Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms

EPA Guidance Document

Found on:

http://www.epa.gov/eerd/westmethman.htm

Michael Lee/R9/USEPA/US
07/21/2008 09:47 AM

To Richard Remigio/R9/USEPA/US@EPA
cc
bcc
Subject Fw: Agana and N. District WET Tests and RW Monitoring

History: This message has been replied to and forwarded.

Rich,

See attached WET tests for Agana and N. District. Do you we need to have these sent to us more formally, i.e., cover letter?

Mike

----- Forwarded by Michael Lee/R9/USEPA/US on 07/21/2008 09:45 AM -----

"Carmen Sian-Denton" <cdenton@ite.net>
07/18/2008 03:14 PM

To "Paul J. Kemp" <paulkemp@ite.net>, Michael Lee/R9/USEPA/US@EPA
cc "Don Antrobus" <dantrobus@guamwaterworks.org>, "Julie Shane" <jshane@guamwaterworks.org>, "John M. Benavente" <gpagm@ite.net>
Subject Re: Agana and N. District WET Tests and RW Monitoring

Hafa Adai Mike,

I've attached the Agana STP bioassay done in Dec 07 and the NDSTP bioassay done in Oct 07. They are scheduled to be done again later this year. Do you need this to be formally certified by our Compliance Officer?

Carmen

----- Original Message -----
From: <Lee.Michael@epa.gov>
To: "Carmen Denton" <cdenton@guamwaterworks.org>; "Paul J. Kemp" <paulkemp@ite.net>
Cc: "Don Antrobus" <dantrobus@guamwaterworks.org>; "Julie Shane" <jshane@guamwaterworks.org>; "John M. Benavente" <gpagm@ite.net>
Sent: Thursday, July 17, 2008 4:24 PM
Subject: Agana and N. District WET Tests and RW Monitoring

>
> Dear Carmen and Paul,
>
> As part of our Permits Office's ongoing review of GWA's NPDES permit
> renewal application for Northern District, they noted in GWA's cover
> letter for the revised permit renewal application that GWA would be
> doing a WET test (see attached letter). However, we have not been able
> to find a copy of the WET results in our files. Could you let us know
> if you have performed these tests. If so, could you send or if you had
> already submitted could you please resend the results of the tests. If
> not, we would like to have the WET test performed as you had stated in
> your letter.

>
> Also, I would like to bring up the need for GWA to restart its off-shore
> receiving water monitoring program in accordance with the current permit
> requirements for the Agana and Northern District STPs. Currently, GWA
> is performing the nearshore receiving water monitoring but not the
> off-shore monitoring. The off-shore monitoring has not been done for
> sometime and needs to be re-implemented in accordance with the
> respective permits.
>
> If you have any questions, please let me know.
>
> Sincerely,
>
> Mike
>
>
>
> (See attached file: Northern District Cover.pdf)
>
> No virus found in this incoming message.
> Checked by AVG - http://www.avg.com
> Version: 8.0.138 / Virus Database: 270.5.1/1559 - Release Date: 7/17/2008
> 6:08 PM
>
>

220067 - ND (Bioassay) 10-16-07.pdf 225061 - Agana (Bioassay) 12-11-07.pdf

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel 626 386 1100
Fax 626 386 1101
1 800 566 LABS (1 800 566 5227)

Laboratory Report

for

Guam Water Authority
Government of Guam

P.O. Box 3010

Agana , GU 96910

Attention: Carmen Sian-Denton
Fax: (671) 637-2592

DATE OF ISSUE
NOV 1 3 2007
MWH LABORATORIES

ACCREDITED IN ACCORDANCE WITH nelac
01114CA

JCH Jim Hein
Project Manager

Report#: 220067
Project: DRINKING
PO#: 270994-000-0

Laboratory certifies that the test results meet all **NELAC** requirements unless noted in the Comments section or the Case Narrative. Following the cover page are Comments, Data Report, Hits Report, totaling 3 page[s].

AGA 3830

MWH Laboratories
MONTGOMERY WATSON HARZA

CHAIN OF CUSTODY RECORD

220067

750 Royal Oaks, Suite 100
Monrovia, California 91016
Phone: (626) 386-1100
(800) 566-5227
Fax: (626) 386-1101

MWH LAB'S USE ONLY

LOGIN COMMENTS:

SAMPLES CHECKED AGAINST COC BY:

SAMPLES LOGGED IN BY:

SAMPLE TEMP WHEN REC'D AT LAB. (Compliance: 4 +/- 2°C)

SAMPLES REC'D DAY OF COLLECTION ☐ (check for yes)

CONDITION OF BLUE ICE: FROZEN ___ PARTIALLY FROZEN ___ THAWED ___

TO BE COMPLETED BY SAMPLER

COMPANY, UTILITY or PROJECT: GWA

SYSTEM #:

MWH LABS CLIENT CODE:

P.O. # / JOB # / PROJECT:

SAMPLER PRINTED NAME AND SIGNATURE: R. VILLAGOMEZ / [signature]

TAT requested: rush by adv notice only
STD ___ 1 week ___ 3 day ___ 2 day ___ 1 day ___

COMPLIANCE SAMPLES (check for yes) ☑ - Requires state forms ☐
NON-COMPLIANCE SAMPLES (check for yes) ☐
REGULATION INVOLVED: [illegible]
Type of samples (circle one): ROUTINE SPECIAL CONFIRMATION (Phase V, NPDES, FDA,)

SEE ATTACHED BOTTLE ORDER FOR ANALYSES ☑ (check for yes). OR
LIST ANALYSES REQUIRED BELOW (enter number of bottles sent for each test for each sample)

SAMPLE DATE	SAMPLE TIME	SITE NAME OR SAMPLE I.D.	STATION # or LOCATION	MATRIX *	GRAB	COMP	BIOAS	SAMPLER COMMENTS
10/16		N. DET	STT	WW		X	X	

* MATRIX TYPES: RSW = Raw Surface Water; RGW = Raw Ground Water; CFW = Chlor(am)inated Finished Water; FW = Other Finished Water; CWW = Chlorinated Waste Water; WW = Other Waste Water; BW = Bottled Water; SW = Storm Water; SO = Soil; SL = Sludge

	SIGNATURE	PRINT NAME	COMPANY/TITLE	DATE	TIME
RELINQUISHED BY	[signature]	R. VILLAGOMEZ	GWA LAB TECH	10/16/07	
RECEIVED BY	[signature]	C.M.S. DELTON	GWA	10/16/07	
RELINQUISHED BY					
RECEIVED BY					
RELINQUISHED BY					
RECEIVED BY					

CANNED

PAGE ___ OF ___

AGA 3831

MWH Laboratories
A Division of MWH Americas,Inc.
750 Royal Oaks Drive Suite 100
Monrovia, CA 91016-3629
Ph (626) 386-1100 Fax (626) 386-1095

Date 10/19/07

Submittal Form & Purchase Order 99-30017

***REPORTING REQUIREMENTS:** *Do Not Combine Report with any other samples submitted under different MWH project numbers!*
Report & Invoice must have the MWH Project Number **220067** Sub PO# **99-30017** and Job # **1000046**

Report all quality control data according to Method. Include dates analyzed,date extracted (if extracted) and Method reference on the report.
Results must have Complete data & QC with Approval Signature. See reverse side for List of Terms and Conditions

Ship To **Michael Machuzak**
Aquatic Bioassay & Consulting Labs

29 North Olive Street
Ventura, CA 93001

(805) 643-5621 x15 Fax (805) 643-2930

Reports: Elena Montanez / Christine Lewis Sub-contracting Administrator
EMAIL TO: mwhlabs-subcontractreports@mwhglobal.com
MWH Laboratories 750 Royal Oaks Dr. Ste. 100, Monrovia, CA 91016
Phone (626) 386-1118 / 1137 Fax (626) 386-1122
Invoices to: MWH LABORATORIES
Accounts Payable PO BOX 6610, Broomfield, CO 80021

Provide in each Report
the Specified State
Certification # & Exp Date for
requested tests + matrix

GUAM

MWH Project #	Report Due:	Sub PO#
220067	11/03/07	99-30017

ncl

	Use MWH Lab # for ID	Client Sample ID for reference only		Analysis Requested	Sample Date & Time	Matrix	Container
1 BIOAS	2710190360	N DIST STP		Bioassay-CHRON. CERIODAPHNIA	10/16/07	dw	CHECK SUB QUOTE SQ006 FOR CORRECT BOTTLES!SHORT HOLDING TIME!!!!

AGA 3832

...quished by: Sample Control Date 10/19/07 Time MUST HAVE NOTIFICAION IF TEMP IS GREATER THAN 6 OR LESS THAN 2 CELSIUS

Received by: Date Time

An Acknowledgement of Receipt is requested to attn. Christine Lewis

MWH Laboratories, a Division of MWH Americas, Inc.
750 Royal Oaks Avenue Suite 100
Monrovia CA 91016 (626) 386-1100 FAX (626) 386-1124

Bottle Order for Guam Water Authority

Standing

Client Code GWA
Project Code DRINKING
PO# / Job#
Blanket PO 280030-000OP EX 09/30/07

W Weekly
Week 6
Period

Linda Geddes — Your MWL Project Manager
(626) 386-1163 — Direct Phone/Voice Mail

SO# 37040 8338 RS

Sampler: Please Return this Paper with your samples

Created by GJY
0
Order Date 07/02/07

Date Needed by Client

Date Samples to Arrive at MWL

SHIP LOCATION

Ship Sample Kits to
Guam Water Authority
Procurement and Supply Warehouse
Government of Guam
P.O. Box 3010
Agana, Guam 96910

ATTN: Carmen Sian-Denton, Francis
PHONE: (671) 632-9697, 637-2895

Send Report to
Guam Water Authority
Government of Guam
P.O. Box 3010
Agana, Guam 96910

ATTN: Carmen Sian-Denton, Francis
PHONE: (671) 637-2895
FAX: (671) 637-2592

Billing Address
Guam Water Authority
Government of Guam
P.O. Box 3010
Agana, Guam 96910

Quote#
GJY

# of Samples	Tests	Bottles-Qty for each sample, type & preservative if any	UN#	Important Comments
1	BIOAS - TOXICITY TESTING DEFINITIVE CHRON. CERIODAPHNIA WITH 5 DILUTIONS AT 12.5, 25, 50, 75 & 100%	3 1-GAL CUBIETAINERS	1150	

