## **YMEP 17-036**

# YMEP SUMMARY REPORT, REINDEER CREEK PROPERTY, YUKON.

## HAC Minerals Incorporated.

HAC Placer Claims, Reindeer Creek Property

NTS Sheet Claim Sheets 115O/11 Reindeer Mountain

Dawson Mining District, Yukon Territory.

Latitude: N63° 39' 34.5" Longitude: W139° 34' 42.2"

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January 22, 2018

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## Introduction

This Summary Report describes exploration work completed by HAC Minerals Inc. ("HAC Minerals") and the company's contractors to evaluate the placer gold potential of Reindeer Creek Property, located on Reindeer Creek in Dawson Mining District, Yukon, N.T.S. 1140/11 and 12.

HAC Minerals completed two exploration shafts through overburden and gravels to bedrock in spring 2017. Shafting on Reindeer Creek was completed by workers and subcontractors from Dawson City, Yukon. Processing and gold recovery was completed on April 19, 2017 at Indian River by the author.

Reports, GIS and Maps were completed by KIVI Geoscience Inc., of Thunder Bay, ON.

### **Project Location and Access**

The Reindeer Creek Property consists of 100 placer claims staked upstream from Yukon River for 15.4 km on Reindeer Creek. The claim holder is HAC Minerals Inc. (100%), and claims are in good standing at the time of this report.

The Reindeer Creek Property is located 45 km south of Dawson City along Reindeer Creek in Dawson Mining District in Yukon Territory, Claim Sheet NTS 115O/10 and 115O/11. The centre of the claims is N63° 39' 34.5" W139° 34' 42.2" (WGS84) or UTM Zone 7V co-ordinates 570375E 7059865N (NAD83).



Figure 1: HAC Minerals Inc. Reindeer Creek Property Location Map.

The property is accessible by boat or snowmobile from Dawson via Yukon River, or by helicopter.

## Property

The Reindeer Creek Property consists of 100 Placer claims, which are registered 100% to HAC Minerals Inc., of Lac La Biche, AB. A list of active placer claims with expiry date is provided in Table 1.

LABEL	OWNER	STAKE_DATE	RECORDED	EXPIRY	DISTRICT
Hac 1	Hac Minerals Inc 100%	21/06/2016	29/06/2016	29/06/2017	Dawson
Hac 2	Hac Minerals Inc 100%	21/06/2016	29/06/2016	29/06/2017	Dawson
Hac 3	Hac Minerals Inc 100%	21/06/2016	29/06/2016	29/06/2017	Dawson
Hac 4	Hac Minerals Inc 100%	21/06/2016	29/06/2016	29/06/2017	Dawson
Hac 5	Hac Minerals Inc 100%	21/06/2016	29/06/2016	29/06/2017	Dawson
Hac 6	Hac Minerals Inc 100%	21/06/2016	29/06/2016	29/06/2017	Dawson
Hac 7	Hac Minerals Inc 100%	21/06/2016	29/06/2016	29/06/2017	Dawson
Hac 8	Hac Minerals Inc 100%	21/06/2016	29/06/2016	29/06/2017	Dawson
Hac 9	Hac Minerals Inc 100%	21/06/2016	29/06/2016	29/06/2017	Dawson
Hac 10	Hac Minerals Inc 100%	21/06/2016	29/06/2016	29/06/2017	Dawson
Hac 11	Hac Minerals Inc 100%	22/06/2016	29/06/2016	29/06/2017	Dawson
Hac 12	Hac Minerals Inc 100%	22/06/2016	29/06/2016	29/06/2017	Dawson
Hac 13	Hac Minerals Inc 100%	22/06/2016	29/06/2016	29/06/2017	Dawson
Hac 14	Hac Minerals Inc 100%	22/06/2016	29/06/2016	29/06/2017	Dawson
Hac 15	Hac Minerals Inc 100%	22/06/2016	29/06/2016	29/06/2017	Dawson
Hac 16	Hac Minerals Inc 100%	22/06/2016	29/06/2016	29/06/2017	Dawson
Hac 17	Hac Minerals Inc 100%	22/06/2016	29/06/2016	29/06/2017	Dawson
Hac 18	Hac Minerals Inc 100%	22/06/2016	29/06/2016	29/06/2017	Dawson
Hac 19	Hac Minerals Inc 100%	22/06/2016	29/06/2016	29/06/2017	Dawson
Hac 20	Hac Minerals Inc 100%	22/06/2016	29/06/2016	29/06/2017	Dawson
Hac 21	Hac Minerals Inc 100%	23/06/2016	29/06/2016	29/06/2017	Dawson
Hac 22	Hac Minerals Inc 100%	23/06/2016	29/06/2016	29/06/2017	Dawson
Hac 23	Hac Minerals Inc 100%	23/06/2016	29/06/2016	29/06/2017	Dawson
Hac 24	Hac Minerals Inc 100%	23/06/2016	29/06/2016	29/06/2017	Dawson
Hac 25	Hac Minerals Inc 100%	23/06/2016	29/06/2016	29/06/2017	Dawson
Hac 26	Hac Minerals Inc 100%	23/06/2016	29/06/2016	29/06/2017	Dawson
Hac 27	Hac Minerals Inc 100%	23/06/2016	29/06/2016	29/06/2017	Dawson
Hac 28	Hac Minerals Inc 100%	23/06/2016	29/06/2016	29/06/2017	Dawson
Hac 29	Hac Minerals Inc 100%	23/06/2016	29/06/2016	29/06/2017	Dawson
Hac 30	Hac Minerals Inc 100%	23/06/2016	29/06/2016	29/06/2017	Dawson
Hac 31	Hac Minerals Inc 100%	23/06/2016	29/06/2016	29/06/2017	Dawson
Hac 32	Hac Minerals Inc 100%	23/06/2016	29/06/2016	29/06/2017	Dawson
Hac 33	Hac Minerals Inc 100%	23/06/2016	29/06/2016	29/06/2017	Dawson
Hac 34	Hac Minerals Inc 100%	23/06/2016	29/06/2016	29/06/2017	Dawson
Hac 35	Hac Minerals Inc 100%	23/06/2016	29/06/2016	29/06/2017	Dawson
Hac 36	Hac Minerals Inc 100%	24/06/2016	29/06/2016	29/06/2017	Dawson

