



Report Date: March 19, 2018

File: 5661

Report Number: 080101

Walcan Seafood Ltd.
PO Box 429
One Walcan Road
Heriot Bay
Quadra Island BC V0P 1H0

Dear Walcan Seafood Ltd.:

Re: Non-compliance Advisory Letter, Permit 5661, Walcan Seafood Ltd., Quadra Island, Effluent

On February 21, 2018, Ministry of Environment and Climate Change Strategy, Environmental Protection Division conducted an inspection of your facility, Walcan Seafood Ltd. located at Walcan Seafood Ltd., Quadra Island with authorization number 5661 under the *Environmental Management Act*. Ministry staff were accompanied on site by Walcan Seafood Ltd.'s HACCP and Quality Assurance Manager, President and GM, and Owner.

This Advisory, the alleged violations and the circumstances to which it refers will form part of the compliance history of Walcan Seafood Ltd., and will be taken into account in the event of future non-compliance.

Please note that this authorization is considered to be out of compliance until such a time as it can be confirmed to meet the authorization requirements.

Inspection Details:

Requirement Description:	Environmental Management Act, Environmental Management Act 6 (4): (4) Subject to subsection (5), a person must not introduce waste into the environment in such a manner or quantity as to cause pollution.
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Details/Findings:	<p>General Overview:</p> <p>On February 21, 2018, Ministry of Environment and Climate Change Strategy (ENV) Officer Laura Hunse (Officer) conducted an on-site inspection of Walcan Seafood Ltd. (Walcan) on Quadra Island in order to assess compliance with effluent discharge permit 5661. The Officer was accompanied by guests Maureen Bilawchuk (ENV) and Glen Okrainetz (ENV). Senior Enforcement Officer Ken Russell also attended on behalf of Environment and Climate Change Canada. Arrival at the site was approximately 12:15, and the inspection was concluded at approximately 15:40. Weather was overcast and approximately 1 degree Celsius, with light flurries increasing towards the latter half of the inspection. This inspection report includes results of both the on-site inspection as well as reported data from 2016 - 2017 inclusive (Reporting Period).</p> <p>Inspection Findings:</p> <p>Samples of the processing effluent were taken by the Officer at the time of the inspection. The samples were collected after the effluent had passed through the authorized treatment works, prior to discharge through the outfall.</p> <p>The analytical results of the effluent (Laboratory Certificate of Analysis attached) were:</p> <p>(Parameter: Result Units) pH: 6.97 Total Suspended Solids: 155 mg/L Ammonia, Total (as N): 0.635 mg/L Nitrate (as N): less than 0.50 mg/L Nitrite (as N): less than 0.10 mg/L Total Nitrogen: 42.3 mg/L Total Organic Nitrogen: 41.7 mg/L BOD: 246 mg/L (Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time) COD: 740 mg/L Oil and Grease: 22.5 mg/L</p> <p>Toxicity 96 hr (Static) Single Concentration: not acutely lethal @ 36% test concentration. Microtox test 5 minute (Static) IC50: not acutely toxic 15 minute (Static) IC50: not acutely toxic</p> <p>No bacterial analysis was conducted because samples were received past their hold time due to courier error. A single sample of the processing effluent was collected; therefore, there are insufficient available data at this time to determine whether the effluent has substantially altered or impaired the usefulness of the environment.</p>
Compliance:	Not Determined
Actions to be taken:	

Requirement Description:	1. AUTHORIZED DISCHARGES, 1.1 1.1.1: 1.1 This section applies to the discharge of effluent from a fish processing plant. The site reference number for this discharge is E263080. 1.1.1 The maximum authorized rate of discharge is 750 m3/d.
Details/Findings:	For the Reporting Period, flow volumes ranged from 0 to 748 m3/day. Flow meter was intermittently functional and flow estimation was calculated manually when necessary (see section 3.2).
Compliance:	In
Actions to be taken:	
Requirement Description:	1. AUTHORIZED DISCHARGES, 1.1 1.1.3: 1.1 This section applies to the discharge of effluent from a fish processing plant. The site reference number for this discharge is E263080. 1.1.3 The characteristics of the discharge shall be equivalent to or better than seafood processing plant effluent passed through a fine screen (0.5 millimetres apertures or finer) and be of a quality such that any measurement at the point of discharge is equivalent to or better than the following parameters: pH, 6.0-9.0; ammonia, 100 mg/L; TSS, 1,000 mg/L.
Details/Findings:	For the Reporting Period, the range of results was the following: pH: 6.55 - 7.74 Ammonia: 0.46 - 4.90 mg/L TSS: 21.5 - 778 mg/L ENV Sample from onsite inspection: pH: 6.97 Ammonia: 0.635 mg/L TSS: 155 mg/L All results are below permitted maximums.
Compliance:	In

Actions to be taken:	
Requirement Description:	<p>1. AUTHORIZED DISCHARGES, 1.1</p> <p>1.1.4: 1.1 This section applies to the discharge of effluent from a fish processing plant. The site reference number for this discharge is E263080. 1.1.4 Until December 31, 2007, the authorized works are a process and wash water collection system with a fine screen rotary drum (0.5 millimetres apertures or finer), 2 outfalls (each extending at least 20 m from mean low water to a depth of 6m below mean low water) and related appurtenances located approximately as shown on Appendix A. After December 31, 2007, the authorized works are a process and wash water collection system with a fine screen rotary drum (0.5 millimetres apertures or finer), a single outfall (extending at least 100 m from mean low water to a depth of 20m below mean low water) with a variable orifice diffuser and related appurtenances located approximately as shown on Appendix B.</p>
Details/Findings:	Works were in place and operational at the time of inspection (see Photo 1, attached).
Compliance:	In
Actions to be taken:	
Requirement Description:	<p>1. AUTHORIZED DISCHARGES, 1.2</p> <p>1.2.1: 1.2 This section applies to the discharge of effluent from a domestic sewage treatment system. 1.2.1 The maximum authorized rate of discharge is 20 cubic meters per day.</p>
Details/Findings:	For the Reporting Period, flow volumes ranged from zero to 2.71 m ³ /day. Flow meter was intermittently functional and flow estimation was calculated manually when necessary.
Compliance:	In
Actions to be taken:	

