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ASSESSMENT REPORT

describing

METALLURGICAL TEST PITS, METALLURGICAL AUGER DRILLING, GEOTECHNICAL AUGER DRILLING, GEOTECHNICAL STUDY, ENVIRONMENTAL BASELINE STUDIES, HERITAGE EVALUATION, AND WATER QUALITY AND CLIMATE MONITORING SURVEYS

at the

TIGER PROJECT

ACX 1-310, GF 3-4, Rau 1-96, Rau 97F-100F, Q 1-109, R 1-103, R 105-1337, S 1-1250

NTS 105M/14, 15 & 106D/01, 02, 03, 06, 07, 08
Latitude 63°58´N to 64°27´N; Longitude 135°18´W to 134°11´W

in the

Mayo Mining District,
Yukon Territory

Field work performed from July 24 to August 7, 2013 and
September 18 to March 14, 2014

prepared by

Archer, Cathro & Associates (1981) Limited

for
ATAC RESOURCES LTD.

by
Heather Friday BASc. EIT, GIT
and
Andrew Carne, M.Eng, EIT

August 2014

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INTRODUCTION

The Tiger Project located on the western half of the Rackla Gold Property which comprises a 1700 km^2 area of highly prospective platform to basin facies sedimentary rocks located along the northern edge of the Tintina Gold Belt at the transition from the Selwyn Basin to the Mackenzie Platform, in east central Yukon Territory. Various commodities have been explored for and discovered within the claim block. Historically, this exploration focused on base metal mineralization, while recently the emphasis has been directed towards gold potential. The property is owned 100% by ATAC Resources Ltd. (ATAC). Proprietary

This report describes the work completed and results of heritage resource assessment, and an ongoing environmental monitoring conducted at the Tiger project area July 24 to August 7, 2013 and metallurgical drilling, geotechnical drilling, further heritage resource assessment and further environmental monitoring September 18 to March 14, 2014. Management for this work was provided by Archer, Cathro & Associates (1981) Limited on behalf of ATAC. The authors supervised the program. Their statement of qualification appears in Appendix I.

PROPERTY LOCATION, CLAIM DATA, ACCESS AND INFRASTRUCTURE

The Tiger Project consists of 3011 contiguous mineral claims located from 64°27´N to 63°58´N latitude and stretching from 134°11´W to 135°18´W longitude on NTS map sheets 105M/14, 15 & 106D/01, 02, 03, 06, 07, 08 (Figure 1). The claims are all registered with the Mayo Mining Recorder in the name of Archer Cathro, which holds them in trust for ATAC. Specifics concerning claim registration are tabulated below in while the locations of individual claims are shown on Figures 2-4.

Claim Name	Grant Number	Expiry Date**
ACX 1-234	YD08251-YD08484	28-Apr-23
235-310	YD33163-YD33238	28-Apr-23
GF 3-4	YC32305-YC32306	28-Apr-29
Q 1-13	YC92361-YC92373	28-Apr-26
14	YC92470	28-Apr-26
15-109	YC92375-YC92469	28-Apr-26
R 1-103	YC68334-YC68436	28-Apr-28
105-1295	YC68438-YC69628	28-Apr-28
1296-1337	YC70595-YC70636	28-Apr-25
Rau 1-64	YC50268-YC50331	28-Apr-35
65-96	YC57529-YC57560	28-Apr-28
97F-98F	YC69925-YC69926	28-Apr-29
99F-100F	YC69961-YC69962	28-Apr-29
S 1-700	YC90801-YC91500	28-Apr-26
701-842	YC91901-YC92042	28-Apr-26

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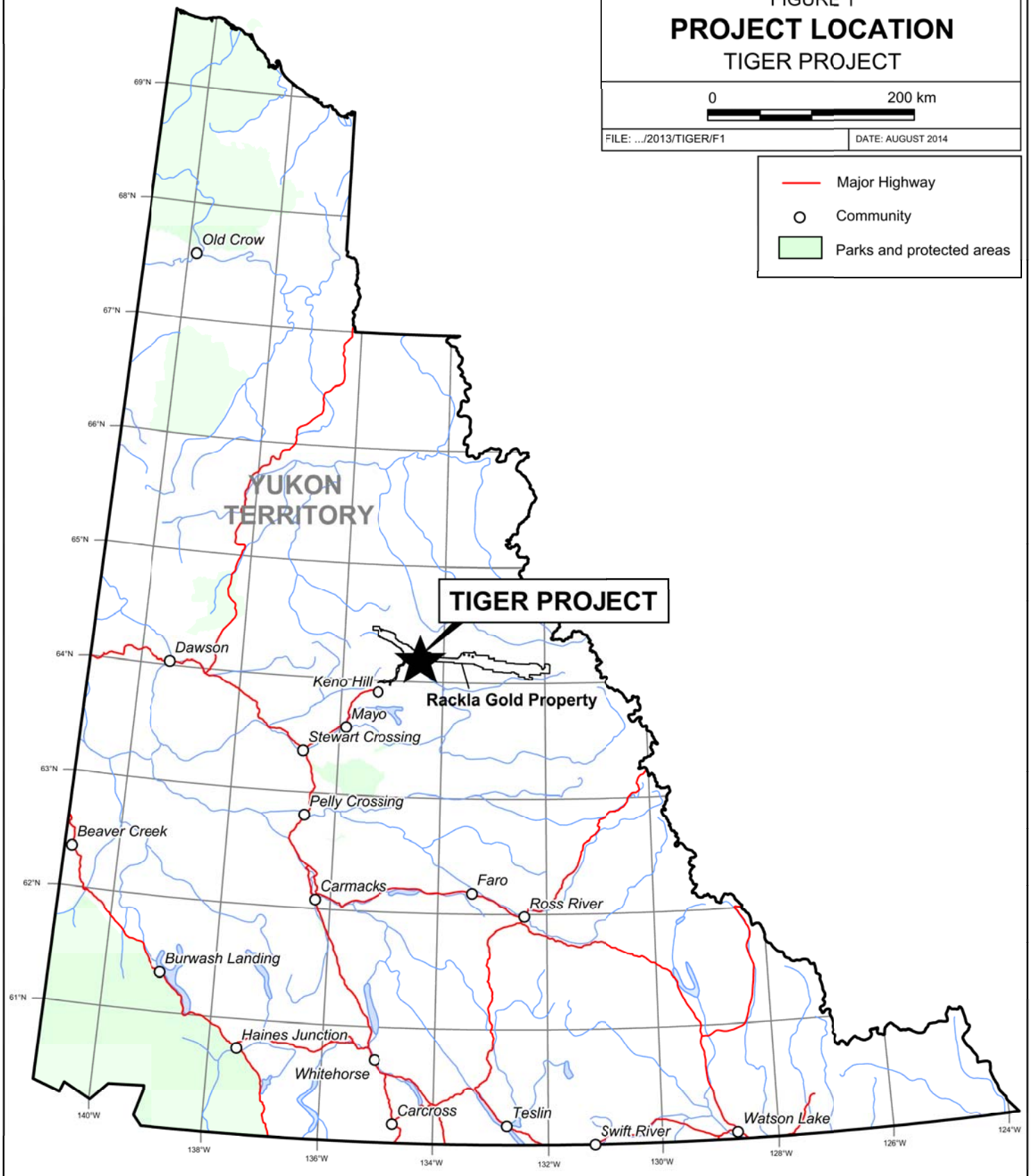
FIGURE 1

