HydroQual
Laboratories Ltd.

#3, 6125 12th Street SE
Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121
Fax (403) 252-9363

Test Report

Client: 2001117	Sample: 20011446	Test: 20013617

Method Trout 96h Static Acute Test (five treatments plus a control)
Reference: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 1990. Environment Canada, EPS 1/RM/13. (amended 1996+2000)

Client: Syntroleum Corporation

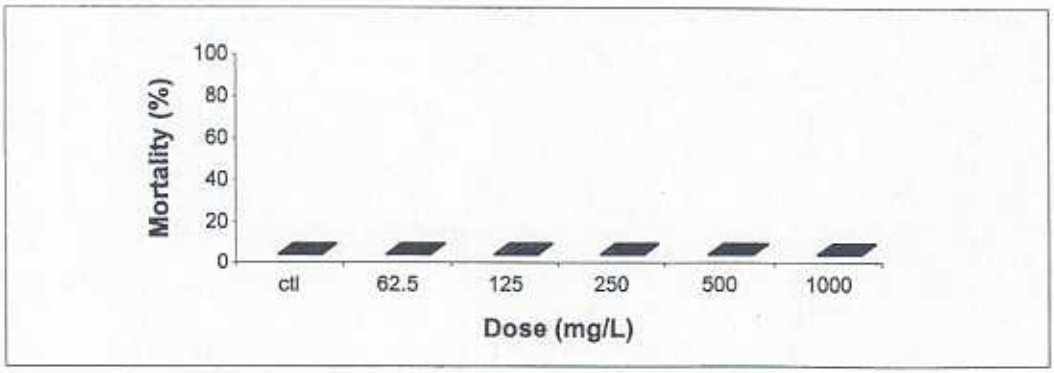
Sample:
description: Syntroleum Diesel Fuel / S-2 (RPU 10920)
collected: not given at not given by na
received: 2001/11/16 at 1200 by D.Guterson

Test:
started: 2001/12/17 at 1330 by D.Guterson/J.Fine
ended: 2001/12/21 at 1345 by J.Fine/D.Guterson
reported: 2001/12/26 by M.Murray

Result:

Endpoint	Value (mg/L)	Confidence Limits (95%) lower	upper	Method Calculated
LC50	>1000			estimated
LC25	>1000			estimated
NOEC	1000			estimated
LOEC	>1000			estimated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population
NOEC, highest concentration tested that had no significant observed effect
LOEC, lowest concentration tested that had an observed significant effect



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Test Data

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Day	Time	Technician	Comment/Observation
0	1330	D.Guterson/J.Fine	test fish loaded at 1345 h
1	1145	J.Fine/D.Guterson	all test fish appear normal
2	1330	J.Fine/D.Guterson	all test fish appear normal
3	1200	J.Fine/D.Guterson	all test fish appear normal
4	1345	J.Fine/D.Guterson	all test fish appear normal

Preaeration (6.5 mL/min/L)	0.5	1.0	1.5	2.0 (h)
DO (mg/L)	9.1			

Dose(mg/L)	ctl	62.5	125	250	500	1000		
day				pH (units)				
0	7.6	7.7	7.7	7.7	7.7	7.8		
1	7.9	7.9	8.0	8.0	8.1	8.1		
2	8.0	8.0	8.1	8.1	8.1	8.1		
3	8.2	8.2	8.2	8.2	8.2	8.2		
4	8.3	8.3	8.3	8.3	8.3	8.2		
				EC (uS/cm)				
0	399	384	390	391	391	394		
1	407	406	407	416	411	401		
2	407	404	407	414	411	404		
3	392	398	393	393	398	392		
4	418	419	422	420	421	418		
				DO (mg/L)				
0	9.1	9.1	9.1	9.0	9.1	9.1		
1	9.0	9.0	9.1	9.1	9.1	9.0		
2	8.9	8.9	9.0	9.1	9.0	8.8		
3	9.0	9.1	9.1	9.1	9.1	8.9		
4	8.9	8.8	8.9	8.8	8.9	8.7		
				Temperature (°C)				
0	14	14	14	14	14	14		
1	14	14	14	14	15	14		
2	14	14	14	14	14	14		
3	14	14	14	14	15	15		
4	15	15	15	15	15	15		
				Number Alive				
0	10	10	10	10	10	10		
1	10	10	10	10	10	10		
2	10	10	10	10	10	10		
3	10	10	10	10	10	10		
4	10	10	10	10	10	10		
				Mortality (%)				
	0	0	0	0	0	0		

