# Appendix 7-B

## Brucejack Gold Mine Project: 2012 Air Quality Baseline Report

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Pretium Resources Inc.

# BRUCEJACK GOLD MINE PROJECT
# 2012 Air Quality Baseline Report

PRETIVM

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April 2013

# BRUCEJACK GOLD MINE PROJECT
# 2012 AIR QUALITY BASELINE REPORT

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**Prepared for:**

PRETIVM

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# Executive Summary

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# Executive Summary

The Brucejack Property is situated within the Sulphurets District in the Iskut River region, approximately 20 kilometres northwest of Bowser Lake or 65 kilometres north-northwest of the town of Stewart, British Columbia. The present report documents baseline air quality studies completed in the area of the proposed Brucejack Gold Mine Project.

The scope of this study was to characterize local ambient air quality through monitoring using dustfall stations and passive air sampling systems (PASS), and compare results to applicable regulations where applicable. A total of six dustfall stations were installed of which three were located near Brucejack Lake where the mine site is proposed and three were located in the Wildfire Creek area towards the eastern of the exploration access road near the site of previously planned infrastructure. The dustfall monitoring stations were installed in accordance with sampling method ASTM D1739-98, and collect particles small enough to pass through a 1 mm stainless steel sieve and large enough to settle by virtue of weight. The dustfall stations are located upwind and downwind at the two primary sampling areas. Within each area, two stations were located off the upwind-downwind axis. Dustfall samples were exposed in open air for approximately 30 days before being analyzed for dust, metal and acid deposition levels.

A PASS was also installed at the upwind dustfall station at each of the two sampling areas. PASS is a diffusive method which monitors gas or vapour pollutants from the atmosphere at a rate controlled by a physical process such as diffusion through a static air layer or permeation through a membrane, which does not involve the active movement of air through the sampler. Local meteorological data are required to calculate PASS sampling rates. Required parameters include air temperature, wind speed and relative humidity. Meteorological conditions were provided using data collected from the Wildfire and Brucejack Lake meteorology stations operated as part of the overall environmental baseline studies program for the Brucejack Gold Mine Project.

From July to September 2012 at the six dustfall monitoring locations, the average dustfall deposition rates ranged from 0.2 to 0.7 mg/dm$^2$/day with the exception of DF1 due to higher dustfall results of 2.67 mg/dm$^2$/day in September. The Pollution Control Objectives for the Mining, Smelting, and Related Industries of British Columbia's dustfall objective is between 1.7 to 2.9 mg/dm$^2$/day. The highest value of 2.67 mg/dm$^2$/day is within the range of BC's pollution control objective. Average dustfall deposition rates observed during the 2012 studies where consistent with baseline dustfall deposition rates recorded for other mineral development projects in the region including the KSM (Kerr-Sulphurets-Mitchell) Project (from below detection limit to 3.75 mg/dm$^2$/day), the Schaft Creek Mine Project (from below detection limit to 2.5 mg/dm$^2$/day), and the Kitsault Mine Project (0.46 mg/dm$^2$/day).

Acid deposition rates were calculated from the sulphate and nitrate contents in the dustfall samples. Because sulphate and nitrate have different molecular weight, acid load was converted into charge equivalency. The highest acid deposition load observed was 398 eq/ha/yr at a site in the Wildfire Creek area (DF6) in September 2012, which is much lower than the BC median acid deposition critical load of 750 eq/ha/yr. The average median acid load across six sampling locations in 2012 was 164 eq/ha/yr, lower than the BC annual median critical load. Most of the metal deposition levels analyses were below detection limits. The reported metal deposition rates are the result of natural sources in the area.

The results from PASS showed that $NO_2$ and $SO_2$ concentrations in the Wildlife Creek area (at PASS1) and $SO_2$ concentration in the Brucejack Lake area (at PASS2) were below detection limit during the

entire sampling period. The $NO_2$ results from the Brucejack Lake area averaged approximately 4 µg/m$^3$. There is currently no 30-day average criterion for $NO_2$ in Canada or BC, but the average of 4 µg/m$^3$ is much lower than the Canadian annual maximum desirable standard of 60 µg/m$^3$. The average $O_3$ concentration at PASS1 was 20 µg/m$^3$ while the $O_3$ concentration at PASS2 was 57 µg/m$^3$. Health Canada states the monthly 1-hour $O_3$ averages between May and September should be in the range of 49 to 78 µg/m$^3$ (25 to 40 ppb) when the source is away from anthropogenic influence (Health Canada 1999). Ambient $O_3$ concentrations measured at PASS1 and PASS2 are approximately within this range.

# Acknowledgements

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# Acknowledgements

This report was produced for Pretium Resources Inc. by Rescan Environmental Services Ltd. It was written by Tina Liu (M.A.Sc.) and reviewed by Derek Shaw (P.Eng., M.A.Sc.). Greg Norton (M.Sc.) was the project manager and Nicole Bishop (B.Sc.) the project coordinator. Graphics production was coordinated by Francine Alford (B.F.A.), GIS production was coordinated by Pieter van Leuzen (M.Sc.) and report production was coordinated by Robert Tarbuck (BTECH). Field work was conducted by Calvin Pin, Chris Doughty, Bradley Harris, Matt MacDonald, and Jordan Hunter.

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# BRUCEJACK GOLD MINE PROJECT
# 2012 AIR QUALITY BASELINE REPORT

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# Glossary and Abbreviations

# Glossary and Abbreviations

Terminology used in this document is defined where it is first used. The following list will assist readers who may choose to review only portions of the document.

| | |
|---|---|
| **AENV** | Alberta Environment |
| **BDL** | Below Detection Limit |
| **CCME** | Canadian Council of Ministers of the Environment |
| **Critical Acid Load** | Amount of acid deposition a particular region can receive without being adversely affected |
| **EC** | Environment Canada |
| **eq/ha/yr** | Total acidity equivalency per hectare per year |
| **kg/ha/yr** | Kilograms per hectare per year |
| **$mg/dm^2/day$** | Milligrams per square decimetre per day |
| **MOE** | Ministry of Environment |
| **$O_3$** | Ozone |
| **$NO_x$** | Oxides of nitrogen |
| **$NO_2$** | Nitrogen dioxide |
| **PASS** | Passive Air Sampling System |
| **Ppb** | Parts per billion |
| **$SO_2$** | Sulphur dioxide |
| **tpd** | Tonne per day |
| **VOC** | Volatile organic compound |
| **$\mu g/m^3$** | Micrograms per cubic metre |

# 1. Introduction

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# 1. Introduction

Air quality is an important environmental factor in ensuring the conservation and health of local vegetation, wildlife and the human population. Poor air quality has the potential to adversely affect the growth of vegetation and can pose a risk to the general health of both wildlife and humans. High sulphate and nitrate concentrations in dust may indicate the potential for acid deposition or acid rain. Similarly, high metal content in dust can lead to concentrations of metals in plant and wildlife tissues that exceed safe levels.

This report presents the results of the air quality baseline study for the Brucejack Gold Mine Project (the Project). The purpose of the study was to collect information for planning of the project, describing the environmental setting, and assessing potential environmental effects of the Project as it moves through the various design, permitting, and development phases.

Ambient air quality is typically assessed by a group of measureable parameters defined as criteria air contaminants (CACs). The specific CACs included in this study are:

- Nitrogen dioxide ($NO_2$),
- Sulphur dioxide ($SO_2$),
- Carbon monoxide (CO),
- Total suspended particulate (TSP),
- Suspended particulate with diameter less than 10 µm ($PM_{10}$),
- Suspended particulate with diameter less than 2.5 µm ($PM_{2.5}$), and
- Ozone ($O_3$)

In addition to CACs, dustfall sampling is generally conducted as part of an air quality monitoring program.

Data collection can generally be classified as active or passive methods. Active methods require air pumped through collection or analytical devices and require continuous power supplies. If the power to the active sampling device is supplied by a generator, the collected data could potentially be affected by fuel combustion exhaust. The power generator would also require refuelling on a regular basis. For these reasons, active sampling is often not practical in remote areas without electric power supply.

Passive air sampling systems (PASS) are able to measure ambient concentrations of $NO_2$, $SO_2$ and $O_3$ without active pumping of air. Dustfall deposition is sampled by collection of dust in ambient air over a fixed amount of time. The samples are then analyzed for deposition rates of nitrate and sulphate, and metal. Although there is currently no passive method available for measuring suspended particulate concentrations, literature and data obtained from other remote areas were reviewed and presented in this study.

# 2. Project Description

# 2. Project Description

Pretium Resources Inc. (Pretivm) proposes to develop the Brucejack Gold Mine Project (the Project) as a 2,700 tonne per day (tpd) underground gold and silver mine. The Brucejack property is located at 56°28′20″ N latitude by 130°11′31″ W longitude, which is approximately 950 km northwest of Vancouver, 65 km north-northwest of Stewart, and 21 km south-southeast of the closed Eskay Creek Mine (Figure 2-1). The Project is located within the Kitimat-Stikine Regional District. Several First Nation and Treaty Nations have traditional territory within the general region of the Project including the Skii km Lax Ha, the Nisga'a Nation, the Tahltan Nation, the Gitxan First Nation, and the Gitanyow First Nation.

The mine site area will be located near Brucejack Lake. Vehicle access to the mine site will be via an existing exploration access road from Highway 37 that may require upgrades to facilitate traffic during mine operations. A transmission line will connect the mine site to the provincial power grid near Stewart or along Highway 37; two options are currently under consideration.

The Project is located within the boundary range of the Coast Mountain Physiographic Belt, along the western margin of the Intermontane Tectonic Belt. The local terrain ranges from generally steep in the western portion of the Project area in the high alpine with substantial glacier cover to relatively subdued topography in the eastern portion of the Project area towards the Bell-Irving River. The Brucejack mine site will be located above the tree line in a mountainous area at an elevation of approximately 1,400 masl; surrounding peaks measure 2,200 m in elevation. The access and transmission corridors will span a range of elevations and ecosystems reaching a minimum elevation near the Bell Irving River of 500 masl. Sparse fir, spruce, and alder grow along the valley bottoms, with only scrub alpine spruce, juniper, alpine grass, moss, and heather covering the steep valley walls.

The general area of the Brucejack Property has been the target of mineral exploration since the 1960s. In the 1980s Newhawk Gold Mines Ltd. conducted advanced exploration activities at the current site of the proposed Brucejack mine site that included 5 km of underground development, construction of an access road along the Bowser River and Knipple Glacier, and resulted in the deposition of 60,000 $m^3$ of waste rock within Brucejack Lake.

Environmental baseline data was collected from Brucejack Lake and the surround vicinity in the 1980s to support a Stage I Impact Assessment for the Sulphurets Project proposed by Newhawk Gold Mines Ltd. Silver Standard Resources Inc. commenced recent environmental baseline studies specific to the currently proposed Project in 2009 which have been continued by Pretivm, following its acquisition of the Project in 2010. The scope and scale of the recent environmental baseline programs have varied over the period from 2009 to the present as the development plan for the Project has evolved.

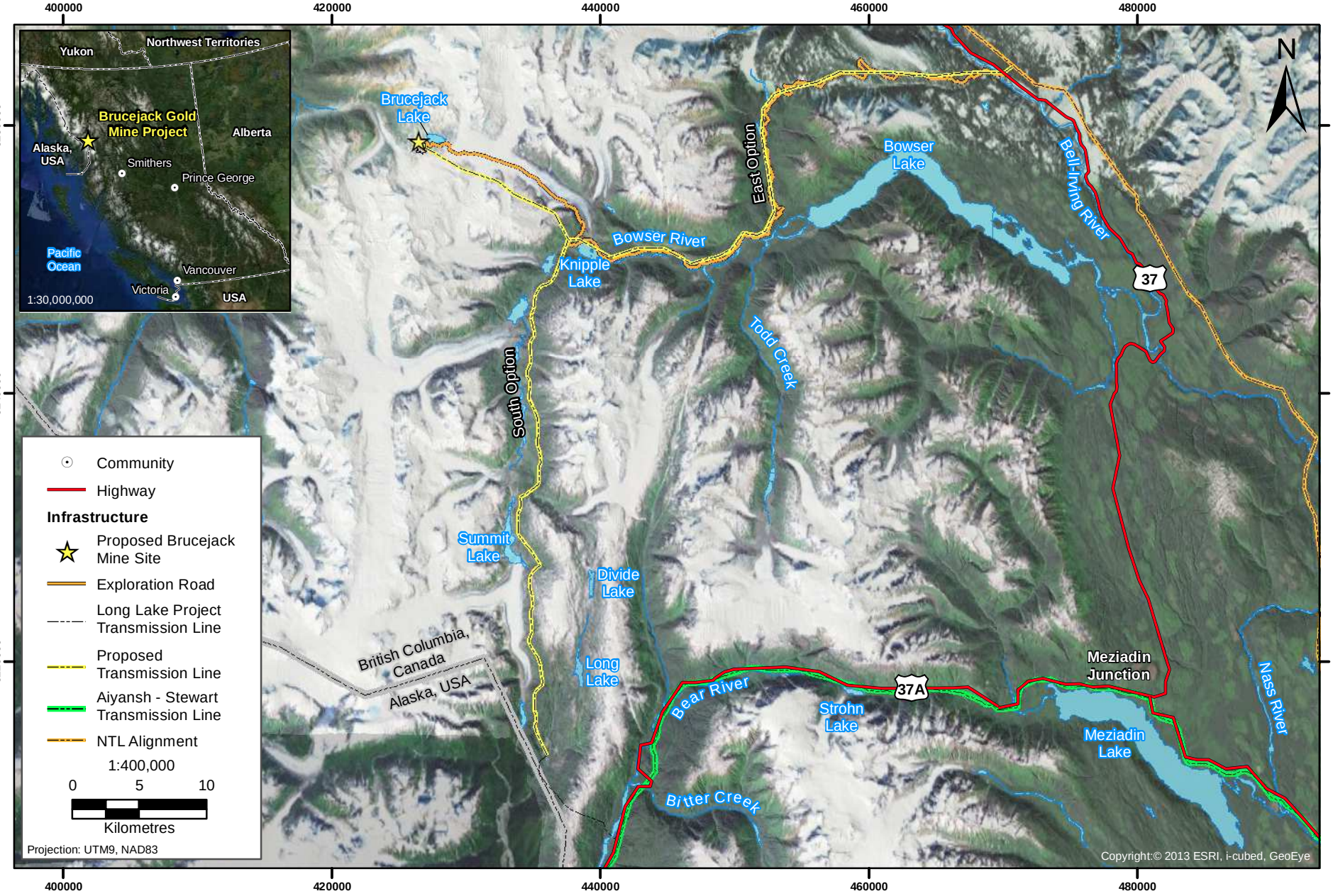


Figure 2-1

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# Brucejack Gold Mine Project Overview

Figure 2-1

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# 3. Background Information

# 3. Background Information

## 3.1 APPLICABLE LEGISLATION (FEDERAL AND PROVINCIAL)

### 3.1.1 Total Dustfall

The Pollution Control Objectives for the Mining, Smelting, and Related Industries of British Columbia (BC MOE 1979) were developed with the objective of protecting the quality of British Columbia's environment. The ambient air control objective for dustfall is defined to be between 1.7 mg/dm$^2$/day to 2.9 mg/dm$^2$/day, averaged over 30 days.

### 3.1.2 Acid Deposition

Acid deposition is the end product of the reaction between sulphur oxides ($SO_X$), nitrogen oxides ($NO_X$) and water in the atmosphere. These compounds can be converted to sulphuric acid and nitric acid by reacting with oxygen and water in the air. Acid deposition occurs when these acid-forming pollutants are deposited on the earth's surface.

Acid deposition critical load is a quantitative estimate of an exposure to one or more acid generating pollutants below which significant harmful effects on specific sensitive elements of the environment do not occur according to present knowledge. Since nitrate and sulphate have different atomic weights, the critical loads are typically reported on a charge equivalency basis. Critical loads have been determined and mapped for upland forest soils in eastern Canada following guidelines established by the New England Governor-Eastern Canadian Premiers (NEG-ECP) Environmental Task Group on Forest Mapping (NEG-ECP 2001) reported in the 2004 Canadian Acid Deposition Science Assessment (EC 2004). In western Canada, the Acid Rain Task Group (ARTG: mandated by the Air Management Committee of the Canadian Council of Ministers of the Environment (CCME)) have supported the determination of critical loads as shown in Table 3.1-1.

**Table 3.1-1. Summary of Acid Deposition Critical Load Estimates**

| Province | Mean | Median | Mode | Minimum | Maximum |
|---|---|---|---|---|---|
| | eq/ha/yr | | | | |
| Alberta | 872 | 868 | 264 | 216 | 3,421 |
| British Columbia | 856 | 750 | 532 | 174 | 4,026 |
| Manitoba | 1,119 | 870 | 259 | 185 | 3,240 |
| New Brunswick | 1,361 | 1,150 | 1,267 | 178 | 6,131 |
| Newfoundland and Labrador | 749 | 602 | 263 | 193 | 4,635 |
| Nova Scotia | 950 | 805 | 405 | 220 | 5,181 |
| Ontario | 775 | 525 | 250 | 213 | 4,276 |
| Prince Edward Island | 1,936 | 1,950 | 2,513 | 201 | 5,930 |
| Quebec | 747 | 525 | 377 | 250 | 3,219 |
| Saskatchewan | 539 | 354 | 303 | 208 | 2,885 |

*Source: (Aherne 2008)*

### 3.1.3 Metal Deposition

There are currently no specific criteria for total metals in environmental dustfall. The atmospheric metal levels are generally low; however, they tend to contribute to the deposition in soils. Heavy metals are persistent in the environment and are subject to bioaccumulation in food-chains. Therefore, metal deposition results are often analyzed further for wildlife, country foods and human health.

### 3.1.4 Ambient Criteria Air Contaminant Concentration

There are currently provincial and federal objectives and standards for ambient concentrations of $NO_2$, $SO_2$ $O_3$, TSP, $PM_{10}$ and $PM_{2.5}$, summarized in Table 3.1-2. Time averaging periods associated with these objective and standards range from hourly to annually. Since the sampling methods used for PASS and dustfall were collected over 30 days, criteria with 30-day averaging period will allow direct comparison of the baseline condition to regulatory criteria. Currently, there is no federal or BC criterion with 30-day averaging period. Alberta Environment (AENV) has recently published a 30-day average objective of 30 µg/m$^3$ for $SO_2$ (effective February 2011). This objective was established for monitoring purposes, specifically for passive monitoring, allowing direct comparison of the results obtained from PASS to the objective. The 30-day average $SO_2$ objective was not established based on values for human health or ecosystems.

