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Joseph Mackenzie, Chair
Wek’èezhìi Land and Water Board
PO Box 32, Wekweètì, NT X1A 3S3
Canada

31 March 2021

Dear Mr. Mackenzie:

Subject: DDMI AEMP Annual Report - 2020

Diavik Diamond Mines (2012) Inc. (DDMI) is pleased to submit the attached 2020 Aquatic Effects Monitoring Plan (AEMP) Annual Report as required under the Wek'èezhìı Land and Water Board (WLWB or Board) Water Licence W2015L2-0001 Part J, Item 8. Sampling for the AEMP in 2020 was carried out according to the requirements specified in the AEMP Study Design Version 4.1 for an interim monitoring year, which included sampling in the Near-field and Mid-field areas of Lac de Gras.

Although AEMP Study Design Version 4.1 was the approved version of the AEMP design for the 2020 AEMP Annual Report, a number of updates outlined in the proposed AEMP Design Plan Version 5.1 and as directed by WLWB directives (28 August 2017, 24 January 2018, 25 March 2019 [re. 2017 AEMP Annual Report, 25 March 2019 [re. 2014 to 2016 Aquatic Effects Re-evaluation Report], 21 October 2019, and 2 June 2020 Decision Packages) have been incorporated into the 2020 AEMP Annual Report. Specific updates are outlined in Section 1 of each AEMP component (see Appendix I through XV).

Under Water Licence W2015L2-0001, Action Level exceedance reporting (Part J, Item 6) is required as part of the 2020 AEMP Annual Report. Action Level exceedances documented by the AEMP in 2020 are summarized in Table 1 attached to this letter and detailed within the 2020 AEMP Annual Report. No Action Levels were triggered as part of the Plankton component in 2020.

The results of the Action Level evaluation completed for the 2020 AEMP identified 21 water quality variables that triggered Action Level 1 (out of nine Action Levels) and eight variables that triggered Action Level 2 (Table 1). None of the water quality variables triggered Action Level 3. Under the approved AEMP Response Framework, no action is required when a water quality variable triggers Action Level 1. When a variable triggers Action Level 2, the required management action is to develop an AEMP Effects Benchmark for that variable if one does not already exist. All variables that triggered Action Level 2 have existing Effects Benchmarks.

The 2020 AEMP results also indicated that chlorophyll *a* triggered Action Level 2 in the Response Framework for Indicators of Eutrophication (Table 1). Because an Action Level

2 has been triggered in previous years, an Effects Benchmark for chlorophyll *a* has previously been established (i.e., 4.5 ug/L).

Per the Water Licence (Schedule 8 Item 6b) each water chemistry, sediment chemistry, and eutrophication indicator variable that has been reported in the AEMP Annual Report to have exceeded an Action Level 2 or 3 requires a Response Plan. The Response Plan is to include a description of the specific actions that will be undertaken, or outcomes of specific actions to be undertaken, to address the response actions as outlined in the Response Framework. Given that the response actions required (i.e., development of an Effects Benchmark) have already been completed for all variables that triggered an Action Level 2 in 2020, no further action is required to satisfy Schedule 8 Item 6b of the Water Licence.

To assist the Board in their review of this document, Table 2 attached to this letter provides a Concordance Table outlining the sections of the report in which the applicable WLWB directives, commitments and comments have been addressed.

Please do not hesitate to contact the undersigned or Kyla Gray (kyla.gray@riotinto.com) if you have any questions related to this submission.

Yours sincerely,

Kofi Boa-Antwi
Superintendent, Environment

cc: Kassandra DeFrancis, WLWB
Anneli Jokela, WLWB

Attachments:

- Table 1. Summary of Action Level Exceedances and Required Management Actions, 2020 AEMP
- Table 2. Concordance Table for the 2020 AEMP Annual Report, Version 0
- 2020 Annual AEMP Report

Table 1. Summary of Action Level Exceedances and Required Management Actions, 2020 AEMP

Component	Variable	Action Level	How the Action Level Exceedance was Determined	Detailed Results of Action Level Evaluation	Relation to Significance Threshold	Action Required[(a)]
Water Quality	Total Dissolved Solids (calculated) - Ice-Cover and Open-Water	2	See Appendix II, Section 2.4.5.1	See Appendix II, Section 3.5	Below Significance Threshold	None
	Total Suspended Solids - Open-Water	1				None
	Turbidity – lab - Ice-Cover	1				None
	Chloride - Ice-Cover and Open-Water	2				None
	Sulphate - Ice-Cover	1				None
	Sulphate - Open-Water	2				None
	Ammonia - Open-Water	1				None
	Nitrate - Ice-cover and Open-Water	2				None
	Aluminum - Ice-Cover	1				None
	Antimony- Ice-cover and Open-Water	1				None
	Barium - Ice-Cover	1				None
	Calcium - Ice-Cover and Open-Water	1				None
	Chromium - Ice-Cover	1				None
	Copper- Ice-Cover	1				None
	Magnesium - Ice-Cover	1				None
	Molybdenum - Ice-Cover and Open-Water	2				None
	Potassium - Open-Water	1				None
	Silicon - Ice-Cover and Open-Water	1				None
	Sodium - Ice-Cover and Open-Water	2				None
	Strontium - Ice-Cover and Open-Water	2				None
	Sulphur - Ice-Cover	1				None
	Uranium - Ice-Cover	1				None
	Uranium - Open-Water	2				None
Eutrophication	Chlorophyll *a*	2	See Appendix XIII, Section 2.5	See Appendix XIII, Section 3.3		None

(a) Management action required under the AEMP Response Framework

Table 2: 2020 AEMP Annual Report Concordance Items

Item #	Location of Direction	Type	Description	Location in Report and Associated Technical Appendices
1	26 May 2016 Letter re: 2011 to 2013 Aquatic Effects Re-evaluation Report, Version 3.1	Request	Outliers identified during the initial screening step will be included in the publicly available datasets submitted annually and will be clearly identified (e.g., highlighted and bolded within the raw data appendices). This was a request from EMAB that DDMI acknowledged.	Appendix II, Attachment D Appendix XI, Table 3-3 Appendix XIII, Attachments B, C, and G
2	26 May 2016 Letter re: 2011 to 2013 Aquatic Effects Re-evaluation Report, Version 3.1	Recommendation	EMAB comment #13 - Any waterbody or landmark that is mentioned in the text, tables or figures should be labeled on study area maps as appropriate.	Main Report, Figure 1-1
3	21 October 2019 Letter re: 2018 AEMP Annual Report	Decision	2 - The Board requires DDMI to include a description of all blank sample types in future AEMP annual Reports *Background: EMAB id'd confusions about the various blanks included as part of DDMI's QA/QC protocol (i.e. all applicable components). DDMI agreed they would include these descriptions in future AEMP reports.*	Appendix I, Appendix G Appendix II, Attachment B Appendix XIII, Attachment C
4	W2015L2-0001 Part J, Item 8	Water Licence Condition	This Report shall satisfy the requirements of Schedule 8, Item 4, and include information relating to data collected in the preceding calendar year:	Generally practiced throughout 2020 AEMP Report
5	W2015L2-0001 Schedule 8, Item 4 (REQUIREMENTS)	Water Licence Condition	a) a summary of activities conducted under the Aquatic Effects Monitoring Program;	Main Report, Sections 2.2, 3.2, 4.2, and 6.2 Appendix I, Section 2 Appendix II, Section 2 Appendix XI, Section 2 Appendix XIII, Section 2
6	W2015L2-0001 Schedule 8, Item 4 (REQUIREMENTS)	Water Licence Condition	b) tabular summaries of all data and information generated under the AEMP in an electronic and printed format acceptable to the Board	Appendix I, Attachments B, C, and D Appendix II, Attachments D* and E* Appendix XI, Attachments C* and D* Appendix XIII, Attachment G* (*provided as electronic files)
7	W2015L2-0001 Schedule 8, Item 4 (REQUIREMENTS)	Water Licence Condition	c) An interpretation of the results, including an evaluation of any identified environmental changes that occurred as a result of the Project	Main Report, Sections 2.3, 3.3, 4.3, 6.3, and 13.1 Appendix I, Sections 3 and 4 Appendix II, Sections 3 and 4 Appendix XI, Sections 3 and 4 Appendix XIII, Sections 3 and 4
8	W2015L2-0001 Schedule 8, Item 4 (REQUIREMENTS)	Water Licence Condition	d) an evaluation of any adaptive management response actions implemented during the year	Main Report, Section 12 Appendix II, Section 5 Appendix XI, Section 5 Appendix XIII, Section 5
9	W2015L2-0001 Schedule 8, Item 4 (REQUIREMENTS)	Water Licence Condition	e) recommendations for refining the Aquatic Effects Monitoring Program to improve its effectiveness as required; and,	Main Report, Section 13.2
10	W2015L2-0001 Schedule 8, Item 4 (REQUIREMENTS)	Water Licence Condition	f) an evaluation of the overall effectiveness of the Aquatic Effects Monitoring Program to date; and, any other information specified in the approved Aquatic Effects Monitoring Program or that may be requested by the Board.	Main Report, Section 13.3
11	27 October 2014 Letter re: 2013 AEMP Annual Report	Request	Report when any action levels are triggered, as well as the proposed management response and associated timelines	Main Report, Section 12 Appendix II, Sections 3.5 and 5 Appendix XI, Sections 3.3 and 5 Appendix XIII, Sections 3.3 and 5
12	28 August 2017 Letter re: 2016 AEMP Annual Report and Update to Schedule 8, Condition 3	Commitment	1a. DDMI stated that it will include maps that illustrate the A21 dike (EMAB comments 5 and 32).	Main Report, Figure 1-1
13	28 August 2017 Letter re: 2016 AEMP Annual Report and Update to Schedule 8, Condition 3	Commitment	1b. DDMI stated that it will include labelling of project infrastructure on figures showing the DDMI mine site (EMAB comment 8).	Main Report, Figure 1-1
14	25 March 2019 Letter re: 2014 to 2016 Aquatic Effects Re-evaluation Report and AEMP Design Plan, Version 5.0	Decision	6B. Provide full rationale for deviations to general statistical methods in all future AEMP-related reports; and	There were no deviations from general statistic methods Appendix I, Section 2 Appendix II, Section 2 Appendix XI, Section 2 Appendix XIII, Section 2
15	25 March 2019 Letter re: 2017 Aquatic Effects Monitoring Program (AEMP) Annual Report	Decision	3B - Directs DDMI to identify and explain any deviations from the Board-approved AEMP Design Plan in future Annual Reports and to propose required changes as updates to the AEMP Design Plan if necessary	Appendix I, Section 2 Appendix II, Section 2 Appendix XI, Section 2 Appendix XIII, Section 2
16	21 October 2019 Letter re: 2018 AEMP Annual Report	Decision	6 - The Board requires DDMI to identify erroneous data in future AEMP Annual Reports *Background: WLWB comment 5 identified an example of where erroneous values were excluded from a graphical summary of the data but were not described or identified clearly. In response, DDMI explained why sometimes data is considered to be erroneous (for example, due to equipment failure) and indicated that if required by the Board, they could highlight these erroneous values in future reports.*	Generally practiced throughout 2020 AEMP Report in relevant tables and figures
17	21 October 2019 Letter re: 2018 AEMP Annual Report	Decision	4 - The Board reminds DDMI to provide a discussion of all potential mine effects, regardless of their cause, including those related to the construction or dewatering of A21, in future AEMP Annual Reports *Background: The Board reminds DDMI that the AEMP should measure and evaluate all aquatic effects resulting from mine activities, including effects associated with dewatering and construction activities.*	Main Report, Sections 2.3, 3.3, 4.3, and 6.3 Appendix I, Section 3 and 4 Appendix II, Section 3 and 4 Appendix XI, Section 3 and 4 Appendix XIII, Section 3 and 4
18	25 March 2019 Letter re: 2014 to 2016 Aquatic Effects Re-evaluation Report and AEMP Design Plan, Version 5.0	Decision	The Board has decided to approve the change for comparisons to reference conditions, as opposed to FF area means, in Biological Action Levels 1 and 2 and believes this can be implemented during the 2019 AEMP season.	Appendix XI, Sections 3 and 4
19	25 March 2019 Letter re: 2014 to 2016 Aquatic Effects Re-evaluation Report and AEMP Design Plan, Version 5.0	Decision	6A. Provide more information in future Aquatic Effects Re-evaluation Reports to support the continued assumption that dust monitoring control stations are not affected by the mine.	Appendix I, Sections 3 and 4 Appendix XIII, Attachment F
20	25 March 2019 Letter re: 2014 to 2016 Aquatic Effects Re-evaluation Report and AEMP Design Plan, Version 5.0	Decision	3A. Assess the potential influence of dust on stations near A21 since the beginning of development and mining activities in that area as part of the 2019 AEMP Annual Report. This assessment should include a consideration of whether any of those stations should no longer be considered as background (either for all years, or during peak construction/activity years);	Appendix I, Section 3 Appendix XIII, Attachment F
21	28 August 2017 Letter re: 2016 AEMP Annual Report and Update to Schedule 8, Condition 3	Decision	4B. Provide all raw data for all variables monitored as part of the AEMP in excel spreadsheet format;	Appendix II, Attachments D* and E* Appendix XI, Attachments C and D Appendix XIII, Attachment G* (*provided as electronic files)
22	28 August 2017 Letter re: 2016 AEMP Annual Report and Update to Schedule 8, Condition 3	Commitment	1e. DDMI will remove reference to an 80% threshold in the RPD calculations for snow water chemistry (EMAB comment 25).	Appendix I, throughout Report

Table 2: 2020 AEMP Annual Report Concordance Items

Item #	Location of Direction	Type	Description	Location in Report and Associated Technical Appendices
23	25 March 2019 Letter re: 2017 Aquatic Effects Monitoring Program (AEMP) Annual Report	Decision	3A The Board directs DDMI to consider how to better detect and evaluate the influence of dust deposition on water quality in Version 5.1 of the AEMP Design Plan. This consideration should include a discussion of whether improvements to the dust monitoring program should be implemented to better quantify loadings from dust versus effluent.	Appendix XIII, Section 3.2.8 and Attachment F
24	25 March 2019 Letter re: 2014 to 2016 Aquatic Effects Re-evaluation Report and AEMP Design Plan, Version 5.0	Decision	3D. Be informed that the onus is on the company to ensure proper monitoring of mine-related effects and that additional sampling to help tease apart the effects of dust deposition versus effluent on TP concentrations should be considered by DDMI for the 2019 season.	Appendix XIII, Section 3.2.8 and Attachment F
25	25 March 2019 Letter re: 2014 to 2016 Aquatic Effects Re-evaluation Report and AEMP Design Plan, Version 5.0	Decision	3J.Implement the approved removal of zooplankton biomass monitoring under the Eutrophication Indicators component of the AEMP at site LDS-4 starting with the 2019 AEMP season.	Appendix XIII, Section 2.1
26	25 March 2019 Letter re: 2014 to 2016 Aquatic Effects Re-evaluation Report and AEMP Design Plan, Version 5.0	Decision	3K. Implement the approved inclusion of soluble reactive silica (SRS), total Kjeldahl nitrogen (TKN), and dissolved Kjeldahl nitrogen (DKN) monitoring under the Eutrophication Indicators component of the AEMP starting with the 2019 AEMP season.	Appendix XIII, Sections 1.3 and 2
27	25 March 2019 Letter re: 2014 to 2016 Aquatic Effects Re-evaluation Report and AEMP Design Plan, Version 5.0	Decision	3L. Implement the approved discontinuation of bicarbonate and pH reporting under the Eutrophication Indicators section of the AEMP Annual Report starting with the 2019 AEMP Annual Report.	Appendix XIII, Section 2
28	25 March 2019 Letter re: 2017 Aquatic Effects Monitoring Program (AEMP) Annual Report	Decision	2B - Directs DDMI to present the spatial extent of effects of eutrophication indicators for both the ice-covered and open-water seasons in future AEMP Annual Reports.	Appendix XIII, Sections 2.4.4.3, 3.2.6, and Attachment E
29	25 March 2019 Letter re: 2017 Aquatic Effects Monitoring Program (AEMP) Annual Report	Decision	2D - Directs DDMI to provide a tabular summary of results for eutrophication indicators, with percent change from baseline and the previous year, for 2017 (included in Table 1) and in future AEMP Annual Reports.	Appendix XIII, Attachment D
30	24 April 2017 Letter re: 2015 AEMP Annual Report	Directive	2D) Include a footnote to Figures 3.1-1 to 3.3-1 explaining the absence of any medians from the 0 to 100m zone.	Appendix I, Section 3
31	24 April 2017 Letter re: 2015 AEMP Annual Report	Directive	2E) Include an explanation of the lower and upper range of the BC dustfall objective for the mining industry.	Appendix I, Sections 2.1 and 3.1
32	27 October 2014 Letter re: 2013 Annual AEMP Report 14 November 2016 Letter re: 2014 AEMP Annual Report	Request	DDMI to include a subsection which considers the potential impacts of dust, in addition to the effect of effluent, on the water quality of Lac de Gras.	Appendix XIII, Section 3.2.8 and Attachment F
33	28 August 2017 Letter re: 2016 AEMP Annual Report and Update to Schedule 8, Condition 3	Commitment	1d. DDMI will consider including seasonal dust deposition data (EMAB comment 21).	Appendix XIII, Section 3.2.8 and Attachment F
34	21 October 2019 Letter re: 2018 AEMP Annual Report	Decision	5 - The Board requires DDMI to include a discussion of the role that dust plays in nutrient enrichment in the main body of future AEMP Annual Reports. *Background: It its review of the 2018 AEMP Annual Report, EMAB id'd that the main body of the Eutrophication chapter does not include a discussion of the role that dust loadings play towards nutrient enrichment in Lac de Gras; this discussion is included in an Appendix. DDMI provided this discussion in response to EMAB's comment, and the Board requires DDMI to be included in future reports.*	Appendix XIII, Section 3.2.8 and Attachment F
35	25 March 2019 Letter re: 2014 to 2016 Aquatic Effects Re-evaluation Report and AEMP Design Plan, Version 5.0	Decision	3M. Implement the approved inclusion of annual sampling for plankton variables (i.e., taxonomy and biomass for both phytoplankton and zooplankton) at stations in the MF and FF2 areas starting with the 2019 AEMP season;	Appendix XI, Section 2.1
36	25 March 2019 Letter re: 2014 to 2016 Aquatic Effects Re-evaluation Report and AEMP Design Plan, Version 5.0	Decision	3N. Implement the approved removal of plankton variable monitoring (i.e., taxonomy and biomass for both phytoplankton and zooplankton) under the Plankton component of the AEMP at site LDS-4 starting with the 2019 AEMP season;	Appendix XI, Section 2.2
37	25 March 2019 Letter re: 2014 to 2016 Aquatic Effects Re-evaluation Report and AEMP Design Plan, Version 5.0	Decision	3Q. Implement the approve change for comparisons to reference conditions, as opposed to FF area means, in Biological Action Levels 1 and 2 starting with the 2019 AEMP season.	Appendix XI, Sections 3 and 4
38	21 October 2019 Letter re: 2018 AEMP Annual Report	Decision	7 - The Board requires DDMI to include the QA/QC analysis for phytoplankton biomass in future AEMP Annual Reports *Background: DDMI indicated (in its response to EMAB requests of the 2017 and 2018 AEMP Annual Reports to include the QA/QC data) that it could provide this data in future reports.*	Appendix XI, Addendum B
39	21 October 2019 Letter re: 2018 AEMP Annual Report	Decision	3 - The Board requires DDMI to continue to monitor pH and evaluate for trends. Should DDMI observe more sites exhibiting a trend of increasing pH with depth, DDMI should discuss potential causes and impacts of this observation *Background: The Board understands that the anomalous observations could have been the result of a problem with the sampling equipment; however, is of the opinion that DDMI should monitor these sites (MF2-3 and FF2-3) in future AEMP sampling periods for emerging trends* .	Main Report, Section 3.3.3 Appendix II, Section 3.3
40	25 March 2019 Letter re: 2017 Aquatic Effects Monitoring Program (AEMP) Annual Report	Commitment	DDMI stated that it will add dissolved oxygen and pH benchmark values to the depth profile plots in future AEMP annual reports and will examine and evaluate evidence related to any potential mine-effects (EMAB comment 6).	Appendix II, Section 3.3
41	25 March 2019 Letter re: 2017 Aquatic Effects Monitoring Program (AEMP) Annual Report	Commitment	DDMI agreed to add results for LDS-4 to figures in future AEMP reports (EMAB comments 17 and 18).	Appendix II, Section 3 Appendix XI, Section 3 Appendix XIII, Section 3
42	14 November 2016 Letter re: 2014 AEMP Annual Report	Commitment	The Board notes that DDMI made one commitment for future reports in response to one of EMAB's comments. EMAB noted that "Several elements are listed under both "major ions" and "total metals" (e.g., calcium and sodium) but different concentrations are given. Presumably this is because the concentrations listed under "major ions" are dissolved concentrations and the latter are total concentrations; however, this is not clearly defined for the reader." (EMAB Comment #10). DDMI responded that "Concentrations listed under "major ions" will be clearly indicated as dissolved in future reports."	Main Report, Section 3.3 Appendix II, Section 2
43	28 August 2017 Letter re: 2016 AEMP Annual Report and Update to Schedule 8, Condition 3	Comment	1b. EMAB comment 37 recommended that depth profile figures for each NF station be provided. As part of the 2015 AEMP Annual Report, the Board has directed to DDMI to include vertical profile data collected at all stations as part of data appendices in future AEMP Annual Reports.31 This inclusion will begin with the 2017 AEMP Annual Report.	Appendix II, Section 3.3 and Attachment D
44	26 May 2016 Letter re: 2011 to 2013 Aquatic Effects Re-evaluation Report, Version 3.1	Recommendation	WLWB comment 35 - Please consider including EQCs, guideline, and/or benchmarks on figures in future Re-evaluation reports.	Appendix I, Section 3 Appendix II, Section 3 Appendix XIII, Section 3

Table 2: 2020 AEMP Annual Report Concordance Items

Item #	Location of Direction	Type	Description	Location in Report and Associated Technical Appendices
45	28 August 2017 Letter re: 2016 AEMP Annual Report and Update to Schedule 8, Condition 3 24 April 2017 Letter re: 2015 AEMP Annual Report 25 March 2019 Letter re: 2017 Aquatic Effects Monitoring Program (AEMP) Annual Report	Decision	2. DDMI is to include the results of its investigation and proposed recommendations regarding ammonia contamination issues.	Appendix II, Section 2.3.1 and Attachment B
46	25 March 2019 Letter re: 2014 to 2016 Aquatic Effects Re-evaluation Report and AEMP Design Plan, Version 5.0	Decision	3E. Start monitoring at the approved LDS-4 location during the 2019 AEMP season	Appendix II, Section 2.1 Appendix XI, Section 2.1 Appendix XIII, Section 2.1
47	25 March 2019 Letter re: 2014 to 2016 Aquatic Effects Re-evaluation Report and AEMP Design Plan, Version 5.0	Decision	3F. Implement the approved updated detection limit (DL) for total dissolved solids (TDS) (i.e., 1 mg/L) starting with the 2019 AEMP season	Appendix II, Table 2-2 and Section 3
48	25 March 2019 Letter re: 2014 to 2016 Aquatic Effects Re-evaluation Report and AEMP Design Plan, Version 5.0	Decision	3G. Implement the approved updated water quality Effects Benchmark for silver (from 0.1 µg/L to 0.25 µg/L) starting with the 2019 AEMP season	Appendix II, Section 2.4.4.3, Table 2-5 and Table 3-3
49	24 April 2017 Letter re: 2015 AEMP Annual Report	Commitment	Section 3.12 Commitments: The GNWT-ENR recommended that DDMI provide the raw toxicity test data as part of the AEMP reports (GNWT-ENR comment 9). In its response, DDMI stated that they would consider including these results as an appendix to the annual AEMP reports.	Appendix II, Attachment E
50	24 April 2017 Letter re: 2015 AEMP Annual Report	Commitment	Section 3.12 Commitments: Board staff recommended that DDMI consider including definitions of "T", "M", and "B" in footnote for Figure 4-3 (Board staff comment 1). In its response, DDMI stated that this will be added in future reports.	Main Report, Sections 3.3.5 and 4.3.2 Appendix II, Sections 3.6 and 3.7 Appendix XIII, Section 3
51	24 April 2017 Letter re: 2015 AEMP Annual Report	Directive	2A)Include the vertical profile data and Secchi depth data collected at all AEMP stations in the data appendices;	Appendix II, Attachment D Appendix XIII, Attachment G
52	28 August 2017 Letter re: 2016 AEMP Annual Report and Update to Schedule 8, Condition 3	Commitment	1c. Because Secchi depth data will be included in future AEMP Annual Reports following a previous Board directive, DDMI has stated that it will use this information, as appropriate, in the interpretation of results for phytoplankton biomass, taxonomy, and chlorophyll a (EMAB comments 13 and 45).	Appendix XIII, Sections 3.2.1, 3.2.5 and 4
53	24 April 2017 Letter re: 2015 AEMP Annual Report	Directive	2B) Include all relevant information, such as changes in detection limits, necessary to interpret monitoring results.	Appendix II, Section 2 Appendix XIII, Section 2
54	28 August 2017 Letter re: 2016 AEMP Annual Report and Update to Schedule 8, Condition 3	Commitment	1j. DDMI has noted that it will use a screening value of greater than 15% censoring to flag data sets that may require alternative analysis methods in future AEMP Annual Reports (Board staff comment 13).	Appendix II, Section 2.4 Appendix XIII, Section 2.4
55	2 June 2020 Letter re. AEMP Design Plan Version 5.1	Directive	2A. Begin sampling Stations FFD-1 and FFD-2;	Main Report, Sections 3.2, 4.2, and 6.2 Appendix II, Section 2.1 Appendix XI, Section 2.1 Appendix XIII, Section 2.1
56	3 June 2020 Letter re. AEMP Design Plan Version 5.1	Directive	2B. Discontinue sampling at stations LDS-2 and LDS-3 starting in the 2020 AEMP season;	Main Report, Sections 3.2, 4.2, and 6.2 Appendix II, Section 2.1 Appendix XI, Section 2.1 Appendix XIII, Section 2.1
57	4 June 2020 Letter re. AEMP Design Plan Version 5.1	Directive	2C. Begin annual sampling of zooplankton and phytoplankton under the plankton component in the MF area of Lac de Gras starting in the 2020 AEMP season; and	Appendix X, Section 2.1
58	5 June 2020 Letter re. AEMP Design Plan Version 5.1	Directive	2D. Begin annual sampling of zooplankton and phytoplankton under the plankton component at station FF1-2 starting in the 2020 AEMP season.	Appendix XI, Section 2.1

DIAVIK DIAMOND MINES (2012) INC.

AQUATIC EFFECTS MONITORING PROGRAM
2020 ANNUAL REPORT

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Executive Summary

Diavik Diamond Mines (2012) Inc. (DDMI) conducts environmental monitoring programs under the terms and conditions of Water Licence W2015L2-0001 issued for the Diavik Diamond Mine (Mine). The Aquatic Effects Monitoring Program (AEMP) is the primary program specified in the Water Licence for monitoring the aquatic environment of Lac de Gras.

The AEMP is a monitoring program "designed to determine the short and long-term effects on the aquatic environment resulting from the Project, to evaluate the accuracy of impact predictions, to assess the effectiveness of impact mitigation measures, and to identify additional impact mitigation measures to reduce or eliminate environmental effects of the licensed undertaking" (WLWB 2015). The goal of the AEMP is to protect the valued ecosystem components of Lac de Gras, which consist of water chemistry, sediment chemistry, lake productivity, plankton and benthic invertebrate communities, fish, fish habitat, and the use of fisheries resources in Lac de Gras.

To accomplish these objectives, aquatic effects monitoring conducted by DDMI has included an East Island-based monitoring program of source waters, represented by the Surveillance Network Program (SNP), and a lake-based monitoring program, represented by the AEMP. The lake monitoring program includes the following components:

- water chemistry monitoring in Lac de Gras
- aquatic biota monitoring in Lac de Gras (including fish surveys, plankton and benthic invertebrate community studies, and supporting sediment and water chemistry data collection)
- water chemistry and plankton monitoring in Lac du Sauvage, immediately upstream of the outflow (the Narrows) to Lac de Gras
- water chemistry and plankton monitoring at the Lac de Gras outflow near the mouth of the Coppermine River
- dust deposition monitoring on the East Island and on ice in Lac de Gras during winter
- special effects studies (SES), as required
- traditional knowledge studies

The lake monitoring program in Lac de Gras generally occurs in three areas:

- the near-field (NF) area located near the effluent diffusers
- three mid-field (MF) areas, MF1, MF2, and MF3, generally surrounding the East Island, and extending away from the NF area
- three far-field (FF) areas, FF1, FFA and FFB, located further from the Mine

A new station, FFD-1, was added in 2020 which falls between the FF1 and MF3 areas. All AEMP sampling areas were exposed to Mine effluent to varying degrees, with the greatest exposure in the NF area, lowest exposure in the FF1, FFA, FFB areas (former reference areas), and intermediate levels of exposure in the MF1, MF2 and MF3 areas. The 2020 AEMP was carried out according to the requirements specified in the

AEMP Design Plan Version 4.1 for an interim monitoring year, which does not require sampling in all designated sampling areas in the lake. All FF areas in Lac de Gras are sampled every third year during the comprehensive monitoring program to allow a detailed assessment of Mine-related effects. During the interim monitoring program, sampling is carried out in the NF and MF sampling areas, and at stations FF1-2 and FFD-1.

The focus of the assessment for an interim year Annual Report is on the analyses of effects on water quality, nutrients, and plankton, to determine whether actions are required to manage effects. This is done by evaluating the presence and magnitude of each effect (e.g., is the concentration of a water quality variable greater than the background range and is it reaching a guideline?) and spatial extent of effects (e.g., how much of the lake is affected?). Dust deposition is also monitored during interim years. The importance of effects is evaluated by comparisons to Action Levels, which are part of a Response Framework. The goal of the Response Framework is to ensure that significant adverse effects never occur in Lac de Gras. A detailed assessment of trends over time was provided in the *2017 to 2019 Aquatic Effects Re-evaluation Report*.

To better communicate AEMP results to the range of technical and non-technical parties who are interested in the results, we have provided information in two ways. First, the main body of the report provides a non-technical summary of the most important results from the 2020 studies. Second, technical appendices provide a full description of the analyses conducted and results obtained. These appendices are intended for parties with more technical interests.

Key findings from the 2020 AEMP include the following:

- Action Level triggers for effluent and water chemistry, and eutrophication indicators were triggered in 2020, as described below:
  - There are 9 defined Action Levels for the effluent and water chemistry component. Mine effluent triggered Action Level 1 (which is considered an early-warning indicator of effects in the NF area) for 21 water quality variables, including total dissolved solids [TDS; calculated], total suspended solids [TSS], turbidity, calcium, chloride, magnesium, potassium, sodium, sulphate, ammonia, nitrate, aluminum, antimony, barium, chromium, copper, molybdenum, silicon, strontium, sulphur, and uranium. All 21 water quality variables were included as substances of interest (SOIs) in 2020. Of the 21 SOIs that triggered Action Level 1, eight also triggered Action Level 2, and included TDS [calculated], chloride, sodium, sulphate, nitrate, molybdenum, strontium, and uranium. None of the water quality variables reached Action Level 3. Regulated effluent parameters were all below applicable effluent quality criteria (EQC). The 2020 effluent toxicity results indicated that the effluent discharged to Lac de Gras in 2020 was non-toxic.
  - Action Level 2 was triggered for eutrophication indicators base on chlorophyll *a* concentrations. Elevated concentrations of nutrients and chlorophyll *a* in the NF and MF areas indicated that the Mine is having a nutrient enrichment effect in Lac de Gras. In 2020, concentrations of total phosphorus (TP) were below the normal range at all stations for both seasons and all depths; therefore, the area of the lake affected by TP was 0%. Although a clear effect on phosphorus concentrations in lake water was not detected, likely due to rapid utilization of this nutrient, Mine-related phosphorus loading is the most likely factor accounting for the observed biological effects. The extent of effect on total nitrogen (TN) was 40% of lake area during the open-water season and greater than or equal to 48% during the ice-cover season. The extent of effects on chlorophyll *a*,

phytoplankton biomass and zooplankton biomass were 22%, 2.8%, and 57% of Lac de Gras, respectively.

- No Action Levels were triggered for plankton in 2020. The 2020 plankton data indicate that a toxicological effect is not occurring in Lac de Gras. Rather, results continue to be consistent with nutrient enrichment. Greater plankton biomass was observed in the NF area compared to the MF areas and the reference condition mean. The NF area mean values for total phytoplankton and zooplankton taxonomic richness and biomass were greater than the reference condition mean, indicating that Action Level 1 was not triggered.

Other findings from the 2020 AEMP include the following:

- Dust deposition rates were greatest close to the Mine infrastructure and decreased with distance from the Mine.
- Although there are no dustfall standards for the Northwest Territories, 2020 dustfall rates were below the commercial and industrial objective of 1,924 mg/dm^2/y documented in the Alberta Ambient Air Quality Objectives Guideline.
- Snow water chemistry variables of interest included aluminum, ammonia, arsenic, cadmium, chromium, copper, lead, nickel, nitrite, phosphorus, and zinc. All 2020 concentrations were below the corresponding EQC values. DDMI compares the measured total metals levels for dust with EQC only because these criteria provide concentrations that can serve as general performance indicators. There is no intention or requirement that snow samples must meet the EQC or Alberta dustfall objectives.

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Acronyms and Abbreviations

AEMP	Aquatic Effects Monitoring Program
AFDM	ash-free dry mass
ALS	ALS Laboratories
Biologica	Biologica Environmental Services, Ltd.
BV Labs	Bureau Veritas Laboratories
CWQGs	Canadian Water Quality Guidelines
DDMI	Diavik Diamond Mines (2012) Inc.
DO	dissolved oxygen
EA	Environmental Assessment
EQC	effluent quality criteria
ERM	ERM Consultants Canada Ltd.
FF	far-field
Golder	Golder Associates Ltd.
LDG	Lac de Gras
LDS	Lac du Sauvage
MF	mid-field
Mine	Diavik Diamond Mine
Mine centroid	geographic centre of the Mine
MZ	mixing zone
NF	near-field
NIWTP	North Inlet Water Treatment Plant
QAPP	Quality Assurance Project Plan
SD	standard deviation
SES	special effects study
SNP	Surveillance Network Program
SOI	substance of interest
SRP	soluble reactive phosphorus
SRSi	soluble reactive silica
TDS	total dissolved solids
TDP	total dissolved phosphorus
TN	total nitrogen
TP	total phosphorus
WLWB	Wek'èezhìı Land and Water Board
ZOI	zone of influence

Symbols and Units of Measure

+	plus
%	percent
>	greater than
<	less than
±	plus or minus
µg/L	micrograms per litre
µg-N/L	micrograms nitrogen per litre
µg-P/L	micrograms phosphorus per litre
cm	centimetre
km	kilometre
km^2	square kilometre
m	metre
kg	kilogram
kg/mo	kilograms per month
kg/yr	kilograms per year
mg/dm^2	milligrams per square decimetre
$mg/dm^2/y$	milligrams per square decimetre per year

1 INTRODUCTION

1.1 Background Information

Diavik Diamond Mines (2012) Inc. (DDMI) conducts environmental monitoring programs under the terms and conditions of Water Licence W2015L2-0001 (WLWB 2015) issued for the Diavik Diamond Mine (Mine). The Mine is a diamond mining operation which discharges effluent to Lac de Gras following treatment at an on-site water treatment plant, the North Inlet Water Treatment Plan (NIWTP) (Figure 1-1). The Aquatic Effects Monitoring Program (AEMP) is the primary program described in the Water Licence for monitoring the aquatic environment of Lac de Gras.

The Water Licence for the Mine requires that DDMI review and update the AEMP design plan every three years, or as directed by the Wek'èezhìı Land and Water Board (WLWB). The current AEMP design is described in the *AEMP Design Plan Version 4.1* (Golder 2017a). The design plan describes how water, sediment, and biological monitoring studies are to be conducted under the AEMP. The reader is encouraged to review the document for specifics regarding the current AEMP design. Although *AEMP Design Plan Version 4.1* (Golder 2017a) is the approved version of the AEMP design at the time this report was written, a number of updates proposed in *AEMP Design Plan Version 5.1* (Golder 2019a), and subsequently detailed in *AEMP Design Plan Version 5.2* (currently in WLWB review; Golder 2020a) and in WLWB directives (i.e., 28 August 2017, 24 January 2018, 25 March 2019, 21 October 2019, and 1 June 2020 Decision Packages) have been incorporated into the 2020 AEMP Report. Specific updates have been outlined in Section 1 of each AEMP component (see Appendix I to XV).

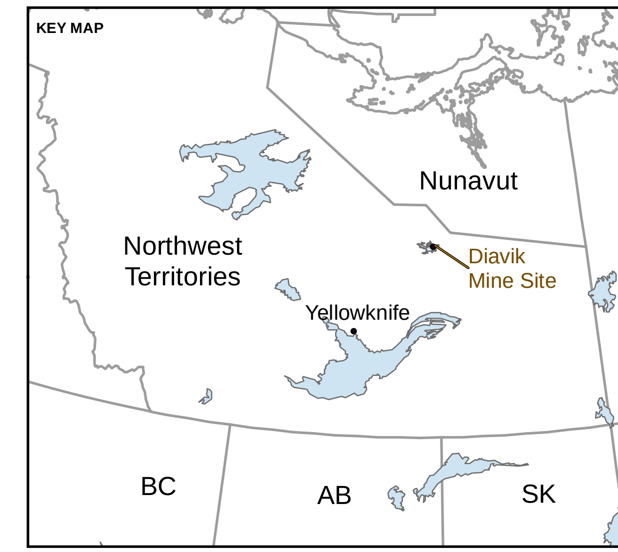
As summarized in the *AEMP Design Plan Version 4.1* (Golder 2017a), Mine effluent discharge (i.e., effluent) represents the main concern for Lac de Gras. The effluent, combined with other Mine-related stressors (e.g., dust deposition) and their potential impact on the lake ecosystem, is the principal focus of the AEMP. The AEMP has also been designed to include the results of other sources of information, specifically the outcomes of Traditional Knowledge studies, on potential effects on the lake. A summary of all AEMP data collected since before mining began, up to and including 2019, was provided in the *2017 to 2019 Aquatic Effects Re-evaluation Report* (Golder 2020b). The report evaluated trends over time in AEMP components, and as such, the *2017 to 2019 Aquatic Effects Re-evaluation Report* (Golder 2020b) is an important reference when considering ongoing monitoring results.

Sampling for the AEMP is required once during late ice-cover conditions (i.e., April and/or May) and once during open-water conditions (i.e., between 15 August and 15 September). The magnitudes of effects are evaluated by comparing water chemistry and biological results for the near-field (NF) and mid-field (MF) areas to "reference conditions". Reference conditions for Lac de Gras are those that fall within the range of natural variability, referred to as the "normal range". The normal ranges used to assess effects of the Mine on individual components of the AEMP are described in the *AEMP Reference Conditions Report Version 1.4* (Golder 2019b). Values that exceed the normal range are considered different from what would be considered natural levels for Lac de Gras, but do not represent levels that are harmful. To evaluate whether water quality variables are reaching potentially harmful concentrations, results are compared to AEMP Effects Benchmarks (as defined in the *AEMP Design Plan Version 4.1* [Golder 2017a]). Similar to water quality guidelines, AEMP Effects Benchmarks are intended to protect fish and other aquatic life in Lac de Gras. Comparison of water quality results to Effects Benchmarks provides an indication of how close the concentrations of water quality variables (e.g., metals[1]) are to concentrations that could be harmful to aquatic life in the lake.

[1] The term metal is used throughout this report and includes non-metals (e.g., selenium) and metalloids (e.g., arsenic).

LEGEND

INFRASTRUCTURE



0 500 1,000

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REFERENCE(S)

1. 2018 WORLDVIEW IMAGE OBTAINED FROM CLIENT
PROJECTION: UTM ZONE 12 DATUM: NAD 83

CLIENT

RioTinto

PROJECT

DIAVIK DIAMOND MINES (2012) INC.

TITLE

SITE PLAN, 2020

CONSULTANT

GOLDER

YYYY-MM-DD	2021-03-22
DESIGNED	MC
PREPARED	LMS
REVIEWED	MC
APPROVED	RLS

PROJECT NO.	PHASE	REV.	FIGURE
20136424	10000	0	1-1

1.2 Purpose and Objectives

As defined in the Water Licence, the AEMP is a monitoring program designed to “determine the short and long-term effects in the aquatic environment resulting from the Project, to evaluate the accuracy of impact predictions, to assess the effectiveness of impact mitigation measures, and to identify additional impact mitigation measures to reduce or eliminate environmental effects of the licensed undertaking” (WLWB 2015). The AEMP is focused on the valued ecosystem components of Lac de Gras, which have been evaluated in previous site investigations, including the Environmental Assessment (EA), and consist of fish, fish habitat, water quality, sediment quality, lake productivity, plankton and benthic invertebrate communities, and the use of fisheries resources in Lac de Gras (DDMI 1998).

In 2015, DDMI’s Water Licence was renewed for a period of eight years, effective 19 October 2015. This AEMP 2020 Annual Report addresses the requirements specified in Part J Item 8 (Table 1-1) of the Water Licence (WLWB 2015).

Table 1-1 Aquatic Effects Monitoring Program Annual Reporting Requirements Specified in Part J, Item 8 of the Water Licence

Item	Location in the AEMP 2020 Annual Report
a) a summary of activities conducted under the AEMP;	Main Report, Section 2.2, 3.2, 4.2, and 6.2. Appendix I, Section 2 Appendix II, Section 2 Appendix XI, Section 2 Appendix XIII, Section 2
b) tabular summaries of all data and information generated under the AEMP in an electronic and printable format acceptable to the Board;	Appendix I, Attachments B to D Appendix II, Attachments D* and E* Appendix XI, Attachments C* and D* Appendix XIII, Attachment G* (*also provided in attached electronic files)
c) an interpretation of the results, including an evaluation of any identified environmental changes that occurred as a result of the Project;	Main Report, Section 13.1 Appendix I, Sections 3 and 4 Appendix II, Sections 3 and 4 Appendix XI, Sections 3 and 4 Appendix XIII, Section 3 and 4
d) an evaluation of any adaptive management response actions implemented during the year;	Main Report, Section 12 Appendix II, Section 5 Appendix XI, Section 5 Appendix XIII, Section 5
e) recommendations for refining the AEMP to improve its effectiveness as required; and	Main Report, Section 13.2
f) an evaluation of the overall effectiveness of the AEMP to date; and, any other information specified in the approved AEMP or that may be requested by the Board.	Main Report, Section 13.3

An objective of the AEMP is to monitor the Mine effluent discharge and assess potential ecological risks, so that appropriate actions can be taken to prevent adverse effects from occurring in the environment. The AEMP is updated at regular intervals and incorporates new information and findings as they become available. The AEMP compares effluent quality to effluent quality criteria (EQC), as defined in the Water Licence, and evaluates compliance monitoring and the effectiveness of operational management (e.g., mitigation) measures.

The AEMP consists of the following components:

- a water and sediment chemistry program in Lac de Gras
- an aquatic biota monitoring program in Lac de Gras, including fish, benthic invertebrate, and plankton surveys
- a dust deposition monitoring program
- special effects studies (SES), as required, as part of the Water Licence and the Fisheries Authorization for the Mine
- traditional knowledge studies

Three general areas of Lac de Gras are monitored under the AEMP:

- the NF exposure area, located near the effluent diffusers (Figure 1-2)
- the MF exposure areas (i.e., MF1, MF2, and MF3), generally surrounding the East Island and extending away from the NF area (Figure 1-2)
- the far-field (FF) exposure areas (i.e., FF1, FFA, FFB) located further from the Mine[2]

A new station, FFD-1, was added in 2020 which falls between the FF1 and MF3 areas (Figure 1-2). The FF1, FFA and FFB areas were formerly reference areas, and data from these areas were used to develop normal ranges as presented in the *AEMP Reference Conditions Report Version 1.4* (Golder 2019b).

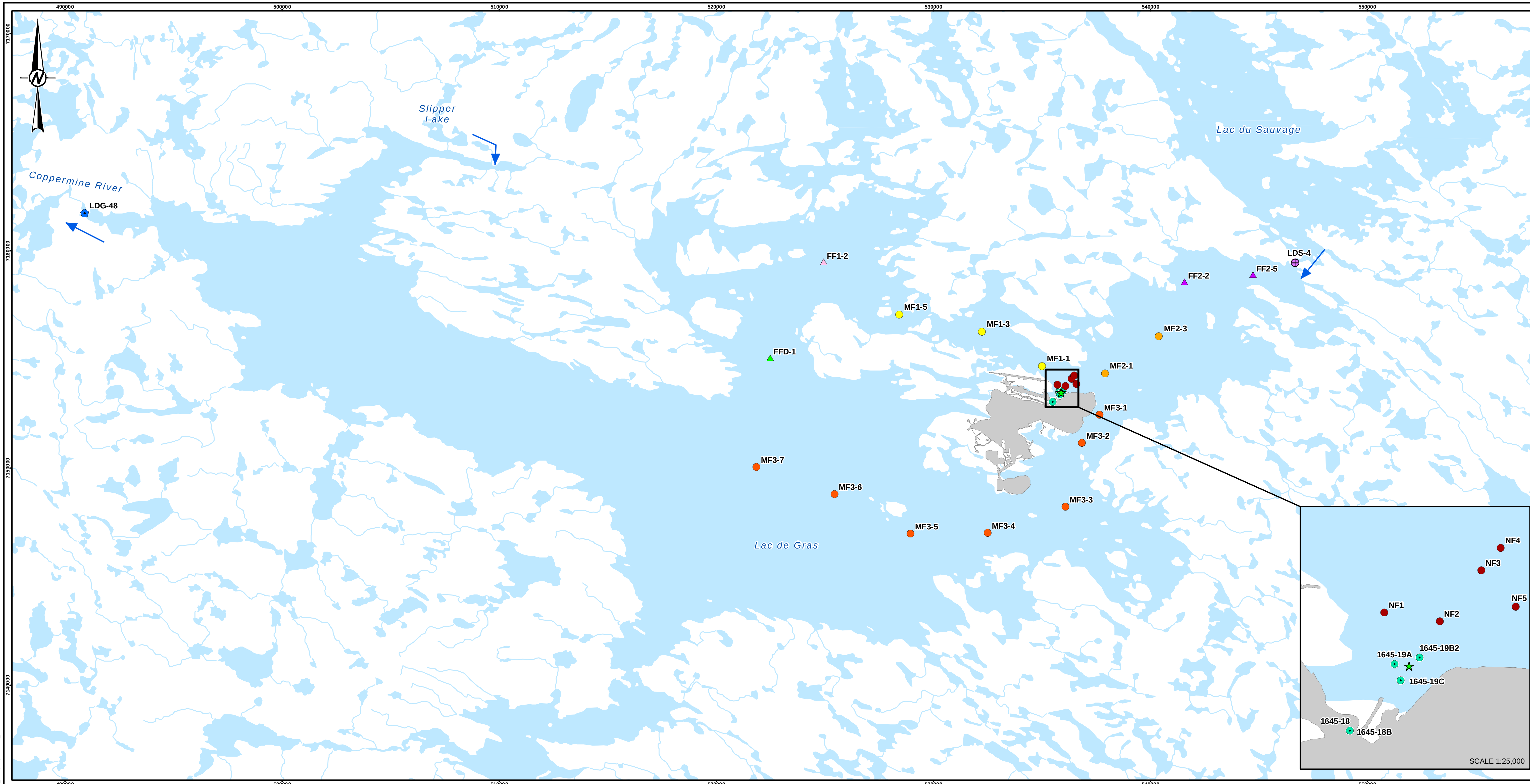
In addition to sampling in the above areas of Lac de Gras, water quality, sediment quality and eutrophication indicators are also sampled at the inflow to Lac de Gras from Lac du Sauvage (i.e., Station LDS-4 located at the Narrows), at Station LDS-1 in Lac du Sauvage near the outflow to Lac de Gras, and at the Lac de Gras outflow to the Coppermine River (i.e., Station LDG-48). Plankton is also sampled at Stations LDS-1 and LDG-48.

Sampling for the AEMP in 2020 was carried out according to the requirements specified in the *AEMP Design Plan Version 4.1* (Golder 2017a) for an interim monitoring year. Dust deposition monitoring, and sampling of water quality, plankton, and eutrophication indicators in the NF and MF areas of Lac de Gras are included in interim years, as well as water quality, eutrophication and plankton sampling at the Narrows (i.e., LDS-4) and the mouth of the Coppermine River (i.e., LDG-48). Per the WLWB approved updates in the A*EMP Design Plan Version 5.1* (Golder 2019a), one station in the FF1 area (i.e., FF1-2) and the new FFD-1 station were added to the interim monitoring year for water quality, plankton and eutrophication indicators sampling. The three FF areas (i.e., FF1, FFA, FFB) in Lac de Gras and the additional station located in Lac du Sauvage near the outflow to Lac de Gras (i.e., LDS-1) are sampled every third year during the

[2] Far-field sampling areas are only sampled in comprehensive years, and 2020 was not a comprehensive year. The far-field sampling areas are shown on Figure 1-2 in the *Aquatics Effects Monitoring Program 2019 Annual Report* (Golder 2020c).

comprehensive monitoring program to allow detailed spatial assessment of Mine-related effects. The comprehensive program also includes sediment sampling, more detailed biological sampling (i.e., benthic invertebrates and fish sampling) and an overall weight-of-evidence analysis. The next comprehensive monitoring program is scheduled for 2022.

The objective of this annual report is to present the results of the 2020 interim monitoring program. Similar annual reports containing results of the 2007 through to 2019 AEMP years were prepared by DDMI (2008, 2009, 2010, 2011, 2012, 2013) and Golder (2014, 2016a,b, 2017b, 2018, 2019c, 2020c). Every third year, AEMP results from the previous three years are integrated in an Aquatic Effects Re-evaluation Report, which includes detailed spatial analysis of effects, analyses of trends over time, and a comparison of results to predicted effects (Government of Canada 1999). The last re-evaluation report was submitted in December 2020 as the *2017 to 2019 Aquatic Effects Re-evaluation Report* (Golder 2020b). The 2020 to 2022 re-evaluation report is expected to be scheduled for submission on 31 December 2023.



LEGEND

- DIFFUSERS
- SURVEILLANCE NETWORK PROGRAM

STATION LOCATIONS

- FAR-FIELD 1
- FAR-FIELD 2
- FAR-FIELD D
- LAC DE GRAS OUTLET
- LAC DU SAUVAGE OUTLET
- MID-FIELD 1
- MID-FIELD 2
- MID-FIELD 3
- NEAR-FIELD

- FLOW DIRECTION
- WATERCOURSE
- DIAVIK FOOTPRINT
- WATERBODY

0 5 10
1:175,000 KILOMETRES

REFERENCE(S)
HYDROGRAPHY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 12 DATUM: NAD 83

CLIENT
RioTinto

PROJECT
DIAVIK DIAMOND MINES (2012) INC.

CONSULTANT
GOLDER

YYYY-MM-DD	2021-03-22
DESIGNED	MC
PREPARED	LMS
REVIEWED	MC
APPROVED	RLS

TITLE
SAMPLING STATIONS, 2020 AEMP

PROJECT NO.	PHASE	REV.	FIGURE
20136424	10000	0	1-2

1.3 AEMP Annual Report Content and Organization

The organization of this report follows the outline provided in Section 7.3 of the *AEMP Design Plan Version 4.1* (Golder 2017a). To better communicate the results of the AEMP to the range of technical and non-technical parties who are interested, we have provided information in two ways. First, this main body of the report provides a summary of the most important results from the 2020 studies, presented in a non-technical way. Second, the appendices provide a full technical description of analyses conducted and results obtained. These appendices are intended for parties with more technical interests. The technical appendices prepared for the 2020 annual report include:

- Appendix I – Dust Deposition Report
- Appendix II – Effluent and Water Chemistry Report
- Appendix XI – Plankton Report
- Appendix XIII – Eutrophication Indicators Report

Appendix I was prepared by ERM Consultants Canada Ltd. (ERM) and technical Appendices II through XV were prepared by Golder Associates Ltd. (Golder).

The order in which the appendices appear in the annual report and the appendix number for a given component is the same from year to year, even though there may not be a technical report for a given component in each year. This was done to meet reporting commitments stated in the *AEMP Design Plan Version 4.1* (Golder 2017a) and as a means of tracking available information. The technical report "placeholder" appendices, which do not contain a technical report for 2020 include:

- Appendix III – Sediment Report
- Appendix IV – Benthic Invertebrate Report
- Appendix V – Fish Report[3]
- Appendix VI – Plume Delineation Survey
- Appendix VII – Dike Monitoring Study
- Appendix VIII – Fish Salvage Program
- Appendix IX – Fish Habitat Compensation Monitoring
- Appendix X – Fish Palatability, Fish Health, and Fish Tissue Chemistry Survey[4]
- Appendix XII – Special Effects Study Reports
- Appendix XIV – Traditional Knowledge Studies[5]
- Appendix XV – Weight-of-Evidence Report

There are no technical reports for these components in 2020, therefore, a note has been inserted in the appropriate appendix placeholder stating that the component was not monitored in 2020.

[3] Appendix V includes the Slimy Sculpin fish health and fish tissue survey report.

[4] Appendix X is a placeholder for Fisheries Authorization surveys (e.g., Fish Habitat Utilization surveys).

[5] Appendix XIV includes the fish palatability data from Lake Trout collected as part of the Traditional Knowledge Studies program.

2 DUST DEPOSITION

2.1 Introduction and Objectives

Many of the activities at the Mine generate dust, in particular, trucks travelling on roads, the dumping of Mine rock on the waste rock piles, and activities associated with construction. The dust in the air can be transported by wind, but eventually settles on the ground or the lake surface. In accordance with the EA and requirements associated with the AEMP, a dust monitoring program was initiated in 2001. The objective of the dust monitoring program is to measure the amount of dustfall at various distances from the Mine footprint and to describe the chemical characteristics of the dustfall deposited into Lac de Gras and the surrounding area.

The detailed technical report on the findings from the 2020 dust deposition monitoring program is provided in the *Dust Deposition Report* (Appendix I). An overview of the dust deposition monitoring program and a summary of the 2020 results are provided herein.

2.2 Methods

The 2020 dustfall monitoring program used three sampling methods: dustfall gauges, snow surveys, and snow water chemistry. Sampling was completed at varying distances around the Mine along five transects, including three reference stations (referred to as "control stations") intended to measure the background dust deposition rate.

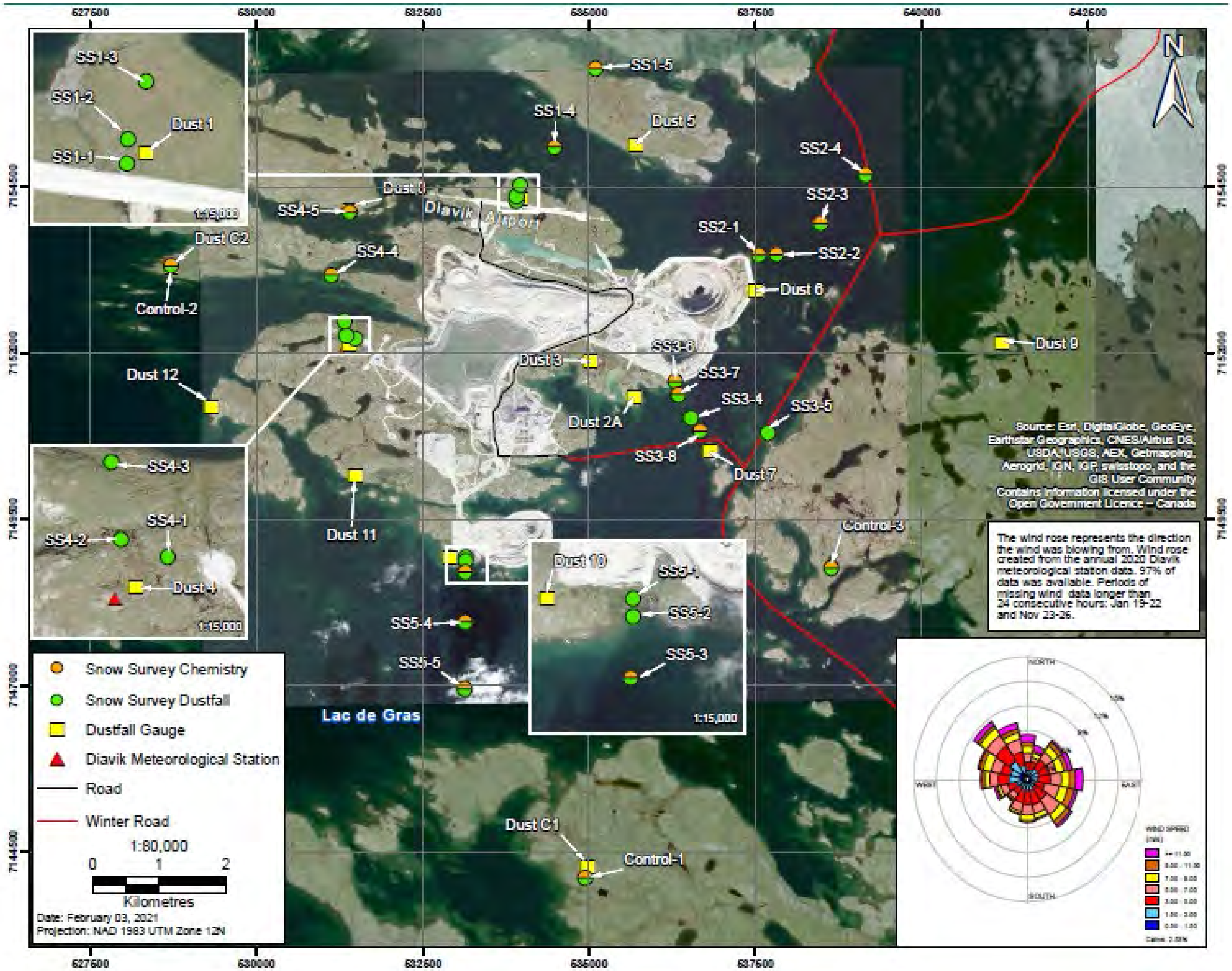
2.2.1 Dustfall Gauges

Passive sampling of airborne particles was done using dust collection gauges. A dust gauge is a hollow brass cylinder, 52 cm in length and 12.5 cm in diameter, surrounded by a fibreglass shield with the shape of an inverted bell (Photo 2-1). Dustfall gauges were placed at 14 stations (including two control stations) around the Project at distances ranging from approximately 13 to 4,646 m from mining operations (Figure 2-1). All fourteen stations collected dustfall year-round, with samples removed every three months from late 2019 to early 2021, for an average total sampling period of 376 days. The dry weight of the material collected in the gauges was recorded, and the mean daily dustfall rate over the collection period was estimated.

The Northwest Territories has no guidelines or objectives for dustfall deposition. Estimated dustfall rates were therefore compared to the Alberta Ambient Air Quality Objectives and Guidelines for dustfall (AEP 2019), which are used only as general performance indicators and are not a regulatory requirement in compliance evaluation. The Alberta Ambient Air Quality Guidelines for dustfall include a guideline for residential and recreational areas (i.e., 53 mg/dm^2 per 30 days, or 646 mg/dm^2 per year), and a guideline for commercial and industrial areas where higher dustfall rates are expected (i.e., 158 mg/dm^2 per 30 days, or 1,924 mg/dm^2 per year).

Photo 2-1 Dustfall gauge during sample collection. The dustfall gauge consisted of a hollow brass cylinder (centre) housed inside a Nipher snow gauge (right).

Figure 2-1 2020 Dustfall Gauge and Snow Core Survey Sampling Stations



2.2.2 Snow Core Surveys

In the snow core surveys, a cylindrical section of snow was collected by drilling into the snowpack with a hollow tube (Photo 2-2). The collected snow was then brought back to the laboratory, thawed, filtered, and the residue was dried, and weighed. Mean daily dustfall was calculated over the collection period, and dustfall rates were compared to the Alberta Ambient Air Quality Objectives and Guidelines for dustfall (AEP 2019), which are used only as general performance indicators and are not a regulatory requirement in compliance evaluation.

Snow survey samples were collected along five transects at 27 stations, including three control stations (Figure 2-1). The average total sampling season in 2020 was 168 days for on-ice stations, and 198 days for land stations. The start dates corresponded to the first snowfall for land stations on 28 September 2019, and the period shortly after freeze-up for on-ice stations, on 28 October 2019.

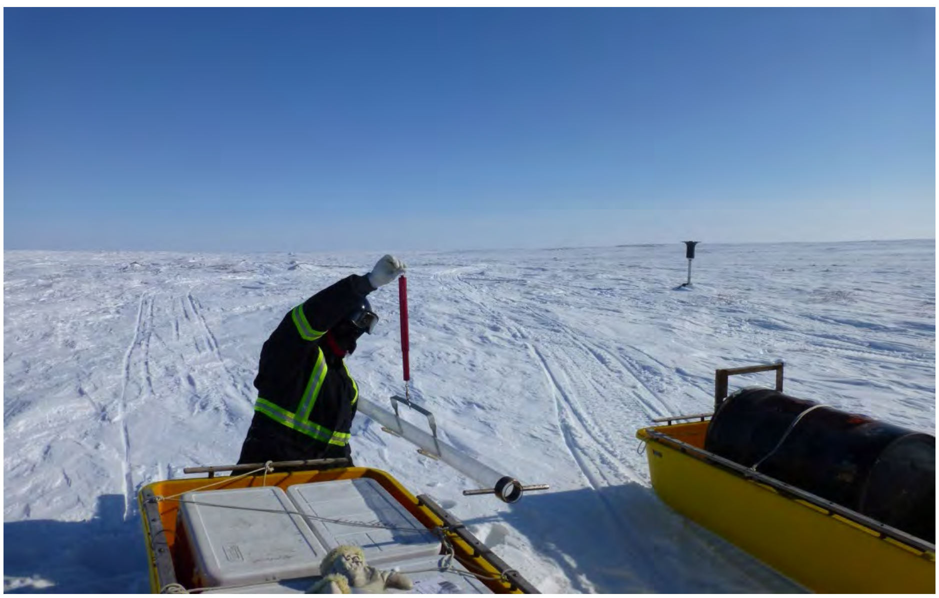


Photo 2-2 Snow core sampling

2.2.3 Snow Water Chemistry

Samples for snow water chemistry analysis were collected using a snow corer at 19 locations, including 16 dustfall snow survey stations located on ice and 3 control locations (on ice adjacent to the control stations) (Figure 2-1). On average, for the 16 sampling locations on ice, the total sampling season was 168 days in 2020 (control stations not included). Snow cores were processed and shipped to Bureau Veritas Laboratories (BV Labs, previously Maxxam Analytics Inc.) for water chemistry analyses. Snow water chemistry results were compared to the EQCs outlined in DDMI’s Water Licence. Snow chemistry analytes of interest included variables with EQCs (i.e., aluminum, ammonia, arsenic, cadmium, chromium, copper, lead, nickel, nitrite, zinc and phosphorus).

2.3 Results and Discussion

2.3.1 Dustfall Gauges

The total dustfall collected from each dustfall gauge is summarized in Table 2-1 and Figure 2-2. As expected, dustfall levels generally decreased with distance from the Mine site. Annual dustfall estimated from each of the 14 dustfall gauges ranged from 78 to 757 mg/dm^2/y. The greatest estimated dustfall rate was measured at Dust 10 (757 mg/dm^2/y; 46 m from the Mine perimeter). The second highest estimated dustfall rate was measured at Dust 3 (599 mg/dm^2/y; 22 m from the Mine perimeter). The lowest dustfall rate was recorded at Dust 9 (78 mg/dm^2/y; 3,796 m to the east). Control stations Dust C1 (118 mg/dm^2/y; 4,646 m to the south) and Dust C2 (103 mg/dm^2/y; 3,031 m to the west) both recorded higher dustfall rates than Dust 9, which is explained by the distance of Dust 9 from the Project footprint, placing it within the control station zone.

The dustfall rates estimated from dustfall gauges in 2020 were slightly lower but comparable to the 2019 rates. The higher recorded dustfall values that have been recorded since 2018 compared to previous years suggest that dustfall rates from 2018 to 2020 were likely influenced by the surface activity at the Mine, particularly at the A21 open pit. The 2020 annualized dustfall rates estimated from gauges at all stations were below the upper limit of the Alberta Ambient Air Quality Objectives and Guideline for dustfall (1,924 mg/dm^2/y), which is applied to commercial and industrial areas (AEP 2019).

2.3.2 Snow Core Surveys

The total dustfall collected from each snow survey station is summarized in Table 2-1 and Figure 2-2. Annual dustfall rates estimated from 2020 snow survey data ranged from 5 to 1,463 mg/dm^2/y. In general, dustfall rates decreased with increasing distance from the Mine site, with the greatest dust deposition rate recorded at SS5-1 (1,463 mg/dm^2/y) followed by SS1-1 (1,017 mg/dm^2/y). SS1-1 is located due north of the airstrip, which explains the higher levels of dustfall found here. This site recorded the highest rates from 2017 to 2019. (Figure 2-2).

Annualized dustfall rates estimated from snow survey stations in 2020 were generally comparable to 2019 dustfall estimates. Annualized dustfall rates measured at all stations during the 2020 snow survey were below the Alberta Ambient Air Quality Objectives and Guidelines for commercial and industrial areas.

2.3.3 Snow Water Chemistry

In general, analyte concentrations in snow meltwater decreased with distance from the Mine site. Concentrations in 2020 were lower compared to recent years for all parameters except nitrite The highest concentrations of all variables were less than their corresponding EQC.

Table 2-1 2020 Dustfall Deposition Results

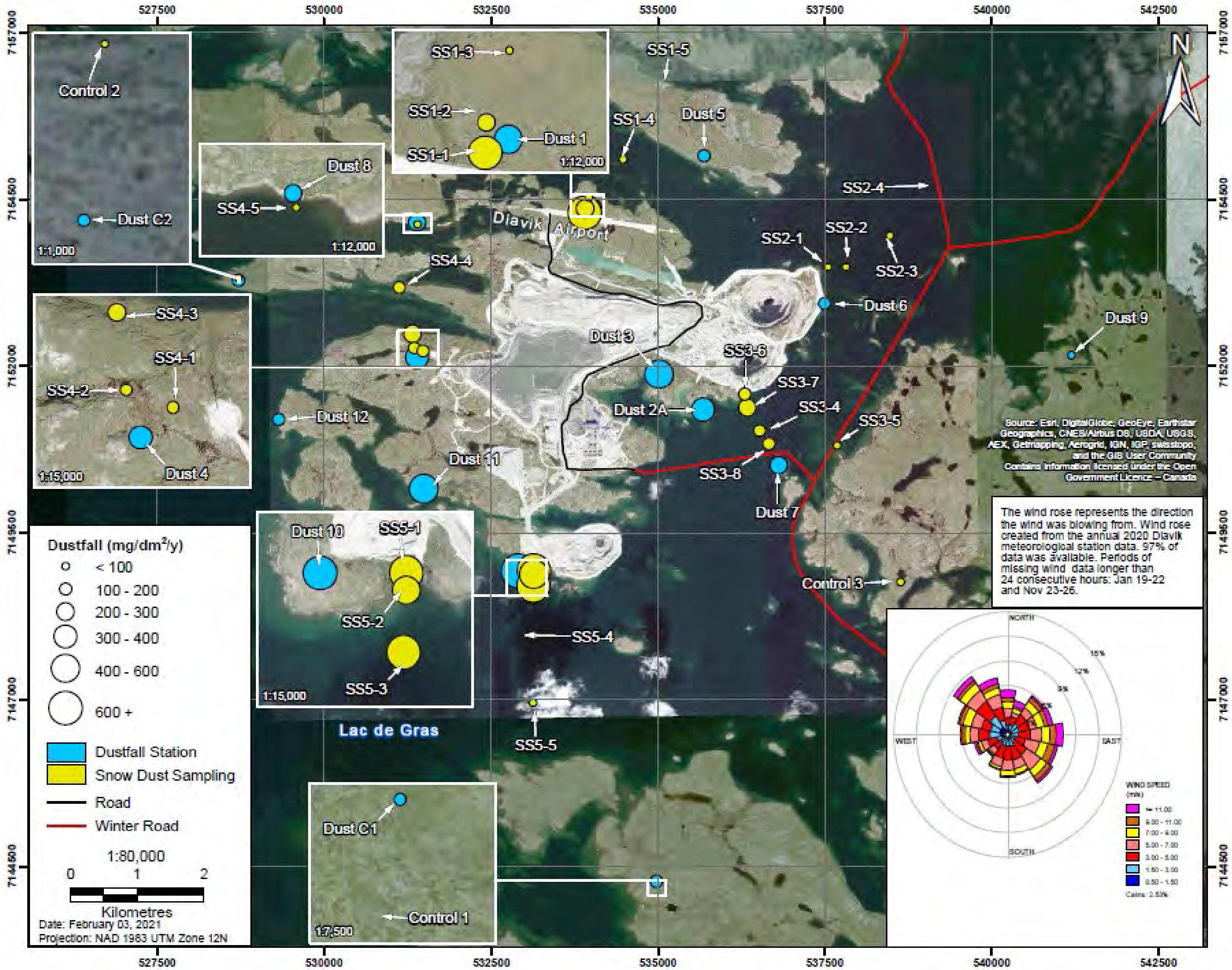
Zone	Station	Approximate Distance from 2020 Mine Footprint (m)	Dustfall ($mg/dm^2/y$)
0 to 100 m	Dust 1	70	403
	Dust 3	22	599
	Dust 6	13	131
	Dust 10	46	757
	SS1-1	30	1,017
	SS3-6	35	122
	SS4-1	61	119
	SS5-1	26	1,463
	SS5-2	55	539
	Mean (SD)		572 (455)
	95% Confidence Interval (Mean ±)		350
	Lower to Upper Limit of 95% Confidence Interval		(222 – 922)
	Median		539
101 to 250 m	Dust 4	173	315
	SS1-2	115	280
	SS2-1	145	44
	SS3-7	239	257
	SS4-2	196	160
	Mean (SD)		211 (110)
	95% Confidence Interval (Mean ±)		136
	Lower to Upper Limit of 95% Confidence Interval		(75 – 347)
	Median		257
251 to 1,000 m	Dust 2	425	309
	Dust 11	747	446
	SS1-3	260	66
	SS1-4	899	61
	SS2-2	427	26
	SS3-4	585	109
	SS3-8	826	139
	SS4-3	335	269
	SS5-3	259	795
	SS5-4	941	98
	Mean (SD)		232 (238)
	95% Confidence Interval (Mean ±)		170
	Lower to Upper Limit of 95% Confidence Interval		(61 – 402)
	Median		124

Table 2-1 2020 Dustfall Deposition Results (continued)

Zone	Station	Approximate Distance from 2020 Mine Footprint (m)	Dustfall ($mg/dm^2/y$)
1,001 to 2,500+ m	Dust 5	1,183	148
	Dust 7	1,147	224
	Dust 8	1,213	226
	Dust 12	2,326	197
	SS1-5	2,175	8
	SS2-3	1,194	18
	SS2-4	2,164	5
	SS3-5	1,325	27
	SS4-4	1,022	147
	SS4-5	1,214	56
	SS5-5	1,894	71
	Dust 9	3,796	78
	Mean (SD)		100 (84)
	95% Confidence Interval (Mean ±)		53
	Lower to Upper Limit of 95% Confidence Interval		(47 – 154)
	Median		75
Control	Dust C1	4,646	118
	Dust C2	3,031	103
	Control 1	4,802	8
	Control 2	3,042	33
	Control 3	3,550	94
	Mean (SD)		71 (48)
	95% Confidence Interval (Mean ±)		59
	Lower to Upper Limit of 95% Confidence Interval		(12 – 130)
	Median		94
Reference Levels[a]			646 and 1,924

a) Alberta Ambient Air Quality Objectives and Guidelines for dustfall for residential and commercial or industrial areas, respectively.
SD = standard deviation; ± = plus or minus; $mg/dm^2/y$ = milligrams per square decimetre per year.

Figure 2-2 Dustfall Results, 2020



3 EFFLUENT AND WATER CHEMISTRY

3.1 Introduction and Objectives

Substances released from the Mine must enter the water of Lac de Gras before aquatic organisms can be exposed to those substances, and potentially be affected. Water quality represents a valuable early-warning indicator of potential effects on aquatic life in Lac de Gras. The objective of the water quality monitoring component of the AEMP is to assess the effects of Mine effluent and other Mine-related stressors on water quality in Lac de Gras.

The following is a summary of the 2020 effluent and water chemistry program. The *Effluent and Water Chemistry Report* (Appendix II) presents detailed results.

3.2 Methods

In total, water quality samples were collected at 23 stations in 2020 (Figure 1-2). Sampling occurred at five stations in the NF area (i.e., NF1 to NF5) and multiple stations located along transects in the MF areas (i.e., MF1, MF2, and MF3). Three stations were located in the MF1 area (i.e., MF1-1, MF1-3, MF1-5), four stations in the MF2 area (i.e., MF2-1, MF2-3, FF2-2, FF2-5), and seven stations in the larger MF3 area (i.e., MF3-1 to MF3-7). Two stations were newly approved by the WLWB to be sampled during interim years, stations FF1-2 and FFD-1. Single stations were sampled at the Lac du Sauvage outflow to Lac de Gras (LDS-4) and the Lac de Gras outflow to the Coppermine River (LDG-48).

The AEMP water quality sampling was carried out over two monitoring seasons: ice-cover and open-water. During the ice-cover season, samples were collected in late winter, from 20 April to 1 May 2020. Open-water sampling was completed from 16 August to 7 September 2020. The same locations were sampled in each season, with the exception of LDS-4, which was sampled in the open-water season only.