PROJECT LOCATION

TIGER PROJECT

0 200 km

FILE: .../2013/TIGER/F1 | DATE: AUGUST 2014



843	YC92355	28-Apr-26
844-1154	YC92044-YC92354	28-Apr-24
1155-1244	YD09635-YD09724	01-Mar-19
1245-1246*	YD09725-YD09726	01-Mar-21
1247	YD09727	01-Mar-19
1248*	YD09728	01-Mar-21
1249-1250	YD09729-YD09730	01-Mar-19
* Claims within the Peel River watershed region.		
** Expiry dates include 2013 work which has been filed for assessment credit but not yet accepted.		

The Tiger Project lies 100 km northeast of Mayo, the nearest supply centre. The closest road access is to the community of Keno City, situated about 49 km by road northeast of Mayo and 55 km by air southwest of the property. Mayo and Keno City can be reached in all seasons by two wheel drive vehicles using the Yukon highway system. The Wind River trail is also accessible via the Yukon highway system from McQuesten Lake near Keno City and crosses the western portion of the property (Figure 5). This winter trail has been used intermittently by various exploration companies since it was built in the late 1960s.

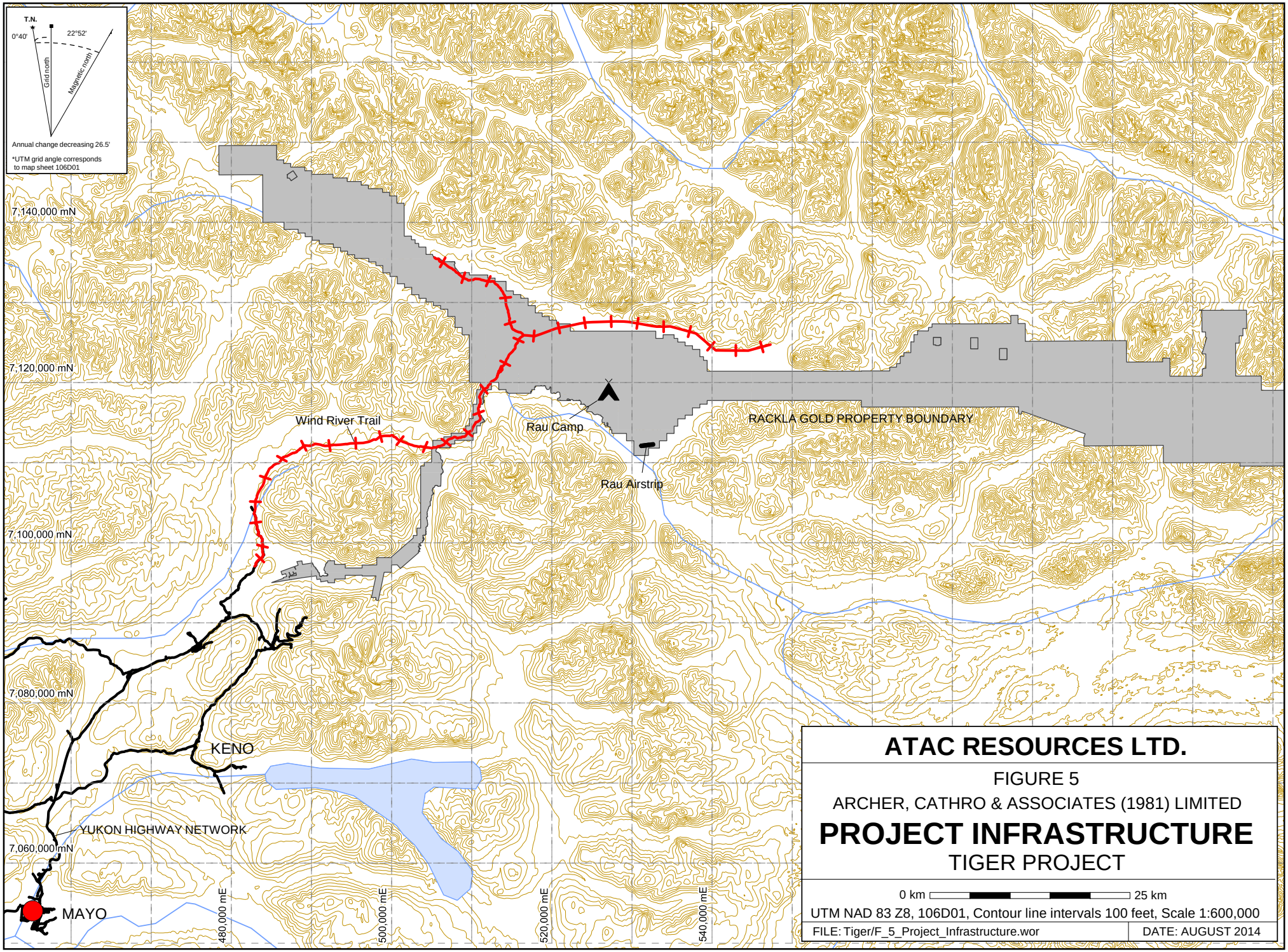
In 2013, access to the property and daily logistical support were accomplished using a Bell 206L4 helicopter based on the property or in Mayo and operated by Fireweed Helicopters Ltd. of Whitehorse. A camp located 1 km to the southeast of the Tiger Deposit, served as a staging area and as a base of operations. A gravel airstrip is located at the confluence of the Beaver and Rackla rivers, 7 km to the southwest of the deposit.

HISTORY AND PREVIOUS WORK

Locations of showings referred to in this report can be found on Figure 6.

The earliest reported exploration within the area of the Rackla Gold Property occurred in 1922 following the discovery of silver mineralization at Keno Hill; prospectors first identified and staked mineralized float occurrences at Carpenter Ridge in the far northwest corner of the current property. In 1924, reconnaissance work conducted by the Geological Survey of Canada discovered galena-calcite-siderite in float on the southwest end of Carpenter Ridge. A sample of this float returned 8.75 oz. silver and 56.0% lead (Cockfield, 1925); however, the source of this mineralization was not found. Hand pits were dug in 1927 and 1928 but little record remains of the work completed during this period. All claims were ultimately dropped.