**Table 3.1-2. Air Quality Objectives and Standards for Canada and British Columbia**

| | | Air Quality Objectives and Standards (µg/m$^3$) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Canada | | | British Columbia | | |
| Contaminant | Averaging Period | Maximum Desirable | Maximum Acceptable | Maximum Tolerable | Level A | Level B | Level C |
| $NO_2$ | 1-hour | - | 400 | 1,000 | | - | |
| | 24-hour | - | 200 | 300 | | - | |
| | Annual | 60 | 100 | - | | - | |
| $SO_2$ | 1-hour | 450 | 900 | - | 450 | 900 | 900-1,300 |
| | 3-hour | - | - | - | 375 | 665 | - |
| | 24-hour | 150 | 300 | 800 | 160 | 260 | 360 |
| | Annual | 30 | 60 | - | 25 | 50 | 80 |
| $O_3$ | 1-hour | 100 | 160 | 300 | | - | |
| | 8-hour | | 130 (65 ppb)[a] | | | - | |
| | 24-hour | 30 | 50 | - | | - | |
| | Annual | - | 30 | - | | - | |
| TSP | 24-hour | - | 120 | 400 | 150 | 200 | 260 |
| | Annual | 60 | 70 | - | 60 | 70 | 75 |
| $PM_{10}$ | 24-hour | - | - | - | | 50 | |
| $PM_{2.5}$ | 24-hour | | 30[b] | | | 25[c] | |
| | Annual | | - | | | 8[d] | |

*Note: dash (-) indicates standards/objective not available.*
*[a] Canada-wide standard established in 2000, based on 4$^{th}$ highest annual value, averaged over three consecutive years*
*[b] Canada-wide standard established in 2000, based on annual 98$^{th}$ percentile value, averaged over 3 consecutive years*
*[c] BC objective established in 2009 based on annual 98$^{th}$ percentile value.*
*[d] BC objective of 8 µg/m$^3$ and planning goal of 6 µg/m$^3$, established in 2009.*

Ozone is a secondary pollutant that is produced by nitrogen oxides ($NO_X$) and volatile organic compounds reacting in sunlight and stagnant air. Since it is a secondary pollutant, it is difficult to identify the source of emission and ozone standards across the world are fairly inconsistent. The Canada-wide 8-hour standard for ozone, set by Canadian Council of Ministers of the Environment (CCME) in 2000, is 65 ppb (130 µg/m$^3$). The standard was initially intended to minimize exposure risk to human health and the environment, but other considerations came into play in the development. Thus the final values had less to do with science and more to do with a negotiated settlement between the various jurisdictions (National Round Table on the Environment and the Economy 2008). The purpose of ozone monitoring is typically not to be compared to the standard, but to obtain background ozone concentrations for estimation of $NO_2$ ambient concentrations from $NO_X$ if ozone limiting method is required.

## 3.2 LITERATURE REVIEW

The Project is located in an area that is remote with few anthropogenic sources. Due to this reason, there is little or no background air quality information readily available. The best available estimates of ambient background concentrations are published by the Canadian Air and Precipitation Monitoring Network (CAPMoN). CAPMoN is a non-urban air quality monitoring network, with siting criterion designed to ensure that the measurement locations are regionally representative (i.e., not affected by local sources of air pollution). Scientists examining atmospheric pollution in urban centres would consider most CAPMoN sites remote and pristine. There are currently 28 measurement sites in Canada and one in the United States (US). The closest CAPMoN site to the Project is the Saturna station, off the southern tip of Vancouver Island in the middle of the Strait of Georgia. Although the station is almost 1,000 km southeast of Project, it provides the best estimate of background concentration available for BC. The second closest CAPMoN monitoring station is Snare Rapids in the Northwest Territories, approximately 100 km northwest of Yellowknife, NT. This station is approximately 1,300 km from the Project and only collects particulate matter. Daily measurements of $SO_2$ concentrations are available from the Saturna monitoring station from 1996 to 2002 (1997 missing). The average annual $SO_2$ concentrations for that period were reported as 2.3 µg/m$^3$ with an average standard deviation of 2.0 µg/m$^3$. However, ambient $NO_2$ and $O_3$ concentrations were not measured at the Saturna station. The Diavik Diamond Mine is in the Northwest Territories, located about 300 km northeast of Yellowknife. In the Diavik Diamond Mine Environmental Assessment (Cirrus Consultants 1998), ambient background concentrations were estimated based on surveys and assumptions. These ambient concentrations have been considered to be typical background concentrations for remote areas with little anthropogenic sources. The $NO_2$ 1-hour and 24-hour concentrations are 21 µg/m$^3$ while the annual concentration is 2 µg/m$^3$. A technical document about background concentration of ozone in BC (McKendry 2006) indicated background ozone concentration to be in the range of 40 to 80 µg/m$^3$ (20 to 40 ppb) in BC.

Baseline air quality data have been collected by other projects in the area. The KSM Project, immediately adjacent to the Brucejack Mine Site (Figure 3.2-1), monitored dust deposition rates from June 2008 to October 2011 at five to ten locations, depending on the year (Rescan 2012). The deposition rates varied from below detection limit to 3.75 mg/dm$^2$/day. Sampling took place during the summer and early fall, which are typically the driest time of the year when dustfall is not mitigated by precipitation as much. The background dust deposition level, calculated using 98$^{th}$ percentile values, was determined to be 1.34 mg/dm$^2$/day.

Kitsault Mine Project is located on the northwest coast of BC approximately 140 km north of Prince Rupert and 130 km south of the Brucejack Gold Mine Project. The baseline monitoring data showed that the highest dustfall rate was 0.46 mg/dm$^2$/day in July 2009 which indicated low concentrations of acid compounds and metals, typically within the range of analytical instrument detection limits (AMEC 2011). Dust in ambient air was monitored at the site from October 8, 2010 to October 12, 2010 at five locations. The overall average 24-hour concentrations were 3.5 µg/m$^3$ for TSP, 2.5 µg/m$^3$ for $PM_{10}$ and 2.3 µg/m$^3$ for $PM_{2.5}$.

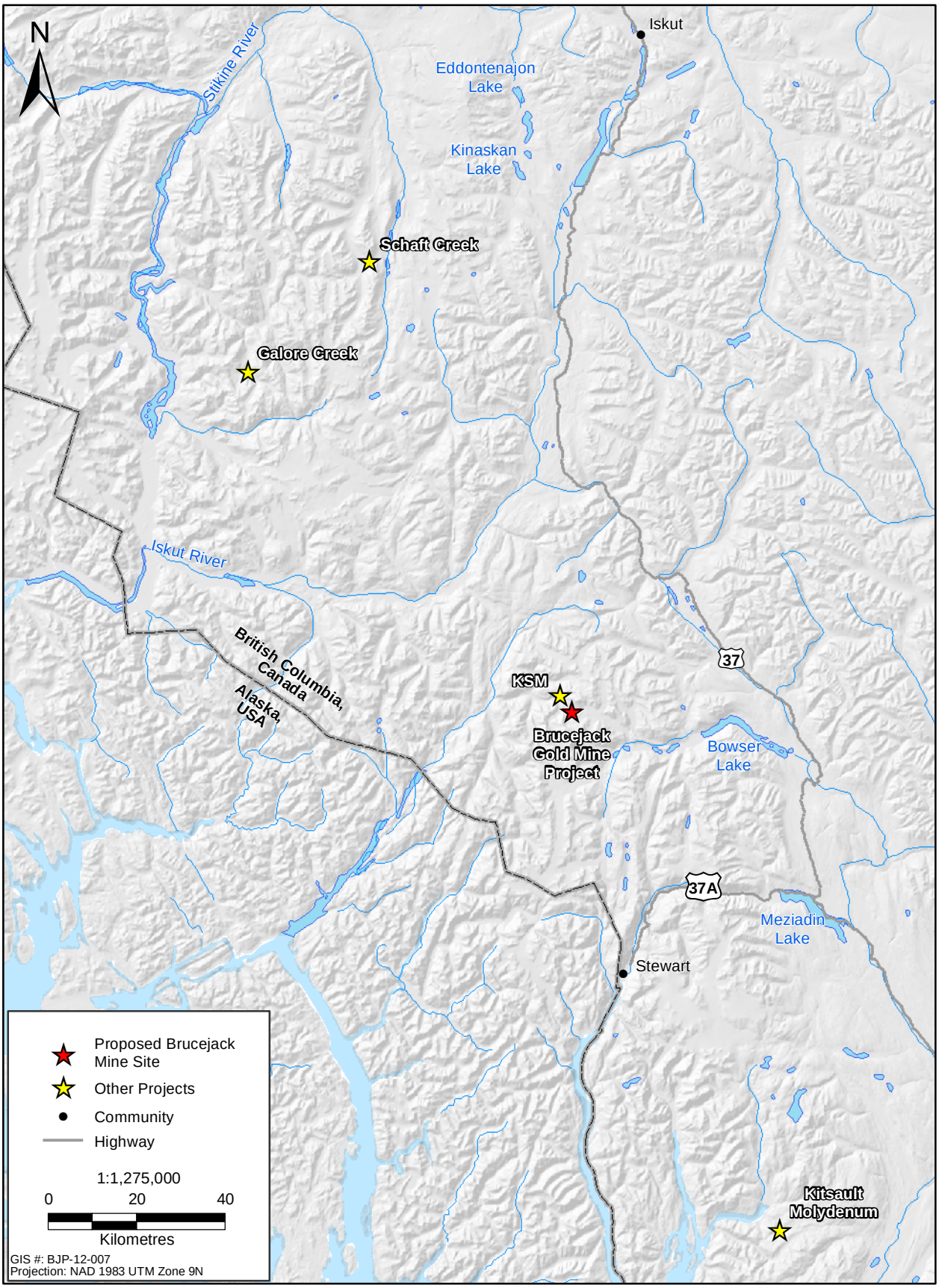


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Figure 3.2-1

Air Quality Data from Nearby Projects

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Dustfall was monitored at Schaft Creek Mine Project in 2007 (July, August and September) and 2008 (June, July, August and November) at eight locations. Dust deposition rates ranged from below detection limit to 2.5 mg/dm$^2$/day which is between the BC objective of 1.7 to 2.9 mg/dm$^2$/day (Rescan RTEC 2010). The overall average between sites and months ranged between 0.13 and 0.93 mg/dm$^2$/day.

The Galore Creek Copper-Gold-Silver Project, approximately 100 km northwest of the Brucejack Gold Mine Project, collected samples of $PM_{10}$ and $PM_{2.5}$ concentrations in July 2005 (Rescan 2006). A total of 16 24-hour samples for $PM_{10}$ were collected and concentrations ranged from 1.4 to 5.6 µg/m$^3$ with an average of 3.4 µg/m$^3$; a total of 13 24-hour $PM_{2.5}$ samples were collected and concentrations ranged from 0.8 to 2.6 µg/m$^3$ with an average of 1.3 µg/m$^3$.

Although suspended particulate baseline concentrations were not collected in the Project area, data collected at Kitsault Mine Project and Galore Creek Copper-Gold-Silver Project indicated average 24-hour concentrations of 3.5 µg/m$^3$ for TSP, 2.5 to 3.4 µg/m$^3$ for $PM_{10}$ and 1.3 to 2.3 µg/m$^3$ for $PM_{2.5}$ (Rescan 2006).

# 4. Objectives

# 4. Objectives

The objective of the air quality baseline program was to collect information on the existing ambient conditions prior to project commencement. This data will be used for planning of the project, describing the environmental setting, and assessing potential environmental effects of the Project as it moves through the various design phases. This objective was achieved by:

- Obtaining background concentrations of suspended particulates representative for the area of the proposed Project based on literature sources;
- Installing six dustfall stations in the area of proposed Project to collect data on dust deposition;
- Installing two PASS stations in the area of proposed Project to collect data on ambient air quality of $NO_2$, $SO_2$ and $O_3$; and
- Comparing the amount of dustfall deposition and ambient concentrations of $NO_2$, $SO_2$ and $O_3$ to applicable guidelines.

# 5. Study Area

# 5. Study Area

The study area of the 2012 air quality baseline monitoring program focused on the location of proposed Project infrastructure anticipated to be locations of main site activity and air emissions during the operations phase of the Project. Monitoring took place in two primary sampling areas: Brucejack Lake and Wildfire Creek. The Brucejack Lake area is at a higher elevation and includes the site of the proposed Project mine site. The Wildfire Creek area is at a lower elevation close to the exploration access road and Highway 37. The Wildfire Creek area was also the site of previously planned infrastructure which is no longer being considered for the Project.

Specific monitoring locations within the primary sampling areas were selected based on the predominant wind direction, which is east and east-southeast. At the Brucejack Lake and Wildfire Creek areas, dustfall stations were installed upwind, downwind, and off the predominant wind axis. The PASS stations were combined with the dustfall stations upwind at each of the two areas to avoid disturbance from exploration activities at these areas. Since the Project Mine Site is located at the Brucejack Lake area, monitoring stations at the Wildfire Creek area can also be used to monitor dustfall and ambient air conditions in an area free of the influence of Project activities.

# 6. Methodology

# 6. Methodology

## 6.1 DUSTFALL

### 6.1.1 Site Selection

The predominant wind direction in the Project area is from the east and east east-southeast. The dustfall locations were located approximately 2 km upwind and downwind from the proposed Mine Site at the Brucejack Lake area, and one station located off the upwind-downwind axis (Figure 6.1-1; Table 6.1-1). Dustfall stations DF1, DF2 and DF3 were located at the Wildfire Creek area in a similar fashion.

**Table 6.1-1. Locations of Dustfall and PASS Stations**

| Station ID | | | |
|---|---|---|---|
| **Dustfall** | **PASS** | **UTM Easting (m)** | **UTM Northing (m)** |
| DF1 | - | 466,868 | 6,261,028 |
| DF2 (June – July 2012) | PASS1 (June – July 2012) | 470,459 | 6,258,883 |
| DF2 | PASS1 | 471,071 | 6,258,637 |
| DF3 | - | 467,074 | 6,258,140 |
| DF4 | - | 425,099 | 6,258,981 |
| DF5 | PASS2 | 428,824 | 6,258,823 |
| DF6 | - | 426,290 | 6,256,735 |

*Note: NAD83 Zone 9V*

There are currently no significant sources of air pollutants within the immediate vicinity of these stations. Construction of the exploration access road was on-going through the monitoring period in the vicinity of stations in the Wildfire Creek area, but was expected to be outside the potential areas of influence of the monitoring stations. Plates 6.1-1 to 6.1-6 show each station and their immediate souring environments.

On July 18, 2012 after the first month of monitoring, station DF2-PASS1 was relocated 640 m southwest of the original location to facilitate helicopter access by field crews.

### 6.1.2 Monitoring Method

The dustfall monitoring program was developed in accordance with the sampling method ASTM D1739-98 (Reapproved 2010). The dustfall monitoring stations collect particles small enough to pass through a 1 mm stainless steel sieve and large enough to settle by virtue of their weight. The containers used were open-topped cylinders not less than 150 mm in diameter placed at the top of stands at a height of 2 m above ground. The containers were partially filled with deionized water and algaecide to prevent resuspension of dust and growth of algae in the containers.

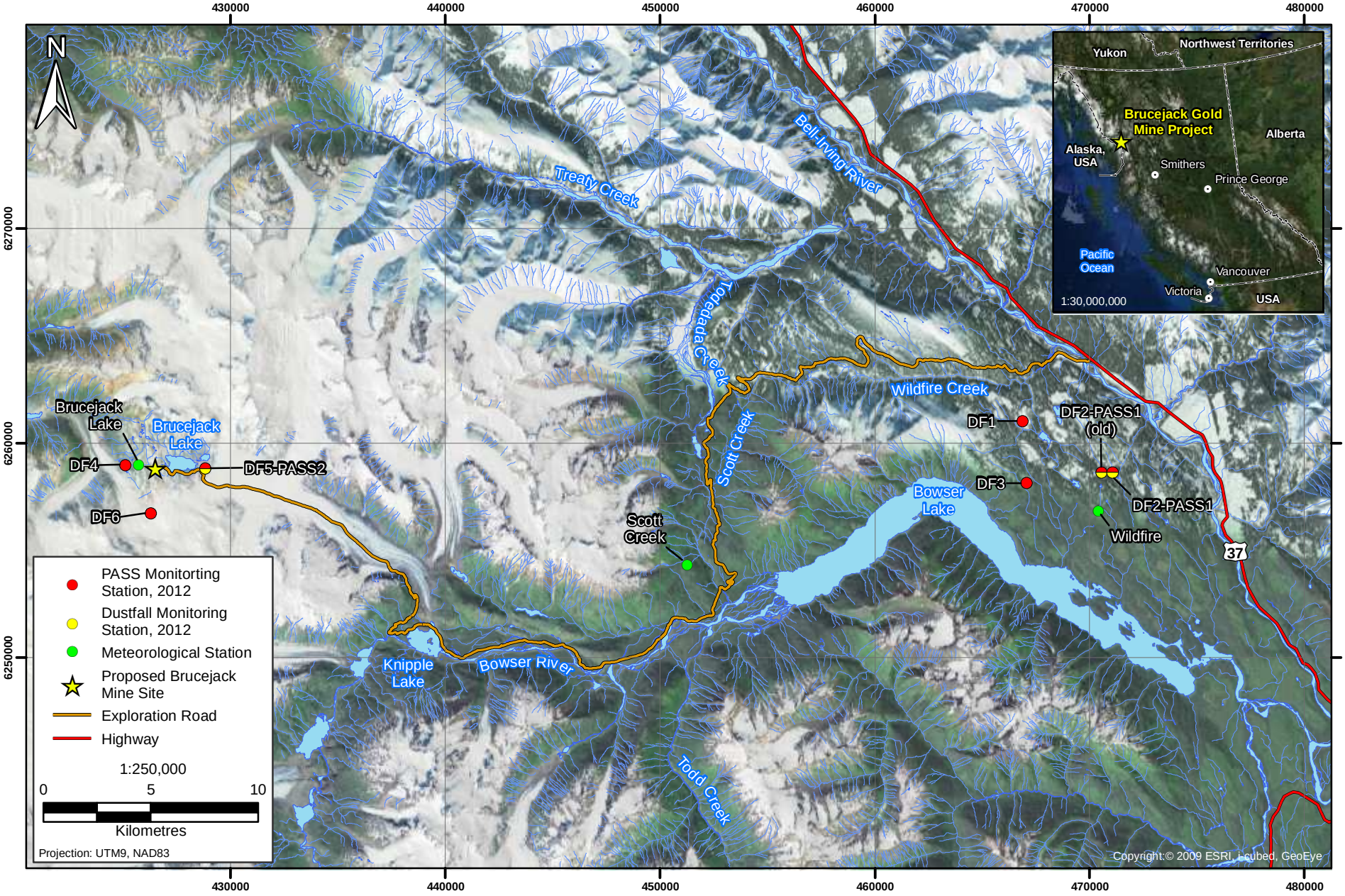


Figure 6.1-1

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## Dustfall and PASS Monitoring Station

Figure 6.1-1

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*Plate 6.1-1. Dustfall Station DF1 (August 8, 2012).*

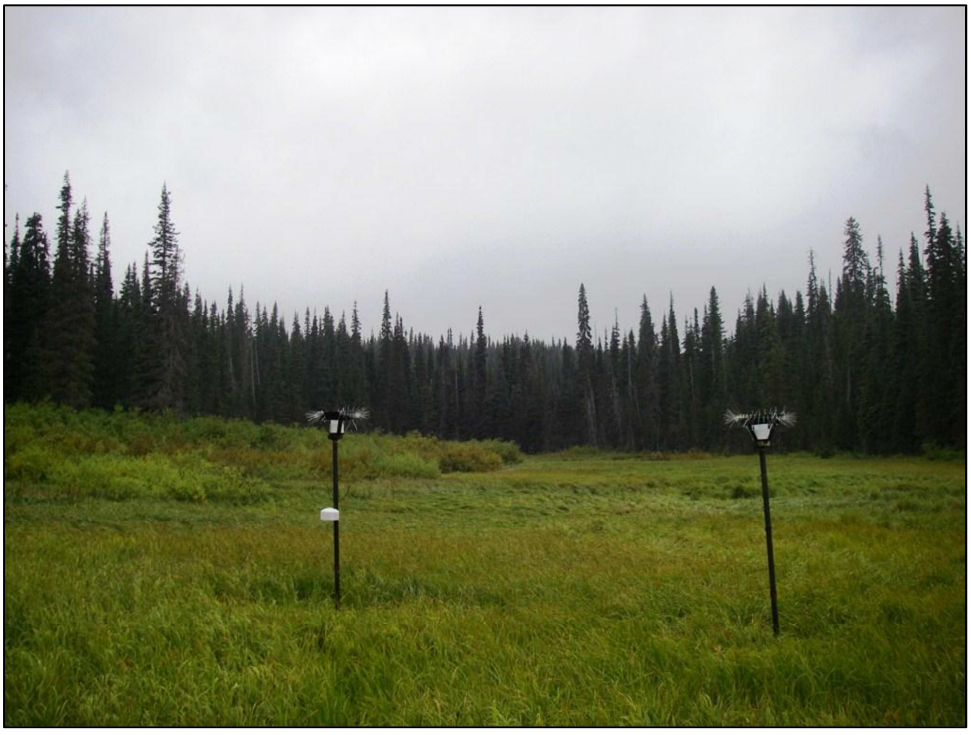

*Plate 6.1-2. Dustfall Station DF2 (September 2012).*

*Plate 6.1-3. Dustfall Station DF3 (August 8, 2012).*

*Plate 6.1-4. Dustfall Station DF4 (August 7, 2012).*

*Plate 6.1-5. Dustfall Station DF5 (September 2012).*

*Plate 6.1-6. Dustfall Station DF6 (August 7, 2012).*

The containers were surrounded by a windscreen and bird spikes (Plate 6.1-1). The wind screen improves the dustfall collection efficiency and bird spikes were used to minimize contaminants from bird faeces. Sample containers were exposed to the atmosphere for approximately 30 days, after which they were sent to the laboratory for analysis. Each dustfall station was comprised of two sample containers with separate mounts. One of the containers was analyzed for particulates (total, soluable and insoluable) and anions (sulphate, nitrate, chloride and ammonia), while the other was analyzed for total metals and various cations. All dustfall samples were analyzed at ALS Environmental Laboratory in Burnaby, BC. Results that are below detection limits were presented as the detection limit in the tables; however, in the calculation of averages, values below detection limits were assumed to be half of the detection limits.