Stations in the NF and MF areas were approximately 20 m deep and sampled at three depths (i.e., top, middle, and bottom) during each season, as these stations are likely to have differences in water quality among different depths due to the Mine discharge (i.e., reflecting the vertical position of the effluent plume). Near-surface water samples (i.e., top) were collected at a depth of 2 m below the water surface or top of the ice, and bottom samples were collected at 2 m above the lake bottom. Middle samples were collected from the mid-point of the total water column depth. Stations FF1-2, FFD-1, LDG-48, and LDS-4 were sampled at mid-depth only.

Data from the Surveillance Network Program (SNP) were incorporated into the 2020 AEMP report. Effluent samples were collected once every six days from the NIWTP from both diffusers (i.e., stations SNP 1645-18 and SNP 1645-18B), and monthly at the mixing zone boundary (i.e., stations SNP 1645-19A SNP 1645-19B2, and SNP 1645-19C). The SNP sampling period summarized in this report extended from 1 November 2019 to 31 October 2020.

Water samples were sent to BV Labs in Edmonton or Calgary, Alberta, Canada for chemical analysis. Field measurements of water quality were also taken at AEMP stations by lowering a water quality meter (YSI) slowly down to the bottom of the lake while recording the measurements of temperature, dissolved oxygen (DO) concentration, conductivity, turbidity, and pH.

Initial data analyses were conducted to identify substances of interest (SOIs), which are a subset of variables with the potential to show Mine-related effects. The intent of defining SOIs was to identify a meaningful set of variables that would undergo further analyses, while limiting analyses on variables that were less likely to be affected. The selection of SOIs considered concentrations in the final effluent (i.e., at stations SNP 1645-18 and SNP 1645-18B), and in the fully-mixed exposure area of Lac de Gras, according to four criteria based on comparisons to EQC, comparisons of mixing zone data to AEMP Effects Benchmarks, Action Level assessment results, and the potential for dust deposition effects.

The following analyses were completed on SOIs:

- an examination of loads in Mine effluent and effluent chemistry (i.e., from SNP 1645-18 and 1645-18B)
- an examination of water chemistry at the edge of the mixing zone (i.e., from SNP 1645-19A, 1645-19B2, and 1645-19C)
- an assessment of magnitude and extent of effects, as defined by the Action Levels in the Response Framework for water quality
- an evaluation of spatial trends in SOI concentrations with distance from the diffusers, including an evaluation of spatial trends in SOI concentrations along the MF transects
- an examination of potential effects from dust deposition, for SOIs that exceeded Action Level 1 in the zone of influence (ZOI) from dust deposition in Lac de Gras

Water quality variables were assessed for a Mine-related effect according to the Response Framework for water chemistry (Table 3-1). Magnitude of effects on water chemistry variables was evaluated by comparing variable concentrations between NF, MF, and FF sampling areas, reference conditions, and benchmark values. Reference conditions for Lac de Gras are those that fall within the range of natural variability, referred to as the normal range. The normal ranges used in the Action Level screening for water quality are described in the *AEMP Reference Conditions Report Version 1.4* (Golder 2019b).

The water quality benchmark values used in the Action Level assessment, otherwise known as Effects Benchmarks, are intended to protect human health or aquatic life. They are based on the Canadian Water Quality Guidelines (CWQGs) for the protection of aquatic life (CCME 1999), the Canadian Drinking Water Quality Guidelines (Health Canada 1996, 2020), guidelines from other jurisdictions (e.g., provincial and state guidelines), adaptations of general guidelines to site-specific conditions in Lac de Gras (DDMI 2007), or values from the scientific literature. Effects were assessed separately for the ice-cover and open-water seasons.

Effluent was tested for toxicity to evaluate whether Mine effluent had the potential to cause toxic responses in the biota in Lac de Gras. The results of toxicity testing were carried out on effluent samples from stations SNP 1645-18 and SNP 1645-18B. Effluent samples were submitted to BV Labs in Burnaby, BC, Canada, or Edmonton, AB, Canada and Nautilus Environmental in Burnaby for toxicity testing.

An analysis of dust effects at stations potentially affected by dust emissions was also conducted. The ZOI from dust deposition in Lac de Gras was estimated to extend between 3.7 and 4.8 km from the geographic centre of the Mine (Mine centroid), or between 0.3 and 4.2 km from the boundary of the Mine footprint. The AEMP sampling stations that fall within the expected ZOI from dust deposition include the five stations in the NF area and stations MF1-1, MF3-1, MF3-2, and MF3-3[6].

[6] The list of stations included in the dust ZOI is based on the revised ZOI delineated in the *2017 to 2019 Aquatic Effects Re-evaluation Report* (Golder 2020b). Station MF2-1 was previously considered to be within in the ZOI, but is no longer expected to be measurably affected by dust. Station MF3-3 now falls within the revised dust ZOI.

Table 3-1 Action Levels for Water Chemistry, Excluding Indicators of Eutrophication

Action Level	Magnitude of Effect[a]	Extent of Effect	Action/Note
1	Median of NF greater than 2 times the median of reference dataset[b] (open-water or ice-cover) and strong evidence of link to Mine	NF	Early warning.
2	5th percentile of NF values greater than 2 times the median of reference areas AND normal range[b]	NF	Establish Effects Benchmark if one does not exist.
3	75th percentile of MZ values greater than normal range plus 25% of Effects Benchmark[c]	MZ	Confirm site-specific relevance of Effects Benchmark. Establish Effects Threshold. Define the Significance Threshold if it does not exist. The WLWB to consider developing an EQC if one does not exist
4	75th percentile of MZ values greater than normal range plus 50% of Effects Threshold[c]	MZ	Investigate mitigation options.
5	95th percentile of MZ values greater than Effects Threshold	MZ	The WLWB to re-assess EQC. Implement mitigation required to meet new EQC if applicable.
6	95th percentile of NF values greater than Effects Threshold + 20%	NF	The WLWB to re-assess EQC. Implement mitigation required to meet new EQC if applicable.
7	95th percentile of MF values greater than Effects Threshold + 20%	MF	The WLWB to re-assess EQC. Implement mitigation required to meet new EQC if applicable.
8	95th percentile of FFB values greater than Effects Threshold + 20%	FFB	The WLWB to re-assess EQC. Implement mitigation required to meet new EQC if applicable.
9	95th percentile of FFA values greater than Effects Threshold + 20%	FFA	Significance Threshold.[d]

a) Calculations are based on pooled data from all depths.

b) Normal ranges and reference datasets are obtained from the *AEMP Reference Conditions Report Version 1.4* (Golder 2019b); the normal range for open-water was based on the 15 August to 15 September period. In cases where the reference area median value reported in the reference conditions report was equal to the detection limit, half the detection limit was used to calculate the 2 x reference area median criterion, to be consistent with data handling methods used for the AEMP.

c) Indicates 25% or 50% of the difference between the Effects Benchmark/Threshold and the top of the normal range.

d) Although the Significance Threshold is not an Action Level, it is presented as the highest Action Level to show escalation of effects towards the Significance Threshold.

NF = near-field; MZ = mixing zone; MF = mid-field; FF = far-field; WLWB = Wek'èezhìı Land and Water Board; EQC = Effluent Quality Criteria.

3.3 Results and Discussion

3.3.1 Substances of Interest

Water quality variables measured in Lac de Gras as part of the 2020 AEMP were assessed for a Mine-related effect according to Action Levels. Twenty-eight variables met the criteria for inclusion as SOIs in 2020 (Table 3-2).

Table 3-2 Water Quality Substances of Interest, 2020

Substance of Interest	Substances of Interest Criteria			
	1 Effluent Screening	2 Mixing Zone Screening	3 Action Level 1	4 Potential Dust Effects
Conventional Parameters				
Total dissolved solids, calculated	-	-	X	X
Total suspended solids	-	-	X	X
Turbidity – lab	-	-	X	-
Major Ions				
Calcium (dissolved)	-	-	X[(a)]	X[(a)]
Chloride	-	-	X	X
Magnesium (dissolved)	-	-	X[(a)]	X[(a)]
Potassium (dissolved)	-	-	X[(a)]	X[(a)]
Sodium (dissolved)	-	-	X[(a)]	X[(a)]
Sulphate	-	-	X	X
Nutrients				
Ammonia	-	-	X	X
Nitrate	-	-	X	X
Total Metals				
Aluminum	-	-	X	X
Antimony	-	-	X	X
Barium	-	-	X	-
Boron	-	-	-	X
Chromium	-	-	X	-
Cobalt	-	-	-	X
Copper	-	-	X	X
Iron	-	-	-	X
Lead	-	-	-	X
Molybdenum	-	-	X	X
Silicon	-	-	X	X
Strontium	-	-	X	X
Sulphur	-	-	X	X
Thallium	-	-	-	X
Tin	-	-	-	X
Uranium	-	-	X	X
Zinc	-	-	-	X

a) Both the total and dissolved fractions of calcium, magnesium, potassium, and sodium triggered Action Level 1 and an effect equivalent to Action Level 1 at one or more of the four mid-field (MF) area stations located within the estimated zone of influence (ZOI) from dust deposition from the Mine site. Review of the analytical data in 2020 indicated that some major ions and dissolved metals AEMP samples from the open-water season were potentially contaminated (Section 2.3.2; Attachment B); therefore, analyses involving the AEMP data were presented for the total fractions.

X = criterion met; - = criterion not met.

3.3.2 Effluent Quality

The monthly loads of total dissolved solids (TDS) and associated ions (i.e., calcium, chloride, magnesium, sodium, and sulphate) from the NIWTP remained within a similar range from November to April, reflecting the monthly volume of effluent discharged (Figure 3-1). The loads of these SOIs increased during the late ice-cover and early open-water seasons, peaking in June (calcium, sodium), July (chloride) or August (TDS, magnesium, potassium, sulphate) before decreasing through the remainder of the open-water season as flow rates from the NIWTP decreased.

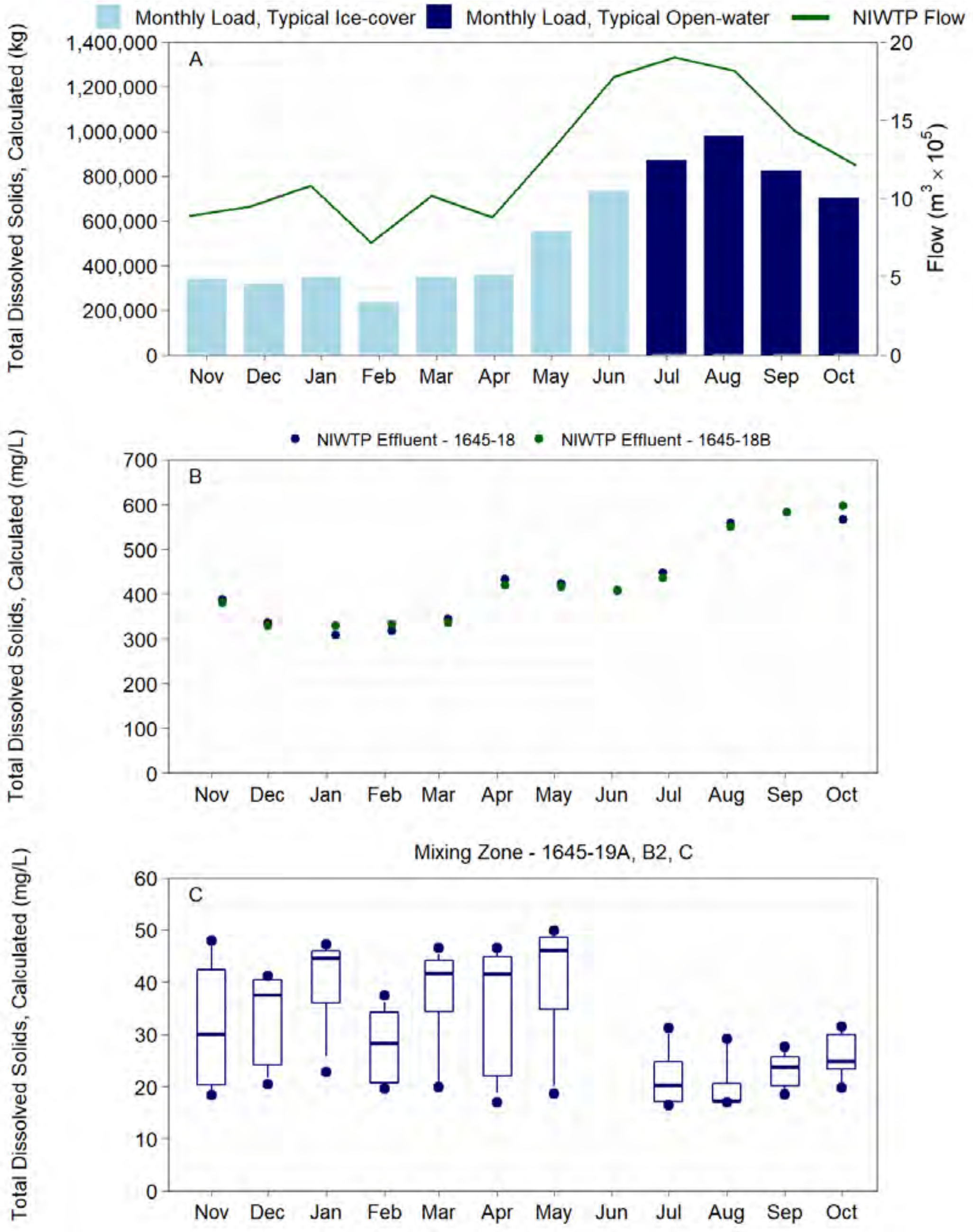
The monthly loading rate of ammonia increased from November to January, decreased through April, and then increased again through late ice-cover before subsequently decreasing through the open-water season. The seasonal trend in the loading rate of ammonia reflected trends both in the effluent flow rate and in effluent concentration. The load and concentration of nitrate generally declined through the early ice-cover season from November to April, and then increased through late ice-cover and early open-water, peaking in August, before decreasing again in September and October.

In general, the monthly loading rates of total metal SOIs either reflected trends in the effluent flow rate or chemistry, or were influenced by a combination of the two. The seasonal pattern in the concentrations of variables in the effluent over the reporting period were variable-specific. Concentrations of total metal SOIs in the effluent were greater than the concentrations measured at the mixing zone boundary, indicating that the Mine effluent is a source of these variables to Lac de Gras. One exception was copper, which had generally similar or lower concentrations in the effluent than those recorded at the mixing zone boundary, with the exception of a short period in August. The concentrations of most of these SOIs at the mixing zone boundary were generally greater and more variable during the ice-cover season than during the open-water season.

The water chemistry monitoring data collected from the NIWTP final discharge (i.e., SNP 1645-18 and SNP 1645-18B) were compared to the EQC defined in the Water Licence. Concentrations of variables in effluent with EQC were below applicable EQC.

Water chemistry at the mixing zone boundary was compared to the relevant AEMP water quality Effects Benchmarks for the protection of aquatic life and drinking water. None of the pH values measured at the mixing zone boundary in 2020 exceeded the upper limits of the aquatic life and drinking water Effects Benchmarks (i.e., 8.5 and 10.5). However, pH values measured at the mixing zone boundary in 2020, were below the drinking water Effects Benchmark value of 7.0 in 76% of samples and below the aquatic life Effects Benchmark value of 6.5 in 32% of samples. Because the pH of the Mine effluent was slightly alkaline (median pH of 7.3) and the pH throughout Lac de Gras was often below the aquatic life Effects Benchmark of 6.5, during both ice-cover and open-water conditions at various depths, and over time (i.e., 2002 to 2019; Golder 2020b), these exceedances were attributed to natural conditions and unrelated to the Mine discharge. Therefore, pH was not considered an SOI.

Figure 3-1 Total Dissolved Solids, Calculated: A) Monthly Loading Rate from the North Inlet Water Treatment Plant, B) Concentration in Effluent (SNP 1645-18 and SNP 1645-18B), and C) Concentration at the Mixing Zone Boundary (SNP 1645-19), 1 November 2019 to 31 October 2020



Notes: Effluent values represent concentrations in individual samples. Mixing zone boxplots represent the 10th, 25th, 50th (median), 75th, and 90th percentile concentrations at three stations (i.e., 1645-19A, 1645-19B2, 1645-19C) and five depths (i.e., 2 m, 5 m, 10 m, 15 m, and 20 m); circles represent the 5th and 95th percentile concentrations. The mixing zone samples could not be collected in June 2020 due to hazardous ice conditions.

NIWTP = North Inlet Water Treatment Plant; SNP = Surveillance Network Program.

3.3.2.1 Effluent Toxicity

Toxicity testing results in 2020 indicated that effluent samples were not toxic to aquatic organisms. These results are consistent with results in previous years, which have also indicated that the Mine effluent is non-toxic.

3.3.3 Depth Profiles

Depth profiles were prepared for conductivity, DO, water temperature, pH, and turbidity at AEMP stations. The greater specific gravity of the effluent, combined with the absence of wind and wave-driven mixing during ice-cover conditions, resulted in elevated conductivity in the bottom two thirds of the water column in the NF area. Complete vertical mixing of the effluent was observed at most stations along the MF transects. During the open-water season, specific conductivity was typically uniform throughout the water column.

During the ice-cover season, water temperature in Lac de Gras increased gradually with depth at most stations. Turbidity was uniform throughout the water column, while DO decreased with depth, and pH values were typically uniform throughout the water column or decreased with depth. During the open-water season, temperature, turbidity, DO and pH were typically uniform throughout the water column.

3.3.4 Assessment of Effects and Action Levels

Twenty-one variables triggered Action Level 1, which is considered an early-warning indication of effects in the NF area (Table 3-3). Each of these variables were measured in the NIWTP effluent at concentrations greater than the concentration in Lac de Gras, with the exception of copper, which had similar to slightly lower concentrations in the effluent than in Lac de Gras. No management action is required under the Response Framework when a water quality variable triggers Action Level 1.

Of the 21 variables that triggered Action Level 1, 8 also triggered Action Level 2 (Table 3-3). In most cases, Action Level 2 was triggered during both the ice-cover and open-water seasons. Exceptions were sulphate and uranium, which triggered Action Level 2 only during the open-water season. Under the Response Framework, when a water quality variable triggers Action Level 2, the required management action is to establish an AEMP Effects Benchmark for that variable if one does not already exist. Each of the eight variables that triggered Action Level 2 in 2020 have existing Effects Benchmarks, and no action was required. None of the SOIs evaluated triggered Action Level 3 in 2020.

Table 3-3 Action Level Summary for Water Quality Substances of Interest, 2020

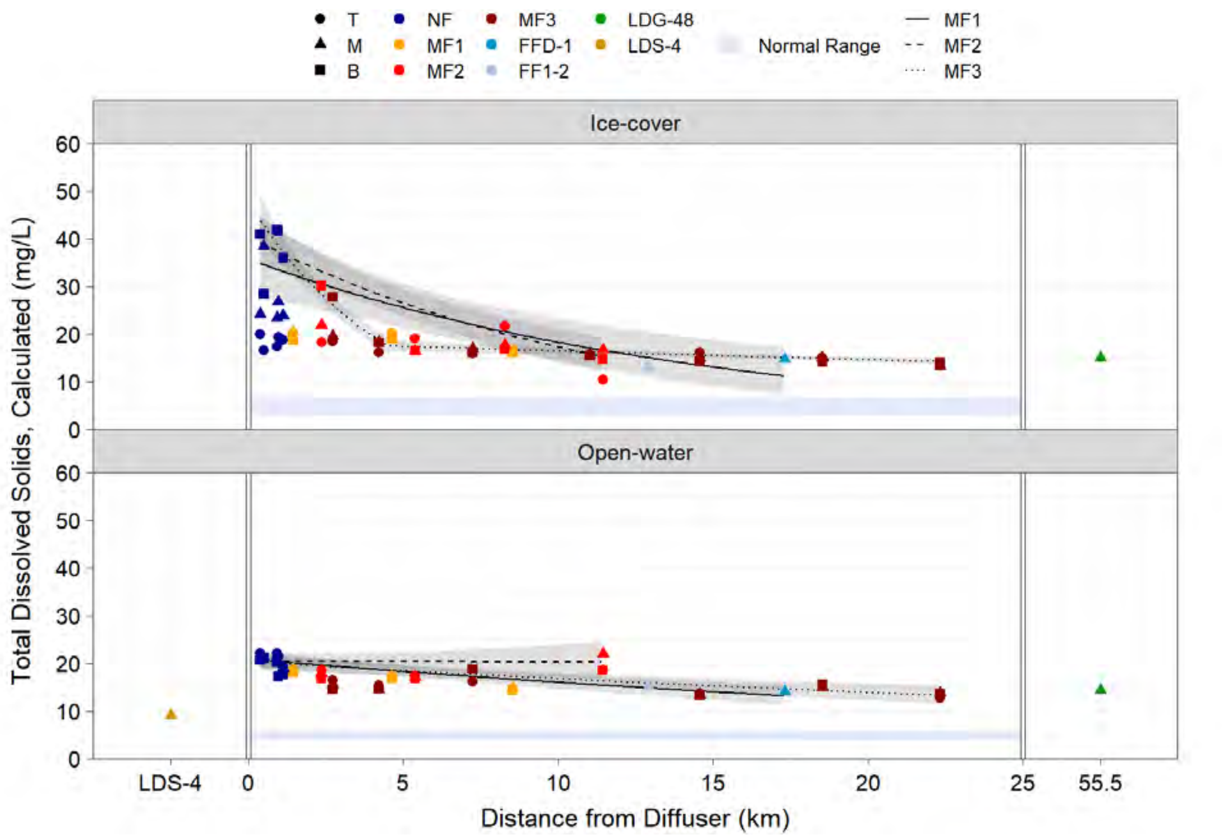
2020 SOIs	Action Level Classification
Conventional Parameters	
Total dissolved solids, calculated	2
Total suspended solids	1
Turbidity – lab	1
Major Ions	
Calcium (dissolved)	1
Chloride	2
Magnesium (dissolved)	1
Potassium (dissolved)	1
Sodium (dissolved)	2
Sulphate	2
Nutrients	
Ammonia	1
Nitrate	2
Total Metals	
Aluminum	1
Antimony	1
Barium	1
Chromium	1
Copper	1
Molybdenum	2
Silicon	1
Strontium	2
Sulphur	1
Uranium	2

SOI = substance of interest; 1 = Action Level 1 triggered; 2 = Action Level 2 triggered.

3.3.5 Gradient Analysis

Spatial trends of decreasing concentrations with distance from the Mine effluent discharge were evident for most variables that triggered Action Levels. An exception was TSS, which had concentrations in the MF area similar to those measured in the NF area in both seasons. Spatial trends were generally more pronounced during the ice-cover season than during open-water conditions. An example showing the plot developed for TDS is provided in Figure 3-2.

Figure 3-2 Concentrations of Total Dissolved Solids (Calculated) According to Distance from the Effluent Discharge, 2020



Note: Values represent concentrations in individual samples collected at top, middle and bottom depths. Open symbols represent non-detect data. Shaded bands around fitted prediction lines are 95% confidence intervals (back-transformed to original scale of the variable).

T = top depth; M = middle depth; B = bottom depth; NF = near-field; MF = mid-field; FF = far-field; LDG = Lac de Gras; LDS = Lac du Sauvage.

3.3.6 Effects from Dust Deposition

In 2020, median concentrations of 25 SOIs met Criterion 4 (Table 3-2) because they exceeded two times the median of the reference dataset at one or more of the four MF area stations located within the estimated ZOI from dust deposition (Section 3.3.1). Of the 25 SOIs, 18 also triggered Action Level 1 in the NF area, indicating that the exceedances of the dust criterion at the MF stations were likely caused by dispersion of Mine effluent into the lake. Compared to median NF area concentrations, eight SOIs were elevated at one or more of the four MF stations. These results indicate that the elevated values within the ZOI may not be solely related to dispersion of effluent in the lake. Most of these 8 SOIs only exceeded the criterion at MF3-3 which is the station within the ZOI that is farthest from the Mine footprint boundary. While there is some potential that these elevated values may be related to dust deposition, this interpretation is not supported by similar increases at the other stations within the ZOI. Overall, analysis of the 2020 AEMP water quality data indicate that effluent is the main source of Mine effects on Lac de Gras, with a negligible contribution from dust deposition.

4 EUTROPHICATION INDICATORS

4.1 Introduction and Objectives

One of the more important predictions from the EA was that operation of the Mine would release nutrients (i.e., nitrogen and phosphorus) into Lac de Gras. Phosphorus naturally occurs in the groundwater that seeps into the Mine workings. Nitrogen enters minewater as a residue from ammonium nitrate used as an explosive during mining. While phosphorus is reduced to the lowest levels practical in the NIWTP and nitrogen is managed to the extent practical through blasting and water management practices, both phosphorus and nitrogen are found at higher concentrations in the NIWTP effluent compared to baseline concentrations in Lac de Gras.

Lac de Gras is a nutrient-poor (i.e., oligotrophic) lake. Aquatic organisms in the lake, including algae, invertebrates, and fish, live with limited nutrient availability, but have low abundances compared to more productive lakes. It is expected, and was predicted, that increasing the nutrient levels in Lac de Gras would affect aquatic organisms (Government of Canada 1999). The primary effect of nutrient enrichment on Lac de Gras was expected to be an increase in primary productivity (i.e., greater abundance of microscopic plants called algae or phytoplankton), sometimes referred to as eutrophication.

The objective of the eutrophication indicators assessment is to describe the AEMP results for nutrients, chlorophyll *a*, phytoplankton biomass, and zooplankton biomass, which are monitored as indicators of eutrophication. Chlorophyll *a* is the pigment that gives plants their green colour and can be used to measure the amount of algae in the water. Algae or phytoplankton are small aquatic plants, which are the first aquatic organisms to respond to a change in nutrient levels. Zooplankton biomass is a measure of the total mass of these tiny animals that live in the water and feed on algae, and is measured as ash-free dry mass (AFDM).

The following is a summary of the 2020 eutrophication indicators program. The *Eutrophication Indicators Report* (Appendix XIII) provides detailed results.

4.2 Methods

The AEMP eutrophication indicators program was completed over two sampling seasons. The ice-cover sampling was conducted from 20 April to 1 May 2020, and the open-water sampling was conducted between 16 August and 7 September 2020. Nutrient samples were collected during both ice-cover and open-water conditions from the NF area, three MF areas (i.e., MF1, MF2, and MF3), and the newly approved sampling of stations FF1-2 and FFD-1 in Lac de Gras, the outlet of Lac de Gras to the Coppermine River (LDG-48), and the narrows between Lac de Gras and Lac du Sauvage (LDS-4; Figure 1-2). Chlorophyll *a*, phytoplankton biomass, and zooplankton biomass samples were collected during the open-water season, when biological activity was greatest; however, zooplankton samples were not collected from LDG-48 and LDS-4 due to the shallow depth at these AEMP stations.

During the ice-cover season, nutrient samples were collected at three depths (i.e., top, middle, and bottom) at each NF, MF, and FF2 station, and at a single depth (i.e., middle) at the FF1-2, FFD-1, and LDG-48 station.

During the open-water season, nutrient samples, chlorophyll *a* and phytoplankton biomass were collected using a depth-integrated sampler. This device collected lake water over a range of sample depths. The top 10 m of the water column was sampled for nutrients, chlorophyll *a* and phytoplankton biomass during the open-water season, because this is the depth where most of the algae are found. Zooplankton samples were collected using a specially designed fine mesh net (i.e., a plankton net) that was pulled up through the entire water column.

The 2020 nutrient and zooplankton biomass samples were analyzed by BV Labs in Edmonton or Calgary, Alberta, Canada. Soluble reactive silica (SRSi) samples were only sent to ALS Laboratories (ALS), Vancouver, British Columbia, Canada. Analysis of samples for total ammonia were completed by both BV Labs and ALS. The total ammonia results used for analysis were from ALS for both seasons. Chlorophyll *a* samples were analyzed by the Biogeochemical Analytical Service Laboratory at the University of Alberta, Edmonton, Alberta. Phytoplankton biomass samples were analyzed by Biologica Environmental Services, Ltd. (Biologica), Victoria, British Columbia, Canada.

Nutrient data from the SNP were incorporated into the *Eutrophication Indicators Report* (Appendix XIII). Treated effluent samples were collected approximately once every six days from the NIWTP from both diffusers (i.e., stations SNP 1645-18 and SNP 1645-18B), and monthly at the mixing zone boundary (i.e., stations SNP 1645-19A, SNP 1645-19B2, and SNP 1645-19C). Samples were not collected during ice-off (June) at the mixing zone stations due to unsafe ice conditions. The quality of the effluent was assessed in Section 3 of the *Effluent and Water Chemistry Report* (Appendix II); however, results for the key nutrient variables (e.g., total phosphorus) are presented herein.

The 2020 AEMP results were analyzed to identify and understand spatial gradient patterns in relation to the Mine effluent discharge. Data were compared to background values (i.e., normal range) to determine if they fell within the natural range of variability. To assess potential effects from dust emissions on nutrient enrichment in Lac de Gras, open-water phosphorus and chlorophyll *a* concentrations within the estimated ZOI from dust deposition were evaluated visually and compared to results at other nearby stations and the normal range. The magnitude of effects for chlorophyll *a* was evaluated according to Action Levels (Table 4-1).

Table 4-1 Action Levels for Chlorophyll *a*

Action Level	Magnitude of Effect	Extent of Effect	Action/Notes
1	95th percentile of MF values greater than normal range[(a)]	MF station	Early warning.
2	NF and MF values greater than normal range[(a)]	20% of lake area or more	Establish Effects Benchmark.
3	NF and MF values greater than normal range plus 25% of Effects Benchmark[(b)]	20% of lake area or more	Confirm site-specific relevance of existing benchmark. Establish Effects Threshold.
4	NF and MF values greater than normal range plus 50% of Effects Threshold[(c)]	20% of lake area or more	Investigate mitigation options.
5	NF and MF values greater than Effects Threshold	20% of lake area or more	The WLWB to re-assess EQC for phosphorus. Implement mitigation required to meet new EQC if applicable.
6	NF and MF values greater than Effects Threshold +20%	20% of lake area or more	The WLWB to re-assess EQC for phosphorus. Implement mitigation required to meet new EQC if applicable.
7	95th percentile of MF values greater than Effects Threshold +20%	All MF stations	The WLWB to re-assess EQC for phosphorus. Implement mitigation required to meet new EQC if applicable.
8	95th percentile of FFB values greater than Effects Threshold +20%	FFB	The WLWB to re-assess EQC for phosphorus. Implement mitigation required to meet new EQC if applicable.
9[(d)]	95th percentile of FFA values greater than Effects Threshold+20%	FFA	Significance Threshold[(d)].

a) The normal range for chlorophyll *a* was obtained from the *AEMP Reference Conditions Report Version 1.4* (Golder 2019a).

b) Indicates 25% of the difference between the Effects Benchmark and the top of the normal range.

c) Indicates 50% of the difference between the Effects Threshold and the top of the normal range.

d) Although the Significance Threshold is not an Action Level, it is shown as the greatest Action Level to demonstrate escalation of effects towards the Significance Threshold.

NF = near-field; MF = mid-field; FF = far-field; WLWB = Wek'èezhìı Land and Water Board; EQC = Effluent Quality Criteria.

4.3 Results and Discussion

4.3.1 Effluent and Mixing Zone

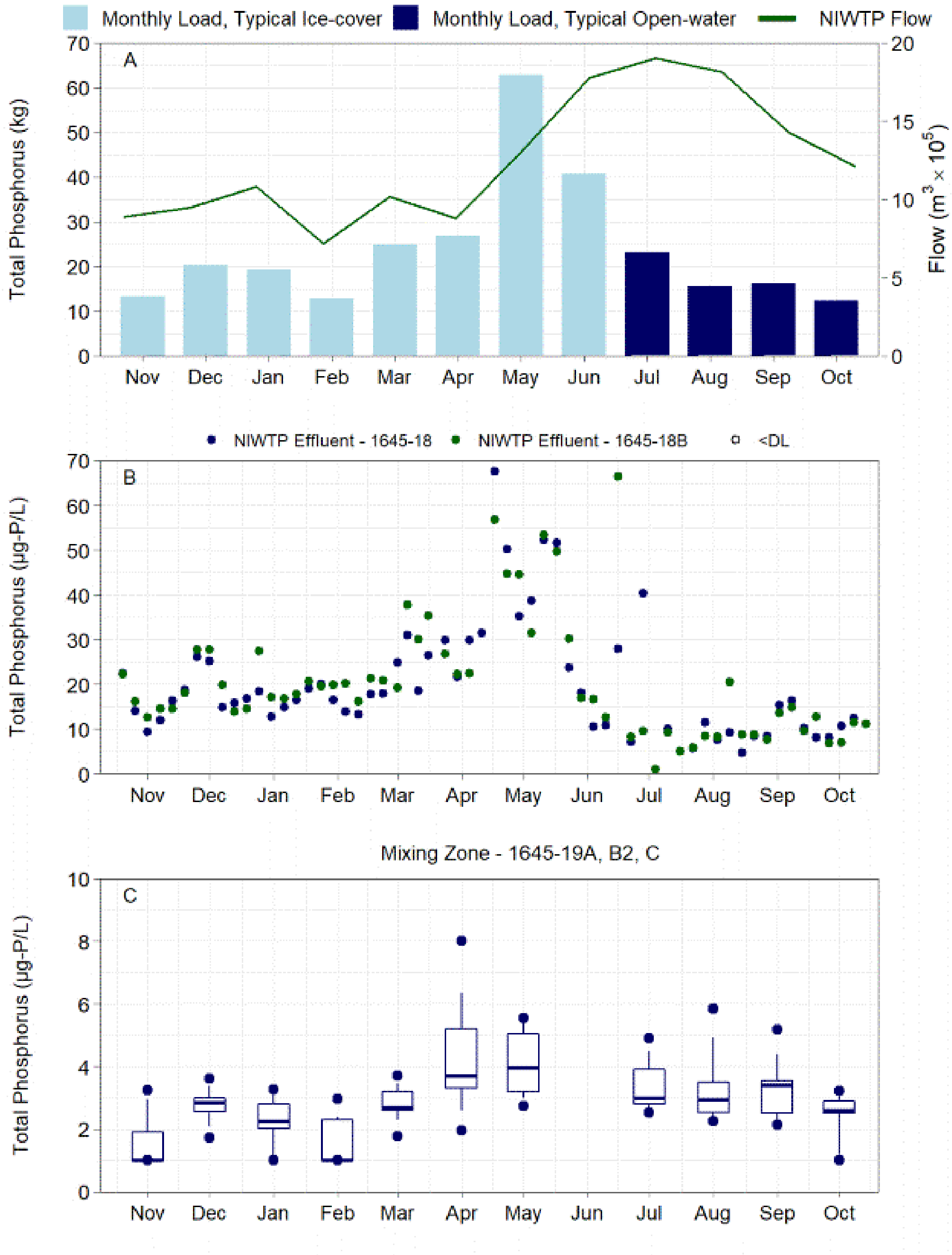
During 2020, phosphorus loads to Lac de Gras and concentrations in effluent tended to be variable throughout the year (Figure 4-1). The annual total phosphorus (TP) load in 2020 was 289 kg, which was similar to the 2019 annual load of 279 kg, and was less than both the monthly and average annual loading criteria of the 300 kg/mo and 1,000 kg/yr, respectively, defined in the Water Licence. Concentrations of TP, total dissolved phosphorus (TDP) and soluble reactive phosphorus (SRP) in effluent were generally greater during the ice-cover season, which resulted in greater monthly loads.

In contrast, monthly loads and concentrations of total nitrogen (TN) and nitrate in effluent were lowest during the ice-cover season and gradually increased from April to August (Figure 4-2). Most of the TN was present as nitrate in the effluent.

Total ammonia monthly loads and concentrations in effluent did not follow the same pattern as the other nitrogen species. Loads generally followed effluent volume for most months (Figure 4-3).

The decreases in concentrations of TN, nitrate, nitrite, and total ammonia between July and August at the mixing zone boundary reflects quick assimilation (i.e., uptake and use) by algae and bacterial nitrification (Wetzel 2001) during the shift between the seasons.

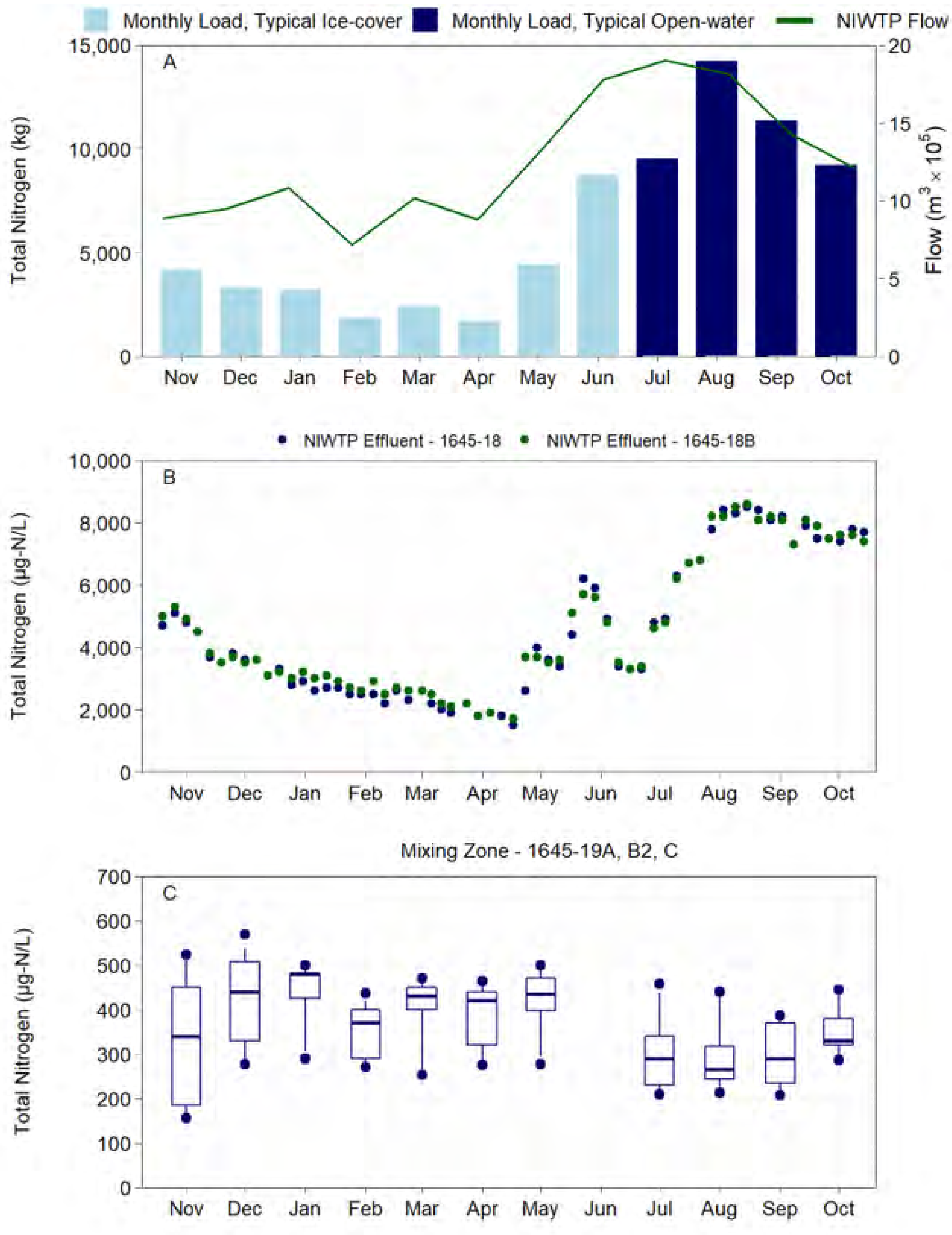
Figure 4-1 Total Phosphorus: A) Monthly Loads in the Effluent, B) Concentrations in the Effluent, C) at the Mixing Zone Boundary, November 2019 to October 2020



Notes: Concentrations in effluent are for individual samples. Mixing zone values represent the monthly 5th percentile, median, and 95th percentile concentrations at three stations (1645-19A, 1645-19B2, 1645-19C) and five depths (2 m, 5 m, 10 m, 15 m and 20 m). The mixing zone samples could not be collected in June 2020 due to hazardous ice conditions. Boxplots represent the 10th, 25th, 50th (i.e., median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles.

µg-P/L = micrograms phosphorus per litre; NIWTP = North Inlet Water Treatment Plant.

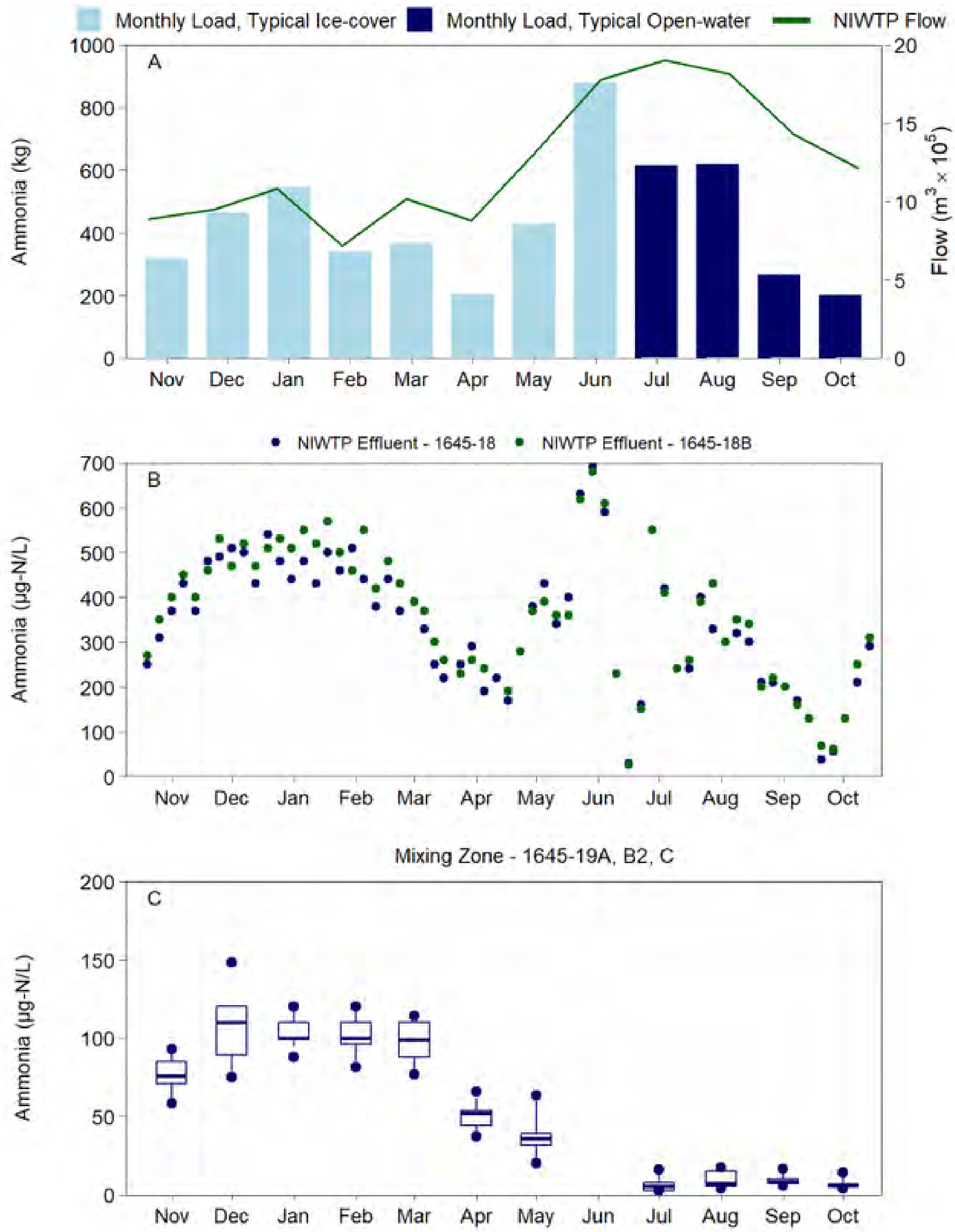
Figure 4-2 Total Nitrogen: A) Monthly Loads in the Effluent, B) Concentrations in the Effluent, C) at the Mixing Zone Boundary, November 2019 to October 2020



Notes: Concentrations in effluent are for individual samples. Mixing zone values represent the monthly 5th percentile, median, and 95th percentile concentrations at three stations (1645-19A, 1645-19B2, 1645-19C) and five depths (2 m, 5 m, 10 m, 15 m and 20 m). The mixing zone samples could not be collected in June 2020 due to hazardous ice conditions. Boxplots represent the 10th, 25th, 50th (i.e., median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles.

µg-N/L = micrograms nitrogen per litre; NIWTP = North Inlet Water Treatment Plant.

Figure 4-3 Total Ammonia: A) Monthly Loads in the Effluent, B) Concentrations in the Effluent, C) at the Mixing Zone Boundary, November 2019 to October 2020



Notes: Concentrations in effluent are for individual samples. Mixing zone values represent the monthly 5th percentile, median, and 95th percentile concentrations at three stations (1645-19A, 1645-19B2, 1645-19C) and five depths (2 m, 5 m, 10 m, 15 m and 20 m). The mixing zone samples could not be collected in June 2020 due to hazardous ice conditions. Boxplots represent the 10th, 25th, 50th (i.e., median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles.

µg-N/L = micrograms nitrogen per litre; NIWTP = North Inlet Water Treatment Plant.

4.3.2 Lac de Gras

Secchi depth measurements showed good light penetration in all areas of Lac de Gras, indicating that a large proportion of the total volume of Lac de Gras was within the euphotic zone, and could support phytoplankton growth.

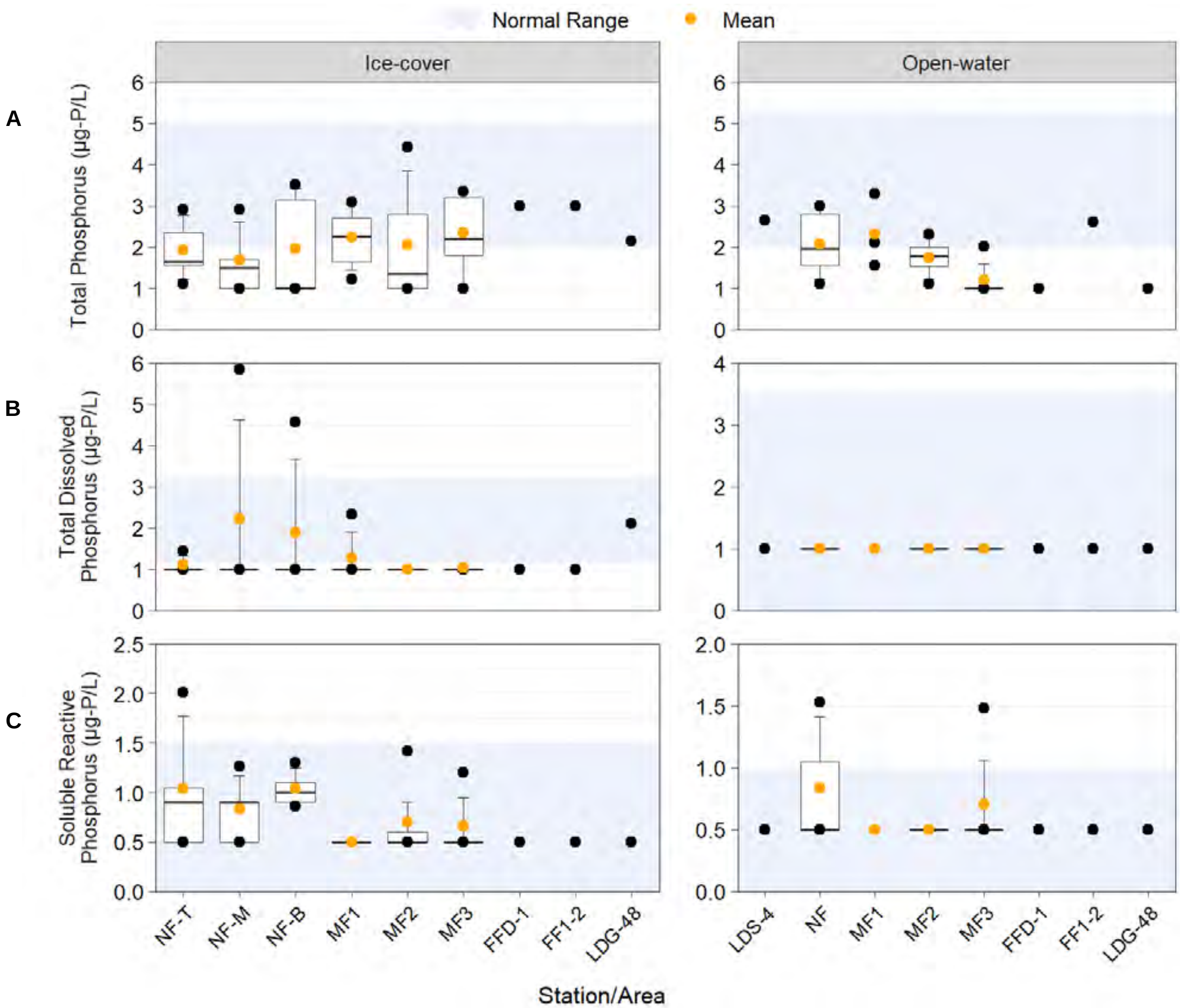
Phosphorus and nitrogen enter Lac de Gras from Mine effluent throughout the year; however, seasonal cycles are apparent in nutrient concentrations in effluent. Phosphorus concentrations at the mixing zone boundary and in the lake were somewhat similar between seasons, although more frequently detected during ice-cover. Phosphorus concentrations continued to be low in 2020, as observed in 2019, likely due to the lower phosphorus load from effluent. Concentrations in the lake were below the normal range at all stations (Figure 4-4). Nitrogen species had concentrations that were greater during the ice-cover season compared to the open-water season. Concentrations of TN were greater in the NF area, generally greater than normal range, and decreased with distance from the diffuser. (Figure 4-5 and Figure 4-6).

Seasonal differences in SRSi were observed, with greater concentrations during the ice-cover season compared to the open-water season. Concentrations were greater in the NF area, and decreased with distance from diffuser (Figure 4-7). The lower concentrations of dissolved inorganic nutrients (i.e., total ammonia, nitrate + nitrite, SRSi) in Lac de Gras during the open-water season may be the result of quick assimilation of nutrients by bacteria and algae.

Despite low nutrient concentrations compared to a number of previous years, a Mine-related nutrient enrichment on the primary producers in Lac de Gras was evident in 2020, as indicated by the gradient analysis results and spatial trends apparent along transects sampled in Lac de Gras. Chlorophyll *a* concentrations and zooplankton biomass were greater in the NF area and decreased with distance from the diffuser, and concentrations were above the normal range in the NF area and at most stations in the MF areas. (Figure 4-8 and Figure 4-10). The effect on total phytoplankton biomass was similar, with decreasing trends with distance from the diffuser (Figure 4-9).

Overall, the conclusions from the 2020 AEMP are consistent with those reported in previous AEMPs, in that the Mine is having a nutrient enrichment effect in Lac de Gras, inputs of phosphorus appear to be the main driver to increases in primary productivity, and the main source of Mine-related effects on eutrophication indicators is the effluent.

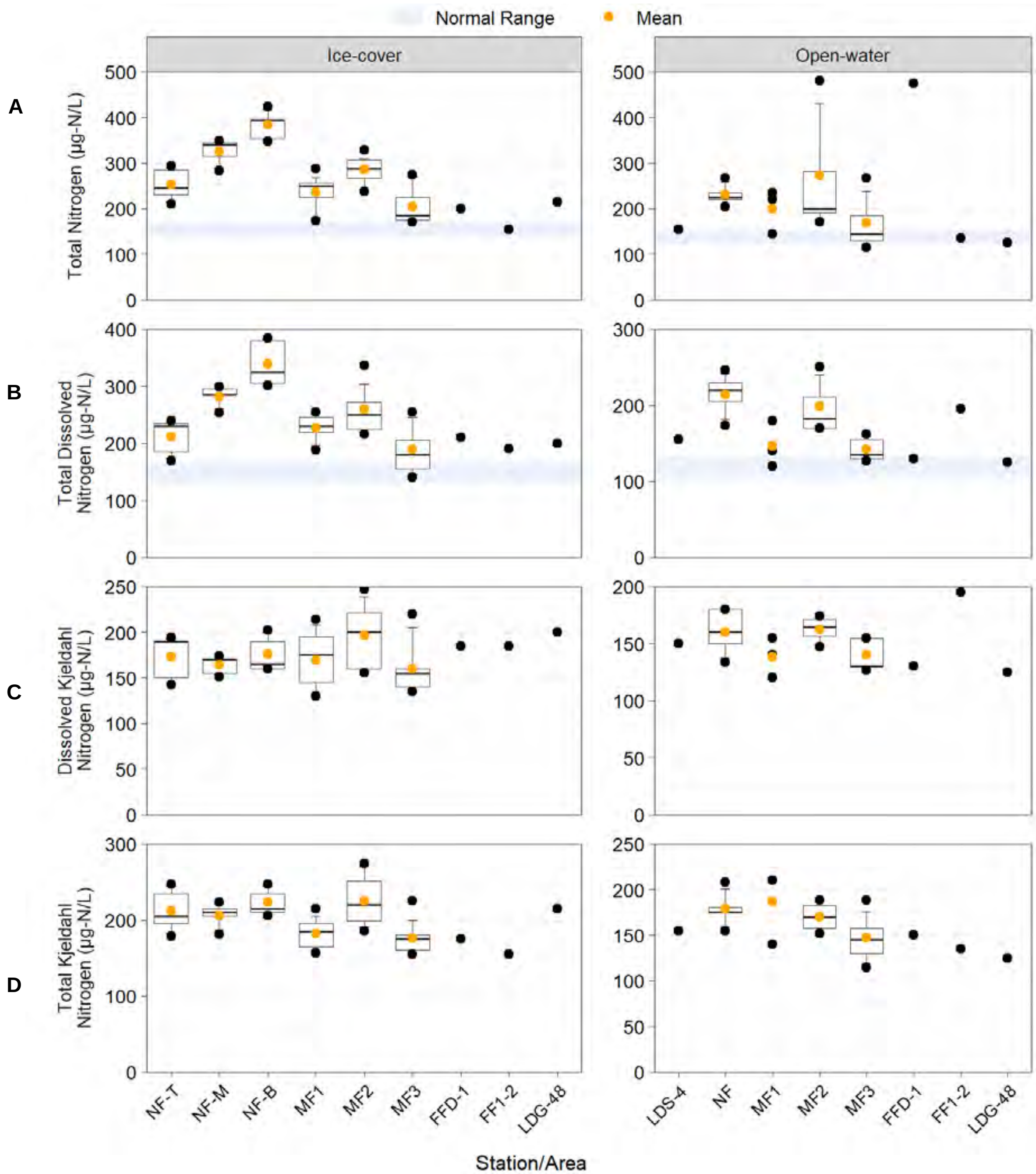
Figure 4-4 Concentrations of Total Phosphorus (A), Total Dissolved Phosphorus (B), and Soluble Reactive Phosphorus (C) in Lac de Gras during the Ice-Cover and Open-Water Season, 2020



Notes: Boxplots represent the 10th, 25th, 50th (median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles, except in cases with three or less data points, where the reported values are shown. Non-detect values are plotted at half detection limit.

µg-P/L = micrograms phosphorus per litre; LDS-4 = Lac du Sauvage outlet (the Narrows); NF = near-field; MF = mid-field; FF = far-field; LDG-48 = Lac de Gras outlet; T = top depth; M = middle depth; B = bottom depth.

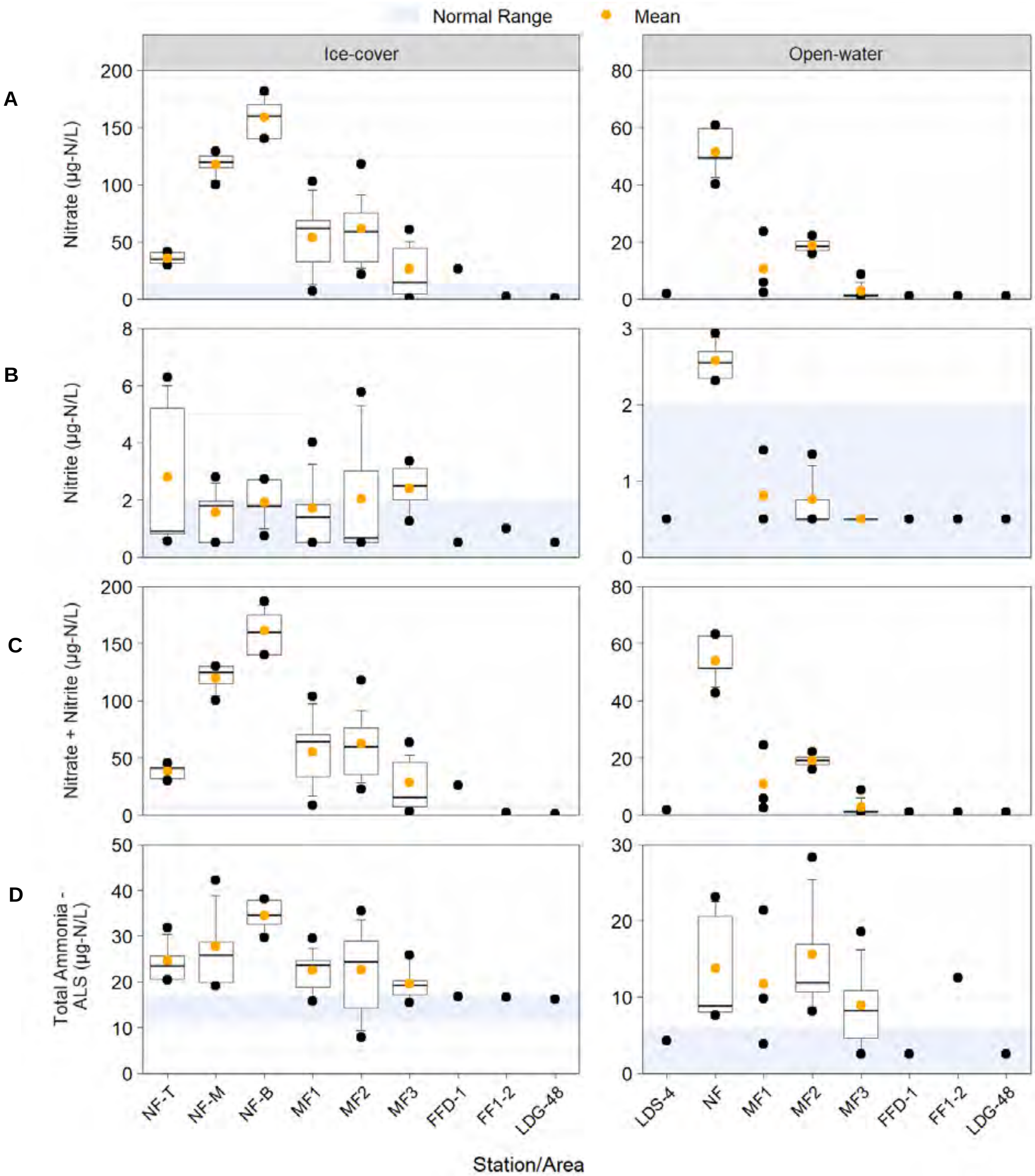
Figure 4-5 Concentrations of Total Nitrogen (A), Total Dissolved Nitrogen (B), Dissolved Kjeldahl Nitrogen (C), and Total Kjeldahl Nitrogen (D) in Lac de Gras during the Ice-Cover and Open-Water Season, 2020



Notes: Boxplots represent the 10th, 25th, 50th (median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles, except in cases with three or less data points, where the reported values are shown.

µg-N/L = micrograms nitrogen per litre; LDS-4 = Lac du Sauvage outlet (the Narrows); NF = near-field; MF = mid-field; FF = far-field; LDG-48 = Lac de Gras outlet; T = top depth; M = middle depth; B = bottom depth.

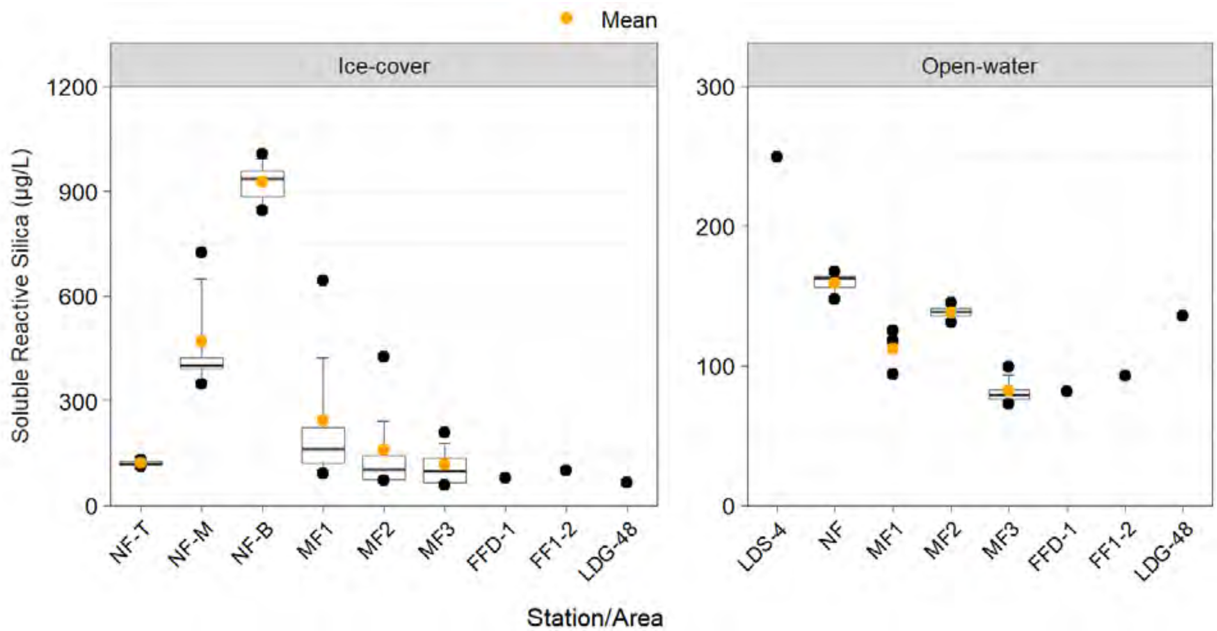
Figure 4-6 Concentrations of Nitrate (A), Nitrite (B), Nitrate + Nitrite (C) and Total Ammonia (D) in Lac de Gras during the Ice-Cover and Open-Water Season, 2020



Notes: Boxplots represent the 10th, 25th, 50th (median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles, except in cases with three or less data points, where the reported values are shown. Non-detect values are plotted at half detection limit.

µg-N/L = micrograms nitrogen per litre; LDS-4 = Lac du Sauvage outlet (the Narrows); NF = near-field; MF = mid-field; FF = far-field; LDG-48 = Lac de Gras outlet; T = top depth; M = middle depth; B = bottom depth.

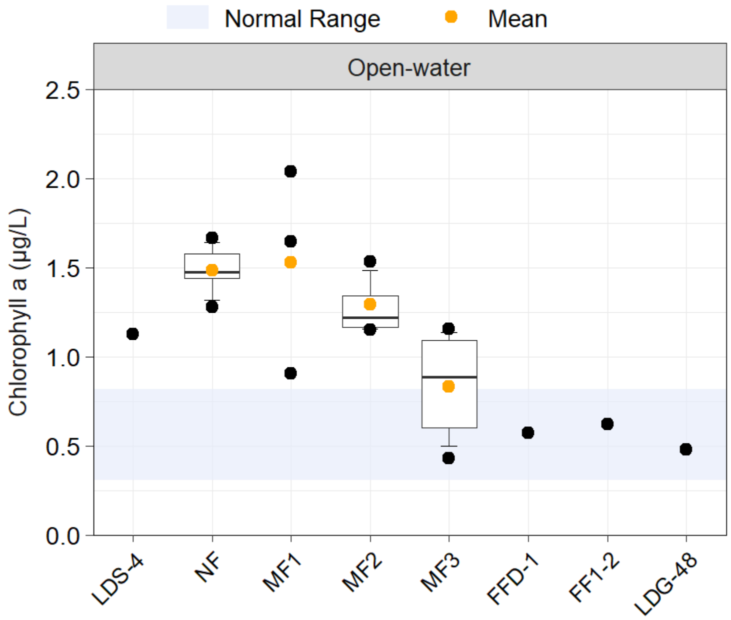
Figure 4-7 Concentrations of Soluble Reactive Silica in Lac de Gras during the Ice-Cover and Open-Water Season, 2020



Notes: Boxplots represent the 10th, 25th, 50th (median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles, except in cases with three or less data points, where the reported values are shown.

µg/L = micrograms per litre; LDS-4 = Lac du Sauvage outlet (the Narrows); NF = near-field; MF = mid-field; FF = far-field; LDG-48 = Lac de Gras outlet; T = top depth; M = middle depth; B = bottom depth.

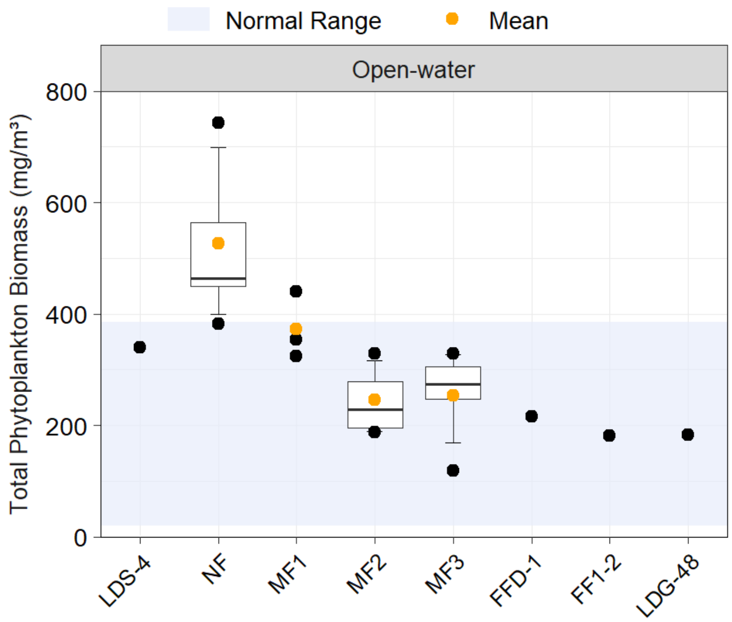
Figure 4-8 Chlorophyll *a* Concentrations in Lac de Gras during the Open-Water Season, 2020



Notes: Boxplots represent the 10th, 25th, 50th (median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles, except in cases with three or less data points, where the reported values are shown.

µg/L = micrograms per litre; LDS-4 = Lac du Sauvage outlet (the Narrows); NF = near-field; MF = mid-field; FF = far-field; LDG-48 = Lac de Gras outlet.

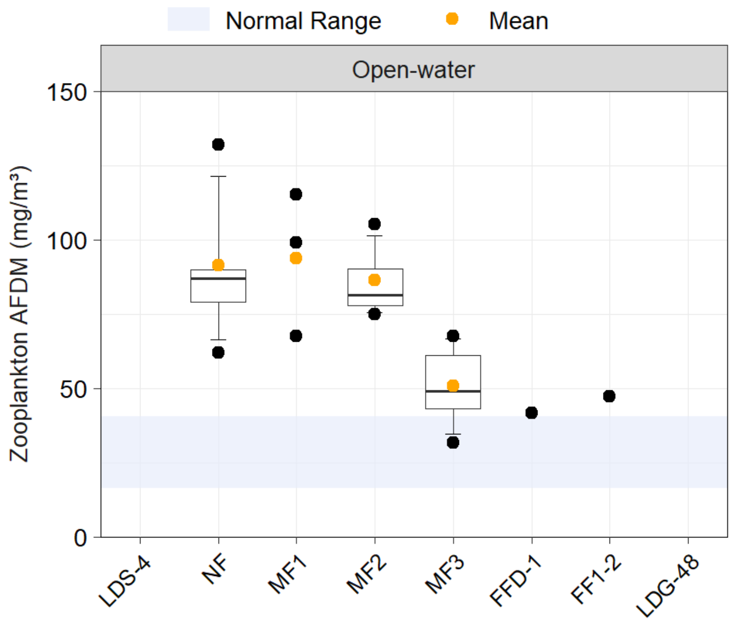
Figure 4-9 Total Phytoplankton Biomass in Lac de Gras during the Open-Water Season, 2020



Notes: Boxplots represent the 10th, 25th, 50th (median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles, except in cases with three or less data points, where the reported values are shown.

mg/m^3 = milligrams per cubic metre; NF = near-field; MF = mid-field; FF = far-field; LDG-48 = Lac de Gras outlet; LDS-4 = Lac du Sauvage outlet (the Narrows).

Figure 4-10 Total Zooplankton Biomass (as AFDM) in Lac de Gras during the Open-Water Season, 2020



Notes: Zooplankton is not measured at LDS-4 and LDG-48. Boxplots represent the 10th, 25th, 50th (median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles, except in cases with three or less data points, where the reported values are shown.

An error by the analytical laboratory resulted in an aliquot being removed for a different analysis from most sample bottles prior analysis of zooplankton biomass. An investigation determined the bias was low (<2% decrease in biomass) and therefore the results were not corrected for this bias.

AFDM = ash-free dry mass; mg/m^3 = milligrams per cubic metre; LDS-4 = Lac du Sauvage outlet (the Narrows); NF = near-field; MF = mid-field; FF = far-field; LDG-48 = Lac de Gras outlet.

4.3.3 Extent of Effects

Concentrations of TP were below the normal range at all stations in both seasons and at all depths. Therefore, the area of the lake affected was 0%.

The area of the lake affected for TN was greater than or equal to 48% based on ice-cover bottom depth concentrations. As TN concentrations were greater than the normal range at the MF3-7 station, and sampling did not occur in the FFA and FFB areas during the 2020 sampling program, the extent of effects could have been greater than the estimated area. However, given that TN concentrations in the middle and top ice-cover samples did not extend through the MF3 transect, it is unlikely that the area affected extended much farther past MF3-7, or to the lake outlet (e.g., as it did in 2019).

In 2020, effects of chlorophyll *a* were observed in the NF area and along the entire MF2 transect. The effect on chlorophyll *a* extended slightly past the MF1-3 and MF3-4 stations along the MF1 and MF3 transects, respectively. The extent of lake affected in 2020 was 22%, which was greater than estimated for 2018 and 2019, but comparable to 2017. Current conditions indicate that Action Level 2 has been triggered for nutrient enrichment based on chlorophyll *a* results. According to the Response Framework, exceedance of Action Level 2 requires an action to establish an Effects Benchmark; however, as previous AEMP reports have triggered Action Level 2, the Effects Benchmark has already been established (i.e., 4.5 µg/L) as presented in *AEMP Design Plan Version 4.1* (Golder 2017a). Therefore, no further action is required.

Total phytoplankton biomass was greater than the normal range in the NF area and the boundary of effect extended to between stations MF1-3 and MF1-5. The area of the lake affected was 2.8%, which is similar to results observed in 2019. This smaller extent of effects is consistent with the results for TP.

Effects on zooplankton biomass (as AFDM) were observed in the NF area and along all three transects. The boundary of effects on zooplankton biomass to the northwest (i.e., MF1 transect) extended to FF1-2 and the new FFD-1 station. The boundary of effects to the northeast of the Mine (i.e., MF2 transect) extended throughout the entire transect, reaching the Lac de Sauvage outlet (LDS-4), although inflow from Lac du Sauvage likely contributed to the observed effect. The boundary to the south of the Mine (i.e., MF3 transect) extended past MF3-6. The area demonstrating effects on zooplankton biomass (as AFDM) represents 326 km^2, or 57% of the lake area.

4.3.4 Effects from Dust Deposition

In 2020, as in previous years, the rate of dust deposition was highest within the Mine footprint and declined with distance from the Mine. In the *2017 to 2019 Aquatic Effects Re-evaluation Report* (Golder 2020b), The ZOI from dust deposition was estimated to extend to approximately 5.0 km from the Mine centroid.

The anthropogenic TP loads to Lac de Gras and the watershed (excluding the Mine and lake) in 2020 were estimated as 0.69 and 0.35 t, respectively, for a total (including Mine effluent) of 1.3 t in 2020. The anthropogenic TP load to Lac de Gras (direct and indirect) was consistent with those estimated for 2017 to 2019 in the re-evaluation report. Thus, the contribution of anthropogenic sources to the total TP loads to Lac de Gras was 4.2% due to dust and 1.2% due to effluent for a total of 5.4% (the rest was contributed from natural TP loads), which was comparable to the total anthropogenic contribution of 5.7% estimated for 2017 to 2019.

