



March 11, 2020

Dr. Robert Dodds, P.Eng.  
Red Pine Exploration Inc.  
141 Adelaide Street, Suite 520  
Toronto, ON M5H 3L5

Re: EXP Project No. THB-00094262-JG-200  
**2019 Results of Additional Surface Water Monitoring  
to Satisfy Part 5 of Mine Rehabilitation Code  
Citadel Gold Mine, Wawa, Ontario**

## **Site Description and Background**

EXP Services Inc. (EXP) (formerly Trow Consulting Engineers / Trow Associates Inc. [Trow]) has conducted annual surface water monitoring since 1992 at the Citadel Gold Mine in Wawa, Ontario, on behalf of Citadel Gold Mines (recently known as Citabar Limited Partnership or Citabar, and currently known as Red Pine Exploration Inc., or Red Pine).

The subject tailings disposal site is located in the Township of Michipicoten (Geographical Township of McMurray) in the District of Algoma, about 2 kilometres southeast of the community of Wawa, as shown on Figure 1 (Appendix A). The mine and mill complex ceased operation in November of 1989 and has not discharged tailings into the tailings system since then. Since a return to production may occur in the future, Red Pine is maintaining the tailings system in its current condition.

At present, the Tailings Pond (Minto Lake) has not been filled to its design capacity. All existing tailings are currently submerged within the Tailings Pond. A former small pile, previously dredged from the lake, was transported to Wesdome Gold Mines Ltd., Eagle River Mill, in the summer of 2008 for further processing.

The Minto Lake Tailings Pond currently supports a fish community including stocked brook trout, white sucker and a variety of Cyprinid species. Suckers and minnows represent self-reproducing populations; therefore, no interim rehabilitation measures are planned or considered necessary. It is the intention of Red Pine to maintain the Tailings Pond in its

present condition. The construction of the overflow spillway approved by the Ministry of Natural Resources (MNR) and the Ministry of the Environment, Conservation and Parks (MECP) was completed in the summer of 2014<sup>1</sup>. In addition, during the spillway construction, a culvert crossing between the access road to the polishing dam and the spillway was removed and a new larger 910 mm (36 inch) diameter culvert was installed.

## Monitoring and Reporting Requirements

The monitoring program required by the original MECP Certificate of Approval (C of A) included surface water sampling at six (6) locations identified as CGM-4 through CGM-9 on Figure 1. Locations CGM-4 through CGM-8 were to be sampled four times annually, while location CGM-9 was to be sampled twice annually. However, a letter of permission from the MECP, dated November 28, 2011 (copy in Appendix B) authorized a reduction in sampling frequency to twice annually (spring and fall) at all six locations. These sampling requirements were incorporated in the current Environmental Compliance Approval (ECA) issued in September 2012 (see Appendix B).

EXP has prepared annual Performance Evaluation (Environmental Compliance) Reports for Red Pine, most recently for 2019<sup>2</sup>, which present and discuss the surface water sampling results for the six monitoring stations. The annual Performance Reports are required to satisfy Condition No. 8 of the ECA, which specifies that reports be prepared for submission to the MECP by the end of March in the year following the reporting period.

Part 5 of the Mine Rehabilitation Code, administered by MENDM (Ministry of Energy, Northern Development and Mines), requires that water quality be unimpaired and satisfactory for aquatic life and other uses. MENDM had required that, effective November 2009, four (4) additional locations (identified as CGM-10 through CGM-13 on Figure 1) be sampled four times annually (i.e., the sampling frequency specified in the original C of A) concurrently with the six ECA locations, to monitor potential contamination from historical mining activities, as described in EXP's (formerly Trow) Closure Plan Amendment<sup>3</sup>. In addition, conductivity, total dissolved solids, acidity, sulphate, aluminum and molybdenum were added to the ECA parameters list in order to harmonize the monitoring with Part 5 of the Rehabilitation Code. The results for the additional MENDM monitoring stations, therefore, were to include all parameters listed in Part 5 (notably mercury at the southern sites), sampled four times annually in accordance with the previous C of A (as opposed to the twice annual requirements of the current ECA). However, if results indicate no significant impacts, the monitoring

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<sup>1</sup> EXP Services Inc. (2014). *As-Built Report, Closure Spillway Construction, Minto Lake Mine Dam*. EXP Reference No. THB-00094262-EG. December 18, 2014.

<sup>2</sup> EXP Services Inc. (2019). *2019 Performance Evaluation (Environmental Compliance) Report, Citadel Gold Mine, Wawa, Ontario*. EXP. Ref. No. THB-00095132-YE. February 12, 2020.

<sup>3</sup> Trow Associates Inc. (2010). *Closure Plan Amendment, Addendum Number 5, For the Properties of Citadel Gold Mine Inc., Wawa, Ontario*. Trow Ref. No. TBGE00094262B. January 14, 2010.

program can revert to the present ECA-specified sampling only. Given that this has generally been the case since 2013, monitoring at all locations has been conducted twice annually.

Three of the additional locations were established downgradient of the discontinued mine sites to determine if impact from historical mining activities is apparent. The three downgradient sampling locations are as follows: CGM-10 was added to assess the discharge from the Surluga vent raise at Surluga Mine, CGM-11 was added on the upstream side of the culvert crossing the access road downstream of the Parkhill site, while CGM-12 was added on the upstream side of the culvert crossing the road downstream of the Grace-Darwin site. The fourth location is CGM-13, upstream of Parkhill and Grace Darwin Mine, to provide background data (i.e., location believed to be unaffected by the historical mining activities) (see Figure 1).

### **Sample Collection and Submission**

Beginning in December of 2009, and subsequently four times annually (twice annually for station CGM-9) in 2010, 2011 and 2012, grab samples were collected from the six ECA monitoring stations and the four additional MENDM stations, as described above. In 2013, the monitoring program at all 10 stations was reduced to twice annually (spring and fall), in general accordance with the current ECA issued in September 2012. However, due to an oversight, the four MENDM stations were not sampled in spring 2013. In 2014 to 2019, the six ECA and four MEDNM locations were sampled in the spring and fall in general accordance with the ECA. The samples were submitted under chain of custody to Maxxam Analytics in Mississauga, ON, for analysis of the parameters specified in the ECA. Additionally, samples from the four extra MENDM locations (CGM10 through CGM13) were analysed for additional parameters to satisfy Part 5 of the Mine Rehabilitation Code.

### **Results and Discussion**

The chemical analysis results are summarized on the Data Summary Tables in Appendix C and are compared with ECA limits and Provincial Water Quality Objectives (PWQO's). The laboratory reports are given in Appendix D. Current and historical results for the critical parameters arsenic and iron are presented graphically in Appendix E.

In 2019, similar to the sampling events conducted from 2009 to 2018, there were no exceedances of ECA limits reported in any of the samples from the ten monitoring stations that could reasonably be ascribed to historical mining activities. Exceedances of the ECA limit for TSS were historically observed at several monitoring stations, including historical highs at CGM-10 in 2018 which were attributed to the little water present (i.e., very low flow) at this location during both events, resulting in the essentially unavoidable presence of considerable sediment in the water samples. No TSS exceedances of ECA limits were observed in 2019.

Mercury levels in 2019 were below PWQO criteria and non-detectable in all samples tested. Levels of cyanide were below PWQO criteria and generally non-detectable, with the exception of total and free cyanide at CGM-4 (although total cyanide remained non-detectable in the spring sample), and free cyanide at CGM-12 (fall sample only – result was equal to the detection limit).

Arsenic levels have historically been identified as being of potential concern at some of the MENDM locations. No exceedances of the current PWQO criterion for arsenic (0.1 mg/L) were observed in 2019. However, similar to historical findings, in 2019, levels of arsenic exceeded the interim PWQO of 0.005 mg/L at CGM-10 and CGM-12 during both sampling events. The interim arsenic PWQO of 0.005 mg/L has been exceeded in all of the samples from CGM-10 and CGM-12. As hypothesized in the 2016 report<sup>4</sup>, a historical high result and exceedance of the current PWQO criterion at CGM-10 in the spring of 2016, with a concentration of 0.16 mg/L, appears to have been anomalous. Prior to the 2016 historical high at CGM-10, arsenic at this location exceeded the current PWQO in only one of 17 samples (namely 0.12 mg/L in fall 2010). CGM-12 also had a single exceedance of the arsenic PWQO (0.11 mg/L in summer 2011). There has been only a single (marginal) exceedance (0.006 mg/L – May 2011) of the interim PWQO for arsenic at CGM-11, while levels at background station CGM-13 have been consistently at or near the detection limit of 0.001 mg/L. No exceedances of either the current or interim PWQO criteria for arsenic have been noted at the ECA sampling locations (CGM-4 to CGM-9) in recent years, with the exception of CGM-4 during the current fall sampling event.

Iron (for which there is no ECA criterion) also continues to be of potential concern. In 2019, iron exceedances of the PWQO criterion (0.3 mg/L) were noted at CGM-10 during both sampling events. The iron levels at the MENDM locations in 2019 were within historical ranges, with the exception of historical lows at CGM-11 and CGM-12, both during the spring event. Iron levels in the spring and fall at the MENDM background location CGM-13 (upstream of Parkhill mine site) were both below the PWQO criterion (0.18 mg/L maximum), while those at the other ECA background location (CGM-7) were non-detectable (<0.1 mg/L), generally similar to historical results. At the remaining ECA locations, iron results in 2019 were generally above the PWQO criterion, with the exception of CGM-4 (spring), CGM-6 (spring), CGM-7 (indicated above), CGM-8 and CGM-9 (spring). In general, the 2019 iron levels at the ECA and MENDM locations are similar to expected levels based on historical results; however, iron at CGM-4 in the fall of 2019 was the highest since 1997 and iron at CGM-9 in the fall of 2019 was the highest since 2003.

It should be noted that the PWQO for aluminum is applicable to clay-free samples, generally requiring lab filtering (0.2-micron filter). During the 13 sampling events conducted from 2009 to 2013, water samples for aluminum analysis were not filtered prior to analysis; therefore, historical exceedances may not represent actual exceedances of the criterion. 2014 was the

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<sup>4</sup> EXP Services Inc. (2017). *2016 Performance Evaluation (Environmental Compliance) Report, Citadel Gold Mine, Wawa, Ontario*. EXP. Ref. No. THB-00095132-VE. February 27, 2017.

first year in which lab filtering for aluminum was conducted, and lab filtering was continued through 2018 (excludes oversight in 2017 where samples for aluminum were not filtered). In 2019, samples for aluminum analysis were again filtered and exceedances of the PWQO interim criterion (0.075 mg/L) were noted during both sampling events at CGM-11, CGM-12 and CGM-13. At the ECA locations, PWQO exceedances were noted during both events at CGM-5, CGM-6, and CGM-9. The highest level of aluminum at the MENDM locations in 2019 was from background location CGM-13 (0.11 mg/L – both events), and the second highest level was noted from CGM-11 (0.10 mg/L). Therefore, as was concluded in previous reports, the aluminum exceedances do not appear to be solely related (if at all) to historical mining activities. Similar to previous years, the highest overall level of aluminum in 2019 was noted in the fall sample from CGM-5 (0.15 mg/L).

In 2019, similar to historical results, levels of several additional parameters at CGM-10, including zinc, hardness, alkalinity, ammonia (highest of MENDM locations), conductivity, TDS, acidity, sulphate (highest of MENDM locations) and molybdenum continued to be elevated relative to other sampling locations, suggesting localized impact from historical mining activities. The 2019 results are generally lower than the spring 2018 and spring 2016 results at this location. The 2016 report (previously referenced) identified historical highs for TSS, copper, zinc, lead, nickel, arsenic and iron at CGM-10, which were generally not exceeded in 2017, 2018 or 2019 (with the exception of TSS in 2018). The 2019 results at CGM-10 are generally similar to expected levels based on historical results.

In 2014, historical high levels of phenols had been reported in the fall samples from all MENDM locations, with the exception of CGM-10 which remained below laboratory detection limits. However, the highest level was 0.0048 mg/L at background location CGM-13. In 2015 and 2016, the reported levels of phenols at the MENDM locations were below the PWQO limit and all were below laboratory detection limits. In the fall of 2017, exceedances of the PWQO criterion for phenols were noted at CGM-11 (0.0043 mg/L), CGM-12 (0.0043 mg/L) and at background location CGM-13 (0.0037 mg/L); these results are generally similar to fall 2014. In 2018 and 2019, no PWQO exceedances were observed at the MENDM sampling locations and all results were non-detectable, with the exception of background location, CGM-13 (0.0027 mg/L) during the fall 2019 event. The fall 2019 phenols exceedance results are lower than the previous exceedances in 2014 and 2017.

## Evaluation of Trends

Time series graphs illustrating changes in concentrations of total arsenic and total iron are provided on Figures E1 and E2, respectively, in Appendix E.

Mann-Kendall trend analysis was conducted for the above parameters, using the AquaChem groundwater software package from Waterloo Hydrogeologic. Concentration trends are based on the values of the test statistic S, the confidence in trend (1-p) and the coefficient of variation (COV) and are interpreted according to the following decision matrix.

Mann-Kendall Statistic (S)	Confidence in Trend (1-p)	Trend
S>0	>95%	Increasing (I)
S>0	90 – 95%	Probably Increasing (PI)
S>0	< 90%	No Trend (NT)
S≤0	<90% and COV≥1	No Trend (NT)
S≤0	<90% and COV<1	Stable (S)
S<0	90 - 95%	Probably Decreasing (PD)
S<0	>95%	Decreasing (D)

Aziz, J. J., Newell, C. J., Rifai, H. S., Ling, M., & Gonzales, J. R. (2007); “*Monitoring and Remediation Optimization System (MAROS): Software User’s Guide Version 2.2*”; United States Air Force Centre for Environmental Excellence; Brooks AFB, San Antonio, TX.

The output from the Mann-Kendall trend testing program, including the calculated COV values and the interpreted trend results, is given on Table 11 in Appendix C.

The trend test requires a minimum of four data points. Also, at least 20% of sampling events must have detectable values. Where non-detectable values occur, a value equal to the detection limit is assumed. Results for sample duplicates are averaged for the purposes of the statistical analysis.

At the MENDM locations, the no increasing or probably increasing trends were observed. For total arsenic a decreasing trend was noted at CGM-12, while the remaining arsenic trends were either stable or showing no trend. Decreasing or probably decreasing trends were observed for total iron at CGM-11, CGM-12 and CGM-13, while no trend was observed at CGM-10.

At the ECA locations, increasing or probably increasing trends were observed at CGM-5 (arsenic and iron), CGM-7 (arsenic), CGM-8 (arsenic and iron) and CGM-9 (arsenic and iron), while the remaining results indicated no trends or stable concentrations. However, because the Mann-Kendall analysis assumes that non-detectable concentrations are equal to the detection limit, it can produce questionable and potentially false conclusions of increasing or probably increasing concentrations where the detection limits have generally increased over time and a considerable proportion of more recent results are non-detectable. This appears to be the case for iron at CGM-8.

## Summary and Recommendations

In 2019, similar to historical events, there were no exceedances of ECA limits reported in any of the samples from the ten monitoring stations that could reasonably be ascribed to historical mining activities.

As illustrated on the graphs in Appendix E, arsenic concentrations at the MDNM sampling locations CGM-10 and CGM-12 are elevated in relation to both the (interim) PWQO and the values at the remaining MENDM and non-MENDM sampling locations. Similarly, iron concentrations at CGM-10 are elevated in relation to both the PWQO and values at the remaining MENDM and non-MENDM sampling locations.

Mann-Kendall statistical trend analysis revealed decreasing or probably decreasing trends at CGM-11 (iron), CGM-12 (arsenic, iron) and CGM-13 (iron) but no increasing or probably increasing trends at any of the MENDM locations. At the ECA locations, increasing or probably increasing trends are indicated at CGM-5 (arsenic and iron), CGM-7 (arsenic), CGM-8 (arsenic and iron) and CGM-9 (arsenic and iron), while the remaining results indicated no trends or stable concentrations. However, the probably increasing trend for iron at CGM-8 is potentially ascribable to variable detection levels over time rather than being indicative of actual increasing concentrations.

Given the continued absence of exceedances of ECA limits for all parameters, the reduction in sampling frequency to twice annually (i.e., spring and fall), as required by the current ECA for the original six sampling stations, remains justifiable, in EXP's opinion. The sampling program for the four additional MNDM locations should be further re-evaluated at the time of any future changes to the ECA sampling program.

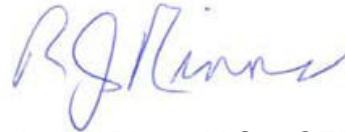
The current sampling program should be continued in 2020. This will provide additional data for evaluation of the potential significance of reported PWQO exceedances for metals and TSS, as well as for trend analysis and confirmation.

We trust that this report is satisfactory for your present requirements. Should you have any questions, please contact the undersigned at your convenience.

Sincerely,  
EXP Services Inc.



Ahileas Mitsopoulos, P.Eng.  
Project Engineer



Robert J. Rinne, M.Sc., QEP  
Senior Scientist



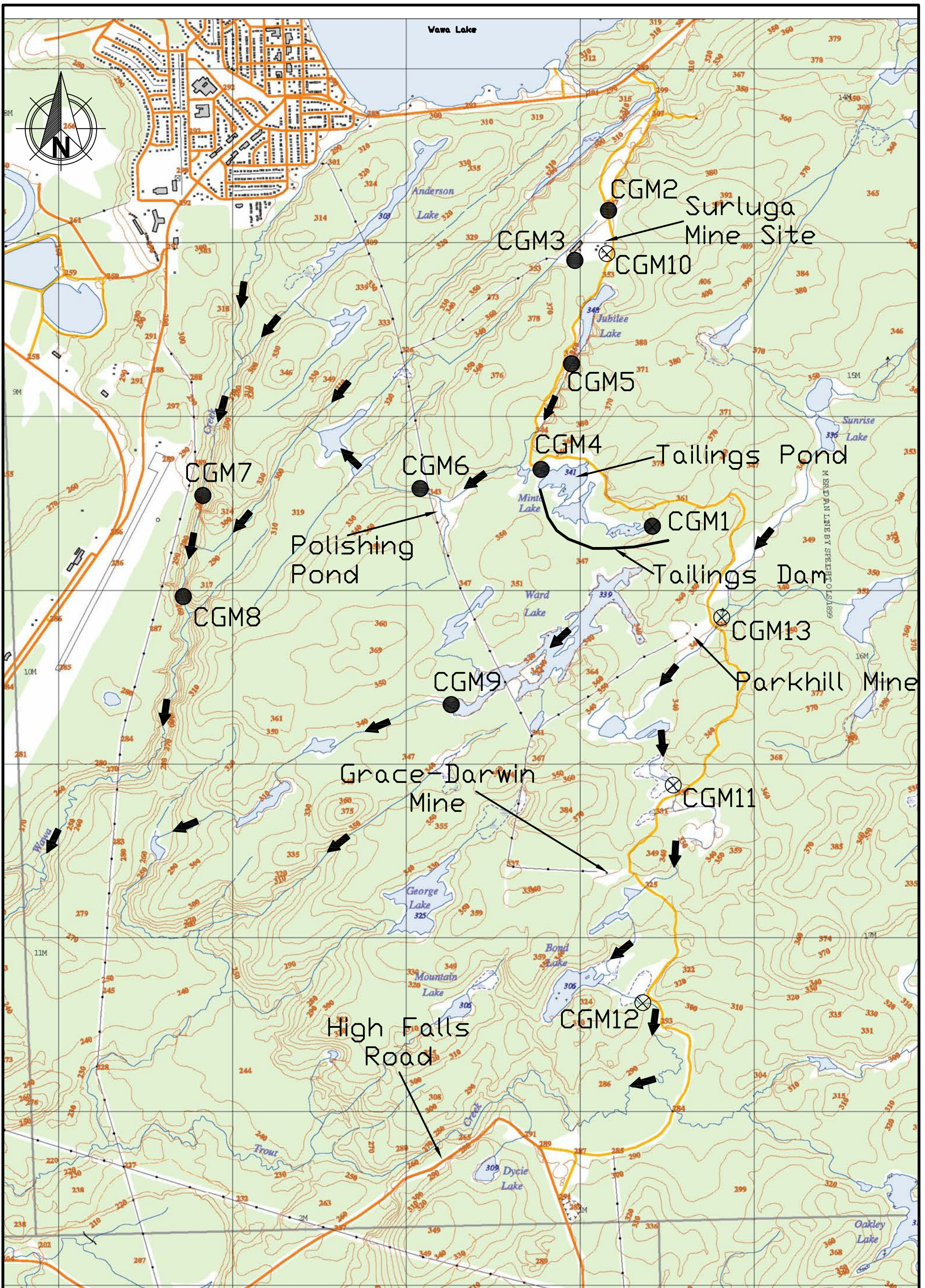
Demetri N. Georgiou, MAsc., P.Eng.  
Principal Engineer/Branch Manager

Attachments:

- Appendix A Figures
- Appendix B MECP Documents
- Appendix C Data Summary Tables
- Appendix D Laboratory Reports of Analysis
- Appendix E Time Series Graphs

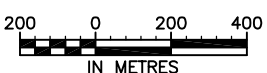


## **Appendix A – Figures**



**NOTES:**  
 1) REFERENCE BASE FROM O.B.M. MAP NO. 20 16 6600 53100.

**LEGEND:**  
 ● CGM4 SURFACE WATER SAMPLING LOCATION  
 ⊗ CGM10 SURFACE WATER SAMPLING LOCATION AS REQUIRED BY MNDM IN ACCORDANCE WITH 2010 CLOSURE PLAN  
 ↘ DRAINAGE DIRECTION



**DRAINAGE AND SURFACE WATER SAMPLING LOCATIONS**

Additional Surface Water Sampling  
 To Satisfy Part 5 of Mine Rehabilitation Code  
 Citadel Gold Mine, Wawa, Ontario

Thunder Bay, Ontario

**FIGURE 1**

PROJECT NO.:	THB-00094262-JG-200
SCALE:	1:20,000
DRAWN BY:	CP
CHECKED BY:	AM
DATE:	January 28, 2020

## **Appendix B - MECP Documents**

**AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL**NUMBER 0919-8UUKR7  
Issue Date: September 18, 2012Wawa GP Inc.  
150 Signet Dr  
Toronto, Ontario  
M9L 1T9Site Location: Citadel Gold Mine  
Surluga Rd  
Wawa Municipality, District of Algoma

*You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:*

Sewage works associated with the closed Citadel Gold Mine located in McMurray Township, Algoma District consisting of a tailings pond and a polishing pond as described below:

**PROPOSED WORKS:**

As part of the mine closure plan, replace existing three (3) 900 mm diameter CSP culverts allowing flows from Tailings Pond (**Minto Lake**) into the Polishing Pond with an overflow spillway consisting of the following:

- one (1) tailings pond (**Minto Lake**) overflow spillway with an upstream invert level of 345.22 m, down stream of spillway with an average slope of 6H:1V, and a minimum of 1.0 m free-board, to be located at the existing location of the CSP culverts, designed to service a total drainage area of 108 ha and handle flows up to a maximum of 1.80 m<sup>3</sup>/sec; and
- including all controls and associated appurtenances.

All in accordance with the supporting documentation listed in Schedule 'A'.

**PREVIOUS WORKS APPROVED ON JANUARY 18, 1989 UNDER CofA No. 4-0101-88-896:**

Sewage works associated with the Citadel Gold Mines Inc. mine/mill site located in McMurray Township, Algoma District, the treatment to consist of the natural degradation of cyanide and removal of slurry from the effluent in the tailings pond, the chemical destruction of cyanide in the ba

ren bleed and tailings pond effluent, consisting of:

- a tailings pond in the Minto Lake basin with a final storage capacity of 1,280,000 m<sup>3</sup> for tailings and 480,000 m<sup>3</sup> for water;
- a polishing pond with a net volume of 270,000 m<sup>3</sup> ; and
- and all pipes and appurtenances to treat and discharge effluent from the polishing pond by natural drainage to Wawa Creek,

All in accordance with the supporting documentation listed in Schedule 'A'.

*For the purpose of this environmental compliance approval, the following definitions apply:*

"*Approval*" means this entire document and any schedules attached to it, and the application;

"*CBOD5*" means five day carbonaceous (nitrification inhibited) biochemical oxygen demand measured in an unfiltered sample;

"*Daily Concentration*" means the concentration of a contaminant in the effluent discharged over any single day, as measured by a composite or grab sample, whichever is required;

"*Director*" means a person appointed by the Minister pursuant to section 5 of the *EPA* for the purposes of Part II.1 of the *EPA*.

