

April 25, 2017

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: March 2017
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 March 2017.

Samples were collected from three (3) stations during the reporting period (Figure 1). Underground retreat was completed on February 9 and flooding of the underground workings is on-going.

This report satisfies the SNP requirements as dictated 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.

Michelle H. Peters Digitally signed by Michelle H. Peters
DN: cn=Michelle H. Peters, o=De Beers Canada
Inc., ou=Snap Lake Mine,
email=Michelle.Peters@debeersgroup.com, c=CA
Date: 2017.05.01 13:16:39 -0600

Michelle Peters
Environmental Monitoring Superintendent

Copied to: J. Steele, M. Sanderson, A.Howton
P. di Pizzo, Z. Liu

GNWT
SLEMA

Snap Lake Mine
Surveillance Network Program
March 2017
Active SNP Stations March 2017



SNP Sampling Status March 2017 MV#2011L2-0004 (Amended September 8, 2016)

SNP STATION	DESCRIPTION	STATUS	SAMPLED	TABLE
02-01	Final mine water collection sump- Dirty minewater from underground stopped pumping to WTP as part of flooding operations in Extended Care & Maintenance.	Active	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	yes	2
02-16 i	Sewage Discharge from Sewage Treatment Plant prior to mixing with Water Treatment Plant Effluent (2)	Active	yes	3
02-17 b	Final Combined Water Treatment Plant, Water Treatment Plant 6-Day 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	--

WATER MANAGEMENT

SNP 02-01: Dirty mine water from underground final mine water collection sump stopped pumping to the Water Treatment Plant (WTP) as part of flooding operations in Extended Care & Maintenance. The station no longer in service.

SNP STATION 02-14: The weekly samples could not be picked up as the Auxillary Plant was in recirculation mode and was not pumping to the WTP.

SNP STATION 02-16 i: The Sewage Treatment Plant (STP) operated for 31 days in the month of March.

SNP STATION 02-17 b: There was no discharge to the lake from Station 02-17 b after February 09.

SNP STATION 02-20: No samples were collected at the SNP 02-20 stations in March.

RAW WATER CONSUMPTION

The quantity of water extracted from Snap Lake for camp operations, site services, and construction is tabulated in Table 6. Please note that mine water results are subject to change pending completion of quality assurance checks.

GENERAL WASTE

Glass jars, tin cans, and most food related plastic containers are washed and 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 March 7th.

ENVIRONMENTAL STUDIES/SURVEYS

Regulatory monitoring of Snap Lake included the following:

- Air Quality Monitoring; and
- Monthly and Quarterly SNP monitoring;

OTHER ON-SITE ACTIVITIES

- Site Water Quality monitoring;
- North Pile Thermistor and Piezometer monitoring;
- Meteorological data downloads;
- Dam and Water Management Pond monitoring;
- North Pile ditch and sump monitoring;
- Potable water monitoring
- Winter road environmental monitoring; and
- Wildlife Surveillance Audits.

CONSTRUCTION ACTIVITIES

There are currently no construction activities on site.

GEO-TECHNICAL ACTIVITIES

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

WATER MANAGEMENT ACTIVITIES

Total Dissolved Solids Loading to Snap Lake	Table 4
Nutrient Loading to Snap Lake	Table 5
Water Balance	Table 6
Runoff Water Pumped to Water Management Pond	Table 7

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 (Reference Table 8-12).

FUEL STORAGE/TANK FARM

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

SPILLS

There were no reportable spills for the month of March.

AIRSTRIP

Regular monitoring and air strip maintenance was carried out in March.

CONTAINMENT DAMS

Weekly inspections of Dams # 1 and # 2 continued during the month of March. North Pile inspection was conducted weekly and report submitted to Geotechnical Engineers.

QA/QC

A travel blank, and field blank were not collected this month as per the Snap Lake QA/QC Plan. The frequency of sampling has reduced post underground flooding and into extended care and maintenance. The current QA/QC plan is under review to better suit the Extended Care and Maintenance monitoring requirements.

Snap Lake Mine
Surveillance Network Program
March 2017

ATTACHMENT:
SNP REPORT DATA TABLES AND FIGURES

TABLE 1
SNAP LAKE WATER LICENSE WTP DISCHARGE CRITERIA
MV#2011L2-0004 (Amended September 8, 2016)
June 14, 2012 – June 13, 2020

PARAMETER	AVERAGE MONTHLY LIMIT	MAXIMUM CONCENTRATION OF ANY GRAB SAMPLE	ANNUAL LOADING
Ammonia as N	10 mg/L	20 mg/L	208,000 kg/yr
Extractable Petroleum Hydrocarbons - F1 Fraction (C6-C10)	4.6 mg/L		
Extractable Petroleum Hydrocarbons - F2 Fraction (C11-C16)	2.1 mg/L		
Faecal Coliforms	10 CFU/100ml*	20 CFU/100ml*	
* CFU - (Colony-forming units)			
Fluoride	1.3 mg/L	2.0 mg/L	
Nitrate as N	12 mg/L	17 mg/L	250,000 kg/yr
Nitrite as N	0.35 mg/L	0.5 mg/L	
pH	6.0 - 9.0		
Total Aluminum	100 µg/L	200 µg/l	
Total Arsenic	3 µg/L	10 µg/L	
Total Chromium	10 µg/L	20 µg/L	
Total Copper	3 µg/L	6 µg/L	
Total Lead	5 µg/L	10 µg/L	
Total Nickel	50 µg/L	100 µg/L	
Total Zinc	10 µg/L	20 µg/L	
Total Phosphorus Discharge from All Sources			229 kg/yr
Total Dissolved Solids (TDS) (calculated)	960 mg/L	1253 mg/L	
Total Suspended Sediments	7 mg/L	14 mg/L	
RUNOFF DISCHARGE CRITERIA			
pH*	5.0 - 9.0		
* Except SNP 02-04, SNP 02-07, SNP 02-08, or SNP 02-09			