Nearby at Grey Copper Hill, 9 km to the southeast, silver-rich tetrahedrite float was discovered in 1923 by an independent prospector. This showing and other nearby prospects were staked later that year. Several investigatory adits were dug into the hillside during follow up exploration but eventually all claim holdings lapsed.


T.N.
0°40'
22°52'
Grid north
Magnetic north
Annual change decreasing 26.5'
*UTM grid angle corresponds to map sheet 106D01
7,140,000 mN
7,120,000 mN
7,100,000 mN
7,080,000 mN
7,060,000 mN
480,000 mE
500,000 mE
520,000 mE
540,000 mE
Wind River Trail
Rau Camp
Rau Airstrip
RACKLA GOLD PROPERTY BOUNDARY
KENO
YUKON HIGHWAY NETWORK
MAYO
ATAC RESOURCES LTD.
FIGURE 5
ARCHER, CATHRO & ASSOCIATES (1981) LIMITED
PROJECT INFRASTRUCTURE
TIGER PROJECT
0 km
25 km
UTM NAD 83 Z8, 106D01, Contour line intervals 100 feet, Scale 1:600,000
FILE: Tiger/F_5_Project_Infrastructure.wor
DATE: AUGUST 2014

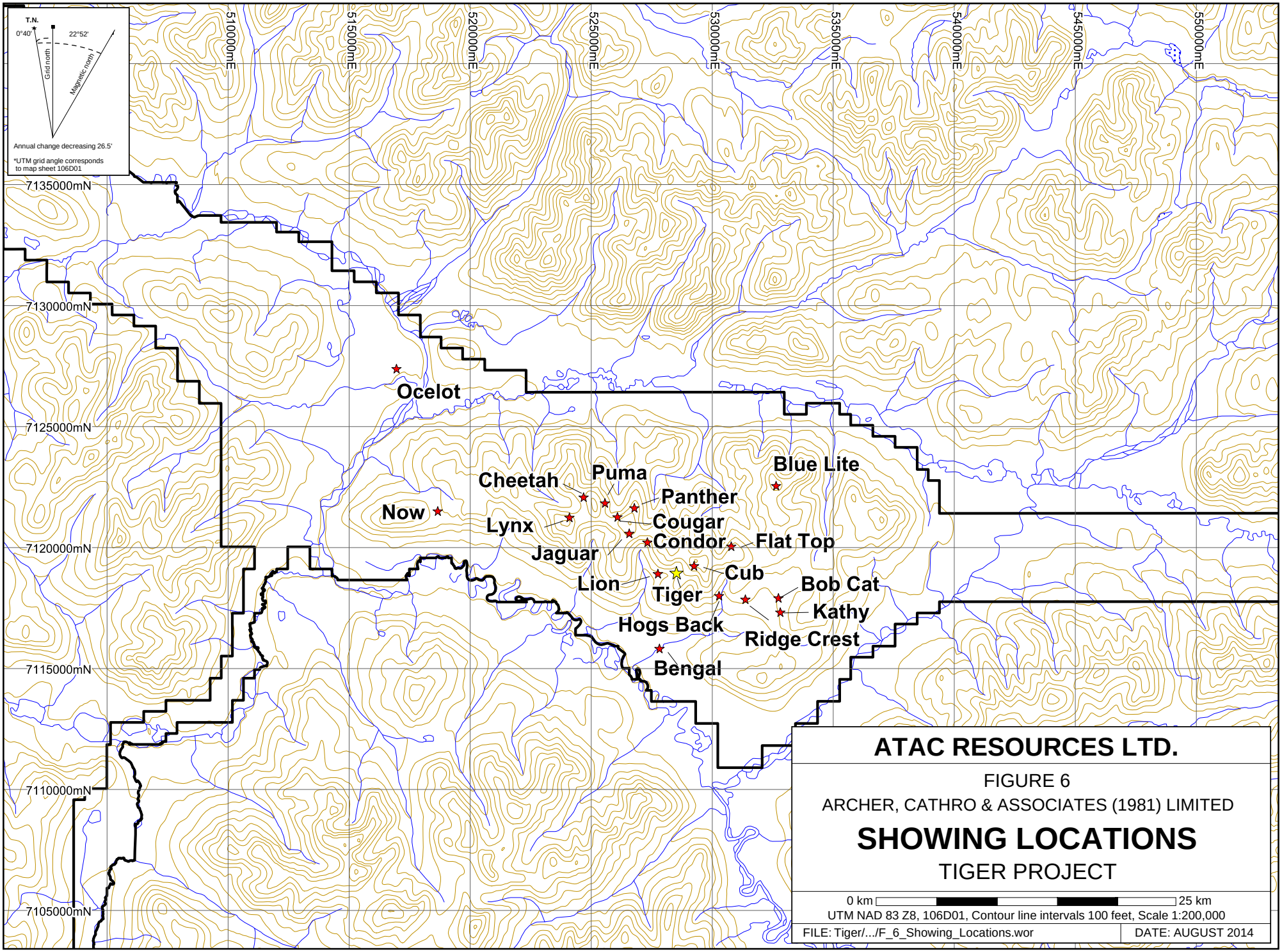


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FIGURE 6

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

SHOWING LOCATIONS

TIGER PROJECT

0 km — 25 km

UTM NAD 83 Z8, 106D01, Contour line intervals 100 feet, Scale 1:200,000

FILE: Tiger/.../F_6_Showing_Locations.wor | DATE: AUGUST 2014

Between 1930 and 1974 Grey Copper Hill was staked several times by independent prospectors and exploration companies, including Cypress Resources Limited and United Keno Hill Mines Limited. Little work was reported (Hilker, 1969) and all claims ultimately expired.

Hesca Resources Corporation Ltd re-staked Grey Copper Hill in 1974 and conducted prospecting, soil sampling, hand trenching and adit maintenance. In addition, two shallow, small diameter diamond drill holes totalling 56.3 m were drilled; however, the results from this drilling are not documented. No further work was done by Hesca and the claims were dropped (Deklerk and Traynor, 2004).

In spring 1978 Prism Resources Limited re-staked the area and conducted prospecting and geochemical sampling later that year. Soil sampling identified several lead and silver anomalies; however, follow up prospecting failed to explain them (Sivertz, 1979). A sample collected from an outcrop of dolomite yielded 0.60% lead and 51.43 g/t silver, while a tetrahedrite sample collected near an old adit assayed 7000 g/t silver (Sivertz, 1980). Prism allowed the claims to lapse.

Grey Copper Hill was again restaked in 1983 by a prospector who conducted grid soil sampling later that year. This program delineated silver anomalies coincident with surface lineations. No further work was completed and the claims expired.

In 1988 Bonventures Limited staked the area and conducted limited blast trenching, prospecting, mapping plus soil and rock sampling. A gossan zone with pyrite and strong fracture filling malachite and azurite was identified between two collapsed adits (Carlyle, 1989). These claims eventually lapsed.