"*District Manager*" means the District Manager of the Sault Ste. Marie District Office;

"*EPA*" means the Environmental Protection Act, R.S.O. 1990, c.E.19, as amended;

"*Ministry*" means the ministry of the government of Ontario responsible for the *EPA* and *OWRA* and includes all officials, employees or other persons acting on its behalf;

"*Owner*" means Wawa GP Inc. and its successors and assignees;

"*OWRA*" means the Ontario Water Resources Act, R.S.O. 1990, c. O.40, as amended;

"*Previous Works*" means those portions of the sewage works previously constructed and approved under an *Approval* ;

"*Proposed Works*" means the sewage works described in the *Owner's* application, this *Approval*, and to the extent approved by this *Approval* ;

"*Substantial Completion*" has the same meaning as "*substantial performance*" in the Construction Lien Act; and

“Works ” means the sewage works described in the *Owner’s* application and this *Approval* and includes both *Previous Works* and *Proposed Works* ;

*You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:*

## **TERMS AND CONDITIONS**

### **1. GENERAL PROVISIONS**

- (1) The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Works* is notified of this *Approval* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.
- (2) Except as otherwise provided by these conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Approval*, and the application for approval of the *Works*.
- (3) Where there is a conflict between a provision of any submitted document referred to in this *Approval* and the conditions of this *Approval*, the conditions in this *Approval* shall take precedence, and where there is a conflict between the listed submitted documents in the schedule, the document bearing the most recent date shall prevail.
- (4) Where there is a conflict between the documents listed in the Schedule and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.
- (5) The conditions of this *Approval* are severable. If any condition of this *Approval*, or the application of any condition of this *Approval* to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this *Approval* shall not be affected thereby.

### **2. EXPIRY OF APPROVAL**

The approval issued by this *Approval* will cease to apply to those parts of the *Proposed Works* which have not been constructed within five (5) years of the date of this *Approval*.

### **3. CHANGE OF OWNER**

- (1) The *Owner* shall notify the *District Manager* and the *Director*, in writing, of any of the following changes within thirty (30) days of the change occurring:

- (a) change of *Owner*;
  - (b) change of address of the *Owner*;
  - (c) change of partners where the *Owner* is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act, R.S.O. 1990, c.B17 shall be included in the notification to the *District Manager*;
  - (d) change of name of the corporation where the *Owner* is or at any time becomes a corporation, and a copy of the most current information filed under the Corporations Information Act, R.S.O. 1990, c. C39 shall be included in the notification to the *District Manager*;
- (2) In the event of any change in Ownership of the *Works*, other than a change to a successor municipality, the *Owner* shall notify in writing the succeeding Owner of the existence of this *Approval*, and a copy of such notice shall be forwarded to the *District Manager* and the *Director*.

#### 4. UPON THE SUBSTANTIAL COMPLETION OF THE WORKS

- (1) Upon the *Substantial Completion* of the *Proposed Works*, the *Owner* shall prepare a statement, certified by a Professional Engineer, that the *Works* are constructed in accordance with this *Approval*, and upon request, shall make the written statement available for inspection by *Ministry* personnel.
- (2) Within one (1) year of the *Substantial Completion* of the *Proposed Works*, a set of as-built drawings showing the *Works* “as constructed” shall be prepared. These drawings shall be kept up to date through revisions undertaken from time to time and a copy shall be retained at the *Works* for the operational life of the *Works*.

#### 5. EFFLUENT LIMITS

- (1) The *Owner* shall design, operate, and maintain the *Works* such that the concentrations of the materials named below as effluent parameters are not exceeded in the effluent from the *Works*.

<b>Table 1 - Effluent Limits - Polishing Pond (CGM-6)</b>	
<b>Effluent Parameter</b>	<b>Maximum Concentration</b> (milligrams per litre unless otherwise indicated)
Column 1	Column 2
<i>CBOD5</i>	15
Total Suspended Solids	15
Oil and Grease	15
Total Cyanide	2.0
Total Phosphorus	1.0
Total Ammonia Nitrogen	10
Phenols	0.02
Weak Acid Dissociable Cyanides	0.5
Arsenic	0.5
Cadmium	0.001
Copper	0.15
Lead	0.1
Mercury	0.001
Nickel	0.25
Zinc	0.3
The pH of the effluent shall be maintained between 6.0 and 8.5 at all times	

- (2) For the purposes of determining compliance with and enforcing subsection (1):
- (a) The *Daily Concentration* of a parameter named in Column 1 of subsection (1) shall not exceed the corresponding maximum concentration set out in Column 2 of subsection (1).
  - (b) The pH of the effluent shall be maintained within the limits outlined in subsection (1), at all times.
- (3) Subsection (2) shall apply upon the issuance of this *Approval*.

## 6. OPERATION AND MAINTENANCE

- (1) The *Owner* shall exercise due diligence in ensuring that, at all times, the *Works* and the related equipment and appurtenances used to achieve compliance with this *Approval* are properly operated and maintained. Proper operation and maintenance shall include effective performance, adequate funding, adequate operator staffing and training, adequate laboratory facilities, process controls and alarms and the use of process chemicals and other substances used in the *Works*.



- (2) The *Owner* shall update the operations manual prior to the commencement of operation of the sewage *Proposed Works* , that includes, but not necessarily limited to, the following information:
- (a) operating procedures for routine operation of the *Works*;
  - (b) inspection programs, including frequency of inspection, for the *Works* and the methods or tests employed to detect when maintenance is necessary;
  - (c) repair and maintenance programs, including the frequency of repair and maintenance for the *Works*;
  - (d) procedures for the inspection and calibration of monitoring equipment;
  - (e) a spill prevention control and countermeasures plan, consisting of contingency plans and procedures for dealing with equipment breakdowns, potential spills and any other abnormal situations, including notification of the *District Manager*; and
  - (f) procedures for receiving, responding and recording public complaints, including recording any follow up actions taken.
- (3) The *Owner* shall maintain the operations manual current and retain a copy at the location of the *Works* for the operational life of the *Works* . Upon request, the *Owner* shall make the manual available to *Ministry* staff.

## 7. MONITORING AND RECORDING

The *Owner* shall, upon commencement of operation of the *Works*, carry out the following monitoring program:

- (1) All samples and measurements taken for the purposes of this *Approval* are to be taken at a time and in a location characteristic of the quality and quantity of the effluent stream over the time period being monitored.
- (2) For the purposes of this condition, the following definitions apply:
  - (a) Daily means once each day;
  - (b) Quarterly means once every three months
  - (c) Semi-annually means once every six months; and
  - (d) Annually means once every twelve months.

- (3) Grab samples shall be collected at the following sampling points and analyzed at a **Semi-Annual (May and November)** frequency for the corresponding parameter levels and parameters for each level and results recorded:

<b>Table 2 - Surface Water and Effluent Monitoring</b>		
<b>Sampling Location</b>	<b>Sampling Location Description</b>	<b>Parameter Levels</b>
<b>CGM-4</b>	Tailing Pond Storage	1, 2, and 3
<b>CGM-5</b>	Jubilee Creek	1, 2, 3, and 4
<b>CGM-6</b>	Polishing Pond Weir	1, 2, 3, 4, and 5
<b>CGM-7</b>	Wawa Creek - Upstream of Jubilee Creek Discharge to Wawa Creek	1, 2, 3, 4, and 5
<b>CGM-8</b>	Wawa Creek - Downstream of Jubilee Creek Discharge to Wawa Creek	1, 2, 3, 4, and 5
<b>CGM-9</b>	Ward Lake	1, 2, 3, and 4

<b>Table 3 - Monitoring Parameter</b>	
<b>Level</b>	<b>Parameters</b>
1	Total Cyanide, Weak Acid Dissociable Cyanides
2	Total Suspended Solids, Arsenic, Copper, Iron, Lead, Nickel, Zinc
3	Alkalinity, Hardness, pH
4	Oil and Grease, Total Ammonia Nitrogen
5	CBOD5 , Phenols, Cadmium, Mercury

- (4) The methods and protocols for sampling, analysis and recording shall conform, in order of precedence, to the methods and protocols specified in the following:
- (a) the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (January 1999), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions;
  - (b) the publication "Standard Methods for the Examination of Water and Wastewater" (21st edition), as amended from time to time by more recently published editions;
- (5) The measurement frequencies specified in subsection (3) in respect to any parameter are minimum requirements which may, after two (2) years of monitoring in accordance with this Condition, be modified by the *District Manager* in writing from time to time.
- (6) The *Owner* shall retain for a minimum of three (3) years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this *Approval*.

8. REPORTING

- (1) The *Owner* shall report to the *District Manager* or designate, any exceedence of any parameter specified in Condition 5 orally, as soon as reasonably possible, and in writing within seven (7) days of the exceedence.
- (4) In addition to the obligations under Part X of the Environmental Protection Act, the *Owner* shall, within ten (10) working days of the occurrence of any reportable spill as defined in Ontario Regulation 675/98, bypass or loss of any product, by-product, intermediate product, oil, solvent, waste material or any other polluting substance into the environment, submit a full written report of the occurrence to the *District Manager* describing the cause and discovery of the spill or loss, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation.
- (5) The *Owner* shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to *Ministry* staff.
- (6) The *Owner* shall prepare, and submit to the *District Manager* upon request, a performance report, on an annual basis, within ninety (90) days following the end of the period being reported upon. The first such report shall cover the first annual period following the commencement of operation of the *Works* and subsequent reports shall be submitted to cover successive annual periods following thereafter. The reports shall contain, but shall not be limited to, the following information:
  - (a) a summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Condition 5, including an overview of the success and adequacy of the *Works* ;
  - (b) a description of any operating problems encountered and corrective actions taken;
  - (c) an engineer's statement on the condition and stability of the dams and berms with respect to their ability to perform properly for another year;
  - (c) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the *Works* ;
  - (d) a summary of any effluent quality assurance or control measures undertaken in the reporting period;
  - (e) a summary of the calibration and maintenance carried out on all effluent monitoring equipment; and
  - (f) any other information the *District Manager* requires from time to time.

## Schedule 'A'

### **I. PREVIOUS WORKS APPROVED ON JANUARY 18, 1989 UNDER CofA No. 4-0101-88-896:**

1. Application for the Approval of Plans and Specifications for the Construction of Works for the Collection, Transmission, Treatment and Disposal of Industrial Wastewater, dated May 18, 1988, signed by L.B. Staines, Mine Manager.
2. Application for the Approval of Plans and Specifications for the Construction of Works for the Collection, Transmission, Treatment and Disposal of Industrial Wastewater, dated May 18, 1988, signed by L.B. Staines, Mine Manager.
3. Report entitled: "Working Document, Application for Certificate of Approval, Mill Waste (Tailings) Disposal, Citadel Gold Mines Inc., Wawa, Ontario", prepared by Trow Ontario Ltd., May 10, 1988.
4. Report entitled: "Addendum, Working Document, Application for Certificate of Approval, Mill Waste (Tailings) Disposal, Citadel Gold Mines Inc., Wawa, Ontario", prepared by Trow Ontario Ltd., August 8, 1988.
5. Report entitled: "Stability Analyses of Dams, Mill Waste (Tailings) Disposal, Citadel Gold Mines Inc., Wawa, Ontario, prepared by Trow Ontario Ltd., August 10, 1988.
6. Letter dated September 20, 1988 from Mr. R.A. Knapp, Senes Consultants Limited, to Mr. Louis Tasfi, Beak Consultants Limited.
7. Letter dated October 31, 1988 from Mr. L. B. Staines, Citadel Gold Mines Inc. to Mr. Z. Tesic, MOE Approvals Branch.
8. Letter dated November 7, 1988 from Mr. L. B. Staines, Citadel Gold Mines Inc. to Mr. Z. Tesic, MOE Approvals Branch.
9. Letter dated November 16, 1988 from Mr. T.D. Armstrong, MOE, Approvals Branch, to Mr. L.B. Staines, Citadel Gold Mines Inc.
10. Letter dated November 29, 1988 from Mr. L. B. Staines, Citadel Gold Mines Inc. to Mr. Z. Tesic, MOE, Approvals Branch.
11. Letter dated December 15, 1988 from Mr. L. B. Staines, Citadel Gold Mines Inc. to Mr. Z. Tesic, MOE, Approvals Branch.
12. Letter dated December 15, 1988 from Mr. T.D. Armstrong, MOE, Approvals Branch, to Mr. L.B. Staines, Citadel Gold Mines Inc.

### **I. PROPOSED WORKS:**

1. An Application for the Approval of Sewage Works submitted by Wawa GP. Inc. dated December 22, 2011.
2. "Closure Spillway Construction, Former Minto Lake TMA, Citadel Property - AMIS No. 00851 et al, Citadel Gold Mines, Wawa, ON." dated July 30, 2010, prepared by Trow Associates Inc., Thunder Bay, Ontario.

*The reasons for the imposition of these terms and conditions are as follows:*

1. Condition 1 is imposed to ensure that the *Works* are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Approval* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. The condition also advises the Owners their responsibility to notify any person they authorized to carry out work pursuant to this *Approval* the existence of this *Approval*.
2. Condition 2 is included to ensure that the *Works* are constructed in a timely manner so that standards applicable at the time of Approval of the *Works* are still applicable at the time of construction, to ensure the ongoing protection of the environment.
3. Condition 3 is included to ensure that the *Ministry* records are kept accurate and current with respect to the approved works and to ensure that subsequent owners of the *Works* are made aware of the *Approval* and continue to operate the *Works* in compliance with it.
4. Condition 4 is included to ensure that the *Works* are constructed in accordance with the approval and that record drawings of the *Works* “as constructed” are maintained for future references.
5. Condition 5 is imposed to ensure that the effluent discharged from the *Works* to the Wawa Creek meets the *Ministry* 's effluent quality requirements thus minimizing environmental impact on the receiver and to protect water quality, fish and other aquatic life in the receiving water body.
6. Condition 6 is included to require that the *Works* be properly operated, maintained, funded, staffed and equipped such that the environment is protected and deterioration, loss, injury or damage to any person or property is prevented. As well, the inclusion of a comprehensive operations manual governing all significant areas of operation, maintenance and repair is prepared, implemented and kept up-to-date by the owner and made available to the *Ministry*.
7. Condition 7 is included to enable the *Owner* to evaluate and demonstrate the performance of the *Works* , on a continual basis, so that the *Works* are properly operated and maintained at a level which is consistent with the effluent limits specified in the *Approval* and that the *Works* does not cause any impairment to the receiving watercourse.
8. Condition 8 is included to provide a performance record for future references, to ensure that the *Ministry* is made aware of problems as they arise, and to provide a compliance record for all the terms and conditions outlined in this *Approval*, so that the *Ministry* can work with the *Owner* in resolving any problems in a timely manner.

**Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 4-0101-88-896 issued on January 18, 1989**

*In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:*

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in

- respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.*

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
655 Bay Street, Suite 1500  
Toronto, Ontario  
M5G 1E5

AND

The Director appointed for the purposes of  
Part II.1 of the Environmental Protection Act  
Ministry of the Environment  
2 St. Clair Avenue West, Floor 12A  
Toronto, Ontario  
M4V 1L5

**\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)**

*The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.*

DATED AT TORONTO this 18th day of September, 2012



---

Mansoor Mahmood, P.Eng.  
Director  
appointed for the purposes of Part II.1 of the  
*Environmental Protection Act*

SH/

c: District Manager, MOE Sault Ste. Marie  
Demetri Georgiou, Trow Associates Inc.

**Ministry of the Environment**

Northern Region  
Northern Region  
Sault Ste Marie Area  
289 Bay Street, 3rd floor  
Sault Ste Marie ON P6A 1W7  
Fax: (705)942-6327  
Tel: (705) 942-6392

**Ministère de l'Environnement**

Direction régionale du Nord  
District du Sudbury  
Secteur de Sault Ste Marie  
289 Bay Street, 3e étage  
Sault Ste Marie ON P6A 1W7  
Télécopieur: (705)942-6327  
Tél:(705) 942-6392



November 28, 2011

Citadel Gold Mines Inc.  
150 Signet Dr  
Toronto, Ontario, M9L 1T9  
Canada

Dear Mr. John Sadowski

**RE:** Citadel Gold Mines ISW 4-0101-88-896  
Wawa, District of Algoma

Reference Number 3617-8G3JDG

This letter is in reply to your request to reduce sampling frequency at the Citadel Gold Mines Property in the Municipality of Wawa, District of Algoma. Currently sampling is to occur four times annually, based on the information supplied in the technical review of the 2010 Environmental Compliance Report, your company has requested a reduction to twice annually (May and November). This reduction in frequency to twice annually is agreed. In the event of a changes at the location (future monitoring detects water quality deterioration or mining exploration or operation resumes) the monitor program would need to updated accordingly.

Yours truly,

A handwritten signature in black ink, appearing to read "Tym Garsjke", written over a horizontal line.

Tym Garsjke  
Area Supervisor  
Sault Ste. Marie Area Office

File Storage Number: AL WW SU 141  
cc. Trow Associates Inc (Thunder Bay)  
MNDFM (Sudbury)

Ministry of the Environment

199 Larch Street  
Suite 1201  
Sudbury ON P3E 5P9

Ministère de l'Environnement

199, rue Larch  
Bureau 1201  
Sudbury ON P3E 5P9



Direct Line: (705) 564-8885  
Fax: (705) 564-4180

November 23, 2011

MEMORANDUM:

TO: Kirk Crosson  
Senior Environmental Officer  
Sault Ste. Marie District Office

FROM: Ed Snucins  
Surface Water Specialist  
Technical Support, Northern Region

RE: Citadel Gold Mines 2010 Environmental Compliance Report

---

As requested, I have reviewed the report prepared by Trow Associates Inc. for Citadel Gold Mines Inc. entitled "2010 Environmental Compliance Report Citadel Gold Mines Inc. Wawa, Ontario" dated February 25, 2011. The purpose of my review was to examine the surface water data for evidence of current impacts from the sewage works and to evaluate the request for reduced frequency of surface water sampling.

Background

Citadel Gold Mine is a mine/mill site located in McMurray Twp southeast of Wawa. The CofA (#4-0101-88-896) for this site was issued in January 1989. The sewage works consists of a tailings pond in the Minto Lake basin and a polishing pond that drains via Jubilee Creek to Wawa Creek. Operations at the site ceased in November 1989; since then tailings have not been deposited in the tailings system and the site is inactive with the exception of measures taken for closure.

Jubilee Creek originates at Jubilee Lake and drains into Wawa Creek. The outlet stream from Minto Lake joins Jubilee Creek upstream of the polishing pond. The polishing pond is part of Jubilee Creek. Ward Lake is located south of the tailings dam that borders Minto Lake, but is not part of the Jubilee Creek watershed.

Surface water samples are collected four times per year (February, May, August, November) at the following five locations.

- CGM-4 Outlet of the tailings pond (Minto Lake)
- CGM-5 Outlet of Jubilee Lake
- CGM-6 Outlet of the polishing pond. The CofA defines effluent from the sewage works as effluent from the polishing pond.
- CGM-7 Wawa Creek upstream of confluence with Jubilee Creek
- CGM-8 Wawa Creek downstream of confluence with Jubilee Creek



Surface water samples are collected two times per year (May, November) at the outlet of Ward Lake (CGM-9).

In Appendix E of the report a letter from Trow Associates to MOE presents the position that CofA Limits have not been exceeded even within the tailings pond since 1996 and that the occasional exceedances of Provincial Water Quality Objectives (PWQO) are due to localized effects or natural conditions. They request that the frequency of sampling be reduced from four times per year to two times per year (May and November).

#### Discussion

The 2010 water chemistry data show small exceedances of PWQO at CGM-4 (Cu 0.006 mg/L in February; As 0.006 mg/L in August exceeds Interim PWQO), CGM-5 (Fe 0.35 mg/L in November), and CGM-6 (Fe 0.38 mg/L in August). This is consistent with data from previous years that show values greater than PWQO on occasion for most of those parameters at those locations. In the case of Fe at CGM-6 values greater than PWQO have been measured quite frequently, but since 1999 only one sample at that location has exceeded the more up-to-date British Columbia Water Quality Guideline for total iron of 1 mg/L.

My interpretation of the water chemistry data is that impact of the sewage works on water quality is currently small. As a consequence, the requested reduction in frequency of water sample collection from four times per year to two times per year (May and November) is reasonable and acceptable with the following provisos. If future monitoring detects water quality deterioration the sampling program will need to be enhanced. Also, if in the future plans are made to resume mining activity at the site, the monitoring program and effluent criteria should be reviewed.

*Original signed by*

Ed Snucins, M.Sc. Biol.  
Surface Water Specialist

cc. Regional file – SW SSM WAW 01



Since 1957

1142 Roland Street  
Thunder Bay, ON  
P7B 5M4

Tel: 807-623-9495  
Fax: 807-623-8070  
thunderbay@trow.com

**Buildings**

**Environment**

**Geotechnical**

**Infrastructure**

**Materials & Quality**

March 6, 2007

Reference: F-95132

Mr. Rod Stewart  
District Supervisor  
Ministry of the Environment  
3<sup>rd</sup> Floor, 289 Bay Street  
Sault Ste. Marie, ON P6A 1W7

**RE: CITADEL GOLD MINES – MONITORING REQUIREMENTS**

Dear Sir:

On behalf of Citadel Gold Mines (Wawa, Ontario), Trow Associates Inc. (Trow) is requesting a reduction in the frequency of surface water monitoring of tailings discharge impacts from four events to two events annually.

The basis for this request is the evident absence of significant environmental effects on water quality downstream of the subject tailings facility. Even within the tailings pond itself, there have been no exceedances of the stipulated Certificate of Approval discharge limits since 1996, and occasional exceedances of Provincial Water Quality criteria can be ascribed to minor localized effects or natural conditions. As you are no doubt aware, the mine has been idle for many years and various closure activities are underway. The MOE's most recent inspection report (dated May 16, 2006) did not identify any non-compliance issues, and concluded that the sewage works is well maintained.

Currently, monitoring is conducted in February, May, August and November. We are requesting that the frequency be reduced to spring and fall (i.e., May and November). The full analytical program would be conducted at all six sampling locations during each of these two events. Reports would continue to be provided by March 1 of the following year. Should the mine return to active status, or should monitoring indicate increased environmental impact, the monitoring requirements could be increased again. Note that the February 2007 sampling has been conducted so the 2007 report would contain these results, regardless.

The current Certificate of Approval allows for changes to the monitoring program with the approval of the MOE District Office and a formal change to the C of A should not be necessary.

We trust you will agree that this request is reasonable and await your anticipated timely approval. If you have any questions or wish to discuss this matter further, please do not hesitate to contact our office.

Yours truly,

Robert J. Rinne, M.Sc., QEP  
Senior Scientist / Environmental Manager

Demetri N. Georgiou, M.A.Sc., P.Eng.  
Principal Engineer / Branch Manager

cc: Mr. John Sadowski, Citabar (Wawa G.P. Inc.)

[www.trow.com](http://www.trow.com)

One Company.  
One Contact.  
One Stop.



## Industrial Sewage Inspection Report


 Ministry of the  
**Environment**
**Industrial Sewage Inspection Report**

<b>Client:</b>	Citadel Gold Mines Inc. Mailing Address: 150 Signal Drive, Toronto, Ontario, Canada, M9L 1T9 Physical Address: 150 Signal Drive, Concession: Plan: Toronto, City, Ontario, Canada, M9L 1T9 Telephone: (416)875-8484, FAX: (416)875-8483 Client #: 8957-5A6NY5, Client Type: Corporation		
<b>Inspection Site Address:</b>	Citadel Gold Mine Address: High Falls Road, 2 kilometers south east of Wawa, Concession: Plan: Michipicoten Township: District of Algoma District: District: Sauc. Sic. Marie GeoReference: Zone: 18, UTM Easting: 888760, UTM Northing: 5317088, UTM Location Description: Citadel Gold Mine		
<b>Contact Name:</b>	John H. Sadowski	<b>Title:</b>	Vice President, Exploration
<b>Contact Telephone:</b>	(416)875-8484 ext.	<b>Contact Fax:</b>	(416)875-8483
<b>Last Inspection Date:</b>			
<b>Inspection Start Date:</b>	2005/05/01	<b>Inspection Finish Date:</b>	2005/05/01
<b>Region:</b>	Northern		

**1.0 INTRODUCTION**

An inspection of the Citadel Mine sewage works was conducted on June 1, 2005, in the company of Mr. Demetri Georgiou, Trow Associates Inc., agent acting on the behalf of Citadel Gold Mines Inc. The purpose of the inspection was to verify the closed status of the mine operation, review Certificate of Approval terms and conditions that still may be applicable even though the mine has been closed, and to audit compliance with the recommendations presented by the agent in the 2004 Environmental Compliance Report for maintenance of the sewage works.

The mine ceased operation in November of 1989 and has not discharged tailings into the tailings system since then. A return to production may occur in the future, and therefore, Citadel is maintaining the tailings system in its current condition. (Trow Associates Inc. 2004 Environmental Compliance Report)

**2.0 INSPECTION OBSERVATIONS**
**MOE Facility Number:**

00

**Certificate of Approval Number(s):**
 Yes  No

**C of A Number(s):** 4-0101-88-888

## Industrial Sewage Inspection Report

**2.1 PROCESS DESCRIPTION**

The industrial sewage works associated with Citadel Gold Mines Inc. is located in the Township of Michipicoten (geographic Township of McMurray) in the District of Algoma, approximately 2 kilometers southeast of the community of Wawa. The sewage works treatment consists of the natural degradation of cyanide and removal of slurry from the effluent in the tailings pond, the chemical destruction of cyanide in the barren bleed, and the tailings pond effluent. The tailings pond in the Minto Lake basin has a final capacity of 1,280,000 cubic meters for tailings and 480,000 cubic meters for water. The polishing pond has a net volume of 270,000 cubic meters. Discharge from the polishing pond is by natural drainage to Wawa Creek.

