: 0 6 12 24 48 72 96	Analyst's Initials: RL
Today's Date: 9/21/99		Time: 1030

	Conc. (mg/L)	Exposure ID# & Rep	# Alive/ # Affected	Obs	DO (mg/L)	pH	Temp. (°C)	Cond. (µmhos/cm)	Alkalinity (as mg $CaCO_3$/L)	Hardness (as mg $CaCO_3$/L)
(3.1)	3.09	A	5/0		8.9	7.84	20.7	184		
		B	5/0	Look good						
		C	5/0							
		D	5/0							
(5.1)	5.14	A	5/0		9.1	7.87	20.8	28	48	46
		B	5/0							
		C	5/0							
		D	5/0							

Parameter	Comments:	Mean±SD
Minimum DO as % satn'	100%	
Test Organisms Length (mm)		
Test Organisms Weight (g)		

Note: Obs = Observation codes for test organisms and test solutions are on the reverse side of this page.

(OVER)

ACUTE TOXICITY TEST FORM

ASci Study ID#: 5010-068	Sponsor: 3M	Test Substance: Lithium
Test Organism: D. magna	Age: 24h	Dilution Water: PC
Study Director: DIERKES	In-Life Phase Test Hour: 0 6 12	Analyst's Initials: CR, [illegible]
Today's Date: 9/22/99	24 48 72 96	Time: 1515

Conc. (mg/L)	Exposure ID# & Rep	# Alive/ # Affected	Obs	DO (mg/L)	pH	Temp. (°C)	Cond. (µmhos/cm)	Alkalinity (as mg $CaCO_3$/L)	Hardness (as mg $CaCO_3$/L)
0	A	5/0	LOOK	8.3	8.04	20.7	135		
	B	5/0	Good		~~8.00~~		~~143~~		
	C	5/0							
	D	5/0							
0.40	A	5/0		8.3	8.00	20.7	143		
	B	5/0							
(0.4)	C	5/0							
	D	5/0							
0.67	A	5/0		8.4	7.97	20.7	148		
	B	5/0							
(0.7)	C	5/0							
	D	5/0							
1.11	A	5/0		8.4	7.96	20.6	155		
	B	5/0							
(1.1)	C	5/0							
	D	5/0							
1.85	A	5/0		8.4	7.94	20.7	166		
	B	5/0							
(1.9)	C	5/0							
	D	5/0							

Parameter	Comments:	Mean±SD
Minimum DO as % satn'	93%	
Test Organisms Length (mm)		
Test Organisms Weight (g)		

Note: Obs = Observation codes for test organisms and test solutions are on the reverse side of this page.

(OVER)

ACUTE TOXICITY TEST FORM

AScI Study ID#: 5010-068	Sponsor: 3M	Test Substance: Lithium
Test Organism: D. magna	Age: 24h	Dilution Water: PC
Study Director: DIERKES	In-Life Phase Test Hour: 0 6 12	Analyst's Initials: [illegible]
Today's Date: 9/22/99	24 48 72 96	Time: 1515

	Conc. (mg/L)	Exposure ID# & Rep	# Alive/ # Affected	Obs	DO (mg/L)	pH	Temp. (°C)	Cond. (µmhos/cm)	Alkalinity (as mg $CaCO_3$/L)	Hardness (as mg $CaCO_3$/L)
	3.09	A	5/0	Look	8.4	7.94	20.7	183		
(3.1)		B	4/1	good						
		C	5/0	↓						
		D	5/0							
	5.14	A	1/4	laying	8.4	7.92	20.7	217		
(5.1)		B	1/4	at bottom						
		C	2/3	↓						
		D	1/4							

Parameter	Comments:	Mean ± SD
Minimum DO as % satn'	94%	
Test Organisms Length (mm)		
Test Organisms Weight (g)		

Note: Obs = Observation codes for test organisms and test solutions are on the reverse side of this page.

