



ENVIRONMENTAL DYNAMICS INC.  
ATTN: Meghan Marjanovic  
2195 - 2nd Ave  
Whitehorse YT Y1A 3T8

Date Received: 21-APR-15  
Report Date: 13-MAY-15 16:22 (MT)  
Version: FINAL

Client Phone: 867-393-4882

## Certificate of Analysis

**Lab Work Order #:** L1601926  
**Project P.O. #:** NOT SUBMITTED  
**Job Reference:** MOUNT NANSEN 15-Y-0148  
**C of C Numbers:** 1  
**Legal Site Desc:**

**Comments:** The bioassay analysis was subcontracted to Nautilus Environmental Ltd in Burnaby, BC. Refer to their report appended for detail.

Can Dang  
Senior Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700  
ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company

# ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID					
Grouping	Analyte				

## Reference Information

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

Laboratory Definition Code	Laboratory Location
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### Chain of Custody Numbers:

1

### GLOSSARY OF REPORT TERMS

*Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.*

*mg/kg - milligrams per kilogram based on dry weight of sample.*

*mg/kg wwt - milligrams per kilogram based on wet weight of sample.*

*mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.*

*mg/L - milligrams per litre.*

*< - Less than.*

*D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).*

*N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.*

**UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.**

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*



**ALS Environmental**  
ATTN: Can Dang  
Suite 100-8081 Lougheed Hwy.  
Burnaby, BC  
V5A 1W9

Report Date: May 13, 2015  
Work Order: 15343

## Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)  
Protocol: EPS 1/RM/13 (Second Ed. with 2007 amendments)

**Table 1.** Results for the 96-h rainbow trout acute toxicity test.

Sample ID	Collection Date and Time	96-h LC50
L1601926-1 0146-150420-003	April 20, 2015 @ N/A	>100

Due to an insufficient number of viable fish, the 96-h rainbow trout toxicity testing was subcontracted to Integrated Resource Consultants. The test met performance criteria and there were no deviations from the test method. The results presented here relate only to the sample tested.

Yvonne Lam, B.Sc.  
Laboratory Biologist

Reviewed By:  
Julianna Kalocai, M.Sc., R.P.Bio  
QA Officer

**DATE:** 05 May 2015

**REPORT TO:** Mr. Josh Baker  
Nautilus Environmental  
8664 Commerce Court  
Burnaby, B.C.  
V5A 4N7

**REPORT ON: RAINBOW TROUT BIOASSAY RESULTS**

**SAMPLE DESCRIPTION:**

IRC Sample ID No.:	1504135
<b>Sample Name:</b>	<b>L1601926-1</b> <b>PO # 15343</b>
Sample collected by:	N/A
Date collected:	20 April 2015
Date, time received:	24 April 2015; 1425 hrs.
Collection Method:	Grab
Amount, Container:	3 x 20 L plastic containers
Physical description:	Opaque, orange liquid
Date, time tested:	25 April 2015; 0915 hrs.

**RAINBOW TROUT 96 HR RESULTS:**

The 96 hour (static) LC<sub>50</sub> was greater than 100% (v/v sample).  
0% trout mortality in 100% concentration.

The LC<sub>50</sub> is defined as the median lethal concentration or the concentration at which there is 50% fish mortality. Results are calculated following the methods described in "Guidance Document on Statistical Methods for Environmental Toxicity Tests" EPS 1/RM/46 – March 2005 (with June 2007 amendments), using the software CETIS, ver 1.8.7E (2014).

The method used for this test was as per the IRC laboratory "Standard Operating Procedure for Rainbow Trout Holding and Testing" RTver5. This procedure follows the "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout" EPS 1/RM/13, Second Edition – December 2000 (with May 2007 amendments). Test volume was 16 litres with 10 fish exposed per test vessel. Aeration was by forced air through airstones at a rate of approximately 6.5 ± 1 ml/L/min. The sample was not pH adjusted or filtered prior to testing

The initial dissolved oxygen level was 8.1 mg/L at 15.0°C, the conductivity was 1282 µS/cm and the initial pH was 6.7. After pre-aerating the sample for 30 minutes, the dissolved oxygen level was 9.0 mg/L. As the dissolved oxygen level was greater than 70% saturation and less than 100% saturation the test was initiated at this time. The test set-up technician was DB.