SHIPPING:
Label coolers
ANNUAL W.E. TOXICITY
BAZA Week 9
UMATAC Week 22,
N. DIST Week 31
AGANA Week 44
INCLUDE:
- Extra Blue Ice, COC, TSCA form, Commercial Invoice

SAMPLERS:
CALL MWLABS TWO WORK DAYS PRIOR TO SAMPLING
Collect 3 gals. per site, ONE SITE PER WEEK. Ship directly to the sub lab
Aquatic Bioassay & Consulting Labs
29 North Olive Street
Ventura, CA 93001
attn: Michael Machuzak
(805) 643-5621
- Please describe the test listed above to the right on the COC sent with the samples

ode | Status | Date Shipped | Carrier | Qty of Coolers | Tracking Number | Prepared By

SCANNED

AGA 3833

MWH Laboratories
750 Royal Oaks Drive, Monrovia, CA 91016
PHONE: 626-386-1100/FAX: 626-386-1101

ACKNOWLEDGMENT OF SAMPLES RECEIVED

Guam Water Authority
Government of Guam
P.O. Box 3010
Agana, GU 96910
Attn: Carmen Sian-Denton
Phone: (671) 637-2895

Customer Code: GWA
PO#: 270994-000-OP
Group#: 220067
Project#: DRINKING
Proj Mgr: James C. Hein
Phone: (626) 386-1189

The following samples were received from you on **10/19/07**. They have been scheduled for the tests listed beside each sample. If this information is incorrect, please contact your service representative. Thank you for using MWH Laboratories.

Sample#	Sample Id	Tests Scheduled	Matrix	Sample Date
2710190380	N DIST STP	BIOAS	Water	16-oct-2007

Test Acronym Description

Test Acronym	Description
BIOAS	Bioassay(Sub)

RECEIVED

AGA 3834

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel 626 386 1100
Fax 626 386 1101
1 800 566 LABS (1 800 566 5227)

Report
Comments
#220067

Group Comments

Analytical results for Chronic Ceriodaphnia are submitted by Aquatic Bioassay & Consulting Laboratories Ventura, CA ELAP # 1907

MWH Laboratories
A Division of MWH Americas, Inc

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel 626 386 1100
Fax 626 386 1101
1 800 566 LABS (1 800 566 5227)

Laboratory
Hits Report
#220067

Guam Water Authority
Carmen Sian-Denton
Government of Guam
P.O. Box 3010
Agana , GU 96910

Samples Received
19-oct-2007 15:10:40

Analyzed	Sample#	Sample ID	Result	Federal MCL	UNITS	MRL
	2710190380	N DIST STP				
10/19/07	Bioassay(Sub)		100		%	

SUMMARY OF POSITIVE DATA ONLY.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive Suite 100
Monrovia, California 91016-3629
Tel. 626 386 1100
Fax 626 386 1101
1 800 566 LABS (1 800 566 5227)

Laboratory
Data Report
#220067

Guam Water Authority
Carmen Sian-Denton
Government of Guam
P.O. Box 3010
Agana , GU 96910

Samples Received
10/19/07

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
N DIST STP (2710190380) Sampled on 10/16/07 00:00								
	10/19/07 00:00		(CAC TITLE 22)	Bioassay(Sub)	100	%	0	1

GWA
220067

AQUATIC
BIOASSAY &
CONSULTING
LABORATORIES, INC

TOXICITY TESTING • OCEANOGRAPHIC RESEARCH

November 2, 2007

Ms. Christine Lewis
MWH Laboratories
750 Royal Oaks Dr., Suite 100
Monrovia, CA 910

Dear Ms. Lewis:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013.* Results were as follows:

CLIENT:	MWH Laboratories
SAMPLE ID.:	#2710190380
DATE RECEIVED:	19 Oct – 07
ABC LAB NO.:	MWH1007.329

CHRONIC CERIODAPHNIA SURVIVAL & REPRODUCTION BIOASSAY

SURVIVAL	NOEC =	100.00 %
	TU (c) =	1.00
	IC25 =	>100.00 %
	IC50 =	>100.00 %
REPRODUCTION	NOEC =	100.00 %
	TU (c) =	1.00
	IC25 =	>100.00 %
	IC50 =	>100.00 %

Yours very truly,

Thomas (Tim) Mikel
Laboratory Director

29 NORTH OLIVE STREET, VENTURA, CA 93001 • (805) 643-5621

-7 Day Survival

Start Date:	10/19/2007	Test ID:	MWH1007329	Sample ID:	CA8000027
End Date:	10/26/2007	Lab ID:	CAABC	Sample Type:	EFF1-POTW
Sample Date:	10/16/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	#2710190380				

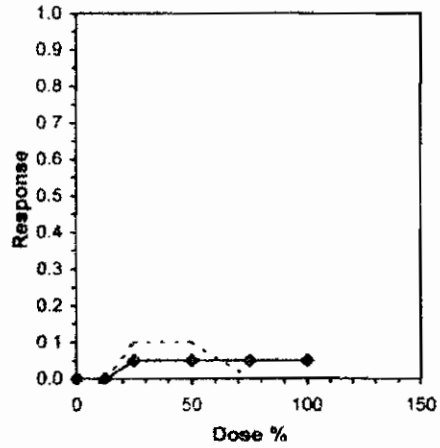
Conc-%	1	2	3	4	5	6	7	8	9	10
N Control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
75	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed Critical	Isotonic Mean	Isotonic N-Mean
N Control	1.0000	1.0000	0	10	10	10			1.0000	1.0000
12.5	1.0000	1.0000	0	10	10	10	1.0000	0.0500	1.0000	1.0000
25	0.9000	0.9000	1	9	10	10	0.5000	0.0500	0.9500	0.9500
50	0.9000	0.9000	1	9	10	10	0.5000	0.0500	0.9500	0.9500
75	1.0000	1.0000	0	10	10	10	1.0000	0.0500	0.9500	0.9500
100	1.0000	1.0000	0	10	10	10	1.0000	0.0500	0.9500	0.9500

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Fisher's Exact Test	100	>100		1
Treatments vs N Control				

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			

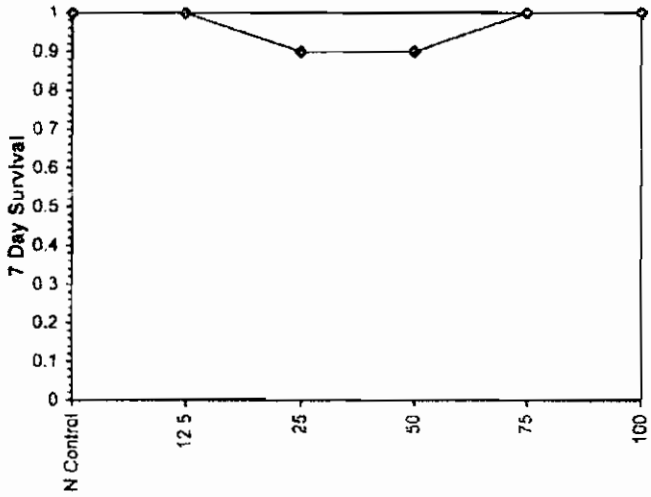


AGA 3839

-7 Day Survival

Start Date:	10/19/2007	Test ID:	MWH1007329	Sample ID:	CA8000027
End Date:	10/26/2007	Lab ID:	CAABC	Sample Type:	EFF1-POTW
Sample Date:	10/16/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	#2710190380				

Dose-Response Plot



ToxCalc v5.0.23

Reviewed by: [illegible]

AGA 3840

-Reproduction

Start Date:	10/19/2007	Test ID:	MWH1007329	Sample ID:	CA8000027
End Date:	10/26/2007	Lab ID:	CAABC	Sample Type:	EFF1-POTW
Sample Date:	10/16/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	#2710190380				

Conc-%	1	2	3	4	5	6	7	8	9	10
N Control	36.000	26.000	19.000	30.000	27.000	33.000	23.000	30.000	32.000	36.000
12.5	27.000	27.000	32 000	34 000	44.000	38.000	42.000	43.000	27.000	36.000
25	10.000	30.000	21 000	22.000	36.000	20.000	23.000	21.000	25.000	25 000
50	24.000	24.000	24.000	22 000	24.000	34.000	30.000	31.000	9.000	49.000
75	17 000	19.000	19 000	28.000	31.000	32 000	24.000	27.000	30 000	27.000
100	26.000	30.000	24 000	14.000	20.000	27 000	27.000	25.000	26.000	26.000

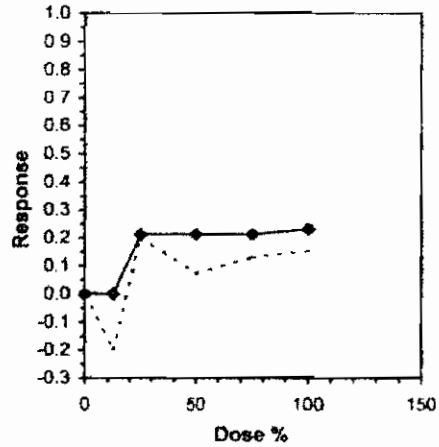
			Transform: Untransformed						1-Tailed		Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
N Control	29.200	1.0000	29.200	19.000	36.000	18.882	10				32 100	1.0000
12 5	35.000	1 1986	35 000	27.000	44.000	19.190	10	-1.911	2.287	6.940	32 100	1.0000
25	23.300	0.7979	23.300	10.000	36.000	29.042	10	1.944	2.287	6 940	25.267	0.7871
50	27.100	0.9281	27.100	9.000	49.000	37.770	10	0.692	2.287	6.940	25.267	0.7871
75	25.400	0 8699	25.400	17.000	32.000	21.258	10	1.252	2.287	6.940	25.267	0.7871
100	24 700	0.8459	24.700	14 000	30.000	18 607	10	1.483	2 287	6.940	24.700	0 7695

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0 01)	0.698	1.035	0.15635	1 79636
Bartlett's Test indicates equal variances (p = 0.19)	7.39363	15.0863		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	6.94013	0.23768	178.35	46.0574	0.00452	5, 54
Treatments vs N Control										