(OVER)

ACUTE TOXICITY TEST FORM

ASci Study ID#: 5010-068	Sponsor: 3M	Test Substance: Lithium
Test Organism: D. magna	Age: 24h	Dilution Water: PC
Study Director: DIERKES	In-Life Phase Test Hour: 0 6 12	Analyst's Initials: [illegible]
Today's Date: 9/23/99	24 (48) 72 96	Time: 0930

Conc. (mg/L)	Exposure ID# & Rep	# Alive/ # Affected	Obs	DO (mg/L)	pH	Temp. (°C)	Cond. (µmhos/cm)	Alkalinity (as mg $CaCO_3$/L)	Hardness (as mg $CaCO_3$/L)
0	A	5/0		8.4	8.07	20.7	135		
	B	5/0	Look						
	C	5/0	Good						
	D	5/0							
0.40	A	5/0		8.5	8.05	20.7	142		
	B	5/0	Look						
(0.41)	C	5/0	Good						
	D	5/0							
0.67	A	5/0		8.5	8.05	20.7	147		
	B	5/0	Look						
(0.7)	C	5/0	Good						
	D	5/0							
1.11	A	5/0		8.5	8.03	20.8	154		
	B	5/0	Look						
(1.1)	C	5/0	Good						
	D	5/0							
1.85	A	5/0		8.5	8.02	20.7	1164		
	B	5/0	Look						
(1.9)	C	5/0	Good						
	D	4/1							

Parameter	Comments:	Mean±SD
Minimum DO as % satn'	94%	
Test Organisms Length (mm)		
Test Organisms Weight (g)		

Note: Obs = Observation codes for test organisms and test solutions are on the reverse side of this page.

(OVER)

ACUTE TOXICITY TEST FORM

AScI Study ID#: 5010-068	Sponsor: 3M	Test Substance: Lithium
Test Organism: D. magna	Age: 24 h	Dilution Water: PC
Study Director: DIERKES	In-Life Phase Test Hour: 0 6 12	Analyst's Initials: JD
Today's Date: 9/23/99	24 48 72 96	Time: 0930

Conc. (mg/L)	Exposure ID# & Rep	# Alive/ # Affected	Obs	DO (mg/L)	pH	Temp. (°C)	Cond. (µmhos/cm)	Alkalinity (as mg $CaCO_3$/L)	Hardness (as mg $CaCO_3$/L)
3.09	A	5/0		8.5	8.01	20.8	186		
(3.1)	B	2/3	sluggish						
	C	4/1							
	D	3/2							
5.14	A	0/5		8.5	8.01	20.7	216		
(5.1)	B	0/5	DEAD						
	C	0/5							
	D	0/5							

Parameter	Comments:	Mean ± SD
Minimum DO as % satn'	96%	
Test Organisms Length (mm)		
Test Organisms Weight (g)		

Note: Obs = Observation codes for test organisms and test solutions are on the reverse side of this page.

(OVER)

APPENDIX C

REFERENCE TEST CONTROL CHART

Precision of *Daphnia magna* 48 Hour NaCl Reference Toxicant Testing

DATE	EC_{50} (g/l) [a]	Mean [b]	S_x [c]	CV (%) [d]
October, 1998	5.66	-	-	-
November, 1998	5.66	5.66	0.00	0.0
December, 1998	5.66	5.66	0.00	0.0
December, 1998	5.46	5.61	0.10	1.8
January, 1999	5.66	5.62	0.09	1.6
February, 1999	5.66	5.63	0.08	1.5
March, 1999	5.66	5.63	0.08	1.3
April, 1999	5.66	5.64	0.07	1.3
May, 1999	5.66	5.64	0.07	1.2
June, 1999	4.29	5.50	0.43	7.8
July, 1999	4.59	5.42	0.49	9.1
August, 1999	5.66	5.44	0.48	8.7
September, 1999	4.49	5.37	0.53	9.8
October, 1999	5.28	5.36	0.51	9.4
November, 1999	3.73	5.25	0.64	12.3
November, 1999	5.28	5.25	0.62	11.8
December, 1999	5.66	5.28	0.61	11.6
December, 1999	4.29	5.22	0.64	12.2
January, 2000	5.66	5.25	0.63	11.9
February, 2000	5.66	5.27	0.62	11.7