Acid deposition rates were calculated based on sulphate and nitrate content measured in each dustfall sample. Environment Canada (EC) has studied the sources of acid deposition and the adverse effects of acid deposition on the Canadian environment since its emergence in the public conscience in the early 1980s. Critical load estimates have been established for both aquatic and terrestrial ecosystems for forested areas throughout Canada (EC 2004). The unit conversion factors used in this calculation from weight to charge equivalency are presented in Table 6.1-2.

**Table 6.1-2. Relationships Among the Units for Atmospheric Deposition Used in the Assessment to Quantify Critical Loads**

| Chemical Species | kg/ha/yr | eq/ha/yr |
|---|---|---|
| $SO_4^{2-}$ | 1.00 | 20.8 |
| S | 1.00 | 62.4 |
| $NO_3^-$ | 1.00 | 16.1 |
| $NH_4^+$ | 1.00 | 55.4 |
| N | 1.00 | 71.4 |

### 6.1.3 Monitoring Period

As part of the ambient air quality baseline program, monthly dustfall measurements were collected at six locations within the Project area from July to September, 2012. Note that the monitoring focused on the snow-free periods (summer and early fall) as snowcover would greatly reduce the amount of dust produced by natural wind erosion of soils. During snow period, the 1 mm sieve on top of the collection container may freeze and prevent further collection of the sample. Moreover, heavy snow may hinder the access to the dustfall stations.

## 6.2 PASSIVE AIR SAMPLING SYSTEM (PASS) STATION

### 6.2.1 Site Selection

As part of the ambient air quality baseline program, monthly average concentrations of three criteria air contaminants were monitored. Two PASS located at the Brucejack Lake area and the Wildfire Creek area were used to monitor $NO_2$, $SO_2$ and $O_3$ on a monthly basis from June to September 2012 (Figure 6.1-1; Appendix B).

The two PASS were installed upwind at the Brucejack Lake and Wildfire Creek areas on the DF2 and DF5 dustfall stations (Plates 6.2-1 and 6.2-2). These locations are free of anthropogenic emissions such as vehicle and equipment exhaust.

*Plate 6.2-1. PASS1 Attached on DF2 (August 8, 2012).*

*Plate 6.2-2. PASS2 Attached on DF5 (August 7, 2012).*

### 6.2.2 Monitoring Method

PASS is a diffusive method which monitors gas or vapour pollutants from the atmosphere at a rate controlled by a physical process such as diffusion through a static air layer or permeation through a membrane, which does not involve the active movement of air through the sampler (Tang 2001). The sampling rate was calculated using equations developed in laboratory studies based on temperature, relative humidity, and average wind speed (Tang 2001). For the present study, meteorological conditions were provided using data collected from Wildfire meteorological station for PASS1 (DF2) and Brucejack Lake station for PASS2 (DF5). The number of days of contact between the ambient air and the permeation membrane is important as contaminant levels captured by the sampler are proportional to exposure time. Both Wildfire and Brucejack Lake stations are operated as part of the environmental baseline studies for the Project. All PASS samples were analyzed by Maxxam Analytics Inc. in Edmonton, AB.

### 6.2.3 Monitoring Period

As part of the ambient air quality baseline program, monthly PASS measurements were collected at two locations, Brucejack Lake and Wildfire Creek areas from July to September in 2012.

# 7. Results

# 7. Results

## 7.1 TOTAL DUSTFALL

Dustfall results from July to September 2012 are summarized in Table 7.1-1 and Figure 7.1-1. The average dustfall results in the study were in the range of 0.2 to 0.7 mg/dm$^2$/day, with the exception of DF1 where the average dusfall deposition rate was 1.53 mg/dm$^2$/day. There were some construction activities related to construction of an exploration access road approximately 3 km north of DF1 that could have been the cause of the higher dust deposition results. The highest dustfall level recorded was 2.67 mg/dm$^2$/day in September 2012 at DF1.

**Table 7.1-1. Total Dustfall Results at Brucejack Gold Mine Project 2012**

| Total Dustfall (mg/dm$^2$/day) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Period** | **DF1** | **DF2** | **DF3** | **DF4** | **DF5** | **DF6** | **Average** |
| Jul-12 | 1.27 | 1.22 | 0.78 | 0.33 | 0.22 | 0.29 | **0.69** |
| Aug-12 | 0.66 | 0.55 | 0.54 | 0.25 | 0.19 | 0.23 | **0.40** |
| Sep-12 | 2.67 | 0.43 | 0.37 | 0.24 | 0.14 | 0.52 | **0.73** |
| **Average** | **1.53** | **0.73** | **0.56** | **0.27** | **0.18** | **0.35** | **-** |

The Pollution Control Objectives for the Mining, Smelting, and Related Industries of British Columbia are between 1.7 and 2.9 mg/dm$^2$/day (BC MOE 1979). Compared to the objectives, the current dustfall levels are generally about half of the more stringent objective. The highest dustfall level of 2.67 mg/dm$^2$/day approaches the less stringent objective of 2.9 mg/dm$^2$/day.

Dustfall results for the Brucejack study area are generally consistent to measured background dustfall rates for other projects in the region. Dustfall deposition rates ranged from below detection limit to 3.75 mg/dm$^2$/day at the KSM Project, from below detection limit to 2.5 mg/dm$^2$/day at the Schaft Creek Mine Project, and from below detection limits to 0.46 mg/dm$^2$/day Kitsault Mine Project.

## 7.2 ACID DEPOSITION

Deposition of sulphate and nitrate in dust was analyzed as part of the dustfall laboratory analysis. The sulphate and nitrate contents of the dustfall samples are shown in Table 7.2-1.

**Table 7.2-1. Nitrate and Sulphate Deposition Results from Collected Dustfall Samples**

| | **DF1** | **DF2** | **DF3** | **DF4** | **DF5** | **DF6** | |
|---|---|---|---|---|---|---|---|
| **Period** | **Nitrate (mg/dm$^2$/day)** | | | | | | **Average** |
| Jul-12 | 0.0011 | 0.0009 | 0.0011 | 0.0020 | 0.0022 | 0.0024 | **0.0016** |
| Aug-12 | 0.0019 | 0.0011 | 0.0013 | 0.0010 | 0.0013 | 0.0008 | **0.0012** |
| Sep-12 | 0.0007 | 0.0009 | 0.0008 | 0.0012 | 0.0012 | 0.0026 | **0.0012** |
| **Average** | **0.0013** | **0.0010** | **0.0010** | **0.0014** | **0.0015** | **0.0019** | **-** |
| | **Sulphate (mg/dm$^2$/day)** | | | | | | |
| Jul-12 | 0.0098 | <0.010 | <0.0063 | <0.0076 | <0.0080 | <0.013 | **0.0054** |
| Aug-12 | <0.0074 | <0.0079 | <0.0039 | <0.015 | <0.014 | <0.015 | **0.0053** |
| Sep-12 | <0.015 | <0.014 | <0.0083 | <0.014 | <0.012 | <0.029 | **0.0077** |
| **Average** | **0.0070** | **0.0053** | **0.0031** | **0.0061** | **0.0057** | **0.0095** | **-** |

*Note: Values below detection limits were assumed to be half of the detection limit in the calculation of averages.*

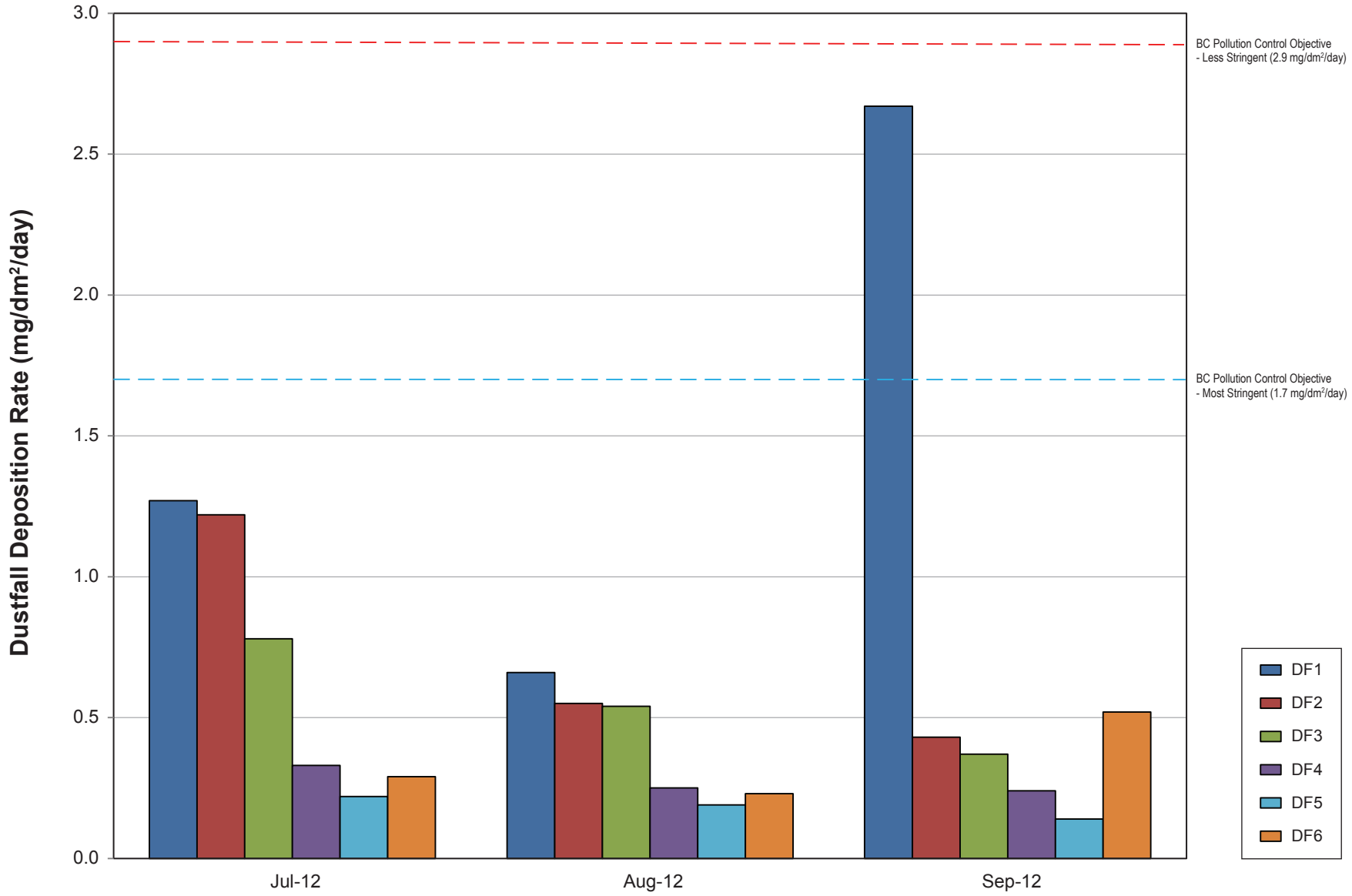


Figure 7.1-1

PRETIVM

## Dustfall Deposition Rates from July to September 2012

Figure 7.1-1

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Since nitrate and sulphate have different molecular weight, acid load is calculated using conversions shown in Table 6.1-2. Based on the measured nitrate and sulphate rates, the acid load as expressed in units of charge equivalency are presented in Table 7.2-2.

**Table 7.2-2. Calculated Acid Deposition Load**

| | Acid Deposition Load (eq/ha/yr) | | | | | | |
|---|---|---|---|---|---|---|---|
| **Period** | **DF1** | **DF2** | **DF3** | **DF4** | **DF5** | **DF6** | **Median** |
| Jul-12 | 103 | 60 | 52 | 80 | 87 | 113 | **83** |
| Aug-12 | 79 | 59 | 47 | 84 | 86 | 77 | **78** |
| Sep-12 | 76 | 77 | 52 | 84 | 77 | 178 | **77** |
| **Median** | **79** | **60** | **52** | **84** | **86** | **113** | **-** |

*Note: value below detection limit is assumed to be half of detection limit in the calculation from rate to equivalency.*

Generally, the acid deposition rate in the study area was between 47 to 178 eq/ha/yr (Figure 7.2-1), with median range from 52 to 113 eq/ha/yr. The average median load across the six dustfall sampling locations was 79 eq/ha/yr.

As discussed previously, acid deposition critical load is a quantitative estimate of an exposure to one or more acid generating pollutants below which significant harmful effects on specific sensitive elements of the environment do not occur according to present knowledge (EC 2004). The calculation presented in the assessment does not consider any neutralizing compounds found in the dustfall of soil. Therefore, actual loading is likely to be well below the calculated value.

For BC, The median acid deposition critical load has been determined to be 750 eq/ha/yr by NEG-ECP. The estimated median acid deposition in the study area is approximately 10% of the median critical load for BC.

## 7.3 METAL DEPOSITION

Full metal results can be found in Appendix A. Since there are currently no significant anthropogenic sources in the study area, metal deposition levels result from natural emissions and the majority of the results were below detection limits. The maximum metal deposition rates at each dustfall station during the three-month monitoring period are presented in Table 7.3-1. Note that the results presented here are total metal content. Out of the 33 metals analyzed, 16 of them are always below their detection limits. There are 17 metals which had at least one reading during a one month period that was above the detection limit, but generally with very low metal deposition rates.

## 7.4 AMBIENT CRITIERA AIR CONTAMINANT CONCENTRATION

Two PASS samplers were installed at the DF2 and DF5 dustfall sites and PASS results are expressed as 30-day averages (Appendix B). The ambient concentrations of $NO_2$, $SO_2$ and $O_3$ are summarized in Table 7.4-1.

During the first month of monitoring, results were voided due to improper sample preparation. For the remaining two months of the monitoring period, $NO_2$ and $SO_2$ concentrations at PASS1 and $SO_2$ concentration at PASS2 were below detection limit. In September 2012 at PASS2, the $O_3$ canister was found missing from the environmental enclosure, likely due improper mounting of the canister.

There are currently no air quality objectives or standards for $NO_2$ or $SO_2$ for Canada or British Columbia with 30-day averaging periods; therefore, results are conservatively compared to annual criterion.

