

DE BEERS GROUP

December 31, 2018

File: L020

**Kierney Leach Regulatory Officer
Mackenzie Valley Land and Water Board
PO Box 2130
Yellowknife, Northwest Territories
X1A 2P6**

Dear: Ms. Leach:

**Re: Snap Lake Mine Monthly Water License Report: November 2018
Water License # MV2011L2-0004**

De Beers Canada Inc., (De Beers) Snap Lake Mine is pleased to provide the Mackenzie Valley Land and Water Board (MVLWB) the Monthly Surveillance Network Program (SNP) Report for November 2018.

Zero occupancy was achieved on September 29, 2018 and continues to present day. No samples were collected for the month of November.

This report satisfies the SNP requirements as prescribed in Snap Lake Mine Water License MV2011L2-0004.

Should you have any questions, comments or require further clarification, please do not hesitate to contact me at 867-767-8567 or e-mail me at the following address:

Michelle.peters@debeersgroup.com

Sincerely,
DE BEERS CANADA INC.

Peters, Michelle

Digitally signed by Peters, Michelle
DN: cn=Peters, Michelle
Date: 2018.12.27 15:02:23 -07'00'

**Michelle Peters
Superintendent, Environment & Asset**

Copied to: **M. Sanderson, T.Covey
P. di Pizzo**

**GNWT
SLEMA**

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Incorporated in Canada | Registration number 889569596

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Active SNP Stations November 2018

FIGURE 1.



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SNP Sampling Status November 2018_MV#2011L2-0004 (Amended September 8, 2016)

SNP STATION	DESCRIPTION	STATUS	SAMPLED	PAGE
02-01	Final mine water collection sump- Dirty minewater from underground stopped pumping to WTP as part of flooding operations in Extended Care & Maintenance.	Inactive	no	--
02-02	North Pile drainage collection ditch	Active	no	--
02-03	Core Facilities area collection ditch near Water Management Pond	Active	no	--
02-04	Uncontrolled surface runoff at culvert by airstrip (3)	Active	no	--
02-05	Uncontrolled surface runoff at Bulk Sample Mine Rock Pad	Active	no	--
02-06	Uncontrolled surface runoff at Quarry Site	Active	no	--
02-07	Uncontrolled surface runoff at Road to Bulk Emulsion Plant (6)	Active	no	--
02-08	Uncontrolled surface runoff at Winter Access Road	Active	no	--
02-09	Uncontrolled surface runoff at Emulsion Plant Area (6)	Active	no	--
02-10	Any other points where observable flow to Snap Lake or IL5 is observed	Active	no	--
02-11	Seepage well down gradient from Dam 1 near Snap Lake shoreline	Active	no	--
02-12	Seepage well down gradient from Dam 1 at Water Management Pond	Active	no	--
02-13	Seepage well down gradient from Dam 2 at Water Management Pond	Active	no	--
02-14	Water Management Pond	Active	no	--
02-15	Water Intake from Snap Lake	Active	no	--
02-16 i	Sewage Discharge from Sewage Treatment Plant prior to mixing with Water Treatment Plant Effluent (2)	Active	no	--
02-17 b	Final Combined Water Treatment Plant, Water Treatment Plant Monthly Rolling Average and Daily Inline Chloride and Measured Total Dissolved Solids of Effluent	Active	no	--
02-18	Whole Lake Total Dissolved Solids, Calcium, and Chloride (several sites within the main lake basin of Snap Lake)	Active	no	--
02-19	SNP Station Removed effective November 16 th 2007	Inactive	no	--
02-20	Snap Lake on the edge of the mixing zone around the diffuser (4 stations located in a radius of 120 degrees at 200 meters from diffuser)	Active	no	--
02-21	Outlet from Snap Lake flowing into the Lockhart System	Active	no	--
02-22	Diffuser Construction	Inactive	no	--
02-23	Intake Construction - completed September 2005	Inactive	no	--

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WATER MANAGEMENT

SNP STATION 02-16 i: The Sewage Treatment Plant (STP) operated for 0 days in the month of November.

RAW WATER CONSUMPTION

No raw water was extracted from Snap Lake for the month of November.

GENERAL WASTE

Glass jars, tin cans, and most food related plastic containers are washed and stored until they can be shipped off site. Waste wood products and cardboard are burned in the authorized pit as per the Land Use Permit MV2010D0053. Waste Management Area staff ensures that waste is handled as per the approved operational procedures for waste handling.

REGULATORY

Regulatory inspections were conducted on November 19th, 2018

ENVIROMENTAL STUDIES/SURVEYS

Regulatory monitoring of Snap Lake included the following:

- Active fuel tank inspections
- Monthly North Pile, ditch and perimeter sump monitoring

OTHER ON-SITE ACTIVITIES

- North Pile Thermistor and Piezometer monitoring
- Meteorological data downloads
- Dam and Water Management Pond monitoring
- Main camp building Inspection

CONSTRUCTION ACTIVITIES

No construction activities for the month of November.

GEO-TECHNICAL ACTIVITIES

The Water Management Pond (WMP) and North Pile sump monitoring are ongoing. Thermistor and piezometer monitoring is ongoing. No anomalies were identified.

WATER MANAGEMENT ACTIVITIES

No water management activities occurred in the month of November.

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PROCESSING PLANT ACTIVITIES

The mine is currently under extended care and maintenance conditions, and the process plant is not in operation at this time. There are no further processing of ore, depositing of slurry, paste, solids, or liquids to the North Pile or paste underground at this time.

FUEL STORAGE/TANK FARM

Ongoing inspections of the tank farms and distribution systems continued in November.

SPILLS

No reportable spills occurred in November.

AIRSTRIP

No regular monitoring and airstrip maintenance was carried out in November.