Table 1. Reindeer Creek Property Yukon Placer Claims.

Hac 37	Hac Minerals Inc 100%	24/06/2016	29/06/2016	29/06/2017	Dawson
Hac 38	Hac Minerals Inc 100%	24/06/2016	29/06/2016	29/06/2017	Dawson
Hac 39	Hac Minerals Inc 100%	24/06/2016	29/06/2016	29/06/2017	Dawson
Hac 40	Hac Minerals Inc 100%	24/06/2016	24/06/2016 29/06/2016 29/0		Dawson
Hac 41	Hac Minerals Inc 100%	24/06/2016	29/06/2016	29/06/2017	Dawson
Hac 42	Hac Minerals Inc 100%	24/06/2016	29/06/2016	29/06/2017	Dawson
Hac 43	Hac Minerals Inc 100%	24/06/2016	29/06/2016	29/06/2017	Dawson
Hac 44	Hac Minerals Inc 100%	24/06/2016	29/06/2016	29/06/2017	Dawson
Hac 45	Hac Minerals Inc 100%	24/06/2016	29/06/2016	29/06/2017	Dawson
Hac 46	Hac Minerals Inc 100%	24/06/2016	29/06/2016	29/06/2017	Dawson
Hac 47	Hac Minerals Inc 100%	24/06/2016	29/06/2016	29/06/2017	Dawson
Hac 48	Hac Minerals Inc 100%	24/06/2016	29/06/2016	29/06/2017	Dawson
Hac 49	Hac Minerals Inc 100%	24/06/2016	29/06/2016	29/06/2017	Dawson
Hac 50	Hac Minerals Inc 100%	24/06/2016	29/06/2016	29/06/2017	Dawson
Hac 51	Hac Minerals Inc 100%	03/07/2016	08/07/2016	08/07/2017	Dawson
Hac 52	Hac Minerals Inc 100%	03/07/2016	08/07/2016	08/07/2017	Dawson
Hac 53	Hac Minerals Inc 100%	03/07/2016	08/07/2016	08/07/2017	Dawson
Hac 54	Hac Minerals Inc 100%	03/07/2016	08/07/2016	08/07/2017	Dawson
Hac 55	Hac Minerals Inc 100%	03/07/2016	08/07/2016	08/07/2017	Dawson
Hac 56	Hac Minerals Inc 100%	03/07/2016	08/07/2016	08/07/2017	Dawson
Hac 57	Hac Minerals Inc 100%	03/07/2016	08/07/2016	08/07/2017	Dawson
Hac 58	Hac Minerals Inc 100%	03/07/2016	08/07/2016	08/07/2017	Dawson
Hac 59	Hac Minerals Inc 100%	03/07/2016	08/07/2016	08/07/2017	Dawson
Hac 60	Hac Minerals Inc 100%	03/07/2016	08/07/2016	08/07/2017	Dawson
Hac 61	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson
Hac 62	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson
Hac 63	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson
Hac 64	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson
Hac 65	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson
Hac 66	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson
Hac 67	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson
Hac 68	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson
Hac 69	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson
Hac 70	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson
Hac 71	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson
Hac 72	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson
Hac 73	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson
Hac 74	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson
Hac 75	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson
Hac 76	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson
Hac 77	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson
Hac 78	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson
Hac 79	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson
Hac 80	Hac Minerals Inc 100%	02/07/2016	08/07/2016	08/07/2017	Dawson