The area remained open until August of 2005 when an independent prospector staked four claims over the Grey Copper Hill showing. No work on these claims has been reported and they are now surrounded by the Rackla Gold Property.

Approximately 45 km to the southeast, Cominco Limited staked the Beaver claims in 1968 based on results of regional geochemical sampling done the year before. Later that year, L. Elliott staked the nearby Now claims and optioned them to Cominco, which completed mapping and soil sampling in 1968 and 1969 (Johnson and Richardson, 1969a and 1969b).

In 1977, Prism Joint Venture (Asamera Oil Corp, Chieftain Development Company Limited, Prism Resources Ltd, Siebens Oil & Gas Limited and E & B Exploration Limited) restaked Cominco's claims as part of a larger block that extended for about 20 km along the north side of the Beaver River. In 1979, Dome Petroleum Ltd replaced Siebens in the joint venture.

Prism conducted most of its activities around the original Beaver claims. Soil sampling and mapping were performed in 1977 (Montgomery and Dewonck, 1978) and additional soil sampling and trenching were done in 1978 (Prism Joint Venture, 1979a). In 1979 Prism completed six diamond drill holes totalling 610 m (Dewonck, 1980). This work focused primarily on sedimentary exhalite and Mississippi Valley type lead-zinc mineralization, but resulted in the discovery of a narrow gold-rich vein (the Now Showing).

NDU Resources Ltd. staked claims over the Now Showing in 1987 to cover the lead, zinc and silver soil geochemical anomalies identified by Cominco and Prism. The following year, NDU conducted a geochemical sampling program which focused on the gold vein mineralization at the Now Showing (Cathro, 1989).

In 1977, 6.25 km further to the northwest, Prism conducted mapping, soil sampling and electromagnetic surveys. Numerous samples from that program returned high zinc-in-soil values ranging from 2100 ppm to 12.2%. One sample collected from a large transported gossan (Ocelot Showing) yielded 3.8 g/t silver, 800 ppm lead and 12.2% zinc (Montgomery and Cavey, 1978), suggesting the metals were leached and remobilized in acidic groundwater before being reprecipitated when the fluids were neutralized. These promising results were not followed up. In 1977, Prism also performed minor soil sampling near a strong gossan developed 19 km to the east (Kathy Showing) (Prism Joint Venture, 1979b).

In 1979 and 1980, Prism explored in two areas approximately 16 km southeast of the current Ocelot Showing and conducted prospecting, soil geochemical sampling and one diamond drill hole. This work led to the discovery of scheelite mineralization at the Blue Lite and Flat Top Showings. Well mineralized tremolite skarn specimens from the Flat Top Showing assayed up to 8.4% WO_3, but most material graded below 0.04% (Churchill, 1980). No further work was done at either showing.

ATAC's interest in the area was prompted by an isolated, high gold value (150 ppb) reported by a regional-scale stream sediment geochemical survey, conducted by the Geological Survey of Canada (Hornbrook, et al 1990). This value is in the 99th percentile of gold results from the survey and is supported by a 99th percentile tungsten value (25 ppm). The sample was collected near the Rackla Pluton, east of the Tiger Zone.

In summer 2006, ATAC staked 64 claims to cover the anomalous drainage. During the staking, a number of rock and soil samples were collected, many of which returned anomalous values for tungsten and a few were notably enriched in gold, lead, zinc, silver and copper. Cursory prospecting relocated scheelite-bearing tremolite skarn (Flat Top Showing) and discovered tungsten in diopside-actinolite skarn and highly fractionated intrusive rocks, about 1500 m to the south.

In 2007 ATAC completed geological mapping, prospecting, grid soil sampling and helicopter-borne variable time-domain electromagnetic (VTEM) surveys (Eaton and Panton, 2008). This work partially delineated a large hydrothermal system centered on the largely buried Rackla Pluton. Following that program, ATAC staked an additional 32 claims, mostly to improve coverage around a very strong gold-in-soil anomaly outlined on the western edge of the grid.

ATAC and Yankee Hat Minerals Limited signed an option agreement in spring 2008 concerning 40 claims that covered the Rackla Pluton and the tungsten-bearing skarns. During the summer of 2008 Yankee Hat conducted prospecting and a total of 437.38 m of diamond drilling in three holes (Dumala, 2008). Several narrow skarn bands with weak to moderate tungsten mineralization were identified within the carbonate host rocks. The option agreement was terminated in late 2008 following poor results and the claims were returned to ATAC.

Also in the summer of 2008, ATAC conducted geological mapping, prospecting, soil and stream sediment geochemical sampling, 3,423.21 m of diamond drilling in 18 holes and property-wide helicopter-borne magnetic variable time-domain electromagnetic (VTEM) surveys on the claims not covered by the Yankee Hat option agreement. Drilling identified three stacked, gold-bearing horizons in what is now known as the Tiger Zone (Dumala, 2009). The central horizon (Discovery Horizon) contains gold in iron carbonate replacement and hosts the most abundant mineralization. In 2008 grid soil sampling and stream sediment sampling was extended to the northwest. In response to positive results, ATAC added 1,340 claims to cover the favourable stratigraphy along the anomalous trend.

In 2009, ATAC continued to delineate the Tiger Zone with an additional 58 diamond drill holes totalling 9,578.30 m (Dumala and Lane, 2010). Drilling identified a significant oxide component to the northwest, within the Tiger Deposit. Prospecting in 2009 also identified several new showings containing mineralization similar to that found at the Tiger Deposit. These include the Cub, Lion, Jaguar, Panther, Cougar, Puma, Cheetah and Lynx Showings.

In 2010, ATAC continued definition drilling at the Tiger Zone resulting in the completion of a NI 43-101 compliant resource estimate of the sulphide and oxide horizons (Stroshein, et al 2011). Results of the resource estimate using a 0.3 g/t gold cut off yield an indicated resource estimate of 508,000 ounces of gold (7,150,000 tonnes at an average grade of 2.21 g/t) and an inferred resource estimate of 290,200 ounces of gold (8,280,000 tonnes at an average grade of 1.09 g/t) for the oxide and sulphide horizons combined.

In conjunction with the resource estimate, mineralogy and cyanide leaching characteristics of the Tiger deposit oxide ore were investigated (Stroshein, et al 2011). This work consisted of bottle roll and carbon-in-pulp/carbon-in-leach tests on finely ground (69µm – 131µm) material, aimed at investigating leaching characteristics which would be representative of those expected in a milling scenario. This test program also included gravity recoverable gold tests to investigate viability of gravity recovery, and acid base accounting to characterize the acid rock drainage potential of the Tiger deposit oxide material.