CONTAINMENT DAMS

Weekly inspections of Dams # 1 and # 2 continued during the month of November. North Pile inspections were conducted monthly and report submitted to Geotechnical Engineers.

QA/QC

The frequency of sampling has reduced post underground flooding and into extended care and maintenance. The current QA/QC plan remains under review to better suit the Extended Care and Maintenance monitoring requirements.

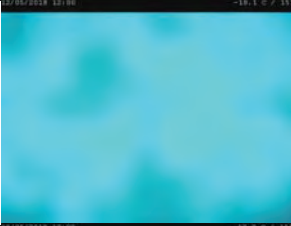
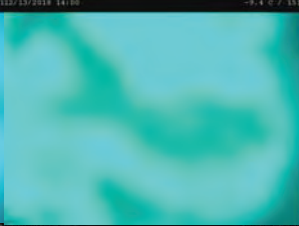

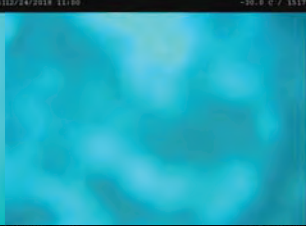
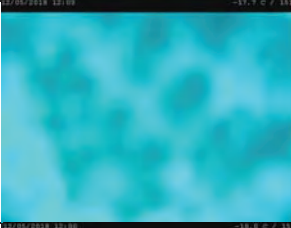

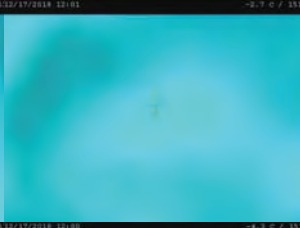
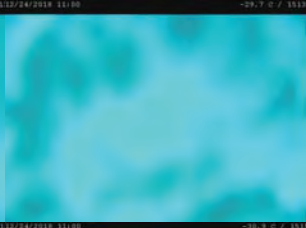
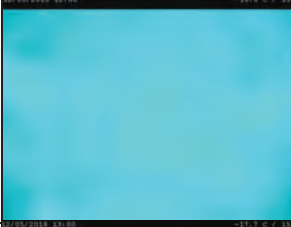





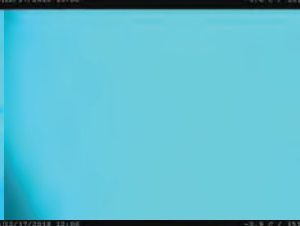
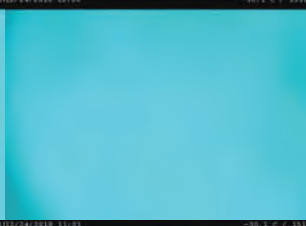












REMOTE MONITORING - December

The following monitoring has been conducted as per the recommendations of the EOR established in the Monitoring Response Frameworks for the North Pile Facility and Water Management Pond Dams {Golder (2018)}:

- The December Monthly Campaign was postponed to January 3rd due to unfavourable weather conditions. Several attempts were made to go in but the high risk and unsafe conditions did not allow for safe passage to Snap Lake Mine.
- The perimeter sumps, WMP and 12M L tank farm were monitored continuously through remote monitoring cameras. Weekly photos were provided to the Inspector and are included in this report.
- Snow clearance was not required in December.
- A contingency plan to allow de-icing to lower the sump or WMP water levels based on inspection is in place.
- Remote monitoring of the East Cell instrumentation and site specific weather data is ongoing as outlined in Golder (2018b).
- A log of camera icing and ice mitigation is included in the appendix of this report. Response categories remain green for all sumps and water management pond.

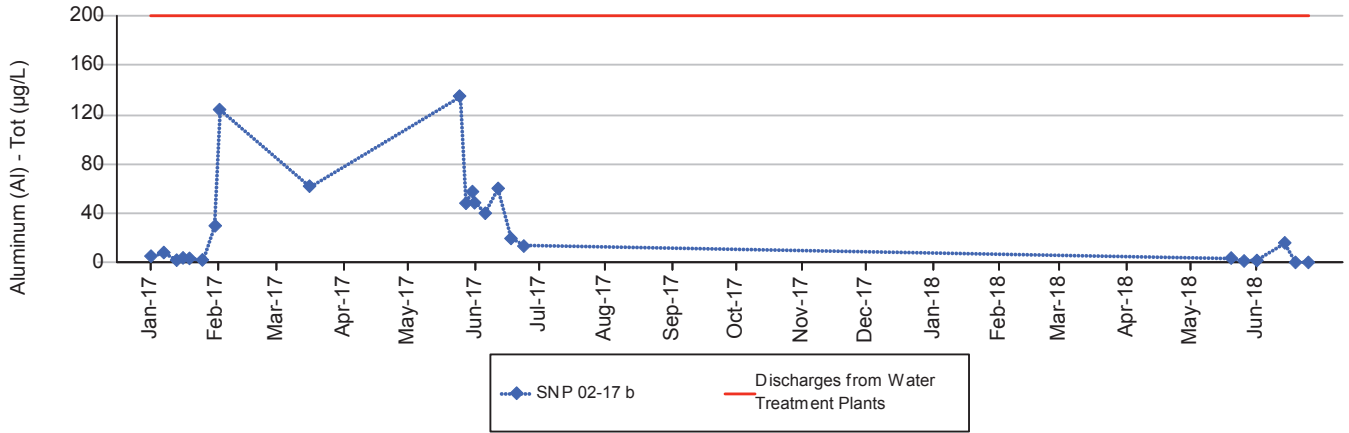
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SNP Report Data Tables and Figures