**2.2 EFFLUENT SUMMARY REPORT**

At the time of the inspection, only a trickle of natural run-off water was noted discharging from the Minto Lake tailings basin. The basin now supports a stocked splake fishery.

**2.3 SYSTEM CAPACITY ASSESSMENT**

Item	Year 1 2002	Year 2 2003	Year 3 2004
Average daily flow (m <sup>3</sup> /day)	622.00	1693.00	1887.00
Maximum daily flow (m <sup>3</sup> /day)	784.00	2246.00	4129.00
Capacity Design (m <sup>3</sup> /day)	0.00		0.00
% of capacity, based on average daily flow	0.00	0.00	0.00

The daily design capacity of the sewage works is limited by a 12:1 flow ratio stipulated in condition 2(3)(a) in the Certificate of Approval. The condition states that the Company shall control the discharge rate of the effluent from the sewage works to such an extent that the flow ratio of the receiving water to the effluent from the sewage works is at least 12:1 respectively.

**2.4 SAMPLING REQUIREMENTS**

Condition 3 of the Certificate of Approval sets out the sampling locations, the frequency of sampling, and the type of sample to be collected. Since 1992 the Company has maintained a reduced sampling program due to closure of the mine. Polishing pond samples are collected four times per year and are analyzed for the parameters listed in the Certificate of Approval. No exceedances of the Certificate of Approval limits were measured in the polishing pond discharge samples in 2004.

**2.5 REPORTING REQUIREMENTS**

Conditions 12 of the Certificate of Approval requires the Company to submit a monthly activity report. Monthly activity reports are not submitted due to the non-operational status of the mine. Condition 13 of the Certificate requires the Company to submit annually a performance evaluation report. The Company continues to submit such a report.

**2.6 FLOW MEASUREMENT**

Condition 4 of the Certificate of Approval requires flow measurements to be taken at Wawa Creek, Jubilee Creek, and the polishing pond discharge.

The Wawa Creek Environment Canada stream flow monitoring station was removed in 1995 and during 2004, the Jubilee Creek weir was removed. With these flow monitoring stations removed, flow ratios cannot be calculated to determine compliance with condition 2(3)(a) of the Certificate of Approval. However, since there is no deposit of tailings to the sewage works, and polishing pond effluent discharges are surface run-off, a 12:1 ratio determination between the sewage works mine tailings effluent and the receiving water would have no meaningful significance.

**2.7 MINISTRY SAMPLE RESULTS**

Were Ministry samples collect during the inspection? No

**2.8 FINANCIAL ASSURANCE**

## Industrial Sewage Inspection Report

Condition 15(1) of the Certificate of Approval requires the Company to deposit with the Regional Director an irrevocable letter of credit in a form satisfactory to the Regional Director and in the amount of at least 200,000 dollars. A record of the financial assurance cannot be found on file. \*

### 3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

The conclusions and recommendations presented in the Trow 2004 Environmental Compliance Report were also presented in the 2002 report. Specifically the report recommended that:

- The depression/sink holes around the Minto Lake basin should be filled with crushed stone and monitored for the next few annual inspections.
- The tall vegetation at the discharge point of the three metal culverts should be trimmed to minimize potential blockage problems at the outlet.
- Debris should be removed from the culvert inlets.
- The large hole near the downstream end of the north culvert should be repaired.
- The seepage at the north end of the downstream toe of the tailings dam should continue to be monitored.
- The railing on the concrete spillway walkway should be restored for safety purposes.
- The debris accumulated on the upstream side of the spillway should be cleared away.
- The open channel should be examined regularly to ensure that no beaver activity is restricting the flow.

At the time of the inspection, all of the recommendations had been implemented with the exception of text bullet recommendation seven. The agent will ensure that the debris from the downstream side of the spillway is removed.

### 4.0 SUMMARY OF INSPECTION FINDINGS (HEALTH/ENVIRONMENTAL IMPACT)

Was there any indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate?

No  
Specifics:

Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material?

No  
Specifics:

Was there any indication of a known or suspected violation of a legal requirement during the inspection and/or review of relevant material which could cause a human health impact or environmental impairment?

No  
Specifics:

Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material?

No  
Specifics:

Industrial Sewage Inspection Report

5.0 ACTION(S) REQUIRED

6.0 OTHER INSPECTION FINDINGS

Remove the accumulated debris on the upstream side of the spillway.

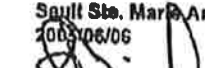
7.0 INCIDENT REPORT

Not Applicable

8.0 ATTACHMENTS

Required attachments:

PREPARED BY:  
Environmental Officer:

Name: Ed Bil  
District Office: Sault Ste. Marie Area Office  
Date: 2005/06/06  
Signature: 

REVIEWED BY:  
District Supervisor:

Name: Rod Stewart  
District Office: Sault Ste. Marie Area Office  
Date: 2005/06/06

Signature:

File Storage Number: AL MAG SU 410

Note:  
"This inspection report does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they may apply to this facility. It is, and remains, the responsibility of the owner and/or the operating authority to ensure compliance with all applicable legislative and regulatory requirements"



Ministry  
of the  
Environment  
Ontario

Ministère  
de  
l'Environnement

C. BAXTER  
R. GAGAN  
D. HAUMANN  
G. KERRON  
H. IVARSSON

RECEIVED JAN 25 1989

R. JOHNSON

250 Davison Avenue  
Toronto, Ontario  
M4S 1H2

250, avenue Davison  
Toronto (Ontario)  
M4S 1H2

B. KATT

R. DOODS TAW

R. KYNARD SARI

P. McDONALD MNR.

S. KOSOVIC MOL.

APPROVALS BRANCH

Citadel Gold Mines, Inc.  
Wawa Mine Office  
P.O. Box 54  
Wawa, Ontario

Attention: Mr. L. B. Staines, P. Eng., Mine Manager

Dear Mr. Staines:

RE: Citadel Gold Mines, Inc.,  
Certificate of Approval (Sewage)  
No. 4-0101-88-896

Enclosed please find the Ministry's Certificate of Approval No. 4-0101-88-896.

As you are aware, this Ministry is proposing comprehensive regulations which will require various types of discharges to be monitored and meet specified criteria. When the regulations are in place, you will have to comply with them. If it is necessary to modify the sewage works to comply with them, you will have to apply for the appropriate approvals at that time.

Should you have any inquires regarding the above, please do not hesitate to contact Mr. Zarko Tesic of this office at (416) 440-3558.

DATED AT TORONTO this

18<sup>th</sup>

day of

January 1989

Director,  
Section 24, O.W.R. Act,  
Ministry of the Environment.

c.c. Mr. R.C. Hore, Dir. NE. Reg., MOE



Ministry  
of the  
Environment

Ministère  
de  
l'Environnement

**Certificate of Approval (Sewage)  
Certificat d'autorisation (eaux usées)**

Number / Numéro: 4-0101-88-896

Whereas / Attendu que

Citadel Gold Mines Inc.  
Wawa, Ontario

of / d

has applied in accordance with Section 24 of the Ontario Water Resources Act for approval of:  
a fait, conformément à l'article 24 de la loi sur les ressources en eau de l'Ontario, une demande d'autorisation:

Sewage works associated with the Citadel Gold Mines Inc. mine/mill site located in McMurray Township, Algoma District, the treatment to consist of the natural degradation of cyanide and removal of slurry from the effluent in the tailings pond, the chemical destruction of cyanide in the barren bleed and tailings pond effluent, consisting of:

- a tailings pond in the Minto Lake basin with a final storage capacity of 1,280,000 m<sup>3</sup> for tailings and 480,000 m<sup>3</sup> for water;
- a polishing pond with a net volume of 270,000 m<sup>3</sup>; and
- and all pipes and appurtenances to treat and discharge effluent from the polishing pond by natural drainage to Wawa Creek,

all in accordance with the information as set out in attached Schedule A submitted by Citadel Gold Mines Inc., subject to the following special terms and conditions which are considered necessary by the undersigned.

**SPECIAL TERMS AND CONDITIONS**

1. For the purpose of this Certificate of Approval:

- (1) "Company" means Citadel Gold Mines Inc.;
- (2) "Director" means the Director of the Approvals Branch, Ministry of the Environment;
- (3) "Regional Director" means the Regional Director of the Northeastern Region of the Ministry of the Environment;
- (4) "District Officer" means the District Officer of the Sault Ste. Marie District Office of the Ministry of the Environment who is responsible for environmental matters in the Algoma District;

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Now therefore this is to certify that after due enquiry the said proposed works have been approved under Section 24 of the Ontario Water Resources Act.

Le présent document certifie qu'après vérification en bonne et due forme la construction dudit projet d'ouvrages a été approuvée aux termes de l'article 24 de la loi sur les ressources en eau de l'Ontario.

DATED AT TORONTO this  
DATÉ À TORONTO ce

18<sup>th</sup>

day of  
jour d

January 1989





- (5) "effluent from the sewage works" means the effluent from the polishing pond;
  - (6) "bi-weekly" means once every two weeks.
2. (1) The sewage works shall be designed, constructed and operated such that the concentrations of the materials named below as effluent parameters shall not be exceeded in the effluent from the sewage works, calculated in accordance with subsection (3).

EFFLUENT PARAMETERS	CONCENTRATION IN EFFLUENT (mg/L)
---------------------	-------------------------------------

✓(a) 5-day Biochemical Oxygen Demand (BOD <sub>5</sub> )	15
✓(b) Suspended Solids	15
(c) Oils and greases of vegetable, animal or mineral origin (total)	15
(d) The total concentration of every individual metal, excluding calcium, magnesium, potassium and sodium	1
(e) Notwithstanding paragraph (d), the cumulative concentration of lead, copper, zinc and nickel	1
✓(f) Total cyanide	.2
✓(g) Notwithstanding paragraph (d), cadmium or mercury	0.001
(h) If total phosphorous discharges are greater than 4.5 kilograms (10 pounds) per day then total phosphorous	1
✓(i) Ammonia (NH <sub>3</sub> , expressed as nitrogen, N)	10
✓(j) Notwithstanding paragraph (c), phenols	0.02
✓(k) Notwithstanding paragraph (d), arsenic	0.5
✓(l) Notwithstanding paragraph (f), weak acid dissociable cyanides	0.5

- (2) Notwithstanding subsection (1), the Company shall operate the sewage works approved herein with the aim of maintaining the effluent from the sewage works concentration of the following parameters below the concentration indicated:

EFFLUENT PARAMETERS	CONCENTRATION IN EFFLUENT (mg/L)
---------------------	-------------------------------------

Copper	0.15
Lead	0.1
Zinc	0.3
Nickel	0.25

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The actions taken and the results achieved shall be described and included in the yearly performance report required under condition No. 13.

(3) Notwithstanding subsections (1) and (2), the Company shall:

(a) Control the discharge rate of the effluent from the sewage works, to such an extent that the flow ratio of the receiving water to the effluent from the sewage works is at least 12:1 respectively.

(b) Notwithstanding paragraph (a), if in the effluent from the sewage works, any one of the parameters listed in subsection (2) is greater than the corresponding parameter concentration indicated in subsection (2), the flow ratio shall be limited to provide the same downstream concentration; for example, if the copper concentration in the effluent from the sewage works is 0.3 mg/l, and the other three parameters are not more than twice the value indicated in subsection (2), the minimum dilution ratio of 24:1 shall be maintained.

✓ (4) ~~The pH of the sewage works effluent shall be maintained within the range of 5.5 to 8.5 (inclusive) at all times.~~

(5) (a) Data generated by the monitoring program outlined in Condition No. 3, shall be used for the purpose of determining compliance with the terms and conditions of this Certificate of Approval and shall be deemed to be conclusive of the minimum concentration.

(b) Exceedence of a concentration in subsection (1) is deemed to have occurred when the arithmetic mean of at least 4 consecutive samples analyzed for a parameter named in subsection (1) is greater than the corresponding concentration set out in subsection (1). Exceedence of pH set out in subsection (4) is deemed to have occurred when the pH value of a single sample is outside the range indicated in subsection (4).

3. The Company shall establish, carry out and maintain, upon commencement of operations of the approved works, the following monitoring program:

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(1) Sampling locations as set out in subsection (2) shall be established to the satisfaction of the District Officer prior to the commencement of operations of the sewage work... Any of these sampling locations may be changed or abandoned and new locations may be added following commencement of operation if, in the opinion of the District Officer, it is necessary to do so to ensure representative samples are being collected.

(2) Grab samples shall be collected and analyzed for:

<u>Location</u>	<u>Frequency</u>	<u>Parameters Measured</u>
(a) Mill's effluent	monthly	Level 1,2,3
(b) Tailings pond supernatant	bi-weekly	Level 1,2,3
(c) Barren Bleed Treatment Plant effluent	bi-weekly	Level 1,2,3
(d) Tailings pond storage	monthly	Level 1,2,3
(e) Jubilee Creek	bi-weekly	Level 2,3,4
(f) Effluent from the sewage works	weekly	Level 1,2,3,4,5
(g) Wawa Creek (upstream and downstream of point of discharge)	weekly	Level 1,2,3,
(h) Notwithstanding (g) Wawa Creek (upstream and downstream of point of discharge)	monthly	Level 4,5
(i) Ward Lake	monthly	Level 1,2,3,4

Analyses:

- Level 1 Total cyanide, weak acid dissociable cyanides
- Level 2 Total suspended solids, copper, lead, nickel, zinc, arsenic, iron
- Level 3 pH, alkalinity, hardness
- Level 4 Oils and grease, ammonia
- Level 5 BOD5, phenols, cadmium and mercury

(3) The time interval between consecutive weekly, bi-weekly and monthly samples shall be, at least 4, 7 and 15 days respectively.

(4) A grab sample of the effluent from the sewage works shall be collected prior to commencement of tailings pond discharge, one month after commencement of tailings pond discharge, near middle and at end of tailings pond discharge, and analyzed for toxicity using the LC50 procedure in accordance with the Ministry of the Environment "Protocol to Determine the Acute Lethality of liquid effluents to Fish," dated July 1983.

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- (5) After the Company obtains a minimum of 12 months of sampling and analytical results, the sampling and monitoring frequency indicated in Condition No. 3 and Condition No. 4 may be changed, to such frequency as the District Officer may specify from time to time.
- (6) The method of measurement for subsection (2) shall be in accordance with the Standard Methods for the Examination of Water and Wastewater, 16th Edition, dated 1985 or as revised. For all receiving water samples, the minimum detection limit shall be less than the Provincial Water Quality Objective for the parameter sampled.
4. (1) The Company shall install, maintain and operate flow measuring devices to measure and record flow rates at the following locations and frequencies:
- (a) Continuously for: mine intake and discharge, make-up water from Jubilee Lake, mill discharge, reclaimed water from tailings pond and barren bleed treatment plant effluent.
- (b) On a weekly basis for: Jubilee Creek, polishing pond effluent and Wawa Creek upstream of the sewage works effluent discharge location.
- 
- (c) Notwithstanding paragraph (b), during times that the tailings pond effluent is being discharged, daily measurements of the effluent from the sewage works and Wawa Creek upstream of the sewage works effluent discharge location shall be made and used to maintain the required dilution per Condition No. 2, subsection (3).
- (2) The flow measuring devices shall be calibrated at least once per year to maintain an accuracy of + or - 15% of the actual discharge flow rate.
- (3) The Company shall measure the water level in the tailings pond bi-weekly.
5. The Company shall install a flow controlling device, to enable control of the effluent flow from the sewage works as stated in Condition No. 2, by use of the data obtained from Conditions Nos. 3 and 4.



6. (1) The Company shall provide, by February 28, 1989, to the Director, an application for an amendment to this Certificate of Approval which includes design information and supporting documentation for a system to treat barren bleed discharges from the mill prior to its release to the tailings pond; and
- (2) Following approval of this treatment system by the Director, the system shall be installed and certified by the Company's engineers as operational by July 1, 1989.
7. (1) The Company shall provide, by July 1, 1989, to the Director, an application for an amendment to this Certificate of Approval which includes design information and supporting documentation for a system to treat tailings pond effluent discharges prior to its release from the tailings pond to the polishing pond. This treatment system shall be designed and operated in such a way that the flow and quality of the effluent from the sewage works shall at all times conform to the requirements of this Certificate of Approval;
- (2) The Company shall indicate in the subsection (1) application the need to have Wawa Creek flow controlled and/or the need for additional tailings pond storage capacity that might be required for normal operation and/or for contingency purposes. A schedule of obtaining the appropriate approvals and implementing the above in the sewage works shall be included in the subsection (1) application; and
- (3) Following approval of the subsection (1) application by the Director,
- (a) the treatment system shall be installed and certified by the Company's engineers as operational at least two months prior to the first discharge of effluent from the tailings pond.
- (b) During start-up, at least one month prior to discharge to the polishing pond, a report containing the final operating parameters of the treatment system, and at least two months of data confirming the expected performance of the treatment system and tailings pond shall be submitted to the Regional Director.



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8. (1) The Company shall submit on or before March 15, 1989 for the approval of the Regional Director, terms of reference for a study which will evaluate the environmental impact of their final discharge on the receiving water system. The terms of reference shall include, but not be limited, to the following:
- (a) Pre and post discharge biological examination of fish and benthic macroinvertebrates population in Minto and Wawa Creeks.
  - (b) A monitoring program that will assess the effect of the sewage works on the surrounding surface and ground waters, as well as the measurement of the actual dilution and impact and changes in water chemistry in the above waters as a result of the continual operation of the sewage works.
- (2) The Company shall submit within one year of the Regional Director's approval of the terms of reference submitted per subsection (1) to the District Officer a written progress report based on the terms of reference referred to in subsection (1).
- 
- 9 (1) The sewage works shall be operated such that the effluent discharged from the tailings pond shall be seasonal with the tailings pond effluent discharge to occur during ice free conditions normally in the months between April to November.
- (2) The Regional Director may, in writing, agree to or direct that the rate and period of discharge be altered within the physical capability of the sewage works to allow the discharge to coincide with the period of peak flow and maximum dilution in the receiving watercourse.
  - (3) The Company shall notify the District Officer at least 7 days prior to the commencement of each seasonal tailings pond discharge.
10. (1) The Company shall implement the rehabilitation and revegetation plan as set out in the Technical Report accompanying the application, unless otherwise approved or requested by the Regional Director.
- (2) These works shall be undertaken progressively as soon as practical on completion of tailings disposal in a given area.

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11. (1) All District Officer's requests for a change in sampling and monitoring frequency pursuant to Condition No. 3 shall be deemed to be an alteration of a term or condition of a certificate pursuant to section 24 of the Ontario Water Resources Act, R.S.O. c.361, and subject to section 61 of that Act.
- (2) All Regional Director's directive pursuant to Conditions No. 8, 9, 10 and 14 shall be deemed to be an alteration of a term or condition of a certificate pursuant to section 24 of the Ontario Water Resources Act, R.S.O. c.361, and subject to section 61 of that Act.

12. A monthly activity report shall be submitted to the District Officer on a monthly basis within the last day of the month following the period being reported upon. The first monthly activity report shall cover the first two month period following the issuance of the certificate and monthly activity reports shall be submitted to cover successive monthly intervals thereafter. The monthly activity report shall contain the following in a format that is acceptable to the District Officer:

- (a) ~~The status storage capacity occupied and remaining of the tailings impoundment area, the polishing pond and estimate of total effluent discharged from the sewage works during the reporting period.~~
- (b) The status of any implementation program, including the substantial modifications to the program which are covered by this Certificate of Approval;
- (c) A description of any action proposed or taken to comply with an elapsed scheduled requirement without further delay;
- (e) A summary and interpretation of all analytical data collected relative to the sewage works facility during the period being reported upon;
- (f) a summary and interpretation of all calibration and maintenance procedures carried out during the reporting period; and
- (h) a tabulation and description of any bypass or upset conditions which occurred during the period being reported upon.



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13. The Company shall submit to the District Officer, by March 1, 1990 and every March 1 thereafter, a performance evaluation report covering the preceding calendar year and containing at least the following in a format that is acceptable to the District Officer:

- (a) A summary of the monthly activity reports;
- (b) An overview of the success and adequacy of the approved sewage works;
- (c) A summary and interpretation, including Quality assurance and quality control of all monitoring data collected by the Company during the calendar year;
- (d) An engineer's statement on the condition and stability of all the dams and berms with respect to their ability to perform properly for another year;
- (e) A description of any operating problems and the corrective action taken during the year; and
- (f) A description of any further modifications to the system that are required to improve the operation of the approved works, including a schedule for the implementation of the modifications.

(g) A summary of rehabilitation procedures utilized to date and/or proposed rehabilitation plans. The proposed rehabilitation plans shall provide explanation of how the proposed rehabilitation plan conforms with the rehabilitation plan referenced in Condition No. 10.

14. All activity and performance reports required by this Certificate shall be submitted to the District Officer by the President or his designate on behalf of the Company who, having properly informed himself of the accuracy of the reports submitted, shall certify the said reports in the following form:

"I certify that the information in this document and all attachments are correct, accurate and complete to the best of my knowledge."

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15. (1) As financial assurance, pursuant to Part X-A of the Environmental Protection Act, that the works shall be operated in accordance with this Certificate of Approval, not later than two weeks from the date of issuance of this Certificate, the Company shall deposit with the Regional Director an irrevocable letter of credit in a form satisfactory to the Regional Director in the amount of at least \$200,000 issued by a chartered bank in Canada to her Majesty the Queen in Right of Ontario as represented by the Minister of the Environment, payable at an office of the bank in the Municipality of Metropolitan Toronto to the Treasurer of Ontario upon the written statement of the Executive Director of the Corporate Services Division of the Ministry of the Environment, or the Regional Director, or the Director, or such other official as may be designated in writing by the Minister or the Deputy Minister of the Environment, that the money is required for the purpose of this condition of the approval.
- (2) The Company, in its first performance report, pursuant to Condition No. 13, shall submit a proposal to the Regional Director setting out:
- (a) Modifications required in the facilities and/or operations to maintain compliance with this Certificate of Approval, and any other statutory or regulatory requirements;
  - (b) Post-closures rehabilitation, maintenance, modification and monitoring of wastewater works and tailings deposited therein, which will be necessary to comply with this Certificate of Approval and any other statutory or regulatory requirements;
  - (c) The cost of all of the measures set out in paragraphs (a) and (b); and
  - (d) What adjustments in the amount of the financial security under subsection (1), if any, will be necessary to ensure that there are adequate funds to cover the cost set out in paragraph (c).

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- (3) The Company shall, two years following the submission of the proposal referred to in subsection (2) above, and every two years thereafter until completion of the closure of the mine/mill complex, submit to the Regional Director that he is satisfied with any of the above reports and the recommendations contained therein. The Company shall be permitted to adjust the amount of security in accordance with the instruction of the Regional Director.
  - (4) Upon the written advice of the Regional Director that he is satisfied with any of the above reports and the recommendations contained therein, the Company shall be permitted to adjust the amount of the security in accordance with the instructions of the Regional Director.
  - (5) In the event the Regional Director indicates that he is satisfied with the results of the post-closure rehabilitation of the tailings area and the affected waterbodies, and that no further action of the Company is required in this matter at that time, the financial assurance shall be returned to the Company.
16. The following information shall be retained by the Company for a period of at least three (3) years from the date of creation:
- (1) Laboratory analytical results of samples taken pursuant to the sampling program set out in Condition No. 3.
  - (2) Sewage works operation, performance and maintenance results, including log books associated with the operation, performance and maintenance of the sewage works.
17. Requirements specified in this certificate are requirements under Section 24 of the Ontario Water Resources Act, and do not abrogate the need to take all steps to avoid violating the provisions of applicable legislation.
18. The requirements of this Certificate of Approval are severable. If any requirement of this Certificate of Approval, or the application of any requirement of this Certificate of Approval to any circumstance, is held invalid, the application of such requirement to other circumstances and the remainder of this Certificate of Approval shall not be affected thereby.

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19. The Company shall notify the District Officer in writing of any of the following changes within thirty (30) days of the change occurring:

- (1) Change of owner or operator or both;
- (2) Change of address or address of new owner;
- (3) Change of name of the corporation; and

a copy of the most current "Initial Notice or Notice of Change" (form 1, 2 or 3 of O. Reg. 189, R.R.O. 1980) filed under the Corporations Information Act shall be submitted to the District Officer.

SCHEDULE "A" TO CERTIFICATE OF APPROVAL #4-0101-88-896

The following is a list of information received from Citadel Gold Mines Inc. and relied upon in the issuance of this Approval:

1. Application for the Approval of Plans and Specifications for the Construction of Works for the Collection, Transmission, Treatment and Disposal of Industrial Wastewater, dated May 18, 1988, signed by L.B. Staines, Mine Manager.
2. Report entitled: "Working Document, Application for Certificate of Approval, Mill Waste (Tailings) Disposal, Citadel Gold Mines Inc., Wawa, Ontario", prepared by Trow Ontario Ltd., May 10, 1988.
3. Report entitled: "Addendum, Working Document, Application for Certificate of Approval, Mill Waste (Tailings) Disposal, Citadel Gold Mines Inc., Wawa, Ontario", prepared by Trow Ontario Ltd., August 8, 1988.
4. Report entitled: "Stability Analyses of Dams, Mill Waste (Tailings) Disposal, Citadel Gold Mines Inc., Wawa, Ontario", prepared by Trow Ontario Ltd., August 10, 1988.
5. Letter dated September 20, 1988 from Mr. R.A. Knapp, Senes Consultants Limited, to Mr. Louis Tasfi, Beak Consultants Limited.