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL		Skew
IC05	15.436	1.359	14.663	19.516	2.6407
IC10	18.372	9.044	16 861	52.784	4.7362
IC15	21.308				
IC20	24.244				
IC25	>100				
IC40	>100				
IC50	>100				



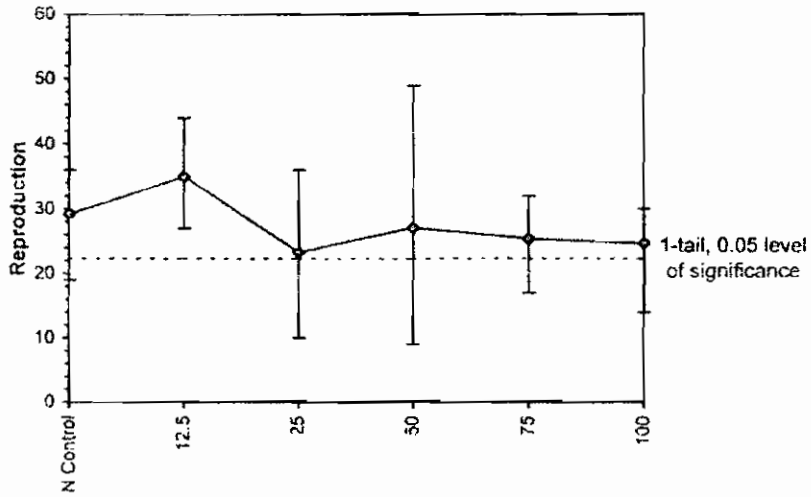
 ToxCalc v5 0.23 Reviewed by:

AGA 3841

-Reproduction

Start Date:	10/19/2007	Test ID:	MWH1007329	Sample ID:	CA8000027
End Date:	10/26/2007	Lab ID:	CAABC	Sample Type:	EFF1-POTW
Sample Date.	10/16/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments	#2710190380				

Dose-Response Plot



AGA 3842

-Reproduction

Start Date:	10/19/2007	Test ID:	MWH1007329	Sample ID:	CA8000027
End Date:	10/26/2007	Lab ID:	CAABC	Sample Type:	EFF1-POTW
Sample Date.	10/16/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	#2710190380				

Auxiliary Data Summary

Conc-%	Parameter	Mean	Min	Max	SD	CV%	N
N Control	Temp C	24.20	24.00	25.00	0.34	2.42	8
12.5		24.25	24.00	25.00	0.35	2.46	8
25		24.25	24.00	25.00	0.35	2.43	8
50		24.28	24.00	25.00	0.36	2.46	8
75		24.31	24.00	24.90	0.37	2.51	8
100		24.35	24.00	24.90	0.41	2.64	8
N Control	pH	8.16	8.00	8.30	0.15	4.75	8
12.5		7.91	7.80	8.00	0.08	3.65	8
25		7.80	7.60	7.90	0.11	4.19	8
50		7.74	7.50	7.90	0.16	5.17	8
75		7.71	7.40	8.00	0.21	5.94	8
100		7.65	7.30	8.00	0.24	6.47	8
N Control	Dissolved Oxygen	7.38	6.60	8.00	0.42	8.75	8
12.5		6.09	4.30	7.90	1.27	18.52	8
25		5.98	4.20	8.10	1.42	19.97	8
50		5.90	4.10	8.20	1.48	20.62	8
75		4.98	0.20	8.10	2.36	30.90	8
100		5.78	4.00	8.10	1.55	21.54	8
N Control	Hardness mg/L	89.75	86.00	92.00	3.11	1.96	8
12.5		0.00	0.00	0.00	0.00		0
25		0.00	0.00	0.00	0.00		0
50		0.00	0.00	0.00	0.00		0
75		0.00	0.00	0.00	0.00		0
100		168.00	168.00	168.00	0.00	0.00	8
N Control	Alkalinity mg/L	64.38	60.00	67.00	3.62	2.96	8
12.5		0.00	0.00	0.00	0.00		0
25		0.00	0.00	0.00	0.00		0
50		0.00	0.00	0.00	0.00		0
75		0.00	0.00	0.00	0.00		0
100		220.00	220.00	220.00	0.00	0.00	8
N Control	Conductivity	346.63	318.00	362.00	13.78	1.07	8
12.5		414.38	360.00	475.00	43.58	1.59	8
25		488.50	391.00	525.00	55.66	1.53	8
50		562.50	487.00	601.00	42.95	1.17	8
75		650.63	585.00	699.00	41.33	0.99	8
100		753.13	689.00	781.00	31.41	0.74	8

MWH Laboratories
A Division of MWH Americas,Inc.
750 Royal Oaks Drive Suite 100
Monrovia, CA 91016-3629
Ph (626) 386 1100 Fax (626) 386-1095

Date 10/19/07

Submittal Form & Purchase Order 99-30017

*REPORTING REQUIREMENTS: *Do Not Combine Report with any other samples submitted under different MWH project numbers!*
Report & Invoice must have the MWH Project Number 220067 Sub PO# 99-30017 and Job # 1000046

Report all quality control data according to Method, Include dates analyzed, (date extracted (if extracted) and Method reference on the report
Results must have Complete data & QC with Approval Signature. See reverse side for List of Terms and Conditions

Ship To **Michael Machuzak**
Aquatic Bioassay & Consulting Labs

29 North Olive Street
Ventura, CA 93001

(805) 643-5621 x15 Fax (805) 643-2930

Reports: Elena Montanez / Christine Lewis Sub-contracting Administrator
EMAIL TO: mwhlabs-subcontractreports@mwhglobal.com
MWH Laboratories 750 Royal Oaks Dr. Ste. 100, Monrovia, CA 91016
Phone (626) 386-1118 / 1137 Fax (626) 386-1122
Invoices to: MWH LABORATORIES
Accounts Payable PO BOX 6610, Broomfield, CO 80021

Provide if each Report
the Specified State
Certification # & Exp Date for
requested tests + matrix

GUAM

MWH Project #	Report Due:	Sub PO#
220067	11/03/07	99-30017

ncl

		Client Sample ID for reference only	Analysis Requested	Sample Date & Time	Matrix	Container
BIOAS	2710190380	N DIST STP	Bioassay-CHRON CERIODAPHNIA	10/16/07	dw	[illegible]

Checked [illegible]
Temp & Receipt 8.2°C

Relinquished by: Sample Control Date 10/19/07 Time

Received by: [illegible] Date 10-19-07 Time [illegible]

MUST HAVE NOTIFICAION IF TEMP IS GREATER THAN 6 OR LESS THAN 2 CELSIUS
Page 1
An Acknowledgement of Receipt is requested to attn. Christine Lewis

AGA 3844

MWH Laboratories

MONTGOMERY WATSON HARZA

750 Royal Oaks, Suite 100
Monrovia, California 91016
Phone: (626) 386-1100
(800) 566-5227
Fax: (626) 386-1101

CHAIN OF CUSTODY RECORD

MWH LABS USE ONLY

LOGIN COMMENTS:

SAMPLES CHECKED AGAINST COC BY:

SAMPLES LOGGED IN BY:

SAMPLE TEMP WHEN REC'D AT LAB: (Compliance 4 +/- 2°C)

SAMPLES REC'D DAY OF COLLECTION ☐ (check for yes)

CONDITION OF BLUE ICE: FROZEN ___ PARTIALLY FROZEN ___ THAWED ___

(check for yes) (check for yes)

PARTITIONED BY SAMPLER

PROJECT: GWA

SYSTEM #

COMPLIANCE SAMPLES ✓ NON-COMPLIANCE SAMPLES ☐

Requires state forms ☐ REGULATION INVOLVED: (Clean Water Act, NPDES, FDA,)

Type of samples (circle one) ROUTINE SPECIAL CONFIRMATION

PROJECT MANAGER

PO # / JOB # / PROJECT

SEE ATTACHED BOTTLE ORDER FOR ANALYSES ✓ (check for yes), OR

LIST ANALYSES REQUIRED BELOW (enter number of bottles sent for each test for each sample)

SAMPLER PRINTED NAME AND SIGNATURE: R. VILLAGOMEZ

TAT requested: rush by adv notice only

STD ___ 1 week ___ 3 day ___ 2 day ___ 1 day ___

SAMPLE DATE	SAMPLE TIME	SITE NAME OR SAMPLE I.D.	STATION # or LOCATION	MATRIX *	GRAB	COMP	BIOAS									SAMPLER COMMENTS
10/16		N. DST	STT	WW		X	X									

* MATRIX TYPES: RSW - Raw Surface Water; RGW - Raw Ground Water; CFW - Chlorinated Finished Water; FW - Other Finished Water; CWW - Chlorinated Waste Water; WW - Other Waste Water; BW - Bottled Water; SW - Storm Water; SO - Soil; SL - Sludge

	SIGNATURE	PRINT NAME	COMPANY/TITLE	DATE	TIME
RELINQUISHED BY		R. VILLAGOMEZ	GWA LAB TECH	10/16/07	
RECEIVED BY		CHRIS DENTON	CWTX	10/16/07	
RELINQUISHED BY					
RECEIVED BY		E. MATUNG	AQUATIC BIOASSAY	10-19-07	1130
RELINQUISHED BY					
RECEIVED BY					

COC # ____

TEMP @ RECEIPT: 8.8 °C (Acceptable ≤ 20.)