Although the magnitude of the estimated TP load from dust suggests that dust is a greater contributor to phosphorus-related effects in Lac de Gras than effluent, several lines of evidence indicate that this is not the case:

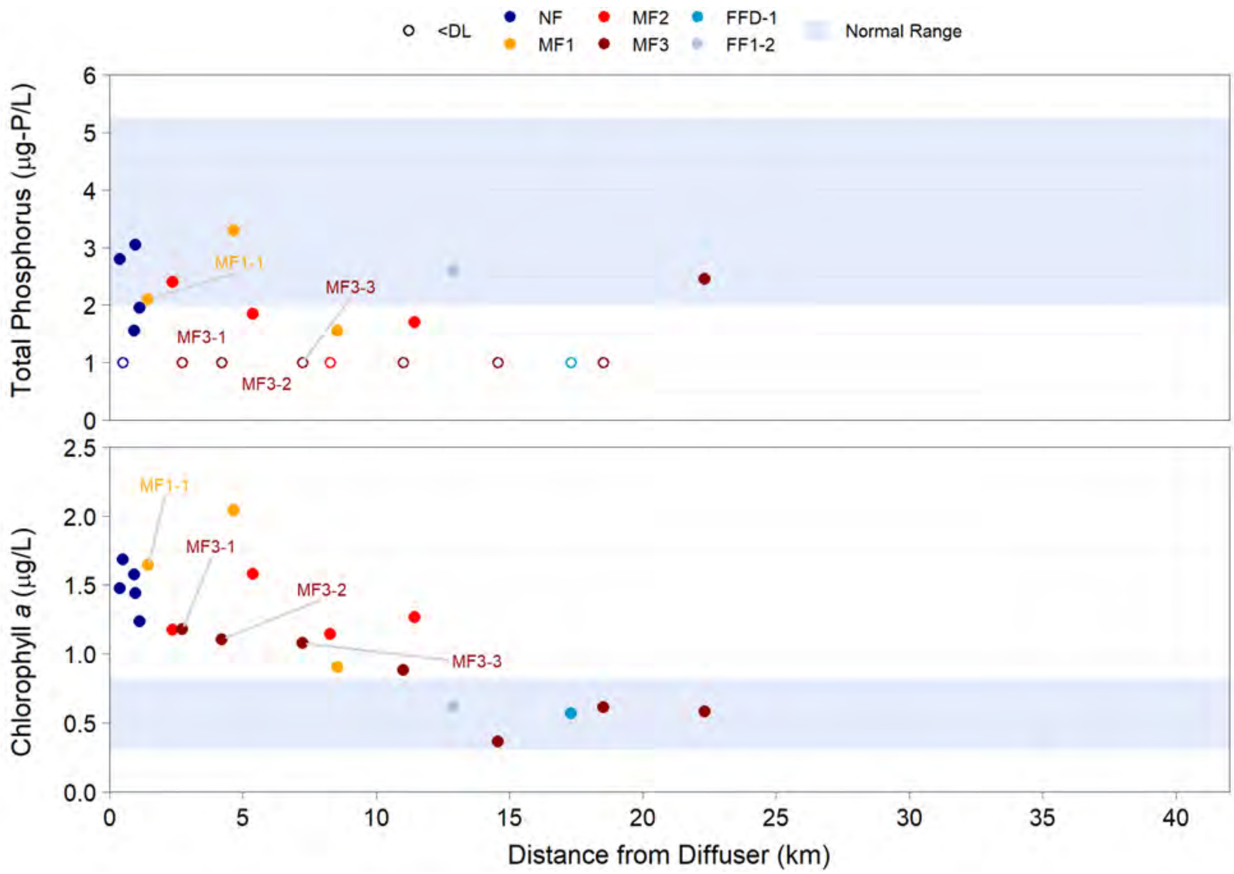
- TP loads from dust are subject to uncertainty, in part because the loading estimates related to dust do not take into account retention of deposited phosphorus on land.
- A large proportion of phosphorus from dust deposition that reaches the lake may not be bioavailable because it would be mostly in particulate form. Dust-associated phosphorus would settle to the sediment instead of dissolving and becoming available for algae to uptake. Therefore, dust-associated phosphorus is unlikely to contribute dissolved phosphorus in amounts that would result in a measurable contribution to the nutrient enrichment observed in the lake.
- Water quality results indicate that effluent is the primary driver of nutrient enrichment in Lac de Gras.
- In 2020, predominant wind directions at the Mine site were from the east, southeast, and northwest. However, the results of the 2020 *Dust Deposition Report* (Appendix I) show that proximity to Mine activity is a stronger indicator of dust deposition than wind direction.

- The lack of obvious dust-related effects on TP and chlorophyll *a* in the 2020 AEMP are supported by the Dust SES that was conducted in 2019.
- The *2017 to 2019 Aquatic Effects Re-evaluation Report* estimated phosphorus input from dust under the annual worst-case loading condition (i.e., spring break-up) at AEMP sampling stations within and outside the dust ZOI. Calculations indicated that adding all TP and SRP deposited to snow during the ice-cover season to the lake at spring break-up would likely result in negligible to small increases in TP and SRP in lake water, within and outside the dust ZOI. Open-water season phosphorus loading from dust deposition is diffuse and episodic, and would be even less likely to result in a measurable increase in phosphorus concentrations in lake water or a biological effect. In addition, only a portion of the added phosphorus would remain in the water column and be bioavailable.

Despite the apparently large contribution of TP from dust relative to other sources, the 2020 AEMP provided no evidence that dust deposition had an additional measurable effect on concentrations of TP or chlorophyll *a* in Lac de Gras, beyond the effect apparent from the Mine effluent discharge. The usefulness of continuing to calculate TP load from dust is questionable; the resulting estimate appears to consistently overestimate the contribution of TP in dust to nutrient enrichment in the lake. The AEMP sampling design for Lac de Gras provides sufficient and appropriate data to evaluate the effects in Lac de Gras from all Mine-related sources, including dustfall.

The evidence indicates that effluent is the main source of Mine effects on Lac de Gras, with a negligible contribution from dust deposition. This conclusion is consistent with the results of the *Special Effects Study – Dust Deposition* (Appendix XII of the 2019 AEMP Annual Report; Golder 2020c), which did not detect a dust-related chemical signature in lake water and suggested limited bioavailability of phosphorus in dust.

Figure 4-11 Concentrations of Total Phosphorus and Chlorophyll *a* in Lac de Gras in Relation to Dust Deposition during the Open-water Season, 2020



Note: MF stations in the zone of influence from dust deposition are labelled (i.e., MF1-1, MF3-1, MF3-2, MF3-3); all NF stations are within the zone of influence.
µg-P/L = micrograms phosphorus per litre; µg/L = micrograms per litre; NF = near-field; MF = mid-field; FF = far-field.

5 SEDIMENT CHEMISTRY

Sediment chemistry sampling was not completed in 2020. Consequently, Appendix III is a placeholder in this AEMP Annual Report.

6 PLANKTON

6.1 Introduction and Objectives

Plankton are small, usually microscopic plants and animals that live suspended in open water. For the purpose of the AEMP, phytoplankton refers to algae and zooplankton refers to microscopic animals, such as crustaceans (i.e., animals with hard shells similar to, but much smaller than, crabs or shrimp) that live suspended in lake water.

The overall objective of the plankton component of the AEMP is to monitor the potential effects of the Mine on the phytoplankton and zooplankton communities in Lac de Gras. The plankton component monitors phytoplankton and zooplankton community endpoints (i.e., abundance, biomass, and taxonomic composition) as indicators of potential effects.

The following is a summary of the 2020 plankton program. The *Plankton Report* (Appendix XI) provides detailed results.

6.2 Methods

A total of 23 phytoplankton and zooplankton samples were collected. Five stations were sampled in the NF area, three stations were sampled in the MF1 area, four stations were sampled in the MF2 area, seven stations were sampled in the MF3 area, and two additional stations were sampled between the MF1 and MF3 areas (i.e., FF1-2 and FFD-1). In addition, single stations were sampled at the outlet of Lac du Sauvage and the outlet of Lac de Gras (Figure 1-2). Samples were collected from 18 August to 7 September 2020. A depth-integrated sampler, which collects water from the surface to a depth of 10 m, was used to collect phytoplankton samples. Zooplankton samples were collected using a plankton net that was pulled up through the entire water column three times at each station.

Phytoplankton samples were sent to Biologica in 2020, which differed from the taxonomists used in previous years. Following completion of the 2020 phytoplankton sample collection, DDMI was informed that the phytoplankton taxonomist selected for the AEMP (Advanced Eco-Solutions Ltd., Liberty Lake, Washington, US) would not be able to analyze the samples in 2020, or moving forward. To analyze samples in a timely manner and allow reporting of results in the 2020 AEMP Annual report, DDMI contracted a new taxonomist to complete the analysis (Biologica). As required by the *Quality Assurance Project Plan Version 3.1* (QAPP; Golder 2017b), a Special Study was carried out using archived AEMP samples to evaluate differences between the taxonomists (Appendix XI, Attachment A). The results of the taxonomist comparison describe some differences between taxonomists. Because of internal consistency within a dataset provided by one taxonomist, these differences are of minimal concern regarding the evaluation of effects during the 2020 AEMP (e.g., using gradient analysis and visual comparisons of community composition along the effluent exposure gradient). However, comparisons to normal ranges and reference conditions can present issues. The results of comparisons show that total phytoplankton biomass, and biomass of the dominant phytoplankton group (microflagellates), are similar between datasets produced by the two taxonomists; therefore, these variables can be compared to normal ranges. However, comparing richness, and biomass of other groups to normal ranges is less likely to produce reliable results, given the greater observed differences between taxonomists for those variables. Although comparison to normal ranges for most major groups may no longer be accurate, the ability to detect Mine-related effects is not compromised, because those effects are best detected using gradient analysis, and overall level of productivity can still be evaluated based on comparison of total phytoplankton biomass to the normal range.

Zooplankton samples were sent to Salki Consultants Inc. in Winnipeg, MB, for analysis of taxonomic composition, abundance, and biomass.

The importance of effects on phytoplankton or zooplankton biomass and taxonomic richness (i.e., the number of different types of organisms) was evaluated according to Action Levels (Table 6-1). The magnitude of effect was evaluated by comparing community endpoints in the NF area to reference conditions. To evaluate spatial trends relative to the Mine discharge, total phytoplankton and zooplankton biomass and taxonomic richness at individual stations were plotted against distance from the effluent discharge and gradient analyses were conducted. Spatial variation in community structure was assessed by comparing sampling areas using multivariate analysis.

Table 6-1 Action Levels for Plankton Effects

Action Level	Plankton	Extent	Action
1	Mean biomass or richness significantly less than *reference condition mean*[(a)]	NF	Confirm effect
2	Mean biomass or richness significantly less than *reference condition mean*[(a)]	Nearest MF station	Investigate cause
3	Mean biomass or richness less than normal range[(b)]	NF	Examine ecological significance Set Action Level 4 Identify mitigation options
4	TBD[(c)]	TBD[(b)]	Define conditions required for the Significance Threshold
5[(d)]	Decline in biomass or richness likely to cause a >20% change in fish population(s)	FFA	Significance Threshold

a) The reference condition dataset was obtained from the AEMP Reference Conditions Report Version 1.4 (Golder 2019b).
b) Normal ranges were obtained from the *AEMP Reference Conditions Report Version 1.4* (Golder 2019b).
c) To be determined if Action Level 3 is triggered.
d) Although the Significance Threshold is not an Action Level, it is shown as the highest Action Level to demonstrate escalation of effects towards the Significance Threshold.
Note: Text in *italics* has been changed relative to wording in the *AEMP Design Plan Version 4.1* (Golder 2017a), to reflect the approved change in the biological Action Level assessment method by WLWB (2019) in Directive 3Q.

> = greater than; TBD = to be determined; NF = near-field; MF = mid-field; FF = far-field.

6.3 Results and Discussion

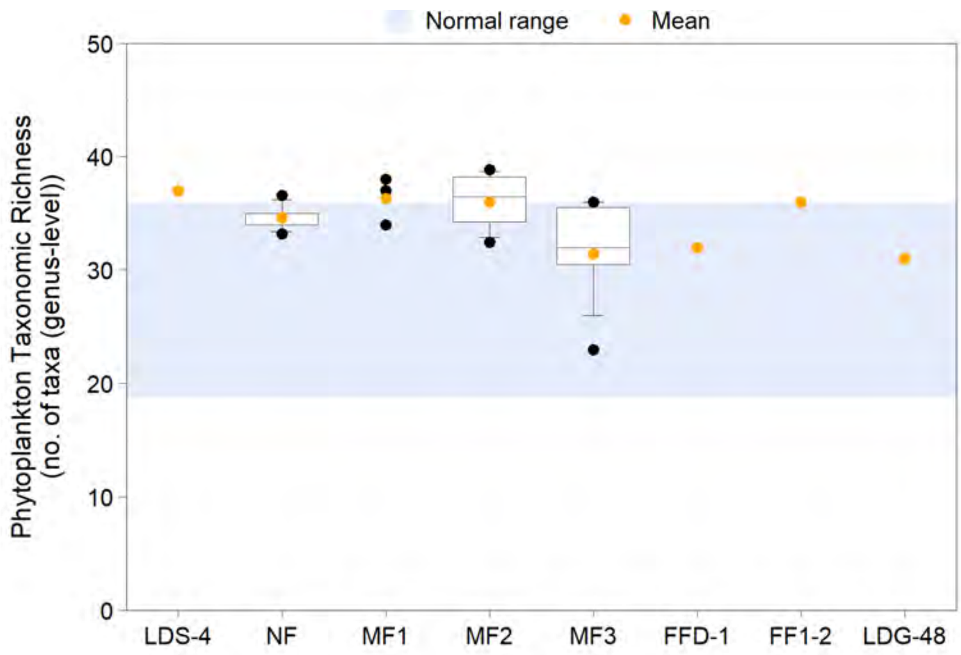
6.3.1 Phytoplankton

Phytoplankton taxonomic richness and biomass were within or above the normal range in all areas of Lac de Gras in 2020 (Figure 6-1 and Figure 6-2). Mean taxonomic richness in the NF area was above the reference condition mean and mean phytoplankton biomass was above the normal range. Gradient analysis demonstrated that phytoplankton richness, biomass, and the biomass of major ecological groups decreased with distance from the diffusers, and that stations close to the effluent exposure (i.e., stations in the NF area) generally had higher richness and biomass than the more distant stations in 2020 (Figure 6-3). These results are consistent with a Mine-related nutrient enrichment effect.

Phytoplankton community composition in the NF area of Lac de Gras did not substantially differ from those in MF areas in terms of relative abundance or biomass in 2020. The phytoplankton communities in all areas of Lac de Gras were dominated by cyanobacteria based on abundance, with microflagellate and chlorophyte sub-dominance, and by microflagellates and diatoms by biomass.

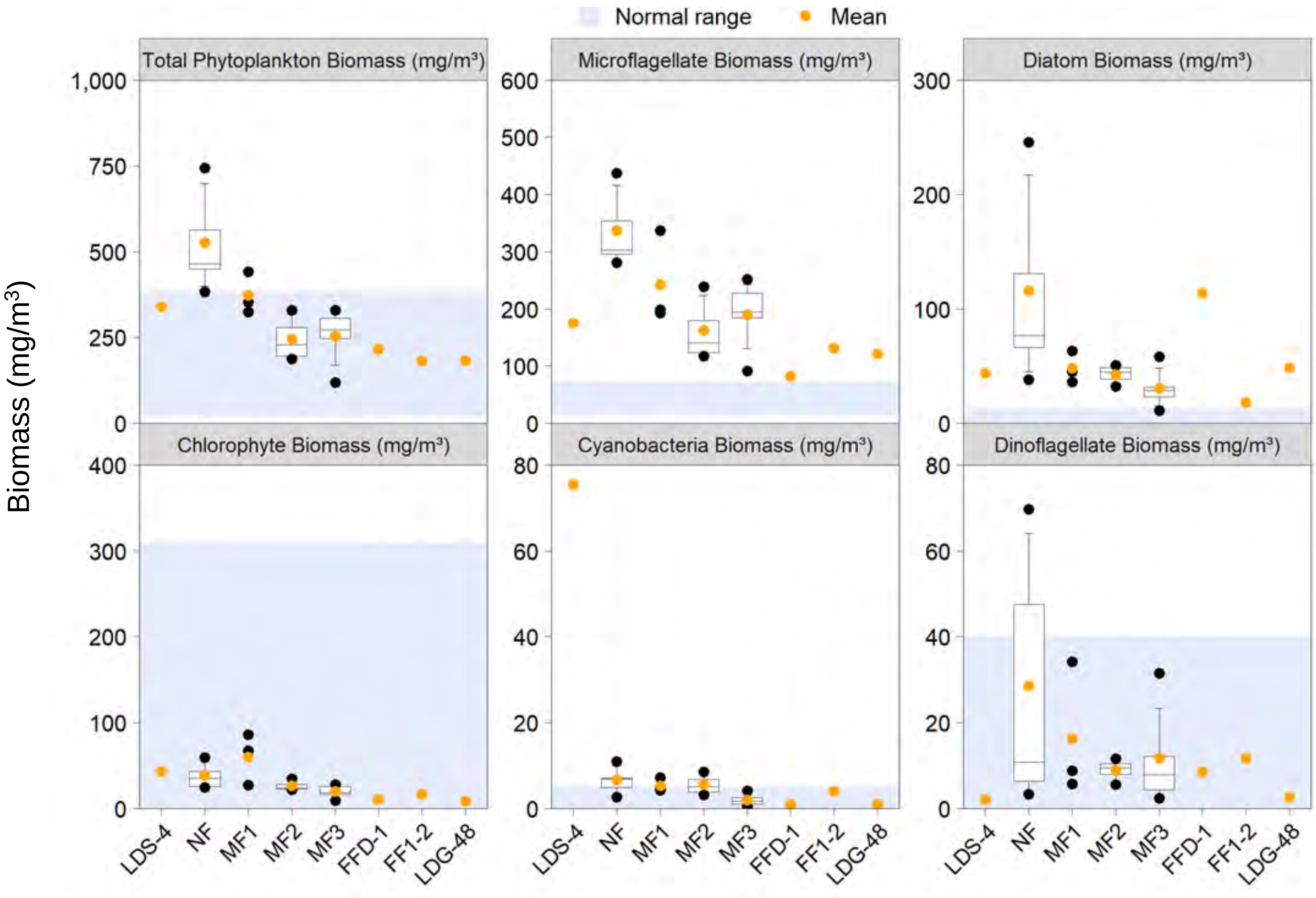
Overall, the 2020 phytoplankton results did not provide evidence of toxicological impairment and Action Level 1 for toxicological impairment was not triggered based on phytoplankton taxonomic richness or biomass. The 2020 phytoplankton biomass results are consistent with the chlorophyll *a* results presented in the 2020 *Eutrophication Indicators Report* (Appendix XIII).

Figure 6-1 Phytoplankton Taxonomic Richness by Sampling Area in Lac de Gras and Lac du Sauvage, 2020



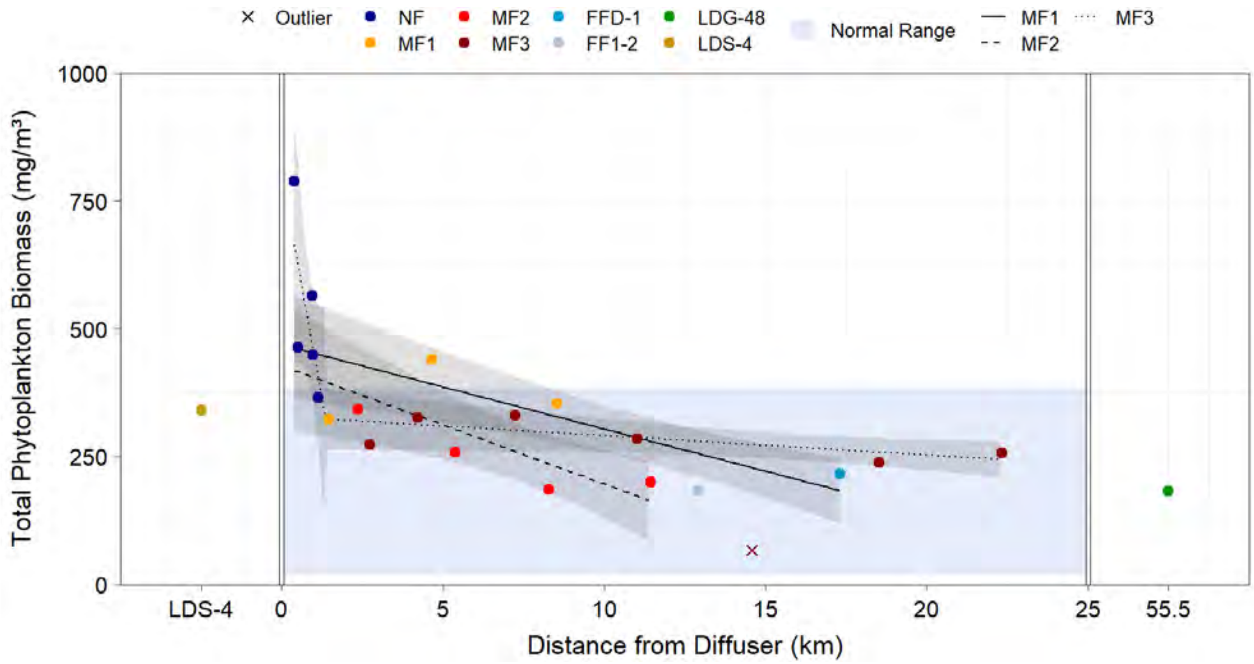
NF = near-field; MF = mid-field; FF = far-field; LDS = Lac du Sauvage; LDG = Lac de Gras.

Figure 6-2 Phytoplankton Biomass of Major Ecological Groups by Sampling Area in Lac de Gras and Lac du Sauvage, 2020



mg/m³ = milligrams per cubic metre; NF = near-field; MF = mid-field; FF = far-field; LDS = Lac du Sauvage; LDG = Lac de Gras.

Figure 6-3 Phytoplankton Biomass in Lac de Gras and Lac du Sauvage Relative to Distance from the Effluent Discharge, 2020



Note: Shaded bands around fitted prediction lines are 95% confidence intervals (back-transformed to original scale of the variable). mg/m^3 = milligrams per cubic metre; NF = near-field; MF = mid-field; FF = far-field; LDS = Lac du Sauvage; LDG = Lac de Gras.

6.3.2 Zooplankton

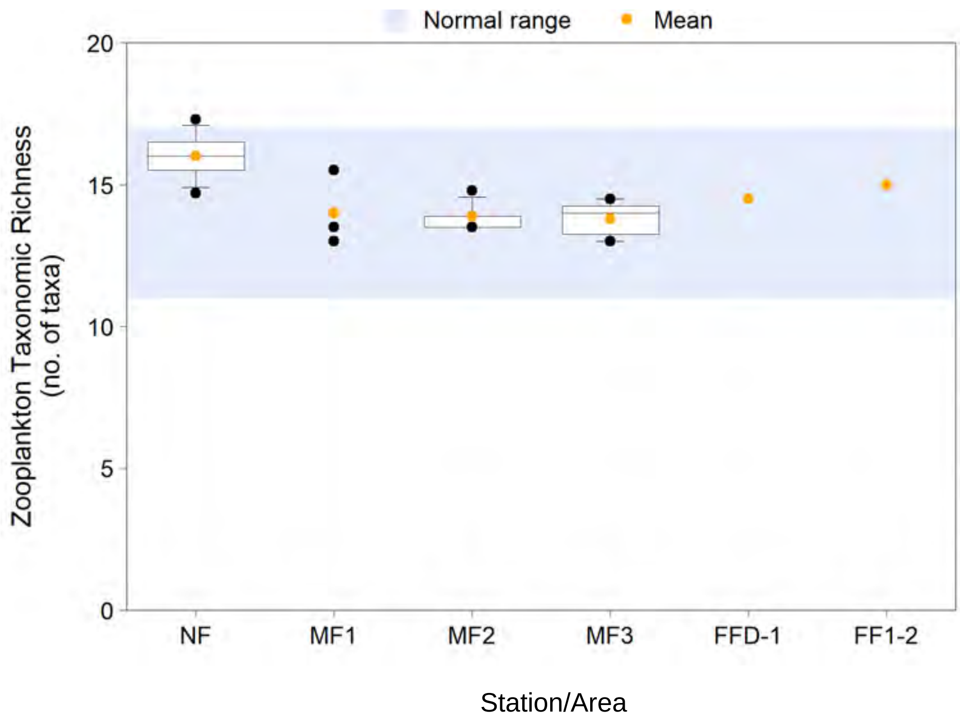
Mean zooplankton taxonomic richness was within the normal range in all areas of Lac de Gras in 2020, and was greater in the NF area compared to the MF areas. The NF area mean value was above the reference condition mean (Figure 6-4). Mean total zooplankton biomass in the NF area was within the normal range, but above the reference condition mean. In the NF area, mean biomass of calanoid copepods and cladocerans were within the normal range, and cyclopoid copepod and rotifer biomass was above the normal range (Figure 6-5).

The gradient analysis of zooplankton richness, biomass and the biomass of major ecological groups indicated that these variables have generally decreased with increasing distance away from the effluent diffusers, consistent with nutrient enrichment (Figure 6-6).

Zooplankton communities, based on abundance, in the NF and MF areas of Lac de Gras were co-dominated by rotifers and cyclopoid copepods in 2020. In terms of mean relative biomass, the zooplankton community in the NF and MF areas was dominated by calanoid copepods, with cyclopoid copepod sub-dominance. There were fewer cladocerans in the NF and MF1 areas compared to the other areas, in terms of both abundance and biomass.

The 2020 zooplankton community did not show a response consistent with toxicological impairment and Action Level 1 for toxicological impairment was not triggered. Rather, results were consistent with Mine-related nutrient enrichment, as demonstrated by greater zooplankton biomass in the NF area compared to the MF2 and MF3 areas, and the reference condition mean. Results reported in the *Eutrophication Indicators Report* (Appendix XIII) also indicate that nutrient enrichment is occurring in Lac de Gras.

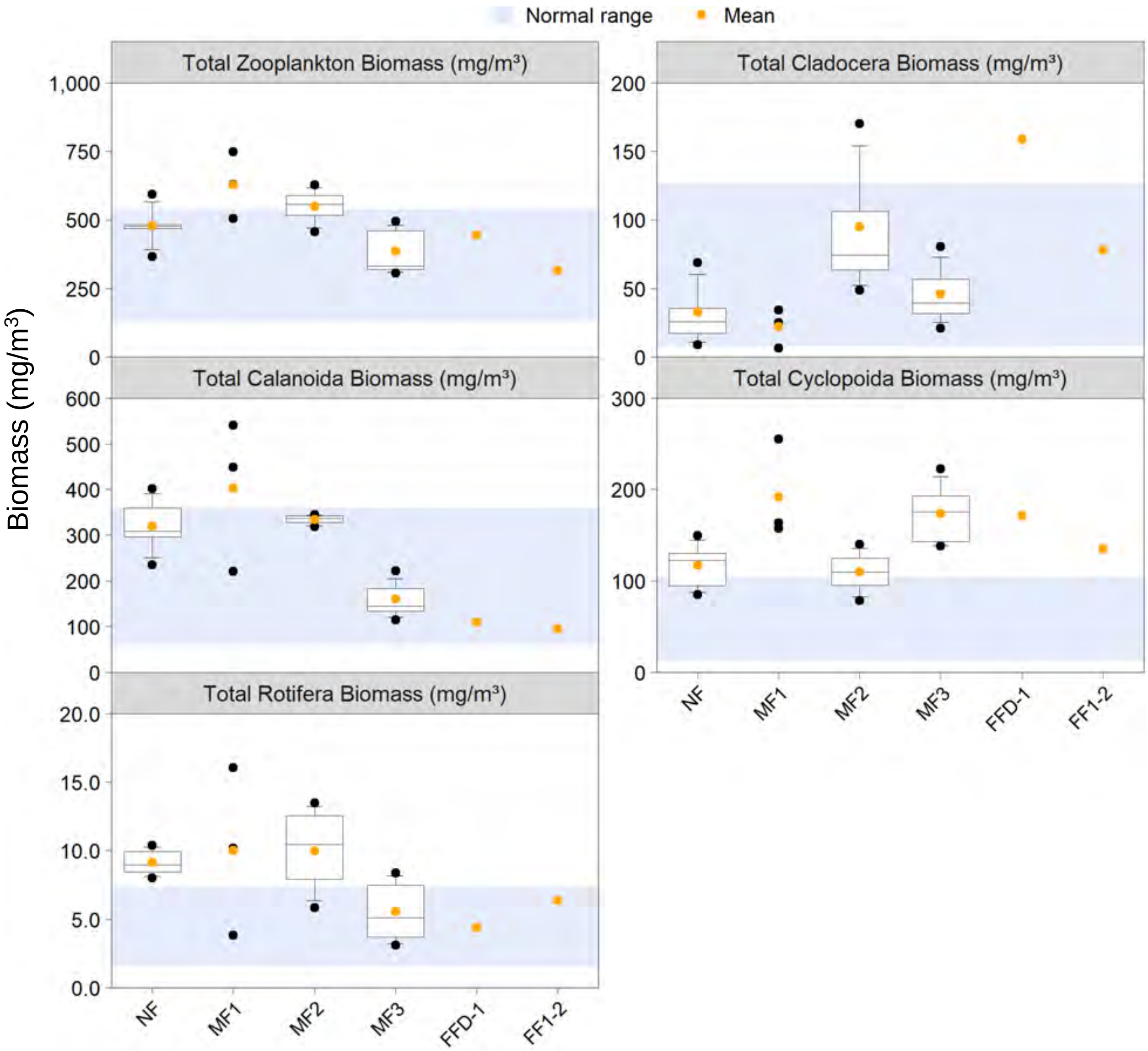
Figure 6-4 Zooplankton Taxonomic Richness by Sampling Area in Lac de Gras, 2020



Note: boxplots represent the 10th, 25th, 50th (i.e., median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles.

NF = near-field; MF = mid-field; FF = far-field.

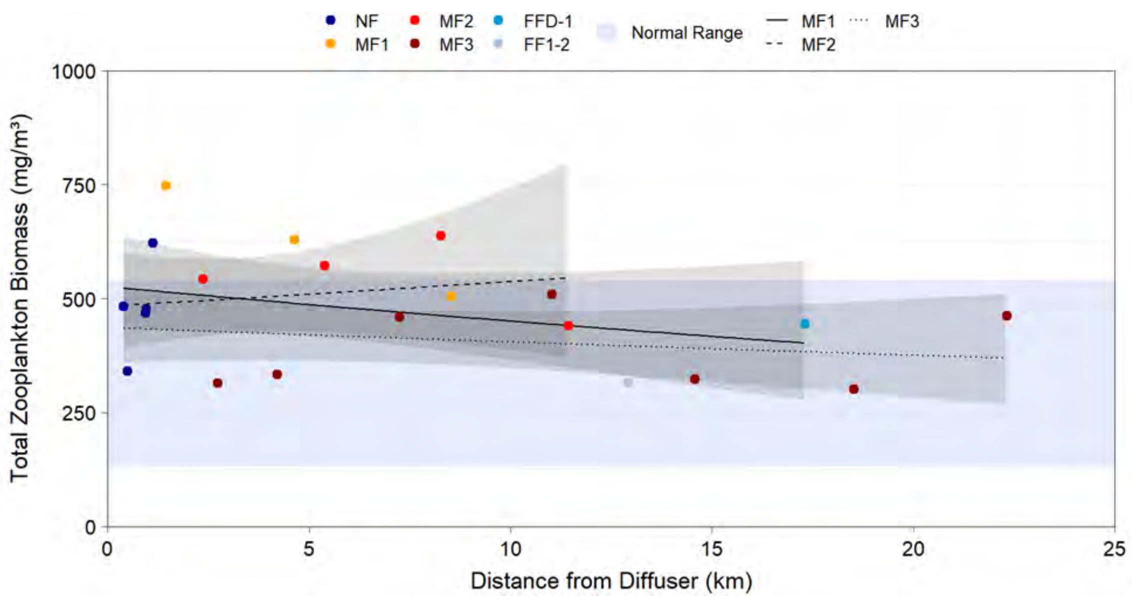
Figure 6-5 Zooplankton Biomass of Major Ecological Groups by Sampling Area in Lac de Gras and Lac du Sauvage, 2020



Note: boxplots represent the 10th, 25th, 50th (i.e., median), 75th, and 90th percentile concentrations in each sampling area. The black dots in the boxplots represent the 5th (on the bottom) and 95th (on the top) percentiles.

NF = near-field; MF = mid-field; FF = far-field; LDS = Lac du Sauvage; LDG = Lac de Gras.

Figure 6-6 Zooplankton Biomass in Lac de Gras and Lac du Sauvage Relative to Distance from the Effluent Discharge, 2020



Note: Shaded bands around fitted prediction lines are 95% confidence intervals (back-transformed to original scale of the variable).
NF = near-field; MF = mid-field; FF = far-field.

7 BENTHIC INVERTEBRATES

Benthic invertebrate sampling was not completed in 2020. Consequently, Appendix IV is a placeholder in this AEMP Annual Report.

8 FISH

Fish tissue sampling was not completed in 2020. Consequently, Appendix V is a placeholder in this AEMP Annual Report.

9 FISHERIES AUTHORIZATION AND SPECIAL EFFECTS STUDIES

9.1 Plume Delineation Survey

Plume delineation surveys did not take place in 2020. Consequently, Appendix VI is a placeholder in this AEMP Annual Report.

9.2 Fisheries Authorization Studies

9.2.1 Dike Monitoring Studies

Dike monitoring did not take place in 2020. Consequently, Appendix VII is a placeholder in this AEMP Annual Report.

9.2.2 Fish Salvage Programs

A fish salvage program did not take place in 2020. Consequently, Appendix VIII is a placeholder in this AEMP Annual Report.

9.2.3 Fish Habitat Compensation Monitoring

A fish habitat compensation monitoring program was not conducted in 2020. Consequently, Appendix IX is a placeholder in this AEMP Annual Report.

9.2.4 Fish Palatability, Fish Health, and Fish Tissue Chemistry Survey

A fish palatability survey was not completed in 2020. Consequently, Appendix X is a placeholder in this AEMP Annual Report.

9.3 AEMP Special Effects Study Reports

There were no special effects studies in 2020. Consequently, Appendix XII is a placeholder in this AEMP Annual Report.

10 TRADITIONAL KNOWLEDGE STUDIES

Traditional knowledge studies did not take place in 2020, the next study is scheduled for 2021. Consequently, Appendix XIV is a placeholder in this AEMP Annual Report.

11 WEIGHT-OF-EVIDENCE

The weight-of-evidence evaluation is only completed during comprehensive years. Consequently, Appendix XV is a placeholder in this AEMP Annual Report.

12 ADAPTIVE MANAGEMENT RESPONSE ACTIONS

A summary of the adaptive management responses and actions for each section of the 2020 AEMP comprehensive report are summarized below.

Dust Deposition

There are no Action Levels for Dust Deposition in the Response Framework.

Effluent and Water Chemistry

Water quality variables were assessed for a Mine-related effect according to Action Levels in the Response Framework. Twenty-one variables triggered Action Level 1. No management action is required under the Response Framework when a variable triggers Action Level 1. Of the 21 variables that triggered Action Level 1, eight also triggered Action Level 2. The required management action when a water quality variable triggers Action Level 2 is to establish an AEMP Effects Benchmark for that variable if one does not already exist. All eight variables that triggered Action Level 2 have existing Effects Benchmarks; therefore, no action was required. No water quality variables triggered Action Level 3 in 2020.

Eutrophication Indicators

Chlorophyll *a* concentrations were assessed for a Mine-related effect according to Action Levels in the Response Framework. Chlorophyll *a* concentrations in 2020 indicated that Action Level 2 was triggered for eutrophication indicators. According to the Response Framework, exceedance of Action Level 2 requires an action to establish an Effects Benchmark; however, since previous AEMP results have triggered Action Level 2, the Effects Benchmark has been established (i.e., 4.5 µg/L) as presented in *AEMP Design Plan Version 4.1* (Golder 2017a). Therefore, no further action is required.

Plankton

No Action Levels were triggered for plankton based on total phytoplankton and zooplankton biomass and zooplankton taxonomic richness results. Therefore, no further action is required.

The unanticipated switch to a different phytoplankton taxonomist in 2020 is likely to affect the comparison of phytoplankton richness to the normal range, which is an Action Level criterion. Based on the results of the taxonomist comparison completed in 2020, adjusting the normal range for phytoplankton richness upwards by the currently suggested number (12) would not result in an Action Level trigger in 2020 for richness.

13 CONCLUSIONS AND RECOMMENDATIONS

13.1 Conclusions

Conclusions for each section of the 2020 AEMP comprehensive report are summarized below.

Dust Deposition

- Dustfall rates decreased with distance from the Mine, as observed in previous years.
- Although there are no dustfall standards for the Northwest Territories, 2020 dustfall rates were below the commercial and industrial objective of 1,924 mg/dm^2/y documented in the Alberta Ambient Air Quality Objectives Guideline (AEP 2019).
- Snow water chemistry variables of interest included aluminum, ammonia, arsenic, cadmium, chromium, copper, lead, nickel, nitrite, phosphorus, and zinc. All 2020 concentrations were below the corresponding EQC values. DDMI compares the measured total metals levels for dust with EQC only because these criteria provide concentrations that can serve as general performance indicators. There is no intention or requirement that snow samples must meet the EQC or Alberta dustfall objectives.

Effluent and Water Chemistry

- The 2020 effluent toxicity results indicated that the effluent discharged to Lac de Gras in 2020 was non-toxic; all effluent samples submitted for lethal and sublethal toxicity testing passed test criteria.
- The concentrations of all regulated effluent variables were below applicable EQC values.
- Nearly all concentrations (>99%) measured in samples collected at the mixing zone boundary were within the relevant AEMP water quality Effects Benchmarks for the protection of aquatic life and drinking water.
- In the ice-cover season, elevated conductivity was measured in the bottom two-thirds of the water column in the NF area, corresponding to the depth range where the effluent plume was located. During the open-water season, in situ water quality measurements were typically uniform throughout the water column.
- Concentrations of the majority of variables in samples collected during the 2020 AEMP were below the relevant Effects Benchmarks for the protection of aquatic life and drinking water.
- In 2020, 21 water quality variables demonstrated an effect equivalent to Action Level 1 (i.e., TDS [calculated], TSS, turbidity, calcium, chloride, magnesium, potassium, sodium, sulphate, ammonia, nitrate, aluminum, antimony, barium, chromium, copper, molybdenum, silicon, strontium, sulphur, and uranium), and were included in the list of SOIs in 2020.
- Of the 21 SOIs that triggered Action Level 1, eight also triggered Action Level 2 (i.e., TDS [calculated], chloride, sodium, sulphate, nitrate, molybdenum, strontium, and uranium); these eight variables already have existing Effects Benchmarks.
- None of the SOIs triggered Action Level 3.

- Spatial trends of decreasing concentrations with distance from the Mine effluent discharge were evident for most SOIs based on a graphical and statistical evaluation of the data. An exception was TSS, which had concentrations in the MF area similar to those measured in the NF area in both seasons.
- Twenty-five variables triggered an effect equivalent to Action Level 1 at one or more of the four MF area stations located within the estimated ZOI from dust deposition from the Mine site. Of these 25 SOIs, 18 also triggered Action Level 1 in the NF area, indicating that the exceedances at the MF stations were at least partly caused by dispersion of Mine effluent into the lake. Analysis of the 2020 AEMP water quality indicate that effluent is the main source of Mine effects on Lac de Gras, with a negligible contribution from dust deposition.

Eutrophication Indicators

- The Mine is having a nutrient enrichment effect in Lac de Gras, as evidenced by greater nutrient and chlorophyll *a* concentrations, and phytoplankton and zooplankton biomass in the NF area, compared to the rest of the lake.
- TP, TDP, and SRP concentrations were within or below the normal range throughout most of Lac de Gras during both the ice-cover and open-water seasons. The lower phosphorus concentrations in lake water relative to previous years were at least partly due to the lower TP loads from Mine effluent in 2020.
- Nitrogen concentrations were above the normal range in a large proportion of Lac de Gras, with significant decreasing concentrations with distance from the diffusers. Along most transects, a significant decreasing trend in SRSi concentration was observed, indicating a Mine effect.
- Chlorophyll *a* concentrations and zooplankton biomass decreased with distance from the diffuser and were above the normal range in the NF area and most stations in the MF areas. Total phytoplankton biomass decreased with distance from the diffuser; however, most results were within the normal range.
- The spatial extent of effects on eutrophication indicators in 2020 varied from 0% to 57% of the lake area depending on indicator:
  - The extent of effect was 0% for TP, and 40% to ≥48% of the lake area for TN, depending on season.
  - The extent of effect was 22% for chlorophyll *a* concentration, 2.8% for phytoplankton biomass and 57% of the lake area for zooplankton biomass.
- The 2020 results indicate that effluent is the main source of Mine effects on Lac de Gras, with a negligible contribution from dust deposition. This conclusion is consistent with the results of the *Special Effects Study – Dust Deposition* (Appendix XII of the 2019 AEMP Annual Report), which did not detect a dust-related chemical signature in lake water and suggested limited bioavailability of phosphorus in dust.
- The magnitude and extent of effects on chlorophyll *a* triggered Action Level 2. This is consistent with observations reported in previous AEMP years as summarized in the *2017 to 2019 Aquatic Effects Re-evaluation Report* (Golder 2020b); either Action Level 1 or 2 were triggered in the 2007 to 2018 AEMPs, and no Action Level was triggered in 2019.

- The 2020 results are consistent with the EA prediction of greater concentrations of nutrients, particularly phosphorus from the minewater discharge, resulting in an increase in primary productivity.

Plankton

- The 2020 plankton data indicate that a toxicological effect is not occurring in Lac de Gras. Rather, results continue to be consistent with nutrient enrichment.
- Greater plankton biomass was observed in NF area compared to the MF areas and the reference condition mean.
- The NF area mean values for total phytoplankton and zooplankton taxonomic richness and biomass were greater than the reference condition mean, indicating that Action Level 1 was not triggered.

13.2 Recommendations

Based on the 2020 AEMP results, no recommendations are provided for the dust deposition components of the AEMP. Recommendations for effluent and water chemistry and plankton components of the AEMP are provided below:

- Based on the 2020 AEMP results for water chemistry and eutrophication indicators, and the previous results for eutrophication indicators (including the *Special Effects Study – Dust Deposition*; Golder 2020c), it is recommended that the analysis used to evaluate potential effects from dust emissions on water quality and eutrophication indicators (including the annual phosphorus loading estimates) in Lac de Gras be discontinued in future AEMP reports. Several lines of evidence suggest that isolating the specific effects from dust emissions on water quality in Lac de Gras from other mine sources (e.g., effluent) is not possible or necessary to manage Mine-related effects in Lac de Gras. The AEMP sampling design provides sufficient and appropriate data to evaluate the combined effects in Lac de Gras from all Mine-related sources, including dustfall.
- For plankton, due to the use of different taxonomist in 2020, it is recommended that either richness be dropped from the Action Level evaluation for phytoplankton, or the normal range for phytoplankton richness be adjusted to reflect the difference between taxonomists, by shifting it upwards by the average difference between taxonomists based on the five sets of sample results (i.e., by 12 taxa). Given that the taxonomist comparison was done based on a limited set of samples and did not include areas of Lac de Gras least affected by the effluent (FFA and FFB), the recommendation to adjust the normal range for richness is subject to verification of the difference between taxonomists in the FFA and FFB areas using previous results from Eco-Logic and Biologica results from the next comprehensive year monitoring. It is also recommended that normal range comparisons for individual groups be discontinued. This reduction will not impact the annual assessment of effects or the Action Level assessment because the Action Level assessment is based on total phytoplankton biomass and not the biomass of major groups.

13.3 Summary

The AEMP is effective at monitoring the Mine effluent discharge and assessing potential ecological risks so that appropriate actions can be taken in the Mine operations to prevent adverse effects from occurring in the environment. Under the Response Framework, the AEMP is subject to response actions, if triggered, to confirm, further investigate, or mitigate effects documented by the AEMP. The AEMP design will be updated as new information and findings indicate it necessary, or as directed by the WLWB. No response actions are required as a result of the 2020 AEMP monitoring results.

14 CONTRIBUTORS

This document has been prepared by DDMI in association with ERM, and Golder Calgary AB, Edmonton AB, Whitby, Ottawa and Mississauga ON, Saskatoon SK, Castlegar BC, and Richmond, Australia.

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15 REFERENCES

AEP (Alberta Environment and Parks). 2019. Alberta Ambient Air Quality Objectives and Guidelines Summary. Air Policy, 2016, No. 2. Air Policy Branch. Government of Alberta. January 2019. https://open.alberta.ca/dataset/0d2ad470-117e-410f-ba4f-aa352cb02d4d/resource/4ddd8097-6787-43f3-bb4a-908e20f5e8f1/download/aaqo-summary-jan2019.pdf

CCME (Canadian Council of Ministers of the Environment). 1999. Canadian Water Quality Guidelines. Prepared by the Task Force on Water Quality Guidelines of the Canadian Council of Ministers of the Environment. With updates to 2019. Ottawa, ON.

DDMI (Diavik Diamond Mines Inc.). 1998. Environmental Effects Report, Fish and Water. Diavik Diamonds Project. Yellowknife, NT, Canada. September 1998.

DDMI. 2007. Lakebed Sediment, Water Quality and Benthic Invertebrate Study – A154 Dike Year 3 Results A418 Year 1 Results. Yellowknife, NT, Canada.

DDMI. 2008. Aquatic Effects Monitoring Program. 2007 Annual Report. Yellowknife, NT. April 2008.

DDMI. 2009. Aquatic Effects Monitoring Program. 2008 Annual Report. Yellowknife, NT. April 2009.

DDMI. 2010. Aquatic Effects Monitoring Program. 2009 Annual Report. Yellowknife, NT. March 2010.

DDMI. 2011. Aquatic Effects Monitoring Program. 2010 Annual Report. Yellowknife, NT. March 2011.

DDMI. 2012. Aquatic Effects Monitoring Program. 2011 Annual Report. Yellowknife, NT. March 2012.

DDMI. 2013. Aquatic Effects Monitoring Program. 2012 Annual Report. Yellowknife, NT. March 2013.

Golder. 2014. Aquatic Effects Monitoring Program 2013 Annual Report. Diavik Diamond Mines (2012) Inc. (DDMI). Yellowknife, NT. March 2014.

Golder. 2016a. Aquatic Effects Monitoring Program. 2014 Annual Report. Prepared for Diavik Diamond Mines (2012) Inc. Yellowknife, NT. March 2016.

Golder. 2016b. Aquatic Effects Monitoring Program. 2015 Annual Report. Prepared for Diavik Diamond Mines (2012) Inc. Yellowknife, NT. March 2016.

Golder. 2017a. Aquatics Effect Monitoring Program Design Plan Version 4.1. Prepared for Diavik Diamond Mines (2012) Inc. (DDMI). Yellowknife, NT. June 2017.

Golder. 2017b. Aquatic Effects Monitoring Program 2016 Annual Report. Diavik Diamond Mines (2012) Inc. (DDMI). Yellowknife, NT. March 2017.

Golder. 2017c. Diavik Diamond Mine – Aquatic Effects Monitoring Program – Quality Assurance Project Plan (QAPP). Version 3.1. Prepared for Diavik Diamond Mines (2012) Inc. Yellowknife, NT, Canada. June 2017.

Golder. 2018. Aquatic Effects Monitoring Program. 2017 Annual Report. Prepared for Diavik Diamond Mines (2012) Inc. Yellowknife, NT. April 2018.

Golder. 2019a. Aquatic Effects Monitoring Program Design Plan Version 5.1, Prepared for Diavik Diamond Mines (2012) Inc. (DDMI) Yellowknife, NT. October 2019.

Golder. 2019b. Aquatic Effects Monitoring Program - Reference Conditions Report, Version 1.4. Prepared for Diavik Diamond Mines (2012) Inc. (DDMI). Yellowknife, NT. July 2019.

Golder. 2019c. Aquatic Effects Monitoring Program 2018 Annual Report. Diavik Diamond Mines (2012) Inc. (DDMI). Yellowknife, NT. March 2019.

Golder. 2020a. Aquatics Effect Monitoring Program Design Plan Version 5.2. Prepared for Diavik Diamond Mines (2012) Inc. Yellowknife, NT, Canada. July 2020.

Golder. 2020b. 2017 to 2019 Aquatic Effects Re-evaluation Report for the Diavik Diamond Mine, Northwest Territories. Prepared for Diavik Diamond Mines (2012) Inc. Yellowknife, NT, Canada. December 2020.

Golder. 2020c. AEMP 2019 Annual Report for the Diavik Diamond Mine, NT. Prepared for Diavik Diamond Mines (2012) Inc. Yellowknife, NT, Canada. April 2020.

Government of Canada. 1999. The Canadian Environmental Assessment Act Comprehensive Study Report. Diavik Diamonds Project. June 1999.

Health Canada. 1996. Guidelines for Canadian Drinking Water Quality, Sixth Edition.

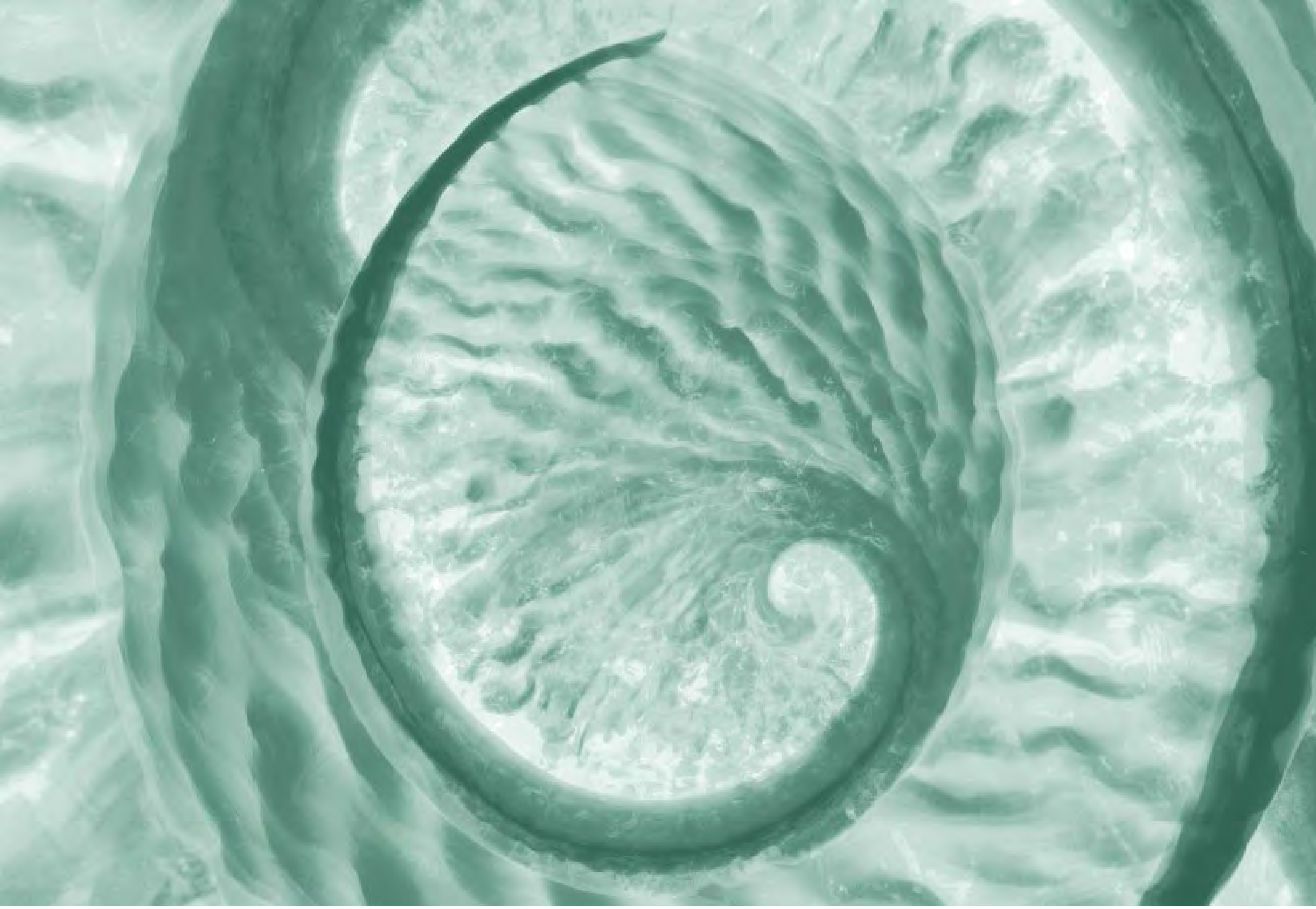
Health Canada. 2020. Guidelines for Canadian Drinking Water Quality Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment. www.healthcanada.gc.ca/waterquality.

Wetzel RG. 2001. Limnology: lake and River Ecosystems 3rd Ed. San Diego, CA: Elsevier Science Academic Press.

WLWB (Wek'èezhìı Land and Water Board). 2015. Wek'èezhìı Land and Water Board Type A Water Licence #W2015L2-0001, effective October 19, 2015. Yellowknife, NT, Canada.

APPENDIX I

DUST DEPOSITION REPORT



Diavik Diamond Mine

2020 Dust Deposition Report

March 2021

Project No.: 0573452-0001

The business of sustainability

March 2021

Diavik Diamond Mine

2020 Dust Deposition Report

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EXECUTIVE SUMMARY

Potential air and water quality concerns associated with airborne fugitive dust, which may result from Diavik Diamond Mine (the Project) mining activities, were identified in the Diavik Diamond Mine *Environmental Assessment Report* (DDMI 1998). In accordance with the Environmental Assessment and requirements associated with the Aquatic Effects Monitoring Program (AEMP), a dust monitoring program was initiated in 2001. The program was designed to achieve the following objectives:

- determine dust deposition (dustfall) rates at various distances from the mine project footprint; and
- determine the chemical characteristics of dustfall that may be deposited onto, and subsequently into, Lac de Gras as a result of mining activities, in support of the AEMP.

In 2020, dustfall monitoring included three components, with sampling conducted at varying distances around the mine from 13 to 4,802 metres (m) away from infrastructure:

- Dustfall gauges (12 monitoring and 2 control locations);
- Dustfall from snow surveys (24 monitoring and 3 control locations); and
- Snow water chemistry from snow surveys (16 monitoring and 3 control locations).

Overall, as expected, dustfall rates decreased with distance from the Project. The proximity to mine activity was the strongest indicator of dustfall deposition. In 2020, the annual dustfall estimated from each of the 14 dustfall gauges ranged from 78 to 757 mg/dm^2/y. Dust 10 (46 m from the Project) had the highest recorded dustfall followed by Dust 3 (22 m from the Project). Although it is expected that fugitive dust generation is higher during snow-free periods because of exposed road surfaces, the difference between the summer and winter dustfall rate was generally minor with the summer rate being higher at most sites (e.g., Dust 1 rate was 596 mg/dm^2/y in the summer and 164 mg/dm^2/y in the winter), while some sites recorded a higher winter dustfall rate (e.g., Dust 2A rate was 298 mg/dm^2/y in the summer and 322 mg/dm^2/y in the winter).

The annualized dustfall rates estimated from the 2020 snow survey data ranged from 5 to 1,463 mg/dm^2/y. Although there are no dustfall standards for the Northwest Territories, dustfall rates at all stations in 2020 were lower than the non-residential objective of 5.27 mg/dm^2/d (1,922 mg/dm^2/y) documented in the Alberta Ambient Air Quality Objectives and Guidelines (Alberta Environment and Parks 2019), and only SS1-1, SS5-1, and SS5-3 dustfall stations exceeded the lower limit (646 mg/dm^2/y) of these guidelines, which applies to residential and recreational areas. These objectives are used as general performance indicators only.

Snow water chemistry analytes of interest included those variables with effluent quality criteria (EQC; i.e., aluminum, ammonia, arsenic, cadmium, chromium, copper, lead, nickel, nitrite, and zinc) or a load limit (i.e., phosphorus) specified in the Type A Water Licence (W2015L2-0001, formerly W2007L2 0003). All 2020 sample concentrations were well below their associated reference levels as specified by the “maximum concentration of any grab sample” in Water Licence W2015L2 0001. Concentrations in 2020 were similar to 2019 and generally lower than recent years for all parameters except nitrite. Typically, concentrations decreased with distance from the Project. The highest concentrations for all variables were less than their corresponding EQC.

ACKNOWLEDGEMENTS

This report was prepared for Diavik Diamond Mines (2012) Inc. (DDMI) by ERM Consultants Canada Ltd. (ERM). Fieldwork and on site sample analyses were completed by DDMI, and other sample analyses were completed by Bureau Veritas (BV). Data analyses and reporting were completed by Talaat Bakri (M.Sc.) and reviewed by Andres Soux (M.Sc.). The project was managed by Carol Adly (M.Sc., R.P.Bio.), and Marc Wen (M.Sc., R.P.Bio.) was the Partner in Charge.

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ACRONYMS AND ABBREVIATIONS

AEMP	Aquatic effects monitoring program
BC	British Columbia
BC MOE	British Columbia Ministry of Environment
CI	Confidence interval
DDMI	Diavik Diamond Mines (2012) Inc.
DL	Detection limit
Dustfall	Dust deposition
EQC	Effluent quality criteria
ERM	ERM Consultants Canada Ltd.
Fugitive Dust	Atmospheric dust arises from mechanical disturbance of granular material exposed to the air and is not discharged to the atmosphere in a confined flow stream.
IQR	The interquartile range of the box plot. In box plots, the middle 50% of data occurs within the limits of the interquartile range.
Q1	The lower quartile of the box plot. In box plots, 25% of data lie below than this value.
Q3	The upper quartile of the box plot. In box plots, 25% of data lie above than this value.
QA/QC	Quality assurance and quality control
the Project	Diavik Diamond Mine
RPD	Relative percent difference
SCRP	South Country Rock Pile
SOP	Standard operating procedure
WLWB	Wek’èezhìi Land and Water Board
WRSA	Waste Rock Storage Area: an elevated surface constructed from dumping waste rock.

1. INTRODUCTION

Potential air and water quality concerns associated with airborne fugitive dust, which may result from Diavik Diamond Mine (the Project) mining activities, were identified in the Diavik Diamond Mine *Environmental Assessment Report* (DDMI 1998). In accordance with the Environmental Assessment and requirement associated with the Aquatic Effects Monitoring Program (AEMP), a dust monitoring program was initiated in 2001. The program was designed to achieve the following objectives:

- determine dust deposition (dustfall) rates at various distances from the mine project footprint; and
- determine the chemical characteristics of dustfall that may be deposited onto, and subsequently into, Lac de Gras as a result of mining activities, in support of the AEMP.

Since 2001, the dustfall monitoring program has gone through various changes, including an increase in the number of sampling locations, the relocation of some sampling stations, and improvements to the dustfall sampling methodology. A description of annual changes is provided in Appendix A. This report includes a comparison between the 2020 observations of dustfall to all site-specific data collected between 2002 and 2020. Appendix A of the Dust Deposition Report summarizes the amendments and additions to the dustfall monitoring program since 2001. Historical dustfall monitoring results have been presented each year in the Diavik Diamond Mine Dust Deposition reports from 2001 to 2019 (DDMI 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020). The historical data presented are not considered to represent baseline conditions because construction of the mine began in 2001.

2. METHODOLOGY

The 2020 dustfall monitoring program incorporated three monitoring components:

1. Dustfall gauges (12 monitoring and 2 control locations);
2. Dustfall from snow surveys (24 monitoring and 3 control); and
3. Snow water chemistry from snow surveys (16 monitoring and 3 control).

Sampling was completed at varying distances around the mine along five transects, including three control locations (Table 2-1, Figure 2-1).

2.1 Dustfall Gauges

Dustfall gauges were placed at 14 stations (including two control stations) around the Project at distances ranging from approximately 13 m to 4,646 m from mining operations (Table 2-1; Figure 2-1). The 12 stations (plus 2 control stations) collected dustfall year-round, with samples collected approximately every three months. The average total sampling period for the 12 year-round locations was 376 days, starting from late 2019 to early 2021.

Dustfall gauges consisted of a hollow brass cylinder (52 cm length, 12.5 cm inner diameter) housed in a Nipher snow gauge (Photo 2.1-1). The cylinder collected dustfall, while the Nipher snow gauge reduced air turbulence around the gauge to increase dustfall catch efficiency. The cylinder was exchanged with an empty, clean cylinder at the end of each sampling period, and the content of the cylinder that was retrieved was processed in the Diavik Diamond Mines (2012) Inc. (DDMI) environment lab to determine the mass of collected dustfall. This processing involved filtration, drying in a high heat oven, and weighing of samples as specified in the Dust Gauge Collection Standard Operating Procedure (SOP; ENVI-908-0119; Appendix E) and the Quality Assurance/Quality Control SOP (ENVI-902-0119; Appendix G).

Photo 2.1-1: Dustfall gauge during sample collection. The dustfall gauge consisted of a hollow brass cylinder (centre) housed inside a Nipher snow gauge (right).

Table 2-1: Dustfall and Snow Chemistry Sampling Locations, Diavik Diamond Mine, 2020

Station ID	2020 Sampling Dates	Total Sample Exposure Duration (days)	UTM Coordinates[1]		Approx. Distance from Mining Operations (m)	Surface Description	Snow Water Chemistry Sampled[2]
			Easting (m)	Northing (m)			
Dustfall Gauges							
Dust 1	Dec 26 (2019; start), Mar 29, Jul 18, Oct 22, Jan 4 (2021; end)	375	533964	7154321	70	Land	n/a
Dust 2A	Dec 28 (2019; start), Mar 27, Jul 18, Oct 20, Jan 8 (2021; end)	377	535678	7151339	425	Land	n/a
Dust 3	Dec 26 (2019; start), Mar 29, Jul 17, Oct 22, Jan 3 (2021; end)	374	535024	7151872	22	Land	n/a
Dust 4	Dec 26 (2019; start), Mar 29, Jul 17, Oct 23, Jan 3 (2021; end)	374	531397	7152127	173	Land	n/a
Dust 5	Dec 27 (2019; start), Mar 27, Jul 18, Oct 20, Jan 8 (2021; end)	378	535696	7155138	1183	Land	n/a
Dust 6	Dec 26 (2019; start), Mar 29, Jul 18, Oct 22, Jan 3 (2021; end)	374	537502	7152934	13	Land	n/a
Dust 7	Dec 27 (2019; start), Mar 27, Jul 18, Oct 20, Jan 8 (2021; end)	378	536819	7150510	1147	Land	n/a
Dust 8	Dec 27 (2019; start), Mar 27, Jul 19, Oct 20, Jan 8 (2021; end)	378	531401	7154146	1213	Land	n/a
Dust 9	Dec 27 (2019; start), Mar 27, Jul 18, Oct 20, Jan 8 (2021; end)	378	541204	7152154	3796	Land	n/a
Dust 10	Dec 26 (2019; start), Mar 29, Jul 17, Oct 22, Jan 3 (2021; end)	374	532908	7148924	46	Land	n/a
Dust 11	Dec 26 (2019; start), Mar 27, Jul 17, Oct 20, Jan 8 (2021; end)	379	531493	7150156	747	Land	n/a
Dust 12	Dec 28 (2019; start), Mar 27, Jul 19, Oct 20, Jan 8 (2021; end)	377	529323	7151191	2326	Land	n/a

Station ID	2020 Sampling Dates	Total Sample Exposure Duration (days)	UTM Coordinates[1]		Approx. Distance from Mining Operations (m)	Surface Description	Snow Water Chemistry Sampled[2]
			Easting (m)	Northing (m)			
Dust C1	Dec 27 (2019; start), Mar 27, Jul 18, Oct 20, Jan 8 (2021; end)	378	534979	7144270	4646	Land	n/a
Dust C2	Dec 28 (2019; start), Mar 27, Jul 19, Oct 20, Jan 8 (2021; end)	377	528714	7153276	3031	Land	n/a
Snow Surveys							
SS1-1	Apr 12	197	533915	7154292	30	Land	
SS1-2	Apr 12	197	533909	7154382	115	Land	
SS1-3	Apr 12	197	533967	7154517	260	Land	
SS1-4[3]	Apr 12	167	534483	7155096	899	Ice	✓
SS1-5	Apr 12	167	535098	7156275	2175	Ice	✓
SS2-1	Apr 12	167	537553	7153474	145	Ice	✓
SS2-2	Apr 12	167	537760	7153435	427	Ice	✓
SS2-3[4]	Apr 12	167	538485	7153933	1194	Ice	✓
SS2-4	Apr 12	167	539142	7154686	2164	Ice	✓
SS3-4	Apr 13	168	536593	7150996	585	Ice	✓
SS3-5	Apr 13	168	537693	7150790	1325	Ice	✓
SS3-6[5]	Apr 13	168	536302	7151563	35	Ice	✓
SS3-7	Apr 13	168	536346	7151364	239	Ice	✓
SS3-8	Apr 13	168	536635	7150873	826	Ice	✓
SS4-1[6]	Apr 14	199	531485	7152217	61	Land	
SS4-2	Apr 14	199	531353	7152263	196	Land	
SS4-3	Apr 14	199	531328	7152476	335	Land	
SS4-4	Apr 14	169	531140	7153172	1022	Ice	✓
SS4-5[6]	Apr 14	169	531410	7154120	1214	Ice	✓

Station ID	2020 Sampling Dates	Total Sample Exposure Duration (days)	UTM Coordinates[1]		Approx. Distance from Mining Operations (m)	Surface Description	Snow Water Chemistry Sampled[2]
			Easting (m)	Northing (m)			
SS5-1	Apr 13	198	533150	7148927	26	Land	
SS5-2	Apr 13	198	533149	7148871	55	Land	
SS5-3	Apr 13	168	533149	7148700	259	Ice	✓
SS5-4	Apr 13	168	533153	7147948	941	Ice	✓
SS5-5	Apr 13	168	533148	7146953	1894	Ice	✓
Control-1	Apr 13	198	534989	7144273	4802	Land	✓[8]
Control-2[7]	Apr 14	199	528714	7153273	3042	Land	✓[8]
Control-3	Apr 3	198	538649	7148747	3550	Land	✓[8]

Notes:

[1] UTM Zone 12W, NAD83.

[2] n/a = not applicable.

[3] Duplicate sample for snow water chemistry was collected at station SS1-4 (SS1-4-4 & SS1-4-5).

[4] Duplicate samples for dustfall snow surveys and snow water chemistry were collected at station SS2-3 (SS2-3-4 & SS2-3-5).

[5] Duplicate sample for snow water chemistry was collected at station SS3-6 (SS3-6-4 & SS3-6-5).

[6] Duplicate sample for dustfall snow surveys was collected at station SS4-5 (SS4-5-4 & SS4-5-5).

[7] Duplicate sample for dustfall snow surveys was collected at Control-2 station (Control-2-4 & Control-2-5).

[8] Snow water chemistry was sampled over ice, adjacent to the on-land control station; see Section 2.3 for further details.

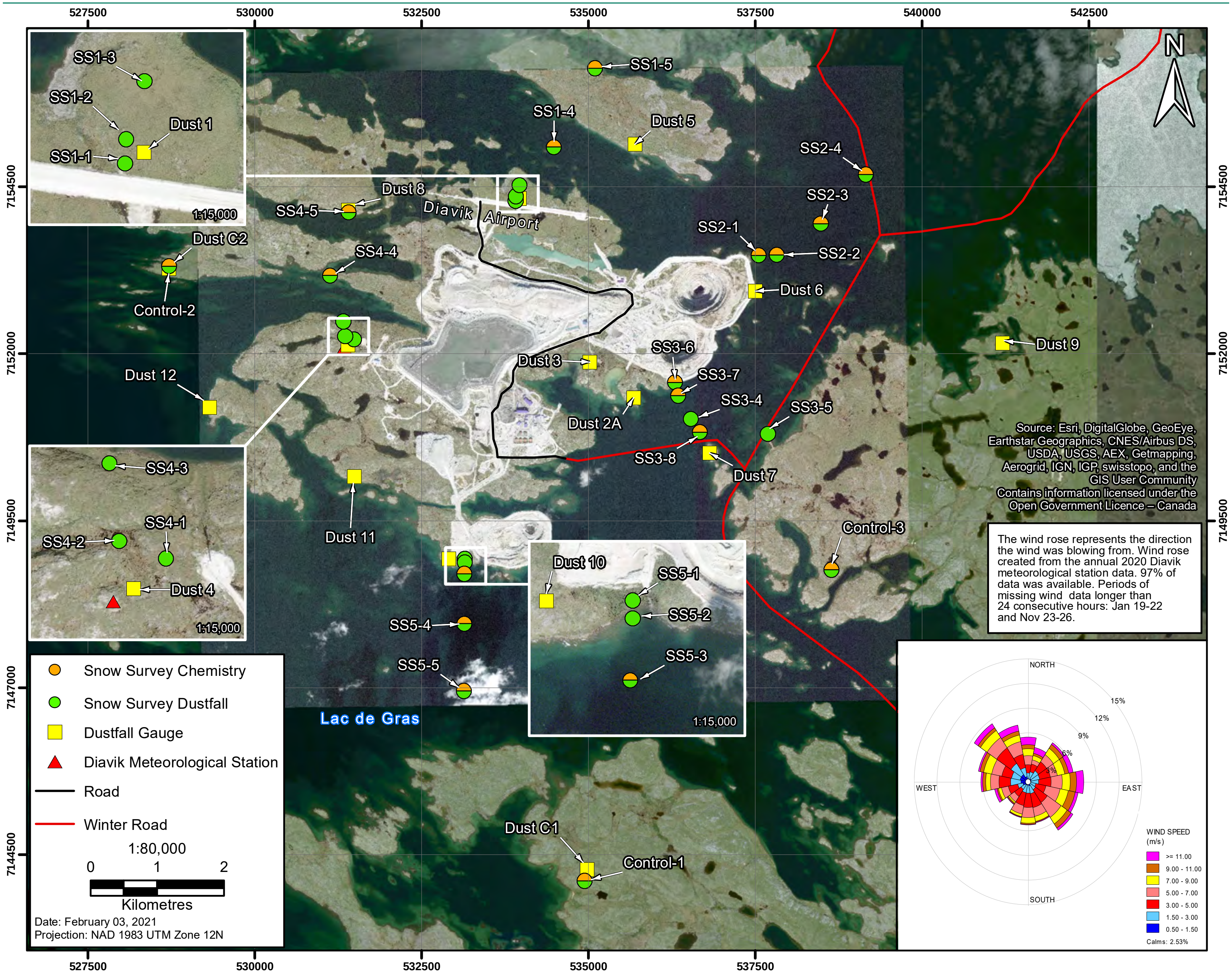


Figure 2-1: Dustfall Gauge and Snow Survey Locations, Diavik Diamond Mine, 2020

Once the mass of collected dustfall at a station was measured, the mean daily dustfall rate over the collection period was calculated as:

$$D = \frac{M}{A * T} \qquad \text{[Equation 1]}$$

where:

D = mean daily dustfall rate (mg/dm^2/d) during time period T
M = mass of dustfall collected (mg) during time period T
A = surface area of dustfall gauge collection cylinder orifice (dm^2; approximately 1.227 dm^2)
T = number of days of dustfall collection (d)

The mean daily dustfall rate (mg/dm^2/d) was then multiplied by 365 days to estimate the mean annual dustfall rate (mg/dm^2/y).

The Northwest Territories has no guidelines or objectives for dustfall deposition. The estimated dustfall rates are compared to the Alberta Ambient Air Quality Objectives and Guidelines for dustfall (Alberta Environment and Parks, 2019), which are used only as general performance indicators and are not a regulatory requirement in compliance evaluation. The Alberta Ambient Air Quality Guidelines for dustfall include a guideline for residential and recreation areas (53 mg/dm^2 per 30 days) and a guideline for commercial and industrial areas where higher dustfall rates are expected (158 mg/dm^2 per 30 days). To compare against the Alberta Ambient Air Quality Guidelines, the daily and annual thresholds are calculated based on the 30 days objectives. The daily threshold ranged from 1.77 mg/dm^2/d to 5.27 mg/dm^2/d, while the annual threshold ranged from 646 to 1,922 mg/dm^2/y. Snow water chemistry data were compared to effluent quality criteria (EQC) set out in Wek'èezhìi Land and Water Board (WLWB) Water Licence W2015L2-0001 (formerly W2007L2-0003).

In previous years, dustfall was compared to guidelines from the Province of British Columbia. However, these guidelines were rescinded by the Province of BC because the guidelines were pollution control objectives and had no basis in assessing health effects. The former guidelines were solely used as a "soiling index" and to assess nuisance dusting, and were not health related. For this reason, using the former BC guidelines to evaluate effects on human or environmental health is not considered to be appropriate.

2.2 Dustfall Snow Surveys

Dustfall snow surveys were performed at 24 monitoring and three control sites along five transects around the Project (Table 2-1 and Figure 2-1). Across stations, the distance from mining operations ranged from approximately 13 m to 3,796 m for the monitoring stations and from 3,031 m to 4,646 m for the control stations. The average total sampling period for the monitoring stations in 2020 was 198 and 168 days for the land and ice stations, respectively (control stations not included). The start dates correspond to the first snowfall for land stations (September 28, 2019), and shortly after freeze up of ice stations (October 28, 2019).

At each snow survey station, a snow corer was used to drill into the snow pack to retrieve a cylindrical snow core (6.1 cm inner diameter; Photo 2.2-1). Cores were extracted at each station and composited in the field to ensure a representative snow sample was obtained for the station. A minimum of three snow cores were collected at each (land and ice) of the snow sampling stations, as outlined in the Snow Core Survey SOP (ENVI-909-0119; Appendix F). Composited samples were bagged and brought to the DDMI environment lab for processing as specified in the Snow Core Survey SOP (ENVI-909-0119; Appendix F) and the Quality Assurance/Quality Control SOP (ENVI-902-0119; Appendix G). Processing of snow cores involved filtration, drying in a high heat oven, and weighing. For quality assurance and control (QA/QC), duplicate samples were collected at stations SS2-3, SS4-5 and Control-2 station.