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6. Letter dated October 31, 1988 from Mr. L.B. Staines, Citadel Gold Mines, Inc. to Mr. Z. Tesic, MOE, Approvals Branch.
7. Letter dated November 7, 1988 from Mr. L.B. Staines, Citadel Gold Mines, Inc. to Mr. Z. Tesic, MOE, Approvals Branch.
8. Letter dated November 16, 1988 from Mr. T.D. Armstrong, MOE, Approvals Branch, to Mr. L.B. Staines, Citadel Gold Mines, Inc.
9. Letter dated November 29, 1988 from Mr. L.B. Staines, Citadel Gold Mines, Inc. to Mr. Z. Tesic, MOE, Approvals Branch.
10. Letter dated December 15, 1988 from Mr. L.B. Staines, Citadel Gold Mines, Inc. to Mr. Z. Tesic, MOE, Approvals Branch.
11. Letter dated December 15, 1988 from Mr. T.D. Armstrong, MOE, Approvals Branch, to Mr. L.B. Staines, Citadel Gold Mines, Inc.

## NOTICE

**TO:** Citadel Gold Mines, Inc.  
Wawa Mine Office  
P.O. Box 54  
Wawa, Ontario

You are hereby notified that a Conditional Certificate of Approval No. 4-0101-88-896 has been issued to you subject to the conditions outlined therein.

The reasons for the imposition of these conditions are as follows:

1. Condition No. 2, regarding effluent quality is required to protect the water quality of the receiving watercourse.
2. Conditions Nos. 3 and 8 regarding monitoring are required of the Company in order that the Company can demonstrate the quality of the effluent from the sewage works on a consistent basis, and to minimize impairment of receiving water quality due to the effluent discharges from the sewage works.
3. Condition No. 3, subsection (4) is included to ensure that where necessary because of changed regulations, or appropriate because of site conditions, the frequency of testing may be altered.
4. ~~Conditions Nos. 4 and 5 regarding flow measurement and control are included in order that the Company controls the discharge flow rate of the effluent from the sewage works relative to the assimilation capacity of Wawa Creek.~~
5. Conditions Nos. 6 and 7 are included in order that the Company provides the Director with additional information and obtains approval for the establishment and operation of barren bleed and tailings pond effluent treatment systems.
6. Condition No. 9 is included to indicate that the effluent discharges from the tailings ponds are seasonal and that the District Officer is to be informed prior to the commencement of each seasonal tailings pond discharge.
7. Condition No. 10 is intended that the Company initiate a rehabilitation and revegetation program to minimize erosion and sedimentation in adjacent watercourses and to avoid wind blown dust contamination, as soon as possible after discontinuing the use of any of the tailings areas in question.
8. Condition No. 11 is included to indicate that the Company has the right to appeal District Officers, and Regional Directors directives that are made pursuant to the Conditions indicated in Condition No. 11.
9. Conditions Nos. 12, 13 and 14 are included in order that the Company report to the Ministry on a regular basis on the performance of its approved wastewater treatment and control system, to ensure that early corrective action is taken by the Company if operating problems develop and to ensure that

10. Condition No. 15 is included to ensure that sufficient financial resources are available to maintain the approved works in compliance with this Certificate of Approval.
11. Condition No. 16 is included to ensure that records are kept by the Company and available for Ministry inspection.
12. Condition No. 17 is included to emphasise that conditional approval does not relieve the Company of the obligation of using all reasonable diligence to protect the environment.
13. Condition No. 18 is included to clarify that all conditions or requirements are severable.
14. Condition No. 19 is included to enable the Ministry of the Environment to maintain correct records regarding the Company ownership.

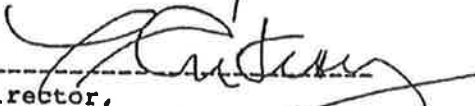
You may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 63 of the Ontario Water Resources Act, as amended in 1983, provides that the Notice requiring the hearing shall state the portions of each term or condition in the approval in respect of which the hearing is required and the grounds on which you intend to rely at the hearing.

This Notice should be served upon:

The Secretary,  
Environmental Appeal Board,  
112 St. Clair Avenue West,  
6th Floor,  
Toronto, Ontario.  
M4V 1N3

and The Director,  
Section 24, O.W.R. Act,  
Ministry of the Environment,  
250 Davisville Avenue,  
3rd Floor,  
Toronto, Ontario.  
M4S 1H2

Dated at Toronto this 18 day of January, 1989.

  
Director,  
Section 24, O.W.R. Act,  
Ministry of the Environment.

## **Appendix C - DATA SUMMARY TABLES**









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Table with columns: Parameters, Level, Analyte, ECA Limit, PWQO, and Sampling Dates (1992-2001). Rows include Total Cyanide, Wk & Dissoc/Free CN, Total Suspended Solids, Copper, Lead, Nickel, Zinc, Arsenic, Iron, pH, Alkalinity, Hardness, Oil & Grease, Ammonia, BOD, Phenols, Cadmium, and Mercury.

Table with columns: Parameters, Level, Analyte, ECA Limit, PWQO, and Sampling Dates (2002-2008). Rows include Total Cyanide, Wk & Dissoc/Free CN, Total Suspended Solids, Copper, Lead, Nickel, Zinc, Arsenic, Iron, pH, Alkalinity, Hardness, Oil & Grease, Ammonia, BOD, Phenols, Cadmium, and Mercury.

Table with columns: Parameters, Level, Analyte, ECA Limit, PWQO, and Sampling Dates (2009-2019). Rows include Total Cyanide, Wk & Dissoc/Free CN, Total Suspended Solids, Copper, Lead, Nickel, Zinc, Arsenic, Iron, pH, Alkalinity, Hardness, Oil & Grease, Ammonia, BOD, Phenols, Cadmium, Mercury, Conductivity, Total Dissolved Solids, Acidity, Sulphate, Aluminum, and Molybdenum.

Notes: 1. All results in mg/L or otherwise indicated, except pH which is unitless. 2. Concentrations of effluent parameters not to be exceeded as per Condition 5 of the Amended Environmental Compliance Approval (ECA). ECA historically known as Certificate of Approval (C of A). Exceedances are shaded. 3. PWQO - Provincial Water Quality Objectives, MOECC 1994 (Updated 1999). Interim PWQO criteria are bracketed. Exceedances are bolded. Interim exceedances are underlined.



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Table with columns: Level, Parameters, Analyte, ECA Limit, PWQO, and Sampling Dates (1992-2000). Rows include Total Cyanide, Wk & Dissoc./Free CN, Total Suspended Solids, Copper, Lead, Nickel, Zinc, Arsenic, Iron, pH, Alkalinity, Hardness, Oil & Grease, Ammonia, BOD, Phenols, Cadmium, and Mercury.

Table with columns: Level, Parameters, Analyte, ECA Limit, PWQO, and Sampling Dates (2001-2007). Rows include Total Cyanide, Wk & Dissoc./Free CN, Total Suspended Solids, Copper, Lead, Nickel, Zinc, Arsenic, Iron, pH, Alkalinity, Hardness, Oil & Grease, Ammonia, BOD, Phenols, Cadmium, and Mercury.

Table with columns: Level, Parameters, Analyte, ECA Limit, PWQO, and Sampling Dates (2008-2019). Rows include Total Cyanide, Wk & Dissoc./Free CN, Total Suspended Solids, Copper, Lead, Nickel, Zinc, Arsenic, Iron, pH, Alkalinity, Hardness, Oil & Grease, Ammonia, BOD, Phenols, Cadmium, Mercury, Conductivity, Total Dissolved Solids, Acidity, Sulphate, Aluminum, and Molybdenum.

Notes: 1. All results in mg/L or otherwise indicated, except pH which is unitless. 2. Concentrations of effluent parameters not to be exceeded as per Condition 5 of the Amended Environmental Compliance Approval (ECA). 3. PWQO - Provincial Water Quality Objectives, MOECC 1994 (Updated 1999). 4. Copper interim PWQO criterion is dependent upon sample hardness. 5. Lead PWQO criterion is dependent upon sample alkalinity. 6. Cadmium interim PWQO criterion is dependent upon sample hardness. 7. \*\* = Sample was not filtered. 8. Table to be read in conjunction with accompanying report.



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Level	Parameters Analyte	ECA Limit <sup>2</sup>	PWQO <sup>3</sup>	Sampling Dates																											
				2009		2010				2011				2012				2013		2014		2015		2016		2017		2018		2019	
				Dec. 12	Feb 03	May 16	Aug 22	Nov 11	Feb 24	May 15	Aug 16	Nov 06	Feb 19	May 29	Aug 16	Nov 06	May 25	Nov 16	May 18	Nov 05	May 22	Nov 16	May 15	Nov 12	May 26	Oct 28	May 22	Nov 04	May 25	Nov 03	
1	Total Cyanide	2	--	<0.005	Not	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
	Wk & Dissoc./Free CN	0.5	0.005	<0.002	Sampled	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
2	Total Suspended Solids	15	--	2		<1	<1	2	3	4	2	1	1	2	2	2		2	<1	17	<10	<10	26	<10	20	<10	110	110	<10	<10	
	Copper <sup>4</sup>	0.15	0.005 (0.001 or 0.005)	<0.001		<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0015		<0.001	<0.001	<0.001	<0.001	<0.001	<u>0.0081</u>	<0.001	<0.001	<0.001	<u>0.0056</u>	<0.001	<0.001	<0.001	
	Lead <sup>5</sup>	0.1	0.005 to 0.025 (0.001 to 0.005)	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.0005	<0.0005
	Nickel	0.25	0.025	<0.001		0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	0.0042	<0.001	<0.001	<0.001	0.0038	<0.001	<0.001	<0.001
	Zinc	0.3	0.03 (0.02)	<0.005		0.007	<0.005	0.014	<0.005	<0.005	0.006	<0.005	0.0069	0.0059	0.01	0.0072		<0.005	<0.005	0.0083	<0.005	<0.005	<u>0.041</u>	<0.005	0.0079	0.0069	<u>0.037</u>	0.0062	0.0059	0.0056	
	Arsenic	0.5	0.1 (0.005)	<u>0.029</u>		<u>0.022</u>	<u>0.021</u>	<u>0.12</u>	<u>0.025</u>	<u>0.024</u>	<u>0.024</u>	<u>0.026</u>	<u>0.051</u>	<u>0.024</u>	<u>0.024</u>	<u>0.027</u>		<u>0.026</u>	<u>0.026</u>	<u>0.046</u>	<u>0.025</u>	<u>0.025</u>	<u>0.16</u>	<u>0.025</u>	<u>0.027</u>	<u>0.026</u>	<u>0.061</u>	<u>0.026</u>	<u>0.025</u>	<u>0.025</u>	
	Iron	--	0.3	<u>2.9</u>		<u>2.1</u>	<u>1.9</u>	<u>8.1</u>	<u>2.1</u>	<u>2</u>	<u>2</u>	<u>2.2</u>	<u>14</u>	<u>2.2</u>	<u>2</u>	<u>2.2</u>		<u>2</u>	<u>2</u>	<u>5.2</u>	<u>1.8</u>	<u>1.9</u>	<u>1.9</u>	<u>1.9</u>	<u>2.4</u>	<u>2.3</u>	<u>10</u>	<u>2.2</u>	<u>2.2</u>	<u>2.3</u>	
3	pH	6.0 to 8.5	6.5 to 8.5	8		8.1	8	8	8.12	8.21	8.01	8.07	8.03	7.85	8.03	7.64		7.89	8.05	7.98	8.36	7.95	7.97	8.03	8.00	8.02	8.19	7.94	8.16	8.12	
	Alkalinity	--	--	161		160	156	159	161	158	157	160	159	170	160	170		160	160	160	160	160	160	160	160	160	160	160	160	160	
	Hardness	--	--	150		160	150	140	160	150	140	160	160	150	160	160		160	160	160	160	160	160	150	150	150	140	160	150	170	
4	Oil & Grease	15	--	1.3				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.3	0.7	<0.5		<0.5	<0.5	<0.5	0.7	0.60	<0.50	<0.50	<0.50	0.90	<0.5	<0.5	<0.5	1.7	
	Ammonia	10	--	0.14		0.08	0.08	0.11	0.09	0.1	0.11	0.09	0.09	<0.05	0.085	0.14		0.07	0.11	0.14	0.093	<0.05	0.12	0.090	0.11	0.10	0.11	0.13	0.13	0.14	
5	BOD	15	--	<2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	
	Phenols	0.02	0.001 (0.005)	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
	Cadmium <sup>6</sup>	0.001	0.0002 (0.0001 or 0.0005)			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00011	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
	Mercury	0.001	0.0002			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
	Conductivity (µS/cm)	--	--	305		302	308	305	304	307	303	312	305	308	307	300		310	312	315	307	304	295	306	305	303	286	292	292	304	
	Total Dissolved Solids	--	--	203		194	200	194	176	196	218	172	138	158	162	168		142	166	192	184	164	174	156	170	160	185	110	185	150	
	Acidity	--	--	--		<10	<10	<10	<10	<10	<10	11	<10	<10	<10	<10		<10	<10	<10	<10	<10	10	11	<10	<5.0	<5.0	6.2	<5.0	5.4	
	Sulphate	--	--	3		3	2	2	2	2	2	2	4	3	3	3		2	1	2	<1	1.6	2.4	2.7	2.6	1.9	1.5	2.6	<1.0	1.5	
	Aluminum	--	(0.075)	<0.005		0.008	0.006	<u>0.26</u>	0.006	0.01	0.011	0.012	0.019	0.0061	<0.005	0.0075		<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	0.026**	0.014**	<0.005	0.008	<0.005	<0.005	
	Molybdenum	--	0.04	0.005		0.005	0.005	0.006	0.005	0.005	0.0044	0.0047	0.005	0.0048	0.0043	0.0045		0.0045	0.0043	0.0044	0.0043	0.0042	0.003	0.0038	0.0039	0.0035	0.0031	0.0038	0.0037	0.0035	

Notes:

- All results in mg/L or otherwise indicated, except pH which is unitless.
- Concentrations of effluent parameters not to be exceeded as per Condition 5 of the Amended Environmental Compliance Approval (ECA). ECA historically known as Certificate of Approval (C of A). Exceedances are shaded.
- PWQO - Provincial Water Quality Objectives, MOECC 1994 (Updated 1999). Interim PWQO criteria are bracketed. Exceedances **in bold**. Interim exceedances are underlined.
- Copper interim PWQO criterion is dependent upon sample hardness.
- Lead PWQO criterion is dependent upon sample alkalinity. Lead interim PWQO criterion is dependent upon sample hardness.
- Cadmium interim PWQO criterion is dependent upon sample hardness.
- \*\* = Sample was not filtered. The PWQO for aluminum is applicable to clay-free samples, generally requiring lab filtering (0.2 micron filter).
- Table to be read in conjunction with accompanying report.



Citabar LP

CGM-11

Level	Parameters Analyte	ECA Limit <sup>2</sup>	PWQO <sup>3</sup>	Sampling Dates																											
				2009	2010				2011				2012				2013		2014		2015		2016		2017		2018		2019		
				Dec. 12	Feb 3	May 16	Aug 22	Nov 11	Feb 24	May 15	Aug 16	Nov 06	Feb 19	May 29	Aug 16	Nov 06	May 25	Nov 16	May 18	Nov 05	May 22	Nov 16	May 15	Nov 12	May 26	Oct 28	May 22	Nov 04	May 25	Nov 03	
1	Total Cyanide	2	--	<0.005	Not	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		
	Wk & Dissoc./Free CN	0.5	0.005	<0.002	Sampled	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		
2	Total Suspended Solids	15	--	<1		<1	1	1	1	7	1	<1	<1	2	1	<1		1	<1	<1	<10	<10	<10	<10	<10	<10	<10	<10	<10		
	Copper <sup>4</sup>	0.15	0.005 (0.001 or 0.005)	0.002		0.001	<0.001	0.001	<0.001	0.003	0.002	0.001	<0.001	0.0011	<0.001	0.0019		0.0011	0.0010	0.0010	0.0010	<0.001	<0.001	0.0011	0.0025	0.001	<0.001	0.0011	<0.001		
	Lead <sup>5</sup>	0.1	0.005 to 0.025 (0.001 to 0.005)	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00076	<0.0005	<0.0005	<0.0005	<0.0005		
	Nickel	0.25	0.025	0.001		0.001	<0.001	0.001	0.001	0.003	0.002	0.001	<0.001	<0.001	<0.001	0.001		<0.001	<0.001	0.001	0.001	0.0014	<0.001	0.0013	0.0018	0.0011	0.001	0.001	<0.001		
	Zinc	0.3	0.03 (0.02)	<0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0054	<0.005	0.0076	<0.005	<0.005	<0.005	<0.005		
	Arsenic	0.5	0.1 (0.005)	0.001		0.001	0.003	0.001	0.001	0.002	0.001	0.0014	0.0013	0.0023	0.0011		0.0011	<0.001	0.0011	0.0012	<0.001	<0.001	0.0023	0.0017	0.0014	0.0011	0.0011	<0.001	0.0014		
	Iron	--	0.3	<b>0.33</b>		0.27	<b>0.81</b>	0.24	<b>1.1</b>	<b>0.37</b>	<b>0.52</b>	0.17	<b>1</b>	0.24	<b>0.63</b>	0.22		0.17	0.14	0.16	0.14	0.19	0.16	0.26	<b>0.69</b>	0.26	0.18	0.17	0.12		
3	pH	6.0 to 8.5	6.5 to 8.5	7.3		7.3	7.5	7.29	7.35	7.48	7.11	7.49	7.19	6.85	7	6.7		6.99	6.88	7.47	7.64	7.41	7.34	7.46	7.34	7.45	7.53	7.29	7.46		
	Alkalinity	--	--	36		35	43	32	48	25	38	35	43	32	40	30		30	17	28	22	32	29	31	26	29	25	26			
	Hardness	--	--	40		41	43	36	47	30	42	37	49	34	40	36		34	24	33	28	39	33	33	29	32	25	30			
4	Oil & Grease	15	--	<0.5				<0.5	<0.5	<0.5	<0.5	<0.5	0.9	0.7	<0.5		<0.5	<0.5	<0.5	0.7	<0.5	<0.50	0.50	<0.50	1.4	<0.5	1.5				
	Ammonia	10	--	0.08		<0.05	<0.05	0.17	<0.05	<0.05	<0.05	0.17	<0.05	0.092		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.050	<0.050	0.057	<0.050	<0.050	0.061				
5	BOD	15	--	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2		<2	2	<2	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0			
	Phenols	0.02	0.001 (0.005)	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<b>0.002</b>	<0.001	<0.001	<0.001	<0.001		0.001	<0.001	<b>0.0038</b>	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<b>0.0043</b>	<0.0010	<0.0010				
	Cadmium <sup>6</sup>	0.001	0.0002 (0.0001 or 0.0005)	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001		<b>0.00029</b>	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			
	Mercury	0.001	0.0002	<0.00002		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			
6	Conductivity (µS/cm)	--	--	83		80	91	77	109	64	84	80	99	73	83	72		71	46	65	54	77	66	70	60	63	54				
	Total Dissolved Solids	--	--	55		56	58	48	68	40	66	66	52	50	84	44		42	32	86	54	70	56	70	50	95					
	Acidity	--	--	--		<10	<10	<10	13	<10	<10	<10	<10	<10	<10	<10		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
	Sulphate	--	--	1		4	<1	<1	4	<1	<1	<1	3	<1	<1	<1		<1	<1	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0				
	Aluminum	--	(0.075)	0.071		0.046	0.026	0.091	0.073	0.17	0.035	0.065	0.067	0.053	0.034	0.12		0.11	0.1	0.12	0.094	0.054	0.048	0.084	0.27**	0.13**	0.056				
	Molybdenum	--	0.04	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005				

Notes:

- All results in mg/L or otherwise indicated, except pH which is unitless.
- Concentrations of effluent parameters not to be exceeded as per Condition 5 of the Amended Environmental Compliance Approval (ECA). ECA historically known as Certificate of Approval (C of A). Exceedances are shaded.
- PWQO - Provincial Water Quality Objectives, MOECC 1994 (Updated 1999). Interim PWQO criteria are bracketed. Exceedances in **bold**. Interim exceedances are underlined.
- Copper interim PWQO criterion is dependent upon sample hardness.
- Lead PWQO criterion is dependent upon sample alkalinity. Lead interim PWQO criterion is dependent upon sample hardness.
- Cadmium interim PWQO criterion is dependent upon sample hardness.
- \*\* = Sample was not filtered. The PWQO for aluminum is applicable to clay-free samples, generally requiring lab filtering (0.2 micron filter).
- Table to be read in conjunction with accompanying report.







**Table 11**  
Mann-Kendall Results Summary Table  
Citibar LP 2019

Monitor	Number of Events	Number of Detects	Parameter	Mann-Kendall "S" Statistic	1-p value (decimal)	Coefficient of Variation	Trend*
CGM4	92	67	Arsenic	110	0.6434	1.570	NT
CGM4	92	80	Iron	35	0.5456	0.691	NT
CGM5	83	47	Arsenic	347	0.9132	1.785	PI
CGM5	83	71	Iron	636	0.9937	0.589	I
CGM6	85	60	Arsenic	-3	0.5030	2.240	NT
CGM6	85	78	Iron	-129	0.6864	0.753	S
CGM7	92	48	Arsenic	595	0.9774	3.604	I
CGM7	92	27	Iron	252	0.8014	2.274	NT
CGM8	92	37	Arsenic	691	0.9900	3.595	I
CGM8	92	52	Iron	384	0.9018	1.041	PI
CGM9	56	38	Arsenic	377	0.9961	2.380	I
CGM9	56	50	Iron	413	0.9982	1.109	I
CGM10	25	25	Arsenic	50	0.8741	0.871	NT
CGM10	25	25	Iron	23	0.6965	0.535	NT
CGM11	25	21	Arsenic	-16	0.6371	0.769	S
CGM11	25	25	Iron	-109	0.9942	0.799	D
CGM12	25	25	Arsenic	-77	0.9621	1.063	D
CGM12	25	25	Iron	-62	0.9229	0.899	PD
CGM13	25	18	Arsenic	22	0.6882	0.446	NT
CGM13	25	25	Iron	-94	0.9851	0.712	D

\*Trend:  
D = decreasing  
PD = probably decreasing  
I = increasing  
PI = probably increasing  
S = stable  
NT = no trend  
-- = <20% Detects

## **Appendix D - LABORATORY REPORTS OF ANALYSIS**



Your Project #: THB-00095132-YE  
 Your C.O.C. #: 715390-01-01

**Attention: Ahileas Mitsopoulos**

exp Services Inc  
 Thunder Bay Branch  
 1142 Roland St  
 Thunder Bay, ON  
 CANADA P7B 5M4

**Report Date: 2019/06/03**  
 Report #: R5737611  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9E2126**

**Received: 2019/05/28, 08:48**

Sample Matrix: Water  
 # Samples Received: 10

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Acidity (CaCO3) in water (1, 2)	10	N/A	2019/06/03		SM 22 2310
Dissolved Aluminum (0.2 u, clay free)	10	N/A	2019/05/30	CAM SOP-00447	EPA 6020B m
Alkalinity	10	N/A	2019/05/30	CAM SOP-00448	SM 23 2320 B m
Biochemical Oxygen Demand (BOD)	7	2019/05/29	2019/06/03	CAM SOP-00427	SM 23 5210B m
Conductivity	10	N/A	2019/05/30	CAM SOP-00414	SM 23 2510 m
Free (WAD) Cyanide	10	N/A	2019/06/01	CAM SOP-00457	OMOE E3015 m
Total Cyanide	10	2019/06/01	2019/06/01	CAM SOP-00457	OMOE E3015 5 m
Hardness (calculated as CaCO3)	10	N/A	2019/05/31	CAM SOP 00102/00408/00447	SM 2340 B
Mercury	4	2019/05/29	2019/05/29	CAM SOP-00453	EPA 7470A m
Mercury	3	2019/05/30	2019/05/30	CAM SOP-00453	EPA 7470A m
Total Metals Analysis by ICPMS	10	N/A	2019/05/30	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	9	N/A	2019/05/30	CAM SOP-00441	EPA GS I-2522-90 m
Total Oil and Grease	9	2019/06/01	2019/06/01	CAM SOP-00326	EPA1664B m,SM5520A m
pH	10	2019/05/29	2019/05/30	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	4	N/A	2019/05/29	CAM SOP-00444	OMOE E3179 m
Phenols (4AAP)	3	N/A	2019/05/30	CAM SOP-00444	OMOE E3179 m
Sulphate by Automated Colourimetry	10	N/A	2019/05/30	CAM SOP-00464	EPA 375.4 m
Total Dissolved Solids	8	2019/05/29	2019/05/30	CAM SOP-00428	SM 23 2540C m
Total Dissolved Solids	2	2019/05/30	2019/05/31	CAM SOP-00428	SM 23 2540C m
Total Suspended Solids	10	2019/05/29	2019/05/30	CAM SOP-00428	SM 23 2540D m

**Remarks:**

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.