Prospecting at the geochemically anomalous Ocelot Showing in 2010 resulted in the discovery of high grade Ag-Pb-Zn massive sulphide mineralization. Grab samples from this area included 2100 g/t Ag, 55.33% Pb and 62 g/t In (Dumala, 2011).

In 2011 ATAC drilled 19 holes totaling 3784.75 m at the Ocelot target beneath a known but previously undrilled surface gossan. The best grade intervals yielded 145.43 g/t silver, 3.36% lead and 11.65% zinc across 41.72 m and 188.07 g/t silver, 8.69% lead and 6.06% zinc over 37.91 m in semi-massive to massive sulphide mineralization. Drilling by the end of the 2011 season identified mineralization over a 230 m strike length and to a depth of 150 m. (Dumala, 2012a). During the field season, the 900 m long Rau gravel airstrip was constructed at the confluence of the Beaver and Rackla rivers.

Also in 2011, ATAC drilled 10 holes totaling 2,113.2 m of diamond drilling at the Now Showing (3 holes) Puma Showing (2 holes) Cheetah Showing (3 holes) and Kathy Showing (2 holes). Weakly anomalous gold, silver, lead and zinc values were intersected in one Now drill hole.

Puma and Cheetah drilling intersected weak gold mineralization; Kathy drilling intersected no significant results (Dumala, 2012b).

In 2012, ATAC undertook further metallurgical study of samples from the Tiger deposit. This work investigated the potential for heap leaching of the oxide ore, and consisted of cyanidation tests performed on coarse crushed material. Test work included bottle rolls at 1", ¾", ½" and ¼" crush sizes, as well as agglomeration and column tests on ¾" material. Results of the bottle roll testing showed minimal difference between the different crush sizes, with the ½" test yielding the best overall recovery, of 88.5% for a 72 hour residence time. Agglomeration testing suggested a cement addition of 10 kg/t would be necessary for heap leaching. A subsequent column test on agglomerated ¾" material yielded recoveries in excess of 87% after 15 days of leaching.

ATAC also continued with ongoing baseline monitoring work throughout the 2012 season. Water quality monitoring was upgraded to monthly frequency on key stations near the deposit, beginning in September, 2012. Heritage assessments were conducted over the Tiger deposit and surrounding regions, and baseline wildlife studies were initiated.

GEOMORPHOLOGY AND CLIMATE

The Tiger Deposit is situated in the Nadaleen Range of the Selwyn Mountains. It is drained by creeks that flow into the Rackla and Beaver Rivers, which are both part of the Yukon River watershed. Local topography is alpine to subalpine and features north and south-trending rocky spurs and valleys that flank a main east-west trending ridge. Elevations range from 725 m alongside the Beaver River in the northwestern part of the claim block to 1700 m atop a peak 3.5 km northwest of camp. Outcrop is most abundant near ridge crests and in actively eroding creek beds. Most hillsides are talus covered at higher elevations and are blanketed by glacial till at lower elevations. Soil development is moderate to poor in most areas.

Treeline in the vicinity of the property is at about 1500 m. Slopes above that elevation are unvegetated. The density and size of vegetation gradually increases on lower slopes, and the valley floors are well treed with mature black spruce. Understorey typically consists of low shrubs and moss. Moderately steep, south facing slopes are well drained and are often lightly forested with poplar. Steep, north facing slopes are usually unvegetated. Gentler, spruce- and moss-covered terrain likely exhibits widespread permafrost.

REGIONAL GEOLOGY

The Geological Survey of Canada performed geological mapping in the vicinity of the Tiger Deposit at 1:250,000 scale in the 1960s (Green, 1972) and 1970s (Blusson, 1978). More recent mapping in the area was completed at 1:50,000 scale by Indian and Northern Affairs Canada (Abbott, 1990 and Roots, 1990).

The Tiger Deposit lies within a band of regional-scale thrust and high angle reverse faults that imbricate rocks of Selwyn Basin and Mackenzie Platform (Figure 7). Selwyn Basin stratigraphy consists of regionally metamorphosed, basinal sediments of Neoproterozoic to Paleozoic age.

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FIGURE 7

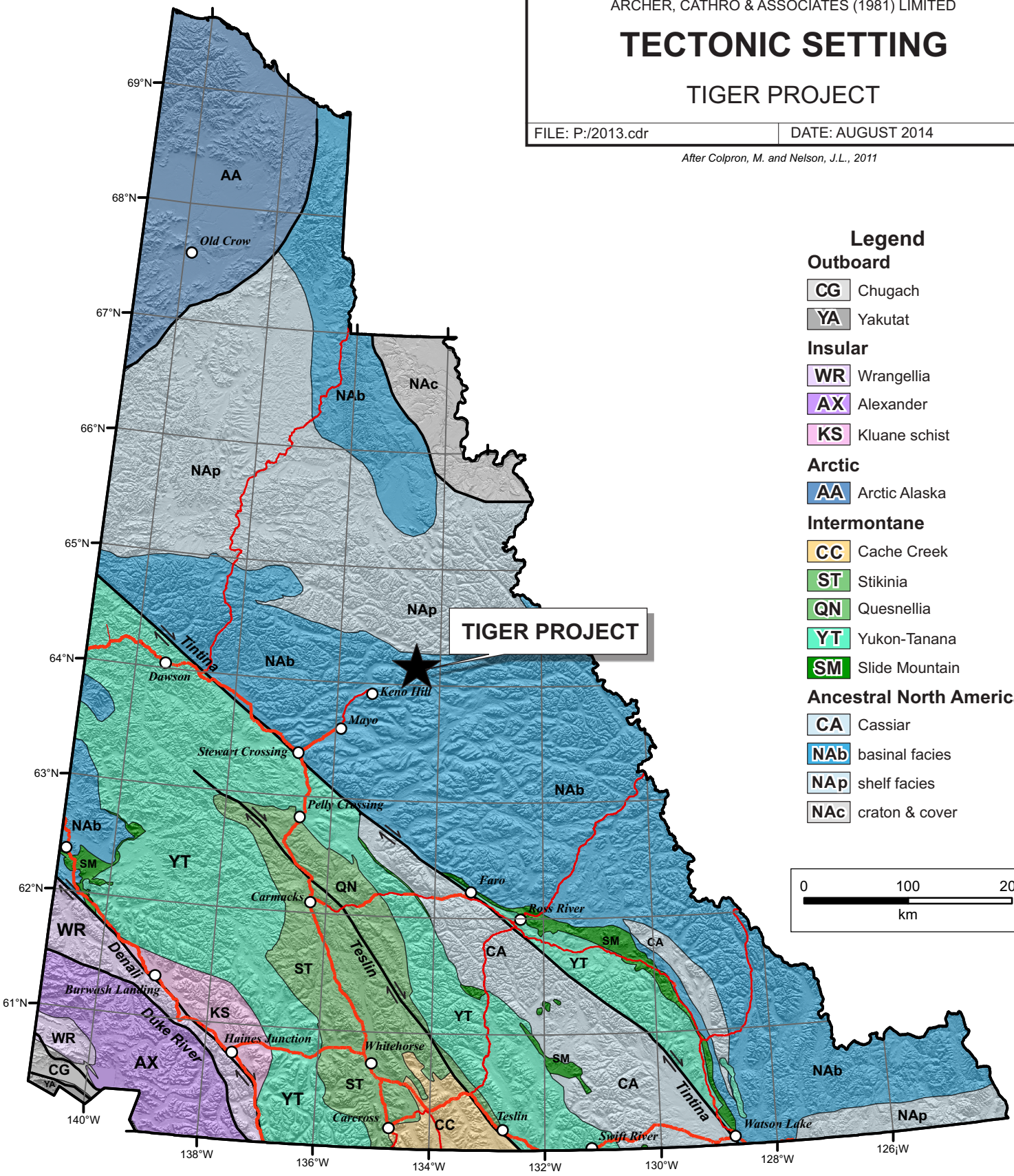
ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