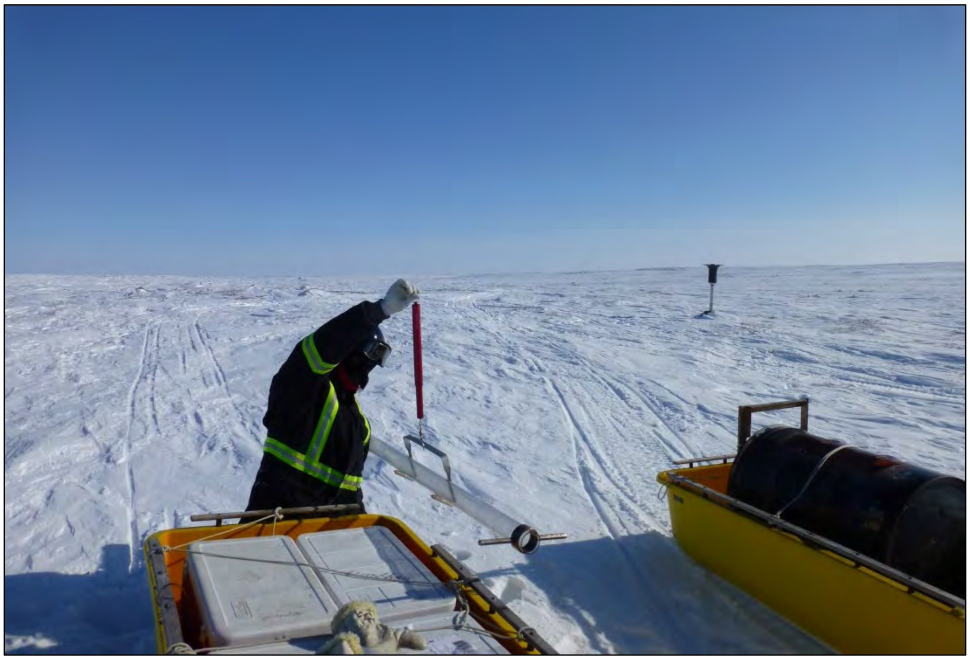


Photo 2.2-1: Snow core sample being weighed, with dustfall gauge in background.

Mean daily dustfall rate (mg/dm^2/d) was then calculated over the collection period using Equation 1, with surface area (A) equal to the surface area of the snow corer tube orifice (0.2922 dm^2) multiplied by the number of snow cores used for the composited sample at the station. The mean annual dustfall rate (mg/dm^2/y) was estimated by multiplying the mean daily dustfall rate by 365 days.

Dustfall rates were compared to the Alberta Ambient Air Quality Objectives and Guidelines for dustfall (Table 2.2-1), which served as general performance indicators only.

Table 2.2-1: Dustfall and Snow Water Chemistry Reference Values

Parameter	Value	Unit	Comment	Source
Dustfall Rate	53–158	mg/dm^2/ 30 day	Alberta Ambient Air Quality Guidelines for dustfall	(Alberta Environment and Parks, 2019).
Aluminum-Total	3,000	µg/L	Max. grab sample concentration	W2015L2-0001
Ammonia-N	12,000	µg/L	Max. grab sample concentration	W2015L2-0001
Arsenic-Total	100	µg/L	Max. grab sample concentration	W2015L2-0001
Cadmium-Total	3	µg/L	Max. grab sample concentration	W2015L2-0001
Chromium-Total	40	µg/L	Max. grab sample concentration	W2015L2-0001
Copper-Total	40	µg/L	Max. grab sample concentration	W2015L2-0001
Lead-Total	20	µg/L	Max. grab sample concentration	W2015L2-0001
Nickel-Total	100	µg/L	Max. grab sample concentration	W2015L2-0001
Nitrite-N	2,000	µg/L	Max. grab sample concentration	W2015L2-0001
Zinc-Total	20	µg/L	Max. grab sample concentration	W2015L2-0001

2.3 Snow Water Chemistry

Snow water chemistry analysis was performed on snow cores extracted from 19 locations, including 16 dustfall snow survey stations located on ice and three samples taken on ice adjacent to the three control locations (Table 2-1 and Figure 2-1). The distance of the snow survey stations from mining operations in 2020 ranged approximately 35 m to 2,175 m, while this distance ranged from 3,042 m to 4,802 m for the control locations. The average total sampling period in 2020 for the snow survey stations was 168 days (control stations not included). At each station located over water, cores were collected for chemistry analysis immediately after the dustfall snow cores were extracted.

Snow water chemistry cores were extracted using a snow corer in accordance with the dustfall snow survey core extraction. A minimum of three cores at each site were extracted and composited to obtain the necessary 3 L of snow water required for the laboratory chemical analysis as required (see Appendix F). Snow cores were then processed and prepared for shipment to Bureau Veritas (BV) where the chemical analysis was performed. For QA/QC purposes, duplicate samples were collected at stations SS1-4, SS2-3 and SS3-6, in addition to an equipment blank sample (SS Bag). Snow water chemistry sampling methodology is detailed in SOP ENVI-909-0119 (see Appendix F).

EQC, including “maximum average concentration” and “maximum concentration of any grab sample,” are stipulated in DDMI’s Water Licence (W2015L2-0001) for aluminum, ammonia, arsenic, cadmium, chromium, copper, lead, nickel, nitrite, and zinc (Table 2.2-1). Snow water chemistry results for these variables were compared to the “maximum concentration of any grab sample.” These results are also presented as part of DDMI’s AEMP report.

DDMI measures the chemistry of snow samples as this assists with characterizing the chemical content of the particulate material deposited over time. This is measured as the total metals and nutrients concentrations of the melted snow sample and makes direct comparison to maximum grab sample concentrations for EQCs difficult.

DDMI compares the measured total metals levels for dust with EQC only because these criteria provide concentrations that can serve as general performance indicators, in a similar way that dustfall rates are compared with the Alberta Ambient Air Quality Objectives and Guidelines for dustfall (Alberta Environment and Parks, 2019). There is no intention or requirement that snow samples must meet the EQC or Alberta dustfall objectives.

3. RESULTS

Dustfall and snow water chemistry results were grouped into zones based on their relative distance from the mine footprint (Table 3-1). Station groupings into zones were first established at the outset of the program; however, these groupings were re-established in 2013 using satellite imagery of the site.

In 2020, the primary sources of fugitive dust were associated with unpaved road and airstrip usage and construction and mining activities at the A21 open pit. Due to construction and mining activities at A21, the distance to mining operations were recalculated in 2019. The revised distances to mining operations are shown in Tables 2-1 and 3-1.

Major waste rock material transfers in 2020 included the use of haul roads (8,210,763 tonnes) and the transfer of kimberlite ore to the crusher (2,478,575 tonnes). Another source of fugitive dust was truck traffic along the ice road to the Project. However, the consistency in the dust deposition rate near the ice road alignment sites between winter and summer, in addition to the generally lower deposition rates at these sites (e.g., Dust 7, SS2-4, SS3-5 and SS3-8) indicated that the contributions of dust from the ice road were modest relative to other sources. To suppress dust generation, roads, parking areas and the plant site were watered during the summer as needed. Between June and September 2020, approximately 3,472 m^3 of water was applied to the plant site and 26,820 m^3 of water was applied to haul roads. The exact impact of dust suppression could not be determined from the data collected in 2020; however, it is likely that road watering reduced the amount of dust generated at the mine. In 2020, Underground Mine production continued at A154 and A418, as well as stripping and production at the A21 open pit. Fugitive dust generation is expected to be greatest during snow-free periods where and when there is site activity. It was expected that the highest fugitive dust generation and resulting dustfall occurred in areas closest to the roads, the airstrip, and mine footprint such as near A21 between May and September. The difference between the summer and winter dustfall rate was generally minor with the summer rate being higher at most sites (e.g., Dust 1 rate was 596 $mg/dm^2/y$ in the summer and 164 $mg/dm^2/y$ in the winter), while some sites recorded a higher winter dustfall rate (e.g., Dust 2A rate was 298 $mg/dm^2/y$ in the summer and 322 $mg/dm^2/y$ in the winter).

The predominant wind directions at the site in 2020 were from east, southeast and northwest although winds in general can be described as omnidirectional. Therefore, the expectation is that airborne material will be deposited in all directions around the mine with a west, northwest and southeast emphasis (Figures 2-1 and 3.1-1). Similar to previous years, the results show that the proximity to the mine activity is a stronger indicator of dust deposition than wind direction. This is supported by the fact that the three highest dust deposition rates in 2020 (Dust 10, 3, and 11) are located south or southwest of the mine footprint where wind speeds were relatively weak compared to other directions. Dust 10 and Dust 3, which are located only 46 and 22 m from the mine, respectively, recorded the highest dustfall rate of the dustfall gauges in 2020.

Results from the dustfall gauges, dustfall snow surveys, and the snow water chemistry analyses are presented below.

Snow water chemistry results that were below analytical detection limits were assumed to be at half the detection limit for the calculation of statistics and displaying in figures.

3.1 Dustfall Gauges

For each station, total dustfall collected throughout the year is summarized in Table 3-1. Annual 2020 dustfall and the station location relative to the Project is presented in Figure 3.1-1, and the historical records of annual dustfall are presented in Figures 3.1-2 and 3.1-3. A comparison of 2020 dustfall versus distance from the mine footprint is presented in Figure 3.1-4. Boxplots summarizing the dustfall magnitude distribution measured annually are presented in Figure 3.1-5. Detailed information on 2020 measurements and calculations for each station are included in Appendix B.

Table 3-1: Dustfall and Snow Water Chemistry Results, Diavik Diamond Mine, 2020

Zone	Station	Approx. Distance from Mining (m)	Dustfall (mg/dm^2/y)	Snow Water Chemistry (µg/L)										
				Aluminum	Ammonia	Arsenic	Cadmium[1]	Chromium	Copper	Lead	Nickel	Nitrite	Phosphorus	Zinc
0-100 m	Dust 1	70	403	-	-	-	-	-	-	-	-	-	-	-
	Dust 3	22	599	-	-	-	-	-	-	-	-	-	-	-
	Dust 6	13	131	-	-	-	-	-	-	-	-	-	-	-
	Dust 10	46	757	-	-	-	-	-	-	-	-	-	-	-
	SS1-1	30	1,017	-	-	-	-	-	-	-	-	-	-	-
	SS3-6	35	122	53.55	72.50	0.05	*< 0.005*	0.27	0.11	0.07	1.11	5.75	80.00	0.99
	SS4-1	61	119	-	-	-	-	-	-	-	-	-	-	-
	SS5-1	26	1,463	-	-	-	-	-	-	-	-	-	-	-
	SS5-2	55	539	-	-	-	-	-	-	-	-	-	-	-
Mean			**572**	**53.55**	**72.50**	**0.05**	***< 0.005***	**0.27**	**0.11**	**0.07**	**1.11**	**5.75**	**80.00**	**0.99**
Median			**539**	**53.55**	**72.50**	**0.05**	***< 0.005***	**0.27**	**0.11**	**0.07**	**1.11**	**5.75**	**80.00**	**0.99**
Standard Deviation			**455**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**
95% Confidence Interval (Mean +/-)			**350**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**
Upper Limit of 95% Confidence Interval			**922**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**
Lower Limit of 95% Confidence Interval			**222**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**

Zone	Station	Approx. Distance from Mining (m)	Dustfall ($mg/dm^2/y$)	Snow Water Chemistry (µg/L)										
				Aluminum	Ammonia	Arsenic	Cadmium[1]	Chromium	Copper	Lead	Nickel	Nitrite	Phosphorus	Zinc
101-250 m	Dust 4	173	315	-	-	-	-	-	-	-	-	-	-	-
	SS1-2	115	280	-	-	-	-	-	-	-	-	-	-	-
	SS2-1	145	44	7.16	49.00	0.04	*< 0.005*	0.03	0.32	0.04	0.43	4.60	21.70	1.00
	SS3-7	239	257	65.00	88.00	0.09	*< 0.005*	0.39	0.18	0.13	1.30	5.10	141.00	1.23
	SS4-2	196	160	-	-	-	-	-	-	-	-	-	-	-
Mean			**211**	**36.08**	**68.50**	**0.06**	***< 0.005***	**0.21**	**0.25**	**0.08**	**0.86**	**4.85**	**81.35**	**1.12**
Median			**257**	**36.08**	**68.50**	**0.06**	***< 0.005***	**0.21**	**0.25**	**0.08**	**0.86**	**4.85**	**81.35**	**1.12**
Standard Deviation			**110**	**40.90**	**27.58**	**0.04**	***< 0.005***	**0.25**	**0.10**	**0.06**	**0.62**	**0.35**	**84.36**	**0.16**
95% Confidence Interval (Mean +/-)			**136**	**367.46**	**247.77**	**0.32**	***< 0.005***	**2.29**	**0.86**	**0.57**	**5.56**	**3.18**	**757.93**	**1.46**
Upper Limit of 95% Confidence Interval			**347**	**403.54**	**316.27**	**0.39**	***< 0.005***	**2.49**	**1.11**	**0.65**	**6.42**	**8.03**	**839.28**	**2.58**
Lower Limit of 95% Confidence Interval			**75**	**0.00**	**0.00**	**0.00**	***< 0.005***	**0.00**	**0.00**	**0.00**	**0.00**	**1.67**	**0.00**	**0.00**

Zone	Station	Approx. Distance from Mining (m)	Dustfall (mg/dm²/y)	Snow Water Chemistry (µg/L)										
				Aluminum	Ammonia	Arsenic	Cadmium[1]	Chromium	Copper	Lead	Nickel	Nitrite	Phosphorus	Zinc
251-1,000 m	Dust 2	425	309	-	-	-	-	-	-	-	-	-	-	-
	Dust 11	747	446	-	-	-	-	-	-	-	-	-	-	-
	SS1-3	260	66	-	-	-	-	-	-	-	-	-	-	-
	SS1-4	899	61	13.95	48.00	0.05	*< 0.005*	0.08	0.16	0.03	0.59	4.35	17.40	1.46
	SS2-2	427	26	11.90	53.00	0.04	*< 0.005*	0.06	0.12	0.03	0.42	4.10	40.50	2.75
	SS3-4	585	109	26.40	69.00	0.04	*< 0.005*	0.17	0.13	0.06	1.44	5.10	64.40	0.71
	SS3-8	826	139	48.30	130.00	0.06	*< 0.005*	0.30	0.22	0.16	1.72	3.40	92.30	1.14
	SS4-3	335	269	-	-	-	-	-	-	-	-	-	-	-
	SS5-3	259	795	75.60	140.00	0.14	*< 0.005*	0.21	0.45	0.35	0.89	5.10	318.00	1.21
	SS5-4	941	98	17.90	63.00	0.03	*< 0.005*	0.05	0.14	0.03	0.50	4.70	54.10	1.13
Mean			**232**	**32.34**	**83.83**	**0.06**	***< 0.005***	**0.14**	**0.20**	**0.11**	**0.93**	**4.46**	**97.78**	**1.40**
Median			**124**	**22.15**	**66.00**	**0.05**	***< 0.005***	**0.13**	**0.15**	**0.05**	**0.74**	**4.53**	**59.25**	**1.18**
Standard Deviation			**238**	**25.00**	**40.43**	**0.04**	***< 0.005***	**0.10**	**0.13**	**0.13**	**0.54**	**0.65**	**110.72**	**0.70**
95% Confidence Interval (Mean +/-)			**170**	**26.24**	**42.43**	**0.04**	***< 0.005***	**0.10**	**0.13**	**0.14**	**0.56**	**0.69**	**116.19**	**0.74**
Upper Limit of 95% Confidence Interval			**402**	**58.58**	**126.27**	**0.10**	***< 0.005***	**0.25**	**0.33**	**0.25**	**1.49**	**5.15**	**213.97**	**2.14**
Lower Limit of 95% Confidence Interval			**61**	**6.10**	**41.40**	**0.02**	***< 0.005***	**0.04**	**0.07**	**0.00**	**0.36**	**3.77**	**0.00**	**0.66**

Zone	Station	Approx. Distance from Mining (m)	Dustfall (mg/dm^2/y)	Snow Water Chemistry (µg/L)										
				Aluminum	Ammonia	Arsenic	Cadmium[1]	Chromium	Copper	Lead	Nickel	Nitrite	Phosphorus	Zinc
1,001-2,500 m	Dust 5	1,183	148	-	-	-	-	-	-	-	-	-	-	-
	Dust 7	1,147	224	-	-	-	-	-	-	-	-	-	-	-
	Dust 8	1,213	226	-	-	-	-	-	-	-	-	-	-	-
	Dust 12	2,326	197	-	-	-	-	-	-	-	-	-	-	-
	SS1-5	2,175	8	4.71	36.00	0.02	*< 0.005*	0.03	0.19	0.02	0.19	4.60	10.00	1.18
	SS2-3	1,194	18	8.56	50.00	0.01	*< 0.005*	0.06	0.07	0.02	0.31	3.05	17.90	0.88
	SS2-4	2,164	5	4.61	36.00	0.01	*< 0.005*	0.03	0.14	0.02	0.16	4.50	1.00	0.95
	SS3-5	1,325	27	10.70	64.00	0.04	*< 0.005*	0.07	0.07	0.02	0.50	5.70	37.60	0.68
	SS4-4	1,022	147	3.86	70.00	0.02	*< 0.005*	0.03	0.13	0.01	1.50	4.80	57.40	0.94
	SS4-5	1,214	56	18.10	56.00	0.01	*< 0.005*	0.06	0.09	0.04	0.37	3.70	36.30	0.05
	SS5-5	1,894	71	17.50	36.00	0.03	*< 0.005*	0.09	0.10	0.03	0.52	6.90	24.20	1.13
+2,500 m	Dust 9	3,796	78	-	-	-	-	-	-	-	-	-	-	-
Mean			**100**	**9.72**	**49.71**	**0.02**	***< 0.005***	**0.05**	**0.11**	**0.02**	**0.51**	**4.75**	**26.34**	**0.83**
Median			**75**	**8.56**	**50.00**	**0.02**	***< 0.005***	**0.06**	**0.10**	**0.02**	**0.37**	**4.60**	**24.20**	**0.94**
Standard Deviation			**84**	**6.04**	**14.26**	**0.01**	***< 0.005***	**0.03**	**0.05**	**0.01**	**0.46**	**1.27**	**19.04**	**0.38**
95% Confidence Interval (Mean +/-)			**53**	**5.58**	**13.18**	**0.01**	***< 0.005***	**0.02**	**0.04**	**0.01**	**0.43**	**1.17**	**17.61**	**0.35**
Upper Limit of 95% Confidence Interval			**154**	**15.30**	**62.90**	**0.03**	***< 0.005***	**0.07**	**0.15**	**0.03**	**0.93**	**5.92**	**43.95**	**1.18**
Lower Limit of 95% Confidence Interval			**47**	**4.14**	**36.53**	**0.01**	***< 0.005***	**0.03**	**0.07**	**0.01**	**0.08**	**3.58**	**8.73**	**0.48**

Zone	Station	Approx. Distance from Mining (m)	Dustfall (mg/dm²/y)	Snow Water Chemistry (µg/L)										
				Aluminum	Ammonia	Arsenic	Cadmium[1]	Chromium	Copper	Lead	Nickel	Nitrite	Phosphorus	Zinc
Control	Dust C1	4,646	118	-	-	-	-	-	-	-	-	-	-	-
	Dust C2	3,031	103	-	-	-	-	-	-	-	-	-	-	-
	Control 1	4,802	8	10.70	67.00	0.03	*< 0.005*	0.05	0.07	0.02	0.17	5.20	35.90	1.12
	Control 2	3,042	33	11.50	79.00	0.05	*< 0.005*	0.07	0.10	0.04	0.46	4.40	7.60	1.46
	Control 3	3,550	94	21.80	55.00	0.04	*< 0.005*	0.10	0.11	0.04	0.46	7.10	46.00	1.34
Mean			**71**	**14.67**	**67.00**	**0.04**	***< 0.005***	**0.08**	**0.09**	**0.04**	**0.36**	**5.57**	**29.83**	**1.31**
Median			**94**	**11.50**	**67.00**	**0.04**	***< 0.005***	**0.07**	**0.10**	**0.04**	**0.46**	**5.20**	**35.90**	**1.34**
Standard Deviation			**48**	**6.19**	**12.00**	**0.01**	***< 0.005***	**0.03**	**0.02**	**0.01**	**0.17**	**1.39**	**19.91**	**0.17**
95% Confidence Interval (Mean +/-)			**59**	**15.38**	**29.81**	**0.02**	***< 0.005***	**0.07**	**0.05**	**0.03**	**0.42**	**3.45**	**49.45**	**0.43**
Upper Limit of 95% Confidence Interval			**130**	**30.04**	**96.81**	**0.06**	***< 0.005***	**0.14**	**0.14**	**0.06**	**0.78**	**9.01**	**79.28**	**1.74**
Lower Limit of 95% Confidence Interval			**12**	**0.00**	**37.19**	**0.01**	***< 0.005***	**0.01**	**0.05**	**0.01**	**0.00**	**2.12**	**0.00**	**0.88**

Notes:

Dash (-) = not available (snow water chemistry not sampled)

n/a = not applicable

[1] For measurements that were less than the detection limit, half the detection limit was used for calculations and are italicized

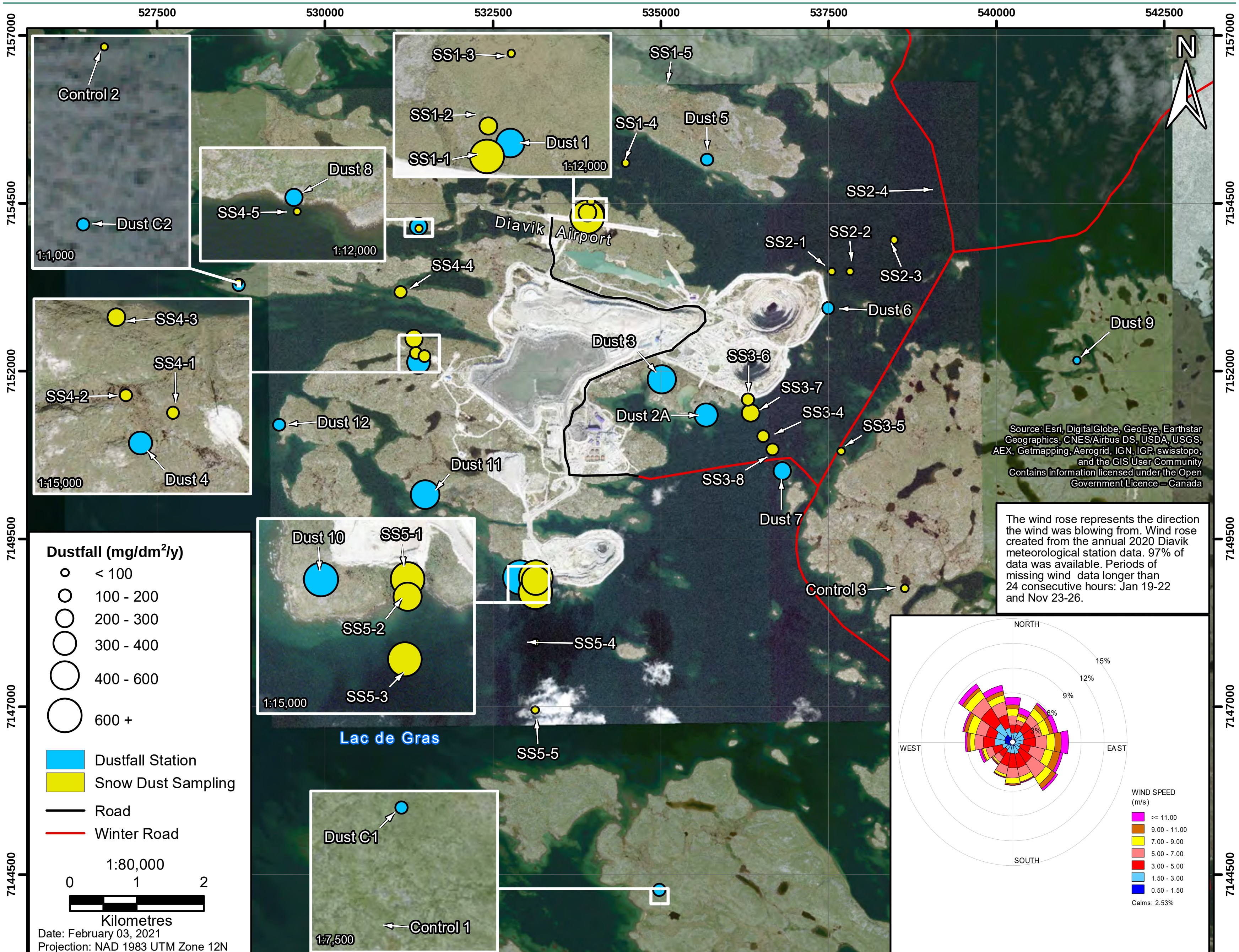
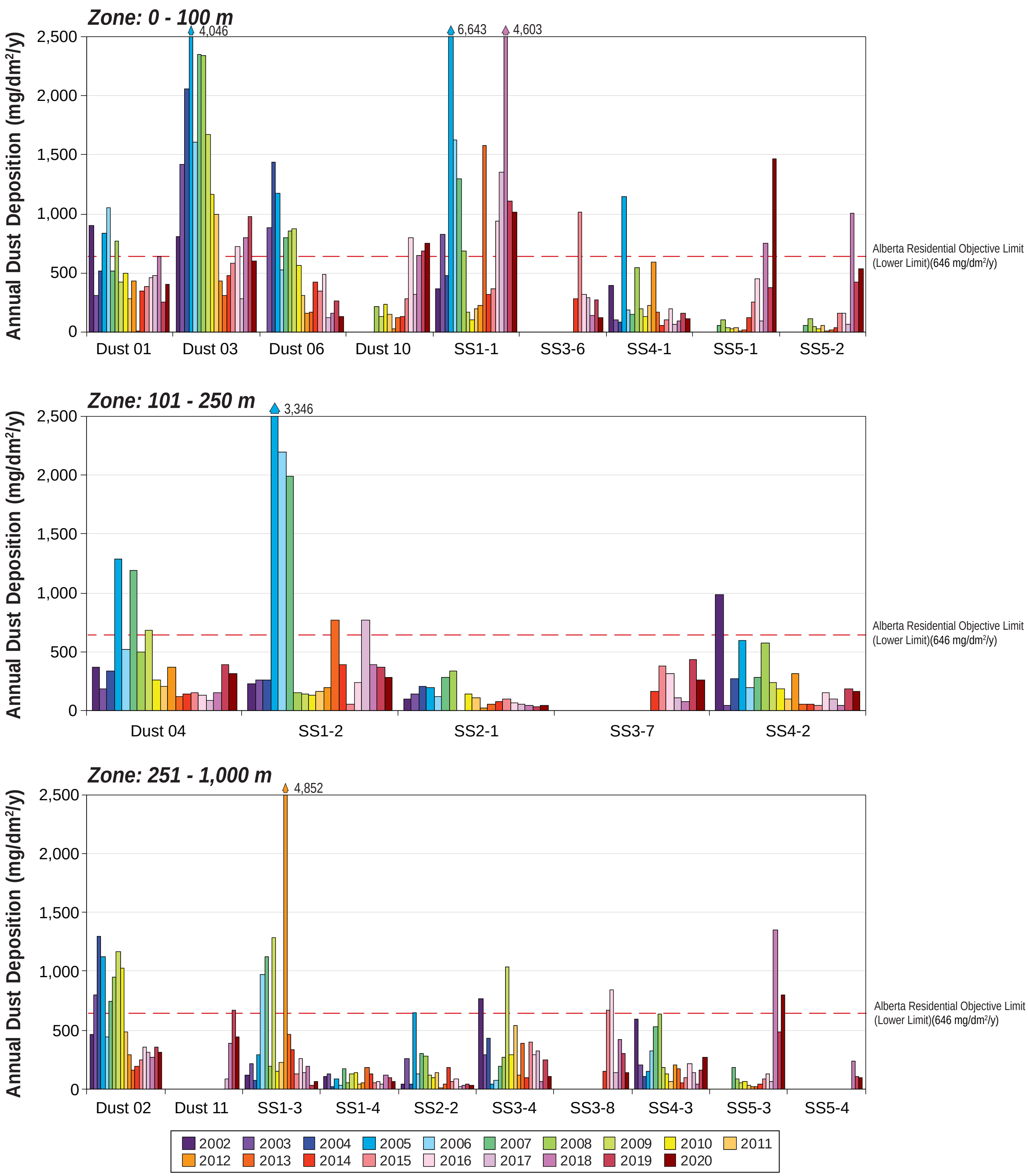
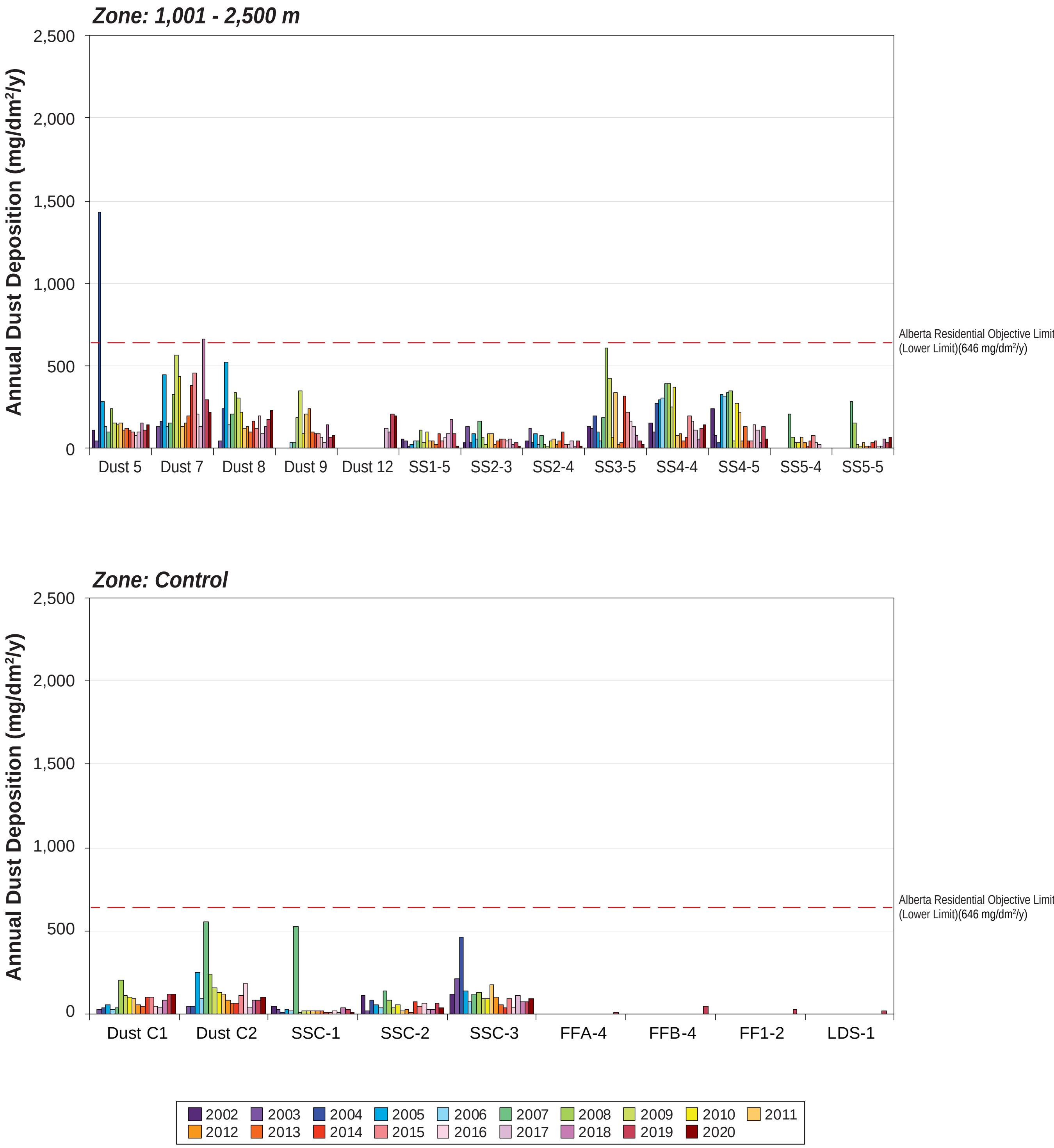


Figure 3.1-1: Dustfall Results, Diavik Diamond Mine, 2020



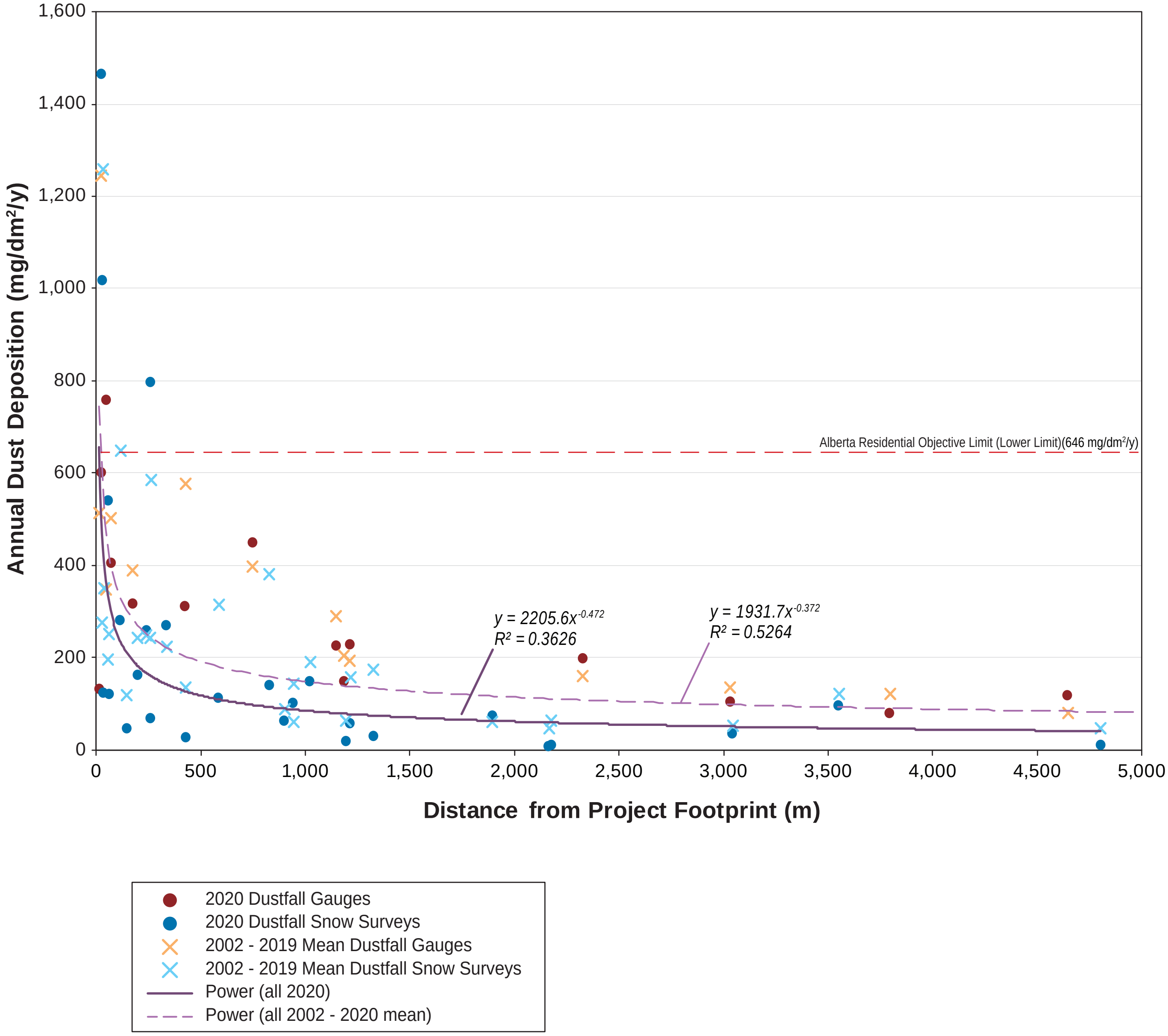
Notes: Annual deposition was calculated using the methodology described in Section 2.
See Table 2-1 for actual 2020 sample exposure times.
Station locations have been grouped into zones based on their distance from the 2019 Project footprint (see Section 3 for further details).
SS5-4 moved to 251-1,000 m zone in 2018

Figure 3.1-2: Calculated Annual Dust Deposition Rates at Dustfall Gauges and Snow Survey Locations up to 1,000 m from the Project Footprint, Diavik Diamond Mine, 2002 to 2020



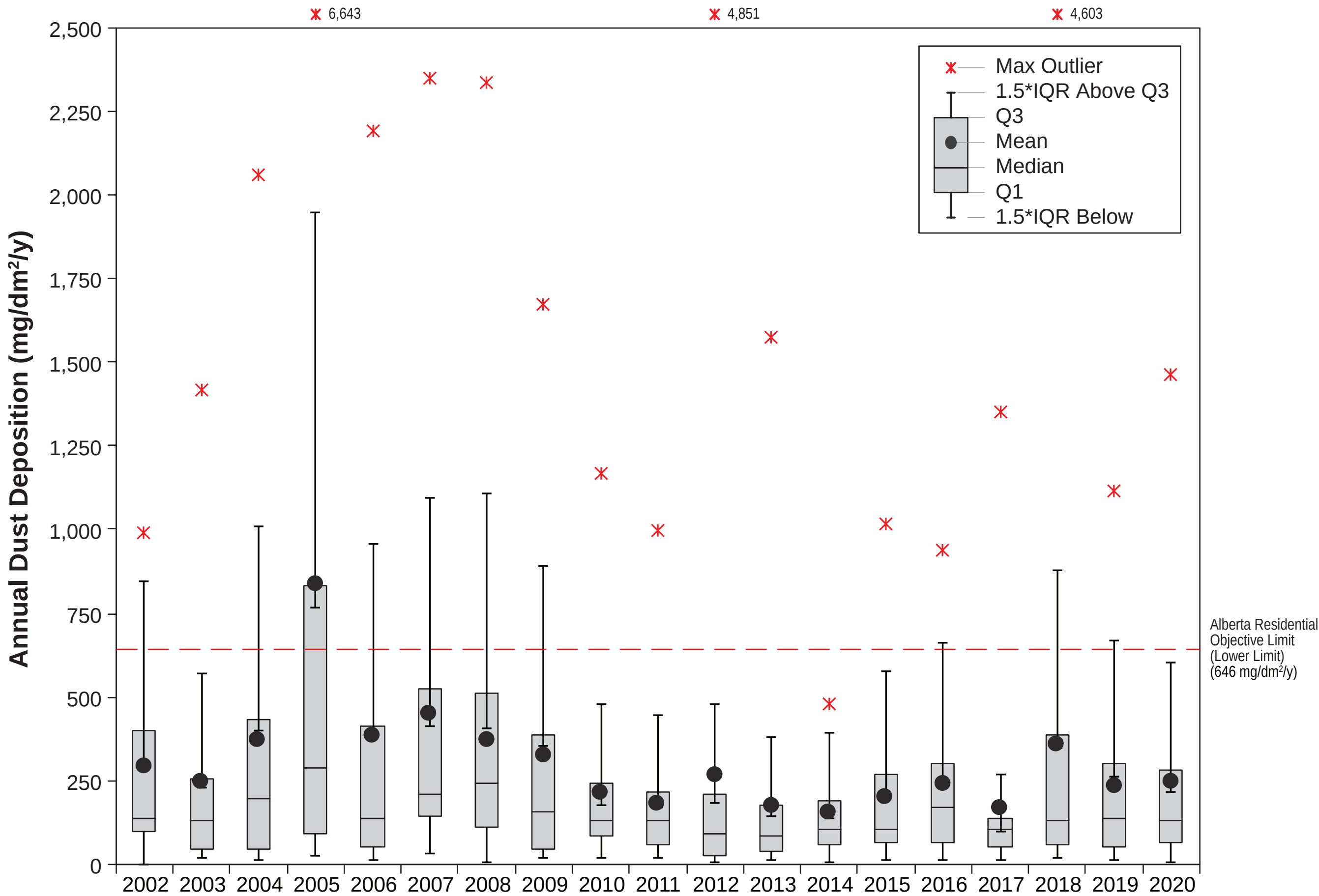
Notes: Annual deposition was calculated using the methodology described in Section 2.
See Table 2-1 for actual 2020 sample exposure times.
Station locations have been grouped into zones based on their distance from the 2019 Project footprint (see Section 3 for further details).
New locations added in 2019 include FFA-4, FFB-4, FF1-2 and LDS-1
SS5-4 moved to 251-1,000 m zone in 2018

Figure 3.1-3: Calculated Annual Dust Deposition Rates at Dustfall Gauges and Snow Survey Locations greater than 1,000 m from the Project Footprint, Diavik Diamond Mine, 2002 to 2020



Notes: Annual deposition was calculated using the methodology described in Section 2.
See Table 2-1 for actual 2020 sample exposure times.

Figure 3.1-4: Dust Deposition Versus Distance from Project Footprint, Diavik Diamond Mine, 2020



Notes: Annual deposition is calculated using the methodology described in Section 2.
See Table 2-1 for actual 2020 sample exposure times.
Q1: Lower quartile (25% of data are less than this value) ,
Q3: Upper quartile (25% of data are greater than this value),
IQR = Q3 – Q1 (the interquartile range).

Figure 3.1-5: Dust Deposition Box Plot, Diavik Diamond Mine, 2002 to 2020

The three highest estimated dustfall rates in 2020 measured using gauges occurred at Dust 10 (757 mg/dm^2/y; 46 m from the Project), followed by Dust 3 (599 mg/dm^2/y; 22m from the Project) and Dust 11 (446 mg/dm^2/y; 747 m from the Project). This is similar to 2019 as Dust 3 recorded the highest rate followed by Dust 10 and Dust 11. The elevated rates at Dust 10 site is explained by its location adjacent to the A21 open pit, while Dust 11 is located west of the South Country Rock Pile – Waste Rock Storage Area (SCRP-WRSA; Figure 2-1). The lowest dustfall rate was recorded at Dust 9 (78 mg/dm^2/y), lower than the control stations Dust C1 (118 mg/dm^2/y; 4,646 m to the south) and Dust C2 (103 mg/dm^2/y; 3,031 m to the west; Table 3-1; Figures 3.1-3 and 3.1-4). This is explained by the distance of Dust 9 from the Project footprint (3,796 m to the east), which places it within the control stations zone.

The dustfall rates estimated from dustfall gauges in 2020 were slightly lower but comparable to 2019 rates. Out of 12 sites, seven locations recorded lower deposition rates in 2020 than 2019, with an average rate of 319 mg/dm^2/y and 372 mg/dm^2/y in 2020 and 2019, respectively (Figures 3.1-2 to 3.1-4). The higher dustfall values that have been recorded since 2018 compared to previous years suggest that dustfall rates from 2018 to 2020 were likely influenced by the surface activity at the mine, particularly at the A21 open pit, which began in December 2017, while the dustfall rates in 2017 were related mainly to the airstrip (DDMI 2018, 2019).

The annualized dustfall rates estimated from gauges at all stations were less than the upper limit of the Alberta Ambient Air Quality Objectives and Guidelines for dustfall (1,922 mg/dm^2/y), which is applied to industrial locations. The lower limit of these objectives (646 mg/dm^2/y) that is applied to residential and recreational areas was exceeded at only one site that recorded the highest dustfall rates in 2020 (Dust 10). The Alberta Ambient Air Quality Objectives and Guidelines recommends that dustfall objectives be used as general performance indicators only with no compliance requirement; thus, these objectives are used here for comparison purposes only, particularly as there are currently no standards or objectives for the Northwest Territories.

3.2 Dustfall Snow Surveys

Annual dustfall rates estimated from each snow survey station in 2020 are summarized in Table 3-1. Historical records of annual snow survey dustfall rates for each station are presented in Figures 3.1-2 and 3.1-3. The relationships between annual snow survey dustfall rates and distance from the mine footprint are shown in Figures 3.1-1 and 3.1-4. Boxplots summarizing dustfall rates measured annually are presented in Figure 3.1-5. 2020 snow survey field datasheets and laboratory results are included in Appendix B. Duplicate samples collected at stations SS2-3, SS4-5, and Control-2 for QA/QC purposes are discussed in Section 3.4.

Annualized dustfall rates estimated from 2020 snow survey data ranged from 5 to 1,463 mg/dm^2/y (Table 3-1; Figures 3.1-2 and 3.1-3). The maximum dust deposition rate was recorded at SS5-1 followed by SS1-1 (1,017 mg/dm^2/y). The higher levels of dustfall rates at SS5-1 is associated with the mine activity at A21 open pit (Figure 3.1-1). SS1-1 is located due north of the airstrip, which explains the higher levels of dustfall found here. This site recorded the highest rates from 2017 to 2019.

In general, snow survey dustfall rates decreased with increasing distance from the Project. Mean dustfall rates estimated using both dustfall gauges and snow surveys within the 0 m to 100 m, 101 m to 250 m, 251 m to 1,000 m, 1,001 m to 2,500 m, and control zones were 572, 211, 232, 100, and 71 mg/dm^2/y, respectively (Table 3-1). Dustfall rates at stations SS1-1, SS5-1, Dust 11, SS5-3, Dust 7, and Dust 12 were greater than the upper limit of the 95% confidence interval (CI) for their respective zones in 2020. A sample that exceeds the 95% CI has a probability of occurrence of 5% or less, which indicates a particularly high dust deposition rate. The 95% CI was exceeded at two sites in each of the 0 m to 100 m zone (SS1-1 and SS5-1) and the 251 m to 1,000 m zone (Dust 11 and SS5-3), and at three sites in the 1,001 m to 2,500 m zone (Dust 7, Dust 8, and Dust 12). In the 0 m to 100 m zone, the exceedance can be explained by the adjacent location to the air strip for SS1-1 and the A21 open pit for SS5-1, while the exceedance at the 251 m to 1,000 m zone is likely explained by the proximity to the A21 open pit for both sites. The exceedance of the 95% CI in the 1,001 m to 2,500 m zone is associated with dust from the ice road for Dust 7 and likely with the air strip for Dust 8. The low rate at some sites of this zone (e.g., SS1-5 and SS2-4; Table 3-1) resulted in a relatively low value of the 95% CI, which led to the three exceedance at this zone.

Annualized dustfall estimated from snow survey stations in 2020 were generally comparable to 2019 dustfall estimates (Figure 3.1-5), with few stations recording higher rates in 2020 than 2019 (Figures 3.1-2 and 3.1-3). The annualized dustfall rates estimated from snow surveys in 2020 never exceeded the upper limit (applied to industrial locations) of the Alberta Ambient Air Quality Objectives and Guidelines at any station, while only SS1-1, SS5-1, and SS5-3 exceeded the lower limit of these guidelines, which applies to residential and recreational areas.

3.3 Snow Water Chemistry

A summary of the snow water chemistry results for each variable of interest (i.e., variables with EQC and phosphorus) is provided below. The full suite of analytical results for snow water chemistry is included in Appendix D. For QA/QC purposes, duplicate samples were collected at stations SS1-4, SS2-3 and SS3-6 station. An equipment blank sample was also collected. Results of QA/QC samples are discussed in Section 3.4.

All 2020 sample concentrations were less than their associated reference levels as specified by the “maximum concentration of any grab sample” in Water Licence W2015L2-0001.

In general, average concentrations of snow water chemistry variables of interest decreased with increasing distance from the Project (Figures 3.3-1 to 3.3-4). Concentrations of all parameters except nitrite were lower in 2020 compared to recent years.

3.3.1 Aluminum

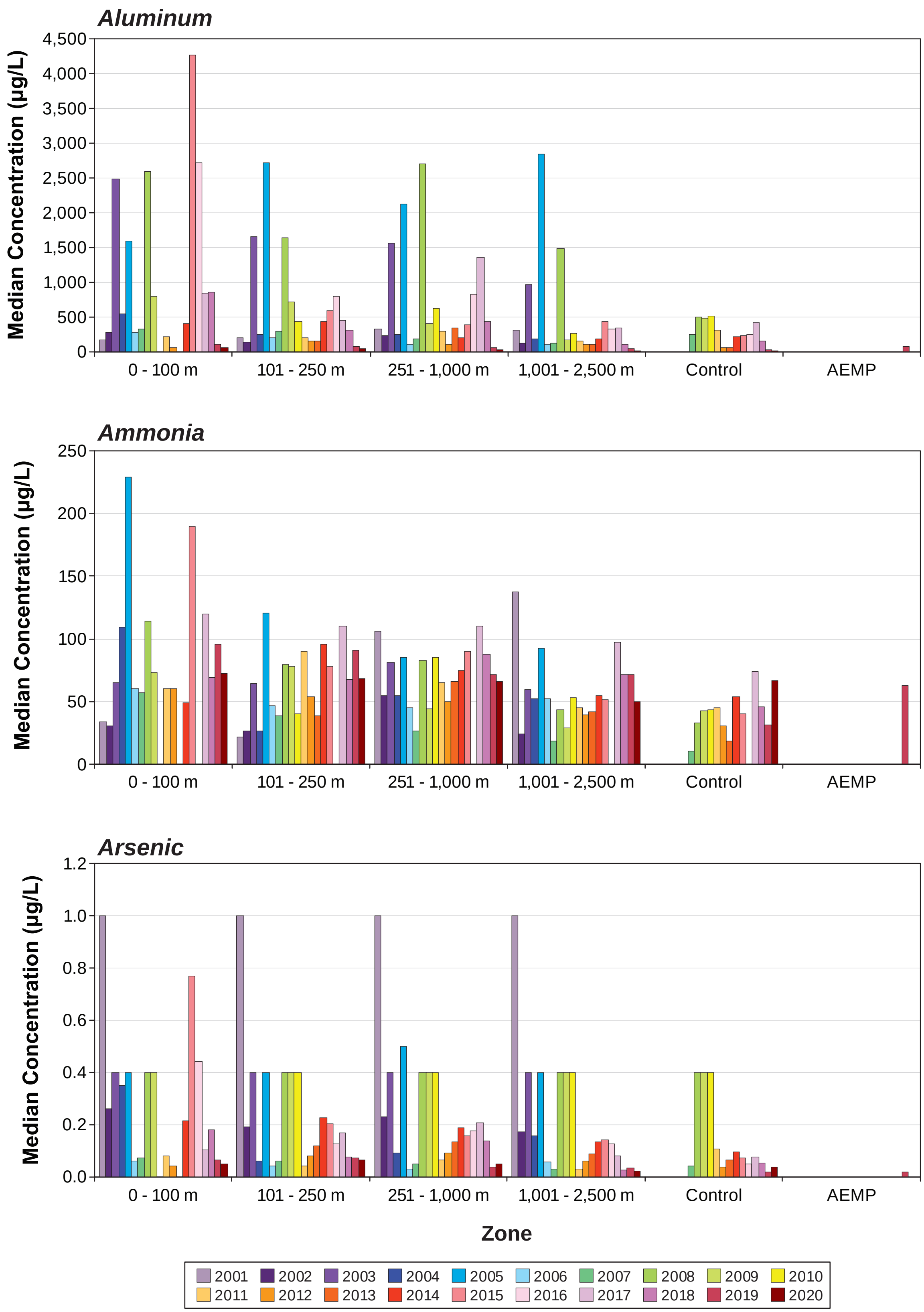
Aluminum concentrations measured in 2020 ranged from 3.9 µg/L at SS4-4 station to 75.6 µg/L at station SS5-3 in the 251 m to 1,000 m zone (Table 3-1). Aluminum concentrations in 2020 were slightly higher in the 0 m to 100 m zone than other zones, where only one sample is available (Figure 3.3-1). The median concentrations in all other zones were much lower in 2020 compared to historical records (2001 to 2019). All the locations were well below the EQC concentration of 3,000 µg/L specified in the Water Licence (Table 3-1; Figure 3.3-1).

3.3.2 Ammonia

Ammonia concentrations measured in 2020 ranged from 36 µg/L at SS1-5, SS2-4, and SS5-5 stations to 140 µg/L at SS5-3 Control-assessment station (Table 3-1). The 2020 median concentrations in all zones were generally similar to historical data. All 2020 and historical ammonia measurements were well below the EQC of 12,000 µg/L specified in the Water Licence for grab sample concentrations.

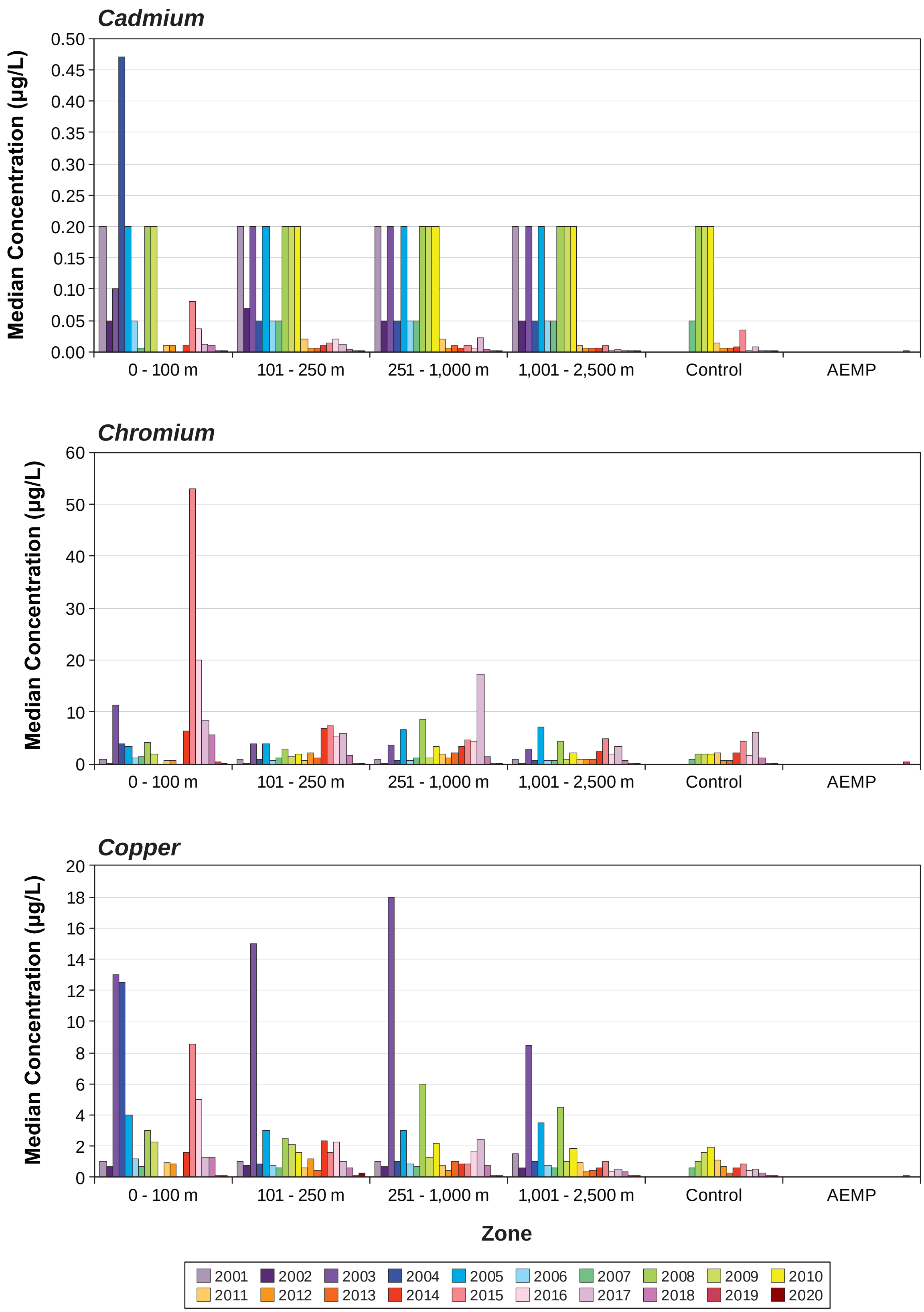
3.3.3 Arsenic

Arsenic concentrations measured in 2019 ranged from 0.01 µg/L at SS2-3 and SS4-5 to 0.14 µg/L at SS5-3 (Table 3-1). Median 2020 arsenic concentrations were similar at all distances from the Project (Figure 3.3-1). 2020 median concentrations were generally lower than historical median concentrations in all zones (Figure 3.3-1). All measurements were well below the EQC of 100 µg/L specified in the Water Licence for grab sample concentrations.



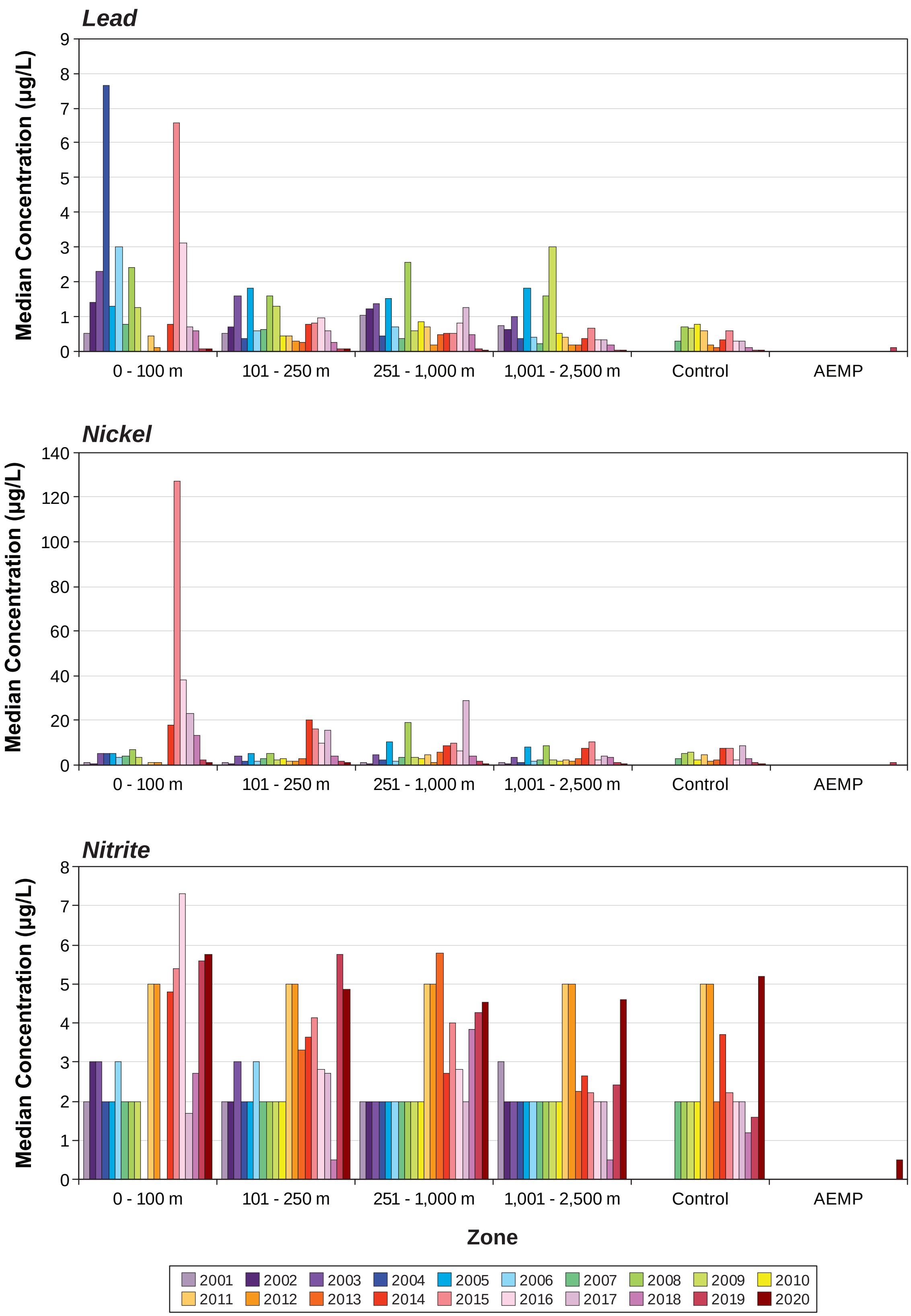
Notes: Values used for the 0-100 m zone represent one sample rather than the median.
EQC (µg/L) = 3000 for Aluminum, 12000 for Ammonia, and 100 for Arsenic
AEMP locations added in 2019 only

Figure 3.3-1: Snow Water Chemistry Results: Aluminum, Ammonia and Arsenic, 2001 to 2020



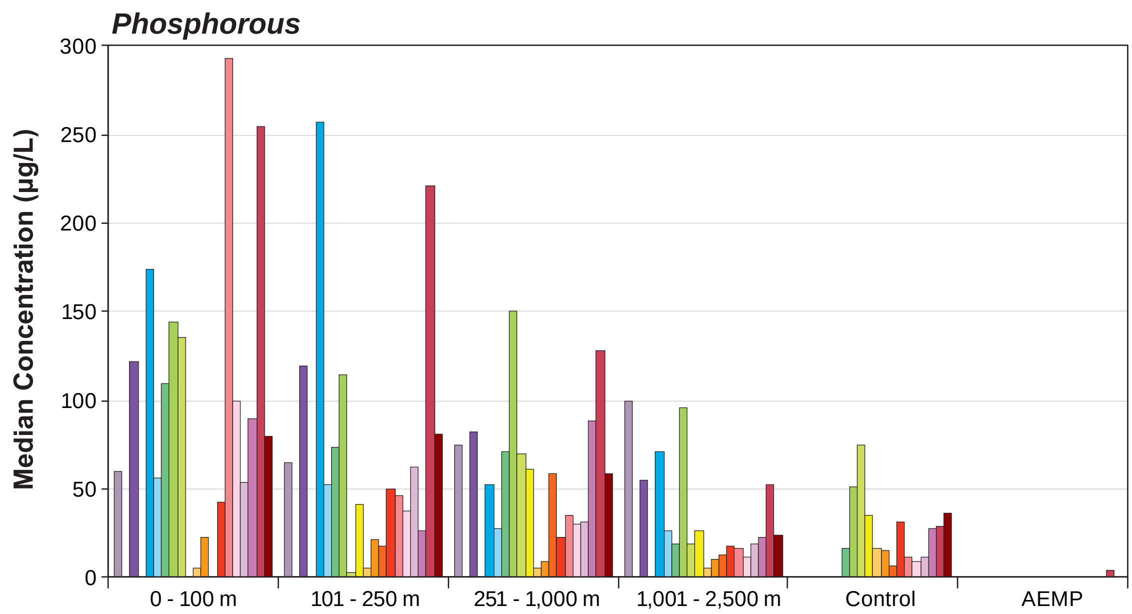
Notes: Values used for the 0-100 m zone represent one sample rather than the median.
EQC (µg/L) = 3 for Cadmium, 40 for Chromium, and 40 for Copper
AEMP locations added in 2019 only

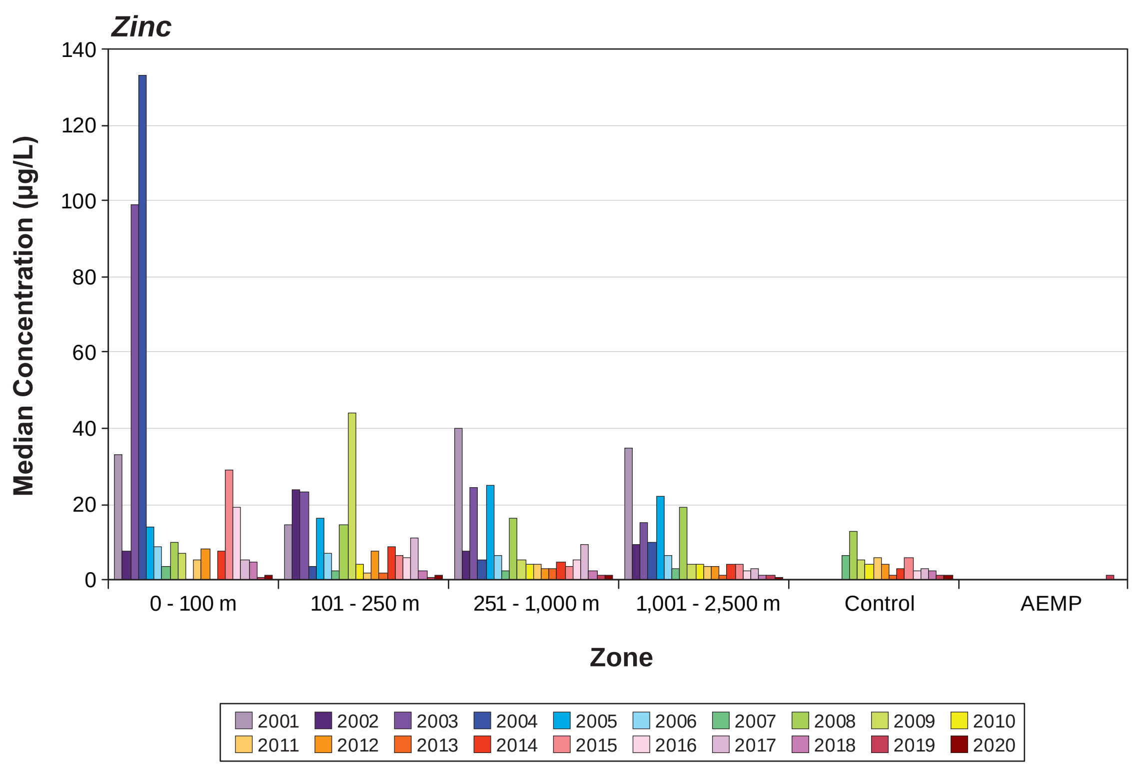
Figure 3.3-2: Snow Water Chemistry Results: Cadmium, Chromium and Copper, 2002 to 2020



Notes: *Values used for the 0-100 m zone represent one sample rather than the median.*
EQC (µg/L) = 20 for Lead, 100 for Nickel, and 2000 for Nitrite
AEMP locations added in 2019 only for Lead and Nickel

Figure 3.3-3: Snow Water Chemistry Results: Lead, Nickel and Nitrite, 2002 to 2020





Notes: AEMP locations added in 2019 only
EQC (µg/L) = 20 for Zinc, no EQC specified for Phosphorus
AEMP locations added in 2019 only

Figure 3.3-4: Snow Water Chemistry Results: Phosphorous and Zinc, 2002 to 2020

3.3.4 Cadmium

Cadmium concentrations measured in 2020 were less than the analytical detection limit (< 0.005 µg/L) (Table 3-1) at all stations. Overall cadmium concentrations in 2020 were less than historical medians and concentrations. (Figure 3.3-2). All measurements were well below than the EQC of 3 µg/L specified in the Water Licence for grab sample concentrations.

3.3.5 Chromium

Chromium concentrations measured in 2020 ranged from less than the analytical detection limit (< 0.05 µg/L) at multiple stations to 0.39 µg/L at SS3-7 (Table 3-1). The 2020 median concentration in each zone was generally lower than historical concentrations and well below 2015 to 2018 median concentrations (Figure 3.3-2). None of the measurements exceeded the EQC of 40 µg/L specified in the Water Licence for grab sample concentrations.

3.3.6 Copper

Copper concentrations measured in 2020 ranged from 0.066 µg/L at SS2-3 to 0.45 µg/L at SS5-3 (Table 3-1). Median 2020 copper concentrations were similar to 2019 and near to the lowest in the record (2001-2020; Figure 3.3-2), with very little variance between zones. All measurements were less than the EQC of 40 µg/L specified in the Water Licence for grab sample concentrations.

3.3.7 Lead

Lead concentrations measured in 2020 ranged from 0.01 µg/L at SS4-4 station in the 1001 – 2500 m zone to 0.4 µg/L at station SS5-3 in the 251-1,000 m zone (Table 3-1). Similar to copper, the 2020 lead median concentrations in all zones were below all historical medians (2001-2019) with very little variance between zones (Figure 3.3-3). All measurements were well below than the EQC of 20 µg/L specified in the Water Licence for grab sample concentrations.

3.3.8 Nickel

Nickel concentrations measured in 2020 ranged from 0.2 µg/L at SS2-4 station to 1.7 µg/L at SS3-8 station (Table 3-1). Median 2020 nickel concentrations were the lowest on record (2002-2019) with only a small variance between the zones. All measurements were well below than the EQC of 100 µg/L specified in the Water Licence for grab sample concentrations.

3.3.9 Nitrite

Nitrite concentrations measured in 2020 ranged 3.1 µg/L at SS2-3 station to 7.1 µg/L at the Control 3 station (Table 3-1). Median 2020 nitrite concentrations were relatively constant with increasing distance (Figure 3.3-3). The 2020 median concentrations were higher overall than concentrations in all other years although, only slightly (Figure 3.3-3). All measurements were well below the EQC of 2,000 µg/L specified in the Water Licence for grab sample concentrations.

3.3.10 Phosphorus

Phosphorus concentrations measured in 2020 ranged from below the analytical detection limit (<2.0 µg/L) at SS2-4 station to 318 µg/L at station SS5-3 in the 251-1,000 m zone (Table 3-1). Median 2020 phosphorus concentrations decreased with increasing distance from the Project (Figure 3.3-4) and were lower than 2019 concentrations in all zones but in line with historical averages (Figure 3.3-4). Although the Water Licence has a load limit for phosphorus, there is no EQC specified for this parameter.

3.3.11 Zinc

Zinc concentrations measured in 2020 ranged from below the analytical detection limit at SS4-5 station in the 1,001-2,500 m zone to 2.8 µg/L at SS2-2 station in the 1,001-2,500 m zone (Table 3-1). Median 2020 zinc concentrations were generally less than historical records (2001-2018) but similar to concentrations in 2019 with little variance between all zones (Figure 3.3-4). All measurements were well below the EQC of 20 µg/L specified in the Water Licence for grab sample concentrations.

3.4 Evaluation of Existing Control Sites

The lowest dustfall rate in 2020 was at station SS2-4 which is 2,164 m from mining activity. The second lowest dustfall rate was at Control station SSC-1 4,802 m from mining operations. In addition, the mean dustfall rate in the control zone was the lowest of all the zones. The SS2 transect stations (SS2-1, SS2-2, SS2-3 and SS2-4), in addition to station SS1-5 all recorded low dustfall rates. Stations SS2-4, SS1-5 and SS3-5 recorded lower dustfall rates than the control sites SSC-2 and SSC-3, indicating that the rates at these two control sites may not be representative of background values, suggesting that dustfall rates at the control sites are potentially affected by the Project. However, the potential effects of the Project on the dustfall in the control zone have marginal impacts on the dustfall monitoring program since dustfall rates at the control zone are lower than rates within zones closer to the Project area (e.g., zones 0 m to 100 m, 101 m to 250 m, 251 m to 1000 m). Concentrations of several snow water chemistry variables were generally consistent with distance from mining activity (zinc, nitrite, copper, ammonia, arsenic, cadmium) indicating that snow chemistry concentrations for these variables are likely not related to the Project activity.

3.5 Quality Assurance and Control

Dustfall gauge, dustfall snow survey and snow water chemistry sampling and analysis were conducted by experienced technicians following SOPs ENVI-908-0119, ENVI-909-0119, and ENVI-902-0119 to ensure proper field sampling and laboratory analysis. As part of SOP ENVI-909-0119, duplicate and blank samples were taken for some snow survey and snow water chemistry sample sites (Table 2-1). The results from these samples are summarized in Tables 3.5-1 and 3.5-2.

The relative percent difference (RPD) of duplicate samples from a site represents the amount of variation between duplicates. According to the Project AEMP, the data quality objective for duplicate water quality samples is a RPD of 40% when concentrations are ≥ 5 times the detection limit (DL; AEMP 2017). RPD values are only calculated when concentrations are ≥ 5 times the DL (BC MOE 2013). The calculated RPD values exceeded 40% on one occasion.

The results of the QA/QC duplicates indicate that snow chemistry is spatially variable on the scale of metres within which the duplicates are collected. The data quality objective from the AEMP (i.e., RPD less than 40%) is designed for surface *liquid* water samples. Surface water in a stream or lake will mix more readily than snow, particularly once snow has settled and has been compacted by wind. Site-specific differences between snow core sampling replicates may not be visible to the sampling team, but may result in differences in the chemical composition of the snow. RPD exceeded 40% once at SS2-3 station. The absolute difference between observations was small in magnitude. The similarity in the magnitude of the variability is consistent with small-scale spatial variation, rather than data quality issues. The results of the sampling network of 23 sites has been demonstrated to detect and quantify Project effects on snow water chemistry (Section 3.3), and these results are concluded to be reliable despite the small-scale variation identified in the QA/QC program.

Table 3.5-1: Sample Duplicates

Parameter	Duplicate Analytical Results (DUPW1/DUPW2; mg/dm^2/y; µg/L)					Analytical Detection Limit (µg/L)	Relative Percent Difference [a] (%)				
	SS4-5	SSC-2	SS1-4	SS2-3	SS3-6		SS4-5	SSC-2	SS1-4	SS2-3	SS3-6
Dustfall	53.8/58.5	45.5/21.2	n/a	20.5/15.2	n/a	0.1	8%	73%	n/a	29%	n/a
Aluminum	n/a	n/a	13/14.9	9.1/8	49.6/57.5	0.2	n/a	n/a	14%	13%	15%
Ammonia	n/a	n/a	50/46	50/50	71/74	5	n/a	n/a	8%	0%	4%
Arsenic	n/a	n/a	0.048/0.061	*0.01/0.01*	0.045/0.053	0.02	n/a	n/a	24%	0%	16%
Cadmium	n/a	n/a	*0.0025/0.0025*	*0.0025/0.0025*	*0.0025/0.0025*	0.005	n/a	n/a	0%	0%	0%
Chromium	n/a	n/a	0.083/0.074	0.062/0.062	0.251/0.282	0.05	n/a	n/a	11%	0%	12%
Copper	n/a	n/a	0.149/0.163	0.067/0.064	0.095/0.119	0.05	n/a	n/a	9%	5%	22%
Lead	n/a	n/a	0.0365/0.0318	0.02/0.0208	0.0594/0.0718	0.005	n/a	n/a	14%	4%	19%
Nickel	n/a	n/a	0.564/0.618	0.326/0.302	1.1/1.11	0.02	n/a	n/a	9%	8%	1%
Nitrite	n/a	n/a	4.1/4.6	3.8/2.3	5/6.5	1	n/a	n/a	11%	49%	26%
Phosphorus	n/a	n/a	17.5/17.3	20.1/15.7	84.2/75.8	2	n/a	n/a	1%	25%	11%
Zinc	n/a	n/a	1.41/1.5	0.91/0.84	0.94/1.03	0.1	n/a	n/a	6%	8%	9%

Notes:

n/a = RPD is not applicable since concentration is less than 5 times the detection limit.

"-" = parameter is not measured.

For measurements that were less than the detection limit, half the detection limit was used for calculations and are italicized.