Hac 81	Hac Minerals Inc 100%	01/07/2016	08/07/2016	08/07/2017	Dawson
Hac 82	Hac Minerals Inc 100%	01/07/2016	08/07/2016	08/07/2017	Dawson
Hac 83	Hac Minerals Inc 100%	01/07/2016	08/07/2016	08/07/2017	Dawson
Hac 84	Hac Minerals Inc 100%	01/07/2016	08/07/2016	08/07/2017	Dawson
Hac 85	Hac Minerals Inc 100%	01/07/2016	08/07/2016	08/07/2017	Dawson
Hac 86	Hac Minerals Inc 100%	01/07/2016	08/07/2016	08/07/2017	Dawson
Hac 87	Hac Minerals Inc 100%	01/07/2016	08/07/2016	08/07/2017	Dawson
Hac 88	Hac Minerals Inc 100%	01/07/2016	08/07/2016	08/07/2017	Dawson
Hac 89	Hac Minerals Inc 100%	01/07/2016	08/07/2016	08/07/2017	Dawson
Hac 90	Hac Minerals Inc 100%	01/07/2016	08/07/2016	08/07/2017	Dawson
Hac 91	Hac Minerals Inc 100%	30/06/2016	08/07/2016	08/07/2017	Dawson
Hac 92	Hac Minerals Inc 100%	30/06/2016	08/07/2016	08/07/2017	Dawson
Hac 93	Hac Minerals Inc 100%	30/06/2016	08/07/2016	08/07/2017	Dawson
Hac 94	Hac Minerals Inc 100%	30/06/2016	08/07/2016	08/07/2017	Dawson
Hac 95	Hac Minerals Inc 100%	30/06/2016	08/07/2016	08/07/2017	Dawson
Hac 96	Hac Minerals Inc 100%	30/06/2016	08/07/2016	08/07/2017	Dawson
Hac 97	Hac Minerals Inc 100%	30/06/2016	08/07/2016	08/07/2017	Dawson
Hac 98	Hac Minerals Inc 100%	30/06/2016	08/07/2016	08/07/2017	Dawson
Hac 99	Hac Minerals Inc 100%	30/06/2016	08/07/2016	08/07/2017	Dawson
Hac 100	Hac Minerals Inc 100%	30/06/2016	08/07/2016	08/07/2017	Dawson

### **Exploration Target**

The Indian River area is a famous gold placer mining area of the Klondike from which 1M ounces of gold has been mined. Reindeer Creek is the next creek south of Indian River along Yukon River. Reindeer Creek is separated from the Indian River and its tributaries by Reindeer Mountain.

The Reindeer Creek Property, like much of the Klondike is not glaciated and is covered with thick gravel deposits that may contain placer gold mineralization.

Detailed study of aerial images show an old winter trail has been cut along the creek, so prospecting has occurred on Reindeer Creek in past, however no significant earth moving is evident from detailed aerial photography.

Indian River gold nuggets suggest a population with features that suggest low transport distances, especially at Kathleen and Ruby Creeks, which are located on the north side of Reindeer Mountain. The same gold may be present in south side of Reindeer Mountain in Reindeer Creek.