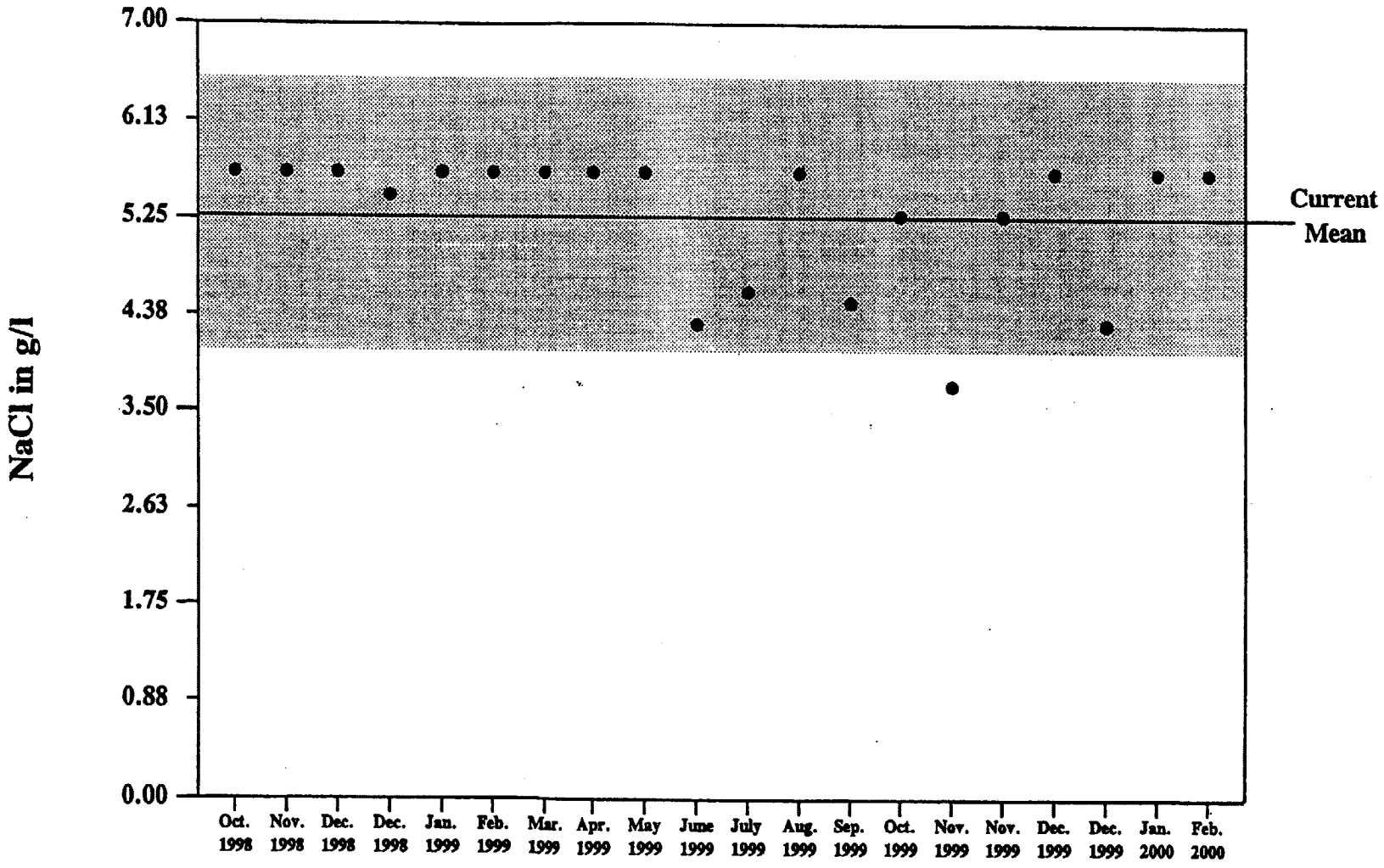
[a] Concentration (g/l) of NaCl which causes 50% effect.