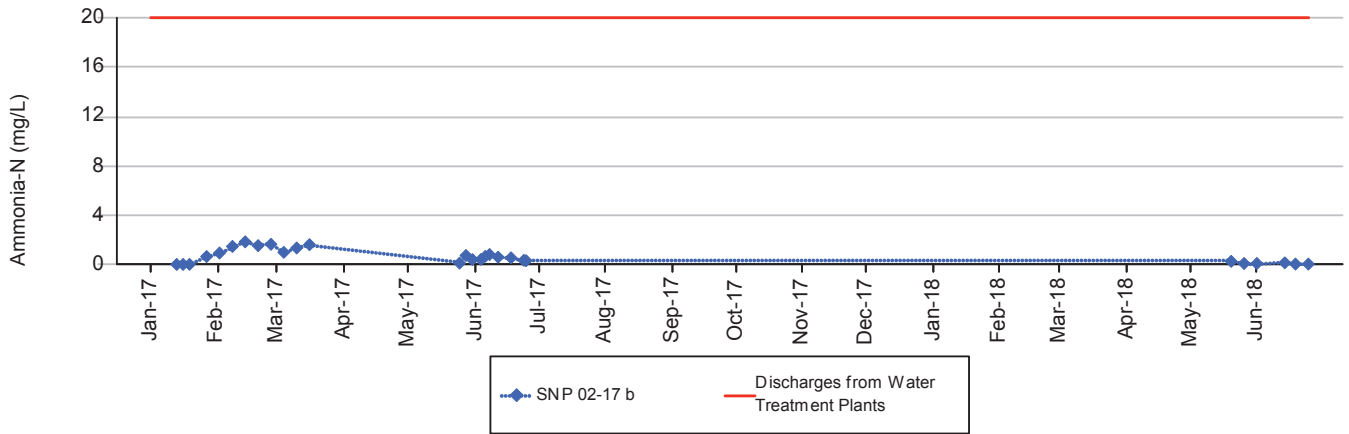
Water Control Structure	Photos			
	Week 10 Dec 2-8, 2018	Week 11 Dec 9-15, 2018	Week 12 Dec 16-22, 2018	Week 13 Dec 23-29, 2018
Perimeter Sump 1				
Perimeter Sump 2				
Perimeter Sump 3				
Perimeter Sump 4				
Perimeter Sump 5				
Water Management Pond				
Fuel Tank				