PAGE ___ OF ___

AGA 3845

MWH Laboratories, a Division of MWH Americas, Inc.
750 Royal Oaks Avenue Suite 100
Monrovia CA 91016 (626) 386-1100 FAX (626) 386-1124

Bottle Order for Guam Water Authority

Standing

Client Code GWA
Project Code DRINKING
PO# / Job#
Blanket PO 280039-000OP EX 09/30/07

W Weekly
Week 6

Period

Linda Geddes Your MWL Project Manager
(626) 386-1163 Direct Phone/Voice Mail

SO# 37040 6326 RS

0

Sampler: Please Return this Paper with your samples

Created by GJY
Order Date 07/02/07

Date Needed by Client

Date Samples to Arrive at MWL

SHIP LOCATION

Ship Sample Kits to
Guam Water Authority
Procurement and Supply Warehouse
Government of Guam
P.O. Box 3010
Agana, Guam 96910

ATTN: Carmen Sian-Denton, Francis
PHONE: (671) 632-9697, 637-2895

Send Report to
Guam Water Authority
Government of Guam
P.O. Box 3010
Agana, Guam 96910

ATTN: Carmen Sian-Denton, Francis
PHONE: (671) 637-2895
FAX: (671) 637-2592

Billing Address
Guam Water Authority
Government of Guam
P.O. Box 3010
Agana, Guam 96910

Quote#
GJY

# of Samples	Tests	Bottles-Qty for each sample, type & preservative if any	UN#
1	BIOAS - TOXICITY TESTING DEFINITIVE CHRON. CERIODAPHNIA WITH 5 DILUTIONS AT 12.5, 25, 50, 75 & 100%	3 1-GAL CUBIETAINERS	1150

Important Comments

SHIPPING:
Label coolers
ANNUAL W.E. TOXICITY
BAZA Week 9
UMATAC Week 22,
N. DIST Week 31
AGANA Week 44
INCLUDE:
- Extra Blue Ice, COC, TSCA form, Commercial Invoice

SAMPLERS:
CALL MWLABS TWO WORK DAYS PRIOR TO SAMPLING
Collect 3 gals per site, ONE SITE PER WEEK. Ship directly to the sub lab
Aquatic Bioassay & Consulting Labs
29 North Olive Street
Ventura, CA 93001
attn Michael Machuzak
(805) 643-5621
- Please describe the test listed above to the right on the COC sent with the samples

ActiveCode Status Date Shipped Carrier Qty of Coolers Tracking Number Prepared By

AGA 3846

TOXIC SUBSTANCE CONTROL ACT (TSCA) CERTIFICATION

DATE: 10 / 16 / 07

(CHECK ONE SECTION ONLY)

POSITIVE CERTIFICATION:

X "I CERTIFY THAT ALL CHEMICAL SUBSTANCES IN THIS SHIPMENT COMPLY WITH ALL APPLICABLE RULES OR ORDERS UNDER TSCA AND THAT I AM NOT OFFERING A CHEMICAL SUBSTANCE FOR ENTRY IN VIOLATION OF TSCA OR ANY APPLICABLE RULE OR ORDER THEREUNDER."

- OR -

NEGATIVE CERTIFICATION:

____ "I CERTIFY THAT ALL CHEMICALS IN THIS SHIPMENT ARE NOT SUBJECT TO TSCA."

COMPANY NAME: MWH Laboratory

COMPANY ADDRESS: 750 Royal Oaks Drive, Suite #100, Monrovia, CA. 91016

AUTHORIZED NAME:

AUTHORIZED SIGNATURE: James C. Hi

TITLE:

AWB#: 754 2361 433

RETURN TO:

IF THE CERTIFIER IS UNSURE IF THEIR CHEMICAL SUBSTANCE IS SUBJECT TO TSCA COMPLIANCE, CONTACT THE ENVIRONMENTAL PROTECTION AGENCY, TSCA ASSISTANCE OFFICE, WASHINGTON, D.C., (202) 554-1404 BETWEEN 8:30 AM AND 5:00 PM EST.

REVISED May 7, 1990 toxic.392

AQUATIC
BIOASSAY &
CONSULTING
LABORATORIES, INC

TOXICITY TESTING • OCEANOGRAPHIC RESEARCH

CHRONIC CERIODAPHNIA SURVIVAL AND REPRODUCTION BIOASSAY

DATE: 11 October - 07

STANDARD TOXICANT: Copper Chloride

ENDPOINT: SURVIVAL

NOEC = 5.00 ug/l

IC25 = 4.67 ug/l
IC50 = 6.43 ug/l

ENDPOINT: REPRODUCTION

NOEC = 5.00 ug/l

IC25 = 4.22 ug/l
IC50 = 5.75 ug/l

Yours very truly,

Thomas (Tim) Mikel
Laboratory Director

29 NORTH OLIVE STREET, VENTURA, CA 93001 • (805) 643-5621

-7 Day Survival

Start Date:	10/11/2007	Test ID:	CER101107	Sample ID:	CA0000000
End Date:	10/18/2007	Lab ID:	CAABC	Sample Type:	CUCL-Copper chloride
Sample Date:	10/11/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	Standard Toxicant				

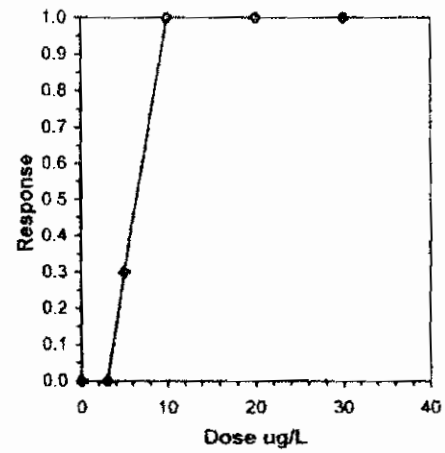
Conc-ug/L	1	2	3	4	5	6	7	8	9	10
N Control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
3	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
5	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
30	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Conc-ug/L	Mean	N-Mean	Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed Critical	Isotonic Mean	Isotonic N-Mean
N Control	1.0000	1.0000	0	10	10	10			1.0000	1.0000
3	1.0000	1.0000	0	10	10	10	1.0000	0.0500	1.0000	1.0000
5	0.7000	0.7000	3	7	10	10	0.1053	0.0500	0.7000	0.7000
10	0.0000	0.0000	10	0	10	10			0.0000	0.0000
20	0.0000	0.0000	10	0	10	10			0.0000	0.0000
30	0.0000	0.0000	10	0	10	10			0.0000	0.0000

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Fisher's Exact Test	5	10	7.07107	
Treatments vs N Control				

Linear Interpolation (200 Resamples)

Point	ug/L	SD	95% CL		Skew
IC05	3.3333	0.4318	3.1667	5.2500	2.8097
IC10	3.6667	0.5798	3.3333	5.5000	1.4287
IC15	4.0000	0.6063	3.5000	5.7500	0.9161
IC20	4.3333	0.6512	3.6667	6.0000	0.4688
IC25	4.6667	0.6735	3.8333	6.2500	0.2857
IC40	5.7143	0.7566	4.3333	7.0000	-0.2615
IC50	6.4286	0.7797	4.6667	7.5000	-0.7397



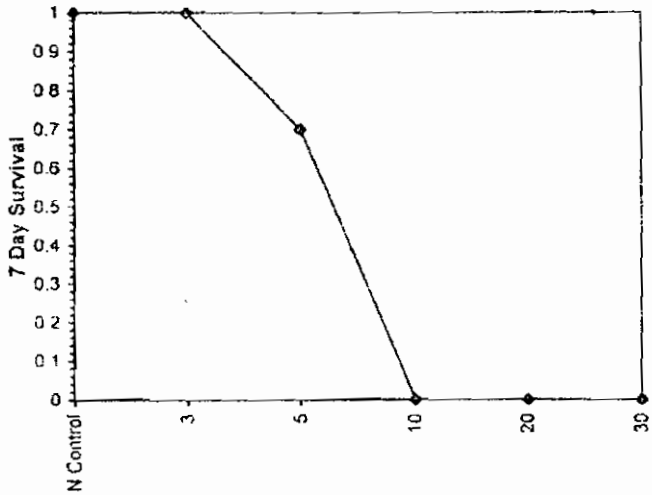
 ToxCalc v5.0.23 Reviewed by

AGA 3849

-7 Day Survival

Start Date:	10/11/2007	Test ID:	CER101107	Sample ID:	CA0000000
End Date:	10/18/2007	Lab ID:	CAABC	Sample Type:	CUCL-Copper chloride
Sample Date:	10/11/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	Standard Toxicant				

Dose-Response Plot



ToxCalc v5.0.23

Reviewed by: CO

AGA 3850

-Reproduction

Start Date:	10/11/2007	Test ID:	CER101107	Sample ID:	CA0000000
End Date:	10/18/2007	Lab ID:	CAABC	Sample Type:	CUCL-Copper chloride
Sample Date:	10/11/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	Standard Toxicant				

Conc-ug/L	1	2	3	4	5	6	7	8	9	10
N Control	16.000	13.000	13.000	22.000	25.000	18.000	14.000	10.000	15.000	15.000
3	24.000	29.000	23.000	23.000	34.000	5.000	16.000	33.000	16.000	20.000
5	13.000	9.000	0.000	21.000	28.000	24.000	2.000	0.000	2.000	14.000
10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

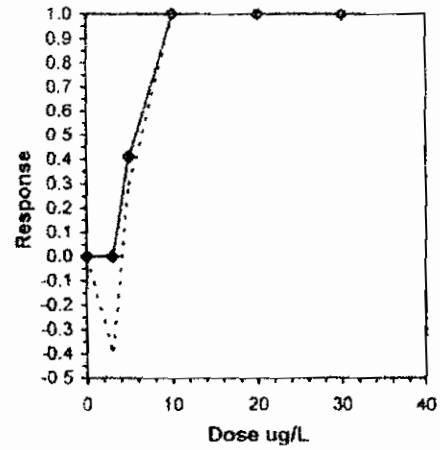
			Transform: Untransformed						1-Tailed		isotonic	
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
N Control	16.100	1.0000	16.100	10.000	25.000	27.847	10				19.200	1.0000
3	22.300	1.3851	22.300	5.000	34.000	39.096	10	-1.678	1.999	7.386	19.200	1.0000
5	11.300	0.7019	11.300	0.000	28.000	92.255	10	1.299	1.999	7.386	11.300	0.5885
10	0.000	0.0000	0.000	0.000	0.000	0.000	10				0.000	0.0000
20	0.000	0.0000	0.000	0.000	0.000	0.000	10				0.000	0.0000
30	0.000	0.0000	0.000	0.000	0.000	0.000	10				0.000	0.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.98272	0.9	0.08737	-0.2286
Bartlett's Test indicates equal variances (p = 0.06)	5.5757	9.21035		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	5	10	7.07107		7.38578	0.45874	304.133	68.263	0.02128	2, 27
Treatments vs N Control										

Linear Interpolation (200 Resamples)