[b] Running mean.

[c] Standard deviation.

[d] Coefficient of variation.

Precision of *Daphnia magna* 48 Hour NaCl Reference Toxicant Testing



APPENDIX D

STATISTICAL CALCULATIONS

Title: NOEC AND LOEC FOR DAPHNIA MAGNA EXPOSED TO LITHIUM ION
File: LITHIUM.DMA Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's Test for Normality

D = 0.2855
W = 0.6736

Critical W = 0.8960 (alpha = 0.01 , N = 28)
W = 0.9240 (alpha = 0.05 , N = 28)

Data FAIL normality test (alpha = 0.01). Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normality and should not be performed with this data as is.

Press any key to continue or ESC to return to menu...

Title: NOEC AND LOEC FOR DAPHNIA MAGNA EXPOSED TO LITHIUM ION
File: LITHIUM.DMA Transform: ARC SINE(SQUARE ROOT(Y))

Steel's Many-One Rank Test - Ho: Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	DF	SIG 0.05
1	CONTROL	1.3453				
2	0.4 MG/L	1.3453	18.00	10.00	4.00	
3	0.7 MG/L	1.3453	18.00	10.00	4.00	
4	1.1 MG/L	1.3453	18.00	10.00	4.00	
5	2.2 MG/L	1.2858	16.00	10.00	4.00	
6	3.2 MG/L	1.0058	12.00	10.00	4.00	
7	5.5 MG/L	0.2255	10.00	10.00	4.00	*

Critical values are 1 tailed (k = 6)

Press any key to continue or ESC to return to menu...

Toxicant/Effluent: LITHIUM ION
Test Start Date: 9/21/99 Test Ending Date: 9/23/99
Test Species: DAPHNIA MAGNA
Test Duration: 24 HOURS
DATA FILE:

Conc. ID	Number Replicates	Concentration MG/L	Response Means	Std. Dev.	Pooled Response Means
1	4	0.000	5.000	0.000	5.000
2	4	0.400	5.000	0.000	5.000
3	4	0.700	5.000	0.000	5.000
4	4	1.100	5.000	0.000	5.000
5	4	2.200	5.000	0.000	5.000
6	4	3.200	4.750	0.500	4.750
7	4	5.500	1.250	0.500	1.250

The Linear Interpolation Estimate: 3.3643 Entered P Value: 10

Number of Resamplings: 80 80 Resamples Generated
The Bootstrap Estimates Mean: 3.3412 Standard Deviation: 0.1566
Original Confidence Limits: Lower: 2.8667 Upper: 3.5286
Expanded Confidence Limits: Lower: 2.5681 Upper: 3.6271
Resampling time in Seconds: 0.00 Random_Seed: -6737628
Press Any Key to Continue

Toxicant/Effluent: LITHIUM ION
Test Start Date: 9/21/99 Test Ending Date: 9/23/99
Test Species: DAPHNIA MAGNA
Test Duration: 48 HOURS
DATA FILE:

Conc. ID	Number Replicates	Concentration MG/L	Response Means	Std. Dev.	Pooled Response Means
1	4	0.000	5.000	0.000	5.000
2	4	0.400	5.000	0.000	5.000
3	4	0.700	5.000	0.000	5.000
4	4	1.100	5.000	0.000	5.000
5	4	2.200	4.750	0.500	4.750
6	4	3.200	3.500	1.291	3.500
7	4	5.500	0.000	0.000	0.000

The Linear Interpolation Estimate: 2.4000 Entered P Value: 10

Number of Resamplings: 80 80 Resamples Generated
The Bootstrap Estimates Mean: 2.4456 Standard Deviation: 0.2631
Original Confidence Limits: Lower: 1.8333 Upper: 2.8667
Expanded Confidence Limits: Lower: 1.4933 Upper: 3.1467
Resampling time in Seconds: 0.00 Random_Seed: 1652986980
Press Any Key to Continue