The exploration target on the Reindeer Creek Property is placer gold deposits similar to those encountered on the north side of Reindeer Mountain on Kathleen, Diversion and Ruby Creek tributaries of Indian River.

## **Geological Description and Previous Work**

Local bedrock geology is available on map GSC OF4970 (Gordey, 2005) which shows local bedrock geology and surrounding MINFILE occurrences. The claims lie along Reindeer River, which is also a bedrock unconformity or fault contact between quartzite and meta-pelite to the north, and orthogneiss

to the south. Cretaceous granitic intrusions (Kg – pink) and meta-gabbro (PMd – green) intrusions are mapped north of the claims, and plutonic-related gold is documented as MINFILE 115O 050, Rudolf which plots adjacent to the HAC claims.

MINFILE 115O 050, Rudolf is a plutonic related gold showing, plots near beneath the HAC claims (grey), but given the type of bedrock gold occurrence, it may be related to the pink cretaceous intrusion (Pink - Kg) that plots east of Rudolf (MINFILE # over-plotted with grey HAC claims).

MINFILE 115O 109, Ruby, plots east of HAC claims on the top of Ruby Mountain, which may be the location of a bedrock shaft seen by the author during a helicopter ride to the claims in 2010.

MINFILE 115O 048, Bishop, plots north of the HAC claims in a north-trending drainage is described as gold-bearing quartz veins.

MINFILE 115O 156, Stockade, plots SW of the HAC claims on the Yukon river. No information is known about the Stockade showing except its location on map GSC OF4970.



Figure 2: Reindeer Creek Bedrock Geology (from Gordey, 2005).

The Placer Potential of the area mapped by Yukon Geological Survey (Bond, 2012) indicates Reindeer Creek (yellow) has 40-80<sup>th</sup> percentile tract potential for gold in bedrock, probably as a result of positive bedrock geology documented earlier. Reindeer Creek is surrounded on three sides by High Probability (red) to Confirmed probability (purple) drainages. Indian River (purple) and its southern tributaries (red) that occur on the north side of Reindeer Mountain, which is the mountain range that separates Reindeer from the Indian River. Haystack Mountain is a prominent topographic anomaly in the eastern mid-point of the map clipped from Bond's 2012 map, for reference.



Figure 3: Reindeer Creek (Yellow) with Moderate Probability for Gold in Bedrock (from Bond, 2012).

Placer gold mineralization has not yet confirmed on the Reindeer property, but government compilation work indicates the potential for placer gold is good.

## **Summary of Work Completed**

HAC Minerals intended to explore the property by shafting, and became aware of YMEP funding, so HAC engaged their consultant to prepare YMEP proposal with HAC Minerals which commenced on February 9, 2017 with generation of GIS, maps and a draft digital YMEP Form and Proposal, which was submitted

on March, 9, 2017 for review and comments by Yukon's YMEP geologist. The final revised digital YMEP Form and Proposal as submitted on March 27, 2017, followed by a hard- copy on March 31, 2017. HAC Minerals learned the project was accepted on May 17, 2017.

HAC Minerals planned to complete several exploration shafts to bedrock during spring 2017, sample basal gravels and process samples for gold using equipment at Northern Exposure's Indian River Camp. The Company expected to complete 4 shafts, but progress was slower than expected. Two shafts were completed and sampled to bedrock in the time and budget allocated.

The Reindeer Creek shafting crew consisted of Bryan Sporer, Reg Audet and Mark Thomas, who are contractors and prospectors from Dawson, YT. Each worker brings significant experience at exploration, mining, shafting and sampling for placer gold in the Klondike. Lead prospectors Reg Audet and Bryan Sporter each own exploration equipment, and together they provided all equipment for the job, including all shafting equipment and the winter camp. These are included as personal rentals and included in their day rates.

A helicopter was chartered to mobilize and provide support for a 3-man crew from Dawson, some 80 km south to the first exploration site. According to flight tickets, mobilization occurred on April 6, 2017. Helicopter support was provided by Fireweed Helicopters, Dawson YT.