Point	ug/L	SD	95% CL		Skew
IC05	3.2430	0.3604	3.1427	5.0094	3.6073
IC10	3.4861	0.4193	3.2853	5.2720	2.8027
IC15	3.7291	0.5002	3.4289	5.5347	1.9886
IC20	3.9722	0.5647	3.5718	5.7973	1.5618
IC25	4.2152	0.6175	3.7148	6.0600	1.2971
IC40	4.9443	0.7798	4.1436	6.8480	0.8128
IC50	5.7522	0.8979	4.4295	7.3733	0.4283



ToxCalc v5.0.23

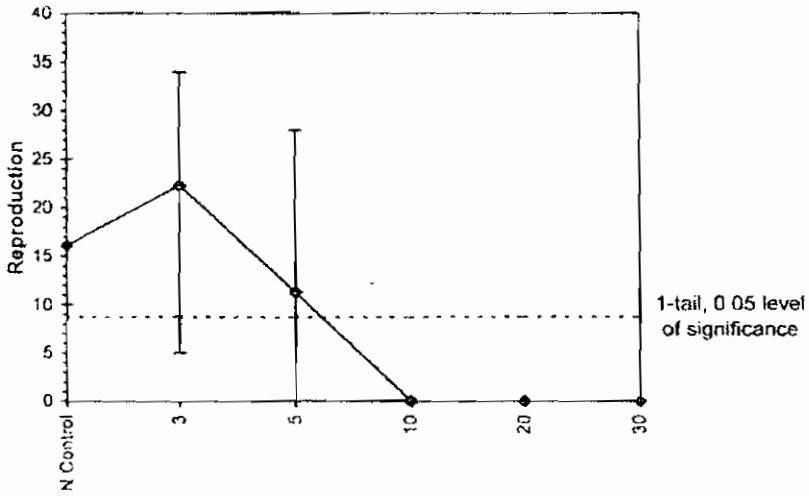
Reviewed by: BC

AGA 3851

-Reproduction

Start Date:	10/11/2007	Test ID:	CER101107	Sample ID:	CA0000000
End Date:	10/18/2007	Lab ID:	CAABC	Sample Type:	CUCL-Copper chloride
Sample Date:	10/11/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	Standard Toxicant				

Dose-Response Plot



ToxCalc v5 0.23

Reviewed by

AGA 3852

-Reproduction

Start Date:	10/11/2007	Test ID:	CER101107	Sample ID:	CA0000000
End Date:	10/18/2007	Lab ID:	CAABC	Sample Type:	CUCL-Copper chloride
Sample Date:	10/11/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	Standard Toxicant				

Auxiliary Data Summary

Conc-ug/L	Parameter	Mean	Min	Max	SD	CV%	N
N Control	Temp C	24.33	24.00	24.80	0.35	2.44	8
3		24.33	24.00	24.80	0.35	2.44	8
5		24.33	24.00	24.80	0.35	2.44	8
10		24.43	24.00	24.80	0.34	2.40	6
20		24.43	24.00	24.80	0.34	2.40	6
30		24.43	24.00	24.80	0.34	2.40	6
N Control	pH	8.29	8.20	8.30	0.04	2.27	8
3		8.05	7.80	8.20	0.15	4.83	8
5		8.06	7.90	8.20	0.12	4.27	8
10		6.68	0.10	8.20	3.23	26.88	6
20		8.02	7.80	8.20	0.15	4.79	6
30		8.00	7.80	8.20	0.15	4.92	6
N Control	DO mg/L	6.99	6.10	7.60	0.47	9.78	8
3		6.65	6.10	7.40	0.44	10.02	8
5		6.73	6.20	7.50	0.38	9.18	8
10		6.77	6.20	7.60	0.47	10.11	6
20		6.80	6.20	7.60	0.45	9.88	6
30		6.80	6.10	7.60	0.48	10.21	6
N Control	Hardness mg/L	93.25	89.00	98.00	3.11	1.89	8
3		0.00	0.00	0.00	0.00		0
5		0.00	0.00	0.00	0.00		0
10		0.00	0.00	0.00	0.00		0
20		0.00	0.00	0.00	0.00		0
30		91.00	91.00	91.00	0.00	0.00	6
N Control	Cond umhos	341.38	330.00	347.00	5.29	0.67	8
3		345.38	337.00	359.00	10.06	0.92	8
5		330.50	321.00	344.00	8.47	0.88	8
10		328.80	321.00	338.00	6.72	0.79	5
20		326.40	322.00	333.00	4.83	0.67	5
30		332.83	330.00	338.00	2.79	0.50	6
N Control	Alkalinity mg/L	63.25	60.00	67.00	2.66	2.58	8
3		0.00	0.00	0.00	0.00		0
5		0.00	0.00	0.00	0.00		0
10		0.00	0.00	0.00	0.00		0
20		0.00	0.00	0.00	0.00		0
30		65.00	65.00	65.00	0.00	0.00	6

MWH Laboratories
A Division of MWH Americas, Inc

750 Royal Oaks Drive Suite 100
Monrovia, California 91016-3629
Tel 626 386 1100
Fax 626 386 1101
(800 566 LABS (1 800 566 5227)

Laboratory Report

for

Guam Water Authority
Government of Guam

P.O. Box 3010

Agana , GU 96910

Attention: Carmen Sian-Denton
Fax: (671) 637-2592

DATE OF ISSUE
MWH LABORATORIES

RCZ Rick Zimmer
Project Manager

ACCREDITED IN ACCORDANCE WITH nelac 01114CA

Report#: 225061
Project: WASTEWATER

Laboratory certifies that the test results meet all **NELAC** requirements unless noted in the Comments section or the Case Narrative. Following the cover page are Comments,Data Report,Hits Report, totaling 3 page[s].

MWH Laboratories
MONTGOMERY WATSON HARZA

CHAIN OF CUSTODY RECORD

750 Royal Oaks, Suite 100
Monrovia, California 91016
Phone: (626) 386-1100
(800) 566-5227
Fax: (626) 386-1101

MWH LABS USE ONLY: PAGE 2 OF 2

LOGIN COMMENTS: _____

SAMPLES CHECKED AGAINST COC BY: _____

SAMPLES LOGGED IN BY: _____

SAMPLE TEMP WHEN REC'D AT LAB: _____ (Compliance: 4 +/- 2°C)

SAMPLES REC'D DAY OF COLLECTION? ☐ (check for yes)

CONDITION OF BLUE ICE: FROZEN ___ PARTIALLY FROZEN ___ THAWED ___

TO BE COMPLETED BY SAMPLER:

COMPANY, UTILITY or PROJECT: GUAM WATER WORKS AUTHORITY

SYSTEM #:

COMPLIANCE SAMPLES ☒ (check for yes) - Requires state forms ☐

NON-COMPLIANCE SAMPLES ☐ (check for yes)

REGULATION INVOLVED:

Type of samples (circle one): ROUTINE SPECIAL CONFIRMATION (eg. SDWA, Phase V, NPDES, FDA....)

MWH LABS CLIENT CODE:

P.O.# / JOB # / PROJECT :

SEE ATTACHED BOTTLE ORDER FOR ANALYSES ☑ (check for yes), OR

IST ANALYSES REQUIRED BELOW (enter number of bottles sent for each test for each sample

SAMPLER PRINTED NAME AND SIGNATURE: A. DUENAS

TAT requested: rush by adv notice only

STD ___ 1 week ___ 3 day ___ 2 day ___ 1 day ___

SAMPLE DATE	SAMPLE TIME	STATION # or LOCATION	SITE NAME OR SAMPLE I.D.	MATRIX *	GRAB	COMP		SAMPLER COMMENTS
12/11		AGANA STP.				X	BIOASSAY — DEF CHLON CERIODAPHNIA	5 dil.
								12.5
								25
								50
								75
								100 %

* MATRIX TYPES: RSW = Raw Surface Water; RGW = Raw Ground Water; CFW = Chlor(am)inated Finished Water; FW = Other Finished Water; CWW = Chlorinated Waste Water; WW = Other Waste Water; BW = Bottled Water; SW = Storm Water; SO = Soil; SL = Sludge

	SIGNATURE	PRINT NAME	COMPANY/TITLE	DATE	TIME
RELINQUISHED BY:	[signature]	A. DUENAS	GWA LAB TECH II	12/11/07	3:30
RECEIVED BY:	[signature]	CMSDENTON	GWA	12/11/07	3:30
RELINQUISHED BY:					
RECEIVED BY:	Ematurino	E. MATURINO	AQUATIC BIOASSAY	12/13/07	1130
RELINQUISHED BY:					
RECEIVED BY:					

Page 1

TEMP. @ RECEIPT = 4.6°C
CHLORINE = 20 !

C-O-C#

PAGE ___ OF

AGA 3855

TOXIC SUBSTANCE CONTROL ACT (TSCA) CERTIFICATION

DATE: 12 / 11 / 07

(CHECK ONE SECTION ONLY)

POSITIVE CERTIFICATION:

X "I CERTIFY THAT ALL CHEMICAL SUBSTANCES IN THIS SHIPMENT COMPLY WITH ALL APPLICABLE RULES OR ORDERS UNDER TSCA AND THAT I AM NOT OFFERING A CHEMICAL SUBSTANCE FOR ENTRY IN VIOLATION OF TSCA OR ANY APPLICABLE RULE OR ORDER THEREUNDER."

- OR -

NEGATIVE CERTIFICATION:

_____ "I CERTIFY THAT ALL CHEMICALS IN THIS SHIPMENT ARE NOT SUBJECT TO TSCA."

COMPANY NAME: MWH AMERICAS

COMPANY ADDRESS: 750 Royal Oaks Drive, Suite #100, Monrovia, CA. 91016

AUTHORIZED NAME: James C. Hein

AUTHORIZED SIGNATURE: James C. Hein

TITLE:

AWB#: 754 2361 455

RETURN TO:

IF THE CERTIFIER IS UNSURE IF THEIR CHEMICAL SUBSTANCE IS SUBJECT TO TSCA COMPLIANCE, CONTACT THE ENVIRONMENTAL PROTECTION AGENCY, TSCA ASSISTANCE OFFICE, WASHINGTON, D.C., (202) 554-1404 BETWEEN 8:30 AM AND 5:00 PM EST.