TECTONIC SETTING

TIGER PROJECT

FILE: P:/2013.cdr | DATE: AUGUST 2014

After Colpron, M. and Nelson, J.L., 2011



Legend

Outboard

- CG Chugach
- YA Yakutat

Insular

- WR Wrangellia
- AX Alexander
- KS Kluane schist

Arctic

- AA Arctic Alaska

Intermontane

- CC Cache Creek
- ST Stikinia
- QN Quesnellia
- YT Yukon-Tanana
- SM Slide Mountain

Ancestral North America

- CA Cassiar
- NAb basinal facies
- NAp shelf facies
- NAc craton & cover

0 100 200 km

Mackenzie Platform stratigraphy comprises dominantly shallow water carbonate and clastic sediments that were deposited from Mid-Proterozoic through Paleozoic times. Both packages of sediments were deposited on the western margin of ancestral North America.

The thrust faults were active during Jurassic to Cretaceous times (160 to 130 Ma), when the area underwent compressional orogenesis related to large-scale plate convergence (Fingler, 2005). During Late Cretaceous (94-90 Ma), intermediate to felsic plutons of the Tombstone Suite were emplaced (Mortensen et al, 2000). Another compressional orogenic event, which occurred about 65 Ma, was accompanied by emplacement of felsic intrusions assigned to the McQuesten Suite.

The Tombstone, Dawson and Robert Service thrust faults plus a number of lesser thrust faults affect stratigraphy along the Rackla Gold Property. All thrusts verge northeasterly and predate emplacement of the Tombstone Suite intrusions. The thrust panel that occurs near the Tiger Project straddles the boundary between Selwyn Basin and Mackenzie Platform and includes units belonging to both tectonic elements.

Table I contains a brief summary of the main lithologies in the area of the Rau Trend.

Table I: Regional Lithological Units (after Roots *in* Cathro, 2006)

Tectonic Element	**Age (Ma)**	**Unit and Lithologies**
Rocks of Ancestral North America		
Mackenzie Platform	1700 - 1800	Gillespie Lake Group: orange-brown dolostone and sandstone.
Mackenzie Platform	540 - 390	Bouvette Formation: white and grey limestone with rare black shale.
Mackenzie Platform	540 - 420	Marmot Formation: dark green to brown mafic, vesicular and amygdaloidal volcanic flows.
Selwyn Basin	750? - 530	Hyland Group: brown quartz-mica schist, with rare limestone.
Selwyn Basin	530 - 500	Gull Lake Formation: brown and green shale, sandstone, conglomerate and volcanic tuff.
Selwyn Basin	500 - 480	Rabbitkettle Formation: dark silty limestone and limy mica-rich conglomerate.
Selwyn Basin	480 - 390	Road River Group: black shale, chert and limy siltstone.
Rock formed before orogenic event		
	390 - 350	Earn Group: black shale and chert with lesser pebble conglomerate, sandstone and grit.
	340	Keno Hill Quartzite: grey metamorphosed sandstone, minor black shale and phyllite.

Rocks formed during orogenic event

225	Galena Suite intrusions: brown and green diorite and gabbro.
200 - 250	Jones Lake and Mt. Christie Formations: sandstone, brown shale and dark limestone.

Rocks formed after orogenic event

90 - 94	Tombstone Suite intrusions: granite and granodiorite.
62 - 67	McQuesten Suite intrusions: granite with two types of mica.

Sediments younger than 3 Ma

0 - 3	Overburden: ice-deposited sand and gravel; river silt.

PROPERTY GEOLOGY

The Tiger Project area lies within a northwest trending thrust package bound to the south by the Dawson Thrust and to the north by the Kathleen Lakes Fault (Figure 8). Stratigraphy within this package forms open folds that are aligned parallel to the thrusts and plunge gently to the southeast. Several high angle faults that parallel the general structural trend are inferred on the project area and others could be present. One or more of these faults may have acted as a conduit for mineralizing fluids.