Your Project #: THB-00095132-YE  
Your C.O.C. #: 715390-01-01

**Attention: Ahileas Mitsopoulos**

exp Services Inc  
Thunder Bay Branch  
1142 Roland St  
Thunder Bay, ON  
CANADA P7B 5M4

**Report Date: 2019/06/03**  
Report #: R5737611  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9E2126**

**Received: 2019/05/28, 08:48**

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) This test was performed by BV Labs Bedford
- (2) Non-accredited test method

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Michelle Brescacin, Project Manager Assistant

Email: Michelle.Brescacin@bvlabs.com

Phone# (807)344-4220

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This report has been generated and distributed using a secure automated process.

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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BV Labs Job #: B9E2126  
Report Date: 2019/06/03

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

### RESULTS OF ANALYSES OF WATER

BV Labs ID		JVE031			JVE031			JVE032		
Sampling Date		2019/05/25 12:35			2019/05/25 12:35			2019/05/25 12:45		
	UNITS	CGM-4	RDL	QC Batch	CGM-4 Lab-Dup	RDL	QC Batch	CGM-5	RDL	QC Batch
<b>Calculated Parameters</b>										
Hardness (CaCO3)	mg/L	43	1.0	6144148				32	1.0	6144148
<b>Inorganics</b>										
Acidity	mg/L	<5.0	5.0	6154353	<5.0	5.0	6154353	<5.0	5.0	6154353
Total Ammonia-N	mg/L							0.067	0.050	6147880
Conductivity	mS/cm	0.088	0.001	6147638	0.088	0.001	6147638	0.063	0.001	6146571
Total Dissolved Solids	mg/L	80	10	6147656				65	10	6147656
pH	pH	7.66		6147641	7.70		6147641	7.53		6146575
Total Suspended Solids	mg/L	<10	10	6147462				<10	10	6147462
Dissolved Sulphate (SO4)	mg/L	3.2	1.0	6146729				<1.0	1.0	6146729
Total Cyanide (CN)	mg/L	<0.0050	0.0050	6153599				<0.0050	0.0050	6153599
WAD Cyanide (Free)	mg/L	0.0017	0.0010	6153611				<0.0010	0.0010	6153611
Alkalinity (Total as CaCO3)	mg/L	38	1.0	6147635	39	1.0	6147635	27	1.0	6146568
<b>Petroleum Hydrocarbons</b>										
Total Oil & Grease	mg/L							<0.50	0.50	6153401
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										



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BV Labs Job #: B9E2126  
Report Date: 2019/06/03

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

### RESULTS OF ANALYSES OF WATER

BV Labs ID		JVE033		JVE034			JVE034		
Sampling Date		2019/05/25 10:35		2019/05/25 13:10			2019/05/25 13:10		
	<b>UNITS</b>	<b>CGM-6</b>	<b>QC Batch</b>	<b>CGM-7</b>	<b>RDL</b>	<b>QC Batch</b>	<b>CGM-7 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>

#### Calculated Parameters

Hardness (CaCO <sub>3</sub> )	mg/L	34	6144148	73	1.0	6144148			
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#### Inorganics

Acidity	mg/L	<5.0	6154353	<5.0	5.0	6154353			
Total Ammonia-N	mg/L	0.056	6147880	<0.050	0.050	6147880	0.092	0.050	6147880
Total BOD	mg/L	<2	6146681	<2	2	6146376			
Conductivity	mS/cm	0.067	6147638	0.171	0.001	6146571			
Total Dissolved Solids	mg/L	40	6149473	100	10	6147656			
pH	pH	7.55	6147641	7.87		6146575			
Phenols-4AAP	mg/L	<0.0010	6148817	<0.0010	0.0010	6146618			
Total Suspended Solids	mg/L	<10	6147462	<10	10	6147462			
Dissolved Sulphate (SO <sub>4</sub> )	mg/L	<1.0	6146729	25	1.0	6146729			
Total Cyanide (CN)	mg/L	<0.0050	6153599	<0.0050	0.0050	6153599	<0.0050	0.0050	6153599
WAD Cyanide (Free)	mg/L	<0.0010	6153611	<0.0010	0.0010	6153611	<0.0010	0.0010	6153611
Alkalinity (Total as CaCO <sub>3</sub> )	mg/L	29	6147635	48	1.0	6146568			

#### Petroleum Hydrocarbons

Total Oil & Grease	mg/L	<0.50	6153401	<0.50	0.50	6153401			
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RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

Lab-Dup = Laboratory Initiated Duplicate



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BV Labs Job #: B9E2126  
Report Date: 2019/06/03

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

### RESULTS OF ANALYSES OF WATER

BV Labs ID		JVE035			JVE035			JVE036		
Sampling Date		2019/05/25 09:45			2019/05/25 09:45			2019/05/25 12:20		
	UNITS	CGM-8	RDL	QC Batch	CGM-8 Lab-Dup	RDL	QC Batch	CGM-9	RDL	QC Batch
<b>Calculated Parameters</b>										
Hardness (CaCO3)	mg/L	70	1.0	6144148				16	1.0	6144148
<b>Inorganics</b>										
Acidity	mg/L	<5.0	5.0	6154353				<5.0	5.0	6154353
Total Ammonia-N	mg/L	<0.050	0.050	6147880				0.12	0.050	6147880
Total BOD	mg/L	<2	2	6146681						
Conductivity	mS/cm	0.166	0.001	6146571				0.034	0.001	6146571
Total Dissolved Solids	mg/L	85	10	6149473				40	10	6146795
pH	pH	7.93		6146575				7.14		6146575
Phenols-4AAP	mg/L	<0.0010	0.0010	6148817						
Total Suspended Solids	mg/L	12	10	6147462				<10	10	6146299
Dissolved Sulphate (SO4)	mg/L	22	1.0	6146729	22	1.0	6146729	<1.0	1.0	6146729
Total Cyanide (CN)	mg/L	<0.0050	0.0050	6153599				<0.0050	0.0050	6153599
WAD Cyanide (Free)	mg/L	<0.0010	0.0010	6153611				<0.0010	0.0010	6153611
Alkalinity (Total as CaCO3)	mg/L	47	1.0	6146568				12	1.0	6146568
<b>Petroleum Hydrocarbons</b>										
Total Oil & Grease	mg/L	<0.50	0.50	6153401				<0.50	0.50	6153401
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										





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BV Labs Job #: B9E2126  
Report Date: 2019/06/03

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

### RESULTS OF ANALYSES OF WATER

BV Labs ID		JVE037	JVE038	JVE039	JVE040			JVE040		
Sampling Date		2019/05/25 12:55	2019/05/25 11:45	2019/05/25 11:15	2019/05/25 12:05			2019/05/25 12:05		
	UNITS	CGM-10	CGM-11	CGM-12	CGM-13	RDL	QC Batch	CGM-13 Lab-Dup	RDL	QC Batch

<b>Calculated Parameters</b>										
Hardness (CaCO3)	mg/L	150	24	25	22	1.0	6144148			
<b>Inorganics</b>										
Acidity	mg/L	<5.0	<5.0	<5.0	<5.0	5.0	6154353			
Total Ammonia-N	mg/L	0.13	<0.050	<0.050	<0.050	0.050	6147880			
Total BOD	mg/L	<2	<2	<2	<2	2	6146376			
Conductivity	mS/cm	0.292	0.048	0.050	0.044	0.001	6146571	0.044	0.001	6146571
Total Dissolved Solids	mg/L	185	50	40	45	10	6146795			
pH	pH	8.16	7.46	7.49	7.27		6146575	7.31		6146575
Phenols-4AAP	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	6146310			
Total Suspended Solids	mg/L	<10	<10	<10	<10	10	6146299			
Dissolved Sulphate (SO4)	mg/L	<1.0	<1.0	<1.0	<1.0	1.0	6146729			
Total Cyanide (CN)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	6153599			
WAD Cyanide (Free)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	6153611			
Alkalinity (Total as CaCO3)	mg/L	160	21	21	16	1.0	6146568	16	1.0	6146568
<b>Petroleum Hydrocarbons</b>										
Total Oil & Grease	mg/L	<0.50	<0.50	<0.50	<0.50	0.50	6153401			

RDL = Reportable Detection Limit  
 QC Batch = Quality Control Batch  
 Lab-Dup = Laboratory Initiated Duplicate



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BV Labs Job #: B9E2126  
Report Date: 2019/06/03

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

### ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		JVE031	JVE032			JVE033	JVE034	JVE035		
Sampling Date		2019/05/25 12:35	2019/05/25 12:45			2019/05/25 10:35	2019/05/25 13:10	2019/05/25 09:45		
	<b>UNITS</b>	<b>CGM-4</b>	<b>CGM-5</b>	<b>RDL</b>	<b>QC Batch</b>	<b>CGM-6</b>	<b>CGM-7</b>	<b>CGM-8</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Metals</b>										
Dissolved (0.2u) Aluminum (Al)	ug/L	16	140	5	6146988	100	18	41	5	6146988
Mercury (Hg)	ug/L					<0.1	<0.1	<0.1	0.1	6148629
Total Aluminum (Al)	ug/L	37	210	5.0	6149149	120	45	120	5.0	6149149
Total Arsenic (As)	ug/L	2.3	2.6	1.0	6149149	1.9	1.1	1.3	1.0	6149149
Total Cadmium (Cd)	ug/L					<0.10	<0.10	<0.10	0.10	6149149
Total Copper (Cu)	ug/L	2.2	2.6	1.0	6149149	1.9	1.2	1.4	1.0	6149149
Total Iron (Fe)	ug/L	230	430	100	6149149	220	<100	140	100	6149149
Total Lead (Pb)	ug/L	<0.50	<0.50	0.50	6149149	<0.50	<0.50	<0.50	0.50	6149149
Total Molybdenum (Mo)	ug/L	<0.50	<0.50	0.50	6149149	<0.50	<0.50	<0.50	0.50	6149149
Total Nickel (Ni)	ug/L	2.4	1.6	1.0	6149149	1.4	<1.0	<1.0	1.0	6149149
Total Zinc (Zn)	ug/L	<5.0	<5.0	5.0	6149149	<5.0	<5.0	<5.0	5.0	6149149
RDL = Reportable Detection Limit QC Batch = Quality Control Batch										

BV Labs ID		JVE036			JVE036			JVE037	JVE038		
Sampling Date		2019/05/25 12:20			2019/05/25 12:20			2019/05/25 12:55	2019/05/25 11:45		
	<b>UNITS</b>	<b>CGM-9</b>	<b>RDL</b>	<b>QC Batch</b>	<b>CGM-9 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>	<b>CGM-10</b>	<b>CGM-11</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Metals</b>											
Dissolved (0.2u) Aluminum (Al)	ug/L	110	5	6146988	110	5	6146988	<5	100	5	6146988
Mercury (Hg)	ug/L							<0.1	<0.1	0.1	6146141
Total Aluminum (Al)	ug/L	130	5.0	6149243				15	110	5.0	6149243
Total Arsenic (As)	ug/L	2.2	1.0	6149243				25	<1.0	1.0	6149243
Total Cadmium (Cd)	ug/L							<0.10	<0.10	0.10	6149243
Total Copper (Cu)	ug/L	<1.0	1.0	6149243				<1.0	<1.0	1.0	6149243
Total Iron (Fe)	ug/L	280	100	6149243				2200	120	100	6149243
Total Lead (Pb)	ug/L	<0.50	0.50	6149243				<0.50	<0.50	0.50	6149243
Total Molybdenum (Mo)	ug/L	<0.50	0.50	6149243				3.7	<0.50	0.50	6149243
Total Nickel (Ni)	ug/L	<1.0	1.0	6149243				<1.0	<1.0	1.0	6149243
Total Zinc (Zn)	ug/L	<5.0	5.0	6149243				5.9	<5.0	5.0	6149243
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate											



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BV Labs Job #: B9E2126  
Report Date: 2019/06/03

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

### ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		JVE039	JVE040		
Sampling Date		2019/05/25 11:15	2019/05/25 12:05		
	UNITS	CGM-12	CGM-13	RDL	QC Batch
<b>Metals</b>					
Dissolved (0.2u) Aluminum (Al)	ug/L	92	110	5	6146988
Mercury (Hg)	ug/L	<0.1	<0.1	0.1	6146141
Total Aluminum (Al)	ug/L	110	140	5.0	6149243
Total Arsenic (As)	ug/L	7.3	1.0	1.0	6149243
Total Cadmium (Cd)	ug/L	<0.10	<0.10	0.10	6149243
Total Copper (Cu)	ug/L	1.3	<1.0	1.0	6149243
Total Iron (Fe)	ug/L	160	110	100	6149243
Total Lead (Pb)	ug/L	<0.50	<0.50	0.50	6149243
Total Molybdenum (Mo)	ug/L	<0.50	<0.50	0.50	6149243
Total Nickel (Ni)	ug/L	<1.0	1.5	1.0	6149243
Total Zinc (Zn)	ug/L	<5.0	<5.0	5.0	6149243
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					



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VERITAS

BV Labs Job #: B9E2126  
Report Date: 2019/06/03

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

### TEST SUMMARY

**BV Labs ID:** JVE031  
**Sample ID:** CGM-4  
**Matrix:** Water

**Collected:** 2019/05/25  
**Shipped:**  
**Received:** 2019/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6154353	N/A	2019/06/03	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6146988	N/A	2019/05/30	Prempal Bhatti
Alkalinity	AT	6147635	N/A	2019/05/30	Yogesh Patel
Conductivity	AT	6147638	N/A	2019/05/30	Yogesh Patel
Free (WAD) Cyanide	SKAL/CN	6153611	N/A	2019/06/01	Barbara Kalbasi Esfahani
Total Cyanide	SKAL/CN	6153599	2019/06/01	2019/06/01	Barbara Kalbasi Esfahani
Hardness (calculated as CaCO3)		6144148	N/A	2019/05/31	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	6149149	N/A	2019/05/30	Arefa Dabhad
pH	AT	6147641	2019/05/29	2019/05/30	Yogesh Patel
Sulphate by Automated Colourimetry	KONE	6146729	N/A	2019/05/30	Alina Dobreanu
Total Dissolved Solids	BAL	6147656	2019/05/29	2019/05/30	Mandeep Kaur
Total Suspended Solids	BAL	6147462	2019/05/29	2019/05/30	Nilam Borole

**BV Labs ID:** JVE031 Dup  
**Sample ID:** CGM-4  
**Matrix:** Water

**Collected:** 2019/05/25  
**Shipped:**  
**Received:** 2019/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6154353	N/A	2019/06/03	Brent Boudreau
Alkalinity	AT	6147635	N/A	2019/05/30	Yogesh Patel
Conductivity	AT	6147638	N/A	2019/05/30	Yogesh Patel
pH	AT	6147641	2019/05/29	2019/05/30	Yogesh Patel

**BV Labs ID:** JVE032  
**Sample ID:** CGM-5  
**Matrix:** Water

**Collected:** 2019/05/25  
**Shipped:**  
**Received:** 2019/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6154353	N/A	2019/06/03	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6146988	N/A	2019/05/30	Prempal Bhatti
Alkalinity	AT	6146568	N/A	2019/05/30	Surinder Rai
Conductivity	AT	6146571	N/A	2019/05/30	Surinder Rai
Free (WAD) Cyanide	SKAL/CN	6153611	N/A	2019/06/01	Barbara Kalbasi Esfahani
Total Cyanide	SKAL/CN	6153599	2019/06/01	2019/06/01	Barbara Kalbasi Esfahani
Hardness (calculated as CaCO3)		6144148	N/A	2019/05/31	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	6149149	N/A	2019/05/30	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6147880	N/A	2019/05/30	Chandra Nandlal
Total Oil and Grease	BAL	6153401	2019/06/01	2019/06/01	Sukhardey Pal Singh Khangura
pH	AT	6146575	2019/05/29	2019/05/30	Surinder Rai
Sulphate by Automated Colourimetry	KONE	6146729	N/A	2019/05/30	Alina Dobreanu
Total Dissolved Solids	BAL	6147656	2019/05/29	2019/05/30	Mandeep Kaur
Total Suspended Solids	BAL	6147462	2019/05/29	2019/05/30	Nilam Borole



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BV Labs Job #: B9E2126  
Report Date: 2019/06/03

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

### TEST SUMMARY

**BV Labs ID:** JVE033  
**Sample ID:** CGM-6  
**Matrix:** Water

**Collected:** 2019/05/25  
**Shipped:**  
**Received:** 2019/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6154353	N/A	2019/06/03	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6146988	N/A	2019/05/30	Prempal Bhatti
Alkalinity	AT	6147635	N/A	2019/05/30	Yogesh Patel
Biochemical Oxygen Demand (BOD)	DO	6146681	2019/05/29	2019/06/03	Prakash Piya
Conductivity	AT	6147638	N/A	2019/05/30	Yogesh Patel
Free (WAD) Cyanide	SKAL/CN	6153611	N/A	2019/06/01	Barbara Kalbasi Esfahani
Total Cyanide	SKAL/CN	6153599	2019/06/01	2019/06/01	Barbara Kalbasi Esfahani
Hardness (calculated as CaCO3)		6144148	N/A	2019/05/31	Automated Statchk
Mercury	CV/AA	6148629	2019/05/30	2019/05/30	Ron Morrison
Total Metals Analysis by ICPMS	ICP/MS	6149149	N/A	2019/05/30	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6147880	N/A	2019/05/30	Chandra Nandlal
Total Oil and Grease	BAL	6153401	2019/06/01	2019/06/01	Sukhardey Pal Singh Khangura
pH	AT	6147641	2019/05/29	2019/05/30	Yogesh Patel
Phenols (4AAP)	TECH/PHEN	6148817	N/A	2019/05/30	Bramdeo Motiram
Sulphate by Automated Colourimetry	KONE	6146729	N/A	2019/05/30	Alina Dobreanu
Total Dissolved Solids	BAL	6149473	2019/05/30	2019/05/31	Xinyue (Sarah) Hou
Total Suspended Solids	BAL	6147462	2019/05/29	2019/05/30	Nilam Borole

**BV Labs ID:** JVE034  
**Sample ID:** CGM-7  
**Matrix:** Water

**Collected:** 2019/05/25  
**Shipped:**  
**Received:** 2019/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6154353	N/A	2019/06/03	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6146988	N/A	2019/05/30	Prempal Bhatti
Alkalinity	AT	6146568	N/A	2019/05/30	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	6146376	2019/05/29	2019/06/03	Nusrat Naz
Conductivity	AT	6146571	N/A	2019/05/30	Surinder Rai
Free (WAD) Cyanide	SKAL/CN	6153611	N/A	2019/06/01	Barbara Kalbasi Esfahani
Total Cyanide	SKAL/CN	6153599	2019/06/01	2019/06/01	Barbara Kalbasi Esfahani
Hardness (calculated as CaCO3)		6144148	N/A	2019/05/31	Automated Statchk
Mercury	CV/AA	6148629	2019/05/30	2019/05/30	Ron Morrison
Total Metals Analysis by ICPMS	ICP/MS	6149149	N/A	2019/05/30	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6147880	N/A	2019/05/30	Chandra Nandlal
Total Oil and Grease	BAL	6153401	2019/06/01	2019/06/01	Sukhardey Pal Singh Khangura
pH	AT	6146575	2019/05/29	2019/05/30	Surinder Rai
Phenols (4AAP)	TECH/PHEN	6146618	N/A	2019/05/29	Bramdeo Motiram
Sulphate by Automated Colourimetry	KONE	6146729	N/A	2019/05/30	Alina Dobreanu
Total Dissolved Solids	BAL	6147656	2019/05/29	2019/05/30	Mandeep Kaur
Total Suspended Solids	BAL	6147462	2019/05/29	2019/05/30	Nilam Borole



TEST SUMMARY

**BV Labs ID:** JVE034 Dup  
**Sample ID:** CGM-7  
**Matrix:** Water

**Collected:** 2019/05/25  
**Shipped:**  
**Received:** 2019/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Free (WAD) Cyanide	SKAL/CN	6153611	N/A	2019/06/01	Barbara Kalbasi Esfahani
Total Cyanide	SKAL/CN	6153599	2019/06/01	2019/06/01	Barbara Kalbasi Esfahani
Total Ammonia-N	LACH/NH4	6147880	N/A	2019/05/30	Chandra Nandlal

**BV Labs ID:** JVE035  
**Sample ID:** CGM-8  
**Matrix:** Water

**Collected:** 2019/05/25  
**Shipped:**  
**Received:** 2019/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6154353	N/A	2019/06/03	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6146988	N/A	2019/05/30	Prempal Bhatti
Alkalinity	AT	6146568	N/A	2019/05/30	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	6146681	2019/05/29	2019/06/03	Prakash Piya
Conductivity	AT	6146571	N/A	2019/05/30	Surinder Rai
Free (WAD) Cyanide	SKAL/CN	6153611	N/A	2019/06/01	Barbara Kalbasi Esfahani
Total Cyanide	SKAL/CN	6153599	2019/06/01	2019/06/01	Barbara Kalbasi Esfahani
Hardness (calculated as CaCO3)		6144148	N/A	2019/05/31	Automated Statchk
Mercury	CV/AA	6148629	2019/05/30	2019/05/30	Ron Morrison
Total Metals Analysis by ICPMS	ICP/MS	6149149	N/A	2019/05/30	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6147880	N/A	2019/05/30	Chandra Nandlal
Total Oil and Grease	BAL	6153401	2019/06/01	2019/06/01	Sukhardey Pal Singh Khangura
pH	AT	6146575	2019/05/29	2019/05/30	Surinder Rai
Phenols (4AAP)	TECH/PHEN	6148817	N/A	2019/05/30	Bramdeo Motiram
Sulphate by Automated Colourimetry	KONE	6146729	N/A	2019/05/30	Alina Dobreanu
Total Dissolved Solids	BAL	6149473	2019/05/30	2019/05/31	Xinyue (Sarah) Hou
Total Suspended Solids	BAL	6147462	2019/05/29	2019/05/30	Nilam Borole

**BV Labs ID:** JVE035 Dup  
**Sample ID:** CGM-8  
**Matrix:** Water

**Collected:** 2019/05/25  
**Shipped:**  
**Received:** 2019/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sulphate by Automated Colourimetry	KONE	6146729	N/A	2019/05/30	Alina Dobreanu

**BV Labs ID:** JVE036  
**Sample ID:** CGM-9  
**Matrix:** Water

**Collected:** 2019/05/25  
**Shipped:**  
**Received:** 2019/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6154353	N/A	2019/06/03	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6146988	N/A	2019/05/30	Prempal Bhatti
Alkalinity	AT	6146568	N/A	2019/05/30	Surinder Rai
Conductivity	AT	6146571	N/A	2019/05/30	Surinder Rai
Free (WAD) Cyanide	SKAL/CN	6153611	N/A	2019/06/01	Barbara Kalbasi Esfahani
Total Cyanide	SKAL/CN	6153599	2019/06/01	2019/06/01	Barbara Kalbasi Esfahani
Hardness (calculated as CaCO3)		6144148	N/A	2019/05/31	Automated Statchk



BUREAU  
VERITAS

BV Labs Job #: B9E2126  
Report Date: 2019/06/03

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

### TEST SUMMARY

**BV Labs ID:** JVE036  
**Sample ID:** CGM-9  
**Matrix:** Water

**Collected:** 2019/05/25  
**Shipped:**  
**Received:** 2019/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals Analysis by ICPMS	ICP/MS	6149243	N/A	2019/05/30	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6147880	N/A	2019/05/30	Chandra Nandlal
Total Oil and Grease	BAL	6153401	2019/06/01	2019/06/01	Sukhardey Pal Singh Khangura
pH	AT	6146575	2019/05/29	2019/05/30	Surinder Rai
Sulphate by Automated Colourimetry	KONE	6146729	N/A	2019/05/30	Alina Dobreanu
Total Dissolved Solids	BAL	6146795	2019/05/29	2019/05/30	Mandeep Kaur
Total Suspended Solids	BAL	6146299	2019/05/29	2019/05/30	Xinyue (Sarah) Hou

**BV Labs ID:** JVE036 Dup  
**Sample ID:** CGM-9  
**Matrix:** Water

**Collected:** 2019/05/25  
**Shipped:**  
**Received:** 2019/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6146988	N/A	2019/05/30	Prempal Bhatti