REVISED May 7, 1990 toxic.392

MWH Laboratories, a Division of MWH Americas, Inc.
750 Royal Oaks Avenue Suite 100
Monrovia CA 91016 (626) 386-1100 FAX (626) 386-1124

Bottle Order for Guam Water Authority

Standing

Client Code GWA
Project Code DRINKING
PO# / Job#
Blanket PO 270086-000OP EX 09/30/06

W Weekly
Week 6
Period

Linda Geddes Your MWL Project Manager
(626) 386-1163 Direct Phone/Voice Mail

SO# 28444 8328 RS
0

Sampler: Please Return this Paper with your samples

Created by
Order Date 01/30/06
Date Needed by Client
Date Samples to Arrive at MWL
SHIP LOCATION

Ship Sample Kits to
Guam Water Authority
Procurement and Supply Warehouse
Government of Guam
P.O. Box 3010
Agana, Guam 96910

ATTN: Carmen Sian-Denton, Francis
PHONE: (671) 632-9697, 637-2895

Send Report to
Guam Water Authority
Government of Guam
P.O. Box 3010
Agana, Guam 96910

ATTN: Carmen Sian-Denton, Francis
PHONE: (671) 637-2895
FAX: (671) 637-2592

Billing Address
Guam Water Authority
Government of Guam
P.O. Box 3010
Agana, Guam 96910

Quote#

# of Samples	Tests	Bottles-Qty for each sample, type & preservative if any	UN#
4	BIOAS - TOXICITY TESTING DEFINITIVE CHRON. CERIODAPHNIA WITH 5 DILUTIONS AT 12.5, 25, 50, 75 & 100%	3 1-GAL CUBIETAINERS	1150

Important Comments

SHIPPING:
Label coolers:
ANNUAL W.E. TOXICITY BAZA, UMATAC, NORTHERN DISTRICT, AGANA
INCLUDE:
- Extra Blue Ice, COC, TSCA form, Commercial Invoice

SAMPLERS:
CALL MWLABS TWO WORK DAYS PRIOR TO SAMPLING
Collect 3 gals. per site, ONE SITE PER WEEK. Ship directly to the sub lab:
Aquatic Bioassay & Consulting Labs
29 North Olive Street
Ventura, CA 93001
attn: Michael Machuzak
(805) 643-5621
- Please describe the test listed above to the right on the COC sent with the samples

tiveCode	Status	Date Shipped	Carrier	Qty of Coolers	Tracking Number	Prepared By

AGA 3857

MWH Laboratories
A Division of MWH Americas, Inc

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel 626 386 1100
Fax 626 386 1101
1 800 566 LABS (1 800 566 5227)

Laboratory
Data Report
#225061

Guam Water Authority
Carmen Sian-Denton
Government of Guam
P.O. Box 3010
Agana , GU 96910

Samples Received
12/13/07

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
AGANA STP (2712140015) Sampled on 12/10/07 00:00								
	12/13/07 00:00		(CAC TITLE 22)	Bioassay(Sub)	75	%	0	1

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive Suite 100
Monrovia, California 91016-3629
Tel 626 386 1100
Fax 626 386 1101
1 800 568 LABS (1 800 566 5227)

Report
Comments
#225061

Group Comments

Analytical results for Chronic Ceriodaphnia are submitted by Aquatic Bioassay & Consulting Laboratories Ventura, CA ELAP # 1907

MWH Laboratories
A Division of MWH Americas,Inc.
750 Royal Oaks Drive Suite 100
Monrovia, CA 91016-3629
Ph (626) 386-1100 Fax (626) 386-1095

Date 12/14/07

Submittal Form & Purchase Order 99-30610

*REPORTING REQUIREMENTS: *Do Not Combine Report with any other samples submitted under different MWH project numbers!*
Report & Invoice must have the MWH Project Number 225061 Sub PO# 99-30610 and Job # 1000046

Report all quality control data according to Method. Include dates analyzed, date extracted (if extracted) and Method reference on the report.
Results must have Complete data & QC with Approval Signature. See reverse side for List of Terms and Conditions

Reports: Elena Montanez / Christine Lewis Sub-contracting Administrator
EMAIL TO: mwhlabs-subcontractreports@mwhglobal.com
MWH Laboratories 750 Royal Oaks Dr. Ste. 100, Monrovia, CA 91016
Phone (626) 386-1118 / 1137 Fax (626) 386-1122
Invoices to: MWH LABORATORIES
Accounts Payable PO BOX 6610, Broomfield, CO 80021

Provide in each Report the Specified State Certification # & Exp Date for requested tests + matrix

GUAM

Ship To Michael Machuzak
Aquatic Bioassay & Consulting Labs
North Olive Street
Ventura, CA 93001

(805) 643-5621 x15 Fax (805) 643-2930

MWH Project #	Report Due:	Sub PO#
225061	12/29/07	99-30610

incl

MWH Lab # for ID	Client Sample ID for reference only	Analysis Requested	Sample Date & Time	Matrix	Container
BIOAS	2712140015 AGANA STP	Bioassay - Ceriodaphnia Larvae	12/10/07	dw	CHECK SUB QUOTE SQ006 FOR CORRECT BOTTLES!SHORT HOLD TIME!!!

Chlorine = <0.1
Temp @ receipt = 4.6°C

Relinquished by: Sample Control Date 12/14/07 Time MUST HAVE NOTIFICAION IF TEMP IS GREATER THAN 6 OR LESS THAN 2 CELSIUS
Page 1
Received by: Date 12-17-07 Time 1133 An Acknowledgement of Receipt is requested to attn: Christine Lewis

T-014 P.01/01 F-276
6263861101
MWH LABORATORIES
AGA 3860

GWA
225061

AQUATIC
BIOASSAY &
CONSULTING
LABORATORIES, INC.

TOXICITY TESTING • OCEANOGRAPHIC RESEARCH

December 31, 2007

Ms. Christine Lewis
MWH Laboratories
750 Royal Oaks Dr., Suite 100
Monrovia, CA 910

Dear Ms. Lewis:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013.* Results were as follows:

CLIENT:	MWH Laboratories
SAMPLE ID.:	#2712140015
DATE RECEIVED:	13 Dec – 07
ABC LAB NO.:	MWH1207.255

CHRONIC CERIODAPHNIA SURVIVAL & REPRODUCTION BIOASSAY

SURVIVAL	NOEC =	75.00 %
	TU (c) =	1.33
	IC25 =	70.83 %
	IC50 =	91.67 %
REPRODUCTION	NOEC =	50.00 %
	TU (c) =	2.00
	IC25 =	41.59 %
	IC50 =	57.29 %

Yours very truly,

Thomas (Tim) Mikel
Laboratory Director

29 NORTH OLIVE STREET, VENTURA, CA 93001 • (805) 643-5621

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date:	12/13/2007	Test ID:	MWH1207255	Sample ID:	CA8000027
End Date:	12/20/2007	Lab ID:	CAABC	Sample Type:	EFF1-POTW
Sample Date:	12/10/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	#2712140015 (Agana STP)				

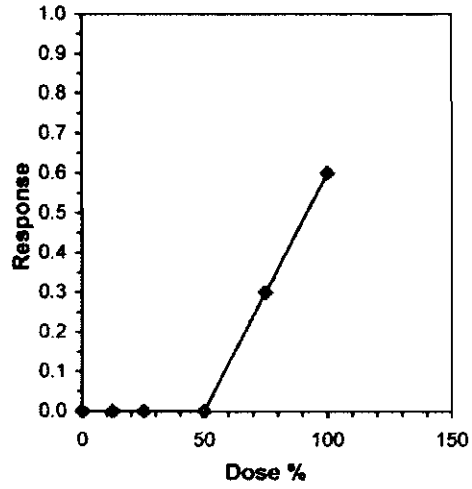
Conc-%	1	2	3	4	5	6	7	8	9	10
N Control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
75	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
100	0.0000	0.0000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000	0.0000	0.0000

Conc-%	Mean	N-Mean	Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed Critical	Isotonic Mean	Isotonic N-Mean
N Control	1.0000	1.0000	0	10	10	10			1.0000	1.0000
12.5	1.0000	1.0000	0	10	10	10	1.0000	0.0500	1.0000	1.0000
25	1.0000	1.0000	0	10	10	10	1.0000	0.0500	1.0000	1.0000
50	1.0000	1.0000	0	10	10	10	1.0000	0.0500	1.0000	1.0000
75	0.7000	0.7000	3	7	10	10	0.1053	0.0500	0.7000	0.7000
*100	0.4000	0.4000	6	4	10	10	0.0054	0.0500	0.4000	0.4000

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Fisher's Exact Test	75	100	86.6025	1.33333
Treatments vs N Control				

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL	Skew
IC05	54.167			
IC10	58.333			
IC15	62.500			
IC20	66.667			
IC25	70.833			
IC40	83.333			
IC50	91.667			



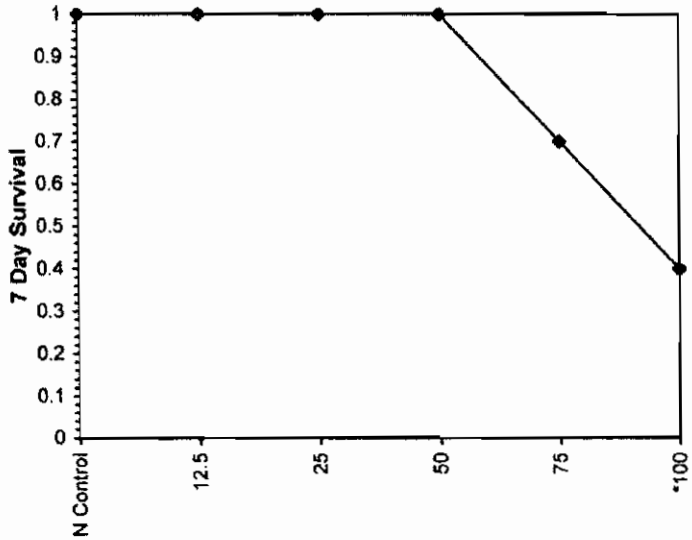
 ToxCalc v5.0.23 Reviewed by:

AGA 3862

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date:	12/13/2007	Test ID:	MWH1207255	Sample ID:	CA8000027
End Date:	12/20/2007	Lab ID:	CAABC	Sample Type:	EFF1-POTW
Sample Date:	12/10/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	#2712140015 (Agana STP)				