[a] Relative difference between duplicates, with respect to their mean: RPD = 100 × |rep1 − rep2| / [(rep1 + rep2)/2].

Table 3.5-2: Analytical Blanks for QA/QC Program

Parameter	SS Equipment Blank Sample (µg/L)	Percent of Equipment Blank Sample Below SS Sample	Detection Limit (µg/L)
Aluminum	0.46	-360%	0.2
Ammonia	8.6	80%	5
Arsenic	*0.01*	69%	0.02
Cadmium	*0.003*	0%	0.005
Chromium	*0.03*	0%	0.05
Copper	*0.09*	-256%	0.05
Lead	0.021	-748%	0.005
Nickel	*0.05*	-380%	0.02
Nitrite	1.90	30%	1
Phosphorus	1.00	0%	2
Zinc	0.94	-104%	0.1

Note: For measurements that were less than the detection limit, half the detection limit was used for calculations and are italicized.

Dustfall RPD at SS4-5 was 8%, SSC-2 was 79%, and SS2-3 was 29% which shows that small scale variation for dustfall and snow water chemistry measures may have been slightly higher for dustfall, although the number of duplicates is small. There is no similar data quality objective for RPD related to dustfall, although spatial variability in dustfall rates similar to snow chemistry is expected.

The equipment blank sample was compared against a bag sample. Many of the blank parameters were higher than those from the bag sample, suggesting there was an issue with either the blank or bag sample. The cause of the blank sample having higher concentrations is unknown and has not been seen in previous years.

4. SUMMARY

Median dustfall rates from dustfall gauges measured in 2020 were slightly lower than 2019 results, with most dustfall gauges recording higher rates in 2019, while 2020 rates from snow surveys were comparable to 2019 results. Similar to historical results, dustfall rates in 2020 decreased with distance from the Project. Annual dustfall estimated from each of the 14 dustfall gauges ranged from 78 to 757 mg/dm^2/y. The annualized dustfall rates estimated from the 2020 snow survey data ranged from 5 to 1,463 mg/dm^2/y. Because dustfall gauges continuously collect dust throughout the year, and the snow surveys are only representative of dustfall accumulated over the snow-covered period, the reported annual dustfall results from the dustfall gauges are expected to provide a better estimate of annual dustfall compared to snow survey results for similar geographic areas. However, results obtained from both methods showed similar overall patterns. It is unknown why the maximum dustfall rate from the snow surveys was roughly double the highest value from the dustfall gauges, although the highest rates were all very close to mining activity. Dustfall rates in 2020 were generally within the historical data range collected for the Project. Annualized dustfall rates estimated from each snow survey station in 2020 were comparable to historical dustfall estimates.

Overall, as expected, dustfall rates generally decreased with distance from the Project with the lowest dustfall rate recorded at station SS2-4. The SS2 transect stations (SS2-1, SS2-2, SS2-3, and SS2-4), in addition to station SS1-5 all recorded low dustfall rates. Stations SS2-4, SS1-5, and SS3-5 recorded lower dustfall rates than the control sites SSC-2 and SSC-3, indicating that the rates at these two control sites may not be representative of background values, suggesting that dustfall rates at the control sites are potentially affected by the Project. However, the potential effects of the Project on the dustfall in the control zone have marginal impacts on the dustfall monitoring program since dustfall rates at the control zone are lower than rates within zones closer to the Project area (e.g., zones 0 m to 100 m, 101 m to 250 m, 251 m to 1000 m). Concentrations of several snow water chemistry variables were consistent or decreased with distance from mining activity (zinc, nitrite, copper, ammonia, arsenic, cadmium) indicating that snow chemistry concentrations for these variables are likely not related to the Project activity.

Areas that were closer to the Project, roads, and airstrip received more dustfall than other areas. Mean dustfall rates estimated using both dustfall gauges and snow surveys within the 0 m to 100 m, 101 m to 250 m, 251 m to 1,000 m, 1,001 m to 2,500 m and control zones were 572, 211, 232, 100, and 71 mg/dm^2/y, respectively. Although there are no dustfall standards for the Northwest Territories, all the 2020 dustfall rates were well below the non-residential 5.26 mg/dm^2/d (1,922 mg/dm^2/y) Alberta Ambient Air Quality Objective for dustfall (Alberta Environment and Parks 2019). Dust 10 station was higher than the residential limit of the Alberta Ambient air Quality Objective for dustfall (1.76 mg/dm2/d; 646 mg/dm^2/y). This objective is used only as a general performance indicator.

Snow water chemistry analytes of interest included those variables with EQC (i.e., aluminum, ammonia, arsenic, cadmium, chromium, copper, lead, nickel, nitrite, and zinc) or a load limit (i.e., phosphorus) specified in the Type “A” Water Licence (W2015L2-0001, formerly W2007L2 0003). All 2020 sample concentrations were well below their associated reference levels as specified by the “maximum concentration of any grab sample” specified in Water Licence W2015L2 0001. Concentrations in 2020 were similar to 2019 and generally lower than recent years for all parameters except nitrite. Typically, concentrations decreased with distance from the Project. The highest concentrations for all variables were less than their corresponding EQC.

5. REFERENCES

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

AEMP. 2017. *Aquatic Effects Monitoring Program- Quality Assurance Project Plan Version 3.1.* Diavik Diamond Mines Inc. Produced by Golder Associates. June 2017.

Alberta Environment and Parks. 2019. *Alberta Ambient Air Quality Objectives and Guidelines Summary*. January 2019.

BC MOE. 2013. *British Columbia field sampling manual, Part II*. British Columbia Ministry of Environment.

DDMI. 1998. *Environmental Assessment Report.* Diavik Diamond Mines Inc.: Yellowknife, NT.

DDMI. 2002. *Diavik Diamond Mine Dust Deposition – 2001.* Diavik Diamond Mines Inc.

DDMI. 2003. *Diavik Diamond Mine Dust Deposition – 2002.* Diavik Diamond Mines Inc.

DDMI. 2004. *Diavik Diamond Mine Dust Deposition – 2003.* Diavik Diamond Mines Inc.

DDMI. 2005. *Diavik Diamond Mine Dust Deposition – 2004.* Diavik Diamond Mines Inc.

DDMI. 2006. *Diavik Diamond Mine Dust Deposition – 2005.* Diavik Diamond Mines Inc.

DDMI. 2007. *Diavik Diamond Mine Dust Deposition – 2006.* Diavik Diamond Mines Inc.

DDMI. 2008. *Diavik Diamond Mine Dust Deposition – 2007.* Diavik Diamond Mines Inc.

DDMI. 2009. *Diavik Diamond Mine Dust Deposition – 2008.* Diavik Diamond Mines Inc.

DDMI. 2010. *Diavik Diamond Mine Dust Deposition – 2009.* Diavik Diamond Mines Inc.

DDMI. 2011. *Diavik Diamond Mine Dust Deposition – 2010.* Diavik Diamond Mines Inc.

DDMI. 2012. *Diavik Diamond Mine Dust Deposition – 2011.* Diavik Diamond Mines Inc.

DDMI. 2013. *Diavik Diamond Mine Dust Deposition – 2012.* Diavik Diamond Mines Inc.

DDMI. 2014. *Diavik Diamond Mine Dust Deposition – 2013.* Diavik Diamond Mines Inc.

DDMI. 2015. *Diavik Diamond Mine Dust Deposition – 2014.* Diavik Diamond Mines Inc.

DDMI. 2016. *Diavik Diamond Mine Dust Deposition – 2015.* Diavik Diamond Mines Inc.

DDMI. 2017. *Diavik Diamond Mine Dust Deposition – 2016.* Diavik Diamond Mines Inc.

DDMI. 2018. *Diavik Diamond Mine Dust Deposition – 2017.* Diavik Diamond Mines Inc.

DDMI. 2019. *Diavik Diamond Mine Dust Deposition – 2018.* Diavik Diamond Mines Inc.

DDMI. 2020. *Diavik Diamond Mine Dust Deposition – 2019.* Diavik Diamond Mines Inc.

W2015L2-0001. *Class A Water Licence Issued to Diavik Diamond Mines (2012) Inc.* by Wek'éezhìi Land and Water Board. October 19, 2015.

W2007L2-0003. *Class A Water Licence Issued to Diavik Diamond Mines (2012) Inc.* by Wek'éezhìi Land and Water Board. November 1, 2007.

APPENDIX A ANNUAL CHANGES TO DUSTFALL PROGRAM

Appendix A: Annual Changes to Dustfall Program

2001

The 2001 dust monitoring program was based entirely upon snow survey samples collected along four radial transects emanating from the project footprint outward to a distance of approximately 1,000 metres. All sample locations were analyzed for dust deposition, while only those locations on Lac de Gras were analyzed for snow water chemistry.

2002

DDMI amended the dust monitoring program, in response to recommendations made by the Mackenzie Valley Land and Water Board, to include two snow survey control locations. In addition, five dust gauges (passive dust collectors) were deployed, one along each of the snow survey transects and one at a control location, in efforts to enhance the monitoring program.

2003

In response to further recommendations, the dust monitoring program was modified. All four snow survey transects were extended in length to a distance of approximately 2,000 metres from the project footprint. An additional five dust gauges, including a second control, were deployed.

2004

Increased construction activity necessitated further changes to the dust monitoring program. One dust gauge (Dust 02) was removed from its location to accommodate project footprint expansion, and subsequently relocated and redeployed (Dust 2A).

2005

Dust deposition monitoring was carried out with no modifications to either the snow survey or the dust gauge portion of the program.

2006

An additional dust gauge was deployed bringing the total to eleven (including two controls). Testing of Mini-Vol portable air samplers were conducted to determine feasibility of incorporation into the dust monitoring program. Preliminary findings proved the inclusion of the Mini-Vol samplers would be impractical.

2007

The snow survey portion of the program was amended with an additional snow survey transect being incorporated bringing the total number of transects to five. As well, snow water chemistry samples were collected adjacent to the pre-existing control locations as background references.

Two additional dust gauges (temporary) were deployed adjacent to two pre-existing dust gauges. The intent of the temporary gauges was to compare results from the same location when sample collection frequency is altered.

DDMI initiated contact with Environment Canada and Golder Associates with regards to remodeling dust deposition with the intent of revising predictions made in the 1998 environmental effects report.

In light of dust deposition monitoring results from previous years, several control measures were adopted to reduce dust generation on site, including the utilization of EK-35 (suppressant) on the airport apron, taxiway and helipad, and fitting a second 830E haul truck with tank for haul road watering.

2008

All of the dust gauges were modified to accommodate the replacement of the polyacrylic dust gauge inserts with brass Nipher gauge inserts, to minimize loss associated with damage during the collection and handling of the dust gauges.

An additional dust gauge was added to the program bringing the total to twelve permanently deployed (including two control), and two temporary (reference) dust gauges.

Three snow survey sample points were not sampled as they had become overtaken by construction activity and expansion of the project footprint.

Additional preparations for dust deposition modelling were completed including data collection, identification of point source inputs, selection of a modelling program and inputs (with regulator input) and discussion of cumulative effects.

2009

The two temporary dust gauges deployed in 2007 were decommissioned. All twelve permanent gauges were collected quarterly. An error in collection/deployment resulted in “No Data” being collected for Dust 3 between July 11 and September.

Snow survey sampling was conducted in April. An error in collection/analysis resulted in the Dust Deposition sample for SS2-1 being compromised; as such “No Dust Deposition Data” was available for this location.

2010

All twelve permanent dust gauges were collected quarterly during 2010. Overall, there was a reduction of observed dustfall deposition from 2009 to 2010, with the exception of Dust 1 and Dust 10.

Snow survey sampling was conducted throughout the month of April. An error in collection/processing resulted in two missing stations for the water quality analysis. SS2-1 field results were collected; however, the sample was compromised during processing in the lab. An error also resulted with the collection of SS5-2; data collection for water quality analysis was missed in the field. No data for these two stations resulted in Zone 1 having no data for the various water chemistry results and SS5-2 was not represented in Zone 3 data for 2010.

2011

All twelve permanent dust gauges were collected quarterly during 2011. During collection and repair to Station Dust 5 in September, the sample was compromised and therefore not processed, which resulted in data loss.

Snow survey sampling was conducted throughout the month of April. Due to an internal error shipping samples, water quality samples for stations SS1-4, SS1-5, SS2-1, SS2-2, SS2-3, SS2-4, and SSC-3 arrived at the Maxxam laboratory past the recommended holding time.

2012

All twelve permanent dust gauges were collected quarterly during 2012. During collection in June, repairs were conducted on Station Dust 9 as it was found on its side, the sample was compromised, which resulted in data loss. Overall in 2012, 8 of the 12 dust gauges reported lower deposition rates compared to 2011.

Snow survey sampling was conducted on April 30, and on May 4 and 5.

2013

All twelve permanent dust gauges were collected quarterly during 2013. Station Dust 5 was dismantled upon arrival in September and the sample was compromised, which resulted in data loss for that quarter.

Snow survey sampling was conducted at 24 locations from April 26 to 28.

2014

All twelve permanent dust gauges were collected quarterly during 2014.

Snow survey sampling was conducted at 24 locations from April 7 to May 12. Three additional sites, SS3-6, SS3-7, SS3-8, were installed.

2015

No changes were made to the dustfall program in 2015.

All twelve permanent dust gauges were collected quarterly during 2015.

Snow survey sampling was conducted at 24 locations from March 31 to April 10.

2016

Due to construction activities at A21, the distance to mining operations decreased for dustfall stations Dust 10, SS5-1, SS5-2, SS5-3, SS5-4, SS5-5, Dust C1, and Control 1. The new distances to mining operations are shown in Table 2-1. Dust 10 station was 670 m from mining operations and now is 46 metres from mining operations.

All twelve permanent dust gauges were collected quarterly during 2016.

Snow survey sampling was conducted at 27 locations from March 3 to April 7.

2017

All twelve permanent dust gauges were collected quarterly during 2017.

During collection of Stations Dust 3 Dust 4, Dust 8 and Dust 10 in July were compromised and an indeterminate amount of sample was lost.

Two new permanent dust gauges (Dust 11 and Dust 12) were deployed on 2017-Oct-05.

Dust 11 and 12 are 0.805 km and 2.58 km respectively from mining operations.

Snow survey sampling was conducted at 27 locations from April 1 to April 10.

2018

No changes to the dustfall program were made in 2018. All fourteen permanent dust gauges were collected quarterly during 2018.

2019

Four new stations are added to the snow survey monitoring network to help assessing the efficiency of the existing control stations. The stations added include FF1-2, FFA-4, FFB-4 and LDS-1. All 14 permanent dust gauges were collected quarterly during 2019.

Snow survey sampling was conducted at 31 locations from April 4 to May 8.

2020

Four stations were removed in 2020. The removed stations include FF1-2, FFA-4, FFB-4 and LDS-1. All 14 permanent dust gauges were collected quarterly during 2020.

Snow survey sampling was conducted at 24 locations from April 3 to April 17.

One lab blank and one equipment blank were run every quarter. Equipment blanks commenced July 20, 2020 (Q2), lab blanks commenced January 5, 2021 (Q4).

APPENDIX B DUSTFALL GAUGE ANALYTICAL RESULTS

Appendix B: Dustfall Gauge Analytical Results

Sample Date	Dust Gauge ID	Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Cumulative Weight of Residue (mg)	Dust Deposition (mg/dm^2)	Days Deployed	Dust Deposition ($mg/dm^2/d$)	Dust Deposition ($mg/dm^2/y$)
Initial deployment date: 26-Dec-2019									
29-Mar-20	Dust 1	1	113.1	148.2					
		2	114.5	138.6	59.2		94	0.5	
18-Jul-20		1	120.3	193.2					
		2	113.4	173.4					
		3	113.7	164.2					
		4	113.2	145.4	215.6		111	1.6	
22-Oct-20		1	118.4	158.9					
		2	120.8	279.4	199.1		96	1.7	
4-Jan-21		1	123.7	157.1	33.4		74	0.4	
					TOTALS	**413.6**	**375**	**1.0**	**402.6**
Initial deployment date: 28-Dec-2019									
27-Mar-20	Dust 2A	1	116.8	235					
		2	114.5	138.1	141.8		90	1.3	
18-Jul-20		1	121.7	255.9					
		2	120.5	121.4	135.1		113	1.0	
20-Oct-20		1	116.7	148.3					
		2	118.2	158.6	72		94	0.6	
8-Jan-21		1	120.1	162.4	42.3		80	0.4	
					TOTALS	**318.9**	**377**	**0.8**	**308.8**
Initial deployment date: 26-Dec-2019									
29-Mar-20	Dust 3	1	117.7	154.5					
		2	115.8	146					
		3	119.4	202	149.6		94	1.3	
17-Jul-20		1	114.3	192.5					
		2	118.1	189.1					
		3	114.5	157.7					
		4	118.6	146.1	219.9		110	1.6	
22-Oct-20		1	127.1	403.5	276.4		97	2.3	
3-Jan-21		1	116.5	223.8	107.3		73	1.2	
					TOTALS	**614.1**	**374**	**1.6**	**599.3**
Initial deployment date: 26-Dec-2019									
29-Mar-20	Dust 4	1	115.7	175.8	60.1		94	0.5	
17-Jul-20		1	119.5	272					
		2	116.9	228.1	263.7		110	2.0	
23-Oct-20		1	125.5	177.4	51.9		98	0.4	
3-Jan-21		1	127.1	147.5	20.4		72	0.2	
					TOTALS	**322.9**	**374**	**0.8**	**315.2**

Appendix B: Dustfall Gauge Analytical Results

Sample Date	Dust Gauge ID	Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Cumulative Weight of Residue (mg)	Dust Deposition (mg/dm^2)	Days Deployed	Dust Deposition ($mg/dm^2/d$)	Dust Deposition ($mg/dm^2/y$)
Initial deployment date: 27-Dec-2019									
27-Mar-20	Dust 5	1	115.7	198.5	82.8		91	0.7	
18-Jul-20		1	115.9	133					
		2	112	141.8	46.9		113	0.3	
20-Oct-20		1	124.7	165.2	40.5		94	0.4	
8-Jan-21		1	125.2	142.5	17.3		80	0.2	
					TOTALS	**152.9**	**378**	**0.4**	**147.6**
Initial deployment date: 26-Dec-2019									
29-Mar-20	Dust 6	1	116.4	185.8	69.4		94	0.6	
18-Jul-20		1	120.8	139.9					
		2	120.2	134.9	33.8		111	0.2	
22-Oct-20		1	125.7	129.9					
		2	112.7	114.8					
		3	118.9	156.6	44		96	0.4	
3-Jan-21		1	126.8	144.5	17.7		73	0.2	
					TOTALS	**134.4**	**374**	**0.4**	**131.2**
Initial deployment date: 27-Dec-2019									
27-Mar-20	Dust 7	1	114.5	183.3	68.8		91	0.6	
18-Jul-20		1	112.5	155.6					
		2	117.1	153					
		3	118.8	118.9	79.1		113	0.6	
20-Oct-20		1	118.5	192.9					
		2	115.4	150.6	109.6		94	1.0	
8-Jan-21		1	126.9	153.4	26.5		80	0.3	
					TOTALS	**231.5**	**378**	**0.6**	**223.6**
Initial deployment date: 27-Dec-2019									
27-Mar-20	**Dust 8**	1	115.8	219.7	103.9		91	0.9	
19-Jul-20		1	119.8	122					
		2	119.9	133.7					
		3	119.1	141.1					
		4	119.5	165.3					
		5	119.9	125.5	89.4		114	0.6	
20-Oct-20		1	119.1	120.1					
		2	116.9	149.7					
		3	117.7	132.8					
		4	125.4	134.6					
		5	125.9	126					
		6	120.4	136.9	74.7		93	0.7	
8-Jan-21		1	125.8	145.3	19.5		80	0.2	
					TOTALS	**234.4**	**378**	**0.6**	**226.3**

Appendix B: Dustfall Gauge Analytical Results

Sample Date	Dust Gauge ID	Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Cumulative Weight of Residue (mg)	Dust Deposition (mg/dm^2)	Days Deployed	Dust Deposition ($mg/dm^2/d$)	Dust Deposition ($mg/dm^2/y$)
Initial deployment date: 27-Dec-2019									
27-Mar-20	Dust 9	1	117.5	142.4	24.9		91	0.2	
18-Jul-20		1	118.7	124.2					
		2	118.6	120.4					
		3	118.2	120.2					
		4	120.6	121.8					
		5	119.7	122.6					
		6	119.4	122.2					
		7	120.1	123.4					
		8	119.7	124.4					
		9	113.8	119.8					
		10	114	129.4					
		11	120.8	121.4	46.2		113	0.3	
20-Oct-20		1	112.8	130.2	17.4		94	0.2	
8-Jan-21		1	114.1	124.4	10.3		80	0.1	
					TOTALS	**80.6**	**378**	**0.4**	**77.8**
Initial deployment date: 26-Dec-2019									
29-Mar-20	Dust 10	1	114.1	284.1					
		2	112.9	282.9	340		94	2.9	
17-Jul-20		1	113.3	137.1					
		2	122	241.6					
		3	121.9	149.5					
		4	119.7	320.1					
		5	118.9	122.7	375.2		110	2.8	
22-Oct-20		1	127.3	177.7					
		2	127.2	214.7	137.9		97	1.2	
3-Jan-21		1	116.5	214.2	97.7		73	1.1	
					TOTALS	**775.2**	**374**	**2.0**	**756.5**
Initial deployment date: 26-Dec-2019									
27-Mar-20	Dust 11	1	120.4	201.2					
		2	114.7	193.2	159.3		92	1.4	
17-Jul-20		1	120.2	145.7					
		2	121	210.5					
		3	119.2	212.3					
		4	120	245.1					
		5	120	121	334.2		112	2.4	
20-Oct-20		1	123.4	136.1	12.7		95	0.1	
8-Jan-21		1	120.30	182.60	62.3		80	0.6	
					TOTALS	**463.5**	**379**	**1.1**	**446.4**

Appendix B: Dustfall Gauge Analytical Results

Sample Date	Dust Gauge ID	Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Cumulative Weight of Residue (mg)	Dust Deposition (mg/dm^2)	Days Deployed	Dust Deposition (mg/dm^2/d)	Dust Deposition (mg/dm^2/y)
Initial deployment date: 28-Dec-2019									
27-Mar-20	Dust 12	1	119.7	175.9	56.2		90	0.5	
19-Jul-20		1	115.4	158.3					
		2	114.4	164	92.5		114	0.7	
20-Oct-20		1	117.7	157.8					
		2	116.5	137.7	61.3		93	0.5	
8-Jan-21		1	119.00	158.70	39.7		80	0.4	
					TOTALS	**203.6**	**377**	**0.5**	**197.1**
Initial deployment date: 27-Dec-2019									
27-Mar-20	Dust C1	1	114.2	131.1	16.9		91	0.2	
18-Jul-20		1	114.6	176	61.4		113	0.4	
20-Oct-20		1	125.4	186.5	61.1		94	0.5	
8-Jan-21		1	117.40	127.30	9.9		80	0.1	
					TOTALS	**121.7**	**378**	**0.3**	**117.5**
Initial deployment date: 28-Dec-2019									
27-Mar-20	Dust C2	1	118	153.6	35.6		90	0.3	
19-Jul-20		1	114.3	148.4					
		2	119.5	119.5	34.1		114	0.2	
20-Oct-20		1	118	140.9					
		2	118.4	129.2	33.7		93	0.3	
8-Jan-21		1	123	149.6	26.6		80	0.3	
					TOTALS	**106.0**	**377**	**0.3**	**102.6**

APPENDIX C DUSTFALL SNOW SURVEY FIELD SHEETS AND ANALYTICAL RESULTS

RioTinto

Dust Gauge Collection Field Sheet			
		No:	ENVI-178-0312
Area:	8000	Revision:	R0
Effective Date:	26-Mar-2012	By:	Dianne Dul
Task:	Dust Gauge Collection Field Sheet		
		Page:	1 of 2

GENERAL

LOCATION NAME: Dust 1 DATE (dd-mmm-yyyy): 2020-03-29 TIME (24:00): 0935

SAMPLED BY: NG TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 533964 E 7154321 N (Zone) 12

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -33 °C Wind Direction: W Wind Speed (knots): 5

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2019-12-26 NG AH

clear liquid, white colour

Floating + settled dust

Analyzed 2020-03-29

Total Volume of Water After Melting: 375 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	113.1	148.2	35.1	
2	114.5	138.6	24.1	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	227.6	286.8	59.2	

RioTinto

Dust Gauge Collection Field Sheet

		No:	ENVI-178-0312
Area:	8000	Revision:	R0
Effective Date:	26-Mar-2012	By:	Dianne Dul
Task:	Dust Gauge Collection Field Sheet		
		Page:	1 of 2

GENERAL

LOCATION NAME: Dust 2A DATE (dd-mmm-yyyy): 2020-03-27 TIME (24:00): 1453

SAMPLED BY: NG TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 535678 E 7151339 N (Zone) 12

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -26 °C Wind Direction: N Wind Speed (knots): 4

Precipitation: rain / mist / snow N/A Cloud Cover: 0% 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2019-12-28 AH NG

Opaque liquid - white colour
lots of visible dust floating + settled

very close to
Winter road,
sampled during
road operation

analyzed 2020-03-28

Total Volume of Water After Melting: 425 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	116.8	235.0	118.2	
2	114.5	138.1	23.6	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	231.3	373.1	141.8	

Rio Tinto

Dust Gauge Collection Field Sheet			
		No:	ENVI-178-0312
Area:	8000	Revision:	R0
Effective Date:	26-Mar-2012	By:	Dianne Dul
Task:	Dust Gauge Collection Field Sheet		
		Page:	1 of 2

GENERAL

LOCATION NAME: Dust 3 DATE (dd-mmm-yyyy): 2020-03-29 TIME (24:00): 1016

SAMPLED BY: NG TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 535024 E 7151872 N (Zone) 12

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -33 °C Wind Direction: W Wind Speed (knots): 5

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible / Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2019-12-26 NG AH

Opaque liquid

Floating + settled dust + organic matter

analyzed 2020-03-29

Total Volume of Water After Melting : 375 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	117.7	154.5	36.8	
2	115.8	146.0	30.2	
3	119.4	202.0	82.6	
4				
5				
6				
7				
8				
9				
10				
11				
Totals	352.9	502.5	149.6	

Rio Tinto

Dust Gauge Collection Field Sheet			
		No:	ENVI-178-0312
Area:	8000	Revision:	R0
Effective Date:	26-Mar-2012	By:	Dianne Dul
Task:	Dust Gauge Collection Field Sheet		
		Page:	1 of 2

GENERAL

LOCATION NAME: Dust 4 **DATE (dd-mmm-yyyy):** 2020-03-29 **TIME (24:00):** 1130

SAMPLED BY: NG **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 531397 **E** 7152127 **N (Zone)** 12

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -29 °C **Wind Direction:** W **Wind Speed (knots):** 8

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2019-12-26 NG AH

clear liquid
floating + settled dust
2 insects

analyzed 2020-03-29

Total Volume of Water After Melting : 450 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	115.7	175.8	60.1	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	115.7	175.8	60.1	

Rio Tinto

Dust Gauge Collection Field Sheet			
		No:	ENVI-178-0312
Area:	8000	Revision:	R0
Effective Date:	26-Mar-2012	By:	Dianne Dul
Task:	Dust Gauge Collection Field Sheet		
		Page:	1 of 2

GENERAL

LOCATION NAME: Dust 5 DATE (dd-mmm-yyyy): ~~2019~~ 2020-03-27 TIME (24:00): 1423

SAMPLED BY: NG TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 535696 E 7155138 N (Zone) 12

DESCRIPTION: QI Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 28 °C Wind Direction: W Wind Speed (knots): 4

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible / Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2019-12-27 AM GE

clear liquid - white colour

visible dust floating + settled

analyzed 2020-03-28

Total Volume of Water After Melting: 375 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	115.7	198.5	82.8	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	115.7	198.5	82.8	

Rio Tinto

Dust Gauge Collection Field Sheet

		No:	ENVI-178-0312
Area:	8000	Revision:	R0
Effective Date:	26-Mar-2012	By:	Dianne Dul
Task:	Dust Gauge Collection Field Sheet		
		Page:	1 of 2

GENERAL

LOCATION NAME: Dust 6 DATE (dd-mmm-yyyy): 2020-03-29 TIME (24:00): 0957

SAMPLED BY: NG TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 537502 E 7152934 N (Zone) 12

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -33 °C Wind Direction: W Wind Speed (knots): 5

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2019-12-26 NGAH

clear liquid, white colour

Floating + settled dust

Analyzed 2020-03-29

Total Volume of Water After Melting : 250 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	116.4	185.8	69.4	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	116.4	185.8	69.4	

Rio Tinto

Dust Gauge Collection Field Sheet

		No:	ENVI-178-0312
Area:	8000	Revision:	R0
Effective Date:	26-Mar-2012	By:	Dianne Dul
Task:	Dust Gauge Collection Field Sheet		
		Page:	1 of 2

GENERAL

LOCATION NAME: Dust 7 **DATE (dd-mmm-yyyy):** 2020-03-27 **TIME (24:00):** 1458

SAMPLED BY: NG **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 536819 **E** 7150510 **N (Zone)** 12

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -26 °C **Wind Direction:** NW **Wind Speed (knots):** 4

Precipitation: rain / mist / snow N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed ~~2020~~ 2019-12-27 AH GC

clear liquid, white colour

some dust visible floating + settled

3 dead insects

analyzed 2020-03-28

Total Volume of Water After Melting : 400 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	114.5	183.3	68.8	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	114.5	183.3	68.8	

RioTinto

Dust Gauge Collection Field Sheet

Area:	8000	No:	ENVI-178-0312
Effective Date:	26-Mar-2012	Revision:	R0
Task:	Dust Gauge Collection Field Sheet	By:	Dianne Dul
		Page:	1 of 2

GENERAL

LOCATION NAME: Dust 8 **DATE (dd-mmm-yyyy):** 2020-03-27 **TIME (24:00):** 1523

SAMPLED BY: NG **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 531401 **E** 7154146 **N (Zone)** 12

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -26 °C **Wind Direction:** NW **Wind Speed (knots):** 4

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible / Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2019-12-27 AH GC

clear liquid, white colour

some dust visible floating + ~~suspended~~ settled

a few pieces of floating organic matter

sample analyzed 2020-03-28

Total Volume of Water After Melting: 675 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	115.8	219.7	103.9	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	115.8	219.7	103.9	

Rio Tinto

Dust Gauge Collection Field Sheet			
		No:	ENVI-178-0312
Area:	8000	Revision:	R0
Effective Date:	26-Mar-2012	By:	Dianne Dul
Task:	Dust Gauge Collection Field Sheet		
		Page:	1 of 2

GENERAL

LOCATION NAME: Dust 9 **DATE (dd-mmm-yyyy):** 2020-03-27 **TIME (24:00):** 1433

SAMPLED BY: NG **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 541204 **E** 7152154 **N (Zone)** 12

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -26 °C **Wind Direction:** NW **Wind Speed (knots):** 4

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, ~~25%,~~ 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible / Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2019-12-27 AH GC

Tube found not quite upright in shell - leaning against sid

clear liquid brownish tinge

Floating + settled dust

2 insects

analyzed 2020-03-28

Drill rig located @ 540670, 7153260 - staged but not yet operational @ time of sampling

Total Volume of Water After Melting : 250 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	117.5	142.4	24.9	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	117.5	142.4	24.9	

Rio Tinto

Dust Gauge Collection Field Sheet			
		No:	ENVI-178-0312
Area:	8000	Revision:	R0
Effective Date:	26-Mar-2012	By:	Dianne Dul
Task:	Dust Gauge Collection Field Sheet		
		Page:	1 of 2

GENERAL

LOCATION NAME: Dust 10 DATE (dd-mmm-yyyy): 2020-03-29 TIME (24:00): 1116

SAMPLED BY: NG TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 532908 E 7148924 N (Zone) 12

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -29 °C Wind Direction: SE Wind Speed (knots): 8

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2019-12-26 NG AH

Opaque liquid, whitish brown colour

floating + settled dust

a few small pieces of organic matter

analyzed 2020-03-29

Total Volume of Water After Melting: 460 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	114.1	284.1	170	
2	112.9	282.9	170	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	227	567	340	

Rio Tinto

Dust Gauge Collection Field Sheet			
		No:	ENVI-178-0312
Area:	8000	Revision:	R0
Effective Date:	26-Mar-2012	By:	Dianne Dul
Task:	Dust Gauge Collection Field Sheet		
		Page:	1 of 2

GENERAL

LOCATION NAME: Dust 11 DATE (dd-mmm-yyyy): 2020-03-27 TIME (24:00): 1512

SAMPLED BY: NG TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 531493 E 7150156 N (Zone) 12

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -26 °C Wind Direction: NW Wind Speed (knots): 4

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed

clear liquid - white colour
visible dust Floating + settled

analyzed 2020-03-28

Total Volume of Water After Melting : 625 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	120.4	201.2	80.8	
2	114.7	193.2	78.5	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	235.1	394.4	159.3	

RioTinto

Dust Gauge Collection Field Sheet

		No:	ENVI-178-0312
Area:	8000	**Revision:**	R0
Effective Date:	26-Mar-2012	**By:**	Dianne Dul
Task:	Dust Gauge Collection Field Sheet		
		Page:	1 of 2

GENERAL

LOCATION NAME: Dust 12 **DATE (dd-mmm-yyyy):** 2020-03-27 **TIME (24:00):** 1518

SAMPLED BY: NG **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 529323 **E** 7151191 **N (Zone)**

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -26 °C **Wind Direction:** NW **Wind Speed (knots):** 4

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2019-12-28 AH GC

clear liquid, white colour
some dust visible floating + settled ~~suspended~~

sample analyzed 2020-03-28

Total Volume of Water After Melting : 575 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	119.7	175.9	56.2	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	119.7	175.9	56.2	

Rio Tinto

Dust Gauge Collection Field Sheet

Area:	8000	No:	ENVI-178-0312
Effective Date:	26-Mar-2012	Revision:	R0
Task:	Dust Gauge Collection Field Sheet	By:	Dianne Dul
		Page:	1 of 2

GENERAL

LOCATION NAME: Dust C1 **DATE (dd-mmm-yyyy):** 2020-03-27 **TIME (24:00):** 1501

SAMPLED BY: NG **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 534979 **E** 7144270 **N (Zone)** 12

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -26 °C **Wind Direction:** NW **Wind Speed (knots):** 4

Precipitation: rain / mist / snow N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2019-12-27 AH GC

Clear liquid

small amount of ~~minimal~~ dust visible (floating + settled)

analyzed 2020-03-28

Total Volume of Water After Melting : 610 (mL)

Filter #	Weight of Filter mg	Filter + Residue mg	Residue Weight	Comments
1	114.2	131.1	16.9	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	114.2	131.1	16.9	

Rio Tinto

Dust Gauge Collection Field Sheet

		No:	ENVI-178-0312
Area:	8000	Revision:	R0
Effective Date:	26-Mar-2012	By:	Dianne Dul
Task:	Dust Gauge Collection Field Sheet		
		Page:	1 of 2

GENERAL

LOCATION NAME: Dust C2 DATE (dd-mmm-yyyy): 2020-03-27 TIME (24:00): 1521

SAMPLED BY: NG TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 528714 E 7153276 N (Zone) 12

DESCRIPTION: Q1 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -26 °C Wind Direction: NW Wind Speed (knots): 4

Precipitation: rain / mist / snow N/A Cloud Cover: 0% 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2019-12-28 AH GC

Clear liquid
small amount of dust visible (floating + settled)
6 pieces floating org. matter (vegetation)

analyzed 2020-03-28

Total Volume of Water After Melting : 500 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	118.0	153.6	35.6	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	118.0	153.6	35.6	

Rio Tinto

Dust Gauge Collection Field Sheet

		No:	ENVI-178-0312
Area:	8000	Revision:	R0
Effective Date:	26-Mar-2012	By:	Dianne Dul
Task:	Dust Gauge Collection Field Sheet		
		Page:	1 of 2

GENERAL

LOCATION NAME: DUST 1 **DATE (dd-mmm-yyyy):** 17-07-2020 **TIME (24:00):** 0830

SAMPLED BY: NG BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 533964 **E** 7154321 **N (Zone)** 12

DESCRIPTION: Q2

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 14 °C **Wind Direction:** W **Wind Speed (knots):** 5

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-03-29

Visible dust + organic matter
12 insects
dust whitish brown in colour

Total Volume of Water After Melting: 1060 **(mL)**

Filter #	Weight of Filter mg	Filter + Residue mg	Residue Weight (mg)	Comments
1	120.3	193.2	72.9	
2	113.4	173.4	60.0	
3	113.7	164.2	50.5	
4	113.2	145.4	32.2	
5				
6				
7				
8				
9				
10				
11				
Totals	460.6	676.2	215.6	

Rio Tinto

Dust Gauge Collection Field Sheet

		No:	ENVI-178-0312
Area:	8000	Revision:	R0
Effective Date:	26-Mar-2012	By:	Dianne Dul
Task:	Dust Gauge Collection Field Sheet		
		Page:	1 of 2

GENERAL

LOCATION NAME: DUST 2A DATE (dd-mmm-yyyy): 18-Jul-2020 TIME (24:00): 1504

SAMPLED BY: 552 BP TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 535678 E 7151339 N (Zone) 12

DESCRIPTION: Q2

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 21 °C Wind Direction: W Wind Speed (knots): 9

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-03-27

- bugs in sample
- visible dust
- mostly clear water

Total Volume of Water After Melting: 1325 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	121.7	255.9	134.2	some organic material still present
2	120.5	121.4	0.9	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	242.2	377.3	135.1	

Rio Tinto

Dust Gauge Collection Field Sheet			
Area:	8000	No:	ENVI-178-0312
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Task:	Dust Gauge Collection Field Sheet	By:	Dianne Dul
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GENERAL

LOCATION NAME: Dust 3 **DATE (dd-mmm-yyyy):** 17-07-2020 **TIME (24:00):** 0842

SAMPLED BY: BP NG **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 535024 **E** 7151872 **N (Zone)** 12

DESCRIPTION: Q2

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 14 °C **Wind Direction:** W **Wind Speed (knots):** 5

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-03-29

Visible dust, white/brown in colour, + organic matter, + 9 insects

Total Volume of Water After Melting: 1130 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	114.3	192.5	78.2	
2	118.1	189.1	71.0	
3	114.5	157.7	43.2	
4	118.6	146.1	27.5	
5				
6				
7				
8				
9				
10				
11				
Totals	465.5	685.4	219.9	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 4 DATE (dd-mmm-yyyy): 17-07-2020 TIME (24:00): 0854

SAMPLED BY: NG BP TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 531397 E 7152127 N (Zone) 12

DESCRIPTION: Q2

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 14 °C Wind Direction: W Wind Speed (knots): 5

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-03-29

Bolt missing from plastic shell.
Sample visibly dusty several bugs

Total Volume of Water After Melting: 1430 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	119.5	272.0	152.5	
2	116.9	228.1	111.2	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	236.4	500.1	263.7	

Rio Tinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: DUST 5 **DATE (dd-mmm-yyyy):** ~~27~~ 18-Jul-2020 **TIME (24:00):** 1430

SAMPLED BY: 552 BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 535696 **E** 7155138 **N (Zone)** 12

DESCRIPTION: Q2

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 20 °C **Wind Direction:** SW **Wind Speed (knots):** ~~9~~ 10

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0% 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-03-27

- eagle sitting on tube when arrived @ site
- visible bugs + dust

Total Volume of Water After Melting: 850 **(mL)**

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	115.9	133.0	17.1	
2	112.0	141.8	29.8	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	227.9	274.8	46.9	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 6 DATE (dd-mmm-yyyy): 17·07·2020 TIME (24:00): 07 07

SAMPLED BY: BP NG TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 537502 E 7152934 N (Zone) 12

DESCRIPTION: Q2

CLIMATE CONDITIONS (if sampling outside)

Air Temp: ______ °C Wind Direction: ______ Wind Speed (knots): ______

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-03-29

some visible dust, whitish brown in colour

visible organic matter

~12 bugs

Total Volume of Water After Melting: 1180 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	120.8	~~134.9~~ 139.9	19.1	
2	120.2	134.9	14.7	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	241.0	274.8	33.8	

Rio Tinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: DUST 7 **DATE (dd-mmm-yyyy):** 18-Jul-2020 **TIME (24:00):** 1449

SAMPLED BY: SS2 BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 536819 **E** 7150510 **N (Zone)** 12

DESCRIPTION: 02

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 20 °C **Wind Direction:** SW **Wind Speed (knots):** 10

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-03-27

- tube tilted
- lichen, bugs, and hair in sample

Total Volume of Water After Melting : 1400 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	112.5	155.6	43.1	some organics remain on filter
2	117.1	153.0	35.9	some organics remain on filter
3	118.8	118.9	0.1	
4				
5				
6				
7				
8				
9				
10				
11				
Totals	348.4	427.5	79.1	

Rio Tinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: DUST 8 **DATE (dd-mmm-yyyy):** 19-Jul-2020 **TIME (24:00):** 1020

SAMPLED BY: BP **TYPE OF SAMPLE:** Dust **Other** ______

GPS COORDINATES (UTM): 531401 **E** 7154146 **N (Zone)** 12

DESCRIPTION: Q2

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 19 °C **Wind Direction:** S **Wind Speed (knots):** 6

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-03-27

- visible dust

- bugs in sample

Total Volume of Water After Melting : 1225 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	119.8	122.0	2.2	
2	119.9	133.7	13.8	
3	119.1	141.1	22.3	
4	119.5	165.3	45.8	
5	119.9	125.5	5.6	
6				
7				
8				
9				
10				
11				
Totals	598.2	687.6	89.4	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: DUST 9 **DATE (dd-mmm-yyyy):** 18-JUL-2020 **TIME (24:00):** 1437

SAMPLED BY: 552 BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 541204 **E** 7152154 **N (Zone)** 12

DESCRIPTION: Q2

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 20 °C **Wind Direction:** SW **Wind Speed (knots):** 10

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, ~~Not Visible~~

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-03-27

- bugs + bird poop in sample
- dark brown coloured water (iced tea colour)
- very thick liquid, takes many filters

Total Volume of Water After Melting: 1000 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	118.7	124.2	5.5	
2	118.6	120.4	1.8	
3	118.2	120.2	2.0	
4	120.6	121.8	1.2	
5	119.7	122.6	2.9	
6	119.4	122.2	2.8	
7	120.1	123.4	3.3	
8	119.7	124.4	4.7	
9	113.8	119.8	6.0	
10	114.0	129.4	15.4	
11	120.8	121.4	0.6	
Totals	1303.6	1349.8	46.2	

Rio Tinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 10 DATE (dd-mmm-yyyy): 17-07-2020 TIME (24:00): 0917

SAMPLED BY: RP TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 532908 E 7148924 N (Zone) 12

DESCRIPTION: Q2

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 14 °C Wind Direction: W Wind Speed (knots): 5

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-03-29

Several bugs visible, abundant dust.
Approx. 5mL spilled.

Total Volume of Water After Melting: 1025 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	113.3	137.1	23.8	
2	122.0	241.6	119.6	
3	121.9	149.5	27.6	
4	119.7	320.1	200.4	Some white ash = burnt organics
5	118.9	122.7	3.8	
6				
7				
8				
9				
10				
11				
Totals	595.8	971.0	375.2	

Rio Tinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: DUST11 **DATE (dd-mmm-yyyy):** 19-Jul-2020 **TIME (24:00):** 1048

SAMPLED BY: BP **TYPE OF SAMPLE:** Dust **Other**____

GPS COORDINATES (UTM): 531493 **E** 7150156 **N (Zone)** 12

DESCRIPTION: Q2

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 19 °C **Wind Direction:** S **Wind Speed (knots):** 6

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-03-27

- bugs in sample

Total Volume of Water After Melting : 2300 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	120.2	145.7	25.5	
2	121.0	210.5	89.5	
3	119.2	212.3	93.1	
4	120.0	245.1	125.1	
5	120.0	121.0	1.0	
6				
7				
8				
9				
10				
11				
Totals	600.4	934.6	334.2	

Rio Tinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: DUST 12 **DATE (dd-mmm-yyyy):** 19-Jul-2020 **TIME (24:00):** 1040

SAMPLED BY: BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 529023 **E** 7151191 **N (Zone)** 12

DESCRIPTION: Q2

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 19 °C **Wind Direction:** S **Wind Speed (knots):** 6

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-03-27

- some bugs + visible dust in sample

Total Volume of Water After Melting: 1375 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	115.4	158.3	42.9	filter green
2	114.4	164.0	49.6	filter green
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	229.8	322.3	92.5	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: DUST C1 **DATE (dd-mmm-yyyy):** 18-Jul-2020 **TIME (24:00):** 1516

SAMPLED BY: BP 552 **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 534579 **E** 7144270 **N (Zone)** 12

DESCRIPTION: Q2

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 21 °C **Wind Direction:** SW **Wind Speed (knots):** 11

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-03-27

-tilted post

-visible dust in sample

-bugs + hair in sample

Total Volume of Water After Melting : 1325 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	114.6	176.0	61.4	dust is green
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	114.6	176.0	61.4	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: DUST C2 **DATE (dd-mmm-yyyy):** 14-Jul-2020 **TIME (24:00):** 1030

SAMPLED BY: BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 528714 **E** 7153276 **N (Zone)** 12

DESCRIPTION: Q2

CLIMATE CONDITIONS (if sampling outside)

Air Temp: 14 °C **Wind Direction:** 5 **Wind Speed (knots):** 6

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-03-27

- bugs in sample
- green "dust" in sample

Total Volume of Water After Melting: 1250 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	114.3	148.4	34.1	filter green
2	119.5	119.5	0.0	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	233.8	267.9	34.1	

RioTinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: EBW **DATE (dd-mmm-yyyy):** 20-07-2020 **TIME (24:00):** 0910

SAMPLED BY: BP **TYPE OF SAMPLE:** Dust **Other**____

GPS COORDINATES (UTM): N/A **E** ____ **N (Zone)** ____

DESCRIPTION: Q2

CLIMATE CONDITIONS (if sampling outside) N/A

Air Temp: ____°C **Wind Direction:** ____ **Wind Speed (knots):**____

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 20-07-2020

No visible dust or discoloration

DI Lot # 200420

Total Volume of Water After Melting : 1000 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	120.3	122.3	2.0mg	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals				

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust1 DATE (dd-mmm-yyyy): 2020-10-22 TIME (24:00): 0837

SAMPLED BY: SS2 RP TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 533964 E 7154321 N (Zone) 12W

DESCRIPTION: Q3 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -7 °C Wind Direction: N Wind Speed (knots): 14

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-07-17

Sample mostly clear, some bugs

Total Volume of Water After Melting: 1350 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	118.4	158.9	40.5	
2	120.8	279.4	158.6	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	239.2	438.3	199.1	

RioTinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 2A **DATE (dd-mmm-yyyy):** 2020-10-20 **TIME (24:00):** 1212

SAMPLED BY: BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 535678 **E** 7151339 **N (Zone)** 12W

DESCRIPTION: Q3 dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -13 °C **Wind Direction:** NW **Wind Speed (knots):** 5

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-07-18

Lots of bugs in sample, cloudy.
Some visible dust, white in colour.

Total Volume of Water After Melting: 1225 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	116.7	148.3	31.6	organic material remaining on filter
2	118.2	158.6	40.4	small amount of org. material
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	234.9	306.9	72.0	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust3 **DATE (dd-mmm-yyyy):** 2020-10-22 **TIME (24:00):** 0913

SAMPLED BY: SSZ BP **TYPE OF SAMPLE:** Dust **Other**______

GPS COORDINATES (UTM): 535024 **E** 7151872 **N (Zone)** 12V

DESCRIPTION: Q3 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -7 °C **Wind Direction:** N **Wind Speed (knots):** 14

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-07-17

fair amount of white dust, few bugs.

Total Volume of Water After Melting : 1200 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	127.1	403.5	276.4	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	127.1	403.5	276.4	

RioTinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 4 **DATE (dd-mmm-yyyy):** 2020-10-23 **TIME (24:00):** 1624

SAMPLED BY: S.?? RP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 531397 **E** 7152127 **N (Zone)** 12W

DESCRIPTION: D3 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -7 °C **Wind Direction:** W **Wind Speed (knots):** 16

Precipitation: rain / mist / snow N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-07-17

One bolt missing from plastic shell on station.

Sample mostly clear, a few bugs and visible white dust

Total Volume of Water After Melting : 1500 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	125.5	177.4	51.9	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	125.5	177.4	51.9	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 5 **DATE (dd-mmm-yyyy):** 2020-10-20 **TIME (24:00):** 1137

SAMPLED BY: RP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 535696 **E** 7155138 **N (Zone)** 12W

DESCRIPTION: Q3 dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -13 °C **Wind Direction:** NW **Wind Speed (knots):** 5

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-07-18

Sample clear, few bugs.
Little visible dust.

Total Volume of Water After Melting : 975 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	124.7	165.2	40.5	Some org. material left
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	124.7	165.2	40.5	

RioTinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 6 **DATE (dd-mmm-yyyy):** 2020-10-22 **TIME (24:00):** 0857

SAMPLED BY: SS2 BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 537502 **E** 7152934 **N (Zone)** 12W

DESCRIPTION: Q3 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -7 °C **Wind Direction:** N **Wind Speed (knots):** 14

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-07-28

Sample cloudy, with many bugs.

Total Volume of Water After Melting : 1000 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	125.7	129.9	4.2	
2	112.7	114.8	2.1	
3	118.9	156.6	37.7	
4				
5				
6				
7				
8				
9				
10				
11				
Totals	357.3	401.3	44.0	

Rio Tinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 7 **DATE (dd-mmm-yyyy):** 2020-10-20 **TIME (24:00):** 1202

SAMPLED BY: BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 536819 **E** 7150510 **N (Zone)** 12W

DESCRIPTION: Q3 dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -12 °C **Wind Direction:** NW **Wind Speed (knots):** 5

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-07-18

Station somewhat tilted; dust gauge tilted against side of plastic shield.
Sample slightly cloudy, several large bugs

Total Volume of Water After Melting: 1400 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	118.5	192.9	74.4	small amounts of org. material
2	115.4	150.6	35.2	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	233.9	343.5	109.6	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 8 **DATE (dd-mmm-yyyy):** 2020-10-20 **TIME (24:00):** 1308

SAMPLED BY: BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 531401 **E** 7154146 **N (Zone)** 12W

DESCRIPTION: Q3 dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -12 °C **Wind Direction:** NW **Wind Speed (knots):** 5

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-07-19

Station tilted, appears to have sunk somewhat into marshy ground.

Sample slightly foamy and cloudy with very slight greenish-grey colour, large number of bugs.

Sample extremely difficult to pass through filters despite relatively low quantities of dust.

Total Volume of Water After Melting: 1725 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	119.1	120.1	1.0	
2	116.9	149.7	32.8	
3	117.7	132.8	15.1	
4	125.4	134.6	9.2	
5	125.9	126.0	0.1	
6	120.4	136.9	16.5	
7				
8				
9				
10				
11				
Totals	725.4	800.1	74.7	

Rio Tinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 9 **DATE (dd-mmm-yyyy):** 2020-10-20 **TIME (24:00):** 1149

SAMPLED BY: BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 541204 **E** 7152154 **N (Zone)** 12W

DESCRIPTION: Q3 dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -12 °C **Wind Direction:** NW **Wind Speed (knots):** 5

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-07-18

Gauge frozen firmly into stand, required several firm taps with a rock to remove.

Sample mostly clear, some bugs + white dust

Total Volume of Water After Melting : 925 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	112.8	130.2	17.4	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	112.8	130.2	17.4	

RioTinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 10 **DATE (dd-mmm-yyyy):** 2020-10-22 **TIME (24:00):** 0933

SAMPLED BY: SS2 BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 532908 **E** 7148924 **N (Zone)** 12U

DESCRIPTION: Q3 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -7 °C **Wind Direction:** N **Wind Speed (knots):** 14

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-07-17

Sample mostly clear, many bugs.

Total Volume of Water After Melting: 1475 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	127.3	177.7	50.4	
2	127.2	214.7	87.5	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	254.5	392.4	137.9	

RioTinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 11 **DATE (dd-mmm-yyyy):** 2020-10-20 **TIME (24:00):** 1239

SAMPLED BY: BP **TYPE OF SAMPLE:** Dust **Other** ____

GPS COORDINATES (UTM): 531493 **E** 7150156 **N (Zone)** 12W

DESCRIPTION: Q3 dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -12 °C **Wind Direction:** NW **Wind Speed (knots):** 5

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-07-19

Sample very clear, very few bugs and minimal visible dust.

Total Volume of Water After Melting : 1950 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	123.4	136.1	12.7	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	123.4	136.1	12.7	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 12 **DATE (dd-mmm-yyyy):** 2020-10-20 **TIME (24:00):** 1251

SAMPLED BY: RP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 529323 **E** 7151191 **N (Zone)** 12 W

DESCRIPTION: Q3 dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -12 °C **Wind Direction:** NW **Wind Speed (knots):** 5

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-07-19

Sample mostly clear, some bugs.
Visible dust white

Total Volume of Water After Melting: 1600 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	117.7	157.8	40.1	
2	116.5	137.7	21.2	
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	234.2	295.5	61.3	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust C1 **DATE (dd-mmm-yyyy):** 2020-10-20 **TIME (24:00):** 1222

SAMPLED BY: BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 524979 **E** 7144270 **N (Zone)** 12W

DESCRIPTION: Q3 dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -12 °C **Wind Direction:** NW **Wind Speed (knots):** 5

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-07-18

Sample mostly clear, some bugs + debris.

Total Volume of Water After Melting : 1650 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	125.4	186.5	61.1	small amount of org. material
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	125.4	186.5	61.1	

RioTinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust C2 DATE (dd-mmm-yyyy): 2020-10-20 TIME (24:00): 1258

SAMPLED BY: BP TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 528714 E 7153276 N (Zone) 12W

DESCRIPTION: Q3 dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -12 °C Wind Direction: NW Wind Speed (knots): 5

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-07-19

Sample appeared slightly foamy, many large bugs.
Sample cloudy, small amount of white dust visible.

Total Volume of Water After Melting: 1375 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	118.0	140.9	22.9	
2	118.4	129.2	10.8	small amount of org. material
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	236.4	270.1	33.7	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: EBW **DATE (dd-mmm-yyyy):** 2020-10-21 **TIME (24:00):** 0920

SAMPLED BY: BP **TYPE OF SAMPLE:** Dust **Other**______

GPS COORDINATES (UTM): N/A **E** ______ **N (Zone)** ______

DESCRIPTION: D3

CLIMATE CONDITIONS (if sampling outside) N/A

Air Temp: ______°C **Wind Direction:** ______ **Wind Speed (knots):**______

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed N/A

Small amount of dust visible in sample

DI Lot # 191009C

Total Volume of Water After Melting : 350 **(mL)**

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	116.6	138.6	22.0	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	116.6	138.6	22.0	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 1 DATE (dd-mmm-yyyy): 2021-01-04 TIME (24:00): 1345

SAMPLED BY: BP TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 533964 E 7154321 N (Zone) 12W

DESCRIPTION: Q4 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -24 °C Wind Direction: E Wind Speed (knots): 9

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-10-22

Small amount of white dust visible in sample

Total Volume of Water After Melting: 260 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	123.7	157.1	33.4	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	123.7	157.1	33.4	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 2A **DATE (dd-mmm-yyyy):** 2021-01-08 **TIME (24:00):** 12:50

SAMPLED BY: GC BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 535678 **E** 7151339 **N (Zone)** 12W

DESCRIPTION: Q4 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -23 °C **Wind Direction:** W **Wind Speed (knots):** 7

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-10-20

White dust in sample

Total Volume of Water After Melting: 380 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	120.1	162.4	42.3	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	120.1	162.4	42.3	

RioTinto

Dust Gauge Collection Field Sheet

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Area:	8000	Revision:	R0
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GENERAL

LOCATION NAME: Dust 3 **DATE (dd-mmm-yyyy):** 2021-01-03 **TIME (24:00):** 1510

SAMPLED BY: GCNG **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 535024 **E** 7151872 **N (Zone)** 12W

DESCRIPTION: Q4 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -29 °C **Wind Direction:** E **Wind Speed (knots):** 12

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-10-22

Slightly cloudy, white dust

Total Volume of Water After Melting: 360 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	116.5	223.8	107.3	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	116.5	223.8	107.3	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 4 DATE (dd-mmm-yyyy): 2021-01-03 TIME (24:00): 1355

SAMPLED BY: GC NG TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 531397 E 7152127 N (Zone) 12W

DESCRIPTION: Q4 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -29 °C Wind Direction: E Wind Speed (knots): 12

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-10-23

Slightly cloudy, white dust

Total Volume of Water After Melting: 380 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	127.1	147.5	20.4	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	127.1	147.5	20.4	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust S **DATE (dd-mmm-yyyy):** 2021-01-08 **TIME (24:00):** 1005

SAMPLED BY: GC BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 535696 **E** 7155138 **N (Zone)** 12W

DESCRIPTION: Q4 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -21 °C **Wind Direction:** W **Wind Speed (knots):** 9

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-10-20

Little dust visible

Total Volume of Water After Melting : 340 **(mL)**

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	125.2	142.5	17.3	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	125.2	142.5	17.3	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 6 DATE (dd-mmm-yyyy): 2021-01-03 TIME (24:00): 1525

SAMPLED BY: GC NG TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 537502 E 7152934 N (Zone) 12W

DESCRIPTION: Q4 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -29 °C Wind Direction: E Wind Speed (knots): 12

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-10-22

Slightly cloudy, white dust

Total Volume of Water After Melting : 190 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	126.8	144.5	17.7	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	126.8	144.5	17.7	

Rio Tinto

Dust Gauge Collection Field Sheet			
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Area:	8000	Revision:	R0
Effective Date:	26-Mar-2012	By:	Dianne Dul
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GENERAL

LOCATION NAME: Dust 7 **DATE (dd-mmm-yyyy):** 2021-01-08 **TIME (24:00):** 1304

SAMPLED BY: GC BP **TYPE OF SAMPLE:** Dust **Other**____

GPS COORDINATES (UTM): 536819 **E** 7150516 **N (Zone)** 12W

DESCRIPTION: Q4 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -23 °C **Wind Direction:** W **Wind Speed (knots):** 7

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-10-20

White dust + a few larger particles visible.

Total Volume of Water After Melting: 400 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	126.9	153.4	26.5	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	126.9	153.4	26.5	

RioTinto

Dust Gauge Collection Field Sheet			
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Area:	8000	**Revision:**	R0
Effective Date:	26-Mar-2012	**By:**	Dianne Dul
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GENERAL

LOCATION NAME: Dust 8 **DATE (dd-mmm-yyyy):** 2021-01-08 **TIME (24:00):** 1025

SAMPLED BY: AC BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 531401 **E** 7154146 **N (Zone)** 12W

DESCRIPTION: Q4 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -21 °C **Wind Direction:** W **Wind Speed (knots):** 9

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-10-20

Snow was up to base of gauge holder and filled wind shade.

Very little dust visible in sample

Total Volume of Water After Melting : 460 **(mL)**

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	125.8	145.3	19.5	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	125.8	145.3	19.5	

Rio Tinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust9 **DATE (dd-mmm-yyyy):** 2021-01-08 **TIME (24:00):** 1319

SAMPLED BY: GC BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 541204 **E** 7152154 **N (Zone)** 12W

DESCRIPTION: Q4 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -23 °C **Wind Direction:** W **Wind Speed (knots):** 7

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-10-20

Sample slightly brown, some dust visible.

Total Volume of Water After Melting : 125 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	114.1	124.4	10.3	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	114.1	124.4	10.3	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 10 **DATE (dd-mmm-yyyy):** 2021-01-03 **TIME (24:00):** 1430

SAMPLED BY: GC N/A **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 532908 **E** 7148924 **N (Zone)** 12W

DESCRIPTION: Q4 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -29 **°C** **Wind Direction:** E **Wind Speed (knots):** 12

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-10-22

Slightly cloudy with white dust visible, no large particles or debris.

Total Volume of Water After Melting : 390 **(mL)**

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	116.5	214.2	97.7	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	116.5	214.2	97.7	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust 11 DATE (dd-mmm-yyyy): 2021-01-08 TIME (24:00): 1131

SAMPLED BY: GC BP TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 531493 E 7150156 N (Zone) 12W

DESCRIPTION: ①4 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -23 °C Wind Direction: W Wind Speed (knots): 7

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, ~~25%~~, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-10-20

White dust visible in sample.

Total Volume of Water After Melting: 520 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	120.3	182.6	62.3	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	120.3	182.6	62.3	

RioTinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust 12 DATE (dd-mmm-yyyy): 2021-01-08 TIME (24:00): 1111

SAMPLED BY: GC BP TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): 529323 E 7151191 N (Zone) 12W

DESCRIPTION: QU Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -23 °C Wind Direction: W Wind Speed (knots): 7

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-10-20

Small amount of dust visible in sample.

Total Volume of Water After Melting : 475 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	119.0	158.7	39.7	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	119.0	158.7	39.7	

RioTinto

Dust Gauge Collection Field Sheet

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GENERAL

LOCATION NAME: Dust C1 **DATE (dd-mmm-yyyy):** 2021-01-08 **TIME (24:00):** 1215

SAMPLED BY: GC BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 534979 **E** 7144270 **N (Zone)** 12W

DESCRIPTION: Q4 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -23 °C **Wind Direction:** W **Wind Speed (knots):** 7

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-10-20

Very little dust in sample

Total Volume of Water After Melting: 360 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	117.4	127.3	9.9	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	117.4	127.3	9.9	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: Dust C2 **DATE (dd-mmm-yyyy):** 2021-01-08 **TIME (24:00):** 1100

SAMPLED BY: GC BP **TYPE OF SAMPLE:** Dust **Other**

GPS COORDINATES (UTM): 528714 **E** 7153276 **N (Zone)** 12W

DESCRIPTION: Q4 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: -23°C **Wind Direction:** W **Wind Speed (knots):** 7

Precipitation: rain / mist / snow / N/A **Cloud Cover:** 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% **Dust in area:** Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed 2020-10-20

White dust + some larger particles visible in sample

Total Volume of Water After Melting: 430 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	123.0	149.6	26.6	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	123.0	149.6	26.6	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: EBW DATE (dd-mmm-yyyy): 2020-12-31 TIME (24:00): 1540

SAMPLED BY: BP TYPE OF SAMPLE: Dust Other____

GPS COORDINATES (UTM): ____ E ____ N (Zone) ____

DESCRIPTION: Q4 Dust

CLIMATE CONDITIONS (if sampling outside)

Air Temp: NA °C Wind Direction: ____ Wind Speed (knots): ____

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed NA

Small amount of dust visible in sample and on filter

Total Volume of Water After Melting: 680 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	119.8	123.7	3.9	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	119.8	123.7	3.9	

Rio Tinto

Dust Gauge Collection Field Sheet			
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GENERAL

LOCATION NAME: LBW DATE (dd-mmm-yyyy): 2021-01-04 TIME (24:00): 1621

SAMPLED BY: BP TYPE OF SAMPLE: Dust Other

GPS COORDINATES (UTM): NA E N (Zone)

DESCRIPTION: Q4 Dust

CLIMATE CONDITIONS (if sampling outside) NA

Air Temp: ____ °C Wind Direction: ____ Wind Speed (knots): ____

Precipitation: rain / mist / snow / N/A Cloud Cover: 0%, 10%, 25%, 50%, 75%, 100

Snow Cover: 0%, 10%, 25%, 50%, 75%, 100% Dust in area: Visible, Not Visible

COLLECTION COMMENTS: (i.e. damage to station, bugs - twigs in sample, hole in vestibule, etc.)

Date Sample Collected was Deployed NA

No visible dust in sample

Total Volume of Water After Melting: 300 (mL)

Filter #	Weight of Filter	Filter + Residue	Residue Weight	Comments
1	116.4	115.9	-0.5	very small amount of dust visible on filter
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
Totals	116.4	115.9	-0.5	

RioTinto

Snow Sampling Field Sheet

		No:	ENVI-177-0312
Area:	8000	**Revision:**	R9
Effective Date:	26-Mar-2012	**By:**	D. Dul
Task:	Snow Sampling Field Sheet		

GENERAL

LOCATION NAME: SS1-1 **DATE (yyyy-mmm-dd):** 2020-04-12 **TIME (24:00):** 0912

SAMPLED BY: SS2 MN **TYPE OF SAMPLE:** Dust ☑ Water Quality ☐ **QAQC:** N/A

GPS COORDINATES (UTM): 533915 **E** 7154292 **N (zone)** 12

DESCRIPTION: Distance to Diavik Ø km & Direction ____ On: Land ☑ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: -22 °C **Wind Direction:** NW **Wind Speed:** 07 kts.

Dust in Area: Visible ☐ Not Visible ☑

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A

Snow Condition: Crystallized ☑ Packed ☑ Wet ☐ Dry ☑

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	~~48~~ 62	38	49	39	10	Y N	
	2	60	38	49	39	10	Y N	hard packed w extra hard pack
	3	56	36	48	39	9	Y N	crumbly bottom
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 960 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	115.0	380.0	265.0	Visible dust on filters
2	114.6	326.4	211.8	" "
3	113.9	117.0	3.1	" "
4				
Totals	343.5	823.4	479.9	

Water Quality Bottles

Total Volume of Melted Snow:__________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC**, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube **(x2)**	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube **(x2)**	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

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GENERAL

LOCATION NAME: SSI-2 **DATE (yyyy-mmm-dd):** 2020-04-12 **TIME (24:00):** 0832

SAMPLED BY: SS2 MN **TYPE OF SAMPLE:** Dust ☑ Water Quality ☐ **QAQC:** N/A

GPS COORDINATES (UTM): 533909 **E** 7154382 **N (zone)** 12

DESCRIPTION: Distance to Diavik Ø km & Direction ______ On: Land ☑ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: -22 °C **Wind Direction:** NW **Wind Speed:** 07 kts.

Dust in Area: Visible ☐ Not Visible ☑ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☑ Packed ☑ Wet ☐ Dry ☑

3
46
39
7

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	39	29	48	39	9	Y N	hard pack @ top, crystal bottom
	2	38	30	48	39	9	Y N	"
	3	25	23	46	39	7	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** **Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$** **

RioTinto

	Snow Sampling Field Sheet		
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Dust Sample Filters

Total Volume of Melted Snow: 800 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	115.1	246.0	130.9	Triple bagged, leaked into 2nd bag Visible dust on filter. Veg. removed.
2	114.4	115.5	1.1	" "
3				
4				
Totals	229.5	361.5	132.0	

Water Quality Bottles

Total Volume of Melted Snow: ______ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC**, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube **(x2)**	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube **(x2)**	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS1-3 **DATE (yyyy-mmm-dd):** 2020-04-12 **TIME (24:00):** 0943

SAMPLED BY: SS2 MN **TYPE OF SAMPLE:** Dust ☑ Water Quality ☐ **QAQC:** N/A

GPS COORDINATES (UTM): 533967 **E** 7154517 **N (zone)** 12

DESCRIPTION: Distance to Diavik Ø km & Direction ______ On: Land ☑ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: -22 °C **Wind Direction:** NW **Wind Speed:** 07 kts.

Dust in Area: Visible ☐ Not Visible ☑ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☑ Packed ☑ Wet ☐ Dry ☑

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	28	20	45	39	6	Y N	hard top layer
	2	27	20	45	39	6	Y N	"
	3	31	22	45	39	6	Y N	"
	4	40	22	46	39	7	Y N	"
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

Snow Sampling Field Sheet			
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Dust Sample Filters

Total Volume of Melted Snow: 830 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	115.9	157.6	41.7	Triple bagged. Leaked into 2nd bag Visible dust, 1 piece grass on filter
2				
3				
4				
Totals	115.9	157.6	41.7	

Water Quality Bottles

Total Volume of Melted Snow:________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC,** Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (**x2**)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (**x2**)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS1-4-4 **DATE (yyyy-mmm-dd):** 2020-04-12 **TIME (24:00):** 1603

SAMPLED BY: SS2 MU **TYPE OF SAMPLE: Dust** ☑ **Water Quality** ☑ **QAQC:** DUP

GPS COORDINATES (UTM): 534483 **E** 7155096 **N (zone)** 12

DESCRIPTION: Distance to Diavik 0.77 km & Direction N On: Land ☐ &/or Lake ☑

CLIMATE CONDITIONS

Air Temp: -21 °C **Wind Direction:** NW **Wind Speed:** 10 kts.

Dust in Area: Visible ☐ Not Visible ☑ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☐ Packed ☑ Wet ☐ Dry ☑

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	35	35	50	39	11	Y N	Layers of hard packed pucks
	2	35	35	51	39	12	Y N	" "
	3	36	36	52	39	13	Y N	"
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	36	36	50	39	11	Y N	Weighed hard puck
	2	36	36	51	39	12	Y N	
	3	37	37	52	39	13	Y N	
	4	37	37	52	39	13	Y N	
	5	38	38	52	39	13	Y N	
	6	38	38	51	39	12	Y N	
	7	37	37	51	39	12	Y N	
	8	37	37	51	39	12	Y N	Reweigh
	9	36	36	50	39	11	Y N	
	10					11	Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** **Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$** **

RioTinto

Snow Sampling Field Sheet			
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Dust Sample Filters

Total Volume of Melted Snow: 1130 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	115.4	140.0	24.6	
2				
3				
4				
Totals	115.4	140.0	24.6	

Water Quality Bottles

Total Volume of Melted Snow: 3505 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * DVP1	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC**, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	~~1000~~ 500 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

Bagged 4x, leaked through 3rd (WQ)

RioTinto

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GENERAL

LOCATION NAME: SSI-4-5 **DATE (yyyy-mmm-dd):** 2020-04-12 **TIME (24:00):** 1027

SAMPLED BY: SS2 MN **TYPE OF SAMPLE:** Dust ☐ Water Quality ☑ **QAQC:** DUP

GPS COORDINATES (UTM): 534486 **E** 7155094 **N (zone)** 12

DESCRIPTION: Distance to Diavik 0.77 km & Direction N On: Land ☐ &/or Lake ☑

CLIMATE CONDITIONS

Air Temp: ~~-17~~ -21 °C **Wind Direction:** NW **Wind Speed:** 10 ~~8~~ kts.

Dust in Area: Visible ☐ Not Visible ☑

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A

Snow Condition: Crystallized ☐ Packed ☑ Wet ☐ Dry ☑

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	39	39	52	39	13	Y N	Weighed, hard packed with hard pucks
	2	40	40	54	39	15	Y N	
	3	39	39	53	39	14	Y N	
	4	39	36	52	39	13	Y N	
	5	40	40	52	39	13	Y N	Weighed
	6	40	40	53	39	14	Y N	
	7	40	36	51	39	12	Y N	
	8	40	40	53	39	14	Y N	
	9					108	Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

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Dust Sample Filters

Total Volume of Melted Snow:______________ (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1				
2				
3				
4				
Totals				

Water Quality Bottles

Total Volume of Melted Snow: 3340 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * DUP2	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC**, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

WQ triple bagged leaked out of 2nd bag

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS1-5 **DATE (yyyy-mmm-dd):** 2020-04-12 **TIME (24:00):** 1058

SAMPLED BY: SS2 MM **TYPE OF SAMPLE:** Dust ☑ Water Quality ☑ **QAQC:** N/A

GPS COORDINATES (UTM): 535098 **E** 7156275 **N (zone)** 12

DESCRIPTION: Distance to Diavik 2.21 km & Direction N On: Land ☐ &/or Lake ☑

CLIMATE CONDITIONS

Air Temp: ~~-14~~ -20 °C **Wind Direction:** NW **Wind Speed:** ~~6~~ 4 kts.