TRIMMED SPEARMAN-KARBER METHOD. MONTANA STATE UNIV

FOR REFERENCE, CITE:
HAMILTON, M.A., R.C. RUSSO, AND R.V. THURSTON, 1977.
TRIMMED SPEARMAN-KARBER METHOD FOR ESTIMATING MEDIAN
LETHAL CONCENTRATIONS IN TOXICITY BIOASSAYS.
ENVIRON. SCI. TECHNOL. 11(7): 714-719;
CORRECTION 12(4):417 (1978).

DATE: 9/21/99 TEST NUMBER: 1 DURATION: 24 HOURS
CHEMICAL: LITHIUM ION SPECIES: DAPHNIA MAG

RAW DATA:

CONCENTRATION(MG/L)	.40	.70	1.10	2.20	3.20	5.50
NUMBER EXPOSED:	20	20	20	20	20	20
MORTALITIES:	0	0	0	0	1	15
SPEARMAN-KARBER TRIM:		25.00%				

SPEARMAN-KARBER ESTIMATES: LC50: 4.53
95% LOWER CONFIDENCE: 4.10
95% UPPER CONFIDENCE: 5.01

DATE: 9/21/99 TEST NUMBER: 1 DURATION: 48 HOURS
CHEMICAL: LITHIUM ION SPECIES: DAPHNIA MAG

RAW DATA:

CONCENTRATION(MG/L)	.40	.70	1.10	2.20	3.20	5.50
NUMBER EXPOSED:	20	20	20	20	20	20
MORTALITIES:	0	0	0	1	6	20
SPEARMAN-KARBER TRIM:		.00%				

SPEARMAN-KARBER ESTIMATES: LC50: 3.56
95% LOWER CONFIDENCE: 3.20
95% UPPER CONFIDENCE: 3.96

APPENDIX E

ANALYTICAL RESULTS

Post-it® Fax Note 7671	Date	# of pages ▶
To Joe D.	From	
Co./Dept. ASG	Co.	
Phone # 218-722-4040	Phone #	
Fax # 218-722-2542	Fax #	

LAB REQUEST NO. W2906
REQUESTOR NAME: RR ROBIDEAU
DEPARTMENT:
PROJECT NO: 0535
DATE RECEIVED: 10/20/1999
DESC: LITHIUM ANALYSIS ON AQUATIC TOX SAMPLES

PHONE NO: 651-778-4048
3M FAX NO: 651-778-6176

Concentrations were based on Li ion.

Samples prepared and analyzed using EPA method 200.7.

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
1	09/22/99	Sludge-0HR	1000mg/L		
LI		LITHIUM		500 MG/L	5
200-7-PREP		PREP BY EPA METHOD 200.7		COMPLETE	
2	09/09/99	Microtox	2000mg/L		
LI		LITHIUM		2000 MG/L	20
200-7-PREP		PREP BY EPA METHOD 200.7		COMPLETE	
3	09/21/99	DM-Initial	0.4mg/L		
LI		LITHIUM		0.46 MG/L	0.01
200-7-PREP		PREP BY EPA METHOD 200.7		COMPLETE	
4	09/21/99	DM-Initial	1.11mg/L		
LI		LITHIUM		1.3 MG/L	0.01
200-7-PREP		PREP BY EPA METHOD 200.7		COMPLETE	
5	09/21/99	DM-Initial	5.14mg/L		
LI		LITHIUM		5.6 MG/L	0.05
200-7-PREP		PREP BY EPA METHOD 200.7		COMPLETE	
6	09/23/99	DM-48HR	Contorl A		
LI		LITHIUM		<0.01 MG/L	0.01
200-7-PREP		PREP BY EPA METHOD 200.7		COMPLETE	
7	09/23/99	DM-48HR	1.85mg/L A		
LI		LITHIUM		2.2 MG/L	0.01
200-7-PREP		PREP BY EPA METHOD 200.7		COMPLETE	
8	09/23/99	DM-48HR	3.09mg/L A		
LI		LITHIUM		3.2 MG/L	0.05