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Test Data

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Control Fish	Length (cm)	Weight (g)	Dose (mg/L)	Group Weight (g)
1	3.6	0.4	ctl	3.9
2	4.1	0.5	62.5	4.1
3	3.5	0.4	125	4.0
4	3.8	0.3	250	4.4
5	3.6	0.5	500	4.2
6	3.7	0.4	1000	6.4
7	3.8	0.4		
8	3.2	0.3		
9	3.1	0.3		
10	3.3	0.3		
average	3.6	0.4		
sd	0.3	0.1		
cv	8.6	20.1		

Ammonium (mg NH_4^+-N/L)

	initial	final
control	nd	nd
100%	nd	nd

Test Information
organism: *Oncorhynchus mykiss* from Spring Valley Trout Farms
age and condition: The fish were held 13 days before testing (batch 20011204TR).
Conditions
The tests were conducted in 22 L plastic pails with polyethylene liners. The test volume was 20 L and there was one replicate per treatment. There were ten fish per replicate (loading density of <0.5 g per litre). All treatments aerated at 6.5 mL/min/L. The sample was not pH adjusted. Mortality of fish 7 days before test <2%.

Comments

The test fish were held less than 14 days prior to test initiation.

Notes: EC, electrical conductivity; DO, dissolved oxygen; nd, not done

The test data and results are verified correct. Becky-Jo Unis
Authorized by: B. Unis, B.Sc., Quality Assurance Officer

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Warning Chart

Quality Assurance Information

Test Method:
Reference: Trout 96h Static Acute Test. (LC50, five or more treatments plus a control) Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 1990. Environment Canada, EPS 1/RM/13. including May 1996 and December 2000 amendments.

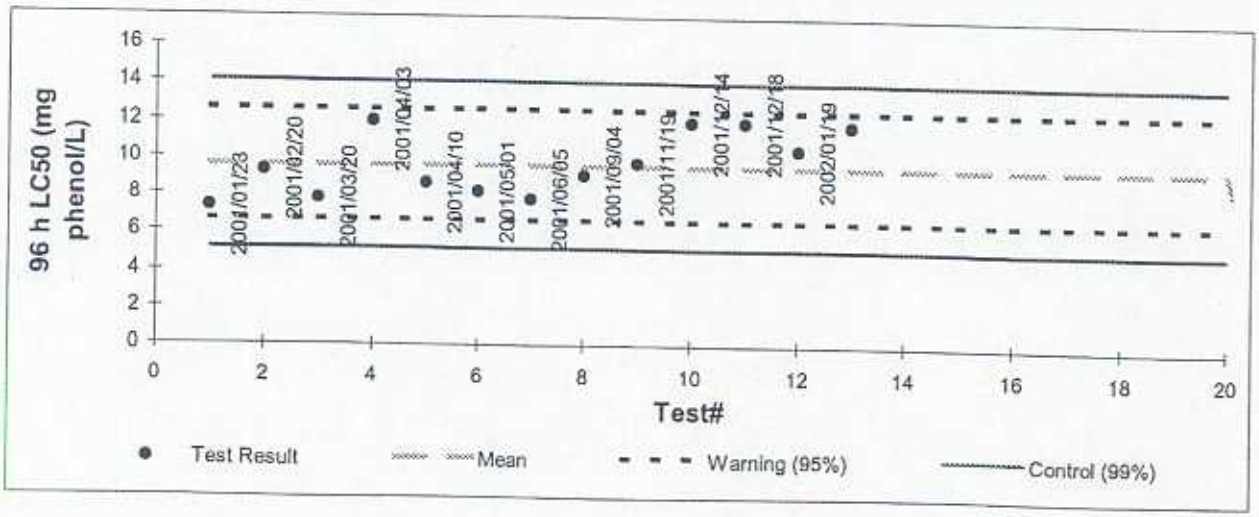
Test Organism

test species	*Oncorhyncus mykiss*
culture source	Spring Valley Trout Farms
temperature (°C)	15 ± 1
dissolved oxygen	saturated
stock mortality (last 7d)	<2%

Test Design

vol. of test vessel (L)	22
test volume depth	>15 cm
replicates per treatment	1
fingerlings per replicate	10
loading (g fish/L)	<0.5
temperature (°C)	15 ± 1
photoperiod	16h light: 8h dark
light level (water surface)	100-500 lux
control/dilution water	dechlorinated tap water

Qualty Assurance Unit:
The test data and result are verified correct. Becky-Jo Uys 2002/01/19

Warning Chart (mortality LC50 at 96 h)

Toxicant:	phenol (C_6H_5OH)						
Current Test:	**started:**	2002/01/15	**ended:**	2002/01/19			
Result (96 h LC50):	11.9	(10.0-13.6)	mg/L	95% confidence limits are in brackets			
Historical Mean:	9.6	**std.dev:**	1.5	**CV(%):**	15		
Chart Limits:	**warning:**	6.6	12.6	**control:**	5.1	14.1	
	95% , two standard deviations			99%, three standard deviations