Dust in Area: Visible ☐ Not Visible ☑

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A

Snow Condition: Crystallized ☑ Packed ☑ Wet ☐ Dry ☑

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	47	47	52	39	13	Y N	Weighed, easy to break up snowcores
	2	46	45	52	39	13	Y N	
	3	47	45	53	39	14	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	45	45	53	39	14	Y N	
	2	45	45	53	39	14	Y N	
	3	45	45	52	39	13	Y N	
	4	45	43	52	39	13	Y N	
	5	45	42	52	39	13	Y N	Weighed
	6	47	45	53	39	14	Y N	
	7	46	45	52	39	13	Y N	
	8	45	44	52	39	13	Y N	
	9					107	Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

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Dust Sample Filters

Total Volume of Melted Snow: 1320 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	~~114.9~~ 116.2	119.4	3.2	Some water leaked out when bags were double bagged. Visible dust on filter
2				
3				
4				
Totals	116.2	119.4	3.2	

Water Quality Bottles

Total Volume of Melted Snow: ~~3480~~ 3450 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	~~1000~~ 500 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

Quadruple bagged leaked into 3rd (WQ)

RioTinto

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GENERAL

LOCATION NAME: SS2-1 **DATE (yyyy-mmm-dd):** 2020-01-12 **TIME (24:00):** 1330

SAMPLED BY: SS2 MN **TYPE OF SAMPLE:** Dust ☑ Water Quality ☑ **QAQC:** N/A

GPS COORDINATES (UTM): 537553 **E** 7153474 **N (zone)** 12

DESCRIPTION: Distance to Diavik 0.15 km & Direction NE On: Land ☐ &/or Lake ☑

CLIMATE CONDITIONS

Air Temp: -19 °C **Wind Direction:** W **Wind Speed:** 5 **kts.**

Dust in Area: Visible ☐ Not Visible ☑ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☑ Packed ☐ Wet ☐ Dry ☑

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	30	27	45	39.0	6	Y N	Weighed
	2	30	28	46	39.0	7	Y N	
	3	30	29	46	39.0	7	Y N	
	4	29	29	45	39.0	6	Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	29	28	45	39.0	6	Y N	
	2	29	29	45	39.0	6	Y N	
	3	29	29	45	39.0	6	Y N	
	4	29	28	45	39.0	6	Y N	Weighed
	5	27	27	45	39.0	6	Y N	
	6	27	27	45	39.0	6	Y N	
	7	28	27	45	39.0	6	Y N	
	8	29	29	46	39.0	7	Y N	
	9	28	28	45	39.0	6	Y N	
	10	28	27	45	39.0	6	Y N	
	11	29	29	45	39.0	6	Y N	
	12	30	29	45	39.0	6	Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

12
14
26

13
16
78
7
85

30	29	45	39.0	6	N	
29	28	45	39.0	6	N	
29	28	45	39.0	6	N	Weighed
28	27	45	39.0	6	N	
29	29	45	39.0	6	N	

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

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Dust Sample Filters

Total Volume of Melted Snow: 890 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	114.9	137.7	22.8	1st bag leaked into 2nd bag Visible dust on filter
2	113.2	114.1	0.9	
3				
4				
Totals	228.1	251.8	23.7	

Water Quality Bottles

Total Volume of Melted Snow: 3435 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	500 ~~1000~~ mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

WQ< quadruple bagged, leaked out of 3rd bag

RioTinto

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GENERAL

LOCATION NAME: SS2-2 **DATE (yyyy-mmm-dd):** 2020-04-12 **TIME (24:00):** 1300

SAMPLED BY: SS2 MN **TYPE OF SAMPLE: Dust** ☑ **Water Quality** ☑ **QAQC:** N/A

GPS COORDINATES (UTM): 537760 **E** 7153435 **N (zone)** 12

DESCRIPTION: Distance to Diavik 0.13 km & Direction ~~NE~~ NE On: Land ☐ &/or Lake ☑

CLIMATE CONDITIONS

Air Temp: -19 °C **Wind Direction:** W **Wind Speed:** 5 **kts.**

Dust in Area: Visible ☐ Not Visible ☑ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☑ Packed ☐ Wet ☐ Dry ☑

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	31	31	47	39	8	Y N	Weighed, moved due to proxi to ice road
	2	31	31	47	39	8	Y N	
	3	34	34	48	39	9	Y N	
	4	34	33	48	39	9	Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	34	33	47	39	8	Y N	
	2	34	34	47	39	8	Y N	16
	3	34	34	47	39	8	Y N	
	4	33	33	47	39	8	Y N	16
	5	31	31	46	39	7	Y N	
	6	33	32	47	39	8	Y N	
	7	31	31	47	39	8	Y N	Weighed
	8	32	30	46	39	7	Y N	62
	9	31	31	46	39	7	Y N	
	10	31	31	47	39	8	Y N	
	11	30	30	46	39	7	Y N	
	12	25	25	45	39	6	Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								
		25 27	25 27	45 47	39 39	6 8	N	

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

48 14 62   69 8 77 7 84   34

RioTinto

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Dust Sample Filters

Total Volume of Melted Snow: 1120 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	114.3	128.3	14.0	Visible dust on filter
2				
3				
4				
Totals	114.3	128.3	14.0	

Water Quality Bottles

Total Volume of Melted Snow: 3425 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC,** Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube **(x2)**	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube **(x2)**	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	500 ~~1000~~ mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

Triple bagged, leaked into 3rd bag (WQ)

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS2-3-4 **DATE (yyyy-mmm-dd):** 2020-04-12 **TIME (24:00):** 1152

SAMPLED BY: SS2 MN **TYPE OF SAMPLE:** Dust ☑ Water Quality ☑ **QAQC:** DUP1

GPS COORDINATES (UTM): 538485 **E** 7153933 **N (zone)** 12

DESCRIPTION: Distance to Diavik 1.20 km & Direction NE On: Land ☐ &/or Lake ☑

CLIMATE CONDITIONS

Air Temp: -19 °C **Wind Direction:** W **Wind Speed:** 5 **kts.**

Dust in Area: Visible ☐ Not Visible ☑ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☐ Packed ☑ Wet ☐ Dry ☑

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	34	31	48	39	9	Y N	Weighed
	2	34	31	48	39	9	Y N	
	3	34	31	48	39	9	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	36	35	49	39	10	Y N	
	2	36	35	49	39	10	Y N	
	3	35	31	48	39	9	Y N	
	4	34	34	48	39	9	Y N	
	5	34	32	47	39	8	Y N	
	6	36	36	50	39	11	Y N	Weighed
	7	37	37	52	39	13	Y N	
	8	37	37	52	39	13	Y N	
	9	37	37	51	39	12	Y N	
	10	39	37	52	39	13	Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 905 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	113.5	121.7	8.2	Visible dust on filter
2	~~116.3~~	~~116.3~~		
3				
4				
Totals	113.5	121.7	8.2	

Water Quality Bottles

Total Volume of Melted Snow: ~~3740~~ 3610 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * DUP1	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC**, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	~~1000~~ 500 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

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GENERAL

LOCATION NAME: SS2-3-5 DATE (yyyy-mmm-dd): 2020-04-12 TIME (24:00): 1222

SAMPLED BY: SS2 MN TYPE OF SAMPLE: Dust ☑ Water Quality ☑ QAQC: DUP2

GPS COORDINATES (UTM): 538485 E 7153930 N (zone) 12

DESCRIPTION: Distance to Diavik 1.20 km & Direction NE On: Land ☐ &/or Lake ☑

CLIMATE CONDITIONS

Air Temp: -19 °C Wind Direction: W Wind Speed: 5 kts.

Dust in Area: Visible ☐ Not Visible ☑

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A

Snow Condition: Crystallized ☐ Packed ☑ Wet ☐ Dry ☑

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	39	39	53	39	14	Y N	Weighed
	2	40	40	51	39	12	Y N	
	3	40	40	51	39	12	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	35	35	48	39	9	Y N	
	2	39	38	48	39	9	Y N	
	3	40	40	50	39	11	Y N	
	4	40	40	50	39	11	Y N	
	5	42	41	51	39	12	Y N	
	6	43	43	52	39	13	Y N	Weighed
	7	44	44	53	39	14	Y N	
	8	43	40	51	39	12	Y N	
	9	45	44	52	39	13	Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1240 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	115.0	121.1	6.1	Triple bagged, Visible dust on filter
2				
3				
4				
Totals	115.0	121.1	6.1	

Water Quality Bottles

Total Volume of Melted Snow: 3460 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * DUP2	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC**, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (**x2**)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (**x2**)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	500 ~~1000~~ mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

Triple bagged, leaked into 3rd bag (WQ)

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS2-4 **DATE (yyyy-mmm-dd):** 2020-04-11 **TIME (24:00):** 1006

SAMPLED BY: AH GC SS2 **TYPE OF SAMPLE:** Dust ☑ Water Quality ☑ **QAQC:** N/A

GPS COORDINATES (UTM): 539142 E 7154686 N (zone) 12

DESCRIPTION: Distance to Diavik ~~4~~ 220 km & Direction NE On: Land ☐ &/or Lake ☑

CLIMATE CONDITIONS

Air Temp: ~~-19~~ -21 °C **Wind Direction:** NW **Wind Speed:** 10 kts.

Dust in Area: Visible ☐ Not Visible ☑ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☐ Packed ☑ Wet ☐ Dry ☑

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	42	31	49	40	9	Y N	weighed - 40 hardpack snow
	2	42	32	51	40	11	Y N	
	3	41	29	50	40	10	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	41	40	52	40	12	Y N	Reweigh - no change
	2	42	30	50	40	10	Y N	
	3	40	31	51	40	11	Y N	
	4	41	33	51	40	11	Y N	
	5	41	31	51	40	11	Y N	Reweigh - still 40
	6	41	30	50	40	10	Y N	
	7	40	38	51	40	11	Y N	
	8	40	38	51	40	11	Y N	
	9	40	38	52	40	12	Y N	Reweigh - same weight
	10	39	38	52	40	12	Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

reweigh

76
39
12
99

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

Dust Sample Filters

Total Volume of Melted Snow: 990 (mL)

Bag + zip: 070

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	113.4	115.3	1.9	little visable dust
2				
3				
4				
Totals	113.4	115.3	1.9	

Water Quality Bottles

Total Volume of Melted Snow: 2770 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC**, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube **(x2)**	Y	☒	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube **(x2)**	Y	☒	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☒	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☒	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☒	☐	☐	
6	Routine	1000 mL plastic	Y	☒	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☒	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

Bags leaked into the second bags (Both AQ and Dust)

Bag 1 - 1.450 Kg
Bag 2 - 1.320 Kg

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS3-4 **DATE (yyyy-mmm-dd):** 2020-04-~~12~~ 13 **TIME (24:00):** 1015

SAMPLED BY: KG SS2 **TYPE OF SAMPLE:** Dust ☒ Water Quality ☒ **QAQC:** N/A

GPS COORDINATES (UTM): 536593 **E** 7150996 **N (zone)** 12

DESCRIPTION: Distance to Diavik 0.57 km & Direction SE On: Land ☐ &/or Lake ☑

CLIMATE CONDITIONS

Air Temp: -17 °C **Wind Direction:** W **Wind Speed:** 3 kts.

Dust in Area: Visible ☒ Not Visible ☐ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☐ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	45	36	50	38	12	Y N	
	2	45	40	50	38	12	Y N	
	3	45	36	50	38	12	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	47	40	52	38	14	Y N	
	2	47	32	50	38	12	Y N	
	3	47	31	50	38	12	Y N	
	4	47	43	52	38	16	Y N	
	5	48	45	55	38	17	Y N	54 snow sticking to side
	6	47	46	56	38	18	Y N	
	7	47	45	54	38	16	Y N	
	8	48	46	55	38	17	Y N	
	9					106	Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** **Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$** **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: ~~1165~~ 1170 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	113.9	157.9	44.0	Triple bagged no leaks. Visible dust on filter
2	~~113.0~~			
3				
4				
Totals	113.9	157.9	44.0	

Water Quality Bottles

Total Volume of Melted Snow: 3410 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	~~1000~~ 500 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

WQ - Triple bagged, leaked into 2nd

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS3-5 **DATE (yyyy-mmm-dd):** 2020-04-~~12~~ 13 **TIME (24:00):** 1200

SAMPLED BY: KG SS2 **TYPE OF SAMPLE:** Dust ☒ Water Quality ☒ **QAQC:** N/A

GPS COORDINATES (UTM): 537693 **E** 7150790 **N (zone)** 12

DESCRIPTION: Distance to Diavik 1.60 km & Direction SE On: Land ☐ &/or Lake ☑

CLIMATE CONDITIONS

Air Temp: -13 °C **Wind Direction:** W **Wind Speed:** 5 kts.

Dust in Area: Visible ☐ Not Visible ☒ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☒ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	28	~~3~~ 22	45	39	6	Y N	Site is ~100 m from ice road
	2	28	25	46	39	7	Y N	19
	3	28	26	46	39	6	Y N	26
	4	28	25	46	39	6	Y N	
	Dust (Min. of 3 cores – Total Water Content SWE =/> 25)							
Water Quality Cores	1	28	21	46	39	~~6~~ 7	Y N	24
	2	28	26	46	39	~~6~~ 7	Y N	14
	3	28	21	46	39	~~6~~ 7	Y N	18
	4	29	21	46	39	~~6~~ 7	Y N	
	5	29	27	47	39	~~7~~ 8	Y N	
	6	29	27	47	39	~~7~~ 8	Y N	38
	7	29	26	46	39	~~6~~ 7	Y N	44
	8	29	~~22~~ 23	46	39	7	Y N	28
	9	29	22	46	39	7	Y N	16
	10	28	22	46	39	7	Y N	44
	11	~~28~~ 30	24	46	39	7	Y N	35
	12	~~28~~ 30	23	47	39	8	Y N	79
	Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)							18 87
		30	29	47	39	8	N	95
		29	27	47	39	8		103

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 895 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	116.0	130.7	14.7	Visible dust on filter, Double bagged, leaked through 1st bag
2				
3				
4				
Totals	116.0	130.7	14.7	

Water Quality Bottles

Total Volume of Melted Snow: 3210 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC**, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	500 ~~1000~~ mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

WQ - Triple bagged, leaked into 2nd

RioTinto

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GENERAL

LOCATION NAME: ~~SS3-6~~ SS3-6-4 **DATE (yyyy-mmm-dd):** 2020-04-~~20~~ 13 **TIME (24:00):** 0918

SAMPLED BY: KG SS2 **TYPE OF SAMPLE: Dust** ☒ **Water Quality** ☒ **QAQC:** DUP1

GPS COORDINATES (UTM): ~~0536~~ 0536302 **E** 7151563 **N (zone)** 12

DESCRIPTION: Distance to Diavik 0 km & Direction NA On: Land ☐ &/or Lake ☑

CLIMATE CONDITIONS

Air Temp: -18 °C **Wind Direction:** W **Wind Speed:** 6 kts.

Dust in Area: Visible ☒ Not Visible ☒

Precipitation: Rain / Mist / Snow / N/A

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Snow Condition: Crystallized ☐ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	~~33~~	~~30~~	~~48~~	~~39.0~~		~~Y N~~	lost - bag broke
	2	33	23	45	39.0	6cm	Y N	
	3	34	23	45	39.0	6cm	Y N	
	4	34	~~34~~ 33	48	39.0	9cm	Y N	
		34	31	48	39.0	9cm		
	Dust (Min. of 3 cores – Total Water Content SWE =/> 25)							
Water Quality Cores	1	34	32	48	38	10cm	Y N	
	2	34	33	49	38	11cm	Y N	
	3	34	32	48	38	10cm	Y N	
	4	34	32	48	38	10cm	Y N	
	5	34	32	47	38	9cm	Y N	
	6	34	31	47	38	9cm	Y N	Reweighed
	7	34	31	48	38	10	Y N	
	8	33	32	48	38	10	Y N	
	9	33	32	47	38	9	Y N	
	10	34	33	47	38	9	Y N	
	11	35	34	49	38	11	Y N	
	12						Y N	
	Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)							

24
9
33
61
94
11
105

** **Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$** **

RioTinto

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Dust Sample Filters

Total Volume of Melted Snow: 950 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	115.1	178.5	63.4	
2	114.0	115.8	1.8	
3				
4				
Totals	229.1	194.3	65.2	

Water Quality Bottles

Total Volume of Melted Snow: 3030 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * DUP1	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC,** Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube **(x2)**	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube **(x2)**	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	~~1000~~ 500 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

WQ - Quadruple bagged, leaked into 2nd

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: ~~SS3-6~~ SS3-6-5 DATE (yyyy-mmm-dd): April ~~2~~ 3 2020 TIME (24:00): 0944

SAMPLED BY: KG SS2 TYPE OF SAMPLE: Dust ☒ Water Quality ☒ QAQC: DUP WQ

GPS COORDINATES (UTM): 0536302 E 7151563 N (zone) 12

DESCRIPTION: Distance to Diavik 0 km & Direction N/A On: Land ☐ &/or Lake ☑

CLIMATE CONDITIONS

Air Temp: -17 °C Wind Direction: W Wind Speed: 3 kts.

Dust in Area: Visible ☒ Not Visible ☐

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A

Snow Condition: Crystallized ☐ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1				4		Y N	
	2						Y N	
	3						Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	34	33	48	38	10	Y N	general comment
	2	34	33	50	38	12	Y N	hard packed top
	3	34	35	48	38	10	Y N	layer + crystalized
	4	35	33	49	38	11	Y N	bottom layer in cores
	5	35	34	48	38	10	Y N	
	6	35	31	48	38	10	Y N	63
	7	35	34	48	38	10	Y N	73
	8	35	31	48	38	10	Y N	83
	9	35	33	48	38	10	Y N	13
	10	34	33	~~50~~ 50	~~3~~ 38	12	Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow:__________ (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1				
2				
3				
4				
Totals				

Water Quality Bottles

Total Volume of Melted Snow: 2850 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☑	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☑	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

3x bagged, leaked into 3rd bag (WQ)

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS3-7 **DATE (yyyy-mmm-dd):** 2020-04-~~12~~ 13 **TIME (24:00):** 1044

SAMPLED BY: KG SS2 **TYPE OF SAMPLE:** Dust ☒ Water Quality ☒ **QAQC:** N/A

GPS COORDINATES (UTM): 536346 **E** 7151364 **N (zone)** 12W

DESCRIPTION: Distance to Diavik 0.19 km & Direction SE On: Land ☐ &/or Lake ☑

CLIMATE CONDITIONS

Air Temp: -14 °C **Wind Direction:** W **Wind Speed:** 4 kts.

Dust in Area: Visible ☒ Not Visible ☐ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☒ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	44	41	50	38	12	Y N	
	2	44	42	51	38	13	Y N	
	3	44	42	54	38	16	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	43	42	54	39	15	Y N	
	2	43	41	51	39	12	Y N	27
	3	44	42	52	39	13	Y N	40
	4	44	42	52	39	13	Y N	53
	5	44	42	54	39	15	Y N	68
	6	44	42	52	39	13	Y N	81
	7	44	42	52	39	13	Y N	94
	8	44	43	52	39	13	Y N	13
	9						Y N	107
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

1
68
13
81
13
94

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1230 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	114.3	211.6	97.3	Visible dust on filter. Triple bagged, leaked into 2nd bag
2	116.0	122.3	6.3	
3				
4				
Totals	230.3	333.9	103.6	

Water Quality Bottles

Total Volume of Melted Snow: 3345 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	~~1000~~ 500 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

WQ - Triple bagged, leaked into 3rd

RioTinto

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GENERAL

LOCATION NAME: SS3-8 **DATE (yyyy-mmm-dd):** 2020-04-~~12~~ 13 **TIME (24:00):** 1121

SAMPLED BY: KG SS2 **TYPE OF SAMPLE:** Dust ☒ Water Quality ☒ **QAQC:** N/A

GPS COORDINATES (UTM): 536625 **E** 7150873 **N (zone)** 12W

DESCRIPTION: Distance to Diavik 0.85 km & Direction SE On: Land ☐ &/or Lake ☑

CLIMATE CONDITIONS

Air Temp: -14 °C **Wind Direction:** W **Wind Speed:** 4 **kts.**

Dust in Area: Visible ☒ Not Visible ☐ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☒ Packed ☒ Wet ☐ Dry ☐

(top) hard packed + crystal layer (bottom)

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	34	32	50	39	11	Y N	
	2	33	32	48	39	9	Y N	
	3	33	31	48	39	9	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	~~34~~ 33	32	48	39	~~11~~ 9	Y N	
	2	~~33~~ 34	~~32~~ 33	50	39	11	Y N	
	3	35	33	50	39	11	Y N	32
	4	32	30	50	39	11	Y N	43
	5	32	~~30~~ 29	48	39	9	Y N	52
	6	34	30	47	39	8	Y N	60
	7	~~34~~ 30	30	48	39	9	Y N	69
	8	35	30	46	39	7	Y N	76
	9	37	33	50	39	11	Y N	87
	10	32	32	48	39	9	Y N	96
	11	37	35	47	39	8	Y N	104
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

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Dust Sample Filters

Total Volume of Melted Snow: 870 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	114.9	169.7	54.8	Visible dust on filter. Triple bagged Leaked into 2nd bag
2	115.9	116.9	1.0	
3				
4				
Totals	~~114.9~~ 230.8	~~169.7~~ 286.6	55.8	

Water Quality Bottles

Total Volume of Melted Snow: 3295 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC,** Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (**x2**)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (**x2**)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	~~1000~~ 500 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

WQ - Triple bagged, leaked into 2nd
- visible dust in melted snow

RioTinto

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GENERAL

LOCATION NAME: SS4-1 **DATE (yyyy-mmm-dd):** 2020-04-14 **TIME (24:00):** 1346

SAMPLED BY: KB MN **TYPE OF SAMPLE:** Dust ☒ Water Quality ☐ **QAQC:** N/A

GPS COORDINATES (UTM): 0531485 **E** 7152217 **N (zone)** 12

DESCRIPTION: Distance to Diavik 0 km & Direction W On: Land ☒ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: -14 °C **Wind Direction:** N **Wind Speed:** 0 kts.

Dust in Area: Visible ☐ Not Visible ☒

Precipitation: Rain / Mist / Snow / N/A

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Snow Condition: Crystallized ☐ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	44	25	47	39	12	Y N	
	2	43	27	47	39	12	Y N	
	3	39	26	47	39	12	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** **Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$** **

Rio Tinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 775 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	119.2	175.8	56.6	Triple bagged, didn't leak, Dust on filter (visible)
2				
3				
4				
Totals	119.2	175.8	56.6	

Water Quality Bottles

Total Volume of Melted Snow: ______ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

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GENERAL

LOCATION NAME: SS84-2 **DATE (yyyy-mmm-dd):** 2020-04-14 **TIME (24:00):** 1330

SAMPLED BY: KG MN **TYPE OF SAMPLE:** Dust ☒ Water Quality ☐ **QAQC:** N/A

GPS COORDINATES (UTM): 531353 **E** 7152263 **N (zone)** 12W

DESCRIPTION: Distance to Diavik Ø km & Direction NA On: Land ☒ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: -12 °C **Wind Direction:** N ~~⊗~~ **Wind Speed:** 0 kts.

Dust in Area: Visible ☐ Not Visible ☒ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☒ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	64	59	58	39	19	Y N	
	2	62	58	58	39	19	Y N	
	3	61	58	58	39	19	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1780 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	118.2	190.2	72.0	3x bagged, leaked into 2nd bag Small Veg made it
2	118.5	123.0	4.5	onto filter, Significant dirt on first filter
3				
4				
Totals	236.7	313.2	76.5	

Water Quality Bottles

Total Volume of Melted Snow:____________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC,** Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube **(x2)**	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube **(x2)**	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

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GENERAL

LOCATION NAME: SS4-3 DATE (yyyy-mmm-dd): 2020-04-14 TIME (24:00): 1300

SAMPLED BY: KG MN TYPE OF SAMPLE: Dust ☒ Water Quality ☐ QAQC: NA

GPS COORDINATES (UTM): 531328 E 7152476 N (zone) 12W

DESCRIPTION: Distance to Diavik Ø km & Direction NA On: Land ☒ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: -12 °C Wind Direction: N Wind Speed: 0 kts.

Dust in Area: Visible ☐ Not Visible ☒ Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A Snow Condition: Crystallized ☐ Packed ☒ very Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	85	74	67	39	27	Y N	
	2	83	73	67	39	27	Y N	
	3	86	~~8~~78	68	39	28	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 2580 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	119.2	209.1	89.9	Triple bagged, leaked into 3rd bag
2	118.1	120.6	2.5	
3	117.5	153.1	35.6	
4				
Totals	~~237.3~~	~~329.7~~	128.0	

Water Quality Bottles

Total Volume of Melted Snow: ______ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

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GENERAL

LOCATION NAME: SS4-4 **DATE (yyyy-mmm-dd):** 2020-04-14 **TIME (24:00):** 1225

SAMPLED BY: MN KG **TYPE OF SAMPLE:** Dust ☒ Water Quality ☒ **QAQC:** N

GPS COORDINATES (UTM): 531140 **E** 7153172 **N (zone)** 12

DESCRIPTION: Distance to Diavik 1.05 km & Direction W On: Land ☐ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: -15 °C **Wind Direction:** N **Wind Speed:** 0 kts.

Dust in Area: Visible ☐ Not Visible ☒ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☐ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	66	61	58	39	19	Y N	Weighed
	2	66	64	58	39	19	Y N	
	3	66	64	59	39	20	Y N	
	4	Ø					Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	68	65	59	39	20	Y N	Reweighed
	2	70	68	58	39	19	Y N	39 39
	3	68	62	58	39	19	Y N	48 ~~47~~ 19 58
	4	68	63	59	39	20	Y N	78
	5	67	61	58	39	19	Y N	19
	6	68	65	59	39	20	Y N	97
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1865 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	118.3	177.8	59.5	Triple bagged, leaked into 2nd Visible dust
2				
3				
4				
Totals	118.3	177.8	59.5	

Water Quality Bottles

Total Volume of Melted Snow: 3650 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☑	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☑	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

Quadruple bagged, leaked into 4th (WQ)

RioTinto

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GENERAL

LOCATION NAME: SS4-5 **DATE (yyyy-mmm-dd):** 2020-04-14 **TIME (24:00):** 1145

SAMPLED BY: MN KS **TYPE OF SAMPLE:** Dust [X] Water Quality [X] **QAQC:** DUPl Dust

GPS COORDINATES (UTM): 531410 **E** 7154120 **N (zone)** 12

DESCRIPTION: Distance to Diavik 1.46 km & Direction NW On: Land [ ] &/or Lake [X]

CLIMATE CONDITIONS

Air Temp: -15 °C **Wind Direction:** N **Wind Speed:** 0 kts.

Dust in Area: Visible [ ] Not Visible [X] **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized [ ] Packed [X] Wet [ ] Dry [ ]

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	38	36	50	39	11	Y N	
	2	38	37	50	39	11	Y N	
	3	38	37	50	39	11	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	40	40	52	39	13	Y N	Re weighed
	2	40	39	51	39	12	Y N	
	3	39	38	51	39	12	Y N	37
	4	38	37	50	39	11	Y N	48
	5	40	40	51	39	12	Y N	12 60
	6	40	39	51	39	12	Y N	72
	7	39	39	51	39	12	Y N	84
	8	39	38	51	39	12	Y N	96 12
	9	40	39	51	39	12	Y N	108
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** $\text{Water Content}_{SWE} = \text{Wt. of Tube \& Core}_{SWE} - \text{Wt. of Empty Tube}_{SWE}$ **

RioTinto

Snow Sampling Field Sheet			
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Dust Sample Filters

Total Volume of Melted Snow: 1135 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	119.1	140.9	21.8	Triple bagged, leaked into 2nd bag
2				
3				
4				
Totals	119.1	140.9	21.8	

Water Quality Bottles

Total Volume of Melted Snow: 3290 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	500 ~~1000~~ mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

WQ - triple bagged, leaked into 2nd

RioTinto

Snow Sampling Field Sheet

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Area:	8000	**Revision:**	R9
Effective Date:	26-Mar-2012	**By:**	D. Dul
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GENERAL

LOCATION NAME: SS4-5-5 **DATE (yyyy-mmm-dd):** 2020-04-14 **TIME (24:00):** 12:00

SAMPLED BY: KG MN **TYPE OF SAMPLE:** Dust ☒ Water Quality ☐ **QAQC:** DUP2-Dust

GPS COORDINATES (UTM): 531410 **E** 7154120 **N (zone)**

DESCRIPTION: Distance to Diavik 1.46 km & Direction NW On: Land ☐ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: -15 °C **Wind Direction:** N **Wind Speed:** 6 **kts.**

Dust in Area: Visible ☐ Not Visible ☒ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☐ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	38	38	51	39	12	Y N	Re-weighed
	2	38	38	51	39	12	Y N	
	3	38	38	51	39	12	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** **Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$** **

RioTinto

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Dust Sample Filters

Total Volume of Melted Snow: 1020 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	119.1	142.8	23.7	
2				
3				
4				
Totals	119.1	142.8	23.7	

Water Quality Bottles

Total Volume of Melted Snow:______________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

Dust - Double bag, leaked into 2nd

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS5-1 **DATE (yyyy-mmm-dd):** 2020-04-~~12~~ 13 **TIME (24:00):** 1700

SAMPLED BY: RG SS2 **TYPE OF SAMPLE:** Dust ☒ Water Quality ☐ **QAQC:** N/A

GPS COORDINATES (UTM): 533150 **E** 7148927 **N (zone)** 12W

DESCRIPTION: Distance to Diavik Ø km & Direction N/A On: Land ☒ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: -10 °C **Wind Direction:** W **Wind Speed:** 3 **kts.**

Dust in Area: Visible ☒ Not Visible ☐ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☒ Packed ☐ Wet ☒ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	30	~~28~~ 24	46	39	7	Y	
	2	~~33~~ 35	~~30~~ 27	47	39	8	Y	
	3	38	25	45	39	6	Y	21
	4	37	30	45	39	6	Y	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

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Dust Sample Filters

Total Volume of Melted Snow: 800 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	117.6	338.5	221.5	Double bagged didn't leak Visible dust on filter
2	114.3	331.7	217.4	
3	114.7	586.5	471.8	
4	118.4	133.1	14.7	
Totals	464.4	1389.8	925.4	

Water Quality Bottles

Total Volume of Melted Snow:________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC,** Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

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GENERAL

LOCATION NAME: ~~SSS-2~~ **DATE (yyyy-mmm-dd):** 2020-04-~~12~~ 13 **TIME (24:00):** 1640

SAMPLED BY: K6 SS2 **TYPE OF SAMPLE:** Dust ☒ Water Quality ☐ **QAQC:** N/A

GPS COORDINATES (UTM): 0533149 **E** 7148871 **N (zone)** 12

DESCRIPTION: Distance to Diavik Ø km & Direction N/A On: Land ☑ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: -10 °C **Wind Direction:** W **Wind Speed:** 3 kts.

Dust in Area: Visible ☒ Not Visible ☐

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A

Snow Condition: Crystallized ☒ Packed ☐ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	25	24	45	39	6	Y N	13
	2	25	24	46	39	7	Y N	7
	3	25	23	46	39	7	Y N	20
	4	24	23	46	39	7	Y N	27
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

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Dust Sample Filters

Total Volume of Melted Snow: ~~835~~ 865 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	115.4	375.2	259.8	Double bagged did not leak Visible dust on filters
2	116.9	291.7	174.8	
3	119.1	125.1	6.0	
4				
Totals	351.4	792.0	340.6	

Water Quality Bottles

Total Volume of Melted Snow:________ (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type *	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC,** Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (**x2**)	Y	☐	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (**x2**)	Y	☐	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☐	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☐	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☐	☐	☐	
6	Routine	1000 mL plastic	Y	☐	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☐	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

RioTinto

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GENERAL

LOCATION NAME: SS5-3 **DATE (yyyy-mmm-dd):** 2020-04-~~12~~ 13 **TIME (24:00):** 1600

SAMPLED BY: KG SS2 **TYPE OF SAMPLE:** Dust ☒ Water Quality ☒ **QAQC:** N/A

GPS COORDINATES (UTM): 533149 **E** 7148700 **N (zone)** 12

DESCRIPTION: Distance to Diavik 0.18 km & Direction S On: Land ☐ &/or Lake ☑

CLIMATE CONDITIONS

Air Temp: -11 °C **Wind Direction:** W **Wind Speed:** 5 kts.

Dust in Area: Visible ☐ Not Visible ☒

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A

Snow Condition: Crystallized ☐ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	43	46	50	39	11	Y N	
	2	40	39	52	39	13	Y N	
	3	43	41	51	39	10	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	43	46	50	39	11	Y N	Reweighed
	2	~~44 42~~					~~Y N~~	
	3	45	43	52	39	13	Y N	
	4	45	43	50	39	11	Y N	34
	5	45	44	53	39	14	Y N	48
	6	43	42	51	37	11	Y N	Reweighed
	7	45	45	53	39	14	Y N	59
	8	45	43	52	39	13	Y N	14 73
	9	48	46	53	39	14	Y N	13 86
	10						Y N	14
	11						Y N	100
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** **Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$** **

RioTinto

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Dust Sample Filters

Total Volume of Melted Snow: 1105 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	114.0	249.1	135.1	
2	116.3	125.8	9.5	
3	115.4	290.8	175.4	
4				
Totals	345.7	5.7	320.0	

Water Quality Bottles

Total Volume of Melted Snow: 3220 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	500 ~~1000 mL~~ plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

WQ Quadruple bagged, leaked into 2nd bag

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SSS-4 ~~2020-04-12~~ **DATE (yyyy-mmm-dd):** 2020-04-~~12~~ 13 **TIME (24:00):** 1529

SAMPLED BY: KG SSL **TYPE OF SAMPLE:** Dust ☒ Water Quality ☒ **QAQC:** NA

GPS COORDINATES (UTM): 533153 **E** 7147948 **N (zone)** 12

DESCRIPTION: Distance to Diavik 0.89 km & Direction S On: Land ☐ &/or Lake ☒

CLIMATE CONDITIONS

Air Temp: -11 °C **Wind Direction:** W **Wind Speed:** 5 kts.

Dust in Area: Visible ☐ Not Visible ☒ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☐ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	42	41	49	39	10	Y N	
	2	43	37	47	39	8	Y N	
	3	44	44	50	39	11	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	~~3~~ 43	41	51	39	12	Y N	Reweighed
	2	45	38	49	39	10	Y N	22
	3	45	42	51	39	12	Y N	34
	4	44	43	53	39	14	Y N	~~44~~ 48
	5	44	43	51	39	~~14~~ 12	Y N	~~12~~ 60
	6	~~45~~ 42	41	50	39	11	Y N	Reweighed
	7	44	42	51	39	12	Y N	70
	8	45	36	49	39	10	Y N	82 ~~92~~
	9	~~43~~ 45	39	49	39	10	Y N	102
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ **

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Dust Sample Filters

Total Volume of Melted Snow: 1010 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	115.9	155.2	39.3	Double bagged, Leaked through bag. Visible dust on filter
2	119.0	119.3	0.3	
3				
4				
Totals	234.9	274.5	39.6	

Water Quality Bottles

Total Volume of Melted Snow: 3185 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC**, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (**x2**)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (**x2**)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	~~1000~~ 500 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

WQ - Quadruple bagged, leaked into 4th

RioTinto

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GENERAL

LOCATION NAME: SSS-5 **DATE (yyyy-mmm-dd):** 2020-04-~~12~~ 13 **TIME (24:00):** 1447

SAMPLED BY: KG SS2 **TYPE OF SAMPLE: Dust** ☒ **Water Quality** ☒ **QAQC:** N/A

GPS COORDINATES (UTM): 533148 **E** 7146953 **N (zone)** 12

DESCRIPTION: Distance to Diavik 1.86 km & Direction S On: Land ☐ &/or Lake ☑

CLIMATE CONDITIONS

Air Temp: -11 °C **Wind Direction:** N **Wind Speed:** 5 kts.

Dust in Area: Visible ☐ Not Visible ☒ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☒ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	50	36	50	39.0	11	Y N	
	2	50	44	60	39	21	Y N	
	3	50	39	~~60~~ 51	39	~~21~~ 12	Y N	
	4						Y N	
	Dust (Min. of 3 cores – Total Water Content SWE =/> 25)							
Water Quality Cores	1	~~50~~ 49	45	51	39	12	Y N	32 re weighed
	2	50	47	55	39	16	Y N	12 44
	3	49	47	55	39	16	Y N	17
	4	49	47	56	39	17	Y N	61 17
	5	49	47	56	39	17	Y N	reweighed
	6	49	47	56	39	17	Y N	78
	7	47	~~47~~ 45	56	39	17	Y N	17 95
	8						Y N	11
	9						Y N	112
	10						Y N	
	11						Y N	
	12						Y N	
	Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)							

** **Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$** **

RioTinto

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Dust Sample Filters

Total Volume of Melted Snow: 1200 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	118.5	147.2	28.7	
2				
3				
4				
Totals	118.5	147.2	28.7	

Water Quality Bottles

Total Volume of Melted Snow: 3090 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☑	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☑	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	500 ~~1000~~ mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

WQ - Quadruple bagged, leaked into 4th bag.

RioTinto

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GENERAL

LOCATION NAME: SSC-1 **DATE (yyyy-mmm-dd):** 2020-04-~~12~~ 13 **TIME (24:00):** 1400

SAMPLED BY: KG SS2 **TYPE OF SAMPLE:** Dust ☒ Water Quality ☒ **QAQC:** N/A

GPS COORDINATES (UTM): 534989 **E** 7144273 **N (zone)** 12W

DESCRIPTION: Distance to Diavik 4.78 km & Direction S On: Land ☒ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: -11 °C **Wind Direction:** W **Wind Speed:** 5 **kts.**

Dust in Area: Visible ☐ Not Visible ☒ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☐ Packed ☐ Wet ☐ Dry ☒

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	30	28	41	39	2	Y N	
	2	35	32	47	39	8	Y N	10
	3	~~29~~ 35	29	46	39	7	Y N	17 24
	4	35	28	46	39	7	Y N	
		34	27	Dust (Min. of 3 cores – Total Water Content SWE =/> 25)				
Water Quality Cores	1	~~32~~ 35	30	47	39	8	Y N	re weighed
	2	35	29	47	39	8	Y N	
	3	37	26	46	39	7	Y N	
	4	36	26	45	39	6	Y N	29
	5	35	26	45	39	6	Y N	35 45
	6	38	32	49	39	10	Y N	55 66
	7	~~35~~ ~~40~~ 43	35	49	39	10	Y N	9
	8	44	35	50	39	11	Y N	75
	9	44	35	48	39	9	Y N	85
	10	44	35	49	39	10	Y N	
	11	44	34	49	39	10	Y N	95
	12	47	36	48	39	9	Y N	~~104~~
		Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)						

** **Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$** **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1140 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	114.8	121.0	6.2	Visible dust/dirt on filter Some veg on filter. Triple bagged, leaked into 2nd
2				
3				
4				
Totals	114.8	121.0	6.2	

Water Quality Bottles

Total Volume of Melted Snow: 3225 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	~~1000~~ 500 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

WQ - triple bagged, leaked into 3rd bag

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SSC-2-4 **DATE (yyyy-mmm-dd):** 2020-04-14 **TIME (24:00):** 1045

SAMPLED BY: KG MN **TYPE OF SAMPLE:** Dust ☒ Water Quality ☒ **QAQC:** DUP1

GPS COORDINATES (UTM): 528714 **E** 7153273 **N (zone)** 12W

DESCRIPTION: Distance to Diavik 1.71 km & Direction W On: Land ☒ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: -17 °C **Wind Direction:** N **Wind Speed:** 0 **kts.**

Dust in Area: Visible ☐ Not Visible ☒ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☐ Packed ☒ very Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	59	50	56	39	17	Y N	hard packed top - crystalized bottom
	2	~~45~~ 39	34	51	~~49~~ 39	12	Y N	
	3	44	41	55	39	16	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	28	28	46	39	7	Y N	1
	2	27	26	46	39	7	Y N	14 8
	3	38	33	47	39	8	Y N	28
	4	38	35	47	39	8	Y N	8 36
	5	35	32	48	39	9	Y N	9 45
	6	36	35	48	39	9	Y N	Reweighed 9 54
	7	33	30	46	39	6	Y N	6 60
	8	33	30	47	39	8	Y N	
	9	33	25	45	39	5	Y N	73 8
	10	39	31	47	39	8	Y N	81
	11	32	26	45	39	6	Y N	87 8
	12	33	25	47	39	8	Y N	95
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								101
		34	27	45	39	6	N	

**** Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$ ****

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 15155 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	118.4	140.1	21.7	3x bagged, no leakage, visible dust on filter some veg on filter
2				
3				
4				
Totals	118.4	140.1	21.7	

Water Quality Bottles

Total Volume of Melted Snow: 3180 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	~~1~~000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	~~1000~~ 500 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

~~Dust Triple~~
WQ - Triple bagged, some veg in sample

RioTinto

Snow Sampling Field Sheet

Area:	8000	**No:**	ENVI-177-0312
Effective Date:	26-Mar-2012	**Revision:**	R9
Task:	Snow Sampling Field Sheet	**By:**	D. Dul

GENERAL

LOCATION NAME: SSC-2-5 **DATE (yyyy-mmm-dd):** 2020-04-14 **TIME (24:00):** 1050

SAMPLED BY: KG MN **TYPE OF SAMPLE:** Dust [X] Water Quality [ ] **QAQC:** X DUP 2

GPS COORDINATES (UTM): 528714 **E** 7153273 **N (zone)** ______

DESCRIPTION: Distance to Diavik 1.71 km & Direction W On: Land [X] &/or Lake [ ]

CLIMATE CONDITIONS

Air Temp: -17 °C **Wind Direction:** N **Wind Speed:** 0 **kts.**

Dust in Area: Visible [ ] Not Visible [X]

Precipitation: Rain / ~~Mist~~ / Snow / N/A

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Snow Condition: Crystallized [ ] Packed [X] Wet [ ] Dry [ ] very

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	42	37	54	39	15	Y N	Re-weighed
	2	32	30	47	39	8	Y N	moved 5m away
	3	32	31	47	31	8	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** **Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$** **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 975 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	118.3	128.4	10.1	
2				
3				
4				
Totals	118.3	128.4	10.1	

Water Quality Bottles

Total Volume of Melted Snow: 3180 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * DUP	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	500 ~~1000~~ mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

DUST - Triple bagged, did not leak, veg strained out
WQ - Triple bagged, some veg in sample

RioTinto

Snow Sampling Field Sheet

Area:	8000	**No:**	ENVI-177-0312
Effective Date:	26-Mar-2012	**Revision:**	R9
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GENERAL

LOCATION NAME: SSC-3 **DATE (yyyy-mmm-dd):** 2020-04-~~12~~ 13 **TIME (24:00):** 1246

SAMPLED BY: KGSS2 **TYPE OF SAMPLE:** Dust ☒ Water Quality ☒ **QAQC:** N/A

GPS COORDINATES (UTM): 538649 **E** 7148747 **N (zone)** 12W

DESCRIPTION: Distance to Diavik 3.58 km & Direction SE On: Land ☒ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: -13 °C **Wind Direction:** W **Wind Speed:** 5 kts.

Dust in Area: Visible ☐ Not Visible ☒

Cloud Cover: 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A

Snow Condition: Crystallized ☐ Packed ☒ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1	90	88	67	39	28	Y N	!! one + done
	2	~~103~~ 87	56	57	39	18	Y N	
	3	87	82	65	39	25	Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1	84	79	59	39	20	Y N	re weighed
	2	90	84	67	39	28	Y N	48
	3	87	83	65	39	26	Y N	26 74
	4	94	89	68	39	29	Y N	29 103
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** **Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$** **

RioTinto

Dust Sample Filters

Total Volume of Melted Snow: 2185 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	118.1	162.6.	44.5	Triple Bagged, leaked into 2nd
2				
3				
4				
Totals	118.1	162.6	44.5	

Water Quality Bottles

Total Volume of Melted Snow: 3090 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * GW	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC**, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube **(x2)**	Y	☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube **(x2)**	Y	☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	~~1000~~ 500 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

WQ - Triple bagged, leaked into 3rd bag

RioTinto

Snow Sampling Field Sheet

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GENERAL

LOCATION NAME: SS EBW **DATE (yyyy-mmm-dd):** 2020-04-17 **TIME (24:00):** 0930

SAMPLED BY: SS2 GC **TYPE OF SAMPLE:** Dust ☒ Water Quality ☒ **QAQC:** EBW

GPS COORDINATES (UTM): ____ E ____ N (zone) ____

DESCRIPTION: Distance to Diavik ____ km & Direction ____ On: Land ☐ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: ____ °C **Wind Direction:** ____ **Wind Speed:** ____ kts.

Dust in Area: Visible ☐ Not Visible ☐ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☐ Packed ☐ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** **Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$** **

RioTinto

Snow Sampling Field Sheet

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Dust Sample Filters

Total Volume of Melted Snow: 1740 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	116.8	116.8	0.0	2x bagged, no leakage
2				
3				
4				
Totals	116.8	116.8	0.0	

Water Quality Bottles

Total Volume of Melted Snow: 2365 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * FBW	Sample Type *	Sample Type *	Sample Comments DI Batch # for QAQC, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube (x2)	Y	✓☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube (x2)	Y	✓☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/Turb/pH	1000 mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

DI Lot # 200312

RioTinto

Snow Sampling Field Sheet			
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GENERAL

LOCATION NAME: 55 Bay **DATE (yyyy-mmm-dd):** 2020-04-17 **TIME (24:00):** ~~0930~~ 0933

SAMPLED BY: 552 GC **TYPE OF SAMPLE: Dust** ☑ **Water Quality** ☑ **QAQC:** EBW

GPS COORDINATES (UTM): ____ **E** ____ **N (zone)** ____

DESCRIPTION: Distance to Diavik ____ km & Direction ____ On: Land ☐ &/or Lake ☐

CLIMATE CONDITIONS

Air Temp: ____ °C **Wind Direction:** ____ **Wind Speed:** ____ **kts.**

Dust in Area: Visible ☐ Not Visible ☐ **Cloud Cover:** 0% / 10% / 25% / 50% / 75% / 100%

Precipitation: Rain / Mist / Snow / N/A **Snow Condition:** Crystallized ☐ Packed ☐ Wet ☐ Dry ☐

	Core Number	Depth of Snow (cm)	Length of Snow Core (cm)	Weight of Tube & Core-SWE (cm)	Weight of Empty Tube-SWE (cm)	Water Content-SWE (cm)	Dust Present Yes/No	Comments (core weighed, bag #, changes in snow condition)
Dust Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
Dust (Min. of 3 cores – Total Water Content SWE =/> 25)								
Water Quality Cores	1						Y N	
	2						Y N	
	3						Y N	
	4						Y N	
	5						Y N	
	6						Y N	
	7						Y N	
	8						Y N	
	9						Y N	
	10						Y N	
	11						Y N	
	12						Y N	
Water Quality (Min. of 3 cores – Total Water Content SWE =/> 100)								

** **Water Content$_{SWE}$ = Wt. of Tube & Core$_{SWE}$ – Wt. of Empty Tube$_{SWE}$** **

RioTinto

Snow Sampling Field Sheet			
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Dust Sample Filters

Total Volume of Melted Snow: 1685 (mL)

Filter #	Weight of Filter (mg)	Filter + Residue (mg)	Residue Weight (mg)	Comments
1	118.7	118.7	0.0	2x bagged, no leakage
2				
3				
4				
Totals	118.7	118.7	0.0	

Water Quality Bottles

Total Volume of Melted Snow: 2425 (mL)

Filling Order	Analysis	Bottle Type	Triple Rinse	Sample Type * EBW	Sample Type *	Sample Type *	Sample Comments **DI Batch # for QAQC**, Location preserved if not in field, label changes
1	Metals Total	60 mL Falcon Tube **(x2)**	Y	✓ ☑	☐	☐	
2	Metals Dissolved	60 mL Falcon Tube **(x2)**	Y	✓ ☑	☐	☐	
3	Total Mercury	40 mL clear glass (pre-preserved)	N	☑	☐	☐	
4	Nutrients	120 mL plastic (pre-preserved)	N	☑	☐	☐	
5	Ammonia	40 mL glass vial (pre-preserved)	N	☑	☐	☐	
6	Routine	1000 mL plastic	Y	☑	☐	☐	
7	TSS/~~Turb/pH~~	500 ~~1000~~ mL plastic	Y	☑	☐	☐	

***Sample Type:** GW, DUPW1/DUPW2, FBW, TBW, EBW, REP1/REP2, Filter Blank

Additional Information

Sample color, odor if applicable: (equipment issues, safety concerns, weather problems, changes during sampling event, follow-up actions etc.)