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
8	09/23/99	DM-48HR	3.09mg/L A		
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
9	09/23/99	DM-48HR	3.09mg/L B		
	LI	LITHIUM		3.2 MG/L	0.05
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
10	09/23/99	DM-48HR	5.14mg/L A		
	LI	LITHIUM		5.4 MG/L	0.05
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
11	09/23/99	DM-48HR	5.14mg/L C		
	LI	LITHIUM		5.5 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
12	09/03/99	FHM-Initial	1.6mg/L A		
	LI	LITHIUM		1.6 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
13	09/03/99	FHM-Initial	1.6mg/L B		
	LI	LITHIUM		1.7 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
14	09/03/99	FHM-Initial	4.3mg/L A		
	LI	LITHIUM		4.3 MG/L	0.05
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
15	09/03/99	FHM-Initial	4.3mg/l B		
	LI	LITHIUM		4.2 MG/L	0.05
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
16	09/03/99	FHM-Initial	12mg/L A		
	LI	LITHIUM		12 MG/L	0.1
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
17	09/03/99	FHM-Initial	12mg/L B		
	LI	LITHIUM		12 MG/L	0.1

LAB REQUEST NO. W2906 CONTINUED

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
17	09/03/99	FHM-Initial	12mg/L B		
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
18	09/05/99	FHM-48HR	7.2mg/L A		
	LI	LITHIUM		7.2 MG/L	0.05
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
19	09/05/99	FHM-48HR	12mg/L A		
	LI	LITHIUM		12 MG/L	0.1
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
20	09/07/99	FHM-96HR	Control A		
	LI	LITHIUM		<0.01 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
21	09/07/99	FHM-96HR	Control B		
	LI	LITHIUM		<0.01 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
22	09/07/99	FHM-96HR	1.6mg/L A		
	LI	LITHIUM		1.6 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
23	09/07/99	FHM-96HR	1.6mg/L B		
	LI	LITHIUM		1.8 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
24	09/07/99	FHM-96HR	4.3mg/L A		
	LI	LITHIUM		4.4 MG/L	0.05
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
25	09/07/99	FHM-96HR	4.3mg/L B		
	LI	LITHIUM		4.3 MG/L	0.05
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
26	09/07/99	FHM-96HR	7.2mg/L A		
	LI	LITHIUM		7.7 MG/L	0.1

LAB REQUEST NO. W2906 CONTINUED

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)

26	09/07/99	FHM-96HR	7.2mg/L A		
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
27	09/07/99	FHM-96HR	7.2mg/L B		
	LI	LITHIUM		7.3 MG/L	0.1
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
28	09/07/99	FHM-96HR	12mg/L A		
	LI	LITHIUM		12 MG/L	0.1
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
29	09/07/99	FHM-96HR	12mg/L B		
	LI	LITHIUM		13 MG/L	0.1
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
30	09/16/99	ALG Initial	WEDTA Contrl		
	LI	LITHIUM		<0.01 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
31	09/06/99	ALG Initial	WEDTA2.3mg/L		
	LI	LITHIUM		2.5 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
32	09/06/99	ALG Initial	WEDTA3.9mg/L		
	LI	LITHIUM		4.0 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
33	09/06/99	ALG Initial	WEDTA6.5mg/L		
	LI	LITHIUM		6.4 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
34	09/06/99	ALG Initial	WEDTA 11mg/L		
	LI	LITHIUM		11 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
35	09/06/99	ALG Initial	WEDTA 18mg/L		
	LI	LITHIUM		19 MG/L	0.01

LAB REQUEST NO. W2906 CONTINUED

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
35	09/06/99	ALG Initial	WEDTA 18mg/L		
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	