Requirement Description:	<p>1. AUTHORIZED DISCHARGES, 1.2</p> <p>1.2.2: 1.2 This section applies to the discharge of effluent from a domestic sewage treatment system. 1.2.2 The characteristics of discharge from the domestic sewage treatment system shall be equivalent to or better than sewage receiving primary treatment (any form of treatment, excluding dilution, that consistently produces an effluent quality with a BODS not exceeding 130 mg/L and TSS not exceeding 130 mg/L).</p>
Details/Findings:	<p>For the Reporting Period, the range of results was the following:</p> <p>BOD5: 20.7 - 123 mg/L TSS: 5.8 - 46 mg/L</p> <p>All results are below permitted maximums.</p>
Compliance:	In
Actions to be taken:	
Requirement Description:	<p>1. AUTHORIZED DISCHARGES, 1.2</p> <p>1.2.3: 1.2 This section applies to the discharge of effluent from a domestic sewage treatment system. 1.2.3 Until December 31, 2007, the authorized works are a domestic sewage treatment system (aeration tank and clarifier chamber), 2 outfalls (each extending at least 20 m from mean low water to a depth of 6m below mean low water) and related appurtenances located approximately as shown on Appendix A. After December 31, 2007, the authorized works are a domestic sewage treatment system (aeration tank and clarifier chamber), a single outfall (extending at least 100 m from the O m tide line with a terminus in at least 20m of water) with a variable orifice diffuser and related appurtenances located approximately as shown on Appendix B (upgraded site plan)</p>
Details/Findings:	Works were in place and operational at the time of inspection.
Compliance:	In
Actions to be taken:	

Requirement Description:	1. AUTHORIZED DISCHARGES 1.3: 1.3 At the time of the commencement of discharge, the authorized works, including the screens, domestic sewage treatment system for domestic sewage, and outfalls as shown in Appendix A, must be completed and in operation. By December 31, 2007, in addition to the works authorized above, an aeration tank and clarifier chamber and the upgraded outfall as shown in Appendix B, must be completed and in operation.
Details/Findings:	Works were in place and operational at the time of inspection (Photo 2).
Compliance:	In
Actions to be taken:	
Requirement Description:	2. GENERAL REQUIREMENTS, 2.1 Maintenance of Works and Emergency Procedures 2.1: 2.1 The permittee shall inspect the authorized works regularly and maintain them in good working order. In the event of an emergency or condition beyond the control of the permittee which prevents effective operation of the approved method of pollution control, the permittee shall notify the Regional Manager, Environmental Protection, immediately and take appropriate remedial action. The Director may reduce or suspend the operation of the permittee to protect the environment until the approved method of pollution control has been restored.
Details/Findings:	Authorized works are maintained in good working order and concerns dealt with as needed. Regular maintenance/inspection logs are not maintained at the facility. Staff noted that there were no emergency conditions that occurred that prevented effective operation of the works.
Compliance:	In
Actions to be taken:	
Requirement Description:	2. GENERAL REQUIREMENTS, 2.2 Bypasses 2.2: 2.2 The discharge of contaminants which have bypassed the authorized treatment works is prohibited unless the approval of the Director is obtained and confirmed in writing.

Details/Findings:	According to staff, no bypasses have taken place in the Reporting Period.
Compliance:	Not Applicable
Actions to be taken:	
Requirement Description:	2. GENERAL REQUIREMENTS, 2.3 Process Modifications 2.3: 2.3 The Regional Manager, Environmental Protection, shall be notified prior to implementing changes to any process that may adversely affect the quality and/or quantity of the discharge.
Details/Findings:	According to staff, no changes to any process that may affect the quality/quantity adversely were undertaken during the Reporting Period.
Compliance:	Not Applicable
Actions to be taken:	
Requirement Description:	2. GENERAL REQUIREMENTS, 2.5 Notification 2.5: 2.5 The Regional Manager, Environmental Protection, shall be notified of a change in ownership of the works authorized in Section 1.1.4 and 1.2.3 within 10 days of an ownership change.
Details/Findings:	No changes of ownership have occurred during the Reporting Period.
Compliance:	Not Applicable

Actions to be taken:	
Requirement Description:	<p>2. GENERAL REQUIREMENTS, 2.6 Facility Classification and Order Certification</p> <p>2.6: 2.6 The permittee shall have the works authorized by Section 1.2 of this permit classified (and the classification shall be maintained) by the Environmental Operators Certification Program Society (Society). The works shall be operated and maintained by persons certified within and according to the program provided by the Society. Certification must be completed to the satisfaction of the Director. In addition, the Regional Manager, Environmental Protection, shall be notified of the classification level of the facility and certification levels of the operators, and changes of operators and/or operator certification levels within 30 days of any change. Alternatively, the works authorized by this permit shall be operated and maintained by persons who the permittee can demonstrate to the satisfaction of the Director, are qualified in the safe and proper operation of the facility for the protection of the environment.</p>
Details/Findings:	<p>The Whitewater style sewage treatment plant is operated and maintained by site staff. Staff are not certified under the Society nor has the Director approved an alternate to certification, therefore compliance is not achieved for this section.</p>
Compliance:	Out
Actions to be taken:	<p>The Officer has clarified and discussed the requirement to obtain certification with site staff via email since the inspection, and provided associated information for the Society. Ensure that the facility is classified and the operator certified by the Society to achieve compliance with this section.</p>
Requirement Description:	<p>2. GENERAL REQUIREMENTS, 2.7 Posting of Outfall</p> <p>2.7: 2.7 A sign shall be erected along the alignment of each outfall above high water mark. The sign shall identify the nature of the works. The wording and size of the sign shall be acceptable to the Director.</p>
Details/Findings:	<p>An outfall sign is erected along the alignment of the outfall above the high water mark (see Photos 3a and 3b).</p>
Compliance:	In

Actions to be taken:	
Requirement Description:	2. GENERAL REQUIREMENTS, 2.8 Outfall Inspection 2.8: 2.8 The permittee shall have each outfall inspected once each five years by independent qualified personnel to ensure it is in good working condition. An inspection report shall be submitted to the Regional Manager, Environmental Protection, within 30 days after the inspection date. The first report shall be submitted by August 30, 2007.
Details/Findings:	Staff noted that the next outfall inspection is due in August of this year, and that no issues were noted in the most recent inspection.
Compliance:	In
Actions to be taken:	
Requirement Description:	2. GENERAL REQUIREMENTS, 2.9 Solid Waste Disposal 2.9: 2.9 Screenings and other solid wastes from fish processing and sludge from the domestic sewage treatment facility shall be disposed of to a site and in a manner approved by the Director, or in a manner as authorized by regulation under the Environmental Management Act.
Details/Findings:	Sludge from the domestic sewage plant is currently picked up by a sewage collection company for disposal and screenings and other solid wastes from fish processing are sent off-site for compost feedstock (Photo 5).
Compliance:	In
Actions to be taken:	