On arrival, with temperature -35°C, the first order of business was to erect a 16'x20' wall tent and cut wood for heat. Two workers set up the tent, while the third cut and stacked enough firewood for the night. The next day further modifications were made to make the camp more comfortable.

The wall tent was a simple canvas prospector tent, with an insulated tarp thrown over the frame, and snow banked up the walls. The tent was heated with an airtight woodstove, with electrical power from a Honda 2000i gas generator. Water was sourced in Reindeer Creek, which was boiled on the woodstove prior to use. Each day one man's job was wood and water.

Camp support and expediting was provided by Eh Plus Exploration in Dawson, YT. Communications from camp was with a DeLorme InReach Explorer (2-way satellite text messenger and handheld GPS unit). Helicopter support and re-supply were scheduled as needed. All food orders were purchased in Dawson.



Figure 4: Reindeer Creek tent camp.

#### Shaft #1.

The first site selected was in a grassy and flat area near the creek. After a few days excavating, the crew hit water and this shaft was abandoned. Crews began prospecting for an area more likely to be frozen with features that might indicate an ancient river channel lies below.

A new site was selected in an area of hummocky swamp and large trees, which are surface features of areas with permafrost. One crew member dowsed the area and found a cross-over here in two directions, and the experienced crew agreed this was an appropriate site for the new shaft.

After digging out the snow and removing vegetation, the crew began excavation of frozen overburden using a 115-volt Hitachi electric jack hammer powered by a Champion 4000W portable gasoline-powered generator. A flat chisel point bit worked best for frozen mud and overburden, and a pointed bit worked best for frozen gravel.

The generator was located >30 m from the site to ensure that exhaust fumes would not enter the pit. Carbon monoxide is an odourless deadly gas that is heavier than air, and sinks to low elevations. The position of the generator and fuel is a very important safety measure when shafting.



Figure 5: Tripod over Shaft 1; generator and gasoline are a safe distance away.

A log tripod with a large single pulley and 5/8" rope was erected above the shaft, to lower a metal pail down the shaft and to raise broken material upwards from the shaft. One man worked in the pit and the other on surface, taking turns in the shaft. Using this method the crew was able to dig about three feet a day through overburden. Overburden was dug for 7 feet depth, and on day 3 they intersected gravel.

Progress in frozen gravel was slow, averaging about 12 inches per day. As the crew continued downward, they excavated a hole about 3x4 feet in size. The clast size of gravel increased in size with depth, and when basal gravels were encountered, crews reported boulders present up to 40 cm in size, which may indicate channel gravel.

Beneath basal gravel, weathered bedrock regolith was encountered at 16 feet, and was dug into for another foot or so until more competent bedrock was intersected. Excavation ceased at 17 feet.



Figure 6: Photo down Shaft 1 with frozen gravel walls, but flooding at bottom.

#### Stratigraphy of Shaft #1

2.13-4.87m River gravel coarsens downwards to include boulders to 40cm in size in basal layer.

4.87-5.18m Regolith – weathered bedrock; hole ended in competent rock.

Shaft #1 was excavated to 5.18m (17 feet) and with surface dimensions of 91 by 121 cm in area (3 x 4 feet). A total volume of material removes was 5.78  $m^3$  (204 ft<sup>3</sup>).

Crews sampled basal gravels, filling four new 20-liter pails purchased from Home Hardware, in Dawson. Each pail was sealed with a plastic lid, and pails remained sealed until processing. Samples from Shaft #1 were backhauled to Dawson on the next helicopter supply flight.

#### Shaft #2.

The site of Shaft #2 was selected from the helicopter about 5 miles upstream from Shaft #1 in a forested valley.

One of the crew flew in first with chainsaw and the tent, and quickly cut a chopper pad so the helicopter could land at the new campsite. The new campsite was prepared in similar fashion to the previous site.

On selecting the second shafting location, crews set up the generator and tripod in similar fashion to the previous location and soon began excavating though frozen overburden using the chisel tip bit on the electric Hitachi jackhammer. Frozen overburden was penetrated for about 7 feet.

When frozen gravel was encountered, crews implemented a new steamer that had been fabricated during excavation of the previous shaft. Rental of this item was also included in day rates of the lead men.