**BV Labs ID:** JVE037  
**Sample ID:** CGM-10  
**Matrix:** Water

**Collected:** 2019/05/25  
**Shipped:**  
**Received:** 2019/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6154353	N/A	2019/06/03	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6146988	N/A	2019/05/30	Prempal Bhatti
Alkalinity	AT	6146568	N/A	2019/05/30	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	6146376	2019/05/29	2019/06/03	Nusrat Naz
Conductivity	AT	6146571	N/A	2019/05/30	Surinder Rai
Free (WAD) Cyanide	SKAL/CN	6153611	N/A	2019/06/01	Barbara Kalbasi Esfahani
Total Cyanide	SKAL/CN	6153599	2019/06/01	2019/06/01	Barbara Kalbasi Esfahani
Hardness (calculated as CaCO3)		6144148	N/A	2019/05/31	Automated Statchk
Mercury	CV/AA	6146141	2019/05/29	2019/05/29	Ron Morrison
Total Metals Analysis by ICPMS	ICP/MS	6149243	N/A	2019/05/30	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6147880	N/A	2019/05/30	Chandra Nandlal
Total Oil and Grease	BAL	6153401	2019/06/01	2019/06/01	Sukhardey Pal Singh Khangura
pH	AT	6146575	2019/05/29	2019/05/30	Surinder Rai
Phenols (4AAP)	TECH/PHEN	6146310	N/A	2019/05/29	Bramdeo Motiram
Sulphate by Automated Colourimetry	KONE	6146729	N/A	2019/05/30	Alina Dobreanu
Total Dissolved Solids	BAL	6146795	2019/05/29	2019/05/30	Mandeep Kaur
Total Suspended Solids	BAL	6146299	2019/05/29	2019/05/30	Xinyue (Sarah) Hou

**BV Labs ID:** JVE038  
**Sample ID:** CGM-11  
**Matrix:** Water

**Collected:** 2019/05/25  
**Shipped:**  
**Received:** 2019/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6154353	N/A	2019/06/03	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6146988	N/A	2019/05/30	Prempal Bhatti
Alkalinity	AT	6146568	N/A	2019/05/30	Surinder Rai



BUREAU  
VERITAS

BV Labs Job #: B9E2126  
Report Date: 2019/06/03

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

### TEST SUMMARY

**BV Labs ID:** JVE038  
**Sample ID:** CGM-11  
**Matrix:** Water

**Collected:** 2019/05/25  
**Shipped:**  
**Received:** 2019/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Biochemical Oxygen Demand (BOD)	DO	6146376	2019/05/29	2019/06/03	Nusrat Naz
Conductivity	AT	6146571	N/A	2019/05/30	Surinder Rai
Free (WAD) Cyanide	SKAL/CN	6153611	N/A	2019/06/01	Barbara Kalbasi Esfahani
Total Cyanide	SKAL/CN	6153599	2019/06/01	2019/06/01	Barbara Kalbasi Esfahani
Hardness (calculated as CaCO3)		6144148	N/A	2019/05/31	Automated Statchk
Mercury	CV/AA	6146141	2019/05/29	2019/05/29	Ron Morrison
Total Metals Analysis by ICPMS	ICP/MS	6149243	N/A	2019/05/30	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6147880	N/A	2019/05/30	Chandra Nandlal
Total Oil and Grease	BAL	6153401	2019/06/01	2019/06/01	Sukhardey Pal Singh Khangura
pH	AT	6146575	2019/05/29	2019/05/30	Surinder Rai
Phenols (4AAP)	TECH/PHEN	6146310	N/A	2019/05/30	Bramdeo Motiram
Sulphate by Automated Colourimetry	KONE	6146729	N/A	2019/05/30	Alina Dobreanu
Total Dissolved Solids	BAL	6146795	2019/05/29	2019/05/30	Mandeep Kaur
Total Suspended Solids	BAL	6146299	2019/05/29	2019/05/30	Xinyue (Sarah) Hou

**BV Labs ID:** JVE039  
**Sample ID:** CGM-12  
**Matrix:** Water

**Collected:** 2019/05/25  
**Shipped:**  
**Received:** 2019/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6154353	N/A	2019/06/03	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6146988	N/A	2019/05/30	Prempal Bhatti
Alkalinity	AT	6146568	N/A	2019/05/30	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	6146376	2019/05/29	2019/06/03	Nusrat Naz
Conductivity	AT	6146571	N/A	2019/05/30	Surinder Rai
Free (WAD) Cyanide	SKAL/CN	6153611	N/A	2019/06/01	Barbara Kalbasi Esfahani
Total Cyanide	SKAL/CN	6153599	2019/06/01	2019/06/01	Barbara Kalbasi Esfahani
Hardness (calculated as CaCO3)		6144148	N/A	2019/05/31	Automated Statchk
Mercury	CV/AA	6146141	2019/05/29	2019/05/29	Ron Morrison
Total Metals Analysis by ICPMS	ICP/MS	6149243	N/A	2019/05/30	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6147880	N/A	2019/05/30	Chandra Nandlal
Total Oil and Grease	BAL	6153401	2019/06/01	2019/06/01	Sukhardey Pal Singh Khangura
pH	AT	6146575	2019/05/29	2019/05/30	Surinder Rai
Phenols (4AAP)	TECH/PHEN	6146310	N/A	2019/05/29	Bramdeo Motiram
Sulphate by Automated Colourimetry	KONE	6146729	N/A	2019/05/30	Alina Dobreanu
Total Dissolved Solids	BAL	6146795	2019/05/29	2019/05/30	Mandeep Kaur
Total Suspended Solids	BAL	6146299	2019/05/29	2019/05/30	Xinyue (Sarah) Hou

**BV Labs ID:** JVE040  
**Sample ID:** CGM-13  
**Matrix:** Water

**Collected:** 2019/05/25  
**Shipped:**  
**Received:** 2019/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6154353	N/A	2019/06/03	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6146988	N/A	2019/05/30	Prempal Bhatti
Alkalinity	AT	6146568	N/A	2019/05/30	Surinder Rai





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VERITAS

BV Labs Job #: B9E2126  
Report Date: 2019/06/03

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

### TEST SUMMARY

**BV Labs ID:** JVE040  
**Sample ID:** CGM-13  
**Matrix:** Water

**Collected:** 2019/05/25  
**Shipped:**  
**Received:** 2019/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Biochemical Oxygen Demand (BOD)	DO	6146376	2019/05/29	2019/06/03	Nusrat Naz
Conductivity	AT	6146571	N/A	2019/05/30	Surinder Rai
Free (WAD) Cyanide	SKAL/CN	6153611	N/A	2019/06/01	Barbara Kalbasi Esfahani
Total Cyanide	SKAL/CN	6153599	2019/06/01	2019/06/01	Barbara Kalbasi Esfahani
Hardness (calculated as CaCO3)		6144148	N/A	2019/05/31	Automated Statchk
Mercury	CV/AA	6146141	2019/05/29	2019/05/29	Ron Morrison
Total Metals Analysis by ICPMS	ICP/MS	6149243	N/A	2019/05/30	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6147880	N/A	2019/05/30	Chandra Nandlal
Total Oil and Grease	BAL	6153401	2019/06/01	2019/06/01	Sukhardey Pal Singh Khangura
pH	AT	6146575	2019/05/29	2019/05/30	Surinder Rai
Phenols (4AAP)	TECH/PHEN	6146310	N/A	2019/05/29	Bramdeo Motiram
Sulphate by Automated Colourimetry	KONE	6146729	N/A	2019/05/30	Alina Dobreanu
Total Dissolved Solids	BAL	6146795	2019/05/29	2019/05/30	Mandeep Kaur
Total Suspended Solids	BAL	6146299	2019/05/29	2019/05/30	Xinyue (Sarah) Hou

**BV Labs ID:** JVE040 Dup  
**Sample ID:** CGM-13  
**Matrix:** Water

**Collected:** 2019/05/25  
**Shipped:**  
**Received:** 2019/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6146568	N/A	2019/05/30	Surinder Rai
Conductivity	AT	6146571	N/A	2019/05/30	Surinder Rai
pH	AT	6146575	2019/05/29	2019/05/30	Surinder Rai



### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.3°C
Package 2	3.0°C
Package 3	2.3°C

**Results relate only to the items tested.**



BUREAU  
VERITAS

BV Labs Job #: B9E2126  
Report Date: 2019/06/03

### QUALITY ASSURANCE REPORT

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
6146141	Mercury (Hg)	2019/05/29	101	75 - 125	103	80 - 120	<0.1	ug/L	NC	20		
6146299	Total Suspended Solids	2019/05/30					<10	mg/L	0.97	25	97	85 - 115
6146310	Phenols-4AAP	2019/05/29	96	80 - 120	98	80 - 120	<0.0010	mg/L	NC	20		
6146376	Total BOD	2019/06/03					<2	mg/L	NC	30	91	80 - 120
6146568	Alkalinity (Total as CaCO3)	2019/05/30			95	85 - 115	<1.0	mg/L	2.7	20		
6146571	Conductivity	2019/05/30			101	85 - 115	<0.001	mS/cm	0.45	25		
6146575	pH	2019/05/30			102	98 - 103			0.54	N/A		
6146618	Phenols-4AAP	2019/05/29	96	80 - 120	98	80 - 120	<0.0010	mg/L	NC	20		
6146681	Total BOD	2019/06/03					<2	mg/L	8.0	30	92	80 - 120
6146729	Dissolved Sulphate (SO4)	2019/05/30	NC	75 - 125	103	80 - 120	<1.0	mg/L	0.16	20		
6146795	Total Dissolved Solids	2019/05/30					<10	mg/L	1.1	25	100	90 - 110
6146988	Dissolved (0.2u) Aluminum (Al)	2019/05/30	104	80 - 120	99	80 - 120	<5	ug/L	3.0	20		
6147462	Total Suspended Solids	2019/05/30					<10	mg/L	NC	25	99	85 - 115
6147635	Alkalinity (Total as CaCO3)	2019/05/30			94	85 - 115	<1.0	mg/L	2.8	20		
6147638	Conductivity	2019/05/30			100	85 - 115	<0.001	mS/cm	0.34	25		
6147641	pH	2019/05/30			102	98 - 103			0.55	N/A		
6147656	Total Dissolved Solids	2019/05/30					<10	mg/L	1.9	25	98	90 - 110
6147880	Total Ammonia-N	2019/05/30	96	75 - 125	96	80 - 120	<0.050	mg/L	NC	20		
6148629	Mercury (Hg)	2019/05/30	96	75 - 125	94	80 - 120	<0.1	ug/L	NC	20		
6148817	Phenols-4AAP	2019/05/30	98	80 - 120	100	80 - 120	<0.0010	mg/L	NC	20		
6149149	Total Aluminum (Al)	2019/05/30	103	80 - 120	103	80 - 120	<5.0	ug/L	0.33	20		
6149149	Total Arsenic (As)	2019/05/30	98	80 - 120	100	80 - 120	<1.0	ug/L	NC	20		
6149149	Total Cadmium (Cd)	2019/05/30	97	80 - 120	100	80 - 120	<0.10	ug/L	NC	20		
6149149	Total Copper (Cu)	2019/05/30	99	80 - 120	99	80 - 120	<1.0	ug/L	0.82	20		
6149149	Total Iron (Fe)	2019/05/30	99	80 - 120	102	80 - 120	<100	ug/L	NC	20		
6149149	Total Lead (Pb)	2019/05/30	98	80 - 120	98	80 - 120	<0.50	ug/L	NC	20		
6149149	Total Molybdenum (Mo)	2019/05/30	97	80 - 120	100	80 - 120	<0.50	ug/L	13	20		
6149149	Total Nickel (Ni)	2019/05/30	95	80 - 120	97	80 - 120	<1.0	ug/L	NC	20		
6149149	Total Zinc (Zn)	2019/05/30	95	80 - 120	100	80 - 120	<5.0	ug/L	NC	20		
6149243	Total Aluminum (Al)	2019/05/30	101	80 - 120	99	80 - 120	<5.0	ug/L	NC	20		
6149243	Total Arsenic (As)	2019/05/30	104	80 - 120	100	80 - 120	<1.0	ug/L				
6149243	Total Cadmium (Cd)	2019/05/30	102	80 - 120	96	80 - 120	<0.10	ug/L	NC	20		



BUREAU  
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BV Labs Job #: B9E2126  
Report Date: 2019/06/03

### QUALITY ASSURANCE REPORT(CONT'D)

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
6149243	Total Copper (Cu)	2019/05/30	104	80 - 120	101	80 - 120	<1.0	ug/L	NC	20		
6149243	Total Iron (Fe)	2019/05/30	102	80 - 120	98	80 - 120	<100	ug/L	8.6	20		
6149243	Total Lead (Pb)	2019/05/30	101	80 - 120	97	80 - 120	<0.50	ug/L	NC	20		
6149243	Total Molybdenum (Mo)	2019/05/30	107	80 - 120	101	80 - 120	<0.50	ug/L	NC	20		
6149243	Total Nickel (Ni)	2019/05/30	99	80 - 120	95	80 - 120	<1.0	ug/L	NC	20		
6149243	Total Zinc (Zn)	2019/05/30	106	80 - 120	104	80 - 120	<5.0	ug/L	NC	20		
6149473	Total Dissolved Solids	2019/05/31					<10	mg/L	1.2	25	97	90 - 110
6153401	Total Oil & Grease	2019/06/01			98	85 - 115	<0.50	mg/L	2.3	25		
6153599	Total Cyanide (CN)	2019/06/01	90	80 - 120	95	80 - 120	<0.0050	mg/L	NC	20		
6153611	WAD Cyanide (Free)	2019/06/01	91	80 - 120	93	80 - 120	<0.0010	mg/L	NC	20		
6154353	Acidity	2019/06/03	94	80 - 120	100	80 - 120	<5.0	mg/L	NC	25		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



BUREAU  
VERITAS

BV Labs Job #: B9E2126  
Report Date: 2019/06/03

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

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Anastassia Hamanov, Scientific Specialist

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Gina Thompson, Inorganics General Chemistry Supervisor

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Maxxam Analytics International Corporation of a Maxxam Analytics  
6740 Campbell Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.maxxam.ca

CHAIN OF CUSTODY RECORD

<b>INVOICE TO:</b>		<b>REPORT TO:</b>		<b>PROJECT INFORMATION:</b>		<b>Laboratory Use Only:</b>	
Company Name: #17501 exp Services Inc		Company Name:		Quotation #: B72106		Maxxam Job #:	
Attention: accounts payable		Attention: Ahileas Mitsopoulos		P.O. #:		Bottle Order #:	
Address: 1142 Roland St Thunder Bay ON P7B 5M4		Address:		Project: THB-00095132-YE			
Tel: (807) 623-9495 Fax: (807) 623-8070		Tel:		Project Name:		COC #:	
Email: thunderbay@exp.com; Karen.Burke@exp.com; AP@exp		Email: ahileas.mitsopoulos@exp.com, michael.suslyk@exp.co		Site #:		Project Manager: Michelle Brescacin	
				Sampled By:			

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

<b>Regulation 153 (2011)</b> <input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Medium/Fine <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> For RSC <input type="checkbox"/> Table _____			<b>Other Regulations</b> <input type="checkbox"/> CCME <input type="checkbox"/> Sanitary Sewer Bylaw <input type="checkbox"/> Reg 558 <input type="checkbox"/> Storm Sewer Bylaw <input type="checkbox"/> MISA Municipality _____ <input type="checkbox"/> PWQO <input type="checkbox"/> Other _____			<b>Special Instructions</b>		
Turnaround Time (TAT) Required: Please provide advance notice for rush projects						<b>Regular (Standard) TAT:</b> (will be applied if Rush TAT is not specified): Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.		
<b>Job Specific Rush TAT (if applies to entire submission)</b> Date Required: _____ Time Required: _____ Rush Confirmation Number: _____ (call lab for #)						<input type="checkbox"/>		

Include Criteria on Certificate of Analysis (Y/N)?						Field Filtered (please circle): Metals / Hg / Cr / VI	Alkalinity	Biochemical Oxygen Demand (BOD)	Conductivity	Free (WAD) Cyanide, Total Cyanide	Hardness (calculated as CaCO3)	Mercury	Total Ammonia-N	Total Oil and Grease	pH	Phenols (GAAP)	# of Bottles	Comments
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix														
1	CGM-4	19/05/25	1235hr	water	N/A	X		X	X	X					X		5	
2	CGM-5		1245hr			X		X	X	X		X	X	X	X		7	
3	CGM-6		1035hr			X	X	X	X	X	X	X	X	X	X	X	10	
4	CGM-7		1310hr			X	X	X	X	X	X	X	X	X	X	X	10	
5	CGM-8		945hr			X	X	X	X	X	X	X	X	X	X	X	10	
6	CGM-9		1220hr			X		X	X	X		X	X	X	X	X	7	
7	CGM-10		1255hr			X	X	X	X	X	X	X	X	X	X	X	10	
8	CGM-11		1145hr			X	X	X	X	X	X	X	X	X	X	X	10	
9	CGM-12		1115hr			X	X	X	X	X	X	X	X	X	X	X	10	
10	CGM-13	19/05/25	1205hr	water	N/A	X	X	X	X	X	X	X	X	X	X	X	10	

28-May-19 08:48  
Michelle Brescacin  
B9E2126  
ASR ENV-409

* RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)		Time		RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)		Time		# jars used and not submitted		Laboratory Use Only					
RCA R. REID		19/05/27		1130hr		Michelle Brescacin		19/05/28		08178				Time Sensitive Temperature (°C) on Reel 4/13/27 4/12/1					
														Custody Seal Present		Yes		No	

\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.  
 \*\* SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.  
 White: Maxxa Yellow: Client  
 SAMPLES MUST BE KEPT COOL (< 10° C ) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM



Maxxam Analytics International Corporation of a Maxxam Analytics  
 6740 Campbell Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.maxxam.ca

CHAIN OF CUSTODY RECORD

<b>INVOICE TO:</b>		<b>REPORT TO:</b>		<b>PROJECT INFORMATION:</b>		<b>Laboratory Use Only:</b>	
Company Name: #17501 exp Services Inc		Company Name: Ahileas Mitsopoulos		Quotation #: B72106		Maxxam Job #:	
Attention: accounts payable		Attention: Ahileas Mitsopoulos		P.O. #:		Bottle Order #:	
Address: 1142 Roland St		Address:		Project: THB-00095132-YE		715390	
Thunder Bay ON P7B 5M4				Project Name:		COC #:	
Tel: (807) 623-9495 Fax: (807) 623-8070		Tel: Fax:		Site #:		Project Manager:	
Email: thunderbay@exp.com; Karen.Burke@exp.com; AP@ex		Email: ahileas.mitsopoulos@exp.com, michael.suslyk@exp.co		Sampled By:		Michelle Brescacin	

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

<b>Regulation 153 (2011)</b> <input type="checkbox"/> Table 1 <input type="checkbox"/> Resi/Park <input type="checkbox"/> Medium/Fine <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> For RSC <input type="checkbox"/> Table		<b>Other Regulations</b> <input type="checkbox"/> CCME <input type="checkbox"/> Sanitary Sewer Bylaw <input type="checkbox"/> Reg 558 <input type="checkbox"/> Storm Sewer Bylaw <input type="checkbox"/> MISA Municipality _____ <input type="checkbox"/> PWQO <input type="checkbox"/> Other _____		<b>Special Instructions</b>  	
---	--	---	--	-------------------------------------	--

Include Criteria on Certificate of Analysis (Y/N)?						ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required: Please provide advance notice for rush projects			
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr / V	Sulphate by Automated Colourimetry	Total Dissolved Solids, TSS	8 Metals	9 Metals	Acidity	Dissolved Aluminum (0.2 u, clay free)							Regular (Standard) TAT: (will be applied if Rush TAT is not specified): Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.	Job Specific Rush TAT (if applies to entire submission) Date Required: _____ Time Required: _____ Rush Confirmation Number: _____ (call lab for #)
1	CGM-4	19/05/25	1235hr	water	N/A	X	X	X		X	X							5	
2	CGM-5		1245hr			X	X	X		X	X							7	
3	CGM-6		1035hr			X	X		X	X	X							10	
4	CGM-7		1310hr			X	X		X	X	X							10	
5	CGM-8		945hr			X	X		X	X	X							10	
6	CGM-9		1220hr			X	X	X		X	X							7	
7	CGM-10		1255hr			X	X		X	X	X							10	
8	CGM-11		1145hr			X	X		X	X	X							10	
9	CGM-12		1115hr			X	X		X	X	X							10	
10	CGM-13	19/05/25	1205hr	water	N/A	X	X		X	X	X							10	

* RELINQUISHED BY: (Signature/Print) RWR - R. RGID		Date: (YY/MM/DD) 19/05/27	Time 1130hr	RECEIVED BY: (Signature/Print) <i>[Signature]</i>		Date: (YY/MM/DD) 19/05/27	Time 0824hr	# jars used and not submitted	Laboratory Use Only		
								Time Sensitive	Temperature (C) on Recej 7/13/27 7/12/1	Custody Seal Present Intact	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.  
 \* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.  
 \*\* SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.  
 SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM  
 White: Maxxa Yellow: Client



Your Project #: THB-00095132-YE  
 Your C.O.C. #: 739299-01-01

**Attention: Ahileas Mitsopoulos**

exp Services Inc  
 Thunder Bay Branch  
 1142 Roland St  
 Thunder Bay, ON  
 CANADA P7B 5M4

**Report Date: 2019/11/11**  
 Report #: R5960520  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9V0662**

**Received: 2019/11/05, 09:05**

Sample Matrix: Water  
 # Samples Received: 10

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Acidity (CaCO3) in water (1, 2)	10	N/A	2019/11/08		SM 22 2310
Dissolved Aluminum (0.2 u, clay free)	10	N/A	2019/11/07	CAM SOP-00447	EPA 6020B m
Alkalinity	10	N/A	2019/11/07	CAM SOP-00448	SM 23 2320 B m
Biochemical Oxygen Demand (BOD)	7	2019/11/06	2019/11/11	CAM SOP-00427	SM 23 5210B m
Conductivity	10	N/A	2019/11/07	CAM SOP-00414	SM 23 2510 m
Free (WAD) Cyanide	10	N/A	2019/11/08	CAM SOP-00457	OMOE E3015 m
Total Cyanide	10	2019/11/06	2019/11/08	CAM SOP-00457	OMOE E3015 5 m
Hardness (calculated as CaCO3)	10	N/A	2019/11/11	CAM SOP 00102/00408/00447	SM 2340 B
Mercury	5	2019/11/07	2019/11/07	CAM SOP-00453	EPA 7470A m
Mercury	2	2019/11/08	2019/11/08	CAM SOP-00453	EPA 7470A m
Total Metals Analysis by ICPMS	10	N/A	2019/11/11	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	9	N/A	2019/11/07	CAM SOP-00441	USGS I-2522-90 m
Total Oil and Grease	9	2019/11/08	2019/11/08	CAM SOP-00326	EPA1664B m,SM5520A m
pH	10	2019/11/06	2019/11/07	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	7	N/A	2019/11/07	CAM SOP-00444	OMOE E3179 m
Sulphate by Automated Colourimetry	10	N/A	2019/11/07	CAM SOP-00464	EPA 375.4 m
Total Dissolved Solids	10	2019/11/07	2019/11/08	CAM SOP-00428	SM 23 2540C m
Total Suspended Solids	10	2019/11/06	2019/11/07	CAM SOP-00428	SM 23 2540D m

**Remarks:**

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied.





Your Project #: THB-00095132-YE  
Your C.O.C. #: 739299-01-01

**Attention: Ahileas Mitsopoulos**

exp Services Inc  
Thunder Bay Branch  
1142 Roland St  
Thunder Bay, ON  
CANADA P7B 5M4

**Report Date: 2019/11/11**  
Report #: R5960520  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9V0662**

**Received: 2019/11/05, 09:05**

BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) This test was performed by BV Labs Bedford
- (2) Non-accredited test method

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Michelle Huth, Project Manager Assistant

Email: Michelle.Huth@bvlabs.com

Phone# (807)344-4220

=====

This report has been generated and distributed using a secure automated process.