Requirement Description:	2. GENERAL REQUIREMENTS, 2.10 Sewer Connection 2.10: 2.10 The sewage discharge authorized by this permit shall be connected to a municipal sewerage system when such facilities become available, as determined by the Director.
Details/Findings:	Municipal sewerage facilities are not available at this time.
Compliance:	Not Applicable
Actions to be taken:	
Requirement Description:	2. GENERAL REQUIREMENTS, 2.11 Pathogen Control 2.11: 2.11 The permit holder shall adhere to any federal or provincial requirements regarding the processing of diseased fish and/or pertaining to bloodwater treatment and/or disease monitoring (e.g. Biosecurity Procedures for IHN Positive Farm Sites).
Details/Findings:	No evaluations were made with regards to the permittee's adherence to federal or provincial procedures that were not directly referenced in this permit. It is not within ENV's mandate to assess compliance with other federal or provincial agencies' procedures. Therefore, compliance with this requirement could not be determined.
Compliance:	Not Determined
Actions to be taken:	Despite this requirement being "not determined", This permit does not relieve the permit holder from complying with any requirements of federal, provincial, regional district or municipal authorities.
Requirement Description:	2. GENERAL REQUIREMENTS, 2.12 Effluent Upgrading 2.12: 2.12 Based on receiving environment monitoring data and/or other information obtained in connection with this discharge, the permittee may be required to provide additional treatment facilities.

Details/Findings:	The permittee is not required to provide additional treatment facilities at this time.
Compliance:	Not Applicable
Actions to be taken:	
Requirement Description:	3. MONITORING AND REPORTING REQUIREMENTS, 3.1 Discharge Flow Monitoring 3.1: 3.1 Until December 31, 2007, the three waste streams (sewage effluent stream and 2 separate process wastewater streams) shall be monitored independently prior to combining and discharging. After December 31, 2007 the two waste streams (sewage effluent stream and process wastewater streams) shall be monitored independently prior to combining and discharging.
Details/Findings:	The two waste streams are monitored independently prior to combining and discharging through the shared outfall and utilize separate flow meters and tankage that were viewed at the inspection.
Compliance:	In
Actions to be taken:	
Requirement Description:	3. MONITORING AND REPORTING REQUIREMENTS, 3.2 Discharge Flow Measurement and Fish Processing Plant Production 3.2: 3.2 Provide and maintain a suitable flow measuring device and record once per day the separate effluent volumes (sewage and process wastewaters) discharged over a 24-hour period. Fish processing plant production records shall be maintained, and the quantity and duration of fish processing production shall be recorded each day.
Details/Findings:	Suitable flow measuring devices record the separate flows (Photos 4a & 4b); however, on several occasions over the Reporting Period the meters were not working for extended times (eg. January - June 2016; October 2016 - April 2017) and flow volumes were estimated manually.

Compliance:	Out
Actions to be taken:	Ensure suitable flow measuring devices are properly installed and maintained, and repaired in a timely manner if malfunctions occur.
Requirement Description:	3. MONITORING AND REPORTING REQUIREMENTS, 3.3 Discharge Composite Sampling During Production 3.3: 3.3 A suitable sampling facility shall be installed and a composite sample of the processing wastewater effluent authorized by Section 1.1 shall be obtained prior to discharge once every month. Based on an initial 60 days of compliance with the quality limits, frequency of sampling shall be altered to once every quarter. The sample is to consist of four grab samples taken over a two hour period at flows occurring during maximum production and mixed to form a single sample (or an approved flow proportional continuous sampler may be used) for subsequent analysis. Proper care should be taken in sampling, storing and transporting the samples to adequately control temperature and avoid contamination, breakage, etc.
Details/Findings:	Staff noted that composite samples are taken and quarterly sample analysis are on file at ENV (Photo 1).
Compliance:	In
Actions to be taken:	
Requirement Description:	3. MONITORING AND REPORTING REQUIREMENTS, 3.5 Discharge Grab Sampling 3.5: 3.5 A suitable sampling facility shall be installed and a grab sample of the domestic sewage effluent authorized by Section 1.2 shall be obtained once each quarter. Proper care should be taken in sampling, storing and transporting the samples to adequately control temperature and avoid contamination, breakage, etc.
Details/Findings:	Quarterly samples of the sewage effluent are obtained as required, and the sampling location was viewed at inspection.
Compliance:	In

Actions to be taken:	
Requirement Description:	3. MONITORING AND REPORTING REQUIREMENTS, 3.6 Discharge Analysis 3.6: 3.6 The discharger must obtain analyses of discharge samples for the following: (a) 5-day Biochemical Oxygen Demand, (b) Total Suspended Solids (nonfilterable residue), (c) for fish processing effluent only, total ammonia, (d) fecal coliforms.
Details/Findings:	Analysis for each of the above listed parameters was obtained quarterly as required.
Compliance:	In
Actions to be taken:	
Requirement Description:	3. MONITORING AND REPORTING REQUIREMENTS, 3.7 Receiving Environment Monitoring 3.7: 3.7 Receiving environment monitoring shall occur within one year of issuance of the permit. Monitoring shall occur between August 1 and August 31, in each year of monitoring. Based on a review of at least 3 years of annual monitoring the frequency of sampling may be altered subject to approval by the Director.
Details/Findings:	By amendment letter of January 13, 2014, the requirement to conduct receiving environment monitoring was changed to every three years, with the next round to be undertaken in August of this year. Because the monitoring period covered by the inspection report is 2016 - 2017, compliance with receiving environment monitoring related clauses is not applicable.
Compliance:	Not Applicable
Actions to be taken:	

Requirement Description:	3. MONITORING AND REPORTING REQUIREMENTS, 3.14 Reporting <p>3.14: 3.14 The permit holder shall maintain data of analyses and flow measurements for inspection and submit the data, suitably tabulated, to the Regional Manager, Environmental Protection, for the previous 6 months. Monitoring data shall be archived in electronic format using software in common use. The first reporting period ends December 31, 2007. An annual report shall be submitted which includes a summary and interpretation by an independent qualified professional of the discharge and receiving environment monitoring results for the previous year. The report shall provide an assessment of the impact of this discharge on the receiving environment and recommended changes (if any) to the monitoring program. The first reporting period ends December 31, 2007. Based on the results of the monitoring program, the permittee monitoring requirements may be extended or altered by the Regional Waste Manager. All reports shall be submitted within 31 days of the end of the reporting period.</p>
Details/Findings:	Data of analyses and flow measurements are submitted monthly.
Compliance:	In
Actions to be taken:	
Requirement Description:	3. MONITORING AND REPORTING REQUIREMENTS, 3.14 Reporting <p>3.14: 3.14 The permit holder shall maintain data of analyses and flow measurements for inspection and submit the data, suitably tabulated, to the Regional Manager, Environmental Protection, for the previous 6 months. Monitoring data shall be archived in electronic format using software in common use. The first reporting period ends December 31, 2007. An annual report shall be submitted which includes a summary and interpretation by an independent qualified professional of the discharge and receiving environment monitoring results for the previous year. The report shall provide an assessment of the impact of this discharge on the receiving environment and recommended changes (if any) to the monitoring program. The first reporting period ends December 31, 2007. Based on the results of the monitoring program, the permittee monitoring requirements may be extended or altered by the Regional Waste Manager. All reports shall be submitted within 31 days of the end of the reporting period.</p>
Details/Findings:	With regards to the annual report requirement to include the summary and interpretation of both the discharge and receiving environment monitoring results for the previous year, it is not clear whether the intention of the Director would be to alter the frequency to every three years in tandem with the changed requirement of receiving environment monitoring to every three years as per the letter amendment of January 13, 2014, or to continue to require an annual report which would include all monitoring data for sampling carried out that year (discharge and/or receiving environment), every year.