The boiler was made from an old welding tank, which was fitted with a capped spout to add water, a pressure safety valve, and a hose fitting to which a length of 500 psi hose was attached, which in turn attached to a steam-valve, more hose and a steam point. The steam point was welded to a sturdy cross-shaped bracket that workers used to press the steam point into frozen gravel with their boots, wiggling it around cobbles until it was set firmly into frozen ground.

The crew would then place the boiler tank in a hot wood fire until contained water began to boil and generate steam. With time, high-pressure steam was available at the steam point. After some three hours of steaming, gravel was thawed in all directions from the steam point.

Crews would then descend down the ladder and shovel thawed gravel into a metal pail that was raised from the base of the shaft using the tripod and pulley system rigged above the open hole.



Figure 7: Muck pile from Shaft 2 with steamer to the right.

Steaming frozen gravel worked well, allowing crews to triple production to about 3 feet per day in gravel. Shaft #2 hit consolidated bedrock at 16.5 feet depth, and the shaft ended at 17 feet in bedrock.



Figure 8: Photo down Shaft 2 with frozen gravel walls and rope-ladder to bottom.

#### Stratigraphy encountered down Shaft #2

0-2.13m Overburden and mud

2.13-5.03m River gravel, coarsens downwards to include boulders to 40cm in size in basal layer.

5.03-5.18m Bedrock – Chlorite schist.

Both Shaft #1 and Shaft #2 are the same depth at 5.18m (17 feet) and with surface dimensions of 91 by 121 cm in area (3 x 4 feet). A total of 5.78  $m^3$  (204 ft<sup>3</sup>).

Basal gravel was sampled into new plastic home hardware pails. The lids were affixed and sealed until processing.

Shaft locations were photographed, marked with flagging tape, and tagged using handheld GPS to collect a waypoint.

Demobilization occurred on April 26, 2017, based on flight tickets from Fireweed Helicopters.

Four pails of coarse gravel sampled from Shaft #2 were backhauled to Dawson during demobilization.

In total, 8 pails of basal gravel remained sealed and stored inside the secure hangar of Fireweed Helicopters care.

The author stopped in at Fireweed Helicopter's hangar on April 28, 2017 to collect Reindeer shaft samples, which consisted of eight sealed and labelled pails. The pails were stored inside Fireweed's secure hangar since demobilizing the shafting crew from Reindeer Creek.

## **Sample Processing and Gold Recovery**

Sample processing and gold classification was completed by the senior geologist (Kevin Kivi, P.Geo.) with camp support from Northern Exposure's Indian River placer gold mine.

The lid seals were broken on May 2, 2017 and samples processed immediately afterwards. All seals were intact and all buckets were in excellent condition, with no indication of tampering.



Figure 9: Reindeer shaft samples in new pails, each labelled and sealed for security.

Initial sample volume was measured and recorded, and then samples were fed into a Devon Sluice.



Figure 10: The author feeding a sample into the Devon sluice.



Figure 11: Oversize material is collected in a pan below the grizzly.

Oversized cobbles (> 1 inch) fall from a grizzly into a deep rectangular pan. The volume of oversize is measured and cobble descriptions recorded.

The Devon sluice uses an array of vortex-shaped holes cut into a sheet of aluminum to catch gold and other heavy minerals. When tabular water flow occurs above the vortex-shaped holes, flow is disrupted by small cyclone-shaped holes, which generate low-pressure cells to capture and hold heavy minerals.



Figure 12: Vortex-shaped holes filled with heavy minerals in Devon sluice.

On completion of sluicing, the heavy mineral concentrate collected in the vortex holes is washed from the Devon sluice into a large and deep rectangular stainless steel pan.

The Devon sluice is thoroughly washed with water to ensure that all sand grains are transferred to the pan. This process also ensures that the sluice is perfectly clean prior to processing the next sample. All hand tools and pails are also thoroughly washed to eliminate any chance of cross-contamination from one sample to the next.

The heavy mineral concentrate from the sluice, rich in garnet and black sand is then panned using a black plastic Estwing gold pan.

Gold grains are isolated in the pan and recovered using a gold snuffer. Gold grains are placed into a copper tray, and dried.

Gold grains are grouped by size that estimates standard sieve sizes, grains are counted, described, and then the total gold concentrate is weighed. Any gold recovered is then stored in a small glass vial, that is labelled with the sample ID, gold grain count and weight.

Gold data is then entered to an excel spreadsheet and GIS.