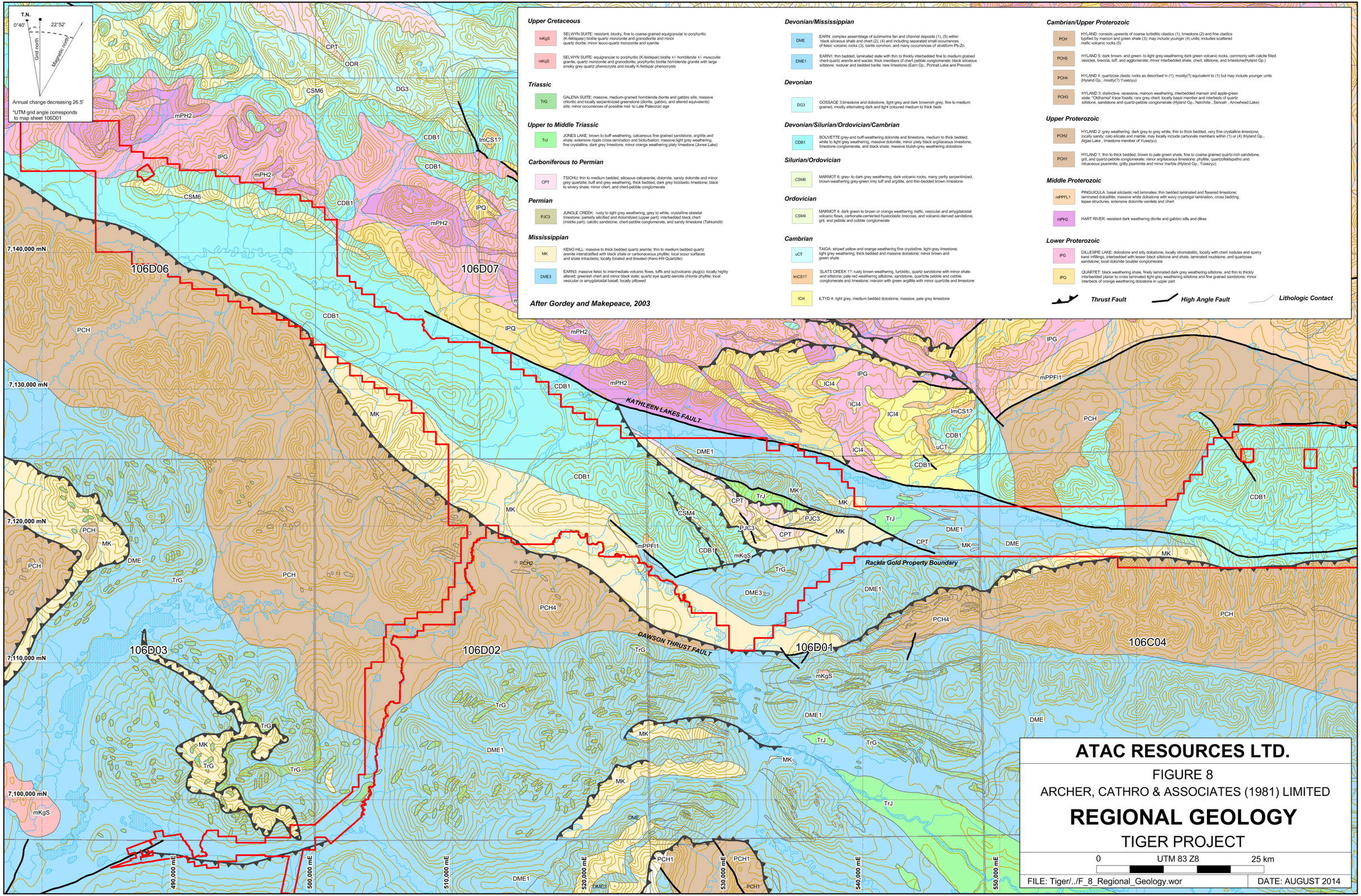
The **Bouvette Formation** is the most abundant inferred rock type shown on government based maps and is the principal focus of ATAC Resources Ltd. exploration. It can be divided into three main units that young to the northeast. In order from oldest to youngest:

1) **Cambrian and Ordovician** – massive pale grey dolostone, oncolitic dolostone, minor quartzite and sandy dolostone.

2) **Ordovician and/or Silurian** – thin to medium bedded grey and buff weathering silty limestone; massive white limestone, well bedded tan and grey limestone in the upper part of the unit.

3) **Silurian and Devonian** – thick bedded to massive light grey dolostone and limestone. Dark grey, fetid limestone that contains “two-hole” and “star” crinoids occurs at the top of the unit.

The thickness of the Bouvette Formation on the project area is estimated to be at least 1,400 meters. The primary focus of mapping has been largely limited to the area around Monument Hill and the Tiger Deposit area within the Ordovician-Silurian strata hosting carbonate gold replacement mineralization. Elsewhere the Bouvette Formation has not been mapped in detail and remains undifferentiated.