Compliance:	Not Determined
Actions to be taken:	Please contact the authorizations section head Karen Moores (Karen.Moores@gov.bc.ca) and discuss the need for clarification of this clause, which may require an amendment or correction to update the clause in tandem with the 2014 amendment if this is the intent of the Director.

Please be advised that this inspection report may be published on the provincial government website within 7 days.

If you have any questions about this letter, please contact the undersigned.

Yours truly,

Laura Hunse

Environmental Protection Officer

cc: Karen Moores, Authorizations Section Head, General Industry

Attachments:

Deliver via:

Email: ☒ Fax: ☐ Mail: ☐
Registered Mail: ☐ Hand Delivery: ☐

**Ministry of Environment
and Climate Change
Strategy**

Compliance
Environmental
Protection Division

Mailing Address:
2080-A
Labieux Rd
Nanaimo BC V9E 6J9

Telephone: 250 751 3100
Facsimile: 250 751 3103
Website: www.gov.bc.ca/env

DISCLAIMER:

Please note that sections of the permit, regulation or code of practice referenced in this inspection record are for guidance and are not the official version. Please refer to the original permit, regulation or code of practice.

To see the most up to date version of the regulations and codes of practices please visit
<http://www.bclaws.ca>

If you require a copy of the original permit, please contact the inspector noted on this inspection record.

It is also important to note that this inspection record does not necessarily reflect each requirement or condition of the authorization therefore compliance is noted only for the requirements or conditions listed in the inspection record.

Authorization: 5661	Walcan Seafood Ltd.
NRIS IR #: 80101	February 21, 2018 Site Inspection Photos

Photo 1

Fine screen rotary drum including sample port (collection location).



Photo 2

Above ground at Whitewater sewage treatment system.



Authorization: 5661	Walcan Seafood Ltd.
NRIS IR #: 80101	February 21, 2018 Site Inspection Photos

Photos 3a & 3b

Outfall sign, and
overlooking
general outfall
terminus area.



Photo 4a & 4b

Plant effluent
flowmeter
(magmeter),
bottom right, and
display readout.



Authorization: 5661	Walcan Seafood Ltd.
NRIS IR #: 80101	February 21, 2018 Site Inspection Photos

Photo 5

Solid waste/offal
collected for
offsite
composting.



Photo 6

Sewage sampling
location.





BC MINISTRY OF ENVIRONMENT -
Compliance - Surrey
ATTN: Hunse, Laura
200-10470 152 Street
Surrey BC V3R 0Y3

Date Received: 23-FEB-18
Report Date: 16-MAR-18 15:25 (MT)
Version: FINAL

Client Phone: 604-582-5216

Certificate of Analysis

Lab Work Order #: L2059997

Project P.O. #: 50234668

Job Reference: SAMPLE 1 EFFLUENT

C of C Numbers: 50234668

Legal Site Desc:

Other Client: CL
Information: EMS ID: E311189

Comments: Please note that no bacterial analysis was conducted because samples were received past their hold time.

Dean Watt, B.Sc.
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 An ALS Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L2059997-1 WATER 21-FEB-18 13:40 E311189_REG	L2059997-2 WATER 21-FEB-18 13:40 E311189_BLK			
Grouping	Analyte					
WATER						
Physical Tests	pH (pH)	6.97				
	Total Suspended Solids (mg/L)	155				
Anions and Nutrients	Ammonia, Total (as N) (mg/L)	0.635				
	Nitrate (as N) (mg/L)	<0.50 ^{DLDS}				
	Nitrite (as N) (mg/L)	<0.10 ^{DLDS}				
	Total Kjeldahl Nitrogen (mg/L)	42.3				
	Total Nitrogen (mg/L)	42.3				
	Total Organic Nitrogen (mg/L)	41.7				
	Phosphorus (P)-Total (mg/L)	6.99				
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	125				
Inorganic Parameters	Chlorine, Total (mg/L)	0.11				
Aggregate Organics	BOD (mg/L)	246 ^{HTD}	423 ^{HTD}			
	COD (mg/L)	740				
	Oil and Grease (mg/L)	22.5				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Total Organic Carbon	MS-B	L2059997-1
Matrix Spike	Total Organic Carbon	MS-B	L2059997-1
Matrix Spike	Total Organic Carbon	MS-B	L2059997-1
Matrix Spike	Total Nitrogen	MS-B	L2059997-1
Matrix Spike	Total Nitrogen	MS-B	L2059997-1
Matrix Spike	Phosphorus (P)-Total	MS-B	L2059997-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BOD5-VA	Water	Biochemical Oxygen Demand- 5 day	APHA 5210 B- BIOCHEMICAL OXYGEN DEMAND
This analysis is carried out using procedures adapted from APHA Method 5210 B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CL2-TOTAL-VA	Water	Chlorine (Residual), Total	APHA 4500-CL G. (DPD)
Chlorine, as free or total, is analyzed using procedures adapted from APHA 4500-Cl "G" Chlorine.			
COD-COL-VA	Water	Chemical Oxygen Demand by Colorimetric	APHA 5220 D. CHEMICAL OXYGEN DEMAND
This analysis is carried out using procedures adapted from APHA Method 5220 "Chemical Oxygen Demand (COD)". Chemical oxygen demand is determined using the closed reflux colourimetric method.			
EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
N-T-COL-VA	Water	Total Nitrogen in water by Colour	APHA4500-P(J)/NEMI9171/USGS03-4174
This analysis is carried out using procedures adapted from APHA Method 4500-P (J) "Persulphate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus" and National Environmental Methods Index - Nemi method 5735.			
N-T-ORG-CALC(TN)-VA	Water	Total Organic Nitrogen (Calc from TN)	EN12260/J. ENVIRON. MONIT, 2005/EPA 300
Total Organic Nitrogen is a calculated parameter. Total Organic Nitrogen = Total Nitrogen - (Ammonia + (Nitrate+Nitrite)).			
NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
OGG-LL-SF-VA	Water	Oil & Grease by Gravimetric	BCMOE (2013), EPA1164A
The procedure involves an extraction of the entire water sample with hexane. This extract is then evaporated to dryness, and the residue weighed to determine Oil and Grease. ALS Environmental's routine detection limit, or Limit of Reporting (LOR), for this method is 1 mg/L for a 1L sample volume.			
P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample. Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.			
Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.			