## **Sample Results**

#### **SHAFT #1:**

LOCATION: UTM 570427E 7059903N, NAD83, Zone 7

Initial Volume: 60 litres from 3 pails of coarse sand and 1 pail chlorite-pyrite schist coarse sand (bedrock)

Oversize: 0.5 litres oversize, including chlorite-pyrite schist and intrusive rocks

Concentrate: garnet-rich, hematite-magnetite pan

Gold: 2 x #10mesh flattened gold nuggets

Gold Weight: 0.009 mg.



Figure 4. Gold recovered from Shaft 1: Reindeer Creek (mechanical pencil with 0.5mm lead for scale).

#### **SHAFT #2:**

LOCATION: UTM 574974E 7055905N, NAD83, Zone 7

Initial Volume: 48 litres

Oversize: 8 litres oversize that consists of 40% angular broken bedrock, 50% mafic schist, 10% granodiorite and gneiss

Concentrate: pyrite-rich pan

Gold: 1 - 60# gold grain

Gold Weight: N/A

## **Conclusions and Recommendations**

HAC Minerals completed two exploration shafts through overburden and gravels to bedrock in spring 2017. Shafting on Reindeer Creek was completed by workers and subcontractors from Dawson City, Yukon. Processing and gold recovery was completed on April 19, 2017 at Indian River by Kevin Kivi, P.Geo.



Figure 13: Shaft #2 is 6km upstream of Shaft #1 on Reindeer Creek Property.

The shafts are located on Reindeer Creek about 6,000m from one another.

Shaft #1 recovered gold, and is therefore properly located in the drainage system, but it may be located just off the main pay channel. Shart #1 should be drifted laterally across the valley to search for a pay channel.

Shaft #2 only recovered trace gold, and therefore may be located too far up the drainage system.

New shafts are recommended up and downstream of Shaft #1 in areas where ground is frozen and the valley floor is suitably sized to develop a mineable pit.

## **Budget**

Expediting services (provided by Eh Plus Earthworks and Exploration) is a required service that was overlooked in the YMEP Proposal. Expediting costs are very modest given the importance of this task. The expediter kept in constant communication with the crew to ensure they were safe, and visited the crew when re-supply flights occurred.

Prospector Bryan Sporter provided his winter camp, which has been split out of his day rate as "private rental" in Table 2 (Eh Plus Earthworks and Exploration (Eh+)). Prospector Reg Audet provided his generators, jack hammer, and the boiler/steamer and related shafting equipment which has been split out of his day rate as a "private rental" in Table 2 (Sunnydale Yukon River Branch (SYRB)).

Contractors opted for 100% helicopter support, and did not take a snowmobile to the property.

This report was written at Indian River in the Klondike, and therefore camp charges and mileage. Interviews with workers for the project history and their qualifications, and photos were critical to adequate reporting. HAC Minerals provided receipts and other information.

Item	Cost	Unit	Number Units	Total
SAMPLING		March 6-26, 2017		
Helicopter	As billed	Per hour + Fuel	5.1 hours	\$10,432
Lead Prospector	\$350	Per Day	20	\$7,000
Prospectors (2)	\$350 and \$250	Per Day (each)	40	\$12,000
Daily Field Expenses	\$100 x 3 men	Per day	20	\$6,000
Expediting	\$200	Per day	3	\$600
Gasoline	As billed			\$41
Hardware	As billed			\$31
Winter Camp (Eh+)	\$50	Per day	20	\$1000
2 Generators (SYRB)	\$15 ea.	Per day	20	\$600
Jack hammer (SYRB)	\$10	Per day	20	\$200
Steam Pt and Equip (SYRB)	\$10	Per day	20	\$200
PROCESSING		Apr25-May3, 2017		
Processing	\$500	Per Day	3.25	\$1625
Daily Field Expenses	100	Per day	3	\$300
Yukon Travel	0.54	Per kilometer	2234	\$1206
REPORT AND GIS				
Reports,	\$500		7.25	\$3,625
GIS, and Maps				
Daily Field Expenses	100	Per day	3	\$300
TOTAL				\$45,160
TOTAL YMEP REQUEST				\$22,580

Table 2. Final Budget

Despite minor omissions and variances, the exploration budget is almost identical to the budget included in the YMEP Proposal.