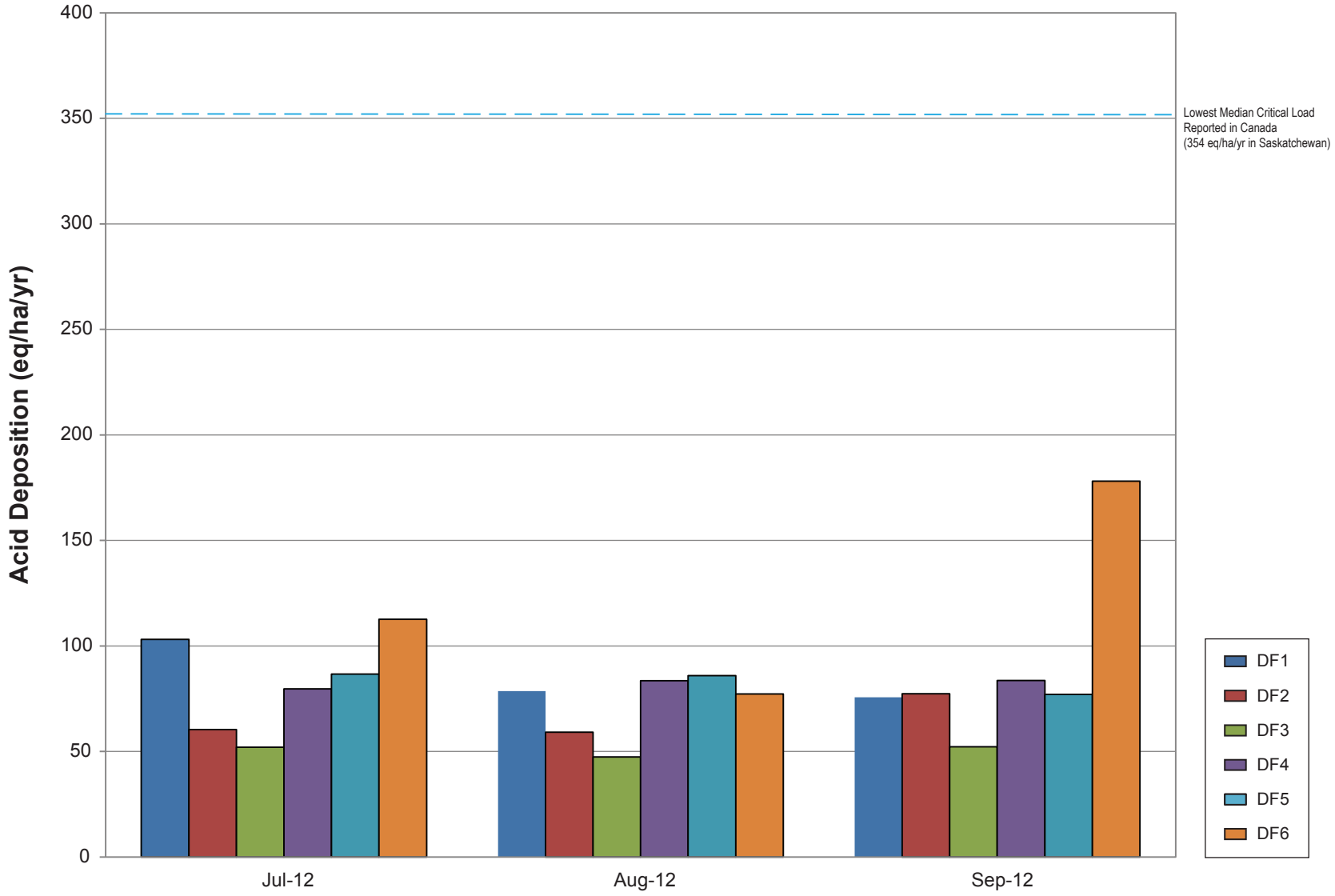


Figure 7.2-1

PRETIVM

## Acid Deposition Rates from July to September 2012

Figure 7.2-1

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**Table 7.3-1. Maximum Metal Deposition from Dustfall**

| Metal | Metal Deposition (mg/dm$^2$/day) | | | | | | |
|---|---|---|---|---|---|---|---|
| | DF1 | DF2 | DF3 | DF4 | DF5 | DF6 | 2012 Maximum |
| Aluminum (Al) | 3.25E-03 | 3.48E-04 | 3.89E-04 | 4.23E-04 | 2.80E-04 | 4.24E-04 | 3.25E-03 |
| Antimony (Sb) | 1.30E-07 | BDL | BDL | 1.90E-04 | BDL | BDL | 1.90E-04 |
| Arsenic (As) | 1.90E-06 | 2.50E-06 | 1.30E-06 | 5.50E-06 | 3.90E-06 | BDL | 5.50E-06 |
| Barium (Ba) | 3.52E-05 | 2.50E-05 | 1.14E-05 | 1.24E-05 | 1.18E-05 | 1.15E-05 | 3.52E-05 |
| Beryllium (Be) | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Bismuth (Bi) | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Boron (B) | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Cadmium (Cd) | 1.50E-06 | BDL | BDL | BDL | BDL | BDL | 1.50E-06 |
| Calcium (Ca) | 5.62E-03 | 1.73E-02 | 1.54E-02 | 1.22E-03 | BDL | BDL | 1.73E-02 |
| Chromium (Cr) | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Cobalt (Co) | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Copper (Cu) | BDL | 3.03E-04 | 4.76E-04 | 8.88E-04 | BDL | BDL | 8.88E-04 |
| Iron (Fe) | 8.72E-03 | 7.10E-04 | 5.80E-04 | 6.30E-04 | 1.23E-03 | BDL | 8.72E-03 |
| Lead (Pb) | 1.07E-05 | 9.25E-06 | 7.61E-06 | 1.89E-05 | 1.04E-05 | BDL | 1.07E-05 |
| Lithium (Li) | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Magnesium (Mg) | 3.20E-03 | 6.10E-03 | 2.60E-04 | BDL | BDL | BDL | 3.20E-03 |
| Manganese (Mn) | 2.56E-04 | 7.94E-04 | 6.58E-05 | 6.63E-05 | 6.85E-05 | 1.00E-04 | 2.56E-04 |
| Mercury (Hg) | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Molybdenum (Mo) | 6.10E-08 | BDL | BDL | BDL | 3.00E-06 | BDL | BDL |
| Nickel (Ni) | 1.40E-05 | 1.90E-05 | 8.09E-05 | BDL | 4.60E-05 | BDL | 1.40E-05 |
| Phosphorus (P) | 1.05E-02 | 1.16E-02 | 1.19E-03 | BDL | BDL | BDL | 1.05E-02 |
| Potassium (K) | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Selenium (Se) | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Silicon (Si) | 5.04E-03 | BDL | 1.90E-04 | BDL | BDL | BDL | 5.04E-03 |
| Silver (Ag) | 3.90E-07 | 3.80E-07 | 3.70E-08 | 5.50E-07 | BDL | BDL | 3.90E-07 |
| Sodium (Na) | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Strontium (Sr) | 2.00E-05 | 1.40E-04 | 2.97E-05 | 5.30E-06 | 3.30E-06 | 4.00E-06 | 2.00E-05 |
| Thallium (Tl) | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Tin (Sn) | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Titanium (Ti) | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Uranium (U) | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Vanadium (V) | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Zinc (Zn) | 1.08E-04 | 1.50E-04 | 9.30E-05 | 7.50E-05 | 7.60E-05 | BDL | 1.08E-04 |

*Note: BDL = Below detection limit*

The highest 30-day average $NO_2$ of 7.9 µg/m$^3$ was recorded occurred in September 2012 and is much lower than the Canadian maximum desirable standard of 60 µg/m$^3$. During the monitoring period, there were no PASS $SO_2$ results higher than the detection limit of 0.26 µg/m$^3$, which is much lower than the AENV 30-day objective and the BC annual objective.

**Table 7.4-1. Ambient Concentrations of $NO_2$, $SO_2$ and $O_3$ Collected by PASS**

| | Concentration (µg/m$^3$) | | | | | |
|---|---|---|---|---|---|---|
| | PASS1 | | | PASS2 | | |
| Period | $NO_2$ | $SO_2$ | $O_3$ | $NO_2$ | $SO_2$ | $O_3$ |
| Jul-12 | | Void[a] | | | Void[a] | |
| Aug-12 | <0.19 | <0.26 | 21.60 | 0.38 | <0.26 | 57.33 |
| Sep-12 | <0.19 | <0.26 | 18.65 | 7.90 | <0.26 | Missing[b] |
| **Average** | **0.09** | **0.13** | **20.12** | **4.14** | **0.13** | **57.33** |

*Note: Values below detection limits were assumed to be half of the detection limit.*
[a] *data were voided due to improper sample preparation*
[b] *$O_3$ canister was found to be missing from the PASS*

There is no 30-day average criterion for $O_3$ in the Canadian standards or BC objectives. The purpose of $O_3$ monitoring is typically to obtain knowledge in ambient $O_3$ concentration for estimation of $NO_2$ emissions from $NO_X$ using ozone limiting method. The average $O_3$ concentration at PASS1 was 20 µg/m$^3$ while the $O_3$ concentration at PASS2 was 57 µg/m$^3$. Health Canada states the monthly 1-hour $O_3$ averages between May and September should be in the range of 49 to 78 µg/m$^3$ (25 to 40 ppb) when the source is away from anthropogenic influence (Health Canada 1999). Ambient $O_3$ concentrations measured at PASS1 and PASS2 are approximately within this range. Comparing to background $O_3$ concentrations indicated in McKendry's study, $O_3$ concentration results collected in the Brucejack study area are comparable to the lower end of the range of 40 to 80 µg/m$^3$.

# 8. Conclusions

# 8. Conclusions

The baseline air quality program completed for the Brucejack Gold Mine Project included the measurement of dustfall levels at six locations, of which three were near Brucejack Lake and three were in the Wildfire Creek area. Two PASS samplers (PASS1 and PASS2) located at each of the two areas measured $NO_2$, $SO_2$ and $O_3$. Dustfall analyses included particulates (total, soluble and insoluble), anions (sulphate, nitrate, chloride and ammonia), total metals and various cations. The maximum dustfall deposition of 2.67 mg/dm$^2$/day was observed in September 2012 at DF1, and was between the BC dustfall objectives of 1.7 to 2.9 mg/dm$^2$/day. The average dustfall deposition rates ranged from 0.27 to 1.53 mg/dm$^2$/day, which is generally in agreement with results for background dustfall levels collected at other mineral development projects in the region.

The average median acid load across the six sampling locations in 2012 was 164 eq/ha/yr and is lower than the BC annual median critical load. The maximum single acid deposition load of 398 eq/ha/yr was observed at DF6 in September 2012, which was also lower than the BC annual median critical acid load of 750 eq/ha/yr. Metal deposition rates observed were either low or below detection limit, which is expected in area with limited anthropogenic emission sources.

$NO_2$ and $SO_2$ concentrations measured at PASS samplers were generally below detection limit. Concentrations, where measureable, were well below relevant objectives. The $NO_2$ concentration at PASS2, while measurable, was only 4 µg/m$^3$ which is much lower than the annual Canadian standard of 60 µg/m$^3$. The $O_3$ concentrations observed at PASS1 and PASS2 were 20 and 57 µg/m$^3$, respectively. These values correspond well with Health Canada's expected $O_3$ concentration of 49 to 78 µg/m$^3$ between May and September.

Although ambient concentrations of dust (TSP, $PM_{10}$ and $PM_{2.5}$) were not monitored for this study, data from the Kitsault Mine Project 130 km south of the Brucejack Gold Mine Project, and the Galore Creek Copper-Gold-Silver Project, 100 km northwest of the Brucejack Gold Mine Project, were reviewed. Dust in ambient air was monitored at the site from October 8, 2010 to October 12, 2010 at five locations at the Kitsault Mine Project. The overall 24-hour average concentrations were 3.5 µg/m$^3$ for TSP, 2.5 µg/m$^3$ for $PM_{10}$ and 2.3 µg/m$^3$ for $PM_{2.5}$.(AMEC 2011). In July 2005, a total of 29 samples were collected for $PM_{10}$ and $PM_{2.5}$ at Galore Creek Copper-Gold-Silver Project. Results for 24-hour $PM_{10}$ concentration ranged from 1.4 to 5.6 µg/m$^3$ with an average of 3.4 µg/m$^3$ while results for 24-hour $PM_{2.5}$ concentration ranged from 0.8 to 2.6 µg/m$^3$ with an average of 1.3 µg/m$^3$ (Rescan 2006).

# References

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# References

Definitions of the acronyms and abbreviations used in this reference list can be found in the Glossary and Abbreviations section.


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# Appendix A

## 2012 Brucejack Dustfall Results

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RESCAN ENVIRONMENTAL SERVICES
ATTN: Derek Shaw
Sixth Floor
1111 West Hastings Street
Vancouver BC V6E 2J3

Date Received: 19-JUL-12
Report Date: 30-JUL-12 13:35 (MT)
Version: FINAL

Client Phone: 604-689-9460

# Certificate of Analysis

**Lab Work Order #: L1181247**

Project P.O. #: NOT SUBMITTED
Job Reference: 1042-008-12-98
C of C Numbers: 10-247233
Legal Site Desc:

Amber Springer
Account Manager

# ALS ENVIRONMENTAL ANALYTICAL REPORT

| Grouping | Analyte | L1181247-1 DUSTFALL 12-JUL-12 14:40 DF-1 | L1181247-2 DUSTFALL 12-JUL-12 12:25 DF-2 | L1181247-3 DUSTFALL 11-JUL-12 18:15 DF-3 | L1181247-4 DUSTFALL 12-JUL-12 09:00 DF-4 | L1181247-5 DUSTFALL 12-JUL-12 10:00 DF-5 |
|---|---|---|---|---|---|---|
| **DUSTFALL** | | | | | | |
| **Particulates** | Total Dustfall (mg/dm2.day) | 1.27 | 1.22 | 0.78 | 0.33 | 0.22 |
| | Total Insoluble Dustfall (mg/dm2.day) | 0.92 | 0.82 | 0.42 | <0.10 | <0.10 |
| | Total Soluble Dustfall (mg/dm2.day) | 0.36 | 0.40 | 0.36 | 0.29 | 0.19 |
| **Anions and Nutrients** | Ammonia, Total (as N) (mg/dm2.day) | 0.00108 | 0.00474 | 0.00232 | <0.00038 | <0.00040 |
| | Chloride (Cl) (mg/dm2.day) | 0.0475 | 0.035 | 0.0452 | 0.0492 | 0.0402 |
| | Nitrate (as N) (mg/dm2.day) | 0.00110 | 0.00086 | 0.00108 | 0.00195 | 0.00216 |
| | Sulfate (SO4) (mg/dm2.day) | 0.0098 | <0.010 | <0.0063 | <0.0076 | <0.0080 |
| **Metals** | Aluminum (Al)-Total (mg/dm2.day) | 0.000125 | 0.000348 | 0.0000908 | 0.000423 | 0.000280 |
| | Antimony (Sb)-Total (mg/dm2.day) | 0.00000013 | <0.0000019 | <0.00000023 | <0.0000016 | <0.0000018 |
| | Arsenic (As)-Total (mg/dm2.day) | 0.00000021 | 0.0000025 | 0.00000024 | 0.0000033 | 0.0000039 |
| | Barium (Ba)-Total (mg/dm2.day) | 0.00000202 | 0.0000250 | 0.00000499 | 0.0000124 | 0.0000118 |
| | Beryllium (Be)-Total (mg/dm2.day) | <0.00000060 | <0.0000095 | <0.0000011 | <0.0000081 | <0.0000091 |
| | Bismuth (Bi)-Total (mg/dm2.day) | <0.00000060 | <0.0000095 | <0.0000011 | <0.0000081 | <0.0000091 |
| | Boron (B)-Total (mg/dm2.day) | <0.000012 | <0.00019 | <0.000023 | <0.00016 | <0.00018 |
| | Cadmium (Cd)-Total (mg/dm2.day) | <0.000000060 | <0.00000095 | <0.00000011 | <0.00000081 | <0.00000091 |
| | Calcium (Ca)-Total (mg/dm2.day) | 0.000150 | 0.0173 | 0.0154 | 0.00122 | <0.00091 |
| | Chromium (Cr)-Total (mg/dm2.day) | <0.00000060 | <0.0000095 | <0.0000011 | <0.0000081 | <0.0000091 |
| | Cobalt (Co)-Total (mg/dm2.day) | <0.00000012 | <0.0000019 | <0.00000023 | <0.0000016 | <0.0000018 |
| | Copper (Cu)-Total (mg/dm2.day) | <0.000019 DLB | <0.00023 DLB | <0.000027 DLB | 0.000888 | <0.00016 DLB |
| | Iron (Fe)-Total (mg/dm2.day) | 0.000235 | 0.00071 | 0.000135 | 0.00063 | <0.00054 |
| | Lead (Pb)-Total (mg/dm2.day) | 0.000000865 | <0.0000047 DLB | <0.00000046 DLB | 0.0000184 | <0.0000072 DLB |
| | Lithium (Li)-Total (mg/dm2.day) | <0.0000060 | <0.000095 | <0.000011 | <0.000081 | <0.000091 |
| | Magnesium (Mg)-Total (mg/dm2.day) | 0.00014 | 0.0061 | 0.00026 | <0.0016 | <0.0018 |
| | Manganese (Mn)-Total (mg/dm2.day) | 0.0000151 | 0.000794 | 0.0000177 | 0.0000663 | 0.0000452 |
| | Mercury (Hg)-Total (mg/dm2.day) | <0.000000060 | <0.00000095 | <0.00000011 | <0.00000081 | <0.00000091 |
| | Molybdenum (Mo)-Total (mg/dm2.day) | 0.000000061 | <0.00000095 | <0.00000011 | <0.00000081 | <0.00000091 |
| | Nickel (Ni)-Total (mg/dm2.day) | <0.0000012 DLB | <0.000019 DLB | <0.0000011 | <0.0000081 | <0.0000091 |
| | Phosphorus (P)-Total (mg/dm2.day) | 0.00054 | 0.0116 | 0.00119 | <0.0049 | <0.0054 |
| | Potassium (K)-Total (mg/dm2.day) | <0.0024 | <0.038 | <0.0046 | <0.032 | <0.036 |
| | Selenium (Se)-Total (mg/dm2.day) | <0.0000012 | <0.000019 | <0.0000023 | <0.000016 | <0.000018 |
| | Silicon (Si)-Total (mg/dm2.day) | 0.000118 | <0.00095 | 0.00019 | <0.00081 | <0.00091 |
| | Silver (Ag)-Total (mg/dm2.day) | 0.000000034 | 0.00000038 | 0.000000037 | 0.00000021 | <0.00000018 |
| | Sodium (Na)-Total (mg/dm2.day) | <0.0024 | <0.038 | <0.0046 | <0.032 | <0.036 |
| | Strontium (Sr)-Total (mg/dm2.day) | 0.00000076 | 0.000140 | 0.0000297 | 0.0000053 | 0.0000033 |
| | Thallium (Tl)-Total (mg/dm2.day) | <0.00000012 | <0.0000019 | <0.00000023 | <0.0000016 | <0.0000018 |
| | Tin (Sn)-Total (mg/dm2.day) | <0.00000012 | <0.0000019 | <0.00000023 | <0.0000016 | <0.0000018 |
| | Titanium (Ti)-Total (mg/dm2.day) | <0.000012 | <0.00019 | <0.000023 | <0.00016 | <0.00018 |

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

# ALS ENVIRONMENTAL ANALYTICAL REPORT

| | | | | | | |
|---|---|---|---|---|---|---|
| | **Sample ID** | L1181247-6 | | | | |
| | **Description** | DUSTFALL | | | | |
| | **Sampled Date** | 12-JUL-12 | | | | |
| | **Sampled Time** | 08:50 | | | | |
| | **Client ID** | DF-6 | | | | |
| **Grouping** | **Analyte** | | | | | |
| **DUSTFALL** | | | | | | |
| **Particulates** | Total Dustfall (mg/dm2.day) | 0.29 | | | | |
| | Total Insoluble Dustfall (mg/dm2.day) | <0.10 | | | | |
| | Total Soluble Dustfall (mg/dm2.day) | 0.28 | | | | |
| **Anions and Nutrients** | Ammonia, Total (as N) (mg/dm2.day) | <0.00063 | | | | |
| | Chloride (Cl) (mg/dm2.day) | 0.040 | | | | |
| | Nitrate (as N) (mg/dm2.day) | 0.00243 | | | | |
| | Sulfate (SO4) (mg/dm2.day) | <0.013 | | | | |
| **Metals** | Aluminum (Al)-Total (mg/dm2.day) | 0.000424 | | | | |
| | Antimony (Sb)-Total (mg/dm2.day) | <0.0000031 | | | | |
| | Arsenic (As)-Total (mg/dm2.day) | <0.0000031 | | | | |
| | Barium (Ba)-Total (mg/dm2.day) | 0.0000115 | | | | |
| | Beryllium (Be)-Total (mg/dm2.day) | <0.000015 | | | | |
| | Bismuth (Bi)-Total (mg/dm2.day) | <0.000015 | | | | |
| | Boron (B)-Total (mg/dm2.day) | <0.00031 | | | | |
| | Cadmium (Cd)-Total (mg/dm2.day) | <0.0000015 | | | | |
| | Calcium (Ca)-Total (mg/dm2.day) | <0.0015 | | | | |
| | Chromium (Cr)-Total (mg/dm2.day) | <0.000015 | | | | |
| | Cobalt (Co)-Total (mg/dm2.day) | <0.0000031 | | | | |
| | Copper (Cu)-Total (mg/dm2.day) | <0.000062 DLB | | | | |
| | Iron (Fe)-Total (mg/dm2.day) | <0.00093 | | | | |
| | Lead (Pb)-Total (mg/dm2.day) | <0.0000062 DLB | | | | |
| | Lithium (Li)-Total (mg/dm2.day) | <0.00015 | | | | |
| | Magnesium (Mg)-Total (mg/dm2.day) | <0.0031 | | | | |
| | Manganese (Mn)-Total (mg/dm2.day) | 0.0000641 | | | | |
| | Mercury (Hg)-Total (mg/dm2.day) | <0.0000015 | | | | |
| | Molybdenum (Mo)-Total (mg/dm2.day) | <0.0000015 | | | | |
| | Nickel (Ni)-Total (mg/dm2.day) | <0.000015 | | | | |
| | Phosphorus (P)-Total (mg/dm2.day) | <0.0093 | | | | |
| | Potassium (K)-Total (mg/dm2.day) | <0.062 | | | | |
| | Selenium (Se)-Total (mg/dm2.day) | <0.000031 | | | | |
| | Silicon (Si)-Total (mg/dm2.day) | <0.0015 | | | | |
| | Silver (Ag)-Total (mg/dm2.day) | <0.00000031 | | | | |
| | Sodium (Na)-Total (mg/dm2.day) | <0.062 | | | | |
| | Strontium (Sr)-Total (mg/dm2.day) | 0.0000040 | | | | |
| | Thallium (Tl)-Total (mg/dm2.day) | <0.0000031 | | | | |
| | Tin (Sn)-Total (mg/dm2.day) | <0.0000031 | | | | |
| | Titanium (Ti)-Total (mg/dm2.day) | <0.00031 | | | | |