Reference Information

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

TKN-CALC-VA Water TKN in Water (Calculation) BC MOE LABORATORY MANUAL (2005)

Total Kjeldahl Nitrogen is a calculated parameter. Total Kjeldahl Nitrogen (calc) = Total Nitrogen - [Nitrite (as N) + Nitrate (as N)].

TSS-VA Water Total Suspended Solids by Gravimetric APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

** 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
----------------------------	---------------------

VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA
----	---

Chain of Custody Numbers:

50234668

Additional Information:

Sampling Agency Code: 10

Average Cooler Temperature (Deg Celsius): 1.1

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 ww - 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.

Quality Control Report

Workorder: L2059997

Report Date: 16-MAR-18

Page 1 of 5

Client: BC MINISTRY OF ENVIRONMENT - Compliance - Surrey
200-10470 152 Street
Surrey BC V3R 0Y3

Contact: Hunse, Laura

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BOD5-VA		Water						
Batch	R3977372							
WG2724223-2	LCS							
BOD			94.8		%		85-115	28-FEB-18
WG2724223-6	LCS							
BOD			100.2		%		85-115	28-FEB-18
WG2724223-1	MB							
BOD			<2.0		mg/L		2	28-FEB-18
WG2724223-5	MB							
BOD			<2.0		mg/L		2	28-FEB-18
CARBONS-TOC-VA		Water						
Batch	R3972008							
WG2722352-1	LCS							
Total Organic Carbon			103.0		%		80-120	26-FEB-18
WG2722352-13	LCS							
Total Organic Carbon			99.7		%		80-120	26-FEB-18
WG2722352-17	LCS							
Total Organic Carbon			101.6		%		80-120	26-FEB-18
WG2722352-21	LCS							
Total Organic Carbon			100.3		%		80-120	27-FEB-18
WG2722352-5	LCS							
Total Organic Carbon			99.8		%		80-120	26-FEB-18
WG2722352-9	LCS							
Total Organic Carbon			96.7		%		80-120	26-FEB-18
WG2722352-12	MB							
Total Organic Carbon			<0.50		mg/L		0.5	26-FEB-18
WG2722352-16	MB							
Total Organic Carbon			<0.50		mg/L		0.5	26-FEB-18
WG2722352-20	MB							
Total Organic Carbon			<0.50		mg/L		0.5	27-FEB-18
WG2722352-4	MB							
Total Organic Carbon			<0.50		mg/L		0.5	26-FEB-18
WG2722352-8	MB							
Total Organic Carbon			<0.50		mg/L		0.5	26-FEB-18
CL2-TOTAL-VA		Water						
Batch	R3968776							
WG2721787-2	DUP	L2059997-1						
Chlorine, Total		0.11	<0.10	RPD-NA	mg/L	N/A	15	24-FEB-18
WG2721787-1	MB							
Chlorine, Total			<0.10		mg/L		0.1	24-FEB-18

Quality Control Report

Workorder: L2059997

Report Date: 16-MAR-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
COD-COL-VA	Water							
Batch	R3979517							
WG2729096-3	LCS							
COD			100.3		%		85-115	08-MAR-18
WG2729096-6	LCS							
COD			101.6		%		85-115	08-MAR-18
WG2729096-1	MB							
COD			<20		mg/L		20	08-MAR-18
WG2729096-5	MB							
COD			<20		mg/L		20	08-MAR-18
N-T-COL-VA	Water							
Batch	R3971793							
WG2722596-2	LCS							
Total Nitrogen			98.2		%		75-125	27-FEB-18
WG2722596-6	LCS							
Total Nitrogen			96.2		%		75-125	27-FEB-18
WG2722596-1	MB							
Total Nitrogen			<0.030		mg/L		0.03	27-FEB-18
WG2722596-5	MB							
Total Nitrogen			<0.030		mg/L		0.03	27-FEB-18
NH3-F-VA	Water							
Batch	R3979420							
WG2728686-5	LCS							
Ammonia, Total (as N)			101.8		%		85-115	08-MAR-18
WG2728686-4	MB							
Ammonia, Total (as N)			<0.0050		mg/L		0.005	08-MAR-18
NO2-L-IC-N-VA	Water							
Batch	R3980670							
WG2729579-2	LCS							
Nitrite (as N)			100.6		%		90-110	09-MAR-18
WG2729579-1	MB							
Nitrite (as N)			<0.0010		mg/L		0.001	09-MAR-18
NO3-L-IC-N-VA	Water							
Batch	R3980670							
WG2729579-2	LCS							
Nitrate (as N)			101.6		%		90-110	09-MAR-18
WG2729579-1	MB							
Nitrate (as N)			<0.0050		mg/L		0.005	09-MAR-18
OGG-LL-SF-VA	Water							

Quality Control Report

Workorder: L2059997

Report Date: 16-MAR-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
OGG-LL-SF-VA	Water							
Batch	R3974529							
WG2722901-2 LCS								
Oil and Grease			106.1		%		70-130	27-FEB-18
WG2722901-1 MB								
Oil and Grease			<1.0		mg/L		1	27-FEB-18
P-T-PRES-COL-VA	Water							
Batch	R3968795							
WG2721722-2 CRM		VA-ERA-PO4						
Phosphorus (P)-Total			96.0		%		80-120	24-FEB-18
WG2721722-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	24-FEB-18
PH-PCT-VA	Water							
Batch	R3971987							
WG2722829-2 CRM		VA-PH7-BUF						
pH			6.98		pH		6.9-7.1	27-FEB-18
TSS-VA	Water							
Batch	R3972317							
WG2723119-2 LCS								
Total Suspended Solids			99.7		%		85-115	27-FEB-18
WG2723119-1 MB								
Total Suspended Solids			<3.0		mg/L		3	27-FEB-18

Quality Control Report

Workorder: L2059997

Report Date: 16-MAR-18

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Workorder: L2059997

Report Date: 16-MAR-18

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Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH by Meter (Automated)	1	21-FEB-18 13:40	27-FEB-18 22:34	0.25	153	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by IC (Low Level)	1	21-FEB-18 13:40	09-MAR-18 06:57	3	16	days	EHT
Nitrite in Water by IC (Low Level)	1	21-FEB-18 13:40	09-MAR-18 06:57	3	16	days	EHT
Inorganic Parameters							
Chlorine (Residual), Total	1	21-FEB-18 13:40	24-FEB-18 09:00	0.25	67	hours	EHTR-FM
Aggregate Organics							
Biochemical Oxygen Demand- 5 day	1	21-FEB-18 13:40	28-FEB-18 14:07	3	7	days	EHT
	2	21-FEB-18 13:40	28-FEB-18 14:07	3	7	days	EHT