Date	Water Control Structure	Type of Issue Detected	Action Required	Management responses taken	Response Category	
16-Oct-18	Perimeter Sump 1	Frost on camera	No	Camera ice melted next day	Green	
16-Oct-18	Water Management Pond	Frost on camera	No	Camera ice melted next day	Green	
14-Oct-18	Perimeter Sump 2	Frost on camera	No	Camera ice melted next day	Green	
16-Oct-18	First Monthly Campaign mobilization to SLM - Day 1. Visual inspection of water control structures confirmed less than 1/3 full of sump operating level.				Green	
18-Oct-18	Perimeter Sump 2	Frost on camera	No	Camera ice melted next day	Green	
	Perimeter Sump 1	Frost on camera	No	Camera ice melted next day	Green	
	Perimeter Sump 5	Frost on camera	No	Camera ice melted next day	Green	
	Water Management Pond	Frost on camera	No	Camera ice melted next day	Green	
19-Oct-18	First Monthly Campaign mobilization to SLM - Day 2 (3 day weather delay due to freezing rain) Visual inspection of water control structures confirmed less than 1/3 full of sump operating level.				Green	
20-Oct-18	Perimeter Sump 3	Frost on camera	No	Camera ice melted next day	Green	
	Perimeter Sump 3	Frost on cameras from Oct 22-26	No	Camera ice melted on Oct 27th	Green	
22-Oct-18	Perimeter Sump 4	Frost on camera from Oct 22-28	No	Camera Ice melted on Oct 29th	Green	
	Water Management Pond	Frost on camera	No	Camera ice melted next day	Green	
2-Nov-18	Perimeter Sump 3	Frost on camera from Nov 2-14th	Yes	Ice manually cleaned off lenses on Nov 14th	Green	
2-Nov-18	Perimeter Sump 4	Frost on camera from Nov 2-14th	Yes	Ice manually cleaned off lenses on Nov 14th	Green	
6-Nov-18	Water Management Pond	Frost on camera Nov 6-9	No	Camera ice melted on Nov 10	Green	
11-Nov-18	Water Management Pond	Frost on camera	No	Camera ice melted next day	Green	
14-Nov-18	Perimeter Sump 1	Successful mobilization to SLM after ice removal. All cameras except Sump 1&2 (unnecessary as they are clear) manually cleaned. Visual inspection of water control structures confirmed less than 1/3 full of sump operating level.			Green	
	Perimeter Sump 2				Green	
	Perimeter Sump 3				Green	
	Perimeter Sump 4				Green	
	Perimeter Sump 5				Green	
	Water Management Pond				Green	
	Fuel Tank				Green	
19-Nov-18	Water Management Pond	Poor visibility due to fog and some ice buildup	Yes	Cameras clear on no 22	Green	
20-Nov-18	Perimeter Sump 4	Frost on camera	No	Frost melted next day	Green	
22-Nov-18	Perimeter Sump 4	Fog/frost on camera on Nov 22- Dec 10	Yes	Minor improvement Nov 23, Mobilization to site on Dec 7 planned to manually remove ice with 91% isopropyl alcohol	Green	
23-Nov-18	Perimeter Sump 2	Frost on camera from Nov 23-26	Yes	Mobilize to site on Nov 23 to manually clear ice off of lenses with 91% isopropyl alcohol	Green	
23-Nov-18	Perimeter Sump 3	Successful mobilization to SLM after 3 weather days. Sumps 3,4 and WMP cameras cleaned with 91% isopropyl alcohol to remove ice. Sump 1&2 are unsafe to access. Visual inspection of water control structures confirmed less than 1/3 full of sump operating level. Note that snow deposition and accumulation in water control structures is not indicative of seepage inflow.				
	Perimeter Sump 4					
Water Management Pond						
26-Nov-18	Perimeter Sump 3	Frost on camera from Nov 26- Dec 6	Yes	Mobilization to site on Dec 7 planned to manually remove ice with 91% isopropyl alcohol	Green	
	Water Management Pond	Frost on camera	Yes			
27-Nov-18	Perimeter Sump 1	Frost on Camera partial blockage from Nov 27-dec 1	Yes			
	Perimeter Sump 5	Frost on camera from Nov 27-Dec 9	Yes			
	Fuel Tank	Frost on camera	Yes			
28-Nov-18	Perimeter Sump 2	Frost on camera, no visibility between Nov 28-Dec 6	Yes	Mobilization to site on Dec 7 planned to manually remove ice with 91% isopropyl alcohol - unsafe conditions to clear the cameras. Partial visibility on cameras as of December 17, 2018	Green	
	Perimeter Sump 1	Adjusted camera warm up time from 4 minutes to 8 minutes.			Green	
	Perimeter Sump 2				Green	
	Perimeter Sump 3				Green	
	Perimeter Sump 4				Green	
	Perimeter Sump 5				Green	
	Water Management Pond				Green	
Fuel Tank	Green					
2-Dec-18	Perimeter Sump 1	Frost on camera, no visibility from Dec 2-16	Yes	Mobilization to site on Dec 7 planned to manually remove ice with 91% isopropyl alcohol - unsafe conditions to clear the cameras. Partial visibility on cameras as of December 17, 2018	Green	
7-Dec-18	Perimeter Sump 1	Adjusted camera warm up time from 8 minutes to 30 minutes.			Green	
	Perimeter Sump 2				Green	
	Perimeter Sump 3				Green	
	Perimeter Sump 4				Green	
	Perimeter Sump 5				Green	
	Water Management Pond				Green	
	Fuel Tank				Green	
10-Dec-18	Perimeter Sump 1	Successful mobilization to SLM after 3 weather days for ice removal. All cameras except Sump 1&2 manually cleaned. Unsafe conditions to reach the cameras at these sumps. Visual inspection of water control structures confirmed less than 1/3 full of sump operating level. Note that snow deposition and accumulation in water control structures is not indicative of seepage inflow.			Green	
	Perimeter Sump 2				Green	
	Perimeter Sump 3				Green	
	Perimeter Sump 4				Green	
	Perimeter Sump 5				Green	
	Fuel Tank				Green	
10-Dec-18	Perimeter Sump 2	Partial visibility of cameras, enough to see the staff gauge in the sump. Same visibility from Dec 10-17	Yes	Mobilization to site on Dec 19th planned to manually remove ice with brooms and 91% isopropyl alcohol.	Green	
17-Dec-18	Perimeter Sump 3	Frost on camera	Yes	camera heat up time to be changed, mobilization to site on 19 Dec for manual snow/ice removal	Green	
18-Dec-18	Perimeter Sump 1	Frost on Camera		Camera warm up time changed to 59 minutes for all cameras	Green	
	Perimeter Sump 2				Green	
	Perimeter Sump 3				Clear from 10 Dec to 17 Dec	Green
	Perimeter Sump 4				Clear to Dec 14	Green
	Perimeter Sump 5				Clear	Green
	Water Management Pond				Frost on Camera	Green
19-Dec-18	Perimeter Sump 1	Weather delay (4 days, dec 19-22) to SLM for Monthly Campaign and manual frost/snow removal from cameras. Cancelled campaign to be rescheduled for Jan 3			Green	
	Perimeter Sump 2				Green	
	Perimeter Sump 3				Green	
	Perimeter Sump 4				Green	
	Perimeter Sump 5				Green	
	Fuel Tank				Green	
24-Dec-18	Perimeter Sump 1	Frost on Camera	Yes	Monthly Campaign scheduled for Jan 3, manual ice removal to be conducted at this time.	Green	
	Perimeter Sump 2	Frost on Camera			Green	
	Perimeter Sump 3	Frost on Camera			Green	
	Perimeter Sump 4	Frost On Camera			Green	
	Perimeter Sump 5	85% Frost on Camera			Green	
	Water Management Pond	Frost on Camera			Green	
Fuel Tank	25% Frost on camera	Green				

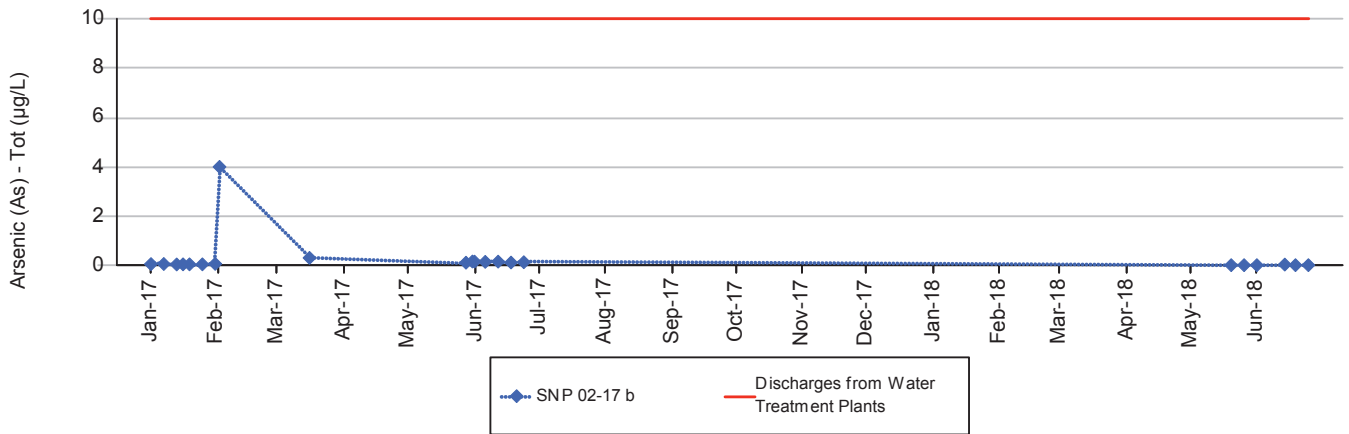
SNP 02-17 b: Aluminum (Al) - Tot ($\mu\text{g/L}$)