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

# ALS ENVIRONMENTAL ANALYTICAL REPORT

| | Sample ID | L1181247-1 | L1181247-2 | L1181247-3 | L1181247-4 | L1181247-5 |
|---|---|---|---|---|---|---|
| | Description | DUSTFALL | DUSTFALL | DUSTFALL | DUSTFALL | DUSTFALL |
| | Sampled Date | 12-JUL-12 | 12-JUL-12 | 11-JUL-12 | 12-JUL-12 | 12-JUL-12 |
| | Sampled Time | 14:40 | 12:25 | 18:15 | 09:00 | 10:00 |
| | Client ID | DF-1 | DF-2 | DF-3 | DF-4 | DF-5 |
| **Grouping** | **Analyte** | | | | | |
| **DUSTFALL** | | | | | | |
| **Metals** | Uranium (U)-Total (mg/dm2.day) | <0.000000012 | <0.00000019 | <0.000000023 | <0.00000016 | <0.00000018 |
| | Vanadium (V)-Total (mg/dm2.day) | <0.0000012 | <0.000019 | <0.0000023 | <0.000016 | <0.000018 |
| | Zinc (Zn)-Total (mg/dm2.day) | 0.0000078 | 0.000150 | 0.0000094 | 0.000075 | <0.000054 |

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

# ALS ENVIRONMENTAL ANALYTICAL REPORT

| | | | | | | |
|---|---|---|---|---|---|---|
| | **Sample ID** | L1181247-6 | | | | |
| | **Description** | DUSTFALL | | | | |
| | **Sampled Date** | 12-JUL-12 | | | | |
| | **Sampled Time** | 08:50 | | | | |
| | **Client ID** | DF-6 | | | | |
| **Grouping** | **Analyte** | | | | | |
| **DUSTFALL** | | | | | | |
| **Metals** | Uranium (U)-Total (mg/dm2.day) | <0.00000031 | | | | |
| | Vanadium (V)-Total (mg/dm2.day) | <0.000031 | | | | |
| | Zinc (Zn)-Total (mg/dm2.day) | <0.000093 | | | | |

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

# Reference Information

**Qualifiers for Individual Parameters Listed:**

| Qualifier | Description |
|---|---|
| DLB | Detection limit was raised due to detection of analyte at comparable level in Method Blank. |

**Test Method References:**

| ALS Test Code | Matrix | Test Description | Method Reference** |
|---|---|---|---|
| **CL-IC-VA** | Dustfall | Dustfall Chloride by Ion Chromatography | BC LAB MAN. - PART. - SOLUBLE - ANIONS |

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The chloride analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

| | | | |
|---|---|---|---|
| **DUSTFALLS-COM-DM2-VA** | Dustfall | Combined Dustfalls-Total, soluble, insol | BCMOE PARTICULATE |

This analysis is carried out using procedures modified from British Columbia Environmental Manual "Particulate."
Particulates or Dustfall are determined gravimetrically. Total Insoluble Dustfall is determined by filtering a sample through a 0.45 um membrane filter and drying the filter at 104 degrees celsius. Total Soluble Dustfall is determined by evaporating the filtrate to dryness at 104 degrees celsius. The Total Dustfall is the sum of Insoluble Dustfall and the Soluble Dustfall.

| | | | |
|---|---|---|---|
| **HG-DUST(DM2-CVAFS-VA** | Dustfall | Total Mercury in Dustfalls by CVAFS | EPA 245.7 |

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

| | | | |
|---|---|---|---|
| **MET-DUST(DM2)-ICP-VA** | Dustfall | Total Metals in Dustfalls by ICPOES | EPA 6010B |

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

| | | | |
|---|---|---|---|
| **MET-DUST(DM2)-MS-VA** | Dustfall | Total Metals in Dustfalls by ICPMS | EPA 6020A |

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

| | | | |
|---|---|---|---|
| **NH3-F-VA** | Dustfall | Dustfall Ammonia by Fluorescence | BC LAB MAN. - PART. - SOLUBLE - ANIONS |

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The ammonia analysis is specifcially carried out using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

| | | | |
|---|---|---|---|
| **NO3-IC-VA** | Dustfall | Dustfall Nitrate by Ion Chromatography | BC LAB MAN. - PART. - SOLUBLE - ANIONS |

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The nitrate analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

| | | | |
|---|---|---|---|
| **SO4-IC-VA** | Dustfall | Dustfall Sulphate by Ion Chromatography | BC LAB MAN. - PART. - SOLUBLE - ANIONS |

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The sulphate analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

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

| Laboratory Definition Code | Laboratory Location |
|---|---|
| VA | ALS ENVIRONMENTAL - VANCOUVER, BC, CANADA |

**Chain of Custody Numbers:**

10-247233

# Reference Information

**GLOSSARY OF REPORT TERMS**

*Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.*
*mg/kg - milligrams per kilogram based on dry weight of sample.*
*mg/kg wwt - milligrams per kilogram based on wet weight of sample.*
*mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.*
*mg/L - milligrams per litre.*
*< - Less than.*
*D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).*
*N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.*
*UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.*
*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*

10-247233

ALS Environmental

*L1181247-COFC*

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

Page 1 of 1

| Report To | Format / Distribution | Service Request: (Rush subject to availability - Contact ALS to confirm TAT) |
|---|---|---|
| Company: RESCAN | Standard: ✓ Other (specify): | ✓ Regular (Standard Turnaround Times - Business Days) |
| Contact: DEREK SHAW | Select: PDF ✓ Excel ✓ Digital Fax | Priority (2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT |
| Address: 6TH FLOOR, 1111 W. HASTINGS ST. VANCOUVER BC V6E2J3 | Email 1: dshaw@rescan.com | Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT |
| Phone: (604) 689-9488 Fax: | Email 2: | Same Day or Weekend Emergency - Contact ALS to confirm TAT |

| Invoice To | Client / Project Information |
|---|---|
| Same as Report ? (circle) Yes or No (if No, provide details) | Job #: 1042-008-12-98 |
| Copy of Invoice with Report? (circle) Yes or No | PO / AFE: |
| Company: | LSD: |
| Contact: | |
| Address: | Quote #: |
| Phone: Fax: | |

Lab Work Order # (lab use only): L1181247

ALS Contact: AMBER SPRINGER

Sampler: CHRIS DOUGHTY

Analysis Request (Indicate Filtered or Preserved, F/P)

| Sample # | Sample Identification (This description will appear on the report) | Date (dd-mmm-yy) | Time (hh:mm) | Sample Type | TOTAL PARTICULATE | SOLUBLE PARTICULATE | INSOLUBLE PARTICULATE | SULPHATE | NITRATE | $NH_3, NH_4^+$ | Cl | TOTAL METALS | $Mg^+$ | $Ca^+$ | $K^+$ | | Number of Containers |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DF-1 -TP | 12 JULY 12 | 14:40 | DUSTFALL | X | X | X | X | X | X | X | | | | | | |
| | DF-1 -TM | 12 JULY 12 | 14:40 | " | | | | | | | | X | X | X | X | | |
| | DF-2 -TP | 12 JULY 12 | 12:25 | " | X | X | X | X | X | X | X | | | | | | |
| | DF-2 -TM (SAMPLE FELL OVER) | 12 JULY 12 | 12:25 | " | | | | | | | | X | X | X | X | | |
| | DF-3 -TP | 11 JULY 12 | 18:15 | " | X | X | X | X | X | X | X | | | | | | |
| | DF-3 -TM | 11 JULY 12 | 18:15 | " | | | | | | | | X | X | X | X | | |
| | DF-4 -TP | 12 JULY 12 | 09:00 | " | X | X | X | X | X | X | X | | | | | | |
| | DF-4 -TM | 12 JULY 12 | 09:00 | " | | | | | | | | X | X | X | X | | |
| | DF-5 -TP | 12 JULY 12 | 10:00 | " | X | X | X | X | X | X | X | | | | | | |
| | DF-5 -TM | 12 JULY 12 | 10:00 | " | | | | | | | | X | X | X | X | | |
| | DF-6 -TP | 12 JULY 12 | 08:50 | " | X | X | X | X | X | X | X | | | | | | |
| | DF-6 -TM | 12 JULY 12 | 08:50 | " | | | | | | | | X | X | X | X | | |

Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1: Natural/ETC) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

| SHIPMENT RELEASE (client use) | | | SHIPMENT RECEPTION (lab use only) | | | | SHIPMENT VERIFICATION (lab use only) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Released by: | Date: | Time: | Received by: | Date: | Time: | Temperature: | Verified by: | Date: | Time: | Observations: Yes / No ? If Yes add SIF |
| CHRIS DOUGHTY | 17 JUL 12 | 10:00 | Brittany | July 19 | 10:35 | 21.4 °C | | | | |

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

GENF 18.01 Front

RESCAN ENVIRONMENTAL SERVICES
ATTN: Daniel Casanova
Sixth Floor
1111 West Hastings Street
Vancouver BC V6E 2J3

Date Received: 13-AUG-12
Report Date: 22-AUG-12 16:25 (MT)
Version: FINAL

Client Phone: 604-689-9460

# Certificate of Analysis

**Lab Work Order #: L1192734**

Project P.O. #: NOT SUBMITTED
Job Reference: 1042-008-12
C of C Numbers:
Legal Site Desc:

Amber Springer
Account Manager

# ALS ENVIRONMENTAL ANALYTICAL REPORT

| Grouping | Analyte | L1192734-1 DUSTFALL 08-AUG-12 12:35 DF1 | L1192734-2 DUSTFALL 08-AUG-12 12:30 DF2 | L1192734-3 DUSTFALL 08-AUG-12 12:00 DF3 | L1192734-4 DUSTFALL 07-AUG-12 17:20 DF4 | L1192734-5 DUSTFALL 07-AUG-12 17:10 DF5 |
|---|---|---|---|---|---|---|
| **DUSTFALL** | | | | | | |
| **Particulates** | Total Dustfall (mg/dm2.day) | 0.66 | 0.55 | 0.54 | 0.25 | 0.19 |
| | Total Insoluble Dustfall (mg/dm2.day) | 0.33 | 0.13 | 0.11 | <0.11 | <0.11 |
| | Total Soluble Dustfall (mg/dm2.day) | 0.33 | 0.42 | 0.42 | 0.22 | 0.17 |
| **Anions and Nutrients** | Ammonia, Total (as N) (mg/dm2.day) | 0.00039 | 0.00143 | 0.00113 | <0.00015 | <0.00014 |
| | Chloride (Cl) (mg/dm2.day) | 0.0586 | 0.0567 | 0.0529 | 0.057 | 0.056 |
| | Nitrate (as N) (mg/dm2.day) | 0.00194 | 0.00112 | 0.00125 | 0.00102 | 0.00126 |
| | Sulfate (SO4) (mg/dm2.day) | <0.0074 | <0.0079 | <0.0039 | <0.015 | <0.014 |
| **Metals** | Aluminum (Al)-Total (mg/dm2.day) | 0.000947 | 0.000328 | 0.000389 | <0.00032 DLB | <0.00054 DLB |
| | Antimony (Sb)-Total (mg/dm2.day) | <0.0000013 | <0.0000013 | <0.0000012 | <0.0000027 | <0.0000030 |
| | Arsenic (As)-Total (mg/dm2.day) | 0.0000019 | 0.0000017 | 0.0000013 | 0.0000034 | <0.0000030 |
| | Barium (Ba)-Total (mg/dm2.day) | 0.0000301 | 0.0000159 | 0.0000114 | <0.000011 DLB | <0.0000091 DLB |
| | Beryllium (Be)-Total (mg/dm2.day) | <0.0000064 | <0.0000064 | <0.0000062 | <0.000013 | <0.000015 |
| | Bismuth (Bi)-Total (mg/dm2.day) | <0.0000064 | <0.0000064 | <0.0000062 | <0.000013 | <0.000015 |
| | Boron (B)-Total (mg/dm2.day) | <0.00013 | <0.00013 | <0.00012 | <0.00027 | <0.00030 |
| | Cadmium (Cd)-Total (mg/dm2.day) | <0.00000064 | <0.00000064 | <0.00000062 | <0.0000013 | <0.0000015 |
| | Calcium (Ca)-Total (mg/dm2.day) | 0.00134 | 0.00102 | 0.00092 | <0.0013 | <0.0015 |
| | Chromium (Cr)-Total (mg/dm2.day) | <0.0000064 | <0.0000064 | <0.0000062 | <0.000013 | <0.000015 |
| | Cobalt (Co)-Total (mg/dm2.day) | <0.0000013 | <0.0000013 | <0.0000012 | <0.0000027 | <0.0000030 |
| | Copper (Cu)-Total (mg/dm2.day) | <0.00019 DLB | 0.000303 | 0.000476 | <0.000054 DLB | <0.00011 DLB |
| | Iron (Fe)-Total (mg/dm2.day) | 0.00115 | 0.00060 | 0.00058 | <0.00081 | <0.00091 |
| | Lead (Pb)-Total (mg/dm2.day) | 0.0000107 | 0.00000925 | <0.0000068 DLB | <0.0000081 DLB | <0.0000091 DLB |
| | Lithium (Li)-Total (mg/dm2.day) | <0.000064 | <0.000064 | <0.000062 | <0.00013 | <0.00015 |
| | Magnesium (Mg)-Total (mg/dm2.day) | <0.0013 | <0.0013 | <0.0012 | <0.0027 | <0.0030 |
| | Manganese (Mn)-Total (mg/dm2.day) | 0.000256 | 0.000125 | 0.0000574 | 0.0000402 | 0.0000322 |
| | Mercury (Hg)-Total (mg/dm2.day) | <0.00000064 | <0.00000064 | <0.00000062 | <0.0000013 | <0.0000015 |
| | Molybdenum (Mo)-Total (mg/dm2.day) | <0.00000064 | <0.00000064 | <0.00000062 | <0.0000013 | 0.0000030 |
| | Nickel (Ni)-Total (mg/dm2.day) | <0.0000064 | <0.0000064 | 0.0000131 | <0.000013 | 0.000046 |
| | Phosphorus (P)-Total (mg/dm2.day) | <0.0038 | <0.0038 | <0.0037 | <0.0081 | <0.0091 |
| | Potassium (K)-Total (mg/dm2.day) | <0.026 | <0.026 | <0.025 | <0.054 | <0.060 |
| | Selenium (Se)-Total (mg/dm2.day) | <0.000013 | <0.000013 | <0.000012 | <0.000027 | <0.000030 |
| | Silicon (Si)-Total (mg/dm2.day) | 0.00085 | <0.00064 | <0.00062 | <0.0013 | <0.0015 |
| | Silver (Ag)-Total (mg/dm2.day) | <0.00000013 | <0.00000013 | <0.00000012 | <0.00000027 | <0.00000030 |
| | Sodium (Na)-Total (mg/dm2.day) | <0.026 | <0.026 | <0.025 | <0.054 | <0.060 |
| | Strontium (Sr)-Total (mg/dm2.day) | 0.0000059 | 0.0000059 | 0.0000038 | <0.0000027 | <0.0000030 |
| | Thallium (Tl)-Total (mg/dm2.day) | <0.0000013 | <0.0000013 | <0.0000012 | <0.0000027 | <0.0000030 |
| | Tin (Sn)-Total (mg/dm2.day) | <0.0000013 | <0.0000013 | <0.0000012 | <0.0000027 | <0.0000030 |
| | Titanium (Ti)-Total (mg/dm2.day) | <0.00013 | <0.00013 | <0.00012 | <0.00027 | <0.00030 |

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

# ALS ENVIRONMENTAL ANALYTICAL REPORT

| | | | | | | |
|---|---|---|---|---|---|---|
| | **Sample ID** | L1192734-6 | | | | |
| | **Description** | DUSTFALL | | | | |
| | **Sampled Date** | 07-AUG-12 | | | | |
| | **Sampled Time** | 17:30 | | | | |
| | **Client ID** | DF6 | | | | |
| **Grouping** | **Analyte** | | | | | |
| **DUSTFALL** | | | | | | |
| **Particulates** | Total Dustfall (mg/dm2.day) | 0.23 | | | | |
| | Total Insoluble Dustfall (mg/dm2.day) | <0.11 | | | | |
| | Total Soluble Dustfall (mg/dm2.day) | 0.18 | | | | |
| **Anions and Nutrients** | Ammonia, Total (as N) (mg/dm2.day) | 0.00025 | | | | |
| | Chloride (Cl) (mg/dm2.day) | 0.059 | | | | |
| | Nitrate (as N) (mg/dm2.day) | 0.00078 | | | | |
| | Sulfate (SO4) (mg/dm2.day) | <0.015 | | | | |
| **Metals** | Aluminum (Al)-Total (mg/dm2.day) | <0.00028 DLB | | | | |
| | Antimony (Sb)-Total (mg/dm2.day) | <0.0000031 | | | | |
| | Arsenic (As)-Total (mg/dm2.day) | <0.0000031 | | | | |
| | Barium (Ba)-Total (mg/dm2.day) | <0.000014 DLB | | | | |
| | Beryllium (Be)-Total (mg/dm2.day) | <0.000015 | | | | |
| | Bismuth (Bi)-Total (mg/dm2.day) | <0.000015 | | | | |
| | Boron (B)-Total (mg/dm2.day) | <0.00031 | | | | |
| | Cadmium (Cd)-Total (mg/dm2.day) | <0.0000015 | | | | |
| | Calcium (Ca)-Total (mg/dm2.day) | <0.0015 | | | | |
| | Chromium (Cr)-Total (mg/dm2.day) | <0.000015 | | | | |
| | Cobalt (Co)-Total (mg/dm2.day) | <0.0000031 | | | | |
| | Copper (Cu)-Total (mg/dm2.day) | <0.00017 DLB | | | | |
| | Iron (Fe)-Total (mg/dm2.day) | <0.00093 | | | | |
| | Lead (Pb)-Total (mg/dm2.day) | <0.0000093 DLB | | | | |
| | Lithium (Li)-Total (mg/dm2.day) | <0.00015 | | | | |
| | Magnesium (Mg)-Total (mg/dm2.day) | <0.0031 | | | | |
| | Manganese (Mn)-Total (mg/dm2.day) | 0.000100 | | | | |
| | Mercury (Hg)-Total (mg/dm2.day) | <0.0000015 | | | | |
| | Molybdenum (Mo)-Total (mg/dm2.day) | <0.0000015 | | | | |
| | Nickel (Ni)-Total (mg/dm2.day) | <0.000015 | | | | |
| | Phosphorus (P)-Total (mg/dm2.day) | <0.0093 | | | | |
| | Potassium (K)-Total (mg/dm2.day) | <0.062 | | | | |
| | Selenium (Se)-Total (mg/dm2.day) | <0.000031 | | | | |
| | Silicon (Si)-Total (mg/dm2.day) | <0.0015 | | | | |
| | Silver (Ag)-Total (mg/dm2.day) | <0.00000031 | | | | |
| | Sodium (Na)-Total (mg/dm2.day) | <0.062 | | | | |
| | Strontium (Sr)-Total (mg/dm2.day) | <0.0000031 | | | | |
| | Thallium (Tl)-Total (mg/dm2.day) | <0.0000031 | | | | |
| | Tin (Sn)-Total (mg/dm2.day) | <0.0000031 | | | | |
| | Titanium (Ti)-Total (mg/dm2.day) | <0.00031 | | | | |