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:

Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2059997 were received on 23-FEB-18 08:35.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

WATER, GENERAL CHEMISTRY AND BACTERIOLOGICAL REQUISITION

ALS Global

Province Of British Columbia
Ministry of Environment

Req # 50234668

Urgent?	Csr No.	Office 10	Client CL
Study	Project	N/A	
Lab	ALS Global		
Ministry Contact	LAHUNSE HUNSE, LAURA		
Sampler	HUNSE, LAURA 250 751-3224		
Signature			
EMS Id	E311189	Well Plate #	
Location	SAMPLE 1 EFFLUENT		

Sampling Agency	
Code 10	Name Vancouver Island, Nanaimo
Address	2080-A Labieux Road
City	Nanaimo
Postal Code	V9T6J9
Phone	(250)751-3100
Number of Containers	

Instructions To Lab PLS SEND RESULTS TO CONNOR.FRALEIGH@GOV.BC.CA

State	WW	Descriptor	OT	Collection Method	GRB	No.	Class	Collection Start YYYY-MM-DD HH:MI	Collection End YYYY-MM-DD HH:MI	Depth Upper Lower Tide	Comment
1	REG	2018-02-21 13:07		13:40							
2											
3											
4											
5											
6											

GENERAL (250 mL PLASTIC)

Acidity pH 8.3
Alkalinity Titration Curve
Alkalinity: Total: pH 4.5
Alkalinity: Phenolphthalein
X (500 mL Plastic) Biochemical Oxygen Demand (BOD)
Bromide
(500 mL Plastic) Carb. Biochem. Oxygen Demand (CBOD)
Carbon: TIC
Chloride
Colour: True
Fluoride
Nitrogen: Nitrate and Nitrite
Nitrogen: Nitrate
Nitrogen: Nitrite
X pH
Phosphorus: Diss. ortho-phosphate
(500 mL Plastic) Residue: Filterable (TDS)
X (500 mL Plastic) Residue: Nonfilterable (TSS) - Subsample (3 mg/L LOR)
(500 mL Plastic) Residue: Nonfilterable, Fixed
(500 mL Plastic) Residue: Total (TS)
Specific Conductance
Turbidity
Sulphate

GENERAL NUTRIENTS (125 mL AMBER GLASS) - H2SO4

X Carbon: TOC
X Chemical Oxygen Demand (COD)
X Nitrogen: Ammonia
X Nitrogen: Total
X Nitrogen: Total Kjeldahl (Calc)
X Nitrogen: Total Organic
X Phosphorus: Total

GENERAL (125 mL AMBER GLASS) - FIELD FILTER, H2SO4

Carbon: DIC (Field Filter)
Carbon: DOC (FF, H2SO4)
Nitrogen: Dissolved Kjeldahl (Calc) (FF, H2SO4)
Nitrogen: Total Dissolved (FF, H2SO4)
Phosphorus: Total Dissolved (FF, H2SO4)

METALS: TOTAL

High	Low
	Metal Pkg. (ICPMS) - HIGH (60 mL Plastic) - HNO3
	Metal Pkg. (ICPMS) - LOW (60 mL Plastic) - HNO3
	Mercury - 40mL Glass, HCl
	Hardness (60 mL Plastic) - HNO3

METALS: DISSOLVED

High	Low
	Metal Pkg (ICPMS) - HIGH (60 mL Plastic)-Field Filter, HNO3
	Metal Pkg. (ICPMS) - LOW (60 mL Plastic)-Field Filter, HNO3
	Mercury - 40mL Glass, Field Filter, HCl
	Hardness (60 mL Plastic) - Field Filter, HNO3

SPECIFIC Tests

Obs Well Package
Cyanide: SAD (60 mL Plastic + NaOH)
Cyanide: WAD (60 mL Plastic + NaOH)
Sulphide: Total (125 mL Plastic, ZnAc & NaOH)
Residue: Nonfilterable (TSS) -Whole Bottle - 1 mg/L LOR (150 mL Plastic)
Chlorophyll a (250 mL Brown Plastic Bottle or Filter) Vol:
Phaeophytin (250 mL Brown Plastic Bottle or Filter) Vol:

ORGANICS

BTEX (2 X 40 mL glass vials, NaHSO4 or Na2S2O3, No headspace)
VOC Full List (2 X 40 mL glass vials, NaHSO4 or Na2S2O3, No headspace)
Volatile Hydrocarbons (VH) (2X40 mL glass vials, NaHSO4 or Na2S2O3, No headspace)
Trihalomethanes (THM) (2 X 40 mL glass vials, NaHSO4 or Na2S2O3, No headspace)
VPH (2 X 40 mL glass vials, NaHSO4 or Na2S2O3, No headspace)
EPH (2 X 100 mL Amber Glass, NaHSO4)
PAH (2 X 100 mL Amber Glass, NaHSO4)
LEPH/HEPH (Calc) (2 X 100 mL Amber Glass, NaHSO4)
X Oil & Grease (2 X 250 mL Amber Glass, 2 mL 1:1 HCl or 1:1 H2SO4)
Mineral Oil & Grease (2 x 250 mL Amber Glass, 2 mL 1:1 HCl or 1:1 H2SO4)
Organochlorine Pesticides (OCP) (2 X 500 mL Amber Glass)
Organophosphorus Pesticides (OPP) (2 X 500 mL Amber Glass)
Polychlorinated Biphenyls (PCBs) (2 X 500 mL Amber Glass)
Chlorophenols (Tri, Tetra & Penta) (2 X 500 mL Amber Glass, C6H8O6 & NaHSO4)
Phenolics, Chlorinated (2 X 500 mL Amber Glass, C6H8O6 & NaHSO4)
Phenolics, Non-Chlorinated (2 X 500 mL Amber Glass, C6H8O6 & NaHSO4)
Phenols, Colorimetric (125 mL Amber Glass, H2SO4)
Acid Extractable Herbicides (2 X 1 L Amber Glass, NaHSO4)
Resin Acids (2 X 500 mL Amber Glass, C6H8O6 & NaHSO4)
Fatty Acids (2 X 500 mL Amber Glass, C6H8O6 & NaHSO4)

BACTERIOLOGY

X E. coli - MF
X Enterococci - MF
Fecal coliform - MF
X Fecal coliform - MPN
Fecal streptococ - MF
Total coliform - MF
Total coliform - MPN

OTHER Tests

X 1 x 500 mL for Field Blank BOD
X Chlorine Residual

Smpl No. FIELD TEST Details Method Results Units

Report ID: EMSR0900

Date: 2018-02-19 14:55

8-35

1.1 06

L2059997-COFC





Report of Analysis

812-CE / CL- EPD COMPLIANCE 2017/18

Connor Fraleigh
MOE
BC
Lower Mainland

Siute 200-10470 152 Street
Surry, BC
V3R 0Y3

Work Order: V18B075

Reported: 2018-03-07
Printed: 2018-03-07

Authorization:

Laretta Liem For Graham van Aggelen
Manager, PYLET

The results reported pertain only to the samples submitted to and tested by the Environment and Climate Change Canada (ECCC) laboratory indicated in the report.