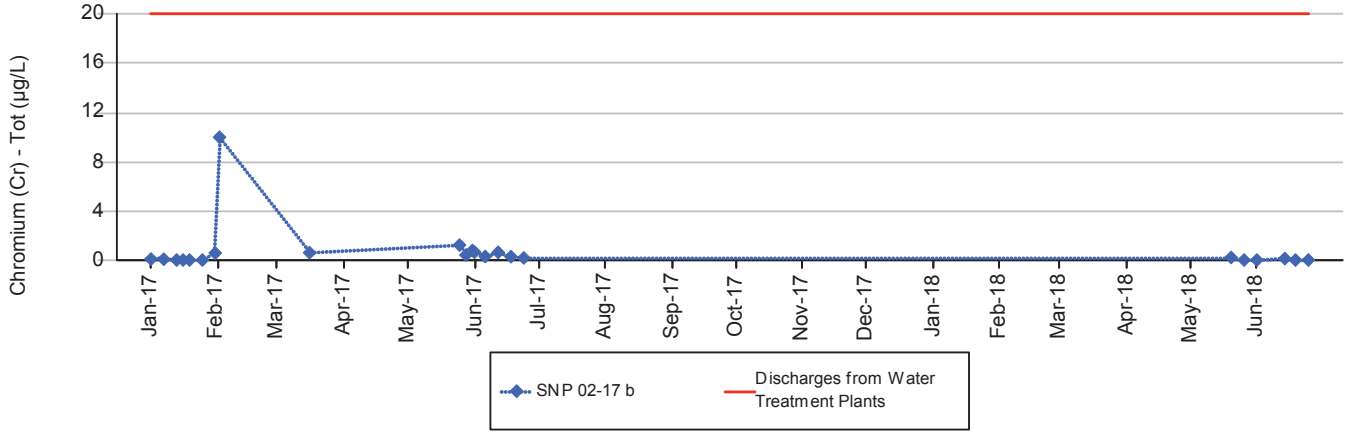
SNP 02-17 b: Ammonia-N (mg/L)



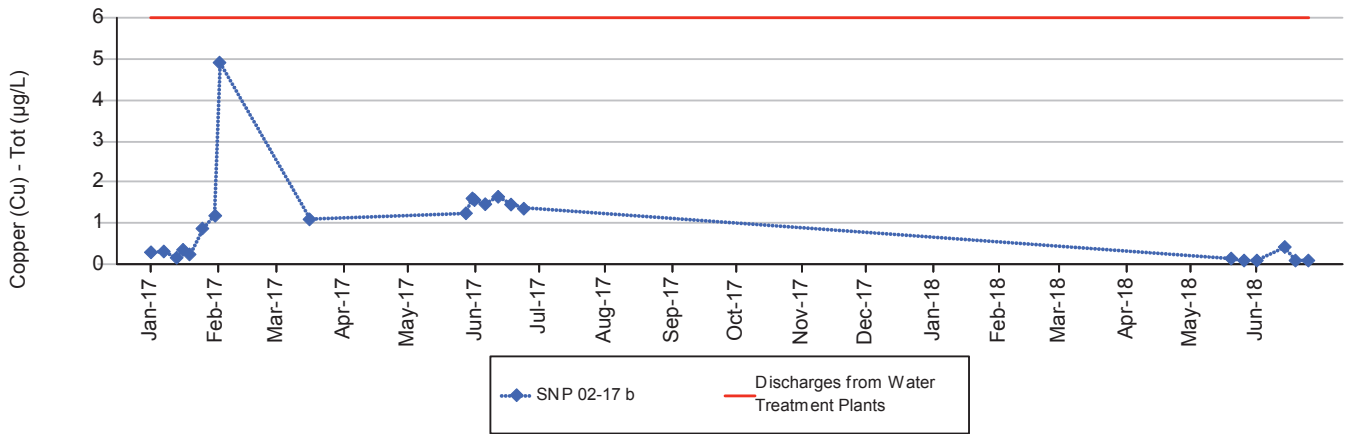
SNP 02-17 b: Arsenic (As) - Tot ($\mu\text{g/L}$)



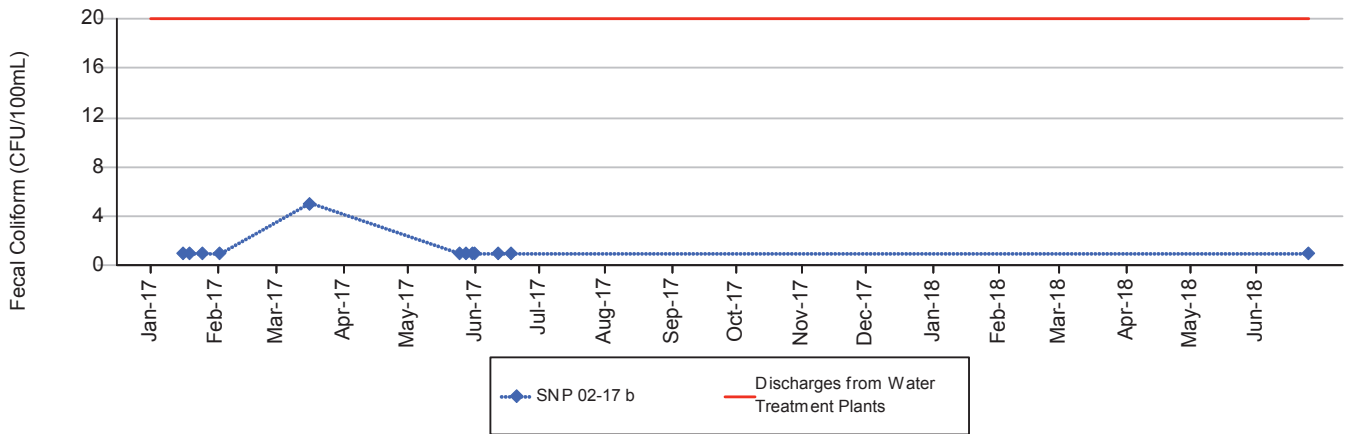
SNP 02-17 b: Chromium (Cr) - Tot ($\mu\text{g/L}$)