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

# ALS ENVIRONMENTAL ANALYTICAL REPORT

| Grouping | Analyte | L1192734-1 DUSTFALL 08-AUG-12 12:35 DF1 | L1192734-2 DUSTFALL 08-AUG-12 12:30 DF2 | L1192734-3 DUSTFALL 08-AUG-12 12:00 DF3 | L1192734-4 DUSTFALL 07-AUG-12 17:20 DF4 | L1192734-5 DUSTFALL 07-AUG-12 17:10 DF5 |
|---|---|---|---|---|---|---|
| **Sample ID / Description / Sampled Date / Sampled Time / Client ID** | | | | | | |
| **DUSTFALL** | | | | | | |
| **Metals** | Uranium (U)-Total (mg/dm2.day) | <0.00000013 | <0.00000013 | <0.00000012 | <0.00000027 | <0.00000030 |
| | Vanadium (V)-Total (mg/dm2.day) | <0.000013 | <0.000013 | <0.000012 | <0.000027 | <0.000030 |
| | Zinc (Zn)-Total (mg/dm2.day) | 0.000091 | 0.000060 | 0.000093 | <0.000081 | <0.000091 |

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

# ALS ENVIRONMENTAL ANALYTICAL REPORT

| | | | | | | |
|---|---|---|---|---|---|---|
| | **Sample ID** | L1192734-6 | | | | |
| | **Description** | DUSTFALL | | | | |
| | **Sampled Date** | 07-AUG-12 | | | | |
| | **Sampled Time** | 17:30 | | | | |
| | **Client ID** | DF6 | | | | |
| **Grouping** | **Analyte** | | | | | |
| **DUSTFALL** | | | | | | |
| **Metals** | Uranium (U)-Total (mg/dm2.day) | <0.00000031 | | | | |
| | Vanadium (V)-Total (mg/dm2.day) | <0.000031 | | | | |
| | Zinc (Zn)-Total (mg/dm2.day) | <0.000093 | | | | |

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

# Reference Information

**Qualifiers for Individual Parameters Listed:**

| Qualifier | Description |
|---|---|
| DLB | Detection limit was raised due to detection of analyte at comparable level in Method Blank. |

**Test Method References:**

| ALS Test Code | Matrix | Test Description | Method Reference** |
|---|---|---|---|
| **CL-IC-VA** | Dustfall | Dustfall Chloride by Ion Chromatography | BC LAB MAN. - PART. - SOLUBLE - ANIONS |

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The chloride analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

| | | | |
|---|---|---|---|
| **DUSTFALLS-COM-DM2-VA** | Dustfall | Combined Dustfalls-Total, soluble, insol | BCMOE PARTICULATE |

This analysis is carried out using procedures modified from British Columbia Environmental Manual "Particulate."
Particulates or Dustfall are determined gravimetrically. Total Insoluble Dustfall is determined by filtering a sample through a 0.45 um membrane filter and drying the filter at 104 degrees celsius. Total Soluble Dustfall is determined by evaporating the filtrate to dryness at 104 degrees celsius. The Total Dustfall is the sum of Insoluble Dustfall and the Soluble Dustfall.

| | | | |
|---|---|---|---|
| **HG-DUST(DM2-CVAFS-VA** | Dustfall | Total Mercury in Dustfalls by CVAFS | EPA 245.7 |

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

| | | | |
|---|---|---|---|
| **MET-DUST(DM2)-ICP-VA** | Dustfall | Total Metals in Dustfalls by ICPOES | EPA 6010B |

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

| | | | |
|---|---|---|---|
| **MET-DUST(DM2)-MS-VA** | Dustfall | Total Metals in Dustfalls by ICPMS | EPA 6020A |

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

| | | | |
|---|---|---|---|
| **NH3-F-VA** | Dustfall | Dustfall Ammonia by Fluorescence | BC LAB MAN. - PART. - SOLUBLE - ANIONS |

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The ammonia analysis is specifcially carried out using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

| | | | |
|---|---|---|---|
| **NO3-IC-VA** | Dustfall | Dustfall Nitrate by Ion Chromatography | BC LAB MAN. - PART. - SOLUBLE - ANIONS |

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The nitrate analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

| | | | |
|---|---|---|---|
| **SO4-IC-VA** | Dustfall | Dustfall Sulphate by Ion Chromatography | BC LAB MAN. - PART. - SOLUBLE - ANIONS |

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The sulphate analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

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

| Laboratory Definition Code | Laboratory Location |
|---|---|
| VA | ALS ENVIRONMENTAL - VANCOUVER, BC, CANADA |

**Chain of Custody Numbers:**

# Reference Information

**GLOSSARY OF REPORT TERMS**

*Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.*
*mg/kg - milligrams per kilogram based on dry weight of sample.*
*mg/kg wwt - milligrams per kilogram based on wet weight of sample.*
*mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.*
*mg/L - milligrams per litre.*
*< - Less than.*
*D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).*
*N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.*
*UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.*
*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*

Website: www.rescan.com
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**Vancouver Office:**
Rescan Environmental Services Ltd.
6th Floor, 1111 West Hastings Street
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Tel: (604) 689-9460 Fax: (604) 687-4277

**Yellowknife Office:**
Rescan Northern Operations
Suite 908-5201 50th Avenue
Yellowknife, NT X1A 3S9
Tel: (867) 920-2090 Fax: (867) 920-2015

**Seattle Office:**
Rescan Consultants Inc.
Suite 3200,1001 Fourth Avenue Plaza
Seattle, WA 98154, USA
Tel: (206) 726-2145 Fax: (206) 382-9648

# CHAIN OF CUSTODY RECORD

**PROJECT NAME:** Brucejack (Pretivm) **PROJECT #:** ~~1042-008-13-98~~

**FIELD SCIENTISTS AND/OR ENGINEERS:** (*Print Name and Sign*) 1042-008-12
Calvin Pin

L1192734

**Laboratory Contact:**

**Laboratory Address:**

**Rescan Contact:** Daniel Casanova

| | STATION NUMBER | DATE | TIME | COMP. SAMPLE | GRAB SAMPLE | SAMPLE IDENTIFICATION (DEPTH, REPLICATE) | NUMBER OF CONTAINERS: | |
|---|---|---|---|---|---|---|---|---|
| 1 | DF1 | 8/Aug/12 | 12:35PM | | | DF-1A | 1 | In cooler 1 of 2 |
| 2 | DF1 | 8/Aug/12 | 12:35PM | | | DF-1B | 1 | In cooler 1 of 2 |
| 3 | DF2 | 8/Aug/12 | 12:30PM | | | DF-2A | 1 | In cooler 1 of 2 |
| 4 | DF2 | 8/Aug/12 | 12:30PM | | | DF-2B | 1 | In cooler 1 of 2 |
| 5 | DF3 | 8/Aug/12 | 12:00PM | | | DF-3A | 1 | In cooler 1 of 2 |
| 6 | DF3 | 8/Aug/12 | 12:00PM | | | DF-3B | 1 | In cooler 1 of 2 |
| 7 | ~~DF4~~ | | | | | | | |
| 8 | DF4 | 7/Aug/12 | 5:30PM | | | DF-4A | 1 | In cooler 1 of 2 |
| 9 | DF4 | 7/Aug/12 | 5:30PM | | | DF-4B | 1 | In cooler 1 of 2 |
| 10 | DF5 | 7/Aug/12 | 5:10PM | | | DF-5A | 1 | In cooler 2 of 2 |
| 11 | DF5 | 7/Aug/12 | 5:10PM | | | DF-5B | 1 | In cooler 2 of 2 |
| 12 | DF6 | 7/Aug/12 | 5:30PM | | | DF-6A | 1 | In cooler 2 of 2 |
| 13 | DF6 | 7/Aug/12 | 5:30PM | | | DF-6B | 1 | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |
| 16 | | | | | | | | |
| 17 | | | | | | | | |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| 21 | | | | | | | | |


| Received by: | Date/Time | Relinquished by: | Date/Time | |
|---|---|---|---|---|
| Company: | D / M / Y | Company: | D / M / Y | Routine Analysis: ☐ Rush Analysis: ☐ |
| Name: (Print and Sign) | / / | Name: Britt (Print and Sign) 11.3°C | 13 08 12 10:30 | Remarks: RESCAN COPY |
| **Received by:** | **Date/Time** | **Received for Laboratory by:** | **Date/Time** | |
| Company: | D / M / Y | Company: | D / M / Y | |
| Name: (Print and Sign) | / / | Name: (Print and Sign) | / / | Page ____ of ____ |

# Sample Receipt Confirmation

## Report Distribution:

**Company Name:** RESCAN ENVIRONMENTAL SERVICES
**Contact:** NEW CONTACT
**Address:** Sixth Floor, 1111 West Hastings Street
Vancouver, BC, V6E 2J3
**Phone:** 604-689-9460
**Fax:** 604-687-4277
**Email:** achateauvert@rescan.com
trobb@rescan.com
mhenry@rescan.com
**Report Name:** CROSSTAB_ALS
**Digital Type:** --
**Digital Email:** --
**Distribution:** Hard Copy: Y Email: Y Fax: N

## Invoice Distribution:

**Acct Name:** RESCAN ENVIRONMENTAL SERVICES
**Contact:** Accounts Payable
**Address:** Sixth Floor, 1111 West Hastings Street
Vancouver, BC, V6E 2J3
**Phone:** 604-689-9460
**Fax:** --
**Invoice Email:** payables@rescan.com
**Project #:** N/A
**Account #:** RES100

## Client Information:

**Job Reference #:** 1042-008-12
**Project PO #:**
**Legal Site Description:** N/A
**Quote #:** N/A
**Date Sampled:** 07-AUG-12
**Date Received:** 13-AUG-12
**Sampled By:**
**Chain Of Custody:** --

## Workorder Summary:

**Lab Work Order #:** **L1192734**
**Estimated completion date:** 22-AUG-12
**6 Samples received at ALS in** **VANCOUVER**
**Client Job #:** 1042-008-12
**Account Manager:** Amber Springer
**Estimated sample disposal date:** 21-SEP-12

| Lab Sample ID | Client Sample ID | Date Sampled | Date Received | Sample Due Date | Priority Flag | Sample Type |
|---|---|---|---|---|---|---|
| L1192734-1 | DF1 | 08-AUG-12 12:05 | 13-AUG-12 10:30 | 22-AUG-12 | | DUSTFALL |
| L1192734-2 | DF2 | 08-AUG-12 12:30 | 13-AUG-12 10:30 | 22-AUG-12 | | DUSTFALL |
| L1192734-3 | DF3 | 08-AUG-12 12:00 | 13-AUG-12 10:30 | 22-AUG-12 | | DUSTFALL |
| L1192734-4 | DF4 | 07-AUG-12 17:20 | 13-AUG-12 10:30 | 22-AUG-12 | | DUSTFALL |
| L1192734-5 | DF5 | 07-AUG-12 17:10 | 13-AUG-12 10:30 | 22-AUG-12 | | DUSTFALL |
| L1192734-6 | DF6 | 07-AUG-12 17:30 | 13-AUG-12 10:30 | 22-AUG-12 | | DUSTFALL |

| Analysis Requested : | Sample Handling and Disposal Fee | Dustfall Chloride by Ion Chromatography | Combined Dustfalls-Total, soluble, insol | Dustfall Ammonia by Fluorescence | Dustfall Nitrate by Ion Chromatography | Total Mercury in Dustfalls by CVAFS | Total Metals in Dustfalls by ICPOES | Total Metals in Dustfalls by ICPMS | Dustfall Sample Preparation | Dustfall Sulphate by Ion Chromatography |
|---|---|---|---|---|---|---|---|---|---|---|
| DF1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| DF2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| DF3 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| DF4 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| DF5 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| DF6 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

**Sample Integrity Observations:** No observations were identified for this work order submission.

**ALS Group strives to deliver on-time results to our clients at all times. However, there are times when due to capacity issues or other unforeseen circumstances we are unable to meet our expected turnaround times. The information above is related to a recent workorder you have submitted to our laboratory. In the event that you have an inquiry, please refer to the Lab Work Order # when calling your Account Manager.**

Website: www.rescan.com
E-mail: rescan@rescan.com

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Yellowknife, NT X1A 3S9
Tel: (867) 920-2090 Fax: (867) 920-2015

**Seattle Office:**
Rescan Consultants Inc.
Suite 3200,1001 Fourth Avenue Plaza
Seattle, WA 98154, USA
Tel: (206) 726-2145 Fax: (206) 382-9648

# CHAIN OF CUSTODY RECORD

**PROJECT NAME:** Brucejack (Pretivm) **PROJECT #:** ~~1042-008-13-98~~

**FIELD SCIENTISTS AND/OR ENGINEERS:** (*Print Name and Sign*) 1042-008-12
Calvin Pin

L1192734

**Laboratory Contact:**

**Laboratory Address:**

**Rescan Contact:** Daniel Casanova

| | STATION NUMBER | DATE | TIME | COMP. SAMPLE | GRAB SAMPLE | SAMPLE IDENTIFICATION (DEPTH, REPLICATE) | NUMBER OF CONTAINERS: | |
|---|---|---|---|---|---|---|---|---|
| 1 | DF1 | 8/Aug/12 | 12:35PM | | | DF-1A | 1 | In cooler 1 of 2 |
| 2 | DF1 | 8/Aug/12 | 12:35PM | | | DF-1B | 1 | In cooler 1 of 2 |
| 3 | DF2 | 8/Aug/12 | 12:30PM | | | DF-2A | 1 | In cooler 1 of 2 |
| 4 | DF2 | 8/Aug/12 | 12:30PM | | | DF-2B | 1 | In cooler 1 of 2 |
| 5 | DF3 | 8/Aug/12 | 12:00PM | | | DF-3A | 1 | In cooler 1 of 2 |
| 6 | DF3 | 8/Aug/12 | 12:00PM | | | DF-3B | 1 | In cooler 1 of 2 |
| 7 | ~~DF4~~ | | | | | | | |
| 8 | DF4 | 7/Aug/12 | 5:30PM | | | DF-4A | 1 | In cooler 1 of 2 |
| 9 | DF4 | 7/Aug/12 | 5:30PM | | | DF-4B | 1 | In cooler 1 of 2 |
| 10 | DF5 | 7/Aug/12 | 5:10PM | | | DF-5A | 1 | In cooler 2 of 2 |
| 11 | DF5 | 7/Aug/12 | 5:10PM | | | DF-5B | 1 | In cooler 2 of 2 |
| 12 | DF6 | 7/Aug/12 | 5:30PM | | | DF-6A | 1 | In cooler 2 of 2 |
| 13 | DF6 | 7/Aug/12 | 5:30PM | | | DF-6B | 1 | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |
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| 21 | | | | | | | | |


| Received by: | Date/Time | Relinquished by: | Date/Time | |
|---|---|---|---|---|
| Company: | D / M / Y | Company: | D / M / Y | Routine Analysis: ☐ Rush Analysis: ☐ |
| Name: (Print and Sign) | / / | Name: Britt (Print and Sign) 11.3°C | 13 08 12 10:30 | Remarks: RESCAN COPY |
| **Received by:** | **Date/Time** | **Received for Laboratory by:** | **Date/Time** | |
| Company: | D / M / Y | Company: | D / M / Y | |
| Name: (Print and Sign) | / / | Name: (Print and Sign) | / / | Page ____ of ____ |

RESCAN ENVIRONMENTAL SERVICES
ATTN: MAtt Macdonald
Sixth Floor
1111 West Hastings Street
Vancouver BC V6E 2J3

Date Received: 19-SEP-12
Report Date: 27-SEP-12 10:57 (MT)
Version: FINAL

Client Phone: 604-689-9460

# Certificate of Analysis

**Lab Work Order #: L1211707**

Project P.O. #: NOT SUBMITTED
Job Reference: 1042-008-13-98
C of C Numbers: 10-252132
Legal Site Desc:

Amber Springer
Account Manager

# ALS ENVIRONMENTAL ANALYTICAL REPORT

| | Sample ID | L1211707-1 | L1211707-2 | L1211707-3 | L1211707-4 | L1211707-5 |
|---|---|---|---|---|---|---|
| | Description | water | water | water | water | water |
| | Sampled Date | 11-SEP-12 | 11-SEP-12 | 11-SEP-12 | 11-SEP-12 | 11-SEP-12 |
| | Sampled Time | 09:40 | 09:27 | 08:50 | 13:45 | 00:30 |
| | Client ID | DF1(8/8/12~9/11/12) | DF2(8/8/12~9/11/12) | DF3(8/8/12~9/11/12) | DF4(8/8/12~9/11/12) | DF5(8/8/12~9/11/12) |
| **Grouping** | **Analyte** | | | | | |
| **DUSTFALL** | | | | | | |
| **Particulates** | Total Dustfall (mg/dm2.day) | 2.67 | 0.43 | 0.37 | 0.24 | 0.14 |
| | Total Insoluble Dustfall (mg/dm2.day) | 2.46 | 0.11 | 0.15 | <0.10 | <0.10 |
| | Total Soluble Dustfall (mg/dm2.day) | 0.21 | 0.32 | 0.21 | 0.24 | 0.13 |
| **Anions and Nutrients** | Ammonia, Total (as N) (mg/dm2.day) | 0.00131 | 0.00081 | <0.00042 | <0.00069 | <0.00058 |
| | Chloride (Cl) (mg/dm2.day) | 0.045 | 0.047 | 0.0455 | 0.045 | 0.049 |
| | Nitrate (as N) (mg/dm2.day) | 0.00072 | 0.00093 | 0.000797 | 0.00117 | 0.00121 |
| | Sulfate (SO4) (mg/dm2.day) | <0.015 | <0.014 | <0.0083 | <0.014 | <0.012 |
| **Metals** | Aluminum (Al)-Total (mg/dm2.day) | 0.00325 | 0.000092 | 0.000078 | 0.000170 | 0.000225 |
| | Antimony (Sb)-Total (mg/dm2.day) | <0.0000015 | <0.0000025 | <0.0000012 | 0.000190 | <0.0000023 |
| | Arsenic (As)-Total (mg/dm2.day) | 0.0000019 | <0.0000025 | <0.0000012 | 0.0000055 | 0.0000024 |
| | Barium (Ba)-Total (mg/dm2.day) | 0.0000352 | 0.0000070 | 0.00000823 | 0.0000088 | 0.0000111 |
| | Beryllium (Be)-Total (mg/dm2.day) | <0.0000077 | <0.000012 | <0.0000058 | <0.000014 | <0.000012 |
| | Bismuth (Bi)-Total (mg/dm2.day) | <0.0000077 | <0.000012 | <0.0000058 | <0.000014 | <0.000012 |
| | Boron (B)-Total (mg/dm2.day) | <0.00015 | <0.00025 | <0.00012 | <0.00027 | <0.00023 |
| | Cadmium (Cd)-Total (mg/dm2.day) | 0.00000150 | <0.0000012 | <0.00000058 | <0.0000014 | <0.0000012 |
| | Calcium (Ca)-Total (mg/dm2.day) | 0.00562 | <0.0012 | 0.00131 | <0.0014 | <0.0012 |
| | Chromium (Cr)-Total (mg/dm2.day) | <0.0000077 | <0.000012 | <0.0000058 | <0.000014 | <0.000012 |
| | Cobalt (Co)-Total (mg/dm2.day) | <0.0000015 | <0.0000025 | <0.0000012 | <0.0000027 | <0.0000023 |
| | Copper (Cu)-Total (mg/dm2.day) | <0.00014 DLB | <0.00030 DLB | 0.000246 | 0.000485 | <0.00028 DLB |
| | Iron (Fe)-Total (mg/dm2.day) | 0.00872 | <0.00075 | 0.00049 | <0.00082 | 0.00123 |
| | Lead (Pb)-Total (mg/dm2.day) | <0.0000046 DLB | <0.0000087 DLB | 0.00000761 | 0.0000189 | 0.0000104 |
| | Lithium (Li)-Total (mg/dm2.day) | <0.000077 | <0.00012 | <0.000058 | <0.00014 | <0.00012 |
| | Magnesium (Mg)-Total (mg/dm2.day) | 0.0032 | <0.0025 | <0.0012 | <0.0027 | <0.0023 |
| | Manganese (Mn)-Total (mg/dm2.day) | 0.000212 | 0.0000673 | 0.0000658 | 0.0000405 | 0.0000685 |
| | Mercury (Hg)-Total (mg/dm2.day) | <0.00000077 | <0.0000012 | <0.00000058 | <0.0000014 | <0.0000012 |
| | Molybdenum (Mo)-Total (mg/dm2.day) | <0.00000077 | <0.0000012 | <0.00000058 | <0.0000014 | 0.0000027 |
| | Nickel (Ni)-Total (mg/dm2.day) | 0.0000140 | 0.000019 | 0.0000809 | <0.000014 | 0.000013 |
| | Phosphorus (P)-Total (mg/dm2.day) | 0.0105 | <0.0075 | <0.0035 | <0.0082 | <0.0069 |
| | Potassium (K)-Total (mg/dm2.day) | <0.031 | <0.050 | <0.023 | <0.055 | <0.046 |
| | Selenium (Se)-Total (mg/dm2.day) | <0.000015 | <0.000025 | <0.000012 | <0.000027 | <0.000023 |
| | Silicon (Si)-Total (mg/dm2.day) | 0.00504 | <0.0012 | <0.00058 | <0.0014 | <0.0012 |
| | Silver (Ag)-Total (mg/dm2.day) | 0.00000039 | <0.00000025 | <0.00000012 | 0.00000055 | <0.00000023 |
| | Sodium (Na)-Total (mg/dm2.day) | <0.031 | <0.050 | <0.023 | <0.055 | <0.046 |
| | Strontium (Sr)-Total (mg/dm2.day) | 0.0000200 | 0.0000042 | 0.0000040 | 0.0000034 | 0.0000026 |
| | Thallium (Tl)-Total (mg/dm2.day) | <0.0000015 | <0.0000025 | <0.0000012 | <0.0000027 | <0.0000023 |
| | Tin (Sn)-Total (mg/dm2.day) | <0.0000015 | <0.0000025 | <0.0000012 | <0.0000027 | <0.0000023 |
| | Titanium (Ti)-Total (mg/dm2.day) | <0.00015 | <0.00025 | <0.00012 | <0.00027 | <0.00023 |

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

# ALS ENVIRONMENTAL ANALYTICAL REPORT

| | | | | | | |
|---|---|---|---|---|---|---|
| | **Sample ID** | L1211707-6 | | | | |
| | **Description** | water | | | | |
| | **Sampled Date** | 11-SEP-12 | | | | |
| | **Sampled Time** | 09:42 | | | | |
| | **Client ID** | DF6(8/8/12~9/11/12) | | | | |
| **Grouping** | **Analyte** | | | | | |
| **DUSTFALL** | | | | | | |
| **Particulates** | Total Dustfall (mg/dm2.day) | 0.52 | | | | |
| | Total Insoluble Dustfall (mg/dm2.day) | <0.10 | | | | |
| | Total Soluble Dustfall (mg/dm2.day) | 0.49 | | | | |
| **Anions and Nutrients** | Ammonia, Total (as N) (mg/dm2.day) | 0.00044 | | | | |
| | Chloride (Cl) (mg/dm2.day) | 0.049 | | | | |
| | Nitrate (as N) (mg/dm2.day) | 0.00261 | | | | |
| | Sulfate (SO4) (mg/dm2.day) | <0.029 | | | | |
| **Metals** | Aluminum (Al)-Total (mg/dm2.day) | <0.00013 | | | | |
| | Antimony (Sb)-Total (mg/dm2.day) | <0.0000044 | | | | |
| | Arsenic (As)-Total (mg/dm2.day) | <0.0000044 | | | | |
| | Barium (Ba)-Total (mg/dm2.day) | 0.0000057 | | | | |
| | Beryllium (Be)-Total (mg/dm2.day) | <0.000022 | | | | |
| | Bismuth (Bi)-Total (mg/dm2.day) | <0.000022 | | | | |
| | Boron (B)-Total (mg/dm2.day) | <0.00044 | | | | |
| | Cadmium (Cd)-Total (mg/dm2.day) | <0.0000022 | | | | |
| | Calcium (Ca)-Total (mg/dm2.day) | <0.0022 | | | | |
| | Chromium (Cr)-Total (mg/dm2.day) | <0.000022 | | | | |
| | Cobalt (Co)-Total (mg/dm2.day) | <0.0000044 | | | | |
| | Copper (Cu)-Total (mg/dm2.day) | <0.00022 DLB | | | | |
| | Iron (Fe)-Total (mg/dm2.day) | <0.0013 | | | | |
| | Lead (Pb)-Total (mg/dm2.day) | <0.0000088 DLB | | | | |
| | Lithium (Li)-Total (mg/dm2.day) | <0.00022 | | | | |
| | Magnesium (Mg)-Total (mg/dm2.day) | <0.0044 | | | | |
| | Manganese (Mn)-Total (mg/dm2.day) | 0.0000435 | | | | |
| | Mercury (Hg)-Total (mg/dm2.day) | <0.0000022 | | | | |
| | Molybdenum (Mo)-Total (mg/dm2.day) | <0.0000022 | | | | |
| | Nickel (Ni)-Total (mg/dm2.day) | <0.000022 | | | | |
| | Phosphorus (P)-Total (mg/dm2.day) | <0.013 | | | | |
| | Potassium (K)-Total (mg/dm2.day) | <0.088 | | | | |
| | Selenium (Se)-Total (mg/dm2.day) | <0.000044 | | | | |
| | Silicon (Si)-Total (mg/dm2.day) | <0.0022 | | | | |
| | Silver (Ag)-Total (mg/dm2.day) | <0.00000044 | | | | |
| | Sodium (Na)-Total (mg/dm2.day) | <0.088 | | | | |
| | Strontium (Sr)-Total (mg/dm2.day) | <0.0000044 | | | | |
| | Thallium (Tl)-Total (mg/dm2.day) | <0.0000044 | | | | |
| | Tin (Sn)-Total (mg/dm2.day) | <0.0000044 | | | | |
| | Titanium (Ti)-Total (mg/dm2.day) | <0.00044 | | | | |

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

# ALS ENVIRONMENTAL ANALYTICAL REPORT

| | Sample ID | L1211707-1 | L1211707-2 | L1211707-3 | L1211707-4 | L1211707-5 |
|---|---|---|---|---|---|---|
| | Description | water | water | water | water | water |
| | Sampled Date | 11-SEP-12 | 11-SEP-12 | 11-SEP-12 | 11-SEP-12 | 11-SEP-12 |
| | Sampled Time | 09:40 | 09:27 | 08:50 | 13:45 | 00:30 |
| | Client ID | DF1(8/8/12~9/11/12) | DF2(8/8/12~9/11/12) | DF3(8/8/12~9/11/12) | DF4(8/8/12~9/11/12) | DF5(8/8/12~9/11/12) |
| **Grouping** | **Analyte** | | | | | |
| **DUSTFALL** | | | | | | |
| **Metals** | Uranium (U)-Total (mg/dm2.day) | <0.00000015 | <0.00000025 | <0.00000012 | <0.00000027 | <0.00000023 |
| | Vanadium (V)-Total (mg/dm2.day) | <0.000015 | <0.000025 | <0.000012 | <0.000027 | <0.000023 |
| | Zinc (Zn)-Total (mg/dm2.day) | 0.000108 | <0.000075 | 0.000052 | <0.000082 | 0.000076 |

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

# ALS ENVIRONMENTAL ANALYTICAL REPORT

| | | | | | | |
|---|---|---|---|---|---|---|
| | **Sample ID** | L1211707-6 | | | | |
| | **Description** | water | | | | |
| | **Sampled Date** | 11-SEP-12 | | | | |
| | **Sampled Time** | 09:42 | | | | |
| | **Client ID** | DF6(8/8/12~9/11/12) | | | | |
| **Grouping** | **Analyte** | | | | | |
| **DUSTFALL** | | | | | | |
| **Metals** | Uranium (U)-Total (mg/dm2.day) | <0.00000044 | | | | |
| | Vanadium (V)-Total (mg/dm2.day) | <0.000044 | | | | |
| | Zinc (Zn)-Total (mg/dm2.day) | <0.00013 | | | | |

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

# Reference Information

**Qualifiers for Individual Parameters Listed:**

| Qualifier | Description |
|---|---|
| DLB | Detection limit was raised due to detection of analyte at comparable level in Method Blank. |

**Test Method References:**

| ALS Test Code | Matrix | Test Description | Method Reference** |
|---|---|---|---|
| **CL-IC-VA** | Dustfall | Dustfall Chloride by Ion Chromatography | BC LAB MAN. - PART. - SOLUBLE - ANIONS |

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The chloride analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

| | | | |
|---|---|---|---|
| **DUSTFALLS-COM-DM2-VA** | Dustfall | Combined Dustfalls-Total, soluble, insol | BCMOE PARTICULATE |

This analysis is carried out using procedures modified from British Columbia Environmental Manual "Particulate."
Particulates or Dustfall are determined gravimetrically. Total Insoluble Dustfall is determined by filtering a sample through a 0.45 um membrane filter and drying the filter at 104 degrees celsius. Total Soluble Dustfall is determined by evaporating the filtrate to dryness at 104 degrees celsius. The Total Dustfall is the sum of Insoluble Dustfall and the Soluble Dustfall.

| | | | |
|---|---|---|---|
| **HG-DUST(DM2-CVAFS-VA** | Dustfall | Total Mercury in Dustfalls by CVAFS | EPA 245.7 |

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

| | | | |
|---|---|---|---|
| **MET-DUST(DM2)-ICP-VA** | Dustfall | Total Metals in Dustfalls by ICPOES | EPA 6010B |

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

| | | | |
|---|---|---|---|
| **MET-DUST(DM2)-MS-VA** | Dustfall | Total Metals in Dustfalls by ICPMS | EPA 6020A |

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

| | | | |
|---|---|---|---|
| **NH3-F-VA** | Dustfall | Dustfall Ammonia by Fluorescence | BC LAB MAN. - PART. - SOLUBLE - ANIONS |

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The ammonia analysis is specifcially carried out using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

| | | | |
|---|---|---|---|
| **NO3-IC-VA** | Dustfall | Dustfall Nitrate by Ion Chromatography | BC LAB MAN. - PART. - SOLUBLE - ANIONS |

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The nitrate analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

| | | | |
|---|---|---|---|
| **SO4-IC-VA** | Dustfall | Dustfall Sulphate by Ion Chromatography | BC LAB MAN. - PART. - SOLUBLE - ANIONS |

The Dustfall analysis is carried out in accordance with the B.C. Laboratory Manual method 'Particulate - Total' and 'Particulate - Soluble - Anions and Cations by Ion Chromatography'. The sulphate analysis is specifcially carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

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

| Laboratory Definition Code | Laboratory Location |
|---|---|
| VA | ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA |

**Chain of Custody Numbers:**

10-252132

# Reference Information

**GLOSSARY OF REPORT TERMS**

*Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.*
*mg/kg - milligrams per kilogram based on dry weight of sample.*
*mg/kg wwt - milligrams per kilogram based on wet weight of sample.*
*mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.*
*mg/L - milligrams per litre.*
*< - Less than.*
*D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).*
*N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.*
*UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.*
*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*

ALS Environmental

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Canada Toll Free: 1 800 6
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L1211707-COFC

10-252132

Page 1 of 1

| Report To | | Report Format / Distribution | | Service Request: (Rush subject to availability - Contact ALS to confirm TAT) |
|---|---|---|---|---|
| Company: | Rescan Env. Services | Standard: ✓ | Other (specify): | Regular (Standard Turnaround Times - Business Days) |
| Contact: | Matt MacDonald | Select: PDF ✓ | Excel ✓ Digital Fax | Priority(2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT |
| Address: | 1111 West Hastings (6th Floor) | Email 1: | mmacdonald@rescan.com | Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT |
| | Vancouver, BC V6E 2J3 | Email 2: | dcasanova@rescan.com | Same Day or Weekend Emergency - Contact ALS to confirm TAT |
| Phone: | 604 689-9460 Fax: 604 687-4277 | | | |
| Invoice To | Same as Report ? (circle) Yes or (No) (if No, provide details) | Client / Project Information | | Analysis Request |
| | Copy of Invoice with Report? (circle) Yes or (No) | Job #: | 1042-008-[redacted]13-98 | ( Indicate Filtered or Preserved, F/P ) |
| Company: | Rescan Env. Services | PO / AFE: | | |
| Contact: | Accounts Payable | LSD: | | |
| Address: | 1111 West Hastings (6th Floor) | | | |
| Phone: | 604 689-9460 Fax: 604 687-4277 | Quote #: | | |
| Lab Work Order # (lab use only) | L1211707 | ALS Contact: | Sampler: | |

| Sample # | Sample Identification (This description will appear on the report) | Date (dd-mmm-yy) | Time (hh:mm) | Sample Type | Total Particulate | Soluble Particulate | Insoluble Particulate | Sulphate | Nitrate | NH3, NH4 | Cl | Total Metals | Mg+ | Ca+ | K+ | | Number of Containers |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DF1-TP | 11-09-12 | 9:40 | Water | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | 1 |
| | DF1-TM | 11-09-12 | 9:42 | | | | | | | | | ✓ | ✓ | ✓ | ✓ | | |
| | DF2-TP | 11-09-12 | 9:27 | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | |
| | DF2-TM | 11-09-12 | 9:28 | | | | | | | | | ✓ | ✓ | ✓ | ✓ | | |
| | DF3-TP | 11-09-12 | 8:50 | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | |
| | DF3-TM | 11-09-12 | 8:51 | | | | | | | | | ✓ | ✓ | ✓ | ✓ | | |
| | DF4-TP | 11-09-12 | 13:45 | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | |
| | DF4-TM | 11-09-12 | 13:46 | | | | | | | | | ✓ | ✓ | ✓ | ✓ | | |
| | DF5-TP | 11-09-12 | 12:30 | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | |
| | DF5-TM | 11-09-12 | 12:32 | | | | | | | | | ✓ | ✓ | ✓ | ✓ | | |
| | DF6-TP | 13-09-12 | 9:42 | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | |
| | DF6-TM | 13-09-12 | 9:42 | | | | | | | | | ✓ | ✓ | ✓ | ✓ | | |

Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/ETC) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

| SHIPMENT RELEASE (client use) | | | SHIPMENT RECEPTION (lab use only) | | | | SHIPMENT VERIFICATION (lab use only) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Released by: | Date: | Time: | Received by: | Date: | Time: | Temperature: | Verified by: | Date: | Time: | Observations: Yes / No ? If Yes add SIF |
| Matt MacDonald | 17/9/12 | 9:00 AM | Brett | Sept. 19 | 13:00 | 20.2 °C | | | | |

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

GENF 18.01 Front

# Sample Receipt Confirmation

## Report Distribution:

**Company Name:** RESCAN ENVIRONMENTAL SERVICES
**Contact:** MAtt Macdonald
**Address:** Sixth Floor, 1111 West Hastings Street
Vancouver, BC, V6E 2J3
**Phone:** 604-689-9460
**Fax:** 604-687-4277
**Email:** achateauvert@rescan.com
trobb@rescan.com
mhenry@rescan.com
mmacdonald@rescan.com
dcasanova@rescan.com
**Report Name:** CROSSTAB_ALS
**Digital Type:** --
**Digital Email:** --
**Distribution:** Hard Copy: Y Email: Y Fax: N

## Invoice Distribution:

**Acct Name:** RESCAN ENVIRONMENTAL SERVICES
**Contact:** Accounts Payable
**Address:** Sixth Floor, 1111 West Hastings Street
Vancouver, BC, V6E 2J3
**Phone:** 604-689-9460
**Fax:** --
**Invoice Email:** payables@rescan.com
**Project #:** N/A
**Account #:** RES100

## Client Information:

**Job Reference #:** 1042-008-13-98
**Project PO #:**
**Legal Site Description:** N/A
**Quote #:** N/A
**Date Sampled:** 11-SEP-12
**Date Received:** 19-SEP-12
**Sampled By:**
**Chain Of Custody:** 10-252132