DI Lot # 200312
WQ - did not leak, double bagged

APPENDIX D SNOW WATER CHEMISTRY ANALYTICAL RESULTS

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Acidity (pH 4.5)	mg/L	CONTROL 1	4/13/2020	<1.0	0.5	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	<1.0	0.5	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	<1.0	0.5	XR5673	GW
	mg/L	SS BAG	4/17/2020	<1.0	0.5	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<1.0	0.5	XR5675	GW
	mg/L	SS1-4	4/12/2020	<1.0	0.5	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	<1.0	0.5	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	<1.0	0.5	XR6024	GW
	mg/L	SS2-1	4/12/2020	<1.0	0.5	XR5777	GW
	mg/L	SS2-2	4/12/2020	<1.0	0.5	XR5778	GW
	mg/L	SS2-3	4/12/2020	<1.0	0.5	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	<1.0	0.5	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	<1.0	0.5	XR5781	GW
	mg/L	SS3-4	4/13/2020	<1.0	0.5	XR6031	GW
	mg/L	SS3-5	4/13/2020	<1.0	0.5	XR6032	GW
	mg/L	SS3-6	4/13/2020	<1.0	0.5	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	<1.0	0.5	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	<1.0	0.5	XR6035	GW
	mg/L	SS3-8	4/13/2020	<1.0	0.5	XR6036	GW
	mg/L	SS4-4	4/14/2020	<1.0	0.5	XR5669	GW
	mg/L	SS4-5	4/14/2020	<1.0	0.5	XR5670	GW
	mg/L	SS5-3	4/13/2020	<1.0	0.5	XR6025	GW
	mg/L	SS5-4	4/13/2020	<1.0	0.5	XR6026	GW
	mg/L	SS5-5	4/13/2020	<1.0	0.5	XR6027	GW
Acidity (pH 8.3)	mg/L	CONTROL 1	4/13/2020	<1.0	0.5	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	<1.0	0.5	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	1.1	1.1	XR5673	GW
	mg/L	SS BAG	4/17/2020	<1.0	0.5	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<1.0	0.5	XR5675	GW
	mg/L	SS1-4	4/12/2020	<1.0	0.5	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	<1.0	0.5	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	<1.0	0.5	XR6024	GW
	mg/L	SS2-1	4/12/2020	<1.0	0.5	XR5777	GW
	mg/L	SS2-2	4/12/2020	<1.0	0.5	XR5778	GW
	mg/L	SS2-3	4/12/2020	<1.0	0.5	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	<1.0	0.5	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	<1.0	0.5	XR5781	GW
	mg/L	SS3-4	4/13/2020	1.2	1.2	XR6031	GW
	mg/L	SS3-5	4/13/2020	<1.0	0.5	XR6032	GW
	mg/L	SS3-6	4/13/2020	1.2	1.2	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	2.3	2.3	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	<1.0	0.5	XR6035	GW
	mg/L	SS3-8	4/13/2020	1.1	1.1	XR6036	GW
	mg/L	SS4-4	4/14/2020	<1.0	0.5	XR5669	GW
	mg/L	SS4-5	4/14/2020	1.0	1	XR5670	GW
	mg/L	SS5-3	4/13/2020	<1.0	0.5	XR6025	GW
	mg/L	SS5-4	4/13/2020	<1.0	0.5	XR6026	GW
	mg/L	SS5-5	4/13/2020	<1.0	0.5	XR6027	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Alkalinity (PP as $CaCO_3$)	mg/L	CONTROL 1	4/13/2020	<0.50	0.25	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	<0.50	0.25	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	<0.50	0.25	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5675	GW
	mg/L	SS1-4	4/12/2020	<0.50	0.25	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	<0.50	0.25	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	<0.50	0.25	XR6024	GW
	mg/L	SS2-1	4/12/2020	<0.50	0.25	XR5777	GW
	mg/L	SS2-2	4/12/2020	<0.50	0.25	XR5778	GW
	mg/L	SS2-3	4/12/2020	<0.50	0.25	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	<0.50	0.25	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	<0.50	0.25	XR5781	GW
	mg/L	SS3-4	4/13/2020	<0.50	0.25	XR6031	GW
	mg/L	SS3-5	4/13/2020	<0.50	0.25	XR6032	GW
	mg/L	SS3-6	4/13/2020	<0.50	0.25	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	<0.50	0.25	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	<0.50	0.25	XR6035	GW
	mg/L	SS3-8	4/13/2020	<0.50	0.25	XR6036	GW
	mg/L	SS4-4	4/14/2020	<0.50	0.25	XR5669	GW
	mg/L	SS4-5	4/14/2020	<0.50	0.25	XR5670	GW
	mg/L	SS5-3	4/13/2020	<0.50	0.25	XR6025	GW
	mg/L	SS5-4	4/13/2020	<0.50	0.25	XR6026	GW
	mg/L	SS5-5	4/13/2020	<0.50	0.25	XR6027	GW
Alkalinity (Total as $CaCO_3$) - Total	mg/L	CONTROL 1	4/13/2020	<0.50	0.25	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	<0.50	0.25	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	<0.50	0.25	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.53	0.53	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	<0.50	0.25	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	<0.50	0.25	XR6024	GW
	mg/L	SS2-1	4/12/2020	<0.50	0.25	XR5777	GW
	mg/L	SS2-2	4/12/2020	<0.50	0.25	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.59	0.59	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.68	0.68	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	<0.50	0.25	XR5781	GW
	mg/L	SS3-4	4/13/2020	1.28	1.28	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.65	0.65	XR6032	GW
	mg/L	SS3-6	4/13/2020	3.24	3.24	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	3.15	3.15	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	4.25	4.25	XR6035	GW
	mg/L	SS3-8	4/13/2020	2.77	2.77	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.52	0.52	XR5669	GW
	mg/L	SS4-5	4/14/2020	<0.50	0.25	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.64	0.64	XR6025	GW
	mg/L	SS5-4	4/13/2020	<0.50	0.25	XR6026	GW
	mg/L	SS5-5	4/13/2020	<0.50	0.25	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Aluminum (Al) - Dissolved	ug/L	CONTROL 1	4/13/2020	10.5	10.5	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	14.0	14	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	19.3	19.3	XR5673	GW
	ug/L	SS BAG	4/17/2020	0.66	0.66	XR5674	EBW
	ug/L	SS BAG	4/17/2020	0.78	0.78	XR5675	GW
	ug/L	SS1-4	4/12/2020	2.75	2.75	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	2.16	2.16	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	4.15	4.15	XR6024	GW
	ug/L	SS2-1	4/12/2020	2.35	2.35	XR5777	GW
	ug/L	SS2-2	4/12/2020	7.29	7.29	XR5778	GW
	ug/L	SS2-3	4/12/2020	3.91	3.91	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	3.21	3.21	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	4.17	4.17	XR5781	GW
	ug/L	SS3-4	4/13/2020	8.68	8.68	XR6031	GW
	ug/L	SS3-5	4/13/2020	5.37	5.37	XR6032	GW
	ug/L	SS3-6	4/13/2020	9.15	9.15	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	16.5	16.5	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	25.7	25.7	XR6035	GW
	ug/L	SS3-8	4/13/2020	16.1	16.1	XR6036	GW
	ug/L	SS4-4	4/14/2020	9.51	9.51	XR5669	GW
	ug/L	SS4-5	4/14/2020	8.89	8.89	XR5670	GW
	ug/L	SS5-3	4/13/2020	8.53	8.53	XR6025	GW
	ug/L	SS5-4	4/13/2020	7.46	7.46	XR6026	GW
	ug/L	SS5-5	4/13/2020	2.95	2.95	XR6027	GW
Aluminum (Al) - Total	ug/L	CONTROL 1	4/13/2020	10.7	10.7	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	11.5	11.5	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	21.8	21.8	XR5673	GW
	ug/L	SS BAG	4/17/2020	0.46	0.46	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.20	0.1	XR5675	GW
	ug/L	SS1-4	4/12/2020	13.0	13	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	14.9	14.9	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	4.71	4.71	XR6024	GW
	ug/L	SS2-1	4/12/2020	7.16	7.16	XR5777	GW
	ug/L	SS2-2	4/12/2020	11.9	11.9	XR5778	GW
	ug/L	SS2-3	4/12/2020	9.11	9.11	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	8.01	8.01	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	4.61	4.61	XR5781	GW
	ug/L	SS3-4	4/13/2020	26.4	26.4	XR6031	GW
	ug/L	SS3-5	4/13/2020	10.7	10.7	XR6032	GW
	ug/L	SS3-6	4/13/2020	49.6	49.6	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	57.5	57.5	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	65.0	65	XR6035	GW
	ug/L	SS3-8	4/13/2020	48.3	48.3	XR6036	GW
	ug/L	SS4-4	4/14/2020	3.86	3.86	XR5669	GW
	ug/L	SS4-5	4/14/2020	18.1	18.1	XR5670	GW
	ug/L	SS5-3	4/13/2020	75.6	75.6	XR6025	GW
	ug/L	SS5-4	4/13/2020	17.9	17.9	XR6026	GW
	ug/L	SS5-5	4/13/2020	17.5	17.5	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Ammonia (N)	mg/L	CONTROL 1	4/13/2020	0.067	0.067	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.079	0.079	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.055	0.055	XR5673	GW
	mg/L	SS BAG	4/17/2020	0.0086	0.0086	XR5674	EBW
	mg/L	SS BAG	4/17/2020	0.042	0.042	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.050	0.05	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.046	0.046	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.036	0.036	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.049	0.049	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.053	0.053	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.050	0.05	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.050	0.05	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	0.036	0.036	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.069	0.069	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.064	0.064	XR6032	GW
	mg/L	SS3-6	4/13/2020	0.071	0.071	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	0.074	0.074	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	0.088	0.088	XR6035	GW
	mg/L	SS3-8	4/13/2020	0.13	0.13	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.070	0.07	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.056	0.056	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.14	0.14	XR6025	GW
	mg/L	SS5-4	4/13/2020	0.063	0.063	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.036	0.036	XR6027	GW
Antimony (Sb) - Dissolved	ug/L	CONTROL 1	4/13/2020	<0.020	0.01	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.020	0.01	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.020	0.01	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.020	0.01	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.020	0.01	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.020	0.01	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.020	0.01	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.020	0.01	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.020	0.01	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.020	0.01	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.020	0.01	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.020	0.01	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.020	0.01	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.020	0.01	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.020	0.01	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.020	0.01	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.020	0.01	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<0.020	0.01	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.020	0.01	XR6036	GW
	ug/L	SS4-4	4/14/2020	0.020	0.02	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.020	0.01	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.040	0.04	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.020	0.01	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.020	0.01	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Antimony (Sb) - Total	ug/L	CONTROL 1	4/13/2020	<0.020	0.01	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.020	0.01	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.020	0.01	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.020	0.01	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.020	0.01	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.020	0.01	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.020	0.01	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.020	0.01	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.020	0.01	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.020	0.01	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.020	0.01	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.020	0.01	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.020	0.01	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.020	0.01	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.020	0.01	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.020	0.01	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.020	0.01	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<0.020	0.01	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.020	0.01	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.020	0.01	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.020	0.01	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.039	0.039	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.020	0.01	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.020	0.01	XR6027	GW
Arsenic (As) - Dissolved	ug/L	CONTROL 1	4/13/2020	0.033	0.033	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.024	0.024	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.052	0.052	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.020	0.01	XR5674	EBW
	ug/L	SS BAG	4/17/2020	0.023	0.023	XR5675	GW
	ug/L	SS1-4	4/12/2020	0.032	0.032	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	0.028	0.028	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.020	0.01	XR6024	GW
	ug/L	SS2-1	4/12/2020	0.041	0.041	XR5777	GW
	ug/L	SS2-2	4/12/2020	0.029	0.029	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.020	0.01	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.020	0.01	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.020	0.01	XR5781	GW
	ug/L	SS3-4	4/13/2020	0.065	0.065	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.041	0.041	XR6032	GW
	ug/L	SS3-6	4/13/2020	0.065	0.065	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.081	0.081	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.075	0.075	XR6035	GW
	ug/L	SS3-8	4/13/2020	0.067	0.067	XR6036	GW
	ug/L	SS4-4	4/14/2020	0.023	0.023	XR5669	GW
	ug/L	SS4-5	4/14/2020	0.022	0.022	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.070	0.07	XR6025	GW
	ug/L	SS5-4	4/13/2020	0.044	0.044	XR6026	GW
	ug/L	SS5-5	4/13/2020	0.050	0.05	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Arsenic (As) - Total	ug/L	CONTROL 1	4/13/2020	0.029	0.029	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.047	0.047	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.035	0.035	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.020	0.01	XR5674	EBW
	ug/L	SS BAG	4/17/2020	0.032	0.032	XR5675	GW
	ug/L	SS1-4	4/12/2020	0.048	0.048	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	0.061	0.061	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	0.021	0.021	XR6024	GW
	ug/L	SS2-1	4/12/2020	0.039	0.039	XR5777	GW
	ug/L	SS2-2	4/12/2020	0.037	0.037	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.020	0.01	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.020	0.01	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.020	0.01	XR5781	GW
	ug/L	SS3-4	4/13/2020	0.040	0.04	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.039	0.039	XR6032	GW
	ug/L	SS3-6	4/13/2020	0.045	0.045	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.053	0.053	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.090	0.09	XR6035	GW
	ug/L	SS3-8	4/13/2020	0.059	0.059	XR6036	GW
	ug/L	SS4-4	4/14/2020	0.023	0.023	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.020	0.01	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.138	0.138	XR6025	GW
	ug/L	SS5-4	4/13/2020	0.033	0.033	XR6026	GW
	ug/L	SS5-5	4/13/2020	0.031	0.031	XR6027	GW
Barium (Ba) - Dissolved	ug/L	CONTROL 1	4/13/2020	0.647	0.647	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	1.33	1.33	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	1.15	1.15	XR5673	GW
	ug/L	SS BAG	4/17/2020	0.030	0.03	XR5674	EBW
	ug/L	SS BAG	4/17/2020	0.029	0.029	XR5675	GW
	ug/L	SS1-4	4/12/2020	3.37	3.37	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	1.64	1.64	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	0.784	0.784	XR6024	GW
	ug/L	SS2-1	4/12/2020	1.15	1.15	XR5777	GW
	ug/L	SS2-2	4/12/2020	1.01	1.01	XR5778	GW
	ug/L	SS2-3	4/12/2020	1.50	1.5	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	0.756	0.756	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.686	0.686	XR5781	GW
	ug/L	SS3-4	4/13/2020	3.59	3.59	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.882	0.882	XR6032	GW
	ug/L	SS3-6	4/13/2020	4.61	4.61	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	3.66	3.66	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	5.53	5.53	XR6035	GW
	ug/L	SS3-8	4/13/2020	4.72	4.72	XR6036	GW
	ug/L	SS4-4	4/14/2020	1.61	1.61	XR5669	GW
	ug/L	SS4-5	4/14/2020	0.939	0.939	XR5670	GW
	ug/L	SS5-3	4/13/2020	2.03	2.03	XR6025	GW
	ug/L	SS5-4	4/13/2020	1.15	1.15	XR6026	GW
	ug/L	SS5-5	4/13/2020	1.56	1.56	XR6027	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Barium (Ba) - Total	ug/L	CONTROL 1	4/13/2020	0.611	0.611	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	1.45	1.45	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	1.28	1.28	XR5673	GW
	ug/L	SS BAG	4/17/2020	0.080	0.08	XR5674	EBW
	ug/L	SS BAG	4/17/2020	0.053	0.053	XR5675	GW
	ug/L	SS1-4	4/12/2020	4.35	4.35	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	2.01	2.01	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	0.897	0.897	XR6024	GW
	ug/L	SS2-1	4/12/2020	1.27	1.27	XR5777	GW
	ug/L	SS2-2	4/12/2020	1.14	1.14	XR5778	GW
	ug/L	SS2-3	4/12/2020	0.868	0.868	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	0.819	0.819	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.713	0.713	XR5781	GW
	ug/L	SS3-4	4/13/2020	3.52	3.52	XR6031	GW
	ug/L	SS3-5	4/13/2020	1.09	1.09	XR6032	GW
	ug/L	SS3-6	4/13/2020	4.67	4.67	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	5.34	5.34	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	7.09	7.09	XR6035	GW
	ug/L	SS3-8	4/13/2020	6.39	6.39	XR6036	GW
	ug/L	SS4-4	4/14/2020	3.25	3.25	XR5669	GW
	ug/L	SS4-5	4/14/2020	3.15	3.15	XR5670	GW
	ug/L	SS5-3	4/13/2020	3.54	3.54	XR6025	GW
	ug/L	SS5-4	4/13/2020	1.24	1.24	XR6026	GW
	ug/L	SS5-5	4/13/2020	2.02	2.02	XR6027	GW
Beryllium (Be) - Dissolved	ug/L	CONTROL 1	4/13/2020	<0.010	0.005	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.010	0.005	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.010	0.005	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.010	0.005	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.010	0.005	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.010	0.005	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.010	0.005	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.010	0.005	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.010	0.005	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.010	0.005	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.010	0.005	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.010	0.005	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.010	0.005	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.010	0.005	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.010	0.005	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.010	0.005	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.010	0.005	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<0.010	0.005	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.010	0.005	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.010	0.005	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.010	0.005	XR5670	GW
	ug/L	SS5-3	4/13/2020	<0.010	0.005	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.010	0.005	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.010	0.005	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Beryllium (Be) - Total	ug/L	CONTROL 1	4/13/2020	<0.010	0.005	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.010	0.005	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.010	0.005	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.010	0.005	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.010	0.005	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.010	0.005	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.010	0.005	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.010	0.005	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.010	0.005	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.010	0.005	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.010	0.005	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.010	0.005	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.010	0.005	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.010	0.005	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.010	0.005	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.010	0.005	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.010	0.005	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<0.010	0.005	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.010	0.005	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.010	0.005	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.010	0.005	XR5670	GW
	ug/L	SS5-3	4/13/2020	<0.010	0.005	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.010	0.005	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.010	0.005	XR6027	GW
Bicarbonate (HCO_3)	mg/L	CONTROL 1	4/13/2020	<0.50	0.25	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	<0.50	0.25	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	<0.50	0.25	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.65	0.65	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	<0.50	0.25	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	<0.50	0.25	XR6024	GW
	mg/L	SS2-1	4/12/2020	<0.50	0.25	XR5777	GW
	mg/L	SS2-2	4/12/2020	<0.50	0.25	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.72	0.72	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.83	0.83	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	<0.50	0.25	XR5781	GW
	mg/L	SS3-4	4/13/2020	1.57	1.57	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.80	0.8	XR6032	GW
	mg/L	SS3-6	4/13/2020	3.95	3.95	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	3.84	3.84	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	5.18	5.18	XR6035	GW
	mg/L	SS3-8	4/13/2020	3.37	3.37	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.64	0.64	XR5669	GW
	mg/L	SS4-5	4/14/2020	<0.50	0.25	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.78	0.78	XR6025	GW
	mg/L	SS5-4	4/13/2020	<0.50	0.25	XR6026	GW
	mg/L	SS5-5	4/13/2020	<0.50	0.25	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Bismuth (Bi) - Dissolved	ug/L	CONTROL 1	4/13/2020	<0.0050	0.0025	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.0050	0.0025	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.0050	0.0025	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.0050	0.0025	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.0050	0.0025	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.0050	0.0025	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.0050	0.0025	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.0050	0.0025	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.0050	0.0025	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.0050	0.0025	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.0050	0.0025	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.0050	0.0025	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.0050	0.0025	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.0050	0.0025	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.0050	0.0025	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<0.0050	0.0025	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.0050	0.0025	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.0050	0.0025	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.0050	0.0025	XR5670	GW
	ug/L	SS5-3	4/13/2020	<0.0050	0.0025	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.0050	0.0025	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.0050	0.0025	XR6027	GW
Bismuth (Bi) - Total	ug/L	CONTROL 1	4/13/2020	<0.0050	0.0025	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.0050	0.0025	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.0050	0.0025	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.0050	0.0025	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.0050	0.0025	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.0050	0.0025	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.0050	0.0025	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.0050	0.0025	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.0050	0.0025	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.0050	0.0025	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.0050	0.0025	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.0050	0.0025	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.0050	0.0025	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.0050	0.0025	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.0050	0.0025	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.0052	0.0052	XR6035	GW
	ug/L	SS3-8	4/13/2020	0.0064	0.0064	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.0050	0.0025	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.0050	0.0025	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.0227	0.0227	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.0050	0.0025	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.0050	0.0025	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Boron (B) - Dissolved	ug/L	CONTROL 1	4/13/2020	<5.0	2.5	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<5.0	2.5	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<5.0	2.5	XR5673	GW
	ug/L	SS BAG	4/17/2020	<5.0	2.5	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<5.0	2.5	XR5675	GW
	ug/L	SS1-4	4/12/2020	<5.0	2.5	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<5.0	2.5	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<5.0	2.5	XR6024	GW
	ug/L	SS2-1	4/12/2020	<5.0	2.5	XR5777	GW
	ug/L	SS2-2	4/12/2020	<5.0	2.5	XR5778	GW
	ug/L	SS2-3	4/12/2020	<5.0	2.5	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<5.0	2.5	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<5.0	2.5	XR5781	GW
	ug/L	SS3-4	4/13/2020	<5.0	2.5	XR6031	GW
	ug/L	SS3-5	4/13/2020	<5.0	2.5	XR6032	GW
	ug/L	SS3-6	4/13/2020	<5.0	2.5	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<5.0	2.5	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<5.0	2.5	XR6035	GW
	ug/L	SS3-8	4/13/2020	<5.0	2.5	XR6036	GW
	ug/L	SS4-4	4/14/2020	<5.0	2.5	XR5669	GW
	ug/L	SS4-5	4/14/2020	<5.0	2.5	XR5670	GW
	ug/L	SS5-3	4/13/2020	<5.0	2.5	XR6025	GW
	ug/L	SS5-4	4/13/2020	<5.0	2.5	XR6026	GW
	ug/L	SS5-5	4/13/2020	<5.0	2.5	XR6027	GW
Boron (B) - Total	ug/L	CONTROL 1	4/13/2020	<5.0	2.5	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<5.0	2.5	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<5.0	2.5	XR5673	GW
	ug/L	SS BAG	4/17/2020	<5.0	2.5	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<5.0	2.5	XR5675	GW
	ug/L	SS1-4	4/12/2020	<5.0	2.5	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<5.0	2.5	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<5.0	2.5	XR6024	GW
	ug/L	SS2-1	4/12/2020	<5.0	2.5	XR5777	GW
	ug/L	SS2-2	4/12/2020	<5.0	2.5	XR5778	GW
	ug/L	SS2-3	4/12/2020	<5.0	2.5	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<5.0	2.5	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<5.0	2.5	XR5781	GW
	ug/L	SS3-4	4/13/2020	<5.0	2.5	XR6031	GW
	ug/L	SS3-5	4/13/2020	<5.0	2.5	XR6032	GW
	ug/L	SS3-6	4/13/2020	<5.0	2.5	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<5.0	2.5	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<5.0	2.5	XR6035	GW
	ug/L	SS3-8	4/13/2020	<5.0	2.5	XR6036	GW
	ug/L	SS4-4	4/14/2020	<5.0	2.5	XR5669	GW
	ug/L	SS4-5	4/14/2020	<5.0	2.5	XR5670	GW
	ug/L	SS5-3	4/13/2020	<5.0	2.5	XR6025	GW
	ug/L	SS5-4	4/13/2020	<5.0	2.5	XR6026	GW
	ug/L	SS5-5	4/13/2020	<5.0	2.5	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Cadmium (Cd) - Dissolved	ug/L	CONTROL 1	4/13/2020	0.0054	0.0054	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.0050	0.0025	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.0050	0.0025	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.0050	0.0025	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.0050	0.0025	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.0050	0.0025	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.0050	0.0025	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.0050	0.0025	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.0050	0.0025	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.0050	0.0025	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.0050	0.0025	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.0050	0.0025	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.0050	0.0025	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.0050	0.0025	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.0050	0.0025	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<0.0050	0.0025	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.0050	0.0025	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.0050	0.0025	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.0050	0.0025	XR5670	GW
	ug/L	SS5-3	4/13/2020	<0.0050	0.0025	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.0050	0.0025	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.0050	0.0025	XR6027	GW
Cadmium (Cd) - Total	ug/L	CONTROL 1	4/13/2020	<0.0050	0.0025	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.0050	0.0025	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.0050	0.0025	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.0050	0.0025	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.0050	0.0025	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.0050	0.0025	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.0050	0.0025	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.0050	0.0025	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.0050	0.0025	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.0050	0.0025	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.0050	0.0025	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.0050	0.0025	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.0050	0.0025	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.0050	0.0025	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.0050	0.0025	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<0.0050	0.0025	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.0050	0.0025	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.0050	0.0025	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.0050	0.0025	XR5670	GW
	ug/L	SS5-3	4/13/2020	<0.0050	0.0025	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.0050	0.0025	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.0050	0.0025	XR6027	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Calcium (Ca) - Dissolved	mg/L	CONTROL 1	4/13/2020	0.150	0.15	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.136	0.136	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.152	0.152	XR5673	GW
	mg/L	SS BAG	4/17/2020	0.027	0.027	XR5674	EBW
	mg/L	SS BAG	4/17/2020	0.019	0.019	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.137	0.137	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.149	0.149	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.169	0.169	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.214	0.214	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.183	0.183	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.167	0.167	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.129	0.129	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	0.087	0.087	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.626	0.626	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.198	0.198	XR6032	GW
	mg/L	SS3-6	4/13/2020	1.39	1.39	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	1.45	1.45	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	1.76	1.76	XR6035	GW
	mg/L	SS3-8	4/13/2020	1.23	1.23	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.287	0.287	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.213	0.213	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.265	0.265	XR6025	GW
	mg/L	SS5-4	4/13/2020	0.136	0.136	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.122	0.122	XR6027	GW
Calcium (Ca) - Total	mg/L	CONTROL 1	4/13/2020	0.125	0.125	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.128	0.128	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.146	0.146	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.010	0.005	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.010	0.005	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.137	0.137	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.147	0.147	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.159	0.159	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.197	0.197	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.153	0.153	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.154	0.154	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.112	0.112	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	0.070	0.07	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.565	0.565	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.169	0.169	XR6032	GW
	mg/L	SS3-6	4/13/2020	1.34	1.34	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	1.22	1.22	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	1.83	1.83	XR6035	GW
	mg/L	SS3-8	4/13/2020	1.25	1.25	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.331	0.331	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.155	0.155	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.299	0.299	XR6025	GW
	mg/L	SS5-4	4/13/2020	0.121	0.121	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.117	0.117	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Carbonate (CO_3)	mg/L	CONTROL 1	4/13/2020	<0.50	0.25	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	<0.50	0.25	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	<0.50	0.25	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5675	GW
	mg/L	SS1-4	4/12/2020	<0.50	0.25	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	<0.50	0.25	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	<0.50	0.25	XR6024	GW
	mg/L	SS2-1	4/12/2020	<0.50	0.25	XR5777	GW
	mg/L	SS2-2	4/12/2020	<0.50	0.25	XR5778	GW
	mg/L	SS2-3	4/12/2020	<0.50	0.25	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	<0.50	0.25	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	<0.50	0.25	XR5781	GW
	mg/L	SS3-4	4/13/2020	<0.50	0.25	XR6031	GW
	mg/L	SS3-5	4/13/2020	<0.50	0.25	XR6032	GW
	mg/L	SS3-6	4/13/2020	<0.50	0.25	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	<0.50	0.25	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	<0.50	0.25	XR6035	GW
	mg/L	SS3-8	4/13/2020	<0.50	0.25	XR6036	GW
	mg/L	SS4-4	4/14/2020	<0.50	0.25	XR5669	GW
	mg/L	SS4-5	4/14/2020	<0.50	0.25	XR5670	GW
	mg/L	SS5-3	4/13/2020	<0.50	0.25	XR6025	GW
	mg/L	SS5-4	4/13/2020	<0.50	0.25	XR6026	GW
	mg/L	SS5-5	4/13/2020	<0.50	0.25	XR6027	GW
Chloride (Cl) - Dissolved	mg/L	CONTROL 1	4/13/2020	<0.50	0.5	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.59	0.59	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	1.0	1	XR5673	GW
	mg/L	SS BAG	4/17/2020	0.87	0.87	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.50	0.5	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.76	0.76	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.80	0.8	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	<0.50	0.5	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.73	0.73	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.62	0.62	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.58	0.58	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.79	0.79	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	0.79	0.79	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.83	0.83	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.79	0.79	XR6032	GW
	mg/L	SS3-6	4/13/2020	0.97	0.97	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	0.93	0.93	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	1.1	1.1	XR6035	GW
	mg/L	SS3-8	4/13/2020	1.1	1.1	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.76	0.76	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.98	0.98	XR5670	GW
	mg/L	SS5-3	4/13/2020	1.3	1.3	XR6025	GW
	mg/L	SS5-4	4/13/2020	<0.50	0.5	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.94	0.94	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Chromium (Cr) - Dissolved	ug/L	CONTROL 1	4/13/2020	<0.050	0.025	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.100	0.1	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.083	0.083	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.050	0.025	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.050	0.025	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.050	0.025	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.050	0.025	XR5777	GW
	ug/L	SS2-2	4/12/2020	0.054	0.054	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.050	0.025	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.050	0.025	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.050	0.025	XR5781	GW
	ug/L	SS3-4	4/13/2020	0.058	0.058	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.050	0.025	XR6032	GW
	ug/L	SS3-6	4/13/2020	0.163	0.163	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.145	0.145	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.180	0.18	XR6035	GW
	ug/L	SS3-8	4/13/2020	0.132	0.132	XR6036	GW
	ug/L	SS4-4	4/14/2020	0.052	0.052	XR5669	GW
	ug/L	SS4-5	4/14/2020	0.051	0.051	XR5670	GW
	ug/L	SS5-3	4/13/2020	<0.050	0.025	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.050	0.025	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.050	0.025	XR6027	GW
Chromium (Cr) - Total	ug/L	CONTROL 1	4/13/2020	0.051	0.051	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.071	0.071	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.104	0.104	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5675	GW
	ug/L	SS1-4	4/12/2020	0.083	0.083	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	0.074	0.074	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.050	0.025	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.050	0.025	XR5777	GW
	ug/L	SS2-2	4/12/2020	0.058	0.058	XR5778	GW
	ug/L	SS2-3	4/12/2020	0.062	0.062	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	0.062	0.062	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.050	0.025	XR5781	GW
	ug/L	SS3-4	4/13/2020	0.173	0.173	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.070	0.07	XR6032	GW
	ug/L	SS3-6	4/13/2020	0.251	0.251	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.282	0.282	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.385	0.385	XR6035	GW
	ug/L	SS3-8	4/13/2020	0.301	0.301	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.050	0.025	XR5669	GW
	ug/L	SS4-5	4/14/2020	0.060	0.06	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.205	0.205	XR6025	GW
	ug/L	SS5-4	4/13/2020	0.054	0.054	XR6026	GW
	ug/L	SS5-5	4/13/2020	0.086	0.086	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Cobalt (Co) - Dissolved	ug/L	CONTROL 1	4/13/2020	0.0840	0.084	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.0373	0.0373	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.0377	0.0377	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5675	GW
	ug/L	SS1-4	4/12/2020	0.0404	0.0404	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	0.0388	0.0388	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	0.0119	0.0119	XR6024	GW
	ug/L	SS2-1	4/12/2020	0.0351	0.0351	XR5777	GW
	ug/L	SS2-2	4/12/2020	0.0355	0.0355	XR5778	GW
	ug/L	SS2-3	4/12/2020	0.0235	0.0235	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	0.0198	0.0198	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.0123	0.0123	XR5781	GW
	ug/L	SS3-4	4/13/2020	0.0503	0.0503	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.0262	0.0262	XR6032	GW
	ug/L	SS3-6	4/13/2020	0.0483	0.0483	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.0422	0.0422	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.0213	0.0213	XR6035	GW
	ug/L	SS3-8	4/13/2020	0.0495	0.0495	XR6036	GW
	ug/L	SS4-4	4/14/2020	0.0711	0.0711	XR5669	GW
	ug/L	SS4-5	4/14/2020	0.0346	0.0346	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.110	0.11	XR6025	GW
	ug/L	SS5-4	4/13/2020	0.0397	0.0397	XR6026	GW
	ug/L	SS5-5	4/13/2020	0.0373	0.0373	XR6027	GW
Cobalt (Co) - Total	ug/L	CONTROL 1	4/13/2020	0.0281	0.0281	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.0274	0.0274	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.0378	0.0378	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5675	GW
	ug/L	SS1-4	4/12/2020	0.0478	0.0478	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	0.0565	0.0565	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	0.0205	0.0205	XR6024	GW
	ug/L	SS2-1	4/12/2020	0.0542	0.0542	XR5777	GW
	ug/L	SS2-2	4/12/2020	0.0335	0.0335	XR5778	GW
	ug/L	SS2-3	4/12/2020	0.0249	0.0249	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	0.0229	0.0229	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.0107	0.0107	XR5781	GW
	ug/L	SS3-4	4/13/2020	0.0550	0.055	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.0452	0.0452	XR6032	GW
	ug/L	SS3-6	4/13/2020	0.0566	0.0566	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.0670	0.067	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.0829	0.0829	XR6035	GW
	ug/L	SS3-8	4/13/2020	0.0884	0.0884	XR6036	GW
	ug/L	SS4-4	4/14/2020	0.0233	0.0233	XR5669	GW
	ug/L	SS4-5	4/14/2020	0.0354	0.0354	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.150	0.15	XR6025	GW
	ug/L	SS5-4	4/13/2020	0.0410	0.041	XR6026	GW
	ug/L	SS5-5	4/13/2020	0.0400	0.04	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Conductivity	us/cm	CONTROL 1	4/13/2020	2.3	2.3	XR5671	GW
	us/cm	CONTROL 2	4/14/2020	2.1	2.1	XR5672	GW
	us/cm	CONTROL 3	4/13/2020	2.2	2.2	XR5673	GW
	us/cm	SS BAG	4/17/2020	<1.0	0.5	XR5674	EBW
	us/cm	SS BAG	4/17/2020	<1.0	0.5	XR5675	GW
	us/cm	SS1-4	4/12/2020	2.1	2.1	XR6022	DUPW1
	us/cm	SS1-4	4/12/2020	2.2	2.2	XR6023	DUPW2
	us/cm	SS1-5	4/12/2020	3.1	3.1	XR6024	GW
	us/cm	SS2-1	4/12/2020	2.0	2	XR5777	GW
	us/cm	SS2-2	4/12/2020	2.1	2.1	XR5778	GW
	us/cm	SS2-3	4/12/2020	1.9	1.9	XR5779	DUPW1
	us/cm	SS2-3	4/12/2020	2.1	2.1	XR5780	DUPW2
	us/cm	SS2-4	4/11/2020	2.3	2.3	XR5781	GW
	us/cm	SS3-4	4/13/2020	4.4	4.4	XR6031	GW
	us/cm	SS3-5	4/13/2020	2.3	2.3	XR6032	GW
	us/cm	SS3-6	4/13/2020	9.8	9.8	XR6033	DUPW1
	us/cm	SS3-6	4/13/2020	10.0	10	XR6034	DUPW2
	us/cm	SS3-7	4/13/2020	13.1	13.1	XR6035	GW
	us/cm	SS3-8	4/13/2020	9.2	9.2	XR6036	GW
	us/cm	SS4-4	4/14/2020	3.7	3.7	XR5669	GW
	us/cm	SS4-5	4/14/2020	1.9	1.9	XR5670	GW
	us/cm	SS5-3	4/13/2020	3.6	3.6	XR6025	GW
	us/cm	SS5-4	4/13/2020	2.1	2.1	XR6026	GW
	us/cm	SS5-5	4/13/2020	2.3	2.3	XR6027	GW
Copper (Cu) - Dissolved	ug/L	CONTROL 1	4/13/2020	0.101	0.101	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.073	0.073	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.092	0.092	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5675	GW
	ug/L	SS1-4	4/12/2020	0.121	0.121	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	0.139	0.139	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	0.094	0.094	XR6024	GW
	ug/L	SS2-1	4/12/2020	0.095	0.095	XR5777	GW
	ug/L	SS2-2	4/12/2020	0.148	0.148	XR5778	GW
	ug/L	SS2-3	4/12/2020	0.132	0.132	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	0.056	0.056	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.120	0.12	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.050	0.025	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.056	0.056	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.050	0.025	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.078	0.078	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.062	0.062	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.050	0.025	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.050	0.025	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.050	0.025	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.185	0.185	XR6025	GW
	ug/L	SS5-4	4/13/2020	0.075	0.075	XR6026	GW
	ug/L	SS5-5	4/13/2020	0.084	0.084	XR6027	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Copper (Cu) - Total	ug/L	CONTROL 1	4/13/2020	0.070	0.07	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.096	0.096	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.105	0.105	XR5673	GW
	ug/L	SS BAG	4/17/2020	0.089	0.089	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5675	GW
	ug/L	SS1-4	4/12/2020	0.149	0.149	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	0.163	0.163	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	0.193	0.193	XR6024	GW
	ug/L	SS2-1	4/12/2020	0.315	0.315	XR5777	GW
	ug/L	SS2-2	4/12/2020	0.115	0.115	XR5778	GW
	ug/L	SS2-3	4/12/2020	0.067	0.067	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	0.064	0.064	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.135	0.135	XR5781	GW
	ug/L	SS3-4	4/13/2020	0.128	0.128	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.065	0.065	XR6032	GW
	ug/L	SS3-6	4/13/2020	0.095	0.095	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.119	0.119	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.180	0.18	XR6035	GW
	ug/L	SS3-8	4/13/2020	0.216	0.216	XR6036	GW
	ug/L	SS4-4	4/14/2020	0.132	0.132	XR5669	GW
	ug/L	SS4-5	4/14/2020	0.094	0.094	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.447	0.447	XR6025	GW
	ug/L	SS5-4	4/13/2020	0.137	0.137	XR6026	GW
	ug/L	SS5-5	4/13/2020	0.103	0.103	XR6027	GW
Fluoride (F)	mg/L	CONTROL 1	4/13/2020	<0.010	0.005	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	<0.010	0.005	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.016	0.016	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.010	0.005	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.010	0.005	XR5675	GW
	mg/L	SS1-4	4/12/2020	<0.010	0.005	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.010	0.01	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	<0.010	0.005	XR6024	GW
	mg/L	SS2-1	4/12/2020	<0.010	0.005	XR5777	GW
	mg/L	SS2-2	4/12/2020	<0.010	0.005	XR5778	GW
	mg/L	SS2-3	4/12/2020	<0.010	0.005	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	<0.010	0.005	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	<0.010	0.005	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.012	0.012	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.010	0.01	XR6032	GW
	mg/L	SS3-6	4/13/2020	0.011	0.011	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	0.012	0.012	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	0.012	0.012	XR6035	GW
	mg/L	SS3-8	4/13/2020	0.011	0.011	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.012	0.012	XR5669	GW
	mg/L	SS4-5	4/14/2020	<0.010	0.005	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.011	0.011	XR6025	GW
	mg/L	SS5-4	4/13/2020	0.010	0.01	XR6026	GW
	mg/L	SS5-5	4/13/2020	<0.010	0.005	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Hardness (as $CaCO_3$) - Dissolved	mg/L	CONTROL 1	4/13/2020	0.53	0.53	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.51	0.51	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.55	0.55	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5675	GW
	mg/L	SS1-4	4/12/2020	<0.50	0.25	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.54	0.54	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.63	0.63	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.69	0.69	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.61	0.61	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.53	0.53	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	<0.50	0.25	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	<0.50	0.25	XR5781	GW
	mg/L	SS3-4	4/13/2020	1.93	1.93	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.65	0.65	XR6032	GW
	mg/L	SS3-6	4/13/2020	4.06	4.06	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	4.21	4.21	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	5.13	5.13	XR6035	GW
	mg/L	SS3-8	4/13/2020	3.68	3.68	XR6036	GW
	mg/L	SS4-4	4/14/2020	1.08	1.08	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.70	0.7	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.99	0.99	XR6025	GW
	mg/L	SS5-4	4/13/2020	<0.50	0.25	XR6026	GW
	mg/L	SS5-5	4/13/2020	<0.50	0.25	XR6027	GW
Hardness (as $CACO_3$) - Total	mg/L	CONTROL 1	4/13/2020	<0.50	0.25	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.50	0.5	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.54	0.54	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.52	0.52	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.58	0.58	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.63	0.63	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.66	0.66	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.54	0.54	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.51	0.51	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	<0.50	0.25	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	<0.50	0.25	XR5781	GW
	mg/L	SS3-4	4/13/2020	1.89	1.89	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.58	0.58	XR6032	GW
	mg/L	SS3-6	4/13/2020	3.94	3.94	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	3.65	3.65	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	5.52	5.52	XR6035	GW
	mg/L	SS3-8	4/13/2020	3.92	3.92	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.93	0.93	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.58	0.58	XR5670	GW
	mg/L	SS5-3	4/13/2020	1.23	1.23	XR6025	GW
	mg/L	SS5-4	4/13/2020	<0.50	0.25	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.50	0.5	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Hydroxide (OH)	mg/L	CONTROL 1	4/13/2020	<0.50	0.25	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	<0.50	0.25	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	<0.50	0.25	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5675	GW
	mg/L	SS1-4	4/12/2020	<0.50	0.25	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	<0.50	0.25	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	<0.50	0.25	XR6024	GW
	mg/L	SS2-1	4/12/2020	<0.50	0.25	XR5777	GW
	mg/L	SS2-2	4/12/2020	<0.50	0.25	XR5778	GW
	mg/L	SS2-3	4/12/2020	<0.50	0.25	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	<0.50	0.25	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	<0.50	0.25	XR5781	GW
	mg/L	SS3-4	4/13/2020	<0.50	0.25	XR6031	GW
	mg/L	SS3-5	4/13/2020	<0.50	0.25	XR6032	GW
	mg/L	SS3-6	4/13/2020	<0.50	0.25	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	<0.50	0.25	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	<0.50	0.25	XR6035	GW
	mg/L	SS3-8	4/13/2020	<0.50	0.25	XR6036	GW
	mg/L	SS4-4	4/14/2020	<0.50	0.25	XR5669	GW
	mg/L	SS4-5	4/14/2020	<0.50	0.25	XR5670	GW
	mg/L	SS5-3	4/13/2020	<0.50	0.25	XR6025	GW
	mg/L	SS5-4	4/13/2020	<0.50	0.25	XR6026	GW
	mg/L	SS5-5	4/13/2020	<0.50	0.25	XR6027	GW
Iron (Fe) - Dissolved	ug/L	CONTROL 1	4/13/2020	7.6	7.6	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	20.8	20.8	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	21.1	21.1	XR5673	GW
	ug/L	SS BAG	4/17/2020	2.7	2.7	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<1.0	0.5	XR5675	GW
	ug/L	SS1-4	4/12/2020	3.6	3.6	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	3.5	3.5	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	3.5	3.5	XR6024	GW
	ug/L	SS2-1	4/12/2020	1.7	1.7	XR5777	GW
	ug/L	SS2-2	4/12/2020	4.3	4.3	XR5778	GW
	ug/L	SS2-3	4/12/2020	3.0	3	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	3.4	3.4	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	3.8	3.8	XR5781	GW
	ug/L	SS3-4	4/13/2020	7.0	7	XR6031	GW
	ug/L	SS3-5	4/13/2020	3.7	3.7	XR6032	GW
	ug/L	SS3-6	4/13/2020	6.5	6.5	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	8.2	8.2	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	7.7	7.7	XR6035	GW
	ug/L	SS3-8	4/13/2020	12.9	12.9	XR6036	GW
	ug/L	SS4-4	4/14/2020	8.4	8.4	XR5669	GW
	ug/L	SS4-5	4/14/2020	7.8	7.8	XR5670	GW
	ug/L	SS5-3	4/13/2020	8.1	8.1	XR6025	GW
	ug/L	SS5-4	4/13/2020	5.1	5.1	XR6026	GW
	ug/L	SS5-5	4/13/2020	4.3	4.3	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Iron (Fe) - Total	ug/L	CONTROL 1	4/13/2020	8.9	8.9	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	16.8	16.8	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	22.7	22.7	XR5673	GW
	ug/L	SS BAG	4/17/2020	4.4	4.4	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<1.0	0.5	XR5675	GW
	ug/L	SS1-4	4/12/2020	17.5	17.5	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	19.7	19.7	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	3.9	3.9	XR6024	GW
	ug/L	SS2-1	4/12/2020	6.4	6.4	XR5777	GW
	ug/L	SS2-2	4/12/2020	10.7	10.7	XR5778	GW
	ug/L	SS2-3	4/12/2020	10.0	10	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	8.7	8.7	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	4.3	4.3	XR5781	GW
	ug/L	SS3-4	4/13/2020	33.9	33.9	XR6031	GW
	ug/L	SS3-5	4/13/2020	10.3	10.3	XR6032	GW
	ug/L	SS3-6	4/13/2020	29.4	29.4	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	37.1	37.1	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	65.6	65.6	XR6035	GW
	ug/L	SS3-8	4/13/2020	56.5	56.5	XR6036	GW
	ug/L	SS4-4	4/14/2020	3.9	3.9	XR5669	GW
	ug/L	SS4-5	4/14/2020	15.7	15.7	XR5670	GW
	ug/L	SS5-3	4/13/2020	85.3	85.3	XR6025	GW
	ug/L	SS5-4	4/13/2020	16.5	16.5	XR6026	GW
	ug/L	SS5-5	4/13/2020	22.0	22	XR6027	GW
Lead (Pb) - Dissolved	ug/L	CONTROL 1	4/13/2020	0.0250	0.025	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.0338	0.0338	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.0351	0.0351	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5675	GW
	ug/L	SS1-4	4/12/2020	0.0072	0.0072	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	0.0067	0.0067	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	0.0179	0.0179	XR6024	GW
	ug/L	SS2-1	4/12/2020	0.0159	0.0159	XR5777	GW
	ug/L	SS2-2	4/12/2020	0.0164	0.0164	XR5778	GW
	ug/L	SS2-3	4/12/2020	0.0072	0.0072	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	0.0059	0.0059	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.0158	0.0158	XR5781	GW
	ug/L	SS3-4	4/13/2020	0.0152	0.0152	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.0077	0.0077	XR6032	GW
	ug/L	SS3-6	4/13/2020	0.0119	0.0119	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.0157	0.0157	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.0155	0.0155	XR6035	GW
	ug/L	SS3-8	4/13/2020	0.0238	0.0238	XR6036	GW
	ug/L	SS4-4	4/14/2020	0.0168	0.0168	XR5669	GW
	ug/L	SS4-5	4/14/2020	0.0197	0.0197	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.0254	0.0254	XR6025	GW
	ug/L	SS5-4	4/13/2020	0.0087	0.0087	XR6026	GW
	ug/L	SS5-5	4/13/2020	0.0089	0.0089	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Lead (Pb) - Total	ug/L	CONTROL 1	4/13/2020	0.0235	0.0235	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.0389	0.0389	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.0428	0.0428	XR5673	GW
	ug/L	SS BAG	4/17/2020	0.0212	0.0212	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5675	GW
	ug/L	SS1-4	4/12/2020	0.0365	0.0365	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	0.0318	0.0318	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	0.0219	0.0219	XR6024	GW
	ug/L	SS2-1	4/12/2020	0.0382	0.0382	XR5777	GW
	ug/L	SS2-2	4/12/2020	0.0281	0.0281	XR5778	GW
	ug/L	SS2-3	4/12/2020	0.0200	0.02	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	0.0208	0.0208	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.0174	0.0174	XR5781	GW
	ug/L	SS3-4	4/13/2020	0.0593	0.0593	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.0206	0.0206	XR6032	GW
	ug/L	SS3-6	4/13/2020	0.0594	0.0594	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.0718	0.0718	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.128	0.128	XR6035	GW
	ug/L	SS3-8	4/13/2020	0.163	0.163	XR6036	GW
	ug/L	SS4-4	4/14/2020	0.0118	0.0118	XR5669	GW
	ug/L	SS4-5	4/14/2020	0.0442	0.0442	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.354	0.354	XR6025	GW
	ug/L	SS5-4	4/13/2020	0.0334	0.0334	XR6026	GW
	ug/L	SS5-5	4/13/2020	0.0329	0.0329	XR6027	GW
Lithium (Li) - Dissolved	ug/L	CONTROL 1	4/13/2020	<0.50	0.25	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.50	0.25	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.50	0.25	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.50	0.25	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.50	0.25	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.50	0.25	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.50	0.25	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.50	0.25	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.50	0.25	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.50	0.25	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.50	0.25	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.50	0.25	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.50	0.25	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.50	0.25	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.50	0.25	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.50	0.25	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.50	0.25	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<0.50	0.25	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.50	0.25	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.50	0.25	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.50	0.25	XR5670	GW
	ug/L	SS5-3	4/13/2020	<0.50	0.25	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.50	0.25	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.50	0.25	XR6027	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Lithium (Li) - Total	ug/L	CONTROL 1	4/13/2020	<0.50	0.25	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.50	0.25	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.50	0.25	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.50	0.25	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.50	0.25	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.50	0.25	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.50	0.25	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.50	0.25	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.50	0.25	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.50	0.25	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.50	0.25	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.50	0.25	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.50	0.25	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.50	0.25	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.50	0.25	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.50	0.25	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.50	0.25	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<0.50	0.25	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.50	0.25	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.50	0.25	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.50	0.25	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.55	0.55	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.50	0.25	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.50	0.25	XR6027	GW
Magnesium (Mg) - Dissolved	mg/L	CONTROL 1	4/13/2020	0.0376	0.0376	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.0420	0.042	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.0418	0.0418	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.0338	0.0338	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.0403	0.0403	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.0513	0.0513	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.0374	0.0374	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.0371	0.0371	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.0277	0.0277	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.0236	0.0236	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	0.0221	0.0221	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.0883	0.0883	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.0390	0.039	XR6032	GW
	mg/L	SS3-6	4/13/2020	0.145	0.145	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	0.144	0.144	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	0.178	0.178	XR6035	GW
	mg/L	SS3-8	4/13/2020	0.150	0.15	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.0882	0.0882	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.0407	0.0407	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.0788	0.0788	XR6025	GW
	mg/L	SS5-4	4/13/2020	0.0347	0.0347	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.0387	0.0387	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Magnesium (Mg) - Total	mg/L	CONTROL 1	4/13/2020	0.0316	0.0316	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.0441	0.0441	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.0436	0.0436	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.0439	0.0439	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.0508	0.0508	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.0573	0.0573	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.0411	0.0411	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.0385	0.0385	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.0304	0.0304	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.0291	0.0291	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	0.0221	0.0221	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.117	0.117	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.0393	0.0393	XR6032	GW
	mg/L	SS3-6	4/13/2020	0.145	0.145	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	0.148	0.148	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	0.234	0.234	XR6035	GW
	mg/L	SS3-8	4/13/2020	0.194	0.194	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.0246	0.0246	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.0471	0.0471	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.117	0.117	XR6025	GW
	mg/L	SS5-4	4/13/2020	0.0433	0.0433	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.0503	0.0503	XR6027	GW
Manganese (Mn) - Dissolved	ug/L	CONTROL 1	4/13/2020	1.20	1.2	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	1.42	1.42	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	1.52	1.52	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5675	GW
	ug/L	SS1-4	4/12/2020	1.98	1.98	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	2.73	2.73	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	0.468	0.468	XR6024	GW
	ug/L	SS2-1	4/12/2020	1.08	1.08	XR5777	GW
	ug/L	SS2-2	4/12/2020	1.10	1.1	XR5778	GW
	ug/L	SS2-3	4/12/2020	0.879	0.879	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	0.709	0.709	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.532	0.532	XR5781	GW
	ug/L	SS3-4	4/13/2020	2.31	2.31	XR6031	GW
	ug/L	SS3-5	4/13/2020	1.30	1.3	XR6032	GW
	ug/L	SS3-6	4/13/2020	2.76	2.76	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	2.46	2.46	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	1.54	1.54	XR6035	GW
	ug/L	SS3-8	4/13/2020	2.70	2.7	XR6036	GW
	ug/L	SS4-4	4/14/2020	3.02	3.02	XR5669	GW
	ug/L	SS4-5	4/14/2020	1.07	1.07	XR5670	GW
	ug/L	SS5-3	4/13/2020	9.54	9.54	XR6025	GW
	ug/L	SS5-4	4/13/2020	1.97	1.97	XR6026	GW
	ug/L	SS5-5	4/13/2020	1.75	1.75	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Manganese (Mn) - Total	ug/L	CONTROL 1	4/13/2020	1.39	1.39	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	1.75	1.75	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	1.78	1.78	XR5673	GW
	ug/L	SS BAG	4/17/2020	0.636	0.636	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5675	GW
	ug/L	SS1-4	4/12/2020	2.36	2.36	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	3.07	3.07	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	0.588	0.588	XR6024	GW
	ug/L	SS2-1	4/12/2020	1.18	1.18	XR5777	GW
	ug/L	SS2-2	4/12/2020	1.42	1.42	XR5778	GW
	ug/L	SS2-3	4/12/2020	1.05	1.05	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	0.896	0.896	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.369	0.369	XR5781	GW
	ug/L	SS3-4	4/13/2020	2.44	2.44	XR6031	GW
	ug/L	SS3-5	4/13/2020	1.24	1.24	XR6032	GW
	ug/L	SS3-6	4/13/2020	4.10	4.1	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	4.46	4.46	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	2.69	2.69	XR6035	GW
	ug/L	SS3-8	4/13/2020	3.92	3.92	XR6036	GW
	ug/L	SS4-4	4/14/2020	4.31	4.31	XR5669	GW
	ug/L	SS4-5	4/14/2020	1.46	1.46	XR5670	GW
	ug/L	SS5-3	4/13/2020	11.7	11.7	XR6025	GW
	ug/L	SS5-4	4/13/2020	2.28	2.28	XR6026	GW
	ug/L	SS5-5	4/13/2020	2.28	2.28	XR6027	GW
Mercury (Hg) - Total	ug/L	CONTROL 1	4/13/2020	<0.0019	0.00095	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.0019	0.00095	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.0019	0.00095	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.0019	0.00095	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.0019	0.00095	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.0019	0.00095	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.0019	0.00095	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.0019	0.00095	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.0019	0.00095	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.0019	0.00095	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.0019	0.00095	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.0019	0.00095	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.0019	0.00095	XR5781	GW
	ug/L	SS3-4	4/13/2020	0.0030	0.003	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.0019	0.00095	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.0019	0.00095	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.0019	0.00095	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.0027	0.0027	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.0019	0.00095	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.0019	0.00095	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.0019	0.00095	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.0041	0.0041	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.0019	0.00095	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.0019	0.00095	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Molybdenum (Mo) - Dissolved	ug/L	CONTROL 1	4/13/2020	<0.050	0.025	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.050	0.025	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.050	0.025	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	2.15	2.15	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.050	0.025	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.050	0.025	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	2.16	2.16	XR6024	GW
	ug/L	SS2-1	4/12/2020	1.77	1.77	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.050	0.025	XR5778	GW
	ug/L	SS2-3	4/12/2020	1.82	1.82	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.050	0.025	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.050	0.025	XR5781	GW
	ug/L	SS3-4	4/13/2020	0.054	0.054	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.050	0.025	XR6032	GW
	ug/L	SS3-6	4/13/2020	0.094	0.094	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.084	0.084	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.109	0.109	XR6035	GW
	ug/L	SS3-8	4/13/2020	0.120	0.12	XR6036	GW
	ug/L	SS4-4	4/14/2020	0.120	0.12	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.050	0.025	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.062	0.062	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.050	0.025	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.050	0.025	XR6027	GW
Molybdenum (Mo) - Total	ug/L	CONTROL 1	4/13/2020	<0.050	0.025	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.050	0.025	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.050	0.025	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.050	0.025	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.050	0.025	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.050	0.025	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.050	0.025	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.050	0.025	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.050	0.025	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.050	0.025	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.050	0.025	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.050	0.025	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.050	0.025	XR6032	GW
	ug/L	SS3-6	4/13/2020	0.077	0.077	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.076	0.076	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.105	0.105	XR6035	GW
	ug/L	SS3-8	4/13/2020	0.120	0.12	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.050	0.025	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.050	0.025	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.065	0.065	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.050	0.025	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.050	0.025	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Nickel (Ni) - Dissolved	ug/L	CONTROL 1	4/13/2020	0.272	0.272	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.416	0.416	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.435	0.435	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.020	0.01	XR5674	EBW
	ug/L	SS BAG	4/17/2020	0.021	0.021	XR5675	GW
	ug/L	SS1-4	4/12/2020	0.484	0.484	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	0.534	0.534	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	0.172	0.172	XR6024	GW
	ug/L	SS2-1	4/12/2020	0.431	0.431	XR5777	GW
	ug/L	SS2-2	4/12/2020	0.499	0.499	XR5778	GW
	ug/L	SS2-3	4/12/2020	0.271	0.271	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	0.283	0.283	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.135	0.135	XR5781	GW
	ug/L	SS3-4	4/13/2020	1.29	1.29	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.532	0.532	XR6032	GW
	ug/L	SS3-6	4/13/2020	1.13	1.13	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	1.15	1.15	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.760	0.76	XR6035	GW
	ug/L	SS3-8	4/13/2020	1.43	1.43	XR6036	GW
	ug/L	SS4-4	4/14/2020	1.14	1.14	XR5669	GW
	ug/L	SS4-5	4/14/2020	0.352	0.352	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.789	0.789	XR6025	GW
	ug/L	SS5-4	4/13/2020	0.422	0.422	XR6026	GW
	ug/L	SS5-5	4/13/2020	0.425	0.425	XR6027	GW
Nickel (Ni) - Total	ug/L	CONTROL 1	4/13/2020	0.169	0.169	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.461	0.461	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.459	0.459	XR5673	GW
	ug/L	SS BAG	4/17/2020	0.048	0.048	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.020	0.01	XR5675	GW
	ug/L	SS1-4	4/12/2020	0.564	0.564	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	0.618	0.618	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	0.185	0.185	XR6024	GW
	ug/L	SS2-1	4/12/2020	0.425	0.425	XR5777	GW
	ug/L	SS2-2	4/12/2020	0.424	0.424	XR5778	GW
	ug/L	SS2-3	4/12/2020	0.326	0.326	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	0.302	0.302	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.155	0.155	XR5781	GW
	ug/L	SS3-4	4/13/2020	1.44	1.44	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.503	0.503	XR6032	GW
	ug/L	SS3-6	4/13/2020	1.10	1.1	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	1.11	1.11	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	1.30	1.3	XR6035	GW
	ug/L	SS3-8	4/13/2020	1.72	1.72	XR6036	GW
	ug/L	SS4-4	4/14/2020	1.50	1.5	XR5669	GW
	ug/L	SS4-5	4/14/2020	0.372	0.372	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.891	0.891	XR6025	GW
	ug/L	SS5-4	4/13/2020	0.501	0.501	XR6026	GW
	ug/L	SS5-5	4/13/2020	0.522	0.522	XR6027	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Nitrate (N)	mg/L	CONTROL 1	4/13/2020	0.060	0.06	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.075	0.075	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.078	0.078	XR5673	GW
	mg/L	SS BAG	4/17/2020	0.0031	0.0031	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.0020	0.001	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.057	0.057	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.050	0.05	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.080	0.08	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.046	0.046	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.058	0.058	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.053	0.053	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.069	0.069	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	0.071	0.071	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.057	0.057	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.046	0.046	XR6032	GW
	mg/L	SS3-6	4/13/2020	0.061	0.061	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	0.062	0.062	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	0.081	0.081	XR6035	GW
	mg/L	SS3-8	4/13/2020	0.088	0.088	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.092	0.092	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.040	0.04	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.096	0.096	XR6025	GW
	mg/L	SS5-4	4/13/2020	0.064	0.064	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.070	0.07	XR6027	GW
Nitrate plus Nitrite (N)	mg/L	CONTROL 1	4/13/2020	0.065	0.065	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.079	0.079	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.085	0.085	XR5673	GW
	mg/L	SS BAG	4/17/2020	0.0050	0.005	XR5674	EBW
	mg/L	SS BAG	4/17/2020	0.0027	0.0027	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.061	0.061	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.055	0.055	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.085	0.085	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.051	0.051	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.062	0.062	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.057	0.057	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.071	0.071	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	0.075	0.075	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.062	0.062	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.052	0.052	XR6032	GW
	mg/L	SS3-6	4/13/2020	0.066	0.066	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	0.069	0.069	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	0.086	0.086	XR6035	GW
	mg/L	SS3-8	4/13/2020	0.091	0.091	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.096	0.096	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.043	0.043	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.10	0.1	XR6025	GW
	mg/L	SS5-4	4/13/2020	0.068	0.068	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.077	0.077	XR6027	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Nitrite (N)	mg/L	CONTROL 1	4/13/2020	0.0052	0.0052	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.0044	0.0044	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.0071	0.0071	XR5673	GW
	mg/L	SS BAG	4/17/2020	0.0019	0.0019	XR5674	EBW
	mg/L	SS BAG	4/17/2020	0.0027	0.0027	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.0041	0.0041	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.0046	0.0046	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.0046	0.0046	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.0046	0.0046	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.0041	0.0041	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.0038	0.0038	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.0023	0.0023	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	0.0045	0.0045	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.0051	0.0051	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.0057	0.0057	XR6032	GW
	mg/L	SS3-6	4/13/2020	0.0050	0.005	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	0.0065	0.0065	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	0.0051	0.0051	XR6035	GW
	mg/L	SS3-8	4/13/2020	0.0034	0.0034	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.0048	0.0048	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.0037	0.0037	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.0051	0.0051	XR6025	GW
	mg/L	SS5-4	4/13/2020	0.0047	0.0047	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.0069	0.0069	XR6027	GW
Nitrogen (N) - Total	mg/L	CONTROL 1	4/13/2020	0.20	0.2	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.19	0.19	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.21	0.21	XR5673	GW
	mg/L	SS BAG	4/17/2020	0.064	0.064	XR5674	EBW
	mg/L	SS BAG	4/17/2020	0.078	0.078	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.18	0.18	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.17	0.17	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.18	0.18	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.20	0.2	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.18	0.18	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.15	0.15	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.17	0.17	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	0.16	0.16	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.20	0.2	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.17	0.17	XR6032	GW
	mg/L	SS3-6	4/13/2020	0.20	0.2	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	0.20	0.2	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	0.27	0.27	XR6035	GW
	mg/L	SS3-8	4/13/2020	0.24	0.24	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.21	0.21	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.16	0.16	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.30	0.3	XR6025	GW
	mg/L	SS5-4	4/13/2020	0.19	0.19	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.20	0.2	XR6027	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Orthophosphate (PO4-P)	mg/L	CONTROL 1	4/13/2020	0.021	0.021	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.0032	0.0032	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.013	0.013	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.0010	0.0005	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.0010	0.0005	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.0028	0.0028	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.0023	0.0023	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.0019	0.0019	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.0048	0.0048	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.012	0.012	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.0066	0.0066	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.0059	0.0059	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	<0.0010	0.0005	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.0062	0.0062	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.013	0.013	XR6032	GW
	mg/L	SS3-6	4/13/2020	0.0038	0.0038	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	0.015	0.015	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	0.0066	0.0066	XR6035	GW
	mg/L	SS3-8	4/13/2020	0.0083	0.0083	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.015	0.015	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.010	0.01	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.0031	0.0031	XR6025	GW
	mg/L	SS5-4	4/13/2020	0.013	0.013	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.0041	0.0041	XR6027	GW
pH	pH	CONTROL 1	4/13/2020	4.91	4.91	XR5671	GW
	pH	CONTROL 2	4/14/2020	4.72	4.72	XR5672	GW
	pH	CONTROL 3	4/13/2020	4.96	4.96	XR5673	GW
	pH	SS BAG	4/17/2020	5.09	5.09	XR5674	EBW
	pH	SS BAG	4/17/2020	4.81	4.81	XR5675	GW
	pH	SS1-4	4/12/2020	5.25	5.25	XR6022	DUPW1
	pH	SS1-4	4/12/2020	4.96	4.96	XR6023	DUPW2
	pH	SS1-5	4/12/2020	5.12	5.12	XR6024	GW
	pH	SS2-1	4/12/2020	4.96	4.96	XR5777	GW
	pH	SS2-2	4/12/2020	4.15	4.15	XR5778	GW
	pH	SS2-3	4/12/2020	5.33	5.33	XR5779	DUPW1
	pH	SS2-3	4/12/2020	5.50	5.5	XR5780	DUPW2
	pH	SS2-4	4/11/2020	4.68	4.68	XR5781	GW
	pH	SS3-4	4/13/2020	6.16	6.16	XR6031	GW
	pH	SS3-5	4/13/2020	5.72	5.72	XR6032	GW
	pH	SS3-6	4/13/2020	6.74	6.74	XR6033	DUPW1
	pH	SS3-6	4/13/2020	6.62	6.62	XR6034	DUPW2
	pH	SS3-7	4/13/2020	6.97	6.97	XR6035	GW
	pH	SS3-8	4/13/2020	6.65	6.65	XR6036	GW
	pH	SS4-4	4/14/2020	6.08	6.08	XR5669	GW
	pH	SS4-5	4/14/2020	4.25	4.25	XR5670	GW
	pH	SS5-3	4/13/2020	5.96	5.96	XR6025	GW
	pH	SS5-4	4/13/2020	5.10	5.1	XR6026	GW
	pH	SS5-5	4/13/2020	4.92	4.92	XR6027	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Phosphorus (P) - Dissolved (TDP	mg/L	CONTROL 1	4/13/2020	0.0310	0.031	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.0053	0.0053	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.0283	0.0283	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.0020	0.001	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.0020	0.001	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.0039	0.0039	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.0037	0.0037	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.0053	0.0053	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.0055	0.0055	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.0254	0.0254	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.0110	0.011	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.0084	0.0084	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	<0.0020	0.001	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.0060	0.006	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.0201	0.0201	XR6032	GW
	mg/L	SS3-6	4/13/2020	0.0024	0.0024	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	0.0253	0.0253	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	0.0069	0.0069	XR6035	GW
	mg/L	SS3-8	4/13/2020	0.0105	0.0105	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.0230	0.023	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.0196	0.0196	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.0033	0.0033	XR6025	GW
	mg/L	SS5-4	4/13/2020	0.0206	0.0206	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.0062	0.0062	XR6027	GW
Phosphorus (P) - Total	mg/L	CONTROL 1	4/13/2020	0.0359	0.0359	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.0076	0.0076	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.0460	0.046	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.0020	0.001	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.0020	0.001	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.0175	0.0175	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.0173	0.0173	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.0100	0.01	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.0217	0.0217	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.0405	0.0405	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.0201	0.0201	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.0157	0.0157	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	<0.0020	0.001	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.0644	0.0644	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.0376	0.0376	XR6032	GW
	mg/L	SS3-6	4/13/2020	0.0842	0.0842	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	0.0758	0.0758	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	0.141	0.141	XR6035	GW
	mg/L	SS3-8	4/13/2020	0.0923	0.0923	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.0574	0.0574	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.0363	0.0363	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.318	0.318	XR6025	GW
	mg/L	SS5-4	4/13/2020	0.0541	0.0541	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.0242	0.0242	XR6027	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Potassium (K) - Dissolved	mg/L	CONTROL 1	4/13/2020	0.020	0.02	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.031	0.031	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.032	0.032	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.010	0.005	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.010	0.005	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.035	0.035	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.037	0.037	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.039	0.039	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.029	0.029	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.020	0.02	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.019	0.019	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.017	0.017	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	0.018	0.018	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.056	0.056	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.021	0.021	XR6032	GW
	mg/L	SS3-6	4/13/2020	0.086	0.086	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	0.091	0.091	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	0.111	0.111	XR6035	GW
	mg/L	SS3-8	4/13/2020	0.090	0.09	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.093	0.093	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.030	0.03	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.105	0.105	XR6025	GW
	mg/L	SS5-4	4/13/2020	0.026	0.026	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.027	0.027	XR6027	GW
Potassium (K) - Total	mg/L	CONTROL 1	4/13/2020	0.019	0.019	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.035	0.035	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.039	0.039	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.010	0.005	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.010	0.005	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.073	0.073	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.078	0.078	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.043	0.043	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.026	0.026	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.023	0.023	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.018	0.018	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.016	0.016	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	0.010	0.01	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.059	0.059	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.060	0.06	XR6032	GW
	mg/L	SS3-6	4/13/2020	0.089	0.089	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	0.102	0.102	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	0.144	0.144	XR6035	GW
	mg/L	SS3-8	4/13/2020	0.120	0.12	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.015	0.015	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.045	0.045	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.158	0.158	XR6025	GW
	mg/L	SS5-4	4/13/2020	0.034	0.034	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.041	0.041	XR6027	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Selenium (Se) - Dissolved	ug/L	CONTROL 1	4/13/2020	<0.040	0.02	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.040	0.02	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.040	0.02	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.040	0.02	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.040	0.02	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.040	0.02	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.040	0.02	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.040	0.02	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.040	0.02	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.040	0.02	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.040	0.02	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.040	0.02	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.040	0.02	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.040	0.02	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.040	0.02	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.040	0.02	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.040	0.02	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<0.040	0.02	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.040	0.02	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.040	0.02	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.040	0.02	XR5670	GW
	ug/L	SS5-3	4/13/2020	<0.040	0.02	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.040	0.02	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.040	0.02	XR6027	GW
Selenium (Se) - Total	ug/L	CONTROL 1	4/13/2020	<0.040	0.02	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.040	0.02	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.040	0.02	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.040	0.02	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.040	0.02	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.040	0.02	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.040	0.02	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.040	0.02	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.040	0.02	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.040	0.02	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.040	0.02	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.040	0.02	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.040	0.02	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.040	0.02	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.040	0.02	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.040	0.02	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.040	0.02	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<0.040	0.02	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.040	0.02	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.040	0.02	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.040	0.02	XR5670	GW
	ug/L	SS5-3	4/13/2020	<0.040	0.02	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.040	0.02	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.040	0.02	XR6027	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Silicon (Si) - Dissolved	ug/L	CONTROL 1	4/13/2020	<50	25	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<50	25	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<50	25	XR5673	GW
	ug/L	SS BAG	4/17/2020	<50	25	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<50	25	XR5675	GW
	ug/L	SS1-4	4/12/2020	<50	25	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<50	25	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<50	25	XR6024	GW
	ug/L	SS2-1	4/12/2020	<50	25	XR5777	GW
	ug/L	SS2-2	4/12/2020	<50	25	XR5778	GW
	ug/L	SS2-3	4/12/2020	<50	25	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<50	25	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<50	25	XR5781	GW
	ug/L	SS3-4	4/13/2020	110	110	XR6031	GW
	ug/L	SS3-5	4/13/2020	<50	25	XR6032	GW
	ug/L	SS3-6	4/13/2020	287	287	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	303	303	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	372	372	XR6035	GW
	ug/L	SS3-8	4/13/2020	241	241	XR6036	GW
	ug/L	SS4-4	4/14/2020	<50	25	XR5669	GW
	ug/L	SS4-5	4/14/2020	<50	25	XR5670	GW
	ug/L	SS5-3	4/13/2020	72	72	XR6025	GW
	ug/L	SS5-4	4/13/2020	<50	25	XR6026	GW
	ug/L	SS5-5	4/13/2020	<50	25	XR6027	GW
Silicon (Si) - Total	ug/L	CONTROL 1	4/13/2020	<50	25	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<50	25	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<50	25	XR5673	GW
	ug/L	SS BAG	4/17/2020	<50	25	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<50	25	XR5675	GW
	ug/L	SS1-4	4/12/2020	<50	25	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<50	25	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<50	25	XR6024	GW
	ug/L	SS2-1	4/12/2020	<50	25	XR5777	GW
	ug/L	SS2-2	4/12/2020	<50	25	XR5778	GW
	ug/L	SS2-3	4/12/2020	<50	25	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<50	25	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<50	25	XR5781	GW
	ug/L	SS3-4	4/13/2020	128	128	XR6031	GW
	ug/L	SS3-5	4/13/2020	<50	25	XR6032	GW
	ug/L	SS3-6	4/13/2020	306	306	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	284	284	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	423	423	XR6035	GW
	ug/L	SS3-8	4/13/2020	268	268	XR6036	GW
	ug/L	SS4-4	4/14/2020	<50	25	XR5669	GW
	ug/L	SS4-5	4/14/2020	<50	25	XR5670	GW
	ug/L	SS5-3	4/13/2020	128	128	XR6025	GW
	ug/L	SS5-4	4/13/2020	<50	25	XR6026	GW
	ug/L	SS5-5	4/13/2020	<50	25	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Silver (Ag) - Dissolved	ug/L	CONTROL 1	4/13/2020	<0.0050	0.0025	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.0050	0.0025	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.0050	0.0025	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.0050	0.0025	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.0050	0.0025	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.0050	0.0025	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.0050	0.0025	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.0050	0.0025	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.0050	0.0025	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.0050	0.0025	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.0050	0.0025	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.0050	0.0025	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.0050	0.0025	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.0050	0.0025	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.0050	0.0025	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<0.0050	0.0025	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.0050	0.0025	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.0050	0.0025	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.0050	0.0025	XR5670	GW
	ug/L	SS5-3	4/13/2020	<0.0050	0.0025	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.0050	0.0025	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.0050	0.0025	XR6027	GW
Silver (Ag) - Total	ug/L	CONTROL 1	4/13/2020	<0.0050	0.0025	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.0050	0.0025	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.0050	0.0025	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.0050	0.0025	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.0050	0.0025	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.0050	0.0025	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.0050	0.0025	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.0050	0.0025	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.0050	0.0025	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.0050	0.0025	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.0050	0.0025	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.0050	0.0025	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.0050	0.0025	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.0050	0.0025	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.0050	0.0025	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.0050	0.0025	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<0.0050	0.0025	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.0050	0.0025	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.0050	0.0025	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.0050	0.0025	XR5670	GW
	ug/L	SS5-3	4/13/2020	<0.0050	0.0025	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.0050	0.0025	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.0050	0.0025	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Sodium (Na) - Dissolved	mg/L	CONTROL 1	4/13/2020	0.119	0.119	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.050	0.05	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.100	0.1	XR5673	GW
	mg/L	SS BAG	4/17/2020	0.010	0.01	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.010	0.005	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.082	0.082	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.089	0.089	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.145	0.145	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.058	0.058	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.091	0.091	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.065	0.065	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.055	0.055	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	0.058	0.058	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.080	0.08	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.076	0.076	XR6032	GW
	mg/L	SS3-6	4/13/2020	0.088	0.088	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	0.143	0.143	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	0.107	0.107	XR6035	GW
	mg/L	SS3-8	4/13/2020	0.102	0.102	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.176	0.176	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.099	0.099	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.110	0.11	XR6025	GW
	mg/L	SS5-4	4/13/2020	0.083	0.083	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.086	0.086	XR6027	GW
Sodium (Na) - Total	mg/L	CONTROL 1	4/13/2020	0.101	0.101	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.048	0.048	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.092	0.092	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.010	0.005	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.010	0.005	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.069	0.069	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.086	0.086	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.145	0.145	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.052	0.052	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.082	0.082	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.052	0.052	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.046	0.046	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	0.041	0.041	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.071	0.071	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.070	0.07	XR6032	GW
	mg/L	SS3-6	4/13/2020	0.090	0.09	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	0.113	0.113	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	0.098	0.098	XR6035	GW
	mg/L	SS3-8	4/13/2020	0.095	0.095	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.054	0.054	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.075	0.075	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.105	0.105	XR6025	GW
	mg/L	SS5-4	4/13/2020	0.081	0.081	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.090	0.09	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Strontium (Sr) - Dissolved	ug/L	CONTROL 1	4/13/2020	0.489	0.489	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.560	0.56	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.729	0.729	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5675	GW
	ug/L	SS1-4	4/12/2020	0.874	0.874	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	0.982	0.982	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	1.27	1.27	XR6024	GW
	ug/L	SS2-1	4/12/2020	0.938	0.938	XR5777	GW
	ug/L	SS2-2	4/12/2020	0.723	0.723	XR5778	GW
	ug/L	SS2-3	4/12/2020	0.505	0.505	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	0.450	0.45	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.406	0.406	XR5781	GW
	ug/L	SS3-4	4/13/2020	2.48	2.48	XR6031	GW
	ug/L	SS3-5	4/13/2020	1.12	1.12	XR6032	GW
	ug/L	SS3-6	4/13/2020	4.10	4.1	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	3.95	3.95	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	5.14	5.14	XR6035	GW
	ug/L	SS3-8	4/13/2020	4.16	4.16	XR6036	GW
	ug/L	SS4-4	4/14/2020	2.02	2.02	XR5669	GW
	ug/L	SS4-5	4/14/2020	0.925	0.925	XR5670	GW
	ug/L	SS5-3	4/13/2020	2.21	2.21	XR6025	GW
	ug/L	SS5-4	4/13/2020	0.900	0.9	XR6026	GW
	ug/L	SS5-5	4/13/2020	0.653	0.653	XR6027	GW
Strontium (Sr) - Total	ug/L	CONTROL 1	4/13/2020	0.358	0.358	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.602	0.602	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.855	0.855	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5675	GW
	ug/L	SS1-4	4/12/2020	0.994	0.994	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	1.29	1.29	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	1.27	1.27	XR6024	GW
	ug/L	SS2-1	4/12/2020	0.890	0.89	XR5777	GW
	ug/L	SS2-2	4/12/2020	0.722	0.722	XR5778	GW
	ug/L	SS2-3	4/12/2020	0.529	0.529	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	0.440	0.44	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.314	0.314	XR5781	GW
	ug/L	SS3-4	4/13/2020	2.43	2.43	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.981	0.981	XR6032	GW
	ug/L	SS3-6	4/13/2020	3.38	3.38	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	3.24	3.24	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	5.07	5.07	XR6035	GW
	ug/L	SS3-8	4/13/2020	3.85	3.85	XR6036	GW
	ug/L	SS4-4	4/14/2020	2.26	2.26	XR5669	GW
	ug/L	SS4-5	4/14/2020	0.855	0.855	XR5670	GW
	ug/L	SS5-3	4/13/2020	2.37	2.37	XR6025	GW
	ug/L	SS5-4	4/13/2020	0.768	0.768	XR6026	GW
	ug/L	SS5-5	4/13/2020	0.877	0.877	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Sulphate (SO_4) - Dissolved	mg/L	CONTROL 1	4/13/2020	<0.50	0.25	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	<0.50	0.25	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	<0.50	0.25	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5675	GW
	mg/L	SS1-4	4/12/2020	<0.50	0.25	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	<0.50	0.25	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	<0.50	0.25	XR6024	GW
	mg/L	SS2-1	4/12/2020	<0.50	0.25	XR5777	GW
	mg/L	SS2-2	4/12/2020	<0.50	0.25	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.52	0.52	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	<0.50	0.25	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	<0.50	0.25	XR5781	GW
	mg/L	SS3-4	4/13/2020	<0.50	0.25	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.53	0.53	XR6032	GW
	mg/L	SS3-6	4/13/2020	<0.50	0.25	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	<0.50	0.25	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	0.61	0.61	XR6035	GW
	mg/L	SS3-8	4/13/2020	<0.50	0.25	XR6036	GW
	mg/L	SS4-4	4/14/2020	<0.50	0.25	XR5669	GW
	mg/L	SS4-5	4/14/2020	<0.50	0.25	XR5670	GW
	mg/L	SS5-3	4/13/2020	<0.50	0.25	XR6025	GW
	mg/L	SS5-4	4/13/2020	1.5	1.5	XR6026	GW
	mg/L	SS5-5	4/13/2020	1.0	1	XR6027	GW
Sulphur (S) - Dissolved	mg/L	CONTROL 1	4/13/2020	<0.50	0.25	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	<0.50	0.25	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	<0.50	0.25	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5675	GW
	mg/L	SS1-4	4/12/2020	<0.50	0.25	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	<0.50	0.25	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	<0.50	0.25	XR6024	GW
	mg/L	SS2-1	4/12/2020	<0.50	0.25	XR5777	GW
	mg/L	SS2-2	4/12/2020	<0.50	0.25	XR5778	GW
	mg/L	SS2-3	4/12/2020	<0.50	0.25	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	<0.50	0.25	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	0.52	0.52	XR5781	GW
	mg/L	SS3-4	4/13/2020	<0.50	0.25	XR6031	GW
	mg/L	SS3-5	4/13/2020	<0.50	0.25	XR6032	GW
	mg/L	SS3-6	4/13/2020	<0.50	0.25	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	<0.50	0.25	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	<0.50	0.25	XR6035	GW
	mg/L	SS3-8	4/13/2020	<0.50	0.25	XR6036	GW
	mg/L	SS4-4	4/14/2020	<0.50	0.25	XR5669	GW
	mg/L	SS4-5	4/14/2020	<0.50	0.25	XR5670	GW
	mg/L	SS5-3	4/13/2020	<0.50	0.25	XR6025	GW
	mg/L	SS5-4	4/13/2020	<0.50	0.25	XR6026	GW
	mg/L	SS5-5	4/13/2020	<0.50	0.25	XR6027	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Sulphur (S) - Total	mg/L	CONTROL 1	4/13/2020	<0.50	0.25	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	<0.50	0.25	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	<0.50	0.25	XR5673	GW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5675	GW
	mg/L	SS1-4	4/12/2020	<0.50	0.25	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	<0.50	0.25	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	<0.50	0.25	XR6024	GW
	mg/L	SS2-1	4/12/2020	<0.50	0.25	XR5777	GW
	mg/L	SS2-2	4/12/2020	<0.50	0.25	XR5778	GW
	mg/L	SS2-3	4/12/2020	<0.50	0.25	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	<0.50	0.25	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	<0.50	0.25	XR5781	GW
	mg/L	SS3-4	4/13/2020	<0.50	0.25	XR6031	GW
	mg/L	SS3-5	4/13/2020	<0.50	0.25	XR6032	GW
	mg/L	SS3-6	4/13/2020	<0.50	0.25	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	<0.50	0.25	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	<0.50	0.25	XR6035	GW
	mg/L	SS3-8	4/13/2020	<0.50	0.25	XR6036	GW
	mg/L	SS4-4	4/14/2020	<0.50	0.25	XR5669	GW
	mg/L	SS4-5	4/14/2020	<0.50	0.25	XR5670	GW
	mg/L	SS5-3	4/13/2020	<0.50	0.25	XR6025	GW
	mg/L	SS5-4	4/13/2020	<0.50	0.25	XR6026	GW
	mg/L	SS5-5	4/13/2020	<0.50	0.25	XR6027	GW
Thallium (Tl) - Dissolved	ug/L	CONTROL 1	4/13/2020	<0.0020	0.001	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.0020	0.001	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.0020	0.001	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.0020	0.001	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.0020	0.001	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.0020	0.001	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.0020	0.001	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.0020	0.001	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.0020	0.001	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.0020	0.001	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.0020	0.001	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.0020	0.001	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.0020	0.001	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.0020	0.001	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.0020	0.001	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.0020	0.001	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.0020	0.001	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<0.0020	0.001	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.0020	0.001	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.0020	0.001	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.0020	0.001	XR5670	GW
	ug/L	SS5-3	4/13/2020	<0.0020	0.001	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.0020	0.001	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.0020	0.001	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Thallium (Tl) - Total	ug/L	CONTROL 1	4/13/2020	<0.0020	0.001	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.0020	0.001	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.0023	0.0023	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.0020	0.001	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.0020	0.001	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.0020	0.001	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.0020	0.001	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.0020	0.001	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.0020	0.001	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.0020	0.001	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.0020	0.001	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.0020	0.001	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.0020	0.001	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.0020	0.001	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.0020	0.001	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.0020	0.001	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.0020	0.002	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.0033	0.0033	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.0020	0.001	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.0020	0.001	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.0020	0.001	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.0037	0.0037	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.0020	0.001	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.0020	0.001	XR6027	GW
Tin (Sn) - Dissolved	ug/L	CONTROL 1	4/13/2020	<0.010	0.005	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.010	0.005	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.010	0.005	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.010	0.005	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.010	0.005	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.010	0.005	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.010	0.005	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.010	0.005	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.010	0.005	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.010	0.005	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.010	0.005	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.010	0.005	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.010	0.005	XR5781	GW
	ug/L	SS3-4	4/13/2020	0.012	0.012	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.010	0.005	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.010	0.005	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.010	0.005	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<0.010	0.005	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.010	0.005	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.010	0.005	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.010	0.005	XR5670	GW
	ug/L	SS5-3	4/13/2020	<0.010	0.005	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.010	0.005	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.010	0.005	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Tin (Sn) - Total	ug/L	CONTROL 1	4/13/2020	<0.010	0.005	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.010	0.005	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.010	0.005	XR5673	GW
	ug/L	SS BAG	4/17/2020	0.012	0.012	XR5674	EBW
	ug/L	SS BAG	4/17/2020	0.011	0.011	XR5675	GW
	ug/L	SS1-4	4/12/2020	0.017	0.017	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	0.016	0.016	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.010	0.005	XR6024	GW
	ug/L	SS2-1	4/12/2020	0.011	0.011	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.010	0.005	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.010	0.005	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.010	0.005	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.014	0.014	XR5781	GW
	ug/L	SS3-4	4/13/2020	0.035	0.035	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.010	0.005	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.010	0.005	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.010	0.005	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.011	0.011	XR6035	GW
	ug/L	SS3-8	4/13/2020	0.011	0.011	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.010	0.005	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.010	0.005	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.012	0.012	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.010	0.005	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.010	0.005	XR6027	GW
Titanium (Ti) - Dissolved	ug/L	CONTROL 1	4/13/2020	<0.50	0.25	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.65	0.65	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.94	0.94	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.50	0.25	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.50	0.25	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.50	0.25	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.50	0.25	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.50	0.25	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.50	0.25	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.50	0.25	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.50	0.25	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.50	0.25	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.50	0.25	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.50	0.25	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.50	0.25	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.50	0.25	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.76	0.76	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<0.50	0.25	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.50	0.25	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.50	0.25	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.50	0.25	XR5670	GW
	ug/L	SS5-3	4/13/2020	<0.50	0.25	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.50	0.25	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.50	0.25	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Titanium (Ti) - Total	ug/L	CONTROL 1	4/13/2020	<0.50	0.25	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.61	0.61	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	1.07	1.07	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.50	0.25	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.50	0.25	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.50	0.25	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.50	0.25	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.50	0.25	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.50	0.25	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.50	0.25	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.50	0.25	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.50	0.25	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.50	0.25	XR5781	GW
	ug/L	SS3-4	4/13/2020	1.86	1.86	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.50	0.25	XR6032	GW
	ug/L	SS3-6	4/13/2020	1.20	1.2	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.88	0.88	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	2.72	2.72	XR6035	GW
	ug/L	SS3-8	4/13/2020	1.80	1.8	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.50	0.25	XR5669	GW
	ug/L	SS4-5	4/14/2020	1.20	1.2	XR5670	GW
	ug/L	SS5-3	4/13/2020	3.17	3.17	XR6025	GW
	ug/L	SS5-4	4/13/2020	0.83	0.83	XR6026	GW
	ug/L	SS5-5	4/13/2020	0.96	0.96	XR6027	GW
Total Dissolved Solids (TDS)	mg/L	CONTROL 1	4/13/2020	4.4	4.4	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	2.4	2.4	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	<1.0	0.5	XR5673	GW
	mg/L	SS BAG	4/17/2020	<1.0	0.5	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<1.0	0.5	XR5675	GW
	mg/L	SS1-4	4/12/2020	<1.0	0.5	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	2.8	2.8	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	<1.0	0.5	XR6024	GW
	mg/L	SS2-1	4/12/2020	<1.0	0.5	XR5777	GW
	mg/L	SS2-2	4/12/2020	<1.0	0.5	XR5778	GW
	mg/L	SS2-3	4/12/2020	3.6	3.6	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	<1.0	0.5	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	<1.0	0.5	XR5781	GW
	mg/L	SS3-4	4/13/2020	2.0	2	XR6031	GW
	mg/L	SS3-5	4/13/2020	<1.0	0.5	XR6032	GW
	mg/L	SS3-6	4/13/2020	5.6	5.6	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	4.0	4	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	7.2	7.2	XR6035	GW
	mg/L	SS3-8	4/13/2020	8.4	8.4	XR6036	GW
	mg/L	SS4-4	4/14/2020	4.8	4.8	XR5669	GW
	mg/L	SS4-5	4/14/2020	2.0	2	XR5670	GW
	mg/L	SS5-3	4/13/2020	<1.0	0.5	XR6025	GW
	mg/L	SS5-4	4/13/2020	<1.0	0.5	XR6026	GW
	mg/L	SS5-5	4/13/2020	<1.0	0.5	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Total Dissolved Solids (TDS) - Calculated	mg/L	CONTROL 1	4/13/2020	0.80	0.8	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	1.30	1.3	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	1.90	1.9	XR5673	GW
	mg/L	SS BAG	4/17/2020	0.90	0.9	XR5674	EBW
	mg/L	SS BAG	4/17/2020	<0.50	0.25	XR5675	GW
	mg/L	SS1-4	4/12/2020	1.70	1.7	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	1.40	1.4	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.80	0.8	XR6024	GW
	mg/L	SS2-1	4/12/2020	1.40	1.4	XR5777	GW
	mg/L	SS2-2	4/12/2020	1.30	1.3	XR5778	GW
	mg/L	SS2-3	4/12/2020	2.10	2.1	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	1.80	1.8	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	1.40	1.4	XR5781	GW
	mg/L	SS3-4	4/13/2020	2.90	2.9	XR6031	GW
	mg/L	SS3-5	4/13/2020	2.40	2.4	XR6032	GW
	mg/L	SS3-6	4/13/2020	5.00	5	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	5.10	5.1	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	6.90	6.9	XR6035	GW
	mg/L	SS3-8	4/13/2020	5.00	5	XR6036	GW
	mg/L	SS4-4	4/14/2020	2.30	2.3	XR5669	GW
	mg/L	SS4-5	4/14/2020	1.70	1.7	XR5670	GW
	mg/L	SS5-3	4/13/2020	2.90	2.9	XR6025	GW
	mg/L	SS5-4	4/13/2020	2.20	2.2	XR6026	GW
	mg/L	SS5-5	4/13/2020	2.60	2.6	XR6027	GW
Total Kjeldahl Nitrogen	mg/L	CONTROL 1	4/13/2020	0.14	0.14	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.11	0.11	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.13	0.13	XR5673	GW
	mg/L	SS BAG	4/17/2020	0.059	0.059	XR5674	EBW
	mg/L	SS BAG	4/17/2020	0.075	0.075	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.12	0.12	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.11	0.11	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.097	0.097	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.15	0.15	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.12	0.12	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.095	0.095	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.094	0.094	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	0.085	0.085	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.14	0.14	XR6031	GW
	mg/L	SS3-5	4/13/2020	0.11	0.11	XR6032	GW
	mg/L	SS3-6	4/13/2020	0.13	0.13	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	0.14	0.14	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	0.19	0.19	XR6035	GW
	mg/L	SS3-8	4/13/2020	0.15	0.15	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.12	0.12	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.11	0.11	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.20	0.2	XR6025	GW
	mg/L	SS5-4	4/13/2020	0.12	0.12	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.12	0.12	XR6027	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Total Organic Carbon (TOC)	mg/L	CONTROL 1	4/13/2020	1.1	1.1	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	0.79	0.79	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	0.87	0.87	XR5673	GW
	mg/L	SS BAG	4/17/2020	0.28	0.28	XR5674	EBW
	mg/L	SS BAG	4/17/2020	0.57	0.57	XR5675	GW
	mg/L	SS1-4	4/12/2020	0.48	0.48	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	0.86	0.86	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	0.53	0.53	XR6024	GW
	mg/L	SS2-1	4/12/2020	0.77	0.77	XR5777	GW
	mg/L	SS2-2	4/12/2020	0.69	0.69	XR5778	GW
	mg/L	SS2-3	4/12/2020	0.84	0.84	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	0.37	0.37	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	0.52	0.52	XR5781	GW
	mg/L	SS3-4	4/13/2020	0.48	0.48	XR6031	GW
	mg/L	SS3-5	4/13/2020	1.0	1	XR6032	GW
	mg/L	SS3-6	4/13/2020	1.2	1.2	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	0.71	0.71	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	0.60	0.6	XR6035	GW
	mg/L	SS3-8	4/13/2020	0.61	0.61	XR6036	GW
	mg/L	SS4-4	4/14/2020	0.91	0.91	XR5669	GW
	mg/L	SS4-5	4/14/2020	0.44	0.44	XR5670	GW
	mg/L	SS5-3	4/13/2020	0.87	0.87	XR6025	GW
	mg/L	SS5-4	4/13/2020	0.48	0.48	XR6026	GW
	mg/L	SS5-5	4/13/2020	0.97	0.97	XR6027	GW
Total Suspended Solids (TSS)	mg/L	CONTROL 1	4/13/2020	7.1	7.1	XR5671	GW
	mg/L	CONTROL 2	4/14/2020	9.9	9.9	XR5672	GW
	mg/L	CONTROL 3	4/13/2020	15	15	XR5673	GW
	mg/L	SS BAG	4/17/2020	<1.0	0.5	XR5674	EBW
	mg/L	SS BAG	4/17/2020	1.0	1	XR5675	GW
	mg/L	SS1-4	4/12/2020	19	19	XR6022	DUPW1
	mg/L	SS1-4	4/12/2020	18	18	XR6023	DUPW2
	mg/L	SS1-5	4/12/2020	6.1	6.1	XR6024	GW
	mg/L	SS2-1	4/12/2020	13	13	XR5777	GW
	mg/L	SS2-2	4/12/2020	15	15	XR5778	GW
	mg/L	SS2-3	4/12/2020	8.9	8.9	XR5779	DUPW1
	mg/L	SS2-3	4/12/2020	5.8	5.8	XR5780	DUPW2
	mg/L	SS2-4	4/11/2020	1.5	1.5	XR5781	GW
	mg/L	SS3-4	4/13/2020	42	42	XR6031	GW
	mg/L	SS3-5	4/13/2020	18	18	XR6032	GW
	mg/L	SS3-6	4/13/2020	61	61	XR6033	DUPW1
	mg/L	SS3-6	4/13/2020	62	62	XR6034	DUPW2
	mg/L	SS3-7	4/13/2020	87	87	XR6035	GW
	mg/L	SS3-8	4/13/2020	68	68	XR6036	GW
	mg/L	SS4-4	4/14/2020	32	32	XR5669	GW
	mg/L	SS4-5	4/14/2020	15	15	XR5670	GW
	mg/L	SS5-3	4/13/2020	210	210	XR6025	GW
	mg/L	SS5-4	4/13/2020	30	30	XR6026	GW
	mg/L	SS5-5	4/13/2020	22	22	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Turbidity	NTU	CONTROL 1	4/13/2020	4.3	4.3	XR5671	GW
	NTU	CONTROL 2	4/14/2020	1.9	1.9	XR5672	GW
	NTU	CONTROL 3	4/13/2020	4.0	4	XR5673	GW
	NTU	SS BAG	4/17/2020	0.64	0.64	XR5674	EBW
	NTU	SS BAG	4/17/2020	3.3	3.3	XR5675	GW
	NTU	SS1-4	4/12/2020	1.2	1.2	XR6022	DUPW1
	NTU	SS1-4	4/12/2020	2.6	2.6	XR6023	DUPW2
	NTU	SS1-5	4/12/2020	0.38	0.38	XR6024	GW
	NTU	SS2-1	4/12/2020	2.4	2.4	XR5777	GW
	NTU	SS2-2	4/12/2020	3.3	3.3	XR5778	GW
	NTU	SS2-3	4/12/2020	1.6	1.6	XR5779	DUPW1
	NTU	SS2-3	4/12/2020	2.6	2.6	XR5780	DUPW2
	NTU	SS2-4	4/11/2020	0.86	0.86	XR5781	GW
	NTU	SS3-4	4/13/2020	7.3	7.3	XR6031	GW
	NTU	SS3-5	4/13/2020	3.5	3.5	XR6032	GW
	NTU	SS3-6	4/13/2020	11	11	XR6033	DUPW1
	NTU	SS3-6	4/13/2020	10	10	XR6034	DUPW2
	NTU	SS3-7	4/13/2020	15	15	XR6035	GW
	NTU	SS3-8	4/13/2020	13	13	XR6036	GW
	NTU	SS4-4	4/14/2020	6.1	6.1	XR5669	GW
	NTU	SS4-5	4/14/2020	3.5	3.5	XR5670	GW
	NTU	SS5-3	4/13/2020	26	26	XR6025	GW
	NTU	SS5-4	4/13/2020	4.8	4.8	XR6026	GW
	NTU	SS5-5	4/13/2020	3.4	3.4	XR6027	GW
Uranium (U) - Dissolved	ug/L	CONTROL 1	4/13/2020	0.0384	0.0384	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.0378	0.0378	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.104	0.104	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.0020	0.001	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.0020	0.001	XR5675	GW
	ug/L	SS1-4	4/12/2020	0.0196	0.0196	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	0.0283	0.0283	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	0.0224	0.0224	XR6024	GW
	ug/L	SS2-1	4/12/2020	0.0350	0.035	XR5777	GW
	ug/L	SS2-2	4/12/2020	0.0537	0.0537	XR5778	GW
	ug/L	SS2-3	4/12/2020	0.0345	0.0345	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	0.0268	0.0268	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.0173	0.0173	XR5781	GW
	ug/L	SS3-4	4/13/2020	0.0909	0.0909	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.0385	0.0385	XR6032	GW
	ug/L	SS3-6	4/13/2020	0.115	0.115	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.187	0.187	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.129	0.129	XR6035	GW
	ug/L	SS3-8	4/13/2020	0.113	0.113	XR6036	GW
	ug/L	SS4-4	4/14/2020	0.104	0.104	XR5669	GW
	ug/L	SS4-5	4/14/2020	0.0530	0.053	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.688	0.688	XR6025	GW
	ug/L	SS5-4	4/13/2020	0.0724	0.0724	XR6026	GW
	ug/L	SS5-5	4/13/2020	0.0390	0.039	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Uranium (U) - Total	ug/L	CONTROL 1	4/13/2020	0.0293	0.0293	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.0405	0.0405	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.112	0.112	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.0020	0.001	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.0020	0.001	XR5675	GW
	ug/L	SS1-4	4/12/2020	0.0386	0.0386	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	0.0460	0.046	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	0.0304	0.0304	XR6024	GW
	ug/L	SS2-1	4/12/2020	0.0614	0.0614	XR5777	GW
	ug/L	SS2-2	4/12/2020	0.0474	0.0474	XR5778	GW
	ug/L	SS2-3	4/12/2020	0.0405	0.0405	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	0.0447	0.0447	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.0202	0.0202	XR5781	GW
	ug/L	SS3-4	4/13/2020	0.101	0.101	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.0439	0.0439	XR6032	GW
	ug/L	SS3-6	4/13/2020	0.194	0.194	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.200	0.2	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.214	0.214	XR6035	GW
	ug/L	SS3-8	4/13/2020	0.196	0.196	XR6036	GW
	ug/L	SS4-4	4/14/2020	0.163	0.163	XR5669	GW
	ug/L	SS4-5	4/14/2020	0.0508	0.0508	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.686	0.686	XR6025	GW
	ug/L	SS5-4	4/13/2020	0.120	0.12	XR6026	GW
	ug/L	SS5-5	4/13/2020	0.111	0.111	XR6027	GW
Vanadium (V) - Dissolved	ug/L	CONTROL 1	4/13/2020	0.060	0.06	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.050	0.025	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.070	0.07	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.050	0.025	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.050	0.025	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.050	0.025	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.050	0.025	XR5777	GW
	ug/L	SS2-2	4/12/2020	0.059	0.059	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.050	0.025	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.050	0.025	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.050	0.025	XR5781	GW
	ug/L	SS3-4	4/13/2020	0.087	0.087	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.055	0.055	XR6032	GW
	ug/L	SS3-6	4/13/2020	0.167	0.167	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.228	0.228	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.222	0.222	XR6035	GW
	ug/L	SS3-8	4/13/2020	0.174	0.174	XR6036	GW
	ug/L	SS4-4	4/14/2020	0.125	0.125	XR5669	GW
	ug/L	SS4-5	4/14/2020	0.084	0.084	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.091	0.091	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.050	0.025	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.050	0.025	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Vanadium (V) - Total	ug/L	CONTROL 1	4/13/2020	0.061	0.061	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.056	0.056	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.094	0.094	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.050	0.025	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	0.053	0.053	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.050	0.025	XR6024	GW
	ug/L	SS2-1	4/12/2020	0.051	0.051	XR5777	GW
	ug/L	SS2-2	4/12/2020	0.072	0.072	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.050	0.025	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.050	0.025	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.050	0.025	XR5781	GW
	ug/L	SS3-4	4/13/2020	0.123	0.123	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.062	0.062	XR6032	GW
	ug/L	SS3-6	4/13/2020	0.226	0.226	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.253	0.253	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.272	0.272	XR6035	GW
	ug/L	SS3-8	4/13/2020	0.202	0.202	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.050	0.025	XR5669	GW
	ug/L	SS4-5	4/14/2020	0.090	0.09	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.213	0.213	XR6025	GW
	ug/L	SS5-4	4/13/2020	0.063	0.063	XR6026	GW
	ug/L	SS5-5	4/13/2020	0.056	0.056	XR6027	GW
Zinc (Zn) - Dissolved	ug/L	CONTROL 1	4/13/2020	1.14	1.14	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	0.85	0.85	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.78	0.78	XR5673	GW
	ug/L	SS BAG	4/17/2020	0.16	0.16	XR5674	EBW
	ug/L	SS BAG	4/17/2020	0.40	0.4	XR5675	GW
	ug/L	SS1-4	4/12/2020	0.77	0.77	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	0.72	0.72	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	0.74	0.74	XR6024	GW
	ug/L	SS2-1	4/12/2020	0.84	0.84	XR5777	GW
	ug/L	SS2-2	4/12/2020	1.13	1.13	XR5778	GW
	ug/L	SS2-3	4/12/2020	0.69	0.69	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	0.47	0.47	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.53	0.53	XR5781	GW
	ug/L	SS3-4	4/13/2020	0.69	0.69	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.56	0.56	XR6032	GW
	ug/L	SS3-6	4/13/2020	0.39	0.39	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	0.72	0.72	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	0.39	0.39	XR6035	GW
	ug/L	SS3-8	4/13/2020	0.38	0.38	XR6036	GW
	ug/L	SS4-4	4/14/2020	4.56	4.56	XR5669	GW
	ug/L	SS4-5	4/14/2020	2.23	2.23	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.74	0.74	XR6025	GW
	ug/L	SS5-4	4/13/2020	0.85	0.85	XR6026	GW
	ug/L	SS5-5	4/13/2020	0.62	0.62	XR6027	GW