Please call should you have any questions.

IRC Integrated Resource Consultants Inc.



Darcie Blackall  
Laboratory Biologist  
b003.1  
enclosure

**RAW DATA:**

<b>TEST CONCENTRATION</b>		<b>HOURS</b>							
		<b>0</b>	<b>1.0</b>	<b>2.0</b>	<b>4.0</b>	<b>24</b>	<b>48</b>	<b>72</b>	<b>96</b>
<b>100%</b>	Percent Survival	100%	100%	100%	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	9.0				9.7	10.1	9.5	9.5
	Temperature (°C)	15.0				15.5	15.5	15.5	15.5
	pH	6.8				7.9	8.0	8.0	8.0
	Conductivity (µS/cm)	1285							1319
	Symptoms	1	2	2	2	2	2	2	2
	Loading Density (g/L)	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
<b>50%</b>	Percent Survival	100%	100%	100%	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	9.6				9.5	10.0	9.1	9.2
	Temperature (°C)	15.5				15.5	15.5	15.5	15.5
	pH	6.8				7.5	7.7	7.6	7.6
	Conductivity (µS/cm)	723							746
	Symptoms	1	2	2	2	2	2	2	2
	Loading Density (g/L)	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
<b>25%</b>	Percent Survival	100%	100%	100%	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	9.8				9.5	10.0	9.0	8.9
	Temperature (°C)	15.5				15.5	15.5	15.5	15.5
	pH	6.8				7.2	7.3	7.2	7.3
	Conductivity (µS/cm)	408							420
	Symptoms	1	2	2	2	2	2	2	2
	Loading Density (g/L)	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
<b>12.5%</b>	Percent Survival	100%	100%	100%	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.0				9.5	10.0	9.1	8.9
	Temperature (°C)	15.5				15.5	15.5	15.5	15.5
	pH	6.8				7.3	7.2	7.1	7.2
	Conductivity (µS/cm)	240							249
	Symptoms	1	1,2	1,2	1,2	1,2	1,2	1,2	1,2
	Loading Density (g/L)	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
<b>6.25%</b>	Percent Survival	100%	100%	100%	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.0				9.6	10.0	8.9	8.7
	Temperature (°C)	15.5				15.5	15.5	15.5	15.5
	pH	6.8				7.3	7.2	7.1	7.2
	Conductivity (µS/cm)	140							147
	Symptoms	1	1	1	1	1	1,2	1,2	1,2
	Loading Density (g/L)	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
<b>CONTROL</b>	Percent Survival	100%	100%	100%	100%	100%	100%	100%	100%
	Dissolved Oxygen (mg/L)	10.1				9.8	10.1	9.3	8.9
	Temperature (°C)	15.5				15.5	15.5	15.5	15.5
	pH	6.9				7.5	7.3	7.3	7.3
	Conductivity (µS/cm)	40							42
	Symptoms	1	1	1	1	1	1	1	1
	Loading Density (g/L)	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
	Technician	DB	DB	DB	DB	MH	RC	RC	RC

**KEY TO SYMPTOMS:**

- 1 = no apparent effect
- 2 = fish showing signs of stress
- 3 = loss of equilibrium



**TEST FISH STOCK INFORMATION:**

Date received:	12 March 2015	
Source:	Aquafarms JV	
Species:	<i>Oncorhynchus mykiss</i> (Rainbow Trout)	
Fork Length:	Mean:	41.6 mm $\pm$ 2.8 mm
	Range:	36.0 mm – 45.0 mm
Wet weight:	Mean:	0.62 g $\pm$ 0.15 g
	Range:	0.38 g – 0.87 g
Condition Factor (100xWt/length <sup>3</sup> cm):	0.85	

Acclimation History	
Acclimation temperature:	14.5 to 15.0 °CELSIUS
Treatments:	None
Water:	Dechlorinated tap water
Feeding:	BioVita Starter #1 Crum
Mortality:	0.08%