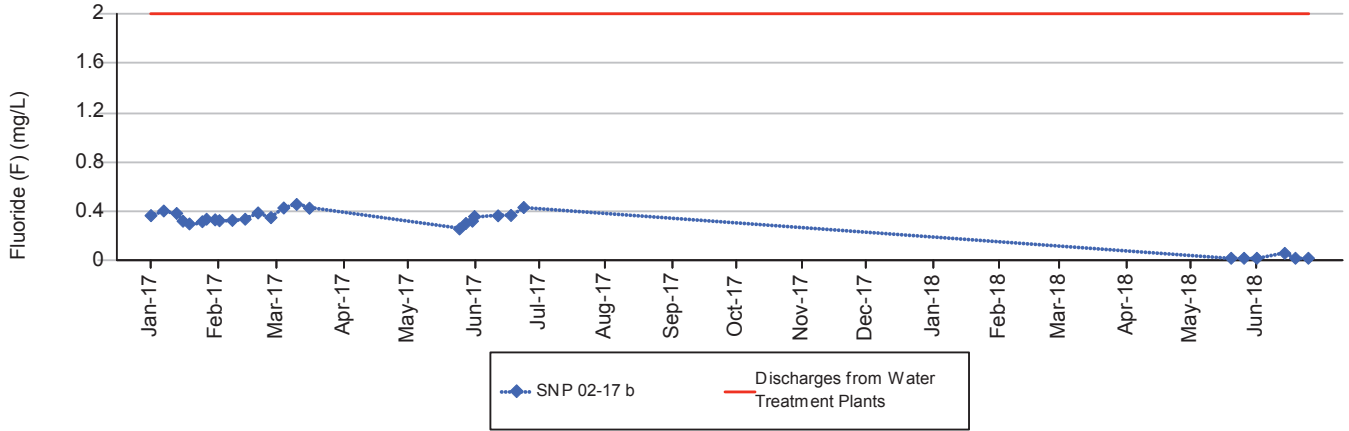
SNP 02-17 b: Copper (Cu) - Tot ($\mu\text{g/L}$)



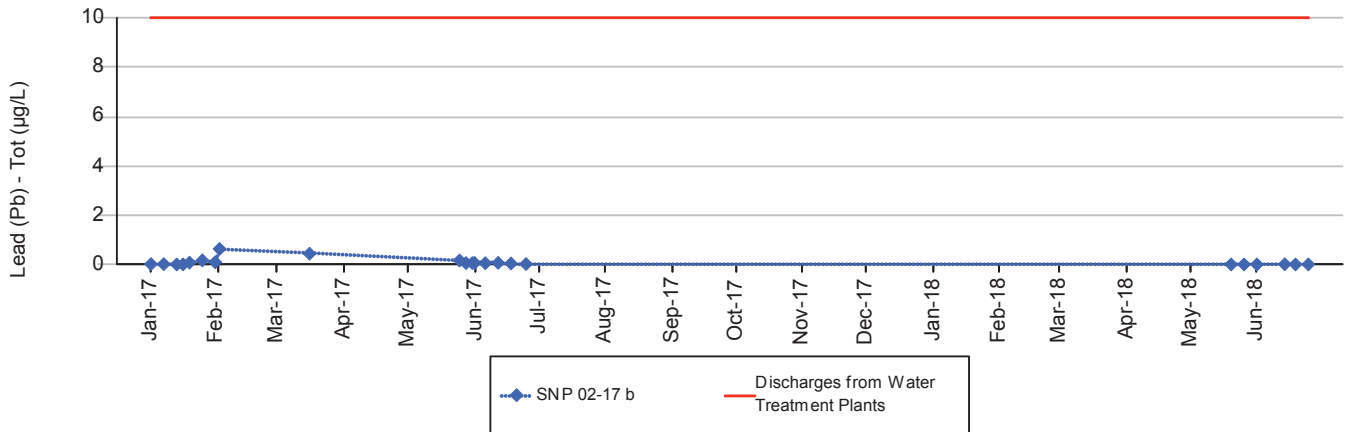
SNP 02-17 b: Fecal Coliform (CFU/100mL)