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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BV Labs Job #: B9V0662

Report Date: 2019/11/11

exp Services Inc

Client Project #: THB-00095132-YE

Sampler Initials: RR

### RESULTS OF ANALYSES OF WATER

BV Labs ID		LFJ613			LFJ613			LFJ614		
Sampling Date		2019/11/03 13:50			2019/11/03 13:50			2019/11/03 14:10		
COC Number		739299-01-01			739299-01-01			739299-01-01		
	UNITS	CGM-4	RDL	QC Batch	CGM-4 Lab-Dup	RDL	QC Batch	CGM-5	RDL	QC Batch
<b>Calculated Parameters</b>										
Hardness (CaCO3)	mg/L	50	1.0	6424838				43	1.0	6424838
<b>Inorganics</b>										
Acidity	mg/L	<5.0	5.0	6432252	<5.0	5.0	6432252	<5.0	5.0	6432252
Total Ammonia-N	mg/L							0.062	0.050	6428266
Conductivity	mS/cm	0.101	0.001	6427907				0.082	0.001	6427907
Total Dissolved Solids	mg/L	55	10	6429893				70	10	6431482
pH	pH	7.84		6427913				7.65		6427913
Total Suspended Solids	mg/L	<10	10	6428562				<10	10	6428562
Dissolved Sulphate (SO4)	mg/L	4.6	1.0	6427754				<1.0	1.0	6427754
Total Cyanide (CN)	mg/L	0.0077	0.0050	6428283	0.0076	0.0050	6428283	<0.0050	0.0050	6428283
WAD Cyanide (Free)	mg/L	0.0035	0.0010	6428297	0.0032	0.0010	6428297	<0.0010	0.0010	6428297
Alkalinity (Total as CaCO3)	mg/L	47	1.0	6427902				35	1.0	6427902
<b>Petroleum Hydrocarbons</b>										
Total Oil & Grease	mg/L							<0.50	0.50	6432121
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										
Lab-Dup = Laboratory Initiated Duplicate										



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BV Labs Job #: B9V0662  
Report Date: 2019/11/11

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

### RESULTS OF ANALYSES OF WATER

BV Labs ID		LFJ614			LFJ615			LFJ615		
Sampling Date		2019/11/03 14:10			2019/11/03 12:15			2019/11/03 12:15		
COC Number		739299-01-01			739299-01-01			739299-01-01		
	UNITS	CGM-5 Lab-Dup	RDL	QC Batch	CGM-6	RDL	QC Batch	CGM-6 Lab-Dup	RDL	QC Batch
<b>Calculated Parameters</b>										
Hardness (CaCO3)	mg/L				47	1.0	6424838			
<b>Inorganics</b>										
Acidity	mg/L				<5.0	5.0	6432252			
Total Ammonia-N	mg/L				<0.050	0.050	6428266	<0.050	0.050	6428266
Total BOD	mg/L				<2	2	6427542			
Conductivity	mS/cm				0.086	0.001	6427907	0.086	0.001	6427907
Total Dissolved Solids	mg/L				55	10	6429893			
pH	pH				7.66		6427913	7.68		6427913
Phenols-4AAP	mg/L				<0.0010	0.0010	6429621			
Total Suspended Solids	mg/L				<10	10	6428562			
Dissolved Sulphate (SO4)	mg/L	<1.0	1.0	6427754	<1.0	1.0	6427763			
Total Cyanide (CN)	mg/L				<0.0050	0.0050	6428283			
WAD Cyanide (Free)	mg/L				<0.0010	0.0010	6428297			
Alkalinity (Total as CaCO3)	mg/L				38	1.0	6427902	37	1.0	6427902
<b>Petroleum Hydrocarbons</b>										
Total Oil & Grease	mg/L				1.4	0.50	6432121			
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										



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BV Labs Job #: B9V0662  
Report Date: 2019/11/11

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

### RESULTS OF ANALYSES OF WATER

BV Labs ID		LFJ616		LFJ617			LFJ618		
Sampling Date		2019/11/03 11:40		2019/11/03 11:20			2019/11/03 13:40		
COC Number		739299-01-01		739299-01-01			739299-01-01		
	<b>UNITS</b>	<b>CGM-7</b>	<b>QC Batch</b>	<b>CGM-8</b>	<b>RDL</b>	<b>QC Batch</b>	<b>CGM-9</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>									
Hardness (CaCO3)	mg/L	81	6424838	84	1.0	6424838	20	1.0	6424838
<b>Inorganics</b>									
Acidity	mg/L	<5.0	6432252	<5.0	5.0	6432252	<5.0	5.0	6432252
Total Ammonia-N	mg/L	<0.050	6428266	0.055	0.050	6428266	0.14	0.050	6428266
Total BOD	mg/L	<2	6427542	<2	2	6427542			
Conductivity	mS/cm	0.174	6427907	0.191	0.001	6427907	0.038	0.001	6427907
Total Dissolved Solids	mg/L	80	6429893	85	10	6431482	40	10	6431482
pH	pH	7.91	6427913	7.97		6427913	7.18		6427913
Phenols-4AAP	mg/L	<0.0010	6429621	<0.0010	0.0010	6429621			
Total Suspended Solids	mg/L	<10	6428562	<10	10	6428562	<10	10	6428562
Dissolved Sulphate (SO4)	mg/L	25	6427754	22	1.0	6427763	<1.0	1.0	6427763
Total Cyanide (CN)	mg/L	<0.0050	6428283	<0.0050	0.0050	6428283	<0.0050	0.0050	6428283
WAD Cyanide (Free)	mg/L	<0.0010	6428297	<0.0010	0.0010	6428297	<0.0010	0.0010	6428297
Alkalinity (Total as CaCO3)	mg/L	49	6427902	55	1.0	6427902	14	1.0	6427902
<b>Petroleum Hydrocarbons</b>									
Total Oil & Grease	mg/L	1.7	6432121	1.6	0.50	6432121	1.9	0.50	6432121
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									



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BV Labs Job #: B9V0662  
Report Date: 2019/11/11

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

### RESULTS OF ANALYSES OF WATER

BV Labs ID		LFJ619		LFJ620		LFJ621		LFJ622		
Sampling Date		2019/11/03 11:55		2019/11/03 12:50		2019/11/03 10:45		2019/11/03 13:15		
COC Number		739299-01-01		739299-01-01		739299-01-01		739299-01-01		
	<b>UNITS</b>	<b>CGM-10</b>	<b>QC Batch</b>	<b>CGM-11</b>	<b>QC Batch</b>	<b>CGM-12</b>	<b>QC Batch</b>	<b>CGM-13</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>										
Hardness (CaCO3)	mg/L	170	6424838	36	6424838	37	6424838	32	1.0	6424838
<b>Inorganics</b>										
Acidity	mg/L	5.4	6432252	<5.0	6432252	<5.0	6432252	5.2	5.0	6432252
Total Ammonia-N	mg/L	0.14	6428266	<0.050	6428266	<0.050	6428266	0.052	0.050	6428266
Total BOD	mg/L	<2	6427542	<2	6427542	<2	6427542	<2	2	6427542
Conductivity	mS/cm	0.304	6427907	0.063	6427907	0.067	6427907	0.063	0.001	6427907
Total Dissolved Solids	mg/L	150	6431482	60	6431482	45	6431482	60	10	6431482
pH	pH	8.12	6427913	7.52	6427913	7.62	6427913	7.45		6427913
Phenols-4AAP	mg/L	<0.0010	6429621	<0.0010	6429621	<0.0010	6429552	0.0027	0.0010	6429621
Total Suspended Solids	mg/L	<10	6428562	<10	6428562	<10	6428562	<10	10	6428562
Dissolved Sulphate (SO4)	mg/L	1.5	6427754	<1.0	6427763	<1.0	6427754	<1.0	1.0	6427763
Total Cyanide (CN)	mg/L	<0.0050	6428283	<0.0050	6428283	<0.0050	6428283	<0.0050	0.0050	6428283
WAD Cyanide (Free)	mg/L	<0.0010	6428297	<0.0010	6428297	<0.0010	6428297	<0.0010	0.0010	6428297
Alkalinity (Total as CaCO3)	mg/L	160	6427902	27	6427902	29	6427902	26	1.0	6427902
<b>Petroleum Hydrocarbons</b>										
Total Oil & Grease	mg/L	1.7	6432121	1.9	6432121	1.3	6432121	1.8	0.50	6432121
RDL = Reportable Detection Limit QC Batch = Quality Control Batch										



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VERITAS

BV Labs Job #: B9V0662  
Report Date: 2019/11/11

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

### ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		LFJ613	LFJ614			LFJ615		LFJ616		
Sampling Date		2019/11/03 13:50	2019/11/03 14:10			2019/11/03 12:15		2019/11/03 11:40		
COC Number		739299-01-01	739299-01-01			739299-01-01		739299-01-01		
	<b>UNITS</b>	<b>CGM-4</b>	<b>CGM-5</b>	<b>RDL</b>	<b>QC Batch</b>	<b>CGM-6</b>	<b>QC Batch</b>	<b>CGM-7</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Metals</b>										
Dissolved (0.2u) Aluminum (Al)	ug/L	16	150	5	6427655	100	6427655	14	5	6427655
Mercury (Hg)	ug/L					<0.1	6432290	<0.1	0.1	6429831
Total Aluminum (Al)	ug/L	75	170	5.0	6432126	120	6432126	26	5.0	6432126
Total Arsenic (As)	ug/L	7.2	2.6	1.0	6432126	3.5	6432126	1.1	1.0	6432126
Total Cadmium (Cd)	ug/L					<0.10	6432126	<0.10	0.10	6432126
Total Copper (Cu)	ug/L	3.9	2.7	1.0	6432126	2.3	6432126	2.4	1.0	6432126
Total Iron (Fe)	ug/L	710	390	100	6432126	370	6432126	<100	100	6432126
Total Lead (Pb)	ug/L	1.5	<0.50	0.50	6432126	0.54	6432126	0.55	0.50	6432126
Total Molybdenum (Mo)	ug/L	<0.50	<0.50	0.50	6432126	<0.50	6432126	<0.50	0.50	6432126
Total Nickel (Ni)	ug/L	3.1	1.6	1.0	6432126	1.6	6432126	<1.0	1.0	6432126
Total Zinc (Zn)	ug/L	<5.0	<5.0	5.0	6432126	<5.0	6432126	<5.0	5.0	6432126

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch

BV Labs ID		LFJ617			LFJ618			LFJ618		
Sampling Date		2019/11/03 11:20			2019/11/03 13:40			2019/11/03 13:40		
COC Number		739299-01-01			739299-01-01			739299-01-01		
	<b>UNITS</b>	<b>CGM-8</b>	<b>RDL</b>	<b>QC Batch</b>	<b>CGM-9</b>	<b>RDL</b>	<b>QC Batch</b>	<b>CGM-9 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Metals</b>										
Dissolved (0.2u) Aluminum (Al)	ug/L	26	5	6427655	89	5	6427655	87	5	6427655
Mercury (Hg)	ug/L	<0.1	0.1	6429831						
Total Aluminum (Al)	ug/L	71	5.0	6432126	99	5.0	6432126			
Total Arsenic (As)	ug/L	1.2	1.0	6432126	2.8	1.0	6432126			
Total Cadmium (Cd)	ug/L	<0.10	0.10	6432126						
Total Copper (Cu)	ug/L	1.1	1.0	6432126	<1.0	1.0	6432126			
Total Iron (Fe)	ug/L	110	100	6432126	550	100	6432126			
Total Lead (Pb)	ug/L	<0.50	0.50	6432126	<0.50	0.50	6432126			
Total Molybdenum (Mo)	ug/L	<0.50	0.50	6432126	<0.50	0.50	6432126			
Total Nickel (Ni)	ug/L	<1.0	1.0	6432126	<1.0	1.0	6432126			
Total Zinc (Zn)	ug/L	<5.0	5.0	6432126	<5.0	5.0	6432126			

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch  
Lab-Dup = Laboratory Initiated Duplicate



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### ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		LFJ619		LFJ620	LFJ621	LFJ622		
Sampling Date		2019/11/03 11:55		2019/11/03 12:50	2019/11/03 10:45	2019/11/03 13:15		
COC Number		739299-01-01		739299-01-01	739299-01-01	739299-01-01		
	<b>UNITS</b>	<b>CGM-10</b>	<b>QC Batch</b>	<b>CGM-11</b>	<b>CGM-12</b>	<b>CGM-13</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Metals</b>								
Dissolved (0.2u) Aluminum (Al)	ug/L	<5	6427655	100	85	110	5	6427655
Mercury (Hg)	ug/L	<0.1	6432290	<0.1	<0.1	<0.1	0.1	6429831
Total Aluminum (Al)	ug/L	7.6	6432126	120	87	120	5.0	6432126
Total Arsenic (As)	ug/L	25	6432126	1.4	9.3	1.1	1.0	6432126
Total Cadmium (Cd)	ug/L	<0.10	6432126	<0.10	<0.10	<0.10	0.10	6432126
Total Copper (Cu)	ug/L	<1.0	6432126	1.1	1.2	1.9	1.0	6432126
Total Iron (Fe)	ug/L	2300	6432126	200	200	180	100	6432126
Total Lead (Pb)	ug/L	<0.50	6432126	<0.50	<0.50	<0.50	0.50	6432126
Total Molybdenum (Mo)	ug/L	3.5	6432126	<0.50	<0.50	<0.50	0.50	6432126
Total Nickel (Ni)	ug/L	<1.0	6432126	1.1	<1.0	1.1	1.0	6432126
Total Zinc (Zn)	ug/L	5.6	6432126	<5.0	<5.0	<5.0	5.0	6432126
RDL = Reportable Detection Limit QC Batch = Quality Control Batch								



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### TEST SUMMARY

**BV Labs ID:** LFJ613  
**Sample ID:** CGM-4  
**Matrix:** Water

**Collected:** 2019/11/03  
**Shipped:**  
**Received:** 2019/11/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6432252	N/A	2019/11/08	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6427655	N/A	2019/11/07	Arefa Dabhad
Alkalinity	AT	6427902	N/A	2019/11/07	Surinder Rai
Conductivity	AT	6427907	N/A	2019/11/07	Surinder Rai
Free (WAD) Cyanide	SKAL/CN	6428297	N/A	2019/11/08	Gnana Thomas
Total Cyanide	SKAL/CN	6428283	2019/11/06	2019/11/08	Gnana Thomas
Hardness (calculated as CaCO3)		6424838	N/A	2019/11/11	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	6432126	N/A	2019/11/11	Arefa Dabhad
pH	AT	6427913	2019/11/06	2019/11/07	Surinder Rai
Sulphate by Automated Colourimetry	KONE	6427754	N/A	2019/11/07	Deonarine Ramnarine
Total Dissolved Solids	BAL	6429893	2019/11/07	2019/11/08	Massarat Jan
Total Suspended Solids	BAL	6428562	2019/11/06	2019/11/07	Mandeep Kaur

**BV Labs ID:** LFJ613 Dup  
**Sample ID:** CGM-4  
**Matrix:** Water

**Collected:** 2019/11/03  
**Shipped:**  
**Received:** 2019/11/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6432252	N/A	2019/11/08	Brent Boudreau
Free (WAD) Cyanide	SKAL/CN	6428297	N/A	2019/11/08	Gnana Thomas
Total Cyanide	SKAL/CN	6428283	2019/11/06	2019/11/08	Gnana Thomas

**BV Labs ID:** LFJ614  
**Sample ID:** CGM-5  
**Matrix:** Water

**Collected:** 2019/11/03  
**Shipped:**  
**Received:** 2019/11/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6432252	N/A	2019/11/08	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6427655	N/A	2019/11/07	Arefa Dabhad
Alkalinity	AT	6427902	N/A	2019/11/07	Surinder Rai
Conductivity	AT	6427907	N/A	2019/11/07	Surinder Rai
Free (WAD) Cyanide	SKAL/CN	6428297	N/A	2019/11/08	Gnana Thomas
Total Cyanide	SKAL/CN	6428283	2019/11/06	2019/11/08	Gnana Thomas
Hardness (calculated as CaCO3)		6424838	N/A	2019/11/11	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	6432126	N/A	2019/11/11	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6428266	N/A	2019/11/07	Mazin Wakai
Total Oil and Grease	BAL	6432121	2019/11/08	2019/11/08	Francis Afonso
pH	AT	6427913	2019/11/06	2019/11/07	Surinder Rai
Sulphate by Automated Colourimetry	KONE	6427754	N/A	2019/11/07	Deonarine Ramnarine
Total Dissolved Solids	BAL	6431482	2019/11/07	2019/11/08	Shivani Desai
Total Suspended Solids	BAL	6428562	2019/11/06	2019/11/07	Mandeep Kaur





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### TEST SUMMARY

**BV Labs ID:** LFJ614 Dup  
**Sample ID:** CGM-5  
**Matrix:** Water

**Collected:** 2019/11/03  
**Shipped:**  
**Received:** 2019/11/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sulphate by Automated Colourimetry	KONE	6427754	N/A	2019/11/07	Deonarine Ramnarine

**BV Labs ID:** LFJ615  
**Sample ID:** CGM-6  
**Matrix:** Water

**Collected:** 2019/11/03  
**Shipped:**  
**Received:** 2019/11/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6432252	N/A	2019/11/08	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6427655	N/A	2019/11/07	Arefa Dabhad
Alkalinity	AT	6427902	N/A	2019/11/07	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	6427542	2019/11/06	2019/11/11	Nusrat Naz
Conductivity	AT	6427907	N/A	2019/11/07	Surinder Rai
Free (WAD) Cyanide	SKAL/CN	6428297	N/A	2019/11/08	Gnana Thomas
Total Cyanide	SKAL/CN	6428283	2019/11/06	2019/11/08	Gnana Thomas
Hardness (calculated as CaCO3)		6424838	N/A	2019/11/11	Automated Statchk
Mercury	CV/AA	6432290	2019/11/08	2019/11/08	Medhat Nasr
Total Metals Analysis by ICPMS	ICP/MS	6432126	N/A	2019/11/11	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6428266	N/A	2019/11/07	Mazin Wakai
Total Oil and Grease	BAL	6432121	2019/11/08	2019/11/08	Francis Afonso
pH	AT	6427913	2019/11/06	2019/11/07	Surinder Rai
Phenols (4AAP)	TECH/PHEN	6429621	N/A	2019/11/07	Bramdeo Motiram
Sulphate by Automated Colourimetry	KONE	6427763	N/A	2019/11/07	Deonarine Ramnarine
Total Dissolved Solids	BAL	6429893	2019/11/07	2019/11/08	Massarat Jan
Total Suspended Solids	BAL	6428562	2019/11/06	2019/11/07	Mandeep Kaur

**BV Labs ID:** LFJ615 Dup  
**Sample ID:** CGM-6  
**Matrix:** Water

**Collected:** 2019/11/03  
**Shipped:**  
**Received:** 2019/11/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6427902	N/A	2019/11/07	Surinder Rai
Conductivity	AT	6427907	N/A	2019/11/07	Surinder Rai
Total Ammonia-N	LACH/NH4	6428266	N/A	2019/11/07	Mazin Wakai
pH	AT	6427913	2019/11/06	2019/11/07	Surinder Rai

**BV Labs ID:** LFJ616  
**Sample ID:** CGM-7  
**Matrix:** Water

**Collected:** 2019/11/03  
**Shipped:**  
**Received:** 2019/11/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6432252	N/A	2019/11/08	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6427655	N/A	2019/11/07	Arefa Dabhad
Alkalinity	AT	6427902	N/A	2019/11/07	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	6427542	2019/11/06	2019/11/11	Nusrat Naz
Conductivity	AT	6427907	N/A	2019/11/07	Surinder Rai



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BV Labs Job #: B9V0662  
Report Date: 2019/11/11

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

### TEST SUMMARY

**BV Labs ID:** LFJ616  
**Sample ID:** CGM-7  
**Matrix:** Water

**Collected:** 2019/11/03  
**Shipped:**  
**Received:** 2019/11/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Free (WAD) Cyanide	SKAL/CN	6428297	N/A	2019/11/08	Gnana Thomas
Total Cyanide	SKAL/CN	6428283	2019/11/06	2019/11/08	Gnana Thomas
Hardness (calculated as CaCO3)		6424838	N/A	2019/11/11	Automated Statchk
Mercury	CV/AA	6429831	2019/11/07	2019/11/07	Medhat Nasr
Total Metals Analysis by ICPMS	ICP/MS	6432126	N/A	2019/11/11	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6428266	N/A	2019/11/07	Mazin Wakai
Total Oil and Grease	BAL	6432121	2019/11/08	2019/11/08	Francis Afonso
pH	AT	6427913	2019/11/06	2019/11/07	Surinder Rai
Phenols (4AAP)	TECH/PHEN	6429621	N/A	2019/11/07	Bramdeo Motiram
Sulphate by Automated Colourimetry	KONE	6427754	N/A	2019/11/07	Deonarine Ramnarine
Total Dissolved Solids	BAL	6429893	2019/11/07	2019/11/08	Massarat Jan
Total Suspended Solids	BAL	6428562	2019/11/06	2019/11/07	Mandeep Kaur

**BV Labs ID:** LFJ617  
**Sample ID:** CGM-8  
**Matrix:** Water

**Collected:** 2019/11/03  
**Shipped:**  
**Received:** 2019/11/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6432252	N/A	2019/11/08	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6427655	N/A	2019/11/07	Arefa Dabhad
Alkalinity	AT	6427902	N/A	2019/11/07	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	6427542	2019/11/06	2019/11/11	Nusrat Naz
Conductivity	AT	6427907	N/A	2019/11/07	Surinder Rai
Free (WAD) Cyanide	SKAL/CN	6428297	N/A	2019/11/08	Gnana Thomas
Total Cyanide	SKAL/CN	6428283	2019/11/06	2019/11/08	Gnana Thomas
Hardness (calculated as CaCO3)		6424838	N/A	2019/11/11	Automated Statchk
Mercury	CV/AA	6429831	2019/11/07	2019/11/07	Medhat Nasr
Total Metals Analysis by ICPMS	ICP/MS	6432126	N/A	2019/11/11	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6428266	N/A	2019/11/07	Mazin Wakai
Total Oil and Grease	BAL	6432121	2019/11/08	2019/11/08	Francis Afonso
pH	AT	6427913	2019/11/06	2019/11/07	Surinder Rai
Phenols (4AAP)	TECH/PHEN	6429621	N/A	2019/11/07	Bramdeo Motiram
Sulphate by Automated Colourimetry	KONE	6427763	N/A	2019/11/07	Deonarine Ramnarine
Total Dissolved Solids	BAL	6431482	2019/11/07	2019/11/08	Shivani Desai
Total Suspended Solids	BAL	6428562	2019/11/06	2019/11/07	Mandeep Kaur

**BV Labs ID:** LFJ618  
**Sample ID:** CGM-9  
**Matrix:** Water

**Collected:** 2019/11/03  
**Shipped:**  
**Received:** 2019/11/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6432252	N/A	2019/11/08	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6427655	N/A	2019/11/07	Arefa Dabhad
Alkalinity	AT	6427902	N/A	2019/11/07	Surinder Rai
Conductivity	AT	6427907	N/A	2019/11/07	Surinder Rai



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### TEST SUMMARY

**BV Labs ID:** LFJ618  
**Sample ID:** CGM-9  
**Matrix:** Water

**Collected:** 2019/11/03  
**Shipped:**  
**Received:** 2019/11/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Free (WAD) Cyanide	SKAL/CN	6428297	N/A	2019/11/08	Gnana Thomas
Total Cyanide	SKAL/CN	6428283	2019/11/06	2019/11/08	Gnana Thomas
Hardness (calculated as CaCO3)		6424838	N/A	2019/11/11	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	6432126	N/A	2019/11/11	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6428266	N/A	2019/11/07	Mazin Wakai
Total Oil and Grease	BAL	6432121	2019/11/08	2019/11/08	Francis Afonso
pH	AT	6427913	2019/11/06	2019/11/07	Surinder Rai
Sulphate by Automated Colourimetry	KONE	6427763	N/A	2019/11/07	Deonarine Ramnarine
Total Dissolved Solids	BAL	6431482	2019/11/07	2019/11/08	Shivani Desai
Total Suspended Solids	BAL	6428562	2019/11/06	2019/11/07	Mandeep Kaur

**BV Labs ID:** LFJ618 Dup  
**Sample ID:** CGM-9  
**Matrix:** Water

**Collected:** 2019/11/03  
**Shipped:**  
**Received:** 2019/11/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6427655	N/A	2019/11/07	Arefa Dabhad

**BV Labs ID:** LFJ619  
**Sample ID:** CGM-10  
**Matrix:** Water

**Collected:** 2019/11/03  
**Shipped:**  
**Received:** 2019/11/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6432252	N/A	2019/11/08	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6427655	N/A	2019/11/07	Arefa Dabhad
Alkalinity	AT	6427902	N/A	2019/11/07	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	6427542	2019/11/06	2019/11/11	Nusrat Naz
Conductivity	AT	6427907	N/A	2019/11/07	Surinder Rai
Free (WAD) Cyanide	SKAL/CN	6428297	N/A	2019/11/08	Gnana Thomas
Total Cyanide	SKAL/CN	6428283	2019/11/06	2019/11/08	Gnana Thomas
Hardness (calculated as CaCO3)		6424838	N/A	2019/11/11	Automated Statchk
Mercury	CV/AA	6432290	2019/11/08	2019/11/08	Medhat Nasr
Total Metals Analysis by ICPMS	ICP/MS	6432126	N/A	2019/11/11	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6428266	N/A	2019/11/07	Mazin Wakai
Total Oil and Grease	BAL	6432121	2019/11/08	2019/11/08	Francis Afonso
pH	AT	6427913	2019/11/06	2019/11/07	Surinder Rai
Phenols (4AAP)	TECH/PHEN	6429621	N/A	2019/11/07	Bramdeo Motiram
Sulphate by Automated Colourimetry	KONE	6427754	N/A	2019/11/07	Deonarine Ramnarine
Total Dissolved Solids	BAL	6431482	2019/11/07	2019/11/08	Shivani Desai
Total Suspended Solids	BAL	6428562	2019/11/06	2019/11/07	Mandeep Kaur



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BV Labs Job #: B9V0662  
Report Date: 2019/11/11