## Personnel

Kevin Kivi34 year Professional Geologist, NAPEG L821.Reg Audet40+ year veteran Yukon prospector and placer minerBryan Sporer10 year Yukon prospector and placer minerMark Thomas10 year miner, 2 year geophysical operatorStatements of Qualifications are provided later in the report.

Kevin R. Kivi, P.Geol. KIVI Geoscience Inc. January 22, 2018

## References

Bond, J.D., 2012. Placer Gold Potential Map - Dawson Land Use Plan (NTS 115N, O and parts of 115P, 116B, C, F and G), Yukon (1:300000 scale). Yukon Geological Survey, Energy Mines and Resources, Government of Yukon, Open File 2012-13.

Gordey, S.P., and Ryan, J.J., 2005, Geology, Stewart River Area, (115N, 1150, and part of 115J), Yukon Territory, Geological Survey of Canada, Open File 4970, scale 1:250,000. Bryan Sporter: Prospector and Miner.

Bryan is a resident of Yukon, who lives in Dawson and works in the Klondike goldfields as a miner and prospector. Bryan is an exploration contractor who owns Eh Plus Earthworks and Exploration, who is a sub-contractor of Hac Minerals Inc.

Reg Audet: Prospector and Miner.

Reg Audet is a resident of Yukon, who lives in Dawson and works in the Klondike goldfields as a miner and prospector for over 40 years. Reg is a specialist on shafting. His company Sunnydale Yukon River Branch is a subcontractor of Hac Minerals Inc.

Mark Thomas: Miner.

Mark is a resident of Yukon, who lives in Dawson and works for Northern Exposures, Indian River Mine as placer miner. Mark is also owner of a placer mine on 40-Mile Creek, Yukon where he has completed test placer mining and shafting. Previously Mark worked as an underground miner at several mines in Canada from 2005-2015, and earlier worked for a geophysical contractor conducting IP geophysical surveys for Eastern Geophysics, in eastern Canada from 2003-2005.

#### **KIVI Geoscience Inc.**

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I Kevin Robert Kivi, P.Geo., am a Professional Geoscientist, employed by KIVI Geoscience Inc. (KGI) of Thunder Bay, Ontario.

I am:

- A practising member of the Association of Professional Geoscientists of Ontario (APGO), Registration 0326, and formerly an elected councillor for NW Ontario;
- A member of the Association of Professional Engineers, Geologists and Geophysicists of the Northwest Territories (NAPEGG), Registration L821;
- A member of the Association of Professional Engineers and Geoscientists of the Province of Manitoba (APEGM), Registration 25680.
- A member of the Association of Professional Engineers and Geoscientists of Saskatchewan (APEGS), Registration #13687.

I graduated from Lakehead University, Thunder Bay with a Bachelor of Science Geology (4 year programme) in 1983, and I have practiced in my profession continuously since 1983. Since 1983 I have been involved in:

- gold exploration with Ovaltex Inc. along the Cadillac Break in Rouyn and Val D'Or, Quebec in winters of 1984, 1985 and 1986, and between 1986-1988 in NW Ontario.
- diamond exploration with BP Resources Inc Selco Division in Ontario, Quebec, Manitoba and NWT in summers of 1984, 1985 and 1988;
- gold and base metals exploration in NW Ontario with Rio Algom Exploration between 1988 and 1992.
- diamond exploration with Kennecott Canada Exploration between 1992-1994 at Lac De Gras, NWT, Diamond Laboratory Manager between 1995-2000 in Thunder Bay, Ontario, diamond exploration 2000-2004 in Wawa in Archean lamprophyric volcaniclastic rocks and Group 2 kimberlites, March-June 2004, Exploration Manager at Diavik Diamond Mines Ltd, Lac De Gras, NT.
- 2004 to present: Geological consultant specializing in diamond, gold and base metal exploration in Canada and Placer Gold evaluation. Current clients include: Northern Exposures Ltd., Churchill Diamonds Corp., RT Minerals Corp., Aurion Resources Ltd., and Orebot Inc.

Dated at Thunder Bay, ON, CANADA this 22nd day of January, 2018.

KIVI Geoscience Inc.

Per: "Kevin Kivi"

Kevin R. Kivi, P.Geo., President