These ECCC laboratories are accredited by the Canadian Association for Laboratory Accreditation (CALA) to the standard ISO/IEC 17025 for each of the reported analytes, except where indicated by an asterisk (). Please refer to the CALA website (www.cala.ca) to view the full Scope(s) of Accreditation.*

ABSTRACT

Sample Manager contact:

Email: ec.coordonnateurdusoutiendelaboratoire-labsupportcoordinator.ec@canada.ca
<<mailto:ec.coordonnateurdusoutiendelaboratoire-labsupportcoordinator.ec@canada.ca>>

Phone: (604) 903-4413

QA Officer contact:

Email: ec.agentdassurancedelaqualiteleepy-qualityassuranceofficerpylet.ec@canada.ca
<<mailto:ec.agentdassurancedelaqualiteleepy-qualityassuranceofficerpylet.ec@canada.ca>>

Phone: (604) 903-4411

<u>Unit</u>	<u>Description</u>
% by Volume	Percent by volume

<u>Qualifier</u>	<u>Description</u>
NAL	Not Acutely Lethal
*	Non-Accredited Analysis/Analyte
ND	Not Detected at Reporting Limit (RL)
NR	Not Recoverable

SAMPLE DESCRIPTION

<u>Lab ID</u>	<u>Client ID</u>	<u>Station ID</u>	<u>Matrix</u>	<u>Date/Time Sampled</u>	<u>Date Received</u>	<u>Sample Type</u>
V18B075-01	SAMPLE 1		Water	2018-02-21 13:07 PAC Sampled By: Laura Hunse	2018-02-28	Grab

REFERENCES

<u>Method ID</u>	<u>Laboratory Method</u>	<u>Reference</u>
V0503W	V_Microtox_IC50ML	EPS 1/RM/24
<u>Toxicology Containers</u>		<u>Temperature °C</u>

ACUTE LETHALITY TEST USING RAINBOW TROUT (96 HOUR SINGLE CONCENTRATION) - REPORT

LAB SAMPLE ID: V18B075-01

TEST CONDITIONS - CUMULATIVE MORTALITY / OBSERVATIONS [†]

Time Check	Concentration (%)					
	Control		Ctrl 9ppt salt		36	
	mortality	obs.	mortality	obs.	mortality	obs.
24 hr	0		0		0	
48 hr	0		0		0	
72 hr	0		0		0	
96 hr	0		0		0	

[†] Test observation Codes - EPS 1/RM/9 July 1990 amended May 1996 and 2007 Appendix E

** immediate stress, coughing & erratic swimming + behaviour cannot be observed **Integument:** A Shedding B Mucous C Hemorrhaging **Pigmentation:** D Light E Dark F Mottled

General behavior: G Quiescent H Hyperexcitable I Irritated J Surfacing K Sounding L Twitching M Tetanic N Normal Δ Moribund

Swimming: O Ceased P Erratic Q Gyration R Skittering S Inverted T On side **Respiration:** U Rapid V Slow W Coughing X Surface Z Irregular

QUALITY CONTROL: Reference Toxicant Test

Test Date: 2018-02-23 96 hr (Static) LC50 = 8.6 mg/L 95% confidence limits: 8.0 & 9.3

Chemical: Phenol Geomean 96 hr LC50 = 10.7 mg/L 95% warning limits: 8.2 & 13.8 (n = 20)

ANALYSIS RESULTS:

Conc. (%)	Control	Ctrl 9ppt salt	36
96 hr Mortality (%)	0	0	0

96 hr (Static) Single Concentration = not acutely lethal @ 36% test concentration.

Where the single concentration (SC) is percent mortality of the test organisms held in a particular test solution over an exposure period of 96 hours.

RESULTS NOTES:

The test solution at 36 % has a salinity of 9.1 ppt.

LIQUID PHASE - TOXICITY TEST USING LUMINESCENT BACTERIA - *Vibrio fischeri* (5 & 15 MINUTE IC50) - REPORT

LAB SAMPLE ID: V18B075-01

Analyst: CB

DESCRIPTION OF SAMPLE:

- 250mL sub-sample from 4x20L carboys of cloudy liquid

DESCRIPTION OF TEST FACILITIES & CONDITIONS:

Testing was started \leq 72 hours of sample collection. Tests were conducted in glass cuvettes. Test instrument was the Microtox M500. Test results were calculated using Microtox Omni software. All physical chemical measurements were performed using instruments that were automatically temperature compensated where necessary. Unless otherwise noted, all test conditions and validity criteria as specified by the Environment Canada test method were met.

PROTOCOL USED:

Test was performed as prescribed in the lab Standard Operating Procedure and the Environment Canada biological test method, Toxicity Test Using Luminescent Bacteria, Report EPS 1/RM/24 November 1992.

TEST METHOD and/or SOP DEVIATIONS:

The test was conducted at $15 \pm 0.5^\circ\text{C}$.

ANALYSIS TYPE:

5 & 15 min IC50 Basic Test Turbidity correction: No Colour correction: No Test Equipment: Model 500 Analyzer

Test Volume: 1 mL Control Replicates: 1 Test Replicates: 1 Start date: 2018-02-27 Start time: 14:45 Test Temp. ($^\circ\text{C}$): 15 ± 0.5

TEST CONCENTRATIONS (%):

1. 0	2. 0.195	3. 0.391	4. 0.781	5. 1.563	6. 3.125	7. 6.25	8. 12.5	9. 25	10. 50
------	----------	----------	----------	----------	----------	---------	---------	-------	--------

CONTROL/DILUTION WATER TYPE and SOURCE:

Type: Sea Water ‰ Salinity: 24.5 Source: Sea Water

TEST ORGANISM:

Species: *Vibrio fischeri* Strain: NRRL B-11177 Source: Modern Water Reagent lot #: 17E4123A Receive date: 2017-10-31

Reagent expiry date: 2019-06-01 Reagent reconstitution time: 13:25 Test start time from reagent reconstitution (min): 80

SAMPLE ADJUSTMENTS:

Osmotic Adjustment: 2% NaCl by weight Source: Fisher Scientific (ACS)

QUALITY CONTROL: Reference Toxicant Test

Test Date: 2018-02-27 15 min (Static) IC50 = 20.4 mg/L 95% confidence limits: 15.3 & 27.2

Chemical: Phenol Geomean 15 min (Static) IC50 = 22.8 mg/L 95% warning limits: 16.8 & 30.8 (n = 20)

LIQUID PHASE - TOXICITY TEST USING LUMINESCENT BACTERIA - *Vibrio fischeri* (5 & 15 MINUTE IC50) - REPORT

LAB SAMPLE ID: V18B075-01

ANALYSIS RESULTS:

5 minute (Static) IC50 = not acutely toxic 95% confidence limits: &

Where the inhibition concentration (IC50) is the concentration of material in water that is calculated to cause a 50% decrease in light emission of the test organisms over an exposure period of 5 minutes.