Dose-Response Plot



ToxCalc v5.0.23

Reviewed by: _____

AGA 3863

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	12/13/2007	Test ID:	MWH1207255	Sample ID:	CA8000027
End Date:	12/20/2007	Lab ID:	CAABC	Sample Type:	EFF1-POTW
Sample Date:	12/10/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	#2712140015 (Agana STP)				

Conc-%	1	2	3	4	5	6	7	8	9	10
N Control	22.000	18.000	15.000	16.000	14.000	16.000	15.000	19.000	13.000	9.000
12.5	16.000	18.000	20.000	14.000	29.000	19.000	30.000	25.000	23.000	22.000
25	23.000	17.000	19.000	13.000	25.000	19.000	27.000	20.000	25.000	7.000
50	3.000	12.000	14.000	5.000	23.000	13.000	15.000	9.000	15.000	9.000
75	7.000	1.000	1.000	2.000	6.000	14.000	4.000	1.000	0.000	2.000
100	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	1.000

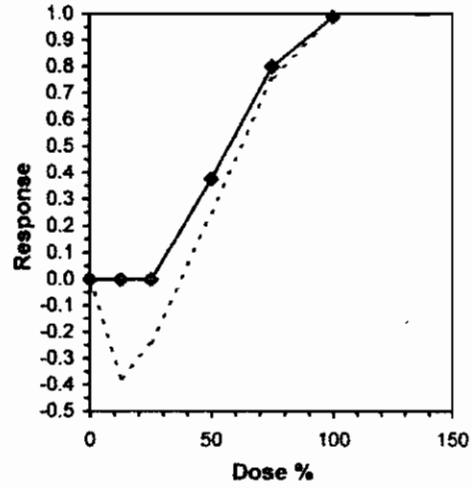
			Transform: Untransformed						1-Tailed		Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
N Control	15.700	1.0000	15.700	9.000	22.000	22.479	10				18.933	1.0000
12.5	21.600	1.3758	21.600	14.000	30.000	24.420	10	-2.854	2.287	4.727	18.933	1.0000
25	19.500	1.2420	19.500	7.000	27.000	31.264	10	-1.838	2.287	4.727	18.933	1.0000
50	11.800	0.7516	11.800	3.000	23.000	48.238	10	1.887	2.287	4.727	11.800	0.6232
*75	3.800	0.2420	3.800	0.000	14.000	112.198	10	5.757	2.287	4.727	3.800	0.2007
*100	0.200	0.0127	0.200	0.000	1.000	210.819	10	7.498	2.287	4.727	0.200	0.0106

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.01)	0.88901	1.035	0.06073	0.93477
Bartlett's Test indicates unequal variances (p = 6.81E-07)	36.7212	15.0863		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	50	75	61.2372	2	4.72701	0.30108	737.12	21.3667	1.2E-15	5, 54
Treatments vs N Control										

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL		Skew
IC05	28.318	4.142	16.285	31.885	-1.4085
IC10	31.636	4.478	20.070	38.769	-0.1295
IC15	34.953	4.776	23.855	45.654	0.2769
IC20	38.271	5.115	28.504	50.651	0.5568
IC25	41.589	4.915	34.689	52.630	0.5411
IC40	51.375	3.983	43.980	58.995	-0.0616
IC50	57.292	3.828	48.971	64.147	-0.3281



ToxCalc v5.0.23

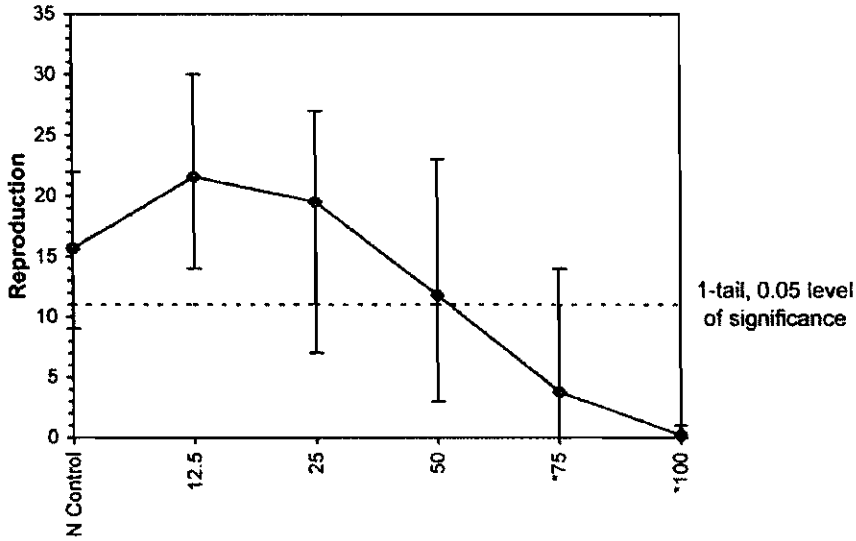
Reviewed by: ____

AGA 3864

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	12/13/2007	Test ID:	MWH1207255	Sample ID:	CA8000027
End Date:	12/20/2007	Lab ID:	CAABC	Sample Type:	EFF1-POTW
Sample Date:	12/10/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	#2712140015 (Agana STP)				

Dose-Response Plot



ToxCalc v5 0.23

Reviewed by:

AGA 3865

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	12/13/2007	Test ID:	MWH1207255	Sample ID:	CA8000027
End Date:	12/20/2007	Lab ID:	CAABC	Sample Type:	EFF1-POTW
Sample Date:	12/10/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	#2712140015 (Agana STP)				

Auxiliary Data Summary

Conc-%	Parameter	Mean	Min	Max	SD	CV%	N
N Control	Temp C	24.15	24.00	24.70	0.28	2.20	8
12.5		24.15	24.00	24.70	0.28	2.20	8
25		24.15	24.00	24.70	0.28	2.20	8
50		24.15	24.00	24.70	0.28	2.20	8
75		24.15	24.00	24.70	0.28	2.20	8
100		24.15	24.00	24.70	0.28	2.20	8
N Control	pH	8.26	8.00	8.30	0.11	3.94	8
12.5		8.13	7.90	8.20	0.12	4.20	8
25		8.10	7.90	8.20	0.11	4.04	8
50		8.10	7.90	8.20	0.11	4.04	8
75		8.10	7.90	8.20	0.11	4.04	8
100		8.10	7.90	8.20	0.11	4.04	8
N Control	Dissolved Oxygen	7.31	7.00	7.50	0.15	5.22	8
12.5		6.53	4.50	7.40	1.01	15.42	8
25		6.53	4.50	7.30	0.99	15.26	8
50		6.38	4.30	7.20	0.98	15.54	8
75		6.30	4.20	7.20	1.02	16.02	8
100		6.25	4.20	7.20	1.00	15.99	8
N Control	Hardness mg/L	92.88	86.00	95.00	2.95	1.85	8
12.5		0.00	0.00	0.00	0.00		0
25		0.00	0.00	0.00	0.00		0
50		0.00	0.00	0.00	0.00		0
75		0.00	0.00	0.00	0.00		0
100		250.00	250.00	250.00	0.00	0.00	8
N Control	Alkalinity mg/L	64.38	60.00	68.00	2.92	2.66	8
12.5		0.00	0.00	0.00	0.00		0
25		0.00	0.00	0.00	0.00		0
50		0.00	0.00	0.00	0.00		0
75		0.00	0.00	0.00	0.00		0
100		250.00	250.00	250.00	0.00	0.00	8
N Control	Conductivity	339.13	333.00	350.00	6.17	0.73	8
12.5		564.50	558.00	579.00	7.21	0.48	8
25		690.50	681.00	699.00	5.63	0.34	8
50		1073.38	1060.00	1081.00	7.35	0.25	8
75		1414.13	1403.00	1423.00	6.92	0.19	8
100		1874.25	1816.00	1895.00	36.00	0.32	8

AQUATIC
BIOASSAY &
CONSULTING
LABORATORIES, INC.

TOXICITY TESTING • OCEANOGRAPHIC RESEARCH

CHRONIC CERIODAPHNIA SURVIVAL AND REPRODUCTION BIOASSAY

DATE: 4 December - 07

STANDARD TOXICANT: Copper Chloride

ENDPOINT: SURVIVAL

NOEC = 10.00 ug/l

IC25 = 10.63 ug/l
IC50 = 13.75 ug/l

ENDPOINT: REPRODUCTION

NOEC = 5.00 ug/l

IC25 = 6.86 ug/l
IC50 = 11.79 ug/l

Yours very truly,

Thomas (Tim) Mikel
Laboratory Director

29 NORTH OLIVE STREET, VENTURA, CA 93001 • (805) 643-5621

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date:	12/4/2007	Test ID:	CER120407	Sample ID:	CA0000000
End Date:	12/11/2007	Lab ID:	CAABC	Sample Type:	CUCL-Copper chloride
Sample Date:	12/4/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	Standard Toxicant				

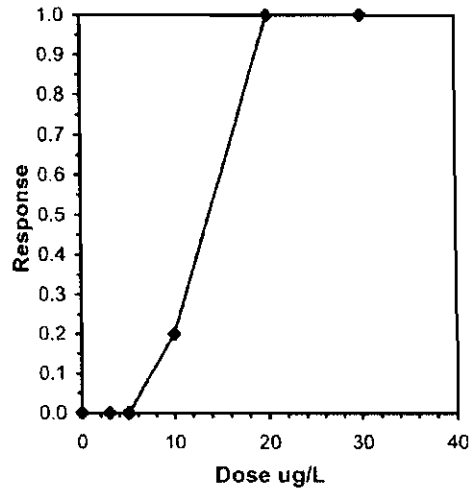
Conc-ug/L	1	2	3	4	5	6	7	8	9	10
N Control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
3	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	0.0000
20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
30	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Conc-ug/L	Mean	N-Mean	Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed Critical	Isotonic Mean	Isotonic N-Mean
N Control	1.0000	1.0000	0	10	10	10			1.0000	1.0000
3	1.0000	1.0000	0	10	10	10	1.0000	0.0500	1.0000	1.0000
5	1.0000	1.0000	0	10	10	10	1.0000	0.0500	1.0000	1.0000
10	0.8000	0.8000	2	8	10	10	0.2368	0.0500	0.8000	0.8000
20	0.0000	0.0000	10	0	10	10			0.0000	0.0000
30	0.0000	0.0000	10	0	10	10			0.0000	0.0000