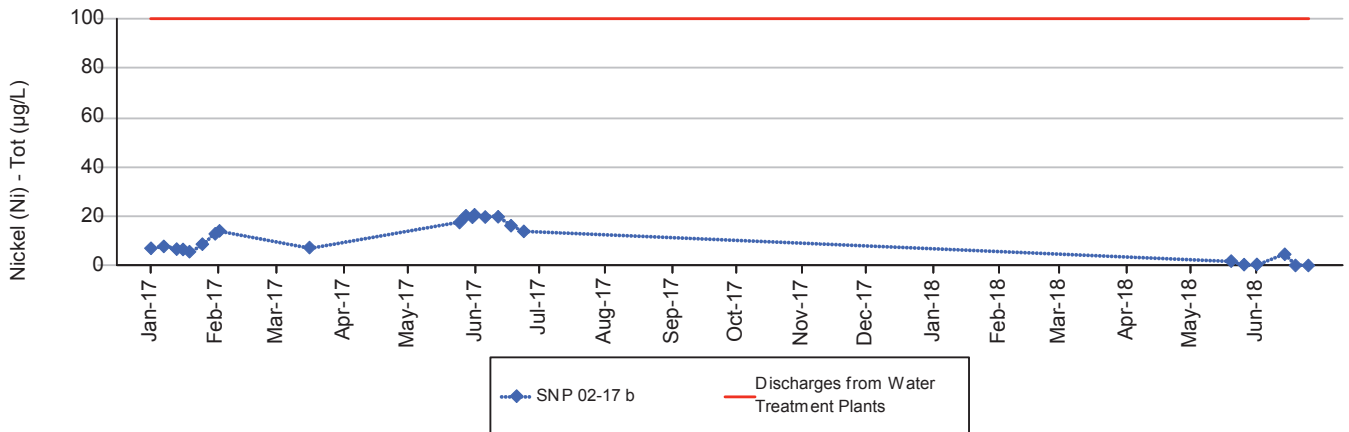
SNP 02-17 b: Fluoride (F) (mg/L)



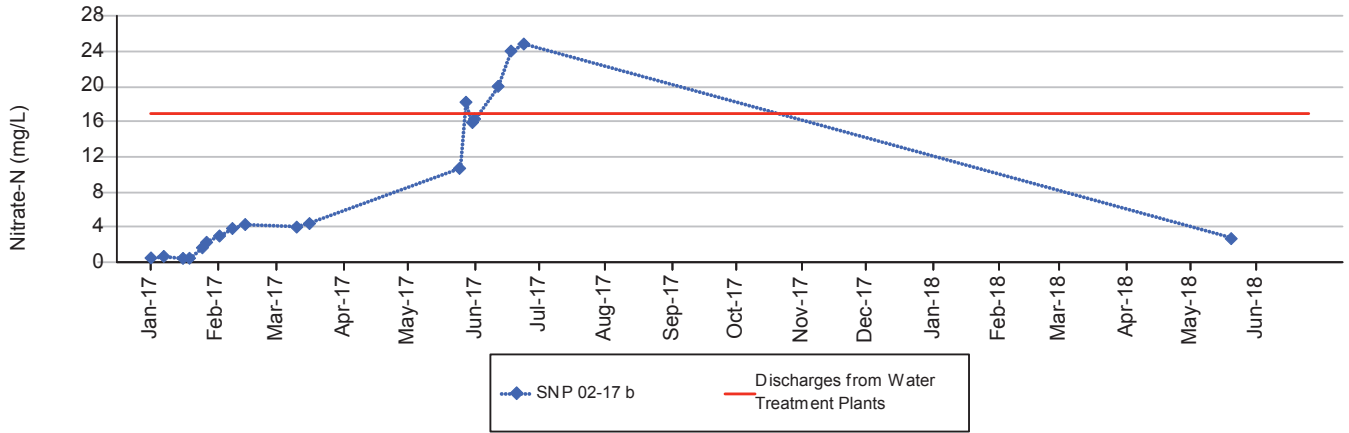
SNP 02-17 b: Lead (Pb) - Tot (µg/L)



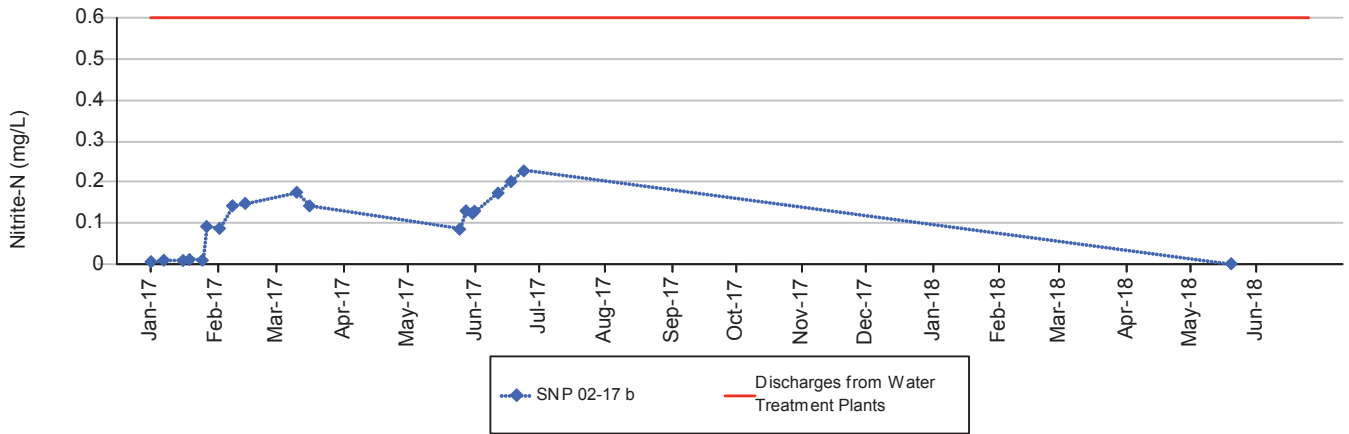
SNP 02-17 b: Nickel (Ni) - Tot (µg/L)