36	09/06/99	ALG Initial	WEDTA 30mg/L		
	LI	LITHIUM		29 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
37	09/06/99	ALG Initial	WEDTA 50mg/L		
	LI	LITHIUM		52 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
38	09/06/99	ALG Initial	WEDTA 83mg/L		
	LI	LITHIUM		86 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
39	09/06/99	ALG-Initial	W/O Control		
	LI	LITHIUM		<0.01 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
40	09/06/99	ALG Initial	W/O 2.3mg/L		
	LI	LITHIUM		2.6 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
41	09/06/99	ALG Initial	W/O 3.9mg/L		
	LI	LITHIUM		4.0 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
42	09/06/99	ALG Initial	W/O,6.5mg/L		
	LI	LITHIUM		6.6 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
43	09/06/99	ALG Initial	W/O 11mg/L		
	LI	LITHIUM		12 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
44	09/06/99	ALG Initial	W/O 18mg/L		
	LI	LITHIUM		19 MG/L	0.01

LAB REQUEST NO. W2906 CONTINUED

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
44	09/06/99	ALG Initial	W/O 18mg/L		
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
45	09/06/99	ALG Initial	W/O 30mg/L		

	LI	LITHIUM	32 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7	COMPLETE	
46	09/06/99	ALG Initial W/O 50mg/L		
	LI	LITHIUM	52 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7	COMPLETE	
47	09/10/99	ALG 96HR WEDTA Contrl		
	LI	LITHIUM	<0.01 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7	COMPLETE	
48	09/10/99	ALG 96HR WEDTA2.3mg/L		
	LI	LITHIUM	2.6 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7	COMPLETE	
49	09/10/99	Alg-96HR WEDTA3.9mg/L		
	LI	LITHIUM	3.8 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7	COMPLETE	
50	09/10/99	ALG-96HR WEDTA6.5mg/L		
	LI	LITHIUM	6.4 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7	COMPLETE	
51	09/10/99	ALG 96HR WEDTA 11mg/L		
	LI	LITHIUM	11 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7	COMPLETE	
52	09/10/99	ALG 96HR WEDTA 18mg/L		
	LI	LITHIUM	19 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7	COMPLETE	
53	09/10/99	ALG 96HR WEDTA 30mg/L		
	LI	LITHIUM	30 MG/L	0.01

LAB REQUEST NO. W2906 CONTINUED

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
53	09/10/99	ALG 96HR	WEDTA 30mg/L		
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
54	09/10/99	ALG 96HR	WEDTA 50mg/L		
	LI	LITHIUM		50 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	

55	09/10/99	ALG 96HR	WEDTA 83mg/L		
	LI	LITHIUM		84 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
56	09/10/99	ALG 96HR	W/O Control		
	LI	LITHIUM		<0.01 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
57	09/10/99	ALG 96HR	W/O 2.3mg/L		
	LI	LITHIUM		2.6 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
58	09/10/99	ALG 96HR	W/O 3.9mg/L		
	LI	LITHIUM		4.0 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
59	09/10/99	ALG 96HR	W/O 6.5mg/L		
	LI	LITHIUM		6.5 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
60	09/10/99	ALG 96HR	W/O 11mg/L		
	LI	LITHIUM		12 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
61	09/10/99	ALG 96HR	W/O 18mg/L		
	LI	LITHIUM		19 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
62	09/10/99	ALG 96HR	W/O 30mg/L		
	LI	LITHIUM		31 MG/L	0.01

LAB REQUEST NO. W2906 CONTINUED

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
62	09/10/99	ALG 96HR	W/O 30mg/L		
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
63	09/10/99	ALG 96HR	W/O 50mg/L		
	LI	LITHIUM		49 MG/L	0.01
	200-7-PREP	PREP BY EPA METHOD 200.7		COMPLETE	
64	11/04/99	new 10000	sludge		
	LI	LITHIUM		1000 MG/L	0.01

200-7-PREP PREP BY EPA METHOD 200.7 COMPLETE