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Fisher's Exact Test	10	20	14.1421	
Treatments vs N Control				

Linear Interpolation (200 Resamples)

Point	ug/L	SD	95% CL		Skew
C05	6.250	1.427	5.622	10.500	1.5016
IC10	7.500	1.713	6.244	11.000	0.2803
IC15	8.750	1.580	6.866	11.500	0.0108
IC20	10.000	1.495	7.488	12.000	-0.3708
IC25	10.625	1.425	8.109	12.500	-0.4758
IC40	12.500	1.285	9.975	14.000	-0.9079
IC50	13.750	1.146	11.625	15.000	-1.2837



ToxCalc v5.0.23

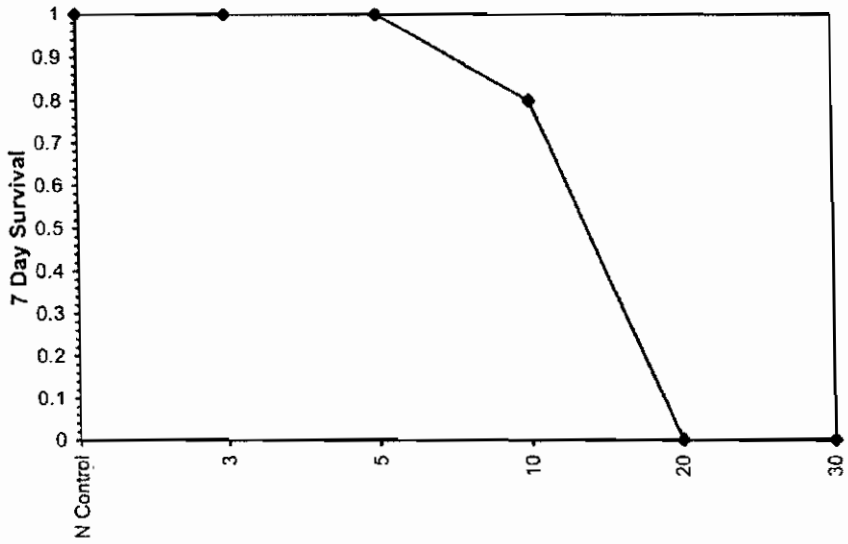
Reviewed by: _____

AGA 3868

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date:	12/4/2007	Test ID:	CER120407	Sample ID:	CA0000000
End Date:	12/11/2007	Lab ID:	CAABC	Sample Type:	CUCL-Copper chloride
Sample Date:	12/4/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	Standard Toxicant				

Dose-Response Plot



AGA 3869

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	12/4/2007	Test ID:	CER120407	Sample ID:	CA0000000
End Date:	12/11/2007	Lab ID:	CAABC	Sample Type:	CUCL-Copper chloride
ample Date:	12/4/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	Standard Toxicant				

Conc-ug/L	1	2	3	4	5	6	7	8	9	10
N Control	19.000	17.000	12.000	18.000	15.000	17.000	15.000	18.000	18.000	17.000
3	13.000	22.000	14.000	21.000	25.000	23.000	14.000	16.000	17.000	17.000
5	15.000	12.000	19.000	16.000	23.000	15.000	7.000	16.000	13.000	9.000
10	8.000	17.000	13.000	14.000	17.000	13.000	8.000	0.000	13.000	3.000
20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

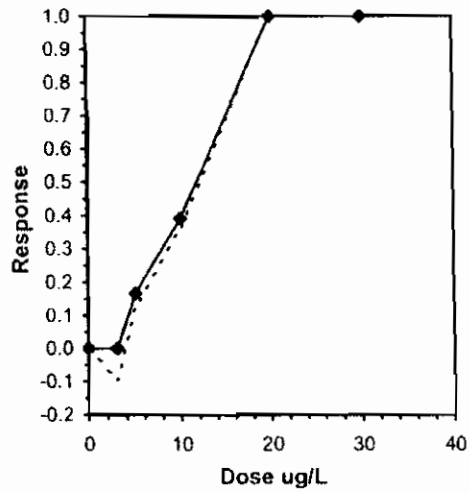
			Transform: Untransformed					Rank	1-Tailed	Isotonic	
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Mean	N-Mean
N Control	16.600	1.0000	16.600	12.000	19.000	12.443	10			17.400	1.0000
3	18.200	1.0964	18.200	13.000	25.000	23.282	10	110.00	75.00	17.400	1.0000
5	14.500	0.8735	14.500	7.000	23.000	31.895	10	86.00	75.00	14.500	0.8333
*10	10.600	0.6386	10.600	0.000	17.000	53.956	10	68.00	75.00	10.600	0.6092
*20	0.000	0.0000	0.000	0.000	0.000	0.000	10	55.00	75.00	0.000	0.0000
*30	0.000	0.0000	0.000	0.000	0.000	0.000	10	55.00	75.00	0.000	0.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.01)	1.6999	1.035	-0.3705	1.57984
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	5	10	7.07107	
reatments vs N Control				

Linear Interpolation (200 Resamples)

Point	ug/L	SD	95% CL		Skew
IC05	3.600	0.817	2.337	5.765	0.8401
IC10	4.200	0.968	3.491	6.808	1.3275
IC15	4.800	1.197	3.892	8.154	1.3667
IC20	5.744	1.458	4.215	9.542	1.0574
IC25	6.859	1.733	4.537	10.440	0.4674
IC40	10.151	1.482	7.271	12.352	-0.4300
IC50	11.792	1.302	9.196	13.626	-0.3663



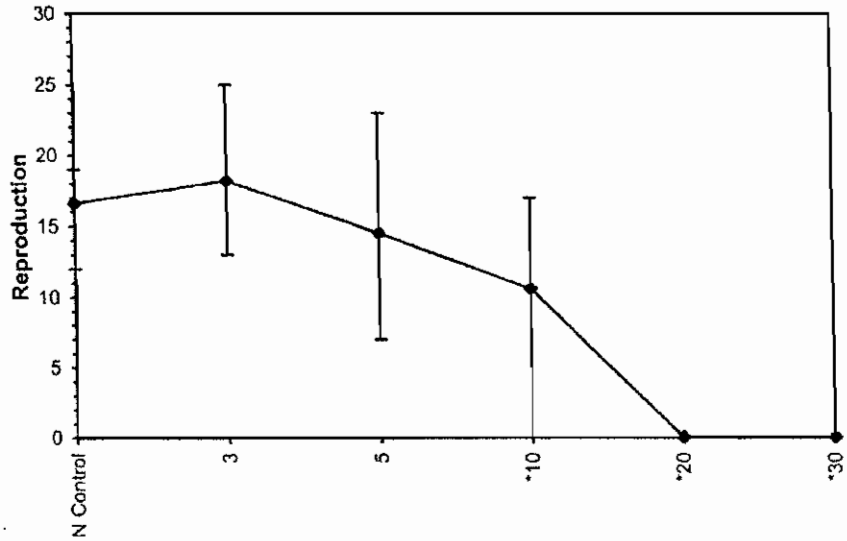
 ToxCalc v5.0.23 Reviewed by: M

AGA 3870

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	12/4/2007	Test ID:	CER120407	Sample ID:	CA0000000
End Date:	12/11/2007	Lab ID:	CAABC	Sample Type:	CUCL-Copper chloride
Sample Date:	12/4/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	Standard Toxicant				

Dose-Response Plot



ToxCalc v5.0.23

Reviewed by: M

AGA 3871

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	12/4/2007	Test ID:	CER120407	Sample ID:	CA0000000
End Date:	12/11/2007	Lab ID:	CAABC	Sample Type:	CUCL-Copper chloride
Sample Date:	12/4/2007	Protocol:	EPA-821-R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	Standard Toxicant				

Auxiliary Data Summary

Conc-ug/L	Parameter	Mean	Min	Max	SD	CV%	N
N Control	Temp C	24.28	24.00	24.80	0.38	2.54	8
3		24.28	24.00	24.80	0.38	2.54	8
5		24.28	24.00	24.80	0.38	2.54	8
10		24.28	24.00	24.80	0.38	2.54	8
20		12.19	0.00	24.80	13.03	29.62	8
30		12.19	0.00	24.80	13.03	29.62	8
N Control	pH	8.14	7.90	8.30	0.18	5.28	8
3		7.96	7.90	8.00	0.05	2.86	8
5		7.94	7.90	8.00	0.05	2.87	8
10		7.93	7.80	8.00	0.07	3.36	8
20		3.96	0.00	8.00	4.24	51.94	8
30		3.96	0.00	8.00	4.24	51.94	8
N Control	DO mg/L	7.08	6.70	7.30	0.25	7.14	8
3		7.06	6.60	7.80	0.41	9.07	8
5		7.08	6.60	7.70	0.38	8.68	8
10		7.04	6.70	7.50	0.28	7.55	8
20		3.50	0.00	7.50	3.75	55.33	8
30		3.54	0.00	7.50	3.79	55.01	8
N Control	Hardness mg/L	93.63	87.00	99.00	4.90	2.36	8
3		0.00	0.00	0.00	0.00		0
5		0.00	0.00	0.00	0.00		0
10		0.00	0.00	0.00	0.00		0
20		0.00	0.00	0.00	0.00		0
30		90.00	90.00	90.00	0.00	0.00	8
N Control	Cond umhos	349.25	345.00	357.00	4.03	0.57	8
3		337.63	333.00	343.00	3.74	0.57	8
5		330.50	321.00	340.00	6.68	0.78	8
10		329.63	324.00	335.00	3.74	0.59	8
20		165.75	0.00	335.00	177.21	8.03	8
30		166.75	0.00	336.00	178.27	8.01	8
N Control	Alkalinity mg/L	62.75	60.00	69.00	3.96	3.17	8
3		0.00	0.00	0.00	0.00		0
5		0.00	0.00	0.00	0.00		0
10		0.00	0.00	0.00	0.00		0
20		0.00	0.00	0.00	0.00		0
30		65.00	65.00	65.00	0.00	0.00	8