TABLE 2
SNP STATION: 02-15
WATER INTAKE FROM SNAP LAKE
LICENCE # MV2011L2-0004

Date Sampled:	2017-03-06	2017-03-06	2017-03-06	2017-03-06	2017-03-06	2017-03-06
Sample Control Number:	2017-0138	2017-0139	2017-0140	2017-0141	2017-0144	2017-0145
QAQC Type:	Sample	Split Sample	Duplicate Sample	Triplicate Sample	Split Sample	Split Sample
Total Dissolved Solids (mg/L) (Measured)	337		339	310		
Total Dissolved Solids, calculated (lab) (mg/L)	331		335	329		
Calcium (mg/L)	67.3		69.1	69.4		
Chloride (mg/L)	158		158	155		
Fluoride (mg/L)	0.203		0.206	0.19		
Hardness, as CaCO3 (mg/L)	205		210	208		
Magnesium (mg/L)	8.87		9.03			
Potassium (mg/L)	3.02		3.03	2.95		
Reactive Silica, as SiO2 (mg/L)	0.880		0.870	0.84		
Sodium (mg/L)	35.6		35.1	33.5		
Sulphate (mg/L)	28.9		28.8	27.8		
Total Alkalinity, as CaCO3 (mg/L) [Major Ions]	41.2		45.7	46.6		
Nitrate, as N (mg/L)	0.750		0.749	0.721		
Total Magnesium (µg/L)				8460		
E. coli (MPN/100mL)		< 1.0			< 1.0	< 1.0
Total Coliforms (MPN/100mL)		1.0				
pH (unitless) [Field]	7.08			7.08		
Specific Conductivity (µS/cm) [Field]	717			717		
Water Temperature (deg. C) [Field]	12.2			12.2		

TABLE 3**SNP STATION: 02-16i****SEWAGE DISCHARGE FROM SEWAGE TREATMENT PLANT PRIOR TO MIXING WITH WATER TREATMENT PLANT EFFLUENT****LICENCE # MV2011L2-0004**

Date Sampled:	2017-03-06	2017-03-06	2017-03-13	2017-03-22	3/30/2017
Sample Control Number:	2017-0136	2017-0137	2017-0152	2017-0174	2017-0177
QAQC Type:	Sample	Duplicate Sample	Sample	Sample	Sample
Biochemical Oxygen Demand (mg/L)	5	6	6	15	11
Total Suspended Solids (mg/L)	23	22	25	44	26
Dissolved Phosphorus (mg/L) [Nutrients]	4.34	4.41	5.30	6.82	5.41
Nitrate, as N (mg/L)	28.2	29.2	30.4	31.3	25.6
Nitrite, as N (mg/L)	< 0.01	< 0.01	< 0.01	0.38	0.22
ortho-Phosphate, as P (mg/L)	4.03	4.06	5.20	5.48	4.63
Total Ammonia, as N (mg/L)	1.65	1.60	0.731	3.11	1.38
Total Kjeldahl Nitrogen (mg/L)	5.68	5.47	4.63	9.70	5.31
Total Organic Carbon (mg/L)	20.7	21.2	27.0	28.9	28.2
Total Phosphorus (mg/L) [Nutrients]	4.97	4.95	5.92	7.79	5.71
Hexane Extractable Material (mg/L)	< 2.0	< 2.0	< 2.0	2.1	< 2.0
E. coli (MPN/100mL)	< 1.0	< 1.0	1.0	3.1	13.4
Fecal Coliform (CFU/100mL)	< 1	< 1	3	4	< 1
pH (unitless) [Field]	5.42		5.48	5.01	5.62
Specific Conductivity (μ S/cm) [Field]	1032		1366	1001	939
Water Temperature (deg. C) [Field]	15.6		16.9		18.6

TABLE 4**TOTAL DISSOLVED SOLIDS CALCIUM AND CHLORIDE LOADING TO SNAP LAKE 2017 (TONNES)**

MONTH	TDS	CALCIUM	CHLORIDE
	(tonnes)		
JAN	594	133	283
FEB	0	0	0
MAR	0	0	0
APR			
MAY			
JUN			
JUL			
AUG			
SEP			
OCT			
NOV			
DEC			
TOTAL	594	133	283

TABLE 5
NUTRIENT LOADING TO SNAP LAKE 2017

MONTH	PHOSPHORUS	AMMONIA	NITRATE
	(kg)		
JAN	5.52	27	558
FEB	0	0	0
MAR	0	0	0
APR			
MAY			
JUN			
JUL			
AUG			
SEP			
OCT			
NOV			
DEC			
TOTAL	5.52	27	558