15 minute (Static) IC50 = not acutely toxic 95% confidence limits: &

Where the inhibition concentration (IC50) is the concentration of material in water that is calculated to cause a 50% decrease in light emission of the test organisms over an exposure period of 15 minutes.

The statistical method used to generate the results was the MicrotoxOmni Software for Windows® Version 1.18 95/98/NT: [Copyright by Azur Environmental 1999, issued by Strategic Diagnostics Inc. 2004].

RESULTS NOTES:

The sample was not acutely toxic to *Vibrio fischeri* (Microtox® bacteria) over 5 minutes of exposure.

The sample was not acutely toxic to *Vibrio fischeri* (Microtox® bacteria) over 15 minutes of exposure.

LIQUID PHASE - TOXICITY TEST USING LUMINESCENT BACTERIA - *Vibrio fischeri* (5 & 15 MINUTE IC50) - REPORT

LAB SAMPLE ID: V18B075-01

Microtox Report

Acute Liquid Phase Microtox Test Report

Date: - -

Test Protocol: Basic-type Test

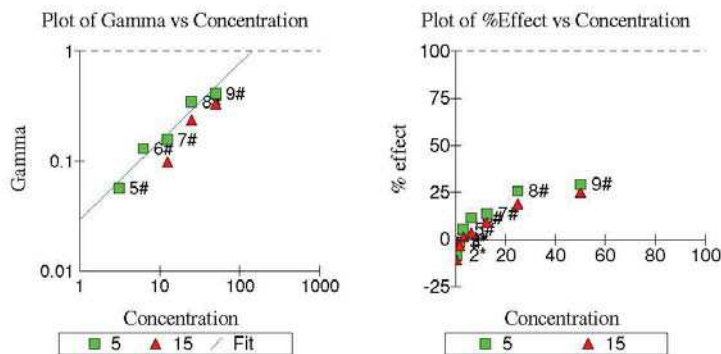
Sample: Sample 1 E311189

Toxicant:

Reagent Lot no.:

Test description: Sample 1 E311189

Data File: Sample 1 E311189.K5; Sample 1 E311189.K15;



Sample	Conc	5 Mins Data:				15 Mins Data:			
		Io	It	Gamma	% effect	It	Gamma	% effect	
Control	0.000	95.50	90.31	0.9457 #		92.87	0.9725 #		
1	0.1953	96.88	93.42	-0.0193 *	-1.970%	96.89	-0.0276 *	-2.843%	
2	0.3906	84.40	86.65	-0.0789 *	-8.566%	91.05	-0.0985 *	-10.93%	
3	0.7813	89.46	85.55	-0.0111 *	-1.125%	88.37	-0.0155 *	-1.579%	
4	1.563	86.02	82.31	-0.0117 *	-1.186%	86.26	-0.0302 *	-3.119%	
5	3.125	91.34	81.73	0.0568 #	5.379%	87.53	0.0147 *	1.457%	
6	6.250	87.86	73.58	0.1292 #	11.44%	82.42	0.0366 *	3.535%	
7	12.50	88.49	72.27	0.1579 #	13.64%	78.36	0.0981	8.940%	
8	25.00	92.53	65.00	0.3462 #	25.72%	72.90	0.2343	18.98%	
9	50.00	84.19	56.35	0.4129 #	29.22%	61.46	0.3321	24.93%	

- used in calculation; * - invalid data; D - deleted from calcs.
Autocalc has been used.

Calculations on 5 Mins data:

IC50 Concentration: 127.9% (95% confidence range: 46.49 to 352.0)

95% Confidence Factor: 2.752

IC50 value is greater than 100%

Estimating Equation: $\text{LOG C} = -1.336 \times \text{LOG G} + 2.107$

Coeff. of Determination (R^2): 0.9542

Slope: 0.7143

Correction Factor: 0.9457

Statistical calculations could not be performed on the 15 Mins data.

Highest % effect: 24.93%

ATTN: CRAIG BURDET

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COC(NF)
WOCN(NF)

Sample Type Code/Code du type d'échantillon

#	ENVIRODAT	Element
01	Discrete Sample	Grab::Instantané
03	Duplicate Sample	Duplicate::Duplicata
04	Triplicate Sample	Triplicate::Triplcata
06	Composite Sample	Composite::Composite
08	Trip Blank	Trip Blank::Blanc transport
09	Matrix Spike	Matrix Spike::Matrice enrichie
11	Pooled Sample	Pooled::Mise en commun
22	Field Blank	Field Blank::Blanc terrain
24	Field Spike	Field Spike::Enrichi terrain
28	Trip Spike	Trip Spike::Enrichi transport

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LABORATORY USE ONLY / À L'USAGE DU LABORATOIRE SEULEMENT

Lab Contacts / Contacts des laboratoires

Moncton
Hélène Harper
ALET
443 University Ave.
Moncton, NB
E1A 6S8
Tel/Tél: 506-851-7208
Fax: 506-851-6608

Montréal
François Dumouchel
LEEQ
105 McGill
Montréal, QC
H2Y 2E7
Tel/Tél: 514-496-7100
Fax: 514-283-1719

Ottawa
Carl Brown
ESTS
335 River Road
Ottawa, ON
K1A 0H3
Tel/Tél: 613-991-1118
Fax: 613-991-9495

Burlington
Sharon Carrier
NLET
867 Lakeshore Road
Burlington, ON
L7S 1A1
Tel/Tél: 905-336-6261
Fax: 905-336-6404

Edmonton
Paul Houle
PNLET
5320 122 Street
Edmonton, AB
T6H 3S5
Tel/Tél: 780-435-7335
Fax: 780-435-7268

Vancouver
Graham vanAggelen
PYLET
2645 Dollarton Highway
North Vancouver, BC
V7H 1B1
Tel/Tél: 604-903-4444
Fax: 604-903-4408

Canada