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### TEST SUMMARY

**BV Labs ID:** LFJ620  
**Sample ID:** CGM-11  
**Matrix:** Water

**Collected:** 2019/11/03  
**Shipped:**  
**Received:** 2019/11/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6432252	N/A	2019/11/08	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6427655	N/A	2019/11/07	Arefa Dabhad
Alkalinity	AT	6427902	N/A	2019/11/07	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	6427542	2019/11/06	2019/11/11	Nusrat Naz
Conductivity	AT	6427907	N/A	2019/11/07	Surinder Rai
Free (WAD) Cyanide	SKAL/CN	6428297	N/A	2019/11/08	Gnana Thomas
Total Cyanide	SKAL/CN	6428283	2019/11/06	2019/11/08	Gnana Thomas
Hardness (calculated as CaCO3)		6424838	N/A	2019/11/11	Automated Statchk
Mercury	CV/AA	6429831	2019/11/07	2019/11/07	Medhat Nasr
Total Metals Analysis by ICPMS	ICP/MS	6432126	N/A	2019/11/11	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6428266	N/A	2019/11/07	Mazin Wakai
Total Oil and Grease	BAL	6432121	2019/11/08	2019/11/08	Francis Afonso
pH	AT	6427913	2019/11/06	2019/11/07	Surinder Rai
Phenols (4AAP)	TECH/PHEN	6429621	N/A	2019/11/07	Bramdeo Motiram
Sulphate by Automated Colourimetry	KONE	6427763	N/A	2019/11/07	Deonarine Ramnarine
Total Dissolved Solids	BAL	6431482	2019/11/07	2019/11/08	Shivani Desai
Total Suspended Solids	BAL	6428562	2019/11/06	2019/11/07	Mandeep Kaur

**BV Labs ID:** LFJ621  
**Sample ID:** CGM-12  
**Matrix:** Water

**Collected:** 2019/11/03  
**Shipped:**  
**Received:** 2019/11/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6432252	N/A	2019/11/08	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6427655	N/A	2019/11/07	Arefa Dabhad
Alkalinity	AT	6427902	N/A	2019/11/07	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	6427542	2019/11/06	2019/11/11	Nusrat Naz
Conductivity	AT	6427907	N/A	2019/11/07	Surinder Rai
Free (WAD) Cyanide	SKAL/CN	6428297	N/A	2019/11/08	Gnana Thomas
Total Cyanide	SKAL/CN	6428283	2019/11/06	2019/11/08	Gnana Thomas
Hardness (calculated as CaCO3)		6424838	N/A	2019/11/11	Automated Statchk
Mercury	CV/AA	6429831	2019/11/07	2019/11/07	Medhat Nasr
Total Metals Analysis by ICPMS	ICP/MS	6432126	N/A	2019/11/11	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6428266	N/A	2019/11/07	Mazin Wakai
Total Oil and Grease	BAL	6432121	2019/11/08	2019/11/08	Francis Afonso
pH	AT	6427913	2019/11/06	2019/11/07	Surinder Rai
Phenols (4AAP)	TECH/PHEN	6429552	N/A	2019/11/07	Bramdeo Motiram
Sulphate by Automated Colourimetry	KONE	6427754	N/A	2019/11/07	Deonarine Ramnarine
Total Dissolved Solids	BAL	6431482	2019/11/07	2019/11/08	Shivani Desai
Total Suspended Solids	BAL	6428562	2019/11/06	2019/11/07	Mandeep Kaur



BUREAU  
VERITAS

BV Labs Job #: B9V0662  
Report Date: 2019/11/11

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

### TEST SUMMARY

**BV Labs ID:** LFJ622  
**Sample ID:** CGM-13  
**Matrix:** Water

**Collected:** 2019/11/03  
**Shipped:**  
**Received:** 2019/11/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acidity (CaCO3) in water	MT	6432252	N/A	2019/11/08	Brent Boudreau
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	6427655	N/A	2019/11/07	Arefa Dabhad
Alkalinity	AT	6427902	N/A	2019/11/07	Surinder Rai
Biochemical Oxygen Demand (BOD)	DO	6427542	2019/11/06	2019/11/11	Nusrat Naz
Conductivity	AT	6427907	N/A	2019/11/07	Surinder Rai
Free (WAD) Cyanide	SKAL/CN	6428297	N/A	2019/11/08	Gnana Thomas
Total Cyanide	SKAL/CN	6428283	2019/11/06	2019/11/08	Gnana Thomas
Hardness (calculated as CaCO3)		6424838	N/A	2019/11/11	Automated Statchk
Mercury	CV/AA	6429831	2019/11/07	2019/11/07	Medhat Nasr
Total Metals Analysis by ICPMS	ICP/MS	6432126	N/A	2019/11/11	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6428266	N/A	2019/11/07	Mazin Wakai
Total Oil and Grease	BAL	6432121	2019/11/08	2019/11/08	Francis Afonso
pH	AT	6427913	2019/11/06	2019/11/07	Surinder Rai
Phenols (4AAP)	TECH/PHEN	6429621	N/A	2019/11/07	Bramdeo Motiram
Sulphate by Automated Colourimetry	KONE	6427763	N/A	2019/11/07	Deonarine Ramnarine
Total Dissolved Solids	BAL	6431482	2019/11/07	2019/11/08	Shivani Desai
Total Suspended Solids	BAL	6428562	2019/11/06	2019/11/07	Mandeep Kaur



### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	0.3°C
Package 2	0.7°C
Package 3	0.3°C

**Results relate only to the items tested.**



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BV Labs Job #: B9V0662

Report Date: 2019/11/11

### QUALITY ASSURANCE REPORT

exp Services Inc

Client Project #: THB-00095132-YE

Sampler Initials: RR

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
6427542	Total BOD	2019/11/11					<2	mg/L	NC	30	99	80 - 120
6427655	Dissolved (0.2u) Aluminum (Al)	2019/11/07	102	80 - 120	101	80 - 120	<5	ug/L	2.1	20		
6427754	Dissolved Sulphate (SO4)	2019/11/07	134 (1)	75 - 125	107	80 - 120	<1.0	mg/L	NC	20		
6427763	Dissolved Sulphate (SO4)	2019/11/07	NC	75 - 125	102	80 - 120	<1.0	mg/L	0.97	20		
6427902	Alkalinity (Total as CaCO3)	2019/11/07			96	85 - 115	<1.0	mg/L	3.9	20		
6427907	Conductivity	2019/11/07			101	85 - 115	<0.001	mS/cm	0.23	25		
6427913	pH	2019/11/07			102	98 - 103			0.27	N/A		
6428266	Total Ammonia-N	2019/11/07	101	75 - 125	101	80 - 120	<0.050	mg/L	NC	20		
6428283	Total Cyanide (CN)	2019/11/08	93	80 - 120	96	80 - 120	<0.0050	mg/L	1.3	20		
6428297	WAD Cyanide (Free)	2019/11/08	93	80 - 120	94	80 - 120	<0.0010	mg/L	9.0	20		
6428562	Total Suspended Solids	2019/11/07					<10	mg/L	13	25	100	85 - 115
6429552	Phenols-4AAP	2019/11/07	102	80 - 120	101	80 - 120	<0.0010	mg/L	18	20		
6429621	Phenols-4AAP	2019/11/07	102	80 - 120	100	80 - 120	<0.0010	mg/L	NC	20		
6429831	Mercury (Hg)	2019/11/07	103	75 - 125	99	80 - 120	<0.1	ug/L	NC	20		
6429893	Total Dissolved Solids	2019/11/08					<10	mg/L	11	25	97	90 - 110
6431482	Total Dissolved Solids	2019/11/08					<10	mg/L	12	25	100	90 - 110
6432121	Total Oil & Grease	2019/11/08			101	85 - 115	<0.50	mg/L	2.0	25		
6432126	Total Aluminum (Al)	2019/11/11	93	80 - 120	98	80 - 120	<5.0	ug/L	7.2	20		
6432126	Total Arsenic (As)	2019/11/11	103	80 - 120	101	80 - 120	<1.0	ug/L				
6432126	Total Cadmium (Cd)	2019/11/11	101	80 - 120	103	80 - 120	<0.10	ug/L				
6432126	Total Copper (Cu)	2019/11/11	103	80 - 120	105	80 - 120	<1.0	ug/L				
6432126	Total Iron (Fe)	2019/11/11	100	80 - 120	99	80 - 120	<100	ug/L	NC	20		
6432126	Total Lead (Pb)	2019/11/11	96	80 - 120	102	80 - 120	<0.50	ug/L				
6432126	Total Molybdenum (Mo)	2019/11/11	101	80 - 120	100	80 - 120	<0.50	ug/L				
6432126	Total Nickel (Ni)	2019/11/11	95	80 - 120	95	80 - 120	<1.0	ug/L				
6432126	Total Zinc (Zn)	2019/11/11	101	80 - 120	100	80 - 120	<5.0	ug/L				
6432252	Acidity	2019/11/08	96	80 - 120	104	80 - 120	<5.0	mg/L	NC	25		



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VERITAS

BV Labs Job #: B9V0662

Report Date: 2019/11/11

### QUALITY ASSURANCE REPORT(CONT'D)

exp Services Inc

Client Project #: THB-00095132-YE

Sampler Initials: RR

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
6432290	Mercury (Hg)	2019/11/08	97	75 - 125	98	80 - 120	<0.1	ug/L	NC	20		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.





BUREAU  
VERITAS

BV Labs Job #: B9V0662  
Report Date: 2019/11/11

exp Services Inc  
Client Project #: THB-00095132-YE  
Sampler Initials: RR

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

---

Eric Dearman, Scientific Specialist

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Eva Pranjic, M.Sc., C.Chem, Scientific Specialist

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Bureau Veritas Laboratories  
6740 Campobello Road, Mississauga, Ontario Canada L5M 2L8 Tel: (905) 817-5700 Toll-free 800-563-6266 F

**BOD**

CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		INFORMATION:		Laboratory Use Only:													
Company Name: #17501 exp Services Inc		Company Name: Ahileas Mitsopoulos		Quotation #: B72106		BV Labs Job #:													
Attention: accounts payable		Attention: Ahileas Mitsopoulos		P.O. #:		Bottle Order #:													
Address: 1142 Roland St		Address:		Project: THB-00095132-YE		739299													
Thunder Bay ON P7B 5M4				Project Name:		CDC #:													
Tel: (807) 623-9495 Fax: (807) 623-8070		Tel: Fax:		Site #:		Project Manager:													
Email: thunderbay@exp.com; Karen.Burke@exp.com; AP@ex		Email: ahileas.mitsopoulos@exp.com; Kristof.Karpiuk@exp.com		Sampled By:		Michelle Huth													
MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY				ANALYSIS REQUESTED (PLEASE BE SPECIFIC)				Turnaround Time (TAT) Required: Please provide advance notice for rush projects											
<b>Regulation 153 (2011)</b> <input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Medium/Fine <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> Table 3 <input type="checkbox"/> Agr/Other <input type="checkbox"/> For RSC <input type="checkbox"/> Table _____		<b>Other Regulations</b> <input type="checkbox"/> CCME <input type="checkbox"/> Sanitary Sewer Bylaw <input type="checkbox"/> Reg 558 <input type="checkbox"/> Storm Sewer Bylaw <input type="checkbox"/> MISA Municipality _____ <input type="checkbox"/> PWQO <input type="checkbox"/> Other _____		<b>Special Instructions</b>  		<input type="checkbox"/> Field Filtered (please circle): Metals / Hg / Cr / V I Alkalinity Biochemical Oxygen Demand (BOD) Conductivity Free (NMN) Cyanide, Total Cyanide Hardness (calculated as CaCO3) Mercury Total Ammonia-N Total Oil and Grease pH Phenols (4AAP)		<b>Regular (Standard) TAT:</b> (will be applied if Rush TAT is not specified). Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details. <b>Job Specific Rush TAT (if applies to entire submission)</b> Date Required: _____ Time Required: _____ Rush Confirmation Number: _____ (call lab for #)											
<b>Include Criteria on Certificate of Analysis (Y/N)?</b>																			
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr / V I	Alkalinity	Biochemical Oxygen Demand (BOD)	Conductivity	Free (NMN) Cyanide, Total Cyanide	Hardness (calculated as CaCO3)	Mercury	Total Ammonia-N	Total Oil and Grease	pH	Phenols (4AAP)	# of Bottles	Comments		
1	CGM-4	11/03	1350hr	water	None	X	X	X	X	X	X	X	X	X	X	5			
2	CGM-5		1410hr 1340hr			X	X	X	X	X	X	X	X	X	X	7			
3	CGM-6		1215hr			X	X	X	X	X	X	X	X	X	X	10			
4	CGM-7		1140hr			X	X	X	X	X	X	X	X	X	X	10			
5	CGM-8		1120hr			X	X	X	X	X	X	X	X	X	X	10			
6	CGM-9		1340hr			X	X	X	X	X	X	X	X	X	X	7			
7	CGM-10		1155hr			X	X	X	X	X	X	X	X	X	X	10			
8	CGM-11		1250hr			X	X	X	X	X	X	X	X	X	X	10			
9	CGM-12		1045hr			X	X	X	X	X	X	X	X	X	X	10			
10	CGM-13	11/03	1315hr	water	None	X	X	X	X	X	X	X	X	X	X	10			
* RELINQUISHED BY: (Signature/Print) R. R. REID		Date: (YY/MM/DD) 19/11/04		Time 1130hr		RECEIVED BY: (Signature/Print) A. S. G. W. H. G. N. J. D. M. R.		Date: (YY/MM/DD) 20/11/05		Time 09:05		# jars used and not submitted		Laboratory Use Only					
												Time Sensitive		Temperature (°C) on Reel 11.0 11.0		Custody Seal Present Intact		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS. * IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS. ** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.												SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS				White: BV Labs Yellow: Client			



<b>INVOICE TO:</b>		<b>REPORT TO:</b>		<b>PROJECT INFORMATION:</b>		<b>Laboratory Use Only:</b>	
Company Name: #17501 exp Services Inc		Company Name: Ahileas Mitsopoulos		Quotation #: B72106		BV Labs Job #:	
Attention: accounts payable		Attention: Ahileas Mitsopoulos		P.O. #:		Bottle Order #:	
Address: 1142 Roland St		Address:		Project: THB-00095132-YE		739299	
Thunder Bay ON P7B 5M4				Project Name:		COC #:	
Tel: (807) 623-9495 Fax: (807) 623-8070		Tel: Fax:		Site #:		Project Manager:	
Email: thunderbay@exp.com; Karen.Burke@exp.com; AP@exp.com		Email: ahileas.mitsopoulos@exp.com; Kristof.Karpiuk@exp.com		Sampled By:		Michelle Huth	

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY						ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required: Please provide advance notice for rush projects							
Regulation 153 (2011)			Other Regulations			Special Instructions	Field Filtered (please circle): Metals / Hg / Cr VI	Sulphate by Automated Colourimetry	Total Dissolved Solids, TSS	8 Metals	9 Metals	Acidity	Dissolved Aluminum (0.2 u. clay free)									Regular (Standard) TAT: (will be applied if Rush TAT is not specified): Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.	Job Specific Rush TAT (if applies to entire submission) Date Required: _____ Time Required: _____ Rush Confirmation Number: _____ (call lab for #)
Table 1	Res/Park	Medium/Fine	CCME	Sanitary Sewer Bylaw																			
Table 2	Ind/Comm	Coarse	Reg 558	Storm Sewer Bylaw																			
Table 3	Agri/Other	For RSC	MISA	Municipality																			
Table			PWOO																				
Include Criteria on Certificate of Analysis (Y/N)?																							
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix																			
1	CGM-4	11/03	1350hr	water	None	X	X	X			X	X										5	
2	CGM-5		1410hr			X	X	X			X	X										7	
3	CGM-6		1215hr			X	X			X	X	X										10	
4	CGM-7		1140hr			X	X			X	X	X										10	
5	CGM-8		1120hr			X	X			X	X	X										10	
6	CGM-9		1340hr			X	X	X			X	X										7	
7	CGM-10		1155hr			X	X			X	X	X										10	
8	CGM-11		1250hr			X	X			X	X	X										10	
9	CGM-12		1045hr			X	X			X	X	X										10	
10	CGM-13	11/03	1315hr	water	None	X	X			X	X	X										10	

RELINQUISHED BY: (Signature/Print) <i>R. Reid</i>	Date: (YY/MM/DD) 19/11/04	Time 1130hr	RECEIVED BY: (Signature/Print) <i>See page 1</i>	Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only						
							Time Sensitive	Temperature (°C) on Faces	Custody Seal Present	Yes	No		
									Intact				

\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

\*\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

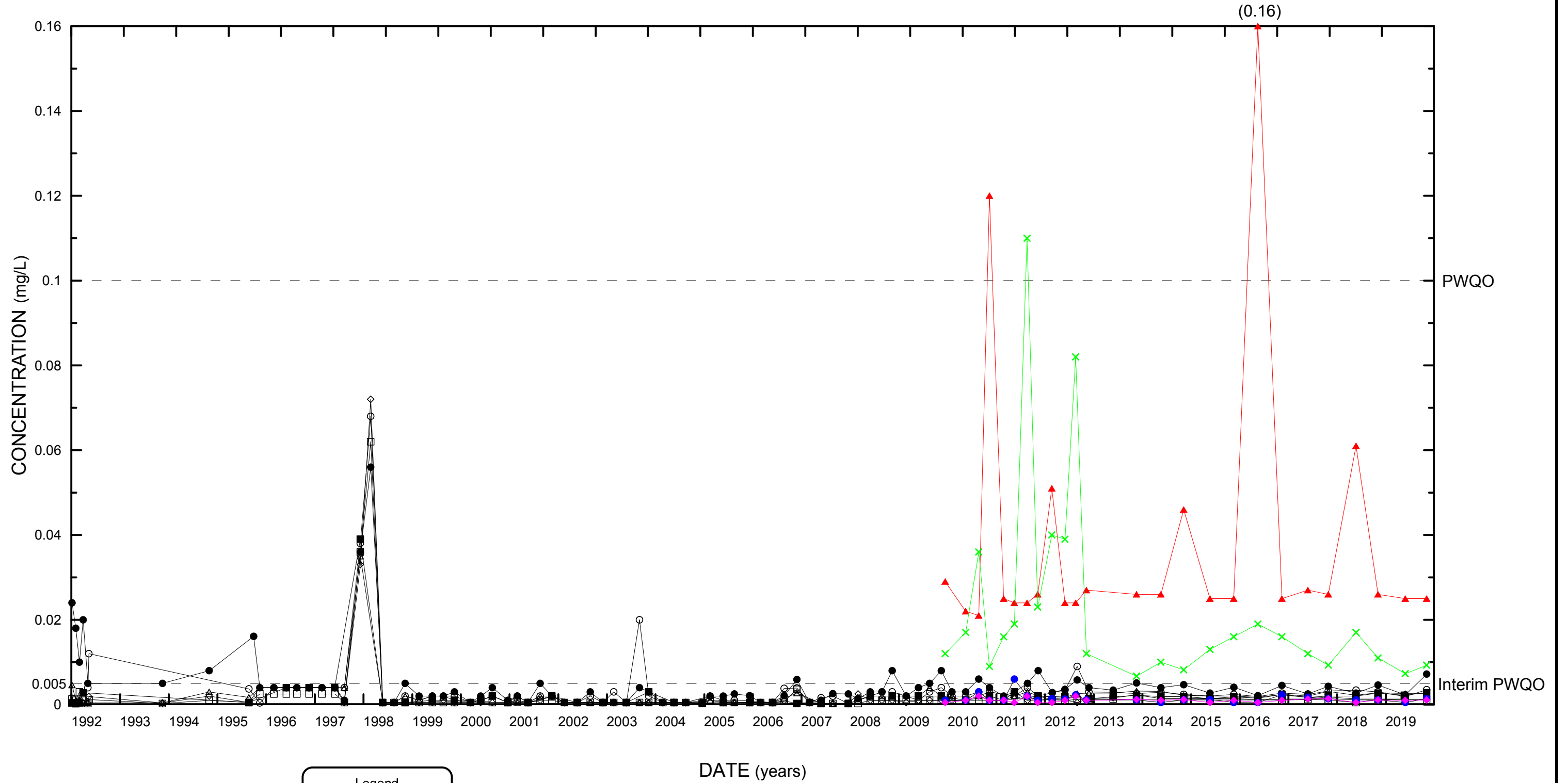
\*\* SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

White: BV Labs Yellow: Client

## **Appendix E - TIME SERIES GRAPHS**

# Arsenic



Legend	
●	CGM4
▲	CGM5
○	CGM6
□	CGM7
◇	CGM8
■	CGM9
▲	CGM 10
●	CGM 11
×	CGM 12
◆	CGM 13

Note:  
 1) PWQO: Provincial Water Quality Objectives.  
 2) ECA: Environmental Compliance Approval  
 3) Drawing to be read in conjunction with accompanying report.

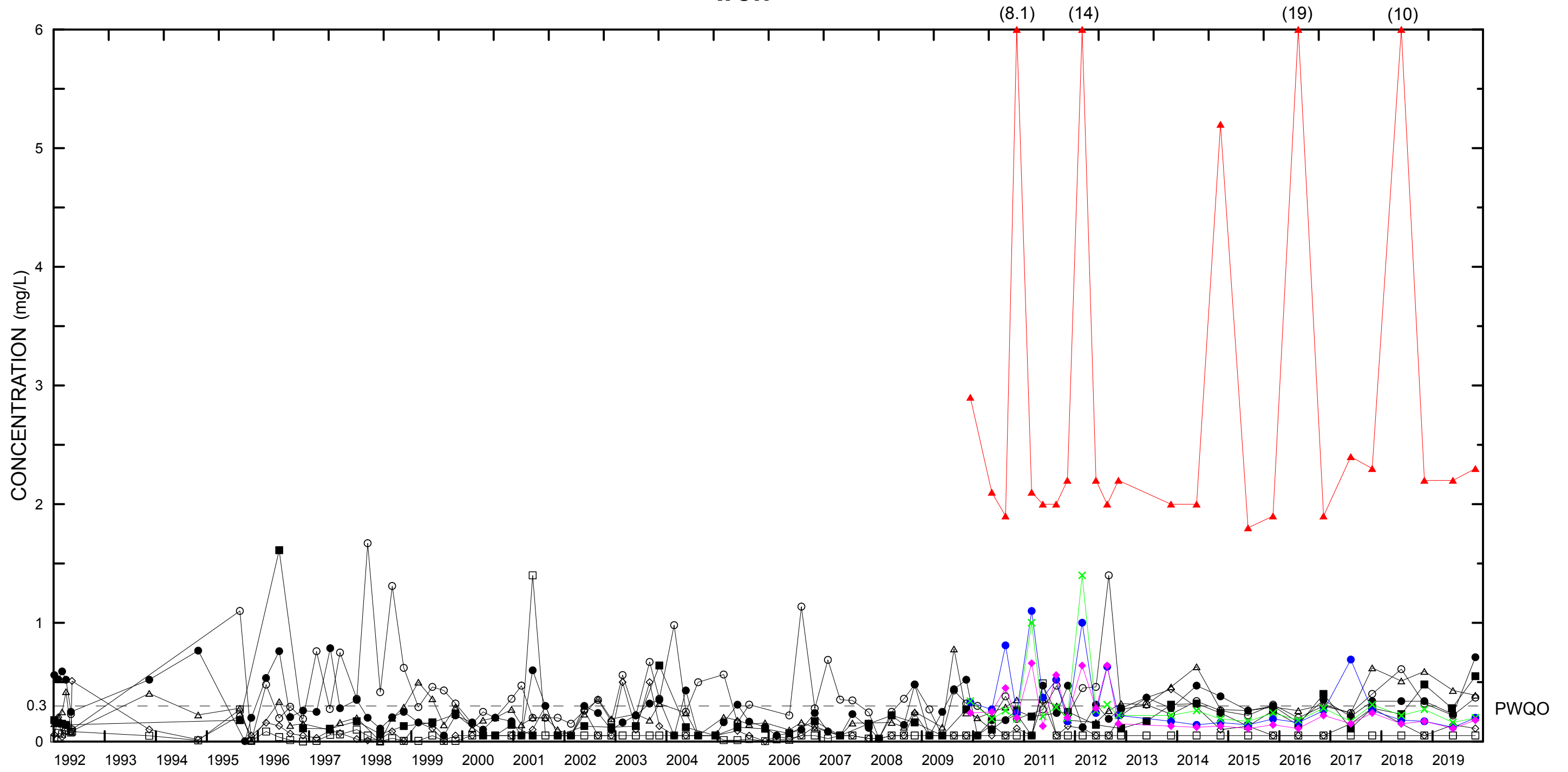


Figure E-1

**Arsenic vs. Time**  
 Additional Surface Water Sampling  
 To Satisfy Part 5 of Mine Rehabilitation Code  
 Wawa, Ontario

REF. NO.:	THB-00094262-JG-200
SCALE:	N/A
DRAWN BY:	CP / MS
CHECKED BY:	AM
DATE:	March 2, 2020

# Iron



Legend	
●	CGM4
△	CGM5
○	CGM6
□	CGM7
◇	CGM8
■	CGM9
▲	CGM 10
●	CGM 11
×	CGM12
◆	CGM 13

Note:  
 1) PWQO: Provincial Water Quality Objectives.  
 2) ECA: Environmental Compliance Approval  
 3) Drawing to be read in conjunction with accompanying report.


 <b>Iron vs. Time</b> Additional Surface Water Sampling To Satisfy Part 5 of Mine Rehabilitation Code Wawa, Ontario	REF. NO.: THB-00094262-JG-200
	SCALE: N/A
	DRAWN BY: CP / MS
	CHECKED BY: AM
	DATE: March 2, 2020

Figure E-2