**RAINBOW TROUT REFERENCE TOXICANT DATA**

Stock Arrival Date (y/m/d)	Test Date (y/m/d)	Toxicant	LC50 (mg/L)	95% Confidence Interval
13.11.21	13.12.05	Phenol	9.02	7.42 to 10.65
13.12.12	13.12.30	“	14.10	12.06 to 16.42
13.12.23	14.01.14	“	10.66	9.60 to 11.82
14.01.20	14.02.04	“	11.07	9.34 to 12.45
14.02.05	14.02.19	“	8.94	7.96 to 10.04
14.02.25	14.03.11	“	14.10	11.86 to 16.57
14.03.11	14.03.25	“	11.07	9.84 to 12.45
14.04.01	14.04.10	“	10.16	8.41 to 12.08
14.04.04	14.04.18	“	10.15	8.87 to 11.61
14.04.28	14.05.06	“	8.94	7.96 to 10.04
14.05.13	14.05.25	“	10.20	9.45 to 11.02
14.05.29	14.06.12	“	9.96	8.19 to 11.89
14.06.12	14.07.09	“	9.02	7.42 to 10.65
14.06.24	14.07.18	“	9.58	9.14 to 10.05
14.07.16	14.08.06	“	12.00	10.56 to 13.64
14.07.30	14.08.14	“	10.20	9.45 to 11.02
14.08.14	14.09.09	“	11.57	9.40 to 13.98
14.09.01	14.09.05	“	10.59	9.54 to 11.74
14.09.24	14.10.08	“	11.52	10.16 to 13.07
14.10.10	14.10.24	“	10.22	9.45 to 11.05
14.10.22	14.11.12	“	10.66	8.74 to 12.55
14.11.30	14.12.19	“	9.80	8.00 to 12.00
14.12.21	15.01.19	“	9.80	8.00 to 12.00
15.01.25	15.02.10	“	12.50	11.02 to 14.17
15.02.01	15.02.17	“	11.52	10.16 to 13.07
15.02.15	15.03.03	“	10.63	9.59 to 11.77
15.03.12	15.03.26	“	10.63	9.59 to 11.77
LAB GEOMETRIC MEAN $\pm$ 2 standard deviations:				10.82 mg/L $\pm$ 3.76
Warning Limits:				7.05 mg/L to 14.58 mg/L

**CONTROL/DILUTION WATER QUALITY:**

Hardness: 20 mg/L  
Total Residual Chlorine: 10  $\mu$ g/L







L1601926

VANCOUVER

Subcontract Request Form

Subcontract To:

NAUTILUS ENVIRONMENTAL

8664 COMMERCE COURT  
BURNABY, BC V5A 4N7

Request for Rimbaw Trout LC50  
w/ 1,2,4 hours monitoring. and LT50  
NY

NOTES: Please reference on final report and invoice: PO# L1601926  
ALS requires QC data to be provided with your final results.

wo# 15343

Please see enclosed 1 sample(s) in 3 Container(s)

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED	Priority Flag
		DUE DATE	
L1601926-1 0146-150420-003	Special Request- Nautilus Environmental (SPECIAL REQUEST-NL 14)	4/20/2015	
		4/29/2015	

Subcontract Info Contact: Dorota Jamro (604) 253-4188

Analysis and reporting info contact: Can Dang  
8081 LOUGHEED HWY  
SUITE 100  
BURNABY, BC V5A 1W9

Phone: (604) 253-4188

Email: can.dang@alsglobal.com

Please email confirmation of receipt to: can.dang@alsglobal.com

Shipped By: Paul Date Shipped: APRIL 24/2015

Received By: NAUTILUS - NY - NAIR YAMANO Date Received: Apr 24/15 @ 11:05

Verified By: \_\_\_\_\_ Date Verified: \_\_\_\_\_

Temperature: 6.2 (2x20L)

Sample Integrity Issues: \_\_\_\_\_  
8.4 (1x20L)  
blue jug.

Subcontracted to IRC