## Workorder Summary:

**Lab Work Order #:** **L1211707**
**Estimated completion date:** 28-SEP-12
**6 Samples received at ALS in** **VANCOUVER**
**Client Job #:** 1042-008-13-98
**Account Manager:** Amber Springer
**Estimated sample disposal date:** 28-OCT-12

| Lab Sample ID | Client Sample ID | Date Sampled | Date Received | Sample Due Date | Priority Flag | Sample Type |
|---|---|---|---|---|---|---|
| L1211707-1 | DF1(8/8/12~9/11/12) | 11-SEP-12 09:40 | 19-SEP-12 13:00 | 28-SEP-12 | | water |
| L1211707-2 | DF2(8/8/12~9/11/12) | 11-SEP-12 09:40 | 19-SEP-12 13:00 | 28-SEP-12 | | water |
| L1211707-3 | DF3(8/8/12~9/11/12) | 11-SEP-12 09:40 | 19-SEP-12 13:00 | 28-SEP-12 | | water |
| L1211707-4 | DF4(8/8/12~9/11/12) | 11-SEP-12 09:40 | 19-SEP-12 13:00 | 28-SEP-12 | | water |
| L1211707-5 | DF5(8/8/12~9/11/12) | 11-SEP-12 09:40 | 19-SEP-12 13:00 | 28-SEP-12 | | water |
| L1211707-6 | DF6(8/8/12~9/11/12) | 11-SEP-12 09:40 | 19-SEP-12 13:00 | 28-SEP-12 | | water |

| Analysis Requested : | Sample Handling and Disposal Fee | Dustfall Chloride by Ion Chromatography | Combined Dustfalls-Total, soluble, insol | Dustfall Ammonia by Fluorescence | Dustfall Nitrate by Ion Chromatography | Dustfall Sample Preparation | Total Mercury in Dustfalls by CVAFS | Total Metals in Dustfalls by ICPOES | Total Metals in Dustfalls by ICPMS | Dustfall Sample Preparation | Dustfall Sulphate by Ion Chromatography |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DF1(8/8/12~9/11/12) | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| DF2(8/8/12~9/11/12) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| DF3(8/8/12~9/11/12) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| DF4(8/8/12~9/11/12) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| DF5(8/8/12~9/11/12) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| DF6(8/8/12~9/11/12) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |

**Sample Integrity Observations:** No observations were identified for this work order submission.

**ALS Group strives to deliver on-time results to our clients at all times. However, there are times when due to capacity issues or other unforeseen circumstances we are unable to meet our expected turnaround times. The information above is related to a recent workorder you have submitted to our laboratory. In the event that you have an inquiry, please refer to the Lab Work Order # when calling your Account Manager.**

ALS Environmental

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10-252132

Page 1 of 1

| Report To | | Report Format / Distribution | | Service Request: (Rush subject to availability - Contact ALS to confirm TAT) |
|---|---|---|---|---|
| Company: | Rescan Env. Services | Standard: ✓ | Other (specify): | Regular (Standard Turnaround Times - Business Days) |
| Contact: | Matt MacDonald | Select: PDF ✓ | Excel ✓ Digital Fax | Priority(2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT |
| Address: | 1111 West Hastings (6th Floor) | Email 1: | mmacdonald@rescan.com | Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT |
| | Vancouver, BC V6E 2J3 | Email 2: | dcasanova@rescan.com | Same Day or Weekend Emergency - Contact ALS to confirm TAT |
| Phone: | 604 689-9460 Fax: 604 687-4277 | | | |
| Invoice To | Same as Report ? (circle) Yes or (No) (if No, provide details) | Client / Project Information | | Analysis Request |
| | Copy of Invoice with Report? (circle) Yes or (No) | Job #: | 1042-008-[redacted]13-98 | ( Indicate Filtered or Preserved, F/P ) |
| Company: | Rescan Env. Services | PO / AFE: | | |
| Contact: | Accounts Payable | LSD: | | |
| Address: | 1111 West Hastings (6th Floor) | | | |
| Phone: | 604 689-9460 Fax: 604 687-4277 | Quote #: | | |
| Lab Work Order # (lab use only) | L1211707 | ALS Contact: | Sampler: | |

| Sample # | Sample Identification (This description will appear on the report) | Date (dd-mmm-yy) | Time (hh:mm) | Sample Type | Total Particulate | Soluble Particulate | Insoluble Particulate | Sulphate | Nitrate | NH3, NH4 | Cl | Total Metals | Mg+ | Ca+ | K+ | | Number of Containers |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DF1-TP | 11-09-12 | 9:40 | Water | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | 1 |
| | DF1-TM | 11-09-12 | 9:42 | | | | | | | | | ✓ | ✓ | ✓ | ✓ | | |
| | DF2-TP | 11-09-12 | 9:27 | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | |
| | DF2-TM | 11-09-12 | 9:28 | | | | | | | | | ✓ | ✓ | ✓ | ✓ | | |
| | DF3-TP | 11-09-12 | 8:50 | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | |
| | DF3-TM | 11-09-12 | 8:51 | | | | | | | | | ✓ | ✓ | ✓ | ✓ | | |
| | DF4-TP | 11-09-12 | 13:45 | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | |
| | DF4-TM | 11-09-12 | 13:46 | | | | | | | | | ✓ | ✓ | ✓ | ✓ | | |
| | DF5-TP | 11-09-12 | 12:30 | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | |
| | DF5-TM | 11-09-12 | 12:32 | | | | | | | | | ✓ | ✓ | ✓ | ✓ | | |
| | DF6-TP | 13-09-12 | 9:42 | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | |
| | DF6-TM | 13-09-12 | 9:42 | | | | | | | | | ✓ | ✓ | ✓ | ✓ | | |

Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/ETC) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

| SHIPMENT RELEASE (client use) | | | SHIPMENT RECEPTION (lab use only) | | | | SHIPMENT VERIFICATION (lab use only) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Released by: | Date: | Time: | Received by: | Date: | Time: | Temperature: | Verified by: | Date: | Time: | Observations: Yes / No ? If Yes add SIF |
| Matt MacDonald | 17/9/12 | 9:00 AM | Brett | Sept. 19 | 13:00 | 20.2 °C | | | | |

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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# Appendix B

## 2012 Passive Air Contaminant Sampling Results

Rescan™
Engineers and Scientists

Your Project #: 1042-008-12
Site Location: BRUCEJACK

**Attention: JEM MORRISON**
RESCAN ENVIRONMENTAL SERVICES LTD.
SIXTH FLOOR
1111 WEST HASTINGS STREET
VANCOUVER, BC
CANADA V6E 2J3

**Report Date: 2012/09/11**

# CERTIFICATE OF ANALYSIS

**MAXXAM JOB #: B273748**
**Received: 2012/08/20, 13:08**

Sample Matrix: Air
# Samples Received: 2

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Analytical Method |
|---|---|---|---|---|---|
| NO2 Passive Analysis (1) | 2 | 2012/08/24 | 2012/09/11 | EINDSOP-00148 | Tang Passive NO2 in |
| O3 Passive Analysis (1) | 2 | 2012/08/23 | 2012/09/11 | EINDSOP-00197 | EPA 300 R2.1 |
| SO2 Passive Analysis (1) | 2 | 2012/08/24 | 2012/09/11 | EINDSOP-00149 | Tang Passive SO2 in |

* Results relate only to the items tested.

(1) The detection limit is based on a 30 day sampling period.

Encryption Key

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

Levi Manchak, Customer Service
Email: LManchak@maxxam.ca
Phone# (780) 378-8500

==========

Maxxam 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.

Total cover pages: 1

Maxxam Job #: B273748
Report Date: 2012/09/11

RESCAN ENVIRONMENTAL SERVICES LTD.
Client Project #: 1042-008-12
Site Location: BRUCEJACK

## RESULTS OF CHEMICAL ANALYSES OF AIR

| Maxxam ID | | EG0508 | EG0556 | | |
|---|---|---|---|---|---|
| Sampling Date | | 2012/07/11 16:30 | 2012/07/12 15:30 | | |
| | **UNITS** | **BJ PASS 1** | **BJ PASS 2** | **RDL** | **QC Batch** |
| **Passive Monitoring** | | | | | |
| Calculated NO2 | ppb | <0.1 | 0.2 | 0.1 | 6112588 |
| Calculated O3 | ppb | 11.0 | 29.2 | 0.1 | 6108617 |
| Calculated SO2 | ppb | <0.1 | <0.1 | 0.1 | 6112647 |

RDL = Reportable Detection Limit

Maxxam Job #: B273748
Report Date: 2012/09/11

RESCAN ENVIRONMENTAL SERVICES LTD.
Client Project #: 1042-008-12
Site Location: BRUCEJACK

## QUALITY ASSURANCE REPORT

| | | | Spiked Blank | | Method Blank | | Calibration Check | |
|---|---|---|---|---|---|---|---|---|
| QC Batch | Parameter | Date | % Recovery | QC Limits | Value | UNITS | % Recovery | QC Limits |
| 6108617 | Calculated O3 | 2012/08/23 | 101 | N/A | <0.1 | ppb | 101 | 91 - 107 |
| 6112588 | Calculated NO2 | 2012/08/24 | 96 | N/A | <0.1 | ppb | 98 | 76 - 118 |
| 6112647 | Calculated SO2 | 2012/08/24 | 103 | N/A | <0.1 | ppb | 100 | 95 - 105 |

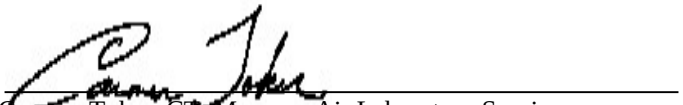
N/A = Not Applicable
Calibration Check: A calibration standard analyzed at different times to evaluate on-going calibration accuracy.

Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

## Validation Signature Page

**Maxxam Job #: B273748**

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



Carmen Toker, CT, Manager Air Laboratory Services

==========

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Maxxam

6744 - 50 St. Edmonton AB
tel: 780-378-8500 fax: 780-378-8699

**SAMPLE ANALYSIS REQUEST FORM**

**INVOICE TO:**
Attn: Accounts Payable
Rescan Environmental Services Ltd.
1111 W. Hastings St.
Vancouver BC V6E 2J3

**REPORT TO:**
Jeremy Morrison - jmorrison@rescan.com

**ADDITIONAL REPORT(S) TO:**

## Rescan - Brucejack

| | | | | | |
|---|---|---|---|---|---|
| **Company Name:** | Rescan | **Phone:** | (604) 689-9460 | **Site/Area Name & LSD:** | Brucejack |
| **Requestor:** | Jeremy Morrison | **Additional Contact:** | | **Project Name/Number:** | 1042-008-12 |

**Please check applicable boxes for routine analysis; for specialty work, provide a detailed description of parameters required or phone Project Manager: Levi Manchak @ (780) 468-3536 to discuss testing procedures.**

**Please indicate analysis completion requirement date (surcharge may apply for priority analysis)**

| Sample identification or location (LSD) | Sampling Start Date (DD/MM/YYYY) | Time (HH:MM) | Sampling End Date (DD/MM/YYYY) | Time (HH:MM) | SO2 | H2S | NO2 | O3 | NOx | PM 2.5 | PM10 | TSP | Metal Scan | Dustfall | VOC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | |
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| BJ PASS 1 | 12/17/2012 | 4:30PM | 8/8/12 | 12:30PM | X | | X | X | | | | | | | | |
| BJ PASS 2 | 12/17/2012 | 3:30PM | 7/8/12 | 4:00PM | X | | X | X | | | | | | | | |
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Analysis

**Extra Notes/Instructions:**

**Additional Information (Project #, PO#, etc.)**

***Maxxam to complete*** *Date received:* *Received By:*

Rescan™
Website: www.rescan.com
E-mail: rescan@rescan.com

**Vancouver Office:**
Rescan Environmental Services Ltd.
6th Floor, 1111 West Hastings Street
Vancouver, B.C. V6E 2J3
Tel: (604) 689-9460 Fax: (604) 687-4277

**Yellowknife Office:**
Rescan Northern Operations
Suite 908-5201 50th Avenue
Yellowknife, NT X1A 3S9
Tel: (867) 920-2090 Fax: (867) 920-2015

**Seattle Office:**
Rescan Consultants Inc.
Suite 3200,1001 Fourth Avenue Plaza
Seattle, WA 98154, USA
Tel: (206) 726-2145 Fax: (206) 382-9648

# CHAIN OF CUSTODY RECORD

**PROJECT NAME:** Brucejack (Pretium)

**PROJECT #:** [redacted]

**FIELD SCIENTISTS AND/OR ENGINEERS:** (*Print Name and Sign*) 1042-008-12

Calvin Pin

**Laboratory Contact:**

**Laboratory Address:**

Daniel Casanova

**Rescan Contact:**

| STATION NUMBER | DATE | TIME | COMP. SAMPLE | GRAB SAMPLE | SAMPLE IDENTIFICATION (DEPTH, REPLICATE) | NUMBER OF CONTAINERS: | SO2 | NO2 | G3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BSPASS1 | 8/8/12 | 12:30PM | | | BSPASS 1 | 3 | X | X | X | | | |
| 2 [redacted] | | | | | | | | | | | | |
| 3 [redacted] | | | | | | | | | | | | |
| BSPASS2 | 7/8/12 | 4:00PM | | | BS PASS2 | 3 | X | X | X | | | |
| 5 [redacted] | | | | | | | | | | | | |
| 6 [redacted] | | | | | | | | | | | | |
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|---|---|---|---|
| **Received by:** *Company:* / *Name:* (Print and Sign) | Date/Time D / M / Y / / | **Relinquished by:** *Company:* / *Name:* (Print and Sign) | Date/Time D / M / Y / / |
| **Received by:** *Company:* / *Name:* (Print and Sign) | Date/Time D / M / Y / / | **Received for Laboratory by:** *Company:* / *Name:* (Print and Sign) | Date/Time D / M / Y / / |

**Routine Analysis:** ☐ **Rush Analysis:** ☐

**Remarks:**

**LAB COPY**

Page ___ of ___

Your Project #: 1042-008-12
Site Location: BRUCEJACK

**Attention: JEM MORRISON**
RESCAN ENVIRONMENTAL SERVICES LTD.
SIXTH FLOOR
1111 WEST HASTINGS STREET
VANCOUVER, BC
CANADA V6E 2J3

**Report Date: 2012/09/27**

# CERTIFICATE OF ANALYSIS

**MAXXAM JOB #: B283954**
**Received: 2012/09/19, 12:12**

Sample Matrix: Air
# Samples Received: 2

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Analytical Method |
|---|---|---|---|---|---|
| NO2 Passive Analysis (1) | 2 | 2012/09/27 | 2012/09/27 | EINDSOP-00148 | Tang Passive NO2 in |
| O3 Passive Analysis (1) | 2 | 2012/09/25 | 2012/09/27 | EINDSOP-00197 | EPA 300 R2.1 |
| SO2 Passive Analysis (1) | 2 | 2012/09/26 | 2012/09/27 | EINDSOP-00149 | Tang Passive SO2 in |

* Results relate only to the items tested.

(1) The detection limit is based on a 30 day sampling period.

Encryption Key

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

Levi Manchak, Customer Service
Email: LManchak@maxxam.ca
Phone# (780) 378-8500

==========

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Total cover pages: 1

Maxxam Job #: B283954
Report Date: 2012/09/27

RESCAN ENVIRONMENTAL SERVICES LTD.
Client Project #: 1042-008-12
Site Location: BRUCEJACK

## RESULTS OF CHEMICAL ANALYSES OF AIR

| Maxxam ID | | EM7781 | EM7782 | | |
|---|---|---|---|---|---|
| Sampling Date | | 2012/08/08 12:30 | 2012/08/08 05:10 | | |
| | **UNITS** | **BJ PASS 1** | **BJ PASS 2** | **RDL** | **QC Batch** |
| **Passive Monitoring** | | | | | |
| Calculated NO2 | ppb | <0.1 | 4.2 | 0.1 | 6203879 |
| Calculated O3 | ppb | 9.5 | MISSING | 0.1 | 6197237 |
| Calculated SO2 | ppb | <0.1 | <0.1 | 0.1 | 6200665 |

RDL = Reportable Detection Limit

Maxxam Job #: B283954
Report Date: 2012/09/27

RESCAN ENVIRONMENTAL SERVICES LTD.
Client Project #: 1042-008-12
Site Location: BRUCEJACK

## QUALITY ASSURANCE REPORT

| | | | Spiked Blank | | Method Blank | | Calibration Check | |
|---|---|---|---|---|---|---|---|---|
| QC Batch | Parameter | Date | % Recovery | QC Limits | Value | UNITS | % Recovery | QC Limits |
| 6197237 | Calculated O3 | 2012/09/25 | 98 | N/A | <0.1 | ppb | 103 | 91 - 107 |
| 6200665 | Calculated SO2 | 2012/09/26 | 102 | N/A | <0.1 | ppb | 100 | 95 - 105 |
| 6203879 | Calculated NO2 | 2012/09/27 | 98 | N/A | <0.1 | ppb | 100 | 76 - 118 |

N/A = Not Applicable
Calibration Check: A calibration standard analyzed at different times to evaluate on-going calibration accuracy.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
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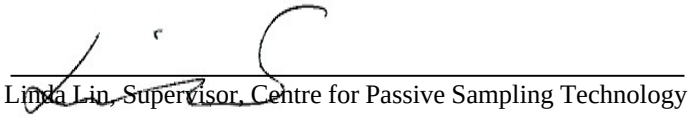
## Validation Signature Page

**Maxxam Job #: B283954**

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



Linda Lin, Supervisor, Centre for Passive Sampling Technology

==========

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Maxxam

6744 - 50 St. Edmonton AB
tel: 780-378-8500 fax: 780-378-8699

# SAMPLE ANALYSIS REQUEST FORM

**INVOICE TO:**
Attn: Accounts Payable
Rescan Environmental Services Ltd.
1111 W. Hastings St.
Vancouver BC V6E 2J3

**REPORT TO:**
Jeremy Morrison - jmorrison@rescan.com

**ADDITIONAL REPORT(S) TO:**
Matt MacDonald
mmacdonald@rescan.com

**Rescan - Brucejack**

| | | | | | |
|---|---|---|---|---|---|
| **Company Name:** | Rescan | **Phone:** | (604) 689-9460 | **Site/Area Name & LSD:** | Brucejack |
| **Requestor:** | Jeremy Morrison | **Additional Contact:** | | **Project Name/Number:** | 1042-008-12 |

**Please check applicable boxes for routine analysis; for specialty work, provide a detailed description of parameters required or phone Project Manager: Levi Manchak @ (780) 468-3536 to discuss testing procedures.**

**Please indicate analysis completion requirement date (surcharge may apply for priority analysis)**

| Sample identification or location (LSD) | Sampling Start Date (DD/MM/YYYY) | Time (HH:MM) | Sampling End Date (DD/MM/YYYY) | Time (HH:MM) | SO2 | H2S | NO2 | O3 | NOx | PM 2.5 | PM10 | TSP | Metal Scan | Dustfall | VOC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SO2 #1 | 8/8/2012 | 12:30 PM | 9/11/2012 | 9:30 AM | X | | | | | | | | | | | |
| SO2 #2 | 7/8/2012 | 5:10 PM | 9/11/2012 | 12:30 PM | X | | | | | | | | | | | |
| NO2 #1 | 8/8/2012 | 12:30 PM | 9/11/2012 | 9:30 AM | | | X | | | | | | | | | |
| NO2 #2 | 7/8/2012 | 5:10 PM | 9/11/2012 | 12:30 PM | | | X | | | | | | | | | |
| O3 #1 | 8/8/2012 | 12:30 PM | 9/11/2012 | 9:30AM | | | | X | | | | | | | | |
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Analysis

**Extra Notes/Instructions:** No O3 canister recuperated from site #2. Broken pin on PASS module.

**Additional Information (Project #, PO#, etc.)**
Project # 1042-008-12

***Maxxam to complete*** *Date received:* *Received By:*