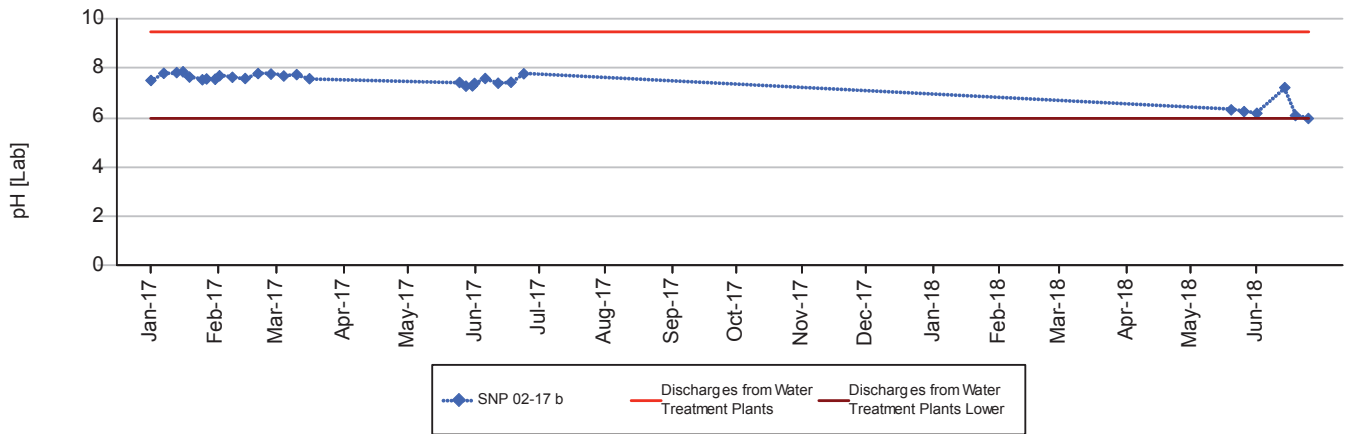
SNP 02-17 b: Nitrate-N (mg/L)



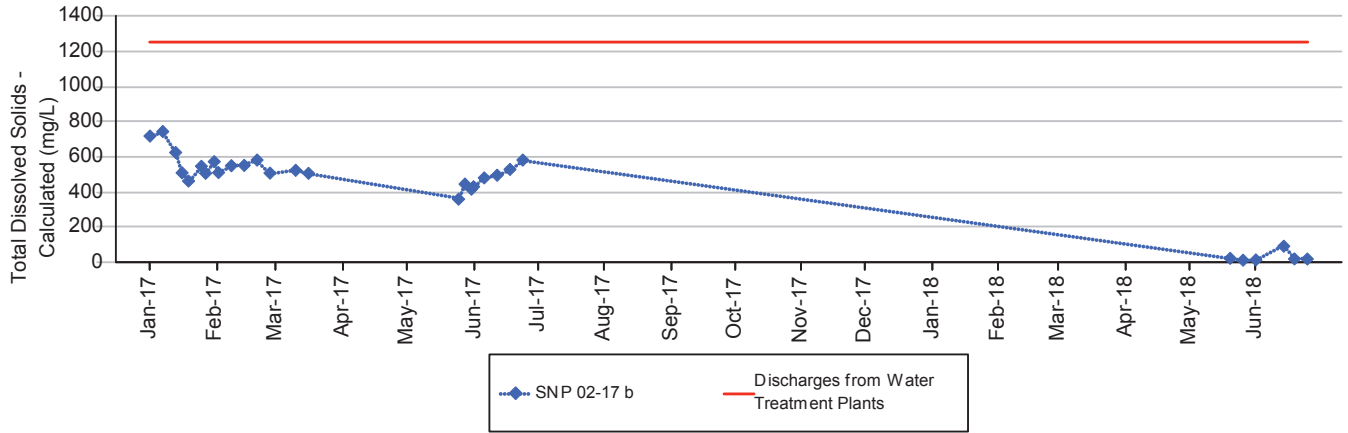
SNP 02-17 b: Nitrite-N (mg/L)



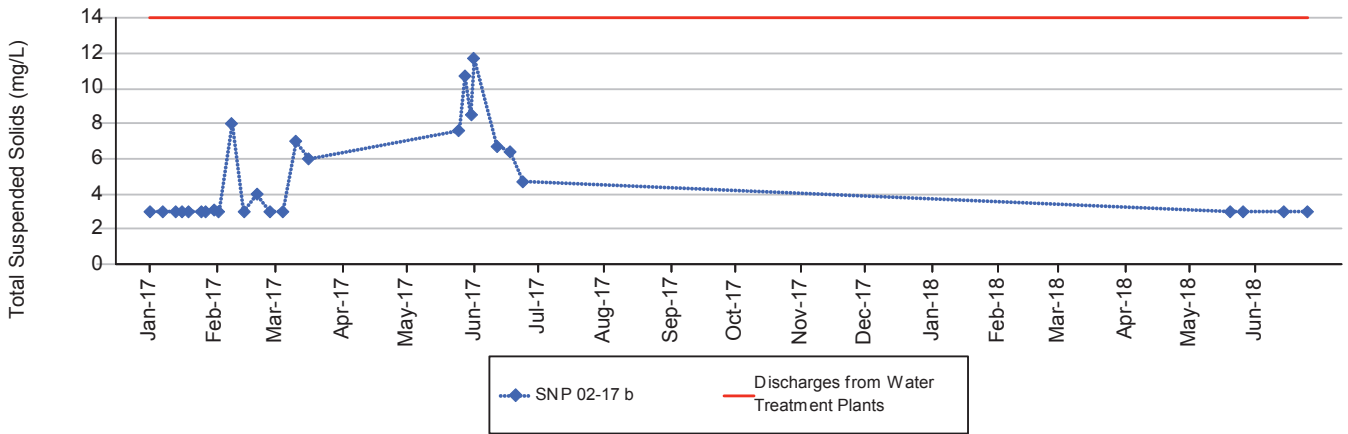
SNP 02-17 b: pH [Lab]



SNP 02-17 b: Total Dissolved Solids - Calculated (mg/L)



SNP 02-17 b: Total Suspended Solids (mg/L)



SNP 02-17 b: Zinc (Zn) - Tot (µg/L)