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Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Zinc (Zn) - Total	ug/L	CONTROL 1	4/13/2020	1.12	1.12	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	1.46	1.46	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	1.34	1.34	XR5673	GW
	ug/L	SS BAG	4/17/2020	0.94	0.94	XR5674	EBW
	ug/L	SS BAG	4/17/2020	0.46	0.46	XR5675	GW
	ug/L	SS1-4	4/12/2020	1.41	1.41	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	1.50	1.5	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	1.18	1.18	XR6024	GW
	ug/L	SS2-1	4/12/2020	1.00	1	XR5777	GW
	ug/L	SS2-2	4/12/2020	2.75	2.75	XR5778	GW
	ug/L	SS2-3	4/12/2020	0.91	0.91	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	0.84	0.84	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.95	0.95	XR5781	GW
	ug/L	SS3-4	4/13/2020	0.71	0.71	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.68	0.68	XR6032	GW
	ug/L	SS3-6	4/13/2020	0.94	0.94	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	1.03	1.03	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	1.23	1.23	XR6035	GW
	ug/L	SS3-8	4/13/2020	1.14	1.14	XR6036	GW
	ug/L	SS4-4	4/14/2020	0.94	0.94	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.10	0.05	XR5670	GW
	ug/L	SS5-3	4/13/2020	1.21	1.21	XR6025	GW
	ug/L	SS5-4	4/13/2020	1.13	1.13	XR6026	GW
	ug/L	SS5-5	4/13/2020	1.13	1.13	XR6027	GW
Zirconium (Zr) - Dissolved	ug/L	CONTROL 1	4/13/2020	<0.050	0.025	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.050	0.025	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	<0.050	0.025	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.050	0.025	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.050	0.025	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.050	0.025	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.050	0.025	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.050	0.025	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.050	0.025	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.050	0.025	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	0.069	0.069	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.050	0.025	XR6031	GW
	ug/L	SS3-5	4/13/2020	<0.050	0.025	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.050	0.025	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.050	0.025	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<0.050	0.025	XR6035	GW
	ug/L	SS3-8	4/13/2020	<0.050	0.025	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.050	0.025	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.050	0.025	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.055	0.055	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.050	0.025	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.050	0.025	XR6027	GW

Appendix D: Snow Water Chemistry Analytical Results

Parameter	Unit	Sample Point	Date	Data Point	Graphable Value	Lab Ref	Sample Type
Zirconium (Zr) - Total	ug/L	CONTROL 1	4/13/2020	<0.050	0.025	XR5671	GW
	ug/L	CONTROL 2	4/14/2020	<0.050	0.025	XR5672	GW
	ug/L	CONTROL 3	4/13/2020	0.051	0.051	XR5673	GW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5674	EBW
	ug/L	SS BAG	4/17/2020	<0.050	0.025	XR5675	GW
	ug/L	SS1-4	4/12/2020	<0.050	0.025	XR6022	DUPW1
	ug/L	SS1-4	4/12/2020	<0.050	0.025	XR6023	DUPW2
	ug/L	SS1-5	4/12/2020	<0.050	0.025	XR6024	GW
	ug/L	SS2-1	4/12/2020	<0.050	0.025	XR5777	GW
	ug/L	SS2-2	4/12/2020	<0.050	0.025	XR5778	GW
	ug/L	SS2-3	4/12/2020	<0.050	0.025	XR5779	DUPW1
	ug/L	SS2-3	4/12/2020	<0.050	0.025	XR5780	DUPW2
	ug/L	SS2-4	4/11/2020	<0.050	0.025	XR5781	GW
	ug/L	SS3-4	4/13/2020	<0.050	0.025	XR6031	GW
	ug/L	SS3-5	4/13/2020	0.059	0.059	XR6032	GW
	ug/L	SS3-6	4/13/2020	<0.050	0.025	XR6033	DUPW1
	ug/L	SS3-6	4/13/2020	<0.050	0.025	XR6034	DUPW2
	ug/L	SS3-7	4/13/2020	<0.050	0.025	XR6035	GW
	ug/L	SS3-8	4/13/2020	0.059	0.059	XR6036	GW
	ug/L	SS4-4	4/14/2020	<0.050	0.025	XR5669	GW
	ug/L	SS4-5	4/14/2020	<0.050	0.025	XR5670	GW
	ug/L	SS5-3	4/13/2020	0.087	0.087	XR6025	GW
	ug/L	SS5-4	4/13/2020	<0.050	0.025	XR6026	GW
	ug/L	SS5-5	4/13/2020	<0.050	0.025	XR6027	GW

APPENDIX E DUST GAUGE COLLECTION STANDARD OPERATING PROCEDURE (ENVR-508-0112)

Rio Tinto

Environment			
STANDARD OPERATING PROCEDURE			
Area No.:	**8000**	**Document #:**	**ENVI-908-0119**
		Revision:	**8**
Task Title:	**SOP – Dust Gauge Collection**		
Next Review:	**1 Year from Final Approval in Documentum**		
Effective Date:	**Date on approved stamp in footer.**		

1 REFERENCES/RELATED DOCUMENTS

1.1 **ENVI-904-0119 - SOP Total Suspended Solids** - Located in: Diavik Intranet - SOPs – Environment Folder

1.2 **ENVI-901-0119 – SOP General Laboratory Safety** - Located in: Diavik Intranet – SOPs – Environment Folder

1.3 **ENVI-919-0119 - SOP Snowmobiles** – Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.4 **ENVI-917-0119 - SOP Watercraft** – Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.5 **ENVI907-0119 - SOP Remote Field Safety** – Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.6 **ENVI-895-0119 - SOP Lightning Response –** Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.7 **ENVI-916-0119 – SOP Helicopter Usage -** Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.8 **ENVI-135-0112 - Remote Field Safety Permit Form** – Located in: P:\DDMI Environment\10.0 Operational Control\10.2 Forms\Current Forms\Approved\Remote Field Safety Plans

1.9 **ENVI-178-0312 - Dust Gauge Collection Field Sheet –** Located in: P:\DDMI Environment\10.0 Operational Control\10.2 Forms\Current Forms\Approved

Revision History			
Revision	**Revision Description**	**Date of Revision**	**Author**
0	Initial Release	11-Jan-12	D. Meredith
1	New SOP format, clarify procedures, adds photos.	23-Nov-14	D. Dul/ D. Bourassa
2	Format update	19-Jul-15	D. Birch
3	Annual Update	10-Feb-16	S. Sinclair
4	New Template, clarification of representative sampling, decrease in oven temperature to be consistent with Standard Methods	04-Nov-16/10-Nov-16	S. Martin-Elson/N. Goodman
5	Template and area manager updated	20-Oct-17	S. Skinner
6	Superintendent update	10-Mar-18	S. Skinner
7	Annual review	27-Feb-19	M. Nelson N. Goodman S. Skinner
8	Added section 6.4.4. (lab QAQC), annual review/Superintendent update	Nov 2020	N. Goodman

Authorized Electronically in Documentum By:	
Area Superintendent:	Kofi Boa-Antwi
Area Manager:	D. Patterson

CRITICAL RISKS

Other potential critical risks not currently assessed as part of this SOP

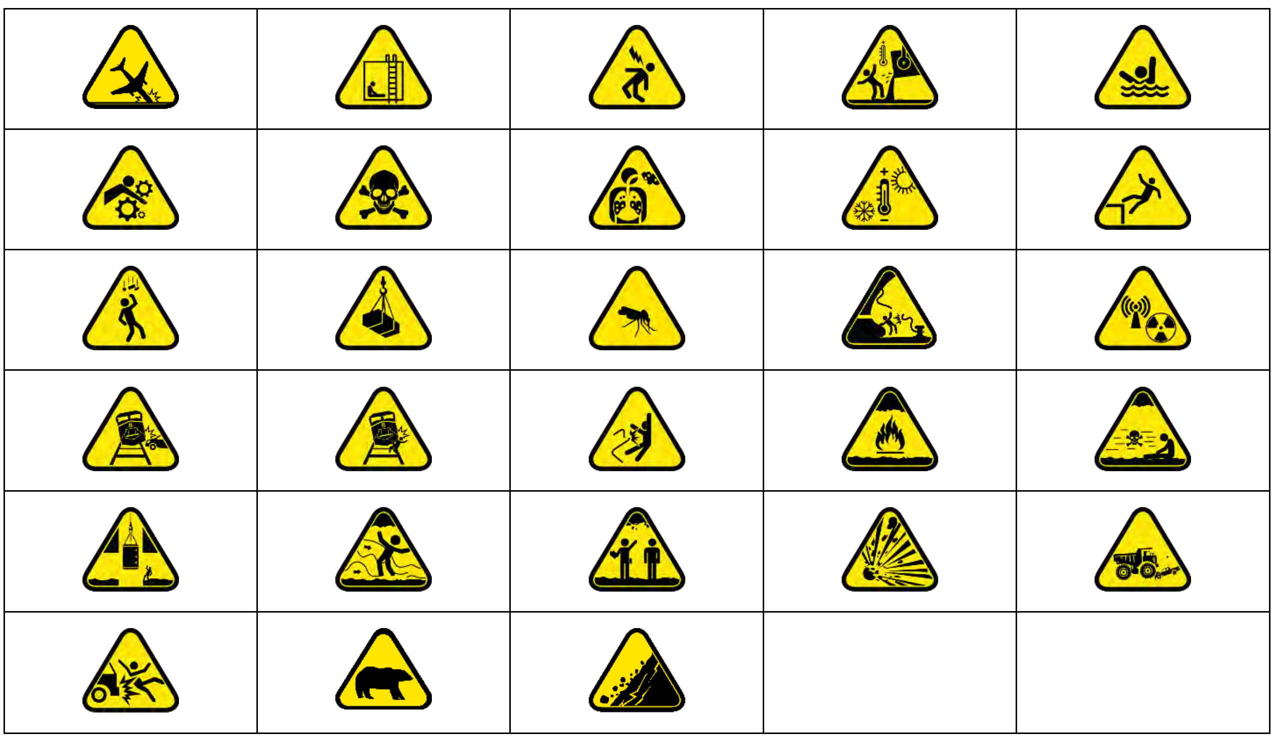


Figure 1: Dust Gauge Site 5 in the Summer

Figure 2: Dust Gauge Site 7 in the Winter

Figure 3: Dust Gauge Tubes prepared for storage

Description

This Standard Operating Procedure (SOP) provides guidelines on procedures to follow when carrying out Dust Gauge Collections.

2 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to outline the methodology for collecting dust gauge samples. This program is aimed at understanding dust deposition rates associated with project activities. Results collected from this program are compiled and included in the Appendix of the annual AEMP report.

3 SCOPE

3.1 Scope of Procedure

This SOP describes the responsibilities and processes for the deployment, collection and analysis of dust gauge samples. These procedures apply to all Diavik Mine personnel and contractor personnel authorized for sample collection activities.

3.2 Scope of Activities

Fourteen dust gauges (12 sample sites, plus 2 control sites) are established on and around East Island for monitoring airborne dust particles. The dust gauges are collected quarterly throughout the year.

4 DEFINITIONS

Definitions							
ACTS		Groundwater		PROVE		SOP	✓
AEMP	✓	JHA	✓	QA		TSS	✓
COC		NTU		QC		TSP	
DI water	✓	PAL		Remote work	✓	WHMIS	
DO		PFD	✓	SDS		WLWB	

ELT		PPE	✓	Seepage			
GPS	✓	Problem bear		SNP			

See: ENVI-443-0415 - Environment Term Definitions - Located in: Diavik Intranet – SOPs – Environment Folder

5 RESPONSIBILITIES

See: ENVI-444-0415 - Environment Roles and Responsibilities - Located in: Diavik Intranet – SOPs – Environment Folder

6 PROCEDURE

6.1 Key HSEQ Aspects

Task Hazards							
Aircraft	✓	Extreme Weather	✓	Line of Fire		Snowmobile Operation	✓
Burns	✓	Fall into Water	✓	Manual Labour		Spills	
Chemical Contact		Falling		Noise	✓	Sprain / Strain	✓
Confined Space		Fire		Overhead Objects		Stored Energy	
Cuts Scrapes	✓	Firearms / Deterrents		Perception		Uneven Terrain / Ground	✓
Dehydration		Fumes / Gases		Pinch Points	✓	Unfamiliar Area	✓
Electrical		Glass		Risk to Wildlife		Visibility	✓

Entanglement		**Heavy Equipment**		**Rotating Parts**	✓	**Watercraft Operation**	✓
Equipment Loss or Damage		**Lifting**		**Sample Loss or Damage**	✓	**Wildlife**	✓
Ergonomics	✓	**Light Vehicle**		**Slip, Trip, Fall**	✓	**Working Remotely**	✓

See: ENVI-445-0415 - Environment Hazard Definitions - Located in: Diavik Intranet – SOPs – Environment Folder

6.2 CRM Critical Risks

Critical Risk	**Critical Control**
Drowning	PFD
Vehicle collision or rollover	Seat Belt, Defensive driving, Segregation
Vehicle impact on person	Seat Belt, Defensive driving/walking, Segregation
Wildlife	Scans, Vehicles as means of safety
Thermal extremes	Weather checks, Remote field permit
Aircraft transport	PPE, Follow pilot’s directions

It is the responsibility of all personnel to adhere to the high health and safety standards used at Diavik. Personnel are required to complete all pre-task planning and safety checks. Queries about the appropriate permits and checks should be brought to the attention of the Supervisor or their delegate. Tasks should be executed to plan using the identified controls. Any deviations from plan should be assessed prior to proceeding with the remainder of the task. All incidents will be reported to the Supervisor or their delegate as soon as possible.

6.3 Tools Required

Supplies, Tools and Equipment			
Tool / Equipment	**Quantity**	**Tool / Equipment**	**Quantity**
Snowmobile (2), Boat or Helicopter	1	Winter/Summer/Boat Survival Gear (Set)	1
GPS/ Loaded Coordinates	2	Spare Batteries	4
Satellite Phone	1	Personal Gear (per person)	1
InReach per person	1	Wildlife Deterrents (air horn/banger kit)	1
Camera (per person)	1	Field Permit and Map	1
Radio with spare battery (per person)	1	Adjustable Wrench's	1
Forceps, Pliers, Tweezers	1	Field Sheets	14
Clean Replacement Sample Tubes	6	Pencils, Pens or Markers	2
Glass Beakers (1000 mL)	6	Large/Clear/Heavy-duty Plastic Bags or Gloves	6
High Temp Oven	1	TSS Filters	12 - 36
Fire Proof Gloves/Tongs	1	Duct Tape	12 - 36
Vice Grips	1	Snowshoes (seasonal) (pair per person) and cam straps	1

6.4 Procedural Steps

6.4.1 Pre-Deployment

Spare tubes are stored in the Environment field lab Shelf B3 with two XL nitrile gloves and plastic bag duct taped closed to prevent dust deposition. **Tubes needs to be cleaned and checked for leaks prior to storage**. To clean and check for leaks, fill spare tubes with water and leave overnight on counter in Environment Lab. If leaks are discovered tag out and make arrangements with truck shop to have them fixed.

6.4.2 Sample Collection and Deployment

Depending on location and season, samples are collected using various methods of transportation; you can walk, drive, boat, snowmobile or use a helicopter to access the various sites.

When using a Helicopter, a Hot Loading Variance is permitted (a JHA must be completed and signed off by HSE Manager). When accessing near-site stations on foot in the winter, snowshoes should be taken to provide safer access. If necessary, snowshoes can be strapped to the back of the snowmobile. The map in Figure 4 provides the Dust Gauge locations and coordinates.

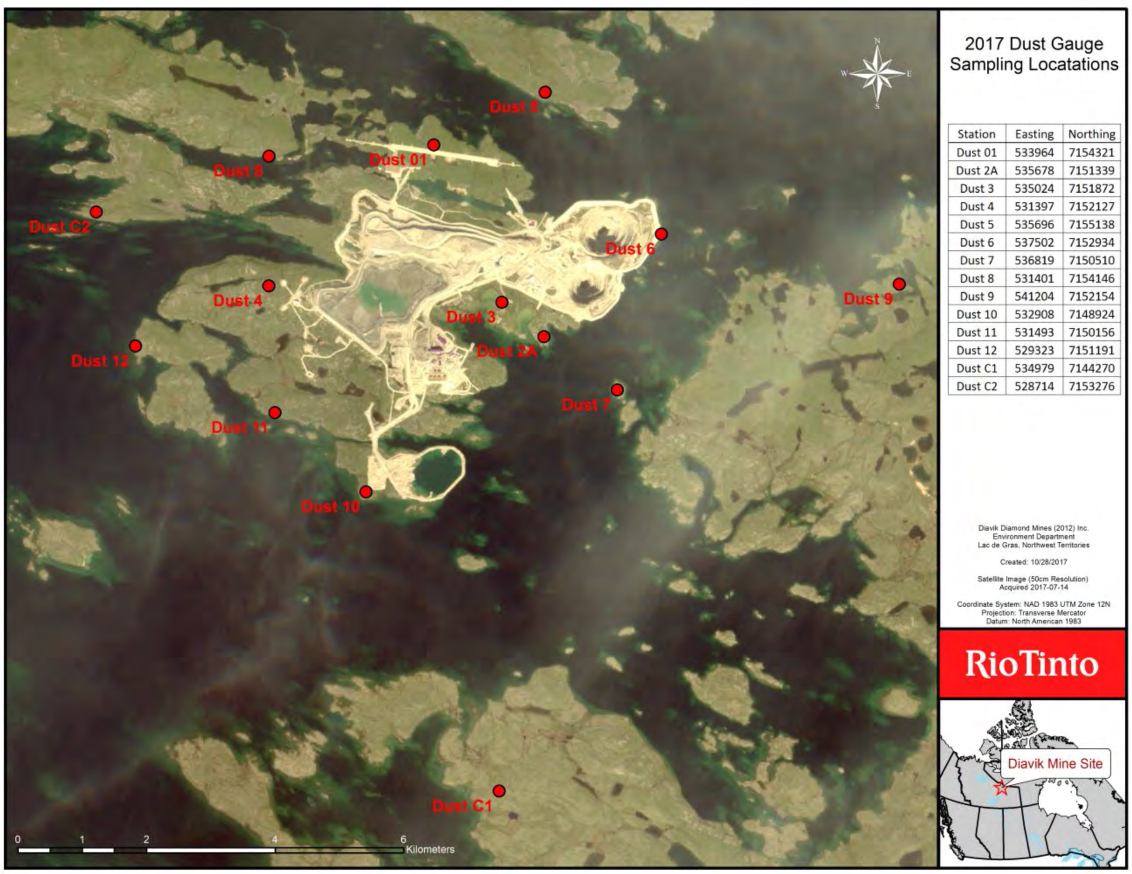


Figure 4: Dust Gauge Sites

When you arrive at the sample location, first inspect the station for damage (fiberglass tube on ground, station on angle etc.) and document anything noted on the Dust Gauge Collection Field Sheet - ENVI-178-0312.

Carefully remove the copper tube out from the center of the fiberglass shield, keeping it upright. If the tube is stuck or frozen, try wiggling it, or tapping it near the bottom. If the tube is still stuck, you may need extra leverage to free the tube and may, if absolutely necessary, use vice grips to grab the top and wiggle while pulling up. If it will not come free, you may have to remove the shield and pop the tube out. Be sure to replace the shield and insert a new tube afterwards. See Plates 1 & 2 below.

Plate 1: Tube Retrieval

Plate 2: Fiberglass Shield Removed

Once retrieved, keep the tube upright, place an extra-large latex glove over top of tube and seal with clean plastic bag and duct tape (Plate 3). Ensure tube is labelled with the station number, date and time collected. Always keep the tube upright and secure during transport.

Place a clean, leak tested tube into the fiberglass shield (the tube should be labelled with the Dust Gauge Site, deployment date and time). Note that tubes need to be *upright and secure in the base rims* in order for the sample to be considered representative. Some of the base rims are bent and the tubes will not sit in them properly. When this is the case, place rocks around the tube within the fiberglass shell to ensure that tube will stay upright. Caution should be exercised to avoid pinch points when placing rocks between the tube and shell.

Plate 3: Sealing the Tube

6.4.3 Sample Analysis

Once back in the Environment Lab, if snow is present, stand up the sample tube in a clean plastic bag (prevents sample loss if there is a leak) and allow samples to melt. Carefully transfer sample into a triple-rinsed 1000 ml glass beaker and record the total volume of water (before rinsing) on the Dust Gauge Collection Field Sheet- ENVI-178-0312. Extract all debris including bugs and twigs and be sure to triple rinse them into the beaker to capture all the dust particles. Rinse the copper tube with DI water until all dust particles are removed.

Cover the 1000 ml beaker with parafilm and store the sample in the fridge until samples can be analysed for Total Suspended Solids (ENVI-904-0119). This should be conducted as soon as possible because some solids may dissolve in water, especially after snow melt. Note that it may take multiple filters to complete one sample, and number of filters varies by season. Please refer to table 2 and use your best judgement when looking at the sample.

Table 2. Average number of filters required by season

Dust Gauge	Winter (Jan)	Spring (March)	Summer (Jun)	Fall (Sept)
1	1	2	4	2
2A	1	2	2	2
3	2	3	4	3
4	1	1	2	1
5	1	1	2	1
6	1	2	2	2
7	1	3	2	2
8	1	1	2	3
9	1	1	2	1
10	2	2	4	2
11	1	3	6	2
12	1	1	3	2
C1	1	1	1	1
C2	1	1	1	1

The resulting filter(s) with the dust particles are put into ceramic crucibles; ensure that you record the sample ID on the crucibles **in pencil** before putting them into the oven (1 filter per crucible, Plate 4). Ensure that you record the same information on the aluminium tins so that sample filters do not get mixed up.

Plate 4: Ceramic crucibles with filter

The high temperature oven is set up in the fume hood with the fan running. To avoid burns, heavy-duty fire-proof gloves and long tongs are used when placing or removing the crucibles from the oven. Filters are processed in the oven at 550 degrees Celsius for one hour. Allow oven to heat up to temperature before use. See Plates 5 & 6 below.

Plate 5: High Heat Oven

Plate 6: Fire Proof Glove and Long Tongs

When samples are removed from the oven, place the crucibles into their original labeled tin tray. Let the sample cool for at least 10 minutes before handling the tins and crucibles without heat resistant gloves. Place the tin tray into the desiccator and allow the sample to cool further for a minimum of one hour. Carefully remove the filters from their ceramic crucible using tweezers. Add any dust that has fallen off into the crucible to the top of the filter.

Weigh the filter according to the procedure outlined in the Total Suspended Solids SOP

Record the results on the Dust Gauge Data Form and in 13.14 Annual Dust Gauge Collection excel file for the given year on the P-Drive.

The dust fall deposition rate is determined using the equation below:

Daily Dust fall Deposition ($mg/dm_2/d$) = (TP (mg) / SA (dm_2)) / TDD (d)

Where:

TP (mg) = Total Particulate

SA (dm_2) = Surface Area of Dust Gauge Collection Tube = (3.14*(6.25*6.25)*100)

TDD = Total Days Gauge was Deployed

Calculations are setup in the excel file. If you have any questions about entering this data contact your supervisor.

6.4.4 Quality Assurance (QA) / Quality Control (QC)

6.4.4.1 Lab Blank Samples

Anytime that dust samples are collected and subsequently analyzed, a lab blank sample must be analyzed following the same procedure.

6.4.4.2 Equipment Blank

Before dust gauge collection occurs, an equipment blank must be collected and analyzed following the procedure outlined below:

1. Remove the nitrile gloves from the copper tube and fill the tube with DI water (the amount of water not important, however, DO NOT PRE-RINSE THE TUBE)
2. Transfer the liquid into a beaker and analyze the sample as per the procedure outlined in section 6.4.3.

7 QUALITY OUTCOMES AND EXPECTATIONS

The primary objectives for implementing this SOP are:

- To safety complete the tasks outlined in this SOP, without incident.
- To produce quality, accurate and repeatable results.

APPENDIX F SNOW CORE SURVEY STANDARD OPERATING PROCEDURE (ENVR-512-0213)

RioTinto

<table>
<tr><td colspan="4"><u>Environment</u>
STANDARD OPERATING PROCEDURE</td></tr>
<tr><td>Area No.:</td><td>8000</td><td>Document #:</td><td>ENVI-909-0119</td></tr>
<tr><td></td><td></td><td>Revision:</td><td>10</td></tr>
<tr><td>Task Title:</td><td colspan="3">Snow Core Survey</td></tr>
<tr><td>Next Review:</td><td colspan="3">1 Year from Final Approval in Documentum</td></tr>
<tr><td>Effective Date:</td><td colspan="3">Date on approved stamp in footer.</td></tr>
</table>

1 REFERENCES/RELATED DOCUMENTS

1.1 **ENVI-907-0119 – SOP Remote Field Safety -** Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.2 **ENVI-919-0119 - SOP Snowmobile -** Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.3 **ENVI-901-0119 - SOP General Laboratory Safety -** Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.4 **ENVI-902-0119 - SOP Quality Assurance and Quality Control -** Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.5 **ENVI-900-0119 - SOP Chain of Custody -** Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.6 **ENVI-904-0119 - SOP Total Suspended Solids Analysis -** Located in: P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

1.7 **ENVI-601-0916- Snowmobile Pre-Op Inspection -** Located in: P:\DDMI Environment\10.0 Operational Control\10.2 Forms\Current Forms\Approved\Check Sheets

1.8 **ENVI-135-0112 – Remote Field Safety Permit -** Located in: P:\DDMI Environment\10.0 Operational Control\10.2 Forms\Current Forms\Approved\Remote Field Safety Plans

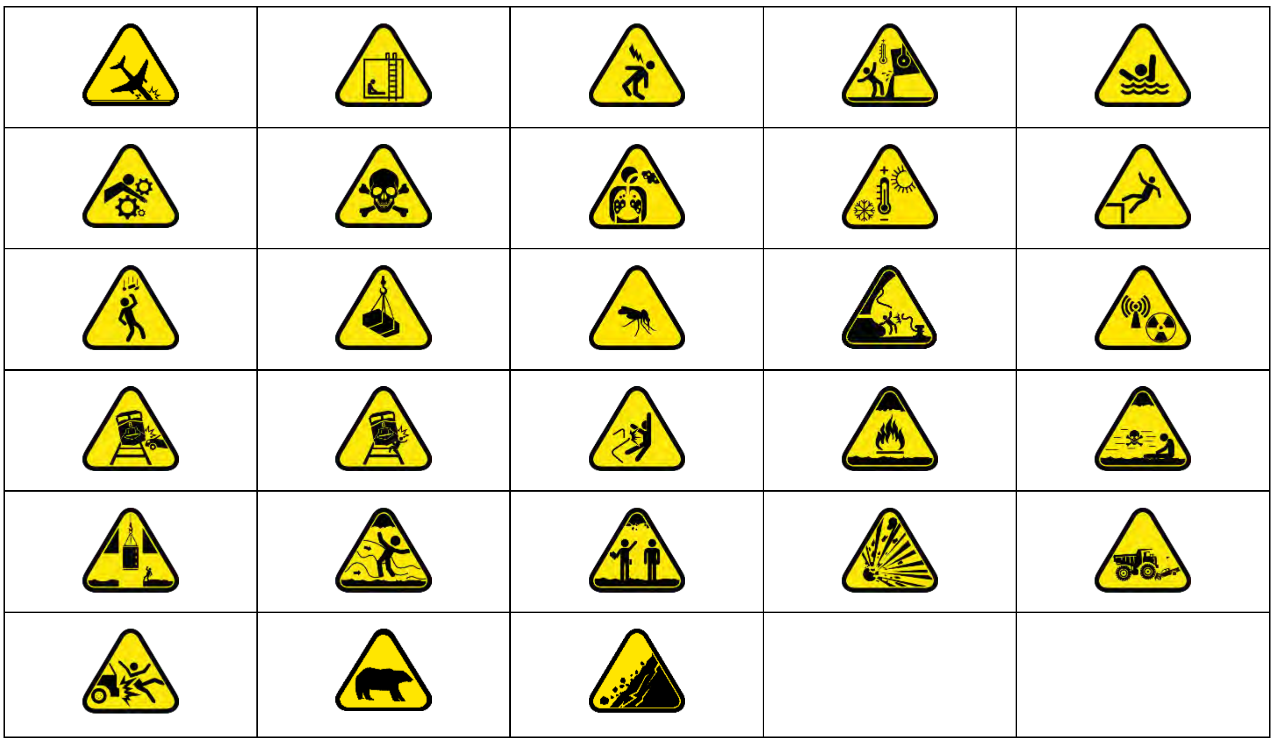
1.9 **ENVI-177-0312 – Snow Sampling Field Sheet -** Located in: P:\DDMI Environment\10.0 Operational Control\10.2 Forms\Current Forms\Approved\Water Quality Forms

Revision History			
Revision	**Revision Description**	**Date of Revision**	**Author**
0	Original Issue	08-Feb-12	D. Grabke
1	Updated Map for 2014, added SS3-6, SS3-7, SS3-8 sample points, updated to new environment SOP format	8-Apr-14	D. Grabke
2	Format update	19-Jul-15	D. Birch
3	Format update	06-Dec-15	G.Reid
4	Format update	06-Nov-16	S. Martin-Elson
5	Format and area manager updated	20-Oct-17	S. Skinner
6	Superintendent update	10-Mar-18	S. Skinner
7	QAQC update	04-Apr-18	S. Skinner
8	Format update throughout, tables in section 4 and 6.1 updated, table 2 preservative for metals removed	25-Nov-18	S. Skinner
9	Dissolved metals added to water quality bottles to Table 2	15-Mar-18	S. Skinner
10	Annual update Changes to bottle requirements	18-Jan-20 25-Oct-20	M. Nelson A. Hehn

Authorized Electronically in Documentum By:	
Area Superintendent:	K. Boa-Antwi
Area Manager:	D. Patterson

CRITICAL RISKS

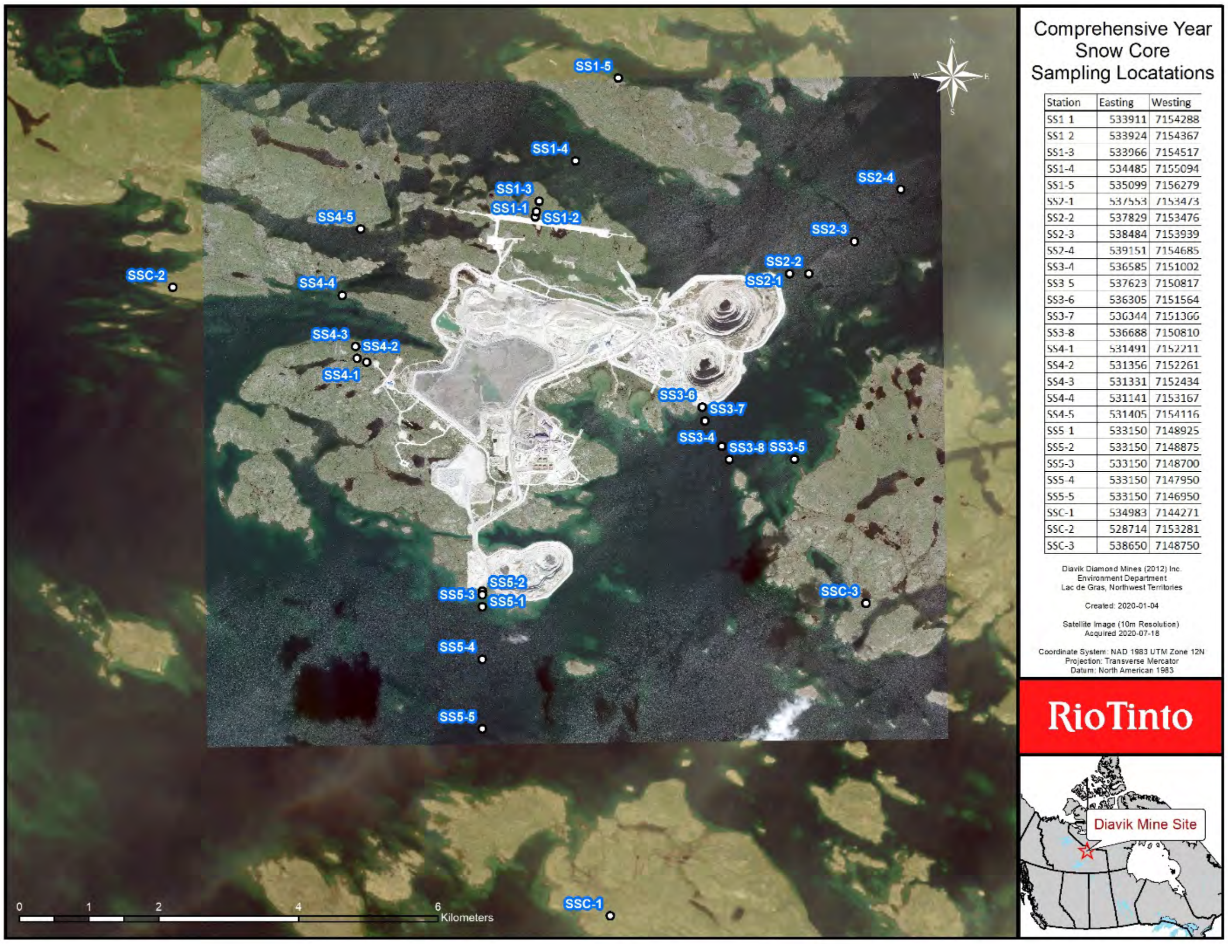
Other potential critical risks not currently assessed as part of this SOP



Environment

STANDARD OPERATING PROCEDURE

Snow Core Survey



Snow Survey Sample Program Map

Description

Snow sampling at the Diavik Diamond Mine consists of snow core sampling to monitor dust deposition rates relative to predictions outlined in the DDMI Environmental Effects Report (1998), and snow water quality sampling in support of the DDMI Aquatic Effects Monitoring Program (AEMP).

2 PURPOSE

The purpose of this guide is to promote efficient and accurate snow surveying and to establish uniform sampling procedures.

3 SCOPE

3.1 Scope of Procedure

This standard operating procedure (SOP) describes the responsibilities and processes for collecting, documenting, and processing snow samples at the Diavik mine site and the surrounding Lac de Gras area (during ice cover). This procedure applies to all Diavik Diamond Mines personnel and contractor personnel authorized to collect samples under the current year's Aurora Research Institute – Aquatic Effects Monitoring Program (AEMP) Research Permit.

3.2 Scope of Activities

This procedure has been developed to be consistent with the requirements of the AEMP design document and Environmental Effects Monitoring.

4 DEFINITIONS

Definitions							
ACTS		Groundwater		PROVE		SOP	✓
AEMP	✓	JHA		QA	✓	TSS	
COC		NTU		QC	✓	TSP	
DI water	✓	PAL		Remote work		WHMIS	
DO		PFD		SDS		WLWB	
ELT		PPE		Seepage		SWE	✓

GPS	✓	**Problem bear**		**SNP**			

See: ENVI-443-0415 - Environment Term Definitions - Located in: Diavik Intranet – SOPs – Environment Folder

SWE: Snow Water Equivalent

5 RESPONSIBILITIES

See: **ENVI-444-0415 - Environment Roles and Responsibilities** - Located in: Diavik Intranet – SOPs – Environment Folder

6 PROCEDURE

6.1 Key HSEQ Aspects

Task Hazards							
Aircraft		**Extreme Weather**	✓	**Line of Fire**		**Snowmobile Operation**	✓
Burns		**Fall into Water**		**Manual Labour**	✓	**Spills**	
Chemical Contact		**Falling**		**Noise**		**Sprain / Strain**	✓
Confined Space		**Fire**		**Overhead Objects**		**Stored Energy**	
Cuts Scrapes		**Firearms / Deterrents**		**Perception**		**Uneven Terrain / Ground**	✓
Dehydration		**Fumes / Gases**		**Pinch Points**		**Unfamiliar Area**	
Electrical		**Glass**		**Risk to Wildlife**		**Visibility**	✓

Entanglement		Heavy Equipment		Rotating Parts		Watercraft Operation	
Equipment Loss or Damage	✓	Lifting		Sample Loss or Damage	✓	Wildlife	✓
Ergonomics	✓	Light Vehicle		Slip, Trip, Fall	✓	Working Remotely	✓

See: ENVI-445-0415 - Environment Hazard Definitions - Located in: Diavik Intranet – SOPs – Environment Folder

6.2 CRM Critical Risks

Critical Risk	Critical Control
Temperature extremes (cold)	Multiple layers, Buddy check, Remote field safety plan
Wildlife	Scans

It is the responsibility of all personnel to adhere to the high health and safety standards used at Diavik. Personnel are required to complete all pre-task planning and safety checks. Queries about the appropriate permits and checks should be brought to the attention of the Supervisor or their delegate. Tasks should be executed to plan using the identified controls. Any deviations from plan should be assessed prior to proceeding with the remainder of the task. All incidents will be reported to the Supervisor or their delegate as soon as possible.

6.3 Tools Required

Supplies, Tools and Equipment			
Tool / Equipment	**Quantity**	**Supplies**	**Quantity**
Snow Corer & Handles	1	Snow Survey Map	2
Transport Case	1	GPS & Waypoints	per person
Weighing Scale & Cradle	1	Satellite Phone	1
Sample Collection Bags & Zip Ties	20	Garmin Inreach	Per person
Black Permanent Marker	2	Survival Kit	1
Field Data Sheets	10	Ice Rescue Kit	2
Snowmobile	per person	Radio and Spare Battery	per person
Toboggan	1	Coolers	5
Camera	1		

6.4 Procedural Steps

6.4.1 Planning

6.4.1.1 Program Management:

The sampling snow survey will be completed annually in April. The survey design consists of 27 sample stations, including three control areas established along five transect lines originating from East Island and extending onto Lac de Gras (Table 1 - Snow core Sampling Locations).

Table 1 – Snow Core Sampling Locations

Transect Line	Station	UTM E (NAD 83)	UTM N (NAD 83)	Description
1	SS1-1	533911	7154288	Land
	SS1-2	533924	7154367	Land
	SS1-3	533966	7154517	Land
	SS1-4	534485	7155094	Ice
	SS1-5	535099	7156279	Ice
2	SS2-1	537553	7153473	Ice
	SS2-2	537829	7153476	Ice
	SS2-3	538484	7153939	Ice
	SS2-4	539151	7154685	Ice
3	SS3-4	536585	7151002	Ice
	SS3-5	537623	7150817	Ice
	SS3-6	536305	7151564	Ice
	SS3-7	536344	7151366	Ice
	SS3-8	536688	7150810	Ice
4	SS4-1	531491	7152211	Land
	SS4-2	531356	7152261	Land
	SS4-3	531331	7152434	Land
	SS4-4	531141	7153167	Ice
	SS4-5	531405	7154116	Ice
5	SS5-1	533150	7148925	Land
	SS5-2	533150	7148875	Land

Transect Line	Station	UTM E (NAD 83)	UTM N (NAD 83)	Description
	SS5-3	533150	7148700	Ice
	SS5-4	533150	7147950	Ice
	SS5-5	533150	7146950	Ice
Controls	SSC-1	534983	7144271	Land
	SSC-2	528714	7153281	Land
	SSC-3	538650	7148750	Land

6.4.1.2 Sampling Requirements – Dust Deposition

Dust deposition will be measured in-house using standard DDMI Total Suspended Solids (TSS) laboratory procedures ENVI-904-0119. To facilitate this analysis, a composite sample comprised of a minimum of three snow cores will be collected at **ALL** (land and ice) snow sampling stations. Water content must add up to a minimum 25cm SWE for there to be sufficient water for analysis.

> **Snow Water Equivalent (SWE)** is a measure of the water content in a snowpack. It is defined as the depth of a snowpack multiplied by the density of the snow. It represents the depth of a theoretical pool of water created from melting a known depth of snowpack. We determine SWE in the field using a snow coring tube in conjunction with a graduated scale that weighs the snow in the tube. The scale is measured in cm of water, as weight is directly contributable to water content. The scale markings are how we measure SWE. The length of core is not necessary for determining SWE when using a scale and a known tube diameter.

6.4.1.3 Sampling Requirements – Snow Water Quality

Snow water quality samples are required for all sample stations on Lac de Gras identified as **on-ice** locations, as well as at the **three control** areas (Table 1 - Snow core Sampling Locations). Snow chemistry analysis will be conducted by Bureau Veritas (BV). To facilitate the required analysis outlined in Table 2, a composite sample comprised of a minimum of three snow cores with an equivalent water depth (SWE) of at least 100 cm will be collected at all of the snow water quality stations.

Table 2- Snow Water Quality Sample Requirements

Bottle Filling Sequence	BV Bottle	Analysis	Minimum Volume of Sample Required (ml)	Preservative
1	Metals	Total ICP Metals (Ultra Low)	2x60 mL Falcon Tube	None Required
2	Metals	Dissolved ICP Metals (Ultra Low)	2x60 mL Falcon Tube	None Required
3	Mercury	Total	40 mL Glass Vial	1 ml Hydrochloric Acid - HCL
4	Nutrients	Ammonia	120 mL HDPE	1 ml Sulfuric Acid
5	Routine	Sulfates, Nitrates, and Nitrites	1000 mL HDPE	None Required
6	Ultra Low TSS, Turbidity & pH (Routine, 2nd Bottle)	TSS, Turbidity & pH	500 mL HDPE	None Required
Total Sample Volume Required			1900 ml + 25% for Triple Rinsing	**3000 ml = 100SWE**

Determining anticipated sample volume from Snow Water Equivalent (SWE)

Sample Water (ml)

=

SWE (cm representing the depth of water in the snow core tube measured by the weight of snow in the tube**)**

x

30(cm^2 representing the surface area of the snow core tube entrance**)**

Therefore:

3000ml /30cm^2 = SWE = 100cm SWE

Therefore, the aggregate Water Content SWE collected at a sample site must add up to at least 100 cm measured from the graduated scale to ensure sufficient volume for water quality analysis.

6.4.1.4 Quality Assurance and Quality Control

Quality Control (QC) will be achieved through the use of duplicate and blank samples.

Duplicate samples will be collected for a minimum 10% of the total samples (both dust and water quality samples):

- At least **three** duplicate samples for the **dust** deposition samples
- At least **three** duplicate samples for the **water quality** samples

One **equipment blank** will be collected and processed by BV for water quality chemical analysis and internally for Total Suspended Solids (TSS). BV DI water batch number will be recorded on the field sheet. Equipment blanks will be completed from a single batch of DI water. Ensure that information from the DI water is recorded on the field sheet (Batch ID and Expiry date).

Quality Assurance (QA) will be achieved via the following processes:

- Field data sheets will be utilized to document any and all observations or occurrences that may impact the integrity of the samples, as well as corrective actions implemented to address those occurrences.
- If a sample is compromised, the information will be recorded on the field data sheet, the sample will be discarded, and a new sample collected.
- Individuals collecting the samples will take precautions to eliminate sample contamination during handling. Avoid touching insides of sample bags and avoid contacting the snow samples with anything other than the sampling corer.
- Steps will be taken prior to, during, and after sampling to ensure all samples are correctly labeled with the sample date, ID, and type.

6.4.1.5 Equipment Inspection & Preparation

Prior to commencing the sampling program, inspect all sampling equipment for contamination or damage. All polyacrylic snow coring tubes that will be utilized during sampling will be rinsed with a 10% nitric acid solution to ensure they are clean prior to the initiation of the program.

Snow Corer – Inspect the core tube to ensure measurement etchings are legible. Check the cutting edge to ensure blade is not deformed or damaged. Inspect the handles and threads to ensure they will assemble and disassemble without binding. Ensure the corer has been de-contaminated (acid rinsed) prior to commencing the program.

Weighing Scale and Cradle – Inspect the scale and cradle for deformity or damage.

Snowmobiles – Inspection and use of snowmobiles will be in accordance with ENVI-919-0119.

Communication – Inspect all communication equipment (radios/sat phones, Garmin Inreach) to ensure they are operational and functional. Ensure batteries (including spares) are fully charged. Ensure check-in times and procedures are clearly identified on the Remote Field Safety Permit.

Navigation – Inspect GPS and spare batteries to ensure equipment is functioning correctly. Verify that all sample locations are present and correct, and that the GPS essentials file is loaded. Ensure an appropriate map is present to allow navigation back to site should the GPS fail.

Personal Gear – In addition to winter survival equipment, each individual participating in off-site activities is expected to carry appropriate personal gear and equipment as is deemed necessary for the individual's well-being in an emergency situation.

Survival Kit – Inspect survival kit and ice rescue kits to ensure that they are complete and all items are functional and ready for use.

Miscellaneous – Individual core samples will be placed into plastic bags (soil sampling bags) and sealed with zip-ties until they are ready for processing. Prior to sampling, ensure bags are new, clean, and leak-proof.

6.4.2 Sample Collection

The person handling the acrylic snow core tube should always wear thick, insulated gloves to minimize the heat transferred from their hands to the tube. A warmer tube will increase the likelihood that snow will melt in the tube causing sticking and making it difficult to get all snow out of the tube.

- Navigate to the sampling locations – If the sample point falls on or immediately adjacent to the winter road, adjust your location to the nearest area with natural snow coverage (i.e. not impacted by the road or snow clearing).
- Assemble the corer by threading the handles onto the tube and re-inspect the snow corer for fouling and/or damage that may have occurred during transportation.
- Fill in station location and weather information on the field data sheet. Identify snow conditions and dust observations in the comments section.
- Prior to collecting a sample, re-inspect the tube for cleanliness.
- Take the weight of the empty snow corer at each station prior to collecting any samples.
- For all stations requiring snow water chemistry, collect the dust sample first – this will effectively rinse the corer with ambient snow minimizing cross contamination from locations.
- Hold the corer vertically (cutter end down) and drive it through the snow to the ground/ice surface below. Be sure the cutter contacts the ground/ice as compacted snow/ice may feel like the ground and result in an incomplete core.
- Before raising the corer, read the depth of the snow (nearest cm) and record on the field datasheet. Turn the corer at least one full turn to cut the core loose from the ground/ice surface. Carefully raise the corer and record the length of the core extracted.

- As the length of core extracted could potentially be different from the depth of snow, inspect the cutter end of the tube for dirt or litter. With gloves on, carefully remove soil and litter from the core. If required, correct the length of the core extracted by subtracting the depth of the soil or litter (plug). Record adjusted core length and litter/soil observations on the field data sheet.
- Carefully balance the corer containing the core on the weighing cradle. Suspend the corer (like a pendulum) and do not hold the corer tube or handles. To ensure an accurate reading, gently tap the scale to be sure it is not sticking or binding. Read the weight of the tube and core from the graduations on the scale. The scale is marked in cm of water. Record the weight of the corer and the core to the nearest one-half cm.
- To transfer the core into the sample bag, lift the tube from the cradle and turn cutter end up. Gently tap the corer and the extracted core will slide out the top end. Be sure to use a clean/new sample bag to catch the core sample.
- Ensure all sample bags are clearly labelled with the station ID, sample type, date, and number of cores included in the composite.
- Ensure all bags are sealed using a clean zip-tie.
- Weigh the empty sampling tube following the first and at least every fourth sample as the weight will change as small particles of water or snow accumulate/cling to the inside and outside of the tube. Record the weight of the empty corer on the field data sheet.
- Subtract the weight of the empty tube from the weight of the tube and core to obtain the water content of the sample.
- Prior to moving to the next sampling location ensure the field datasheet is complete.

Density calculations can be completed back in the lab following the completion of the program.

Density (g/cm^3) = Total SWE Collected (g/cm^{2*}) / Total Snow Core Length Collected (cm)

***assumes pure water density $1 g/cm^3$**

6.4.3 Sample Processing

Prior to processing, all samples must be kept in a frozen state to minimize sample degradation.

When preparing the samples for decanting and analysis, remove the sample bags from the freezer. Check to ensure that the top of the bag is well twisted and the zip-tie is tight. Place the sample bag into a new (clean) sample bag and affix a zip-tie to seal the second bag. This double bagging will help to ensure no sample is lost during the melting process. To process samples, they will require 12-48 hours to thaw at room temperature.

Place the sealed sample bags upright in clean coolers in the lab to thaw overnight.

Once a sample is completely melted, it is ready for processing.

Sample volume can be determined using a scale accurate to 1g. Set up the scale by taring the sampling basin with two bags and 2 zip-ties. Place sample bags in the basin and record the weight of each of the bags on the field sheet.

Snow water quality samples will be decanted to fill the appropriate (pre-labelled) BV sample bottles as per standard water sampling procedures. Any excess sample water can be discarded.

Dust deposition samples will be processed in the DDMI Lab as per Total Suspended Solids SOP (ENVI-904-0119).

The entire volume of sample must be processed – this may require the use of multiple filters.

For samples with large quantities of organics (twigs/leaves etc.), it may be necessary to sieve the sample through a course filter prior to processing.

Given the possibility of the samples containing organic matter, sample filters will be dried in the high temperature oven (550°F) for 1hr to burn off any organics on the filter.

Allow Samples to cool in the desiccator prior to weighing the filters.

6.4.4 Sample Chain of Custody

Samples will be shipped to BV as per the Chain of Custody SOP (ENVI-900-0119) and accompanied by Chain of Custody (COC) documentation.

7 QUALITY OUTCOMES AND EXPECTATIONS

The primary objectives for implementing this SOP are:

- To safety complete the tasks outlined in this SOP, without incident.
- To produce quality, accurate and repeatable results.

APPENDIX G QUALITY ASSURANCE/QUALITY CONTROL STANDARD OPERATING PROCEDURE (ENVR-303-0112)

ENVIRONMENT STANDARD OPERATING PROCEDURE			
Area No.:	**8000**	**Document #:**	**ENVI-902-0119**
		Revision:	**8**
Task Title:	**Quality Assurance/Quality Control**		
	Supersedes: ENV SOP 303		
FOR DOCUMENT CONTROL USE ONLY:			
Next Review:	**1 year from Area Manager Authorized Signature Date below**		
Effective Date:	**See Area Manager Authorized Signature Date below**		

1 REFERENCES/RELATED DOCUMENTS

1.1 ENVI-656-0117 DDMI Environment Lab – Training – Located in: P:\DDMI Environment\10.0 Operational Control\10.13 CALA Certification\Approved Quality Manual Documents\5.2 Training

1.2 ENVI-901-0119 – SOP- General Laboratory Safety - Located in: Diavik Intranet – SOPs – Environment Folder

1.3 ENVI-900-0119 - SOP- Chain of Custody & Sample Shipping - Located in: Diavik Intranet – SOPs – Environment Folder

1.4 ENVI-133-0112 - Aquatic Effects Field Sheet - Located in: P:\DDMI Environment\10.0 Operational Control\10.2 Forms\Current Forms\Approved\Water Quality Forms

1.5 ENVI-134-0112 – 1645-19 SNP Monitoring Field Sheet – Located in: P:\DDMI Environment\10.0 Operational Control\10.2 Forms\Current Forms\Approved\Water Quality Forms

1.6 ENVI-668-0117 DDMI Environment Lab – Equipment Management - Located in: P:\DDMI Environment\10.0 Operational Control\10.13 CALA Certification\Approved Quality Manual Documents\5.5 Equipment

1.7 ENVI-669-0117 DDMI Environment Lab – Measurement Traceability - Located in: P:\DDMI Environment\10.0 Operational Control\10.13 CALA Certification\Approved Quality Manual Documents\5.6 Measurement Traceability

1.8 **ENVI-653-0117 DDMI Environment Lab – Record Control - Located in:** P:\DDMI Environment\10.0 Operational Control\10.13 CALA Certification\Approved Quality Manual Documents\4.13 Record Control

1.9 **ENVI-650-0117 DDMI Environment Lab – Document Control - Located in:** P:\DDMI Environment\10.0 Operational Control\10.13 CALA Certification\Approved Quality Manual Documents\4.3 Document Control

1.10 **ENVI-904-0119 – SOP Total Suspended Solids Analysis - Located in:** Diavik Intranet – SOPs – Environment Folder

1.11 **ENVI-905-0119 – SOP pH Analysis - Located in:** Diavik Intranet – SOPs – Environment Folder

1.12 **ENVI-906-0119 – SOP Turbidity Analysis - Located in:** Diavik Intranet – SOPs – Environment Folder

1.13 **ENVI-918-0119 – SOP Field Meter - Located in:** P:\DDMI Environment\10.0 Operational Control\10.1 SOPs\Working SOPs

Revision History			
Revision	**Revision Description**	**Date of Revision**	**Author**
0	Initial Release	01-Jan-12	D. Grabke
1	Formatting	08-Dec-15	D. Birch
2	Revision of QC schedule and measures	29-May-16	N. Goodman
3	CALA Updates	15-Dec-16	N. Goodman
4	Update to template, area manager and CRM	21-Oct-17	A. Hehn
5	Superintendent update	10-Mar-18	S. Skinner
6	Annual review	27-Feb-19	M. Nelson N. Goodman L. Case
7	Clarification on TSS LBW frequency	22-Nov-2019	N. Goodman

8	Update to QC Frequency (Section 6.3.6) Decrease LBW and LDUP frequency to every 6 days, remove various outdated CALA policies	14-Jun-2020 13-Oct-2020	A. Hehn N. Goodman

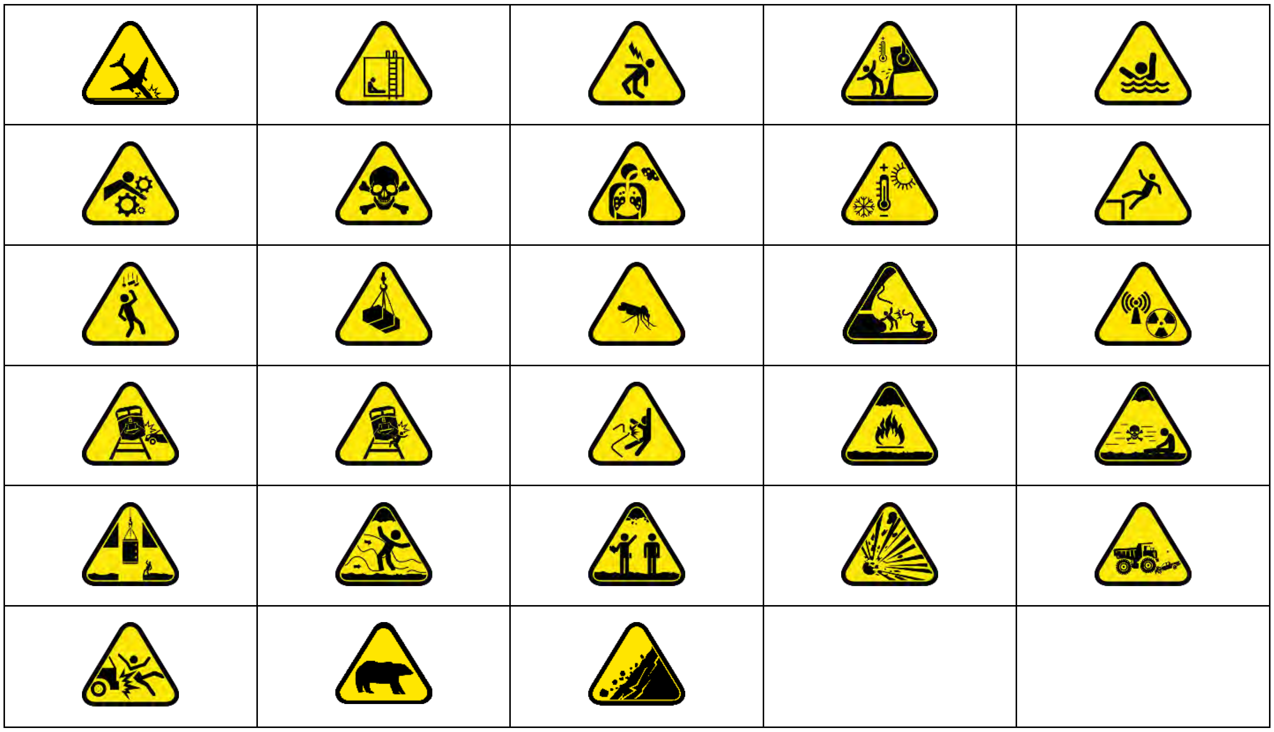
Authorized Electronically in Documentum By:	
Area Superintendent:	K. Boa-Antwi
Area Manager:	D. Patterson

(Document owners will be prompted annually to update content; however, changes may or may not result.)

CRITICAL RISKS

There are no critical risks associated with this SOP

Other potential critical risks not currently assessed as part of this SOP



Internal QA/QC
LBW
LDUPW1/ LDUPW2

External QA/QC KEY		
-1	=	EBW
-2	=	FBW
-3	=	TBW
-4	=	DUPW1
-5	=	DUPW2
-6	=	DLS

Description

This SOP reviews the quality assurance and quality control measures used to ensure best practices are being utilized while collecting and analysing samples.

2 PURPOSE

The objective of this Standard Operating Procedure (SOP) is to establish consistent and uniform criteria and procedures to be implemented for laboratory activities undertaken during water quality analysis to ensure environmental data generated and processed is scientifically valid.

This SOP is intended to define Environmental Quality Assurance (QA) and Quality Control (QC) measures in place to ensure all data generated in the DDMI Environment Laboratory shall be of known precision and accuracy, complete, representative, and comparable.

3 SCOPE

3.1 Scope of Procedure

This procedure applies to all Diavik Diamond Mines personnel and contract personnel authorized by the Environment Superintendent to collect, analyse and ship samples. All persons conducting analyses in the DDMI laboratory are required to read, understand, and fully comply with the methods outlined in the SOP for each analytical test conducted, respectively.

This procedure has been developed to be consistent with the requirements of the Rio Tinto HS & E standards.

4 DEFINITIONS

Definitions							
ACTS		Groundwater		PROVE		SOP	✓
AEMP		JHA		QA	✓	TSS	
COC	✓	NTU		QC	✓	TSP	
DI water		PAL		Remote work		WHMIS	

DO		**PFD**		**SDS**		**WLWB**	
ELT		**PPE**		**Seepage**			
GPS		**Problem bear**		**SNP**			

See: ENVI-443-0415 - Environment Term Definitions - Located in: Diavik Intranet – SOPs – Environment Folder

5 RESPONSIBILITIES

See ENVI-444-0415 - Environment Roles and Responsibilities - Located in: Diavik Intranet – SOPs – Environment Folder

6 PROCEDURE

6.1 Key Safety Aspects

Task Hazards							
Aircraft		**Extreme Weather**		**Line of Fire**		**Snowmobile Operation**	
Burns		**Fall into Water**		**Manual Labour**		**Spills**	
Chemical Contact		**Falling**		**Noise**		**Sprain / Strain**	
Confined Space		**Fire**		**Overhead Objects**		**Stored Energy**	

Cuts Scrapes		**Firearms / Deterrents**		**Perception**		**Uneven Terrain / Ground**	
Dehydration		**Fumes / Gases**		**Pinch Points**		**Unfamiliar Area**	
Electrical		**Glass**		**Risk to Wildlife**		**Visibility**	
Entanglement		**Heavy Equipment**		**Rotating Parts**		**Watercraft Operation**	
Equipment Loss or Damage		**Lifting**		**Sample Loss or Damage**		**Wildlife**	
Ergonomics		**Light Vehicle**		**Slip, Trip, Fall**		**Working Remotely**	

See: ENVI-445-0415 - Environment Hazard Definitions - Located in: Diavik Intranet – SOPs – Environment Folder

6.2 CRM Critical Risks

Critical Risk	Critical Control
N/A	N/A

It is the responsibility of all personnel to adhere to the high health and safety standards used at Diavik. Personnel are required to complete all pre-task planning and safety checks. Queries about the appropriate permits and checks should be brought to the attention of the Supervisor or their delegate. Tasks should be executed to plan using the identified controls. Any deviations from plan should be assessed prior to proceeding with the remainder of the task. All incidents will be reported to the Supervisor or their delegate as soon as possible.

6.3 Procedural Steps

6.3.1 Quality Assurance (QA)

Quality assurance for the environmental laboratory encompasses all quality-related activities that ensure the validity of aquatics testing and analysis and all relevant technical support. All DDMI environment personnel, from management to field laboratory technicians, are required to follow applicable quality control measures and standard operating procedures. Adherence to these documents, combined with staff vigilance, can help ensure that the analytical data and other test results collected will be acceptable as the bases for making decisions.

The DDMI laboratory ("the lab") encompasses a broad range of activities including preparation of samples for internal analytical processing, calibration and maintenance of equipment, data management, and sample handling for external analysis.

Our approach to quality assurance places an emphasis on four aspects:

- Infrastructure (instruments, testing capabilities, calibrations, SOP's)
- Control Measures (internal/external)
- Personnel (competence, ethics, and integrity)
- Data Management/Control of Non-Conforming Work

The quality of the outputs is at risk if any of these four aspects are deficient.

6.3.2 Infrastructure

6.3.2.1 Equipment

All equipment is to be maintained and operated in accordance with manufacturer instructions and SOPs. Any issues with equipment should be immediately reported to the Environment supervisor.

6.3.2.2 Calibrations

Lab equipment with the potential to impact test results are calibrated regularly. Calibrations follow a predefined schedule, and International Standard (Metric) units are used wherever possible. When performed internally, calibrations are always done in accordance with method SOPs. Reference checks are performed after calibration with secondary standards that have a different lot number from the calibration standards. All observations and maintenance actions must be reported in the QA/QC Lab Performance logbook.

The logbook must also keep record of the instrument calibration history. Calibration records for fixed and portable laboratory measuring equipment, and individual monitoring devices, shall be maintained and include dates, personnel, and specifics of calibration standards and reference solutions, such as the lot numbers for the standards used. Instrument calibration procedures and schedules are clearly outlined in individual SOP's.

6.3.3 Internal Quality Control (QC) Measures

Laboratory quality control consists of both internal and external checks on precision and accuracy of analytical results. Employees are trained in quality control and good lab practices by an experienced technician through the lab analyst certification process (ENVI-560-0616, ENVI-561-0616, ENVI-562-0616). This training is documented and saved in the Lab Analysis Competency Checklists folder (6.0) on the Environment network drive.

Best practices in water quality monitoring dictate that QC samples will comprise at least 10% of all samples analyzed, and more as required to maintain assurance of quality across homogenous sampling matrices and conditions. Due to fluctuating sample volumes the DDMI Environment department often performs more than 10% internal QC in order to ensure that any errors or sources of contamination in procedures or equipment are caught immediately.

Internal Quality Control sample types (descriptions below) consist of: Lab Blanks (LBW), Lab Duplicates (LDUPW1/LDUPW2), and Laboratory Splits (DLS). Results of Internal Quality Control samples are recorded in the current year's Internal QAQC excel document in the SNP folder of 13.3 on the Environment network drive.

6.3.3.1 Lab Blanks (LBW)

A laboratory blank is a sample comprised of deionised (DI) water, prepared in the lab, which remains in the lab for analysis. This blank is exposed to any and all reagents that are used in the analytical process and is carried through the entire analytical processes including any filtration required. Lab blanks may identify unsuspected contaminates associated with DI water purity, improper cleaning procedures, filters or air contaminants in the lab. LBWs occur every 6 days along with 6-day sampling. Lab blanks for Total Suspended Solids are performed biweekly (along with the Total Suspended Solids standard check), but can be required more frequently at supervisor discretion.

6.3.3.2 Lab Duplicates (LDUPW1/LDUPW2)

A laboratory duplicate consists of a single sample to be analyzed twice internally (using the same techniques) as though it is two separate samples. The entire lab procedure is repeated twice, using two separate aliquots of water poured from the same sample bottle. Lab duplicates evaluate analytical precision and sample homogeneity, as well as consistency of lab and operator procedures. LDUPW1/LDUPW2s occur every 6 days along with 6-day sampling.

*in Monitor Pro 5 (MP5), under regular sample data entry, the sample that is to be the LDUP is assigned a sample type of "LDUPW1". Then, in the data entry section for that day's LDUP QAQC, the corresponding sample site is to be assigned a sample type of "LDUPW2".

6.3.3.3 Allowable Discrepancy Limits between LDUPWs

If the relative percent difference (RPD) exceeds 20% when analyte concentrations are ≥ 5 times the detection limit (DL), the environment supervisor must be informed so that the data can be flagged and sampling/analytical methods and instrumentation performance can be reviewed. Relevant DLs for DDMI laboratory analysis are:

- TSS – 2.0mg/L
- Turbidity – 0.15 NTU
- Conductivity – 1.1uS/cm
- pH has no applicable detection limit.

6.3.3.4 Laboratory Splits (DLS)

A laboratory split consists of a single sample divided into two aliquots, one to be analyzed internally, and the other to be sent to an external lab using the same techniques to analyze their aliquot so that the two results would be compared. Variability of results must be considered carefully in light of analyte hold times. RPD between duplicate samples will be assessed by environment supervisor.

6.3.3.5 Equipment Blanks,

An aliquot of DI water is subjugated, in the DDMI Environmental Laboratory, to all aspects of sample collection and analysis, using the same procedures that are utilized in the field, including contact with all sampling devices and apparatus (e.g. tubing, jars, samplers, filters). The purpose of the equipment blank is to determine if the sampling devices and apparatus for sample collection have been adequately cleaned before they are utilized at the field sampling location

6.3.4 Internal QC Scheduling

DDMI Environment internal QC falls under two schedules: Station-Dependent Internal QC. Station-Dependent Internal QC is tied to different sample matrices and is included in regular sampling schedules in MP5 (ex. samplers will be required to complete one DLS every four PKC sampling events, i.e., quarterly).

Station-Dependent Internal QC	QC Frequency per sampling event

Sample Matrix	Sampling Event Frequency*	DLS	LDUP/LBW
Ponds	Monthly	none	none
Diffuser	Monthly	none	none
PKC	Monthly	1 in 4	none
UG /clarifiers	Biweekly	none	none
NIWTP Influent/Effluent	6 days	none	Every event

*Note that sampling frequency refers to the frequency with which the entire set of samples is taken, and not the number of sites sampled (ex. the monthly pond sampling includes **10** sample sites but comprises **1** sampling event).

As of November 2019 all Internal QC is station dependent since LBWs and LDUPs are only completed on 6-day samples. All QC sampling is scheduled along with a specific station sampling event from now on.

6.3.5 External Quality Control (QC) Measures

External QC samples comprise ~ 10% of all samples analyzed and are spaced across sampling matrices and sample events to capture as much process homogeneity as possible. With the exception of Trip Blanks (TBW, below), external quality control samples are prepared by DDMI Environment staff, who subject them to the relevant procedures. All external QC samples are then shipped off-site to a qualified external laboratory, where all analysis is conducted.

External QC sample types consist of Trip Blanks (TBW), Equipment Blanks (EBW), Field Blanks (FBW), and Duplicates (DUPW1/DUPW2). Results of external Quality Control samples are reported in monthly SNP reports and reviewed by Environment supervisors.

6.3.5.1 Trip Blanks (TBW)

A Trip Blank is an aliquot of laboratory grade distilled water, which is received from an external lab, in the same type of container that is required for the analytical test. The trip blank is sealed and labelled in the external lab from which it originates. Upon our receipt of the trip blanks they are to be stored, sealed, at ~ 4°C until such a time as they are to be utilized (no longer than 1 month). When utilized, trip blanks travel with the sampling cooler from the laboratory to the sampling site and back to the laboratory without being opened. The trip blank is then packaged and shipped to the originating laboratory to be analyzed. The purpose of the trip blank is to verify that no sample contamination occurred during transportation or sampling operations. Trip blanks are ordered from BV every month by Environment Supervisor.

6.3.5.2 Equipment Blanks (EBW)

An aliquot of DI water is subjected, in the Environment laboratory, to all aspects of sample collection and analysis, using the same procedures that are utilized in the field, including contact with all sampling devices and apparatus (e.g. tubing, jars, samplers, filters). The purpose of the equipment blank is to determine if the sampling devices and apparatus for sample collection are a source of contamination in the samples.

6.3.5.3 Field Blanks (FBW)

An aliquot of DI water is subjected, in the field, to all aspects of sample collection and analysis, using the same procedures that are utilized in the field, including contact with all sampling devices and apparatus (e.g. tubing, jars, samplers, filters). The purpose of the field blank is to demonstrate that sample contamination has not occurred during field sample collection and processing.

6.3.5.4 Duplicates (DUPW1/DUPW2)

Duplicate samples are independent samples collected as close as possible to the same point in space and time and are intended to assess precision of the entire program (field and laboratory components). The use of replicates for this purpose assumes that the variability between DUPW1 and DUPW2 is affected by the sampling method or technician. In most cases natural variability between samples collected in close succession will be low. When performing duplicate samples, the second sample will consist of each bottle that is regularly collected for that station, including the DDMI internal routine bottle.

*in MP5, under regular sample data entry, the sample that is to be the DUPW is assigned a sample type of “DUPW1.” Then, in the data entry section for that day’s DUPW QC, the corresponding sample site is to be assigned a sample type of “DUPW2.”

6.3.6 External QC Scheduling

DDMI Environment external QC is entirely station-dependent, and QC types have different frequencies for each sample matrix that are programmed into MP5.

External QC	QC Frequency per sampling event	

Sample Matrix*	Sampling Frequency	DUPW	FBW	TBW	EBW	Total % External QC (all types)
Ponds	Monthly	1 in 2	1 in 6	1 in 6	1 in 3	**12.7**
Reference Lakes	Biannual	None	None	None	1 in 2	**12.5**
Diffuser	Monthly	1 in 1	1 in 6	1 in 6	1 in 3	**11.5**
PKC	Monthly	1 in 4	1 in 12	1 in 12	n/a	**10.4**
UG /clarifiers	Biweekly	1 in 6*	1 in 6	1 in 12	n/a	**10.4**
A21 Dewatering	Biweekly	1 in 24	1 in 24	1 in 24	n/a	**11.5**
NIWTP Influent/Effluent	6 days	1 in 6	1 in 12	1 in 12	n/a	**10.9**
Total QC type per month**		**2.75**	**2.25**	**1.0**	**0.58**	**6.58 QC/month**

*Every other DUPW event is assigned to a clarifier sample in MP5 QAQC Schedule

Again, note that sampling frequency refers to the frequency with which the entire set of samples is taken, and not the number of sites sampled (e.g., the monthly pond sampling includes **10 sample sites but comprises **1** sampling event.)

6.4 Data Management

6.4.1 External Sample Tracking – Chain of Custody

All samples collected, packaged and shipped to external laboratories are tracked via Chain of Custody (CoC) documentation. The CoC record is used to document change in possession from sampling to delivery to receipt by the external analytical laboratory. CoC procedures are clearly outlined in ENVI-900-0119 – SOP - Chain of Custody.

6.4.2 Internal Sample Tracking

All samples collected are documented in Monitor Pro 5 on the Environment iPads as per the regular sampling schedule.

6.4.3 Data Recording/Record Keeping

Internal QAQC data is uploaded to MP5 and recorded in the current year's internal QAQC excel document in the SNP folder of 13.3 on the Environment network drive. External QAQC data is uploaded to MP5 upon receipt from BV Labs.

6.4.4 Data Reporting

Immediately following laboratory analyses, all records are transferred from the applicable field sheets, to their respective electronic databases.

Laboratory supervisors will regularly review the electronic databases to ensure that laboratory recordkeeping meets the aforementioned elements. Results can then be queried and exported as required from MP5 for reporting purposes.

6.5 Control of Nonconforming Testing and/or Calibration Work

Environment supervisors are responsible for management of nonconforming work, evaluation of non-conformance significance, and prescribing of corrective actions. Nonconforming testing and/or calibration work should be shared with all Environment lab staff.

6.5.1 Continual Improvement

The laboratory shall continually improve the effectiveness of its QAQC system and produced data through the use of the quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management review.

6.6 Personnel

6.6.1 Competency – Certification of Analyst Proficiency

Certification of Analyst Proficiency is the process for assessing and recognizing the technical competence and the effective quality processes of the DDMI Environment Laboratory and staff.

Staff proficiency means that an individual is capable of performing specified test methods and procedures correctly, and familiar with all related policies and procedures pertaining to lab quality.

Staff will be trained and tested so as to document their competence for the range of activities they will be expected to perform in the lab, in accordance with all method SOPs. This documentation is saved in the lab analysis competency checklists folder of 6.0 in the Environment network drive.

6.6.2 Ethics

Ethics is a set of moral principles, code for right and wrong, or behaviour which conforms to acceptable professional practices.

All employees at all times shall conduct themselves in an honest and ethical manner.

Examples of unethical behaviour include but are not limited to the following:

- Improper manipulation of data or software
- Improper handling of data errors, non-compliant data, or QC outliers
- Lack of reporting unethical behaviour of others
- Artificially fabricating results
- Misrepresenting data such as peak integration, calibration, tuning, or system suitability
- Improper clock setting to meet holding times
- Intentional deletion of non-compliant data

An employee must report any suspected unethical behaviour or fraudulent activities to the Environment Supervisor.

7 QUALITY OUTCOMES AND EXPECTATIONS

The primary objectives for implementing this SOP are:

- To safety complete the tasks outlined in this SOP, without incident.
- To produce quality, accurate and repeatable results.

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