T.N.
0°40'
22°52'
Grid north
Magnetic north
Annual change decreasing 26.5'
*UTM grid angle corresponds to map sheet 106D01
Upper Cretaceous
mKgS
SELWYN SUITE: resistant, blocky, fine to coarse grained equigranular to porphyritic (K-feldspasr) biotite quartz monzonite and granodiorite and minor quartz diorite; minor leuco-quartz monzonite and syenite
mKgS
SELWYN SUITE: equigranular to porphyritic (K-feldspar) biotite +/- hornblende +/- muscovite granite, quartz monzonite and granodiorite; porphyritic biotite hornblende granite with large smoky grey quartz phenocrysts and locally K-feldspar phenocrysts
Triassic
TrG
GALENA SUITE: massive, medium-grained hornblende diorite and gabbro sills; massive chloritic and locally serpentinized greenstone (diorite, gabbro, and altered equivalents) sills; minor occurrences of possible mid- to Late Paleozoic age
Upper to Middle Triassic
TrJ
JONES LAKE: brown to buff weathering, calcareous fine grained sandstone, argillite and shale; extensive ripple cross-lamination and bioturbation; massive,light grey weathering, fine crystalline, dark grey limestone; minor orange weathering platy limestone (Jones Lake)
Carboniferous to Permian
CPT
TSICHU: thin to medium bedded, siliceous calcarenite, dolomite, sandy dolomite and minor grey quartzite; buff and grey weathering, thick bedded, dark grey bioclastic limestone; black to silvery shale; minor chert, and chert-pebble conglomerate
Permian
PJC3
JUNGLE CREEK: rusty to light grey weathering, grey to white, crystalline skeletal limestone; partially silicified and dolomitized (upper part); interbedded black chert (middle part); calcitic sandstone, chert-pebble conglomerate, and sandy limestone (Tahkandit)
Mississippian
MK
KENO HILL: massive to thick bedded quartz arenite; thin to medium bedded quartz arenite interstratified with black shale or carbonaceous phyllite; local scour surfaces and shale intraclasts; locally foliated and lineated (Keno Hill Quartzite)
DME3
EARN3: massive felsic to intermediate volcanic flows, tuffs and subvolcanic plug(s); locally highly altered; greenish chert and minor black slate; quartz eye quartz-sericite chlorite phyllite; local vesicular or amygdaloidal basalt, locally pillowed
After Gordey and Makepeace, 2003
Devonian/Mississippian
DME
EARN: complex assemblage of submarine fan and channel deposits (1), (5) within black siliceous shale and chert (2), (4) and including separated small occurrences of felsic volcanic rocks (3); barite common, and many occurrences of stratiform Pb-Zn
DME1
EARN1: thin bedded, laminated slate with thin to thickly interbedded fine to medium grained chert-quartz arenite and wacke; thick members of chert pebble conglomerate; black siliceous siltstone; nodular and bedded barite; rare limestone (Earn Gp., Portrait Lake and Prevost)
Devonian
DG3
GOSSAGE 3:limestone and dolostone, light grey and dark brownish grey, fine to medium grained, mostly alternating dark and light coloured medium to thick beds
Devonian/Silurian/Ordovician/Cambrian
CDB1
BOUVETTE:grey-and buff-weathering dolomite and limestone, medium to thick bedded; white to light grey weathering, massive dolomite; minor platy black argillaceous limestone, limestone conglomerate, and black shale; massive bluish-grey weathering dolostone
Silurian/Ordovician
CSM6
MARMOT 6: grey- to dark grey weathering, dark volcanic rocks, many partly serpentinized, brown-weathering grey-green limy tuff and argillite, and thin-bedded brown limestone
Ordovician
CSM4
MARMOT 4: dark green to brown or orange weathering mafic, vesicular and amygdaloidal volcanic flows, carbonate-cemented hyaloclastic breccias, and volcanic-derived sandstone, grit, and pebble and cobble conglomerate
Cambrian
uCT
TAIGA: striped yellow and orange weathering fine crystalline, light grey limestone; light grey weathering, thick bedded and massive dolostone; minor brown and green shale
lmCS1?
SLATS CREEK 1?: rusty brown weathering, turbiditic, quartz sandstone with minor shale and siltstone; pale red weathering siltstone, sandstone, quartzite pebble and cobble conglomerate and limestone; maroon with green argillite with minor quartzite and limestone
lCl4
ILTYD 4: light grey, medium bedded dolostone; massive, pale grey limestone
Cambrian/Upper Proterozoic
PCH
HYLAND: consists upwards of coarse turbiditic clastics (1), limestone (2) and fine clastics typified by maroon and green shale (3); may include younger (4) units; includes scattered mafic volcanic rocks (5)
PCH5
HYLAND 5: dark brown- and green- to light grey-weathering dark green volcanic rocks, commonly with calcite filled vesicles, breccia, tuff, and agglomerate; minor interbedded shale, chert, siltstone, and limestone(Hyland Gp.)
PCH4
HYLAND 4: quartzose clastic rocks as described in (1); mostly(?) equivalent to (1) but may include younger units (Hyland Gp., mostly(?) Yusezyu)
PCH3
HYLAND 3: distinctive, recessive, maroon weathering, interbedded maroon and apple-green slate; "Oldhamia" trace fossils; rare grey chert; locally basal member and interbeds of quartz siltstone, sandstone and quartz-pebble conglomerate (Hyland Gp., Narchilla , Sencah , Arrowhead Lake)
Upper Proterozoic
PCH2
HYLAND 2: grey weathering, dark grey to grey white, thin to thick bedded, very fine crystalline limestone, locally sandy; calc-silicate and marble; may locally include carbonate members within (1) or (4) (Hyland Gp., Algae Lake , limestone member of Yusezyu)
PCH1
HYLAND 1: thin to thick bedded, brown to pale green shale, fine to coarse grained quartz-rich sandstone, grit, and quartz-pebble conglomerate; minor argillaceous limestone; phyllite, quartzofeldspathic and micaceous psammite, gritty psammite and minor marble (Hyland Gp., Yusezyu)
Middle Proterozoic
mPPFL1
PINGUICULA: basal siliclastic red laminatec; thin bedded laminated and flasered limestone; laminated dolosiltite; massive white dolostone with wavy crystalgal lamination, cross bedding, tepee structures, extensive dolomite veinlets and chert
mPH2
HART RIVER: resistant dark weathering diorite and gabbro sills and dikes
Lower Proterozoic
IPG
GILLESPIE LAKE: dolostone and silty dolostone, locally stromatolitic, locally with chert nodules and sparry karst infillings, interbedded with lesser black siltstone and shale, laminated mudstone, and quartzose sandstone; local dolomite boulder conglomerate
IPQ
QUARTET: black weathering shale, finely laminated dark grey weathering siltstone, and thin to thickly interbedded planar to cross laminated light grey weathering siltstone and fine grained sandstone; minor interbeds of orange weathering dolostone in upper part
Thrust Fault
High Angle Fault
Lithologic Contact
106D06
106D07
106D03
106D02
106D01
106C04
KATHLEEN LAKES FAULT
DAWSON THRUST FAULT
Rackla Gold Property Boundary
7,140,000 mN
7,130,000 mN
7,120,000 mN
7,110,000 mN
7,100,000 mN
490,000 mE
500,000 mE
510,000 mE
520,000 mE
530,000 mE
540,000 mE
550,000 mE
ATAC RESOURCES LTD.
FIGURE 8
ARCHER, CATHRO & ASSOCIATES (1981) LIMITED
REGIONAL GEOLOGY
TIGER PROJECT
0
UTM 83 Z8
25 km
FILE: Tiger/../F_8_Regional_Geology.wor
DATE: AUGUST 2014

A narrow sliver of Middle Proterozoic **Fifteen Mile Group** dolostone lies beneath the Bouvette Formation, to the southwest. This unit is composed of chocolate to orange brown weathering, cryptalgal laminated, medium to thick bedded dolostone, overlain by rusty brown weathering, olive green siltstone and shale with lesser maroon black and buff shale.

The **Marmot Formation** consists of thin volcanic horizons that are inter-bedded with the Ordovician and/or Silurian Bouvette Formation. The horizons range from a few meters to about 20 meters thick and comprise dark green to brown weathering mafic, vesicular volcanic flows, carbonate-cemented hyaloclastic breccias and volcanic-derived sandstone, grit and pebble and cobble conglomerate. Locally these horizons are magnetic. Although the Marmot Formation is volumetrically insignificant, it appears to have played an important role in localizing mineralization in the underlying carbonate by acting as an impermeable cap.

Devonian and Mississippian **Earn Group** rocks are located in the southern half of the project area and bounds the Bouvette Formation to the south, east and north. This unit is generally recessive weathering and is mostly composed of black shale and chert. To the south a high angle normal fault places Earn Group against Bouvette Formation, while a thrust fault marks the southeastern contact. To the north, the Earn Group conformably lies above Cambrian to Devonian shale and limestone, which has been placed against the Bouvette Formation by another high angle fault.

The east-central part of the project area hosts numerous dykes and sills believed to represent a roughly 1000 m diameter granitic plug referred to as the "**Rackla Pluton**". The plug is mostly composed of coarse grained, equigranular, biotite-and muscovite-bearing granite that is locally miarolitic (Panton 2008). The dykes and sills typically range between 30 cm and 7 m in thickness. They are often more fractionated than the plug and include garnet bearing aplite and coarse pegmatite that locally features beryl, amazonite (a green variety of feldspar) and one or more tourmaline minerals (rubellite, indigolite and schorl). The pegmatite bodies comprise mainly orthoclase and quartz but often exhibit abundant lithium-and vanadium-rich micas on their margins.

On surface, the Rackla Pluton is mostly covered by glacial till and only aplite and pegmatite sills and dykes are visible. The pluton is best delineated by its airborne magnetic signature. At the property scale the pluton is represented by a strong magnetic high. When the data is collapsed to the area immediately surrounding the pluton and a high-pass filter is applied, the signature shows a core magnetic low with a fringing magnetic high.

Analysis of several small bodies of granitic aplite and pegmatite have yielded 40Ar/39Ar muscovite ages of 62.3 ± 0.7 Ma, 62.4 ± 1.8 Ma and 59.1 ± 2.0 Ma (Kingston, 2009 and Kingston et al., 2010). Based on this data and the composition of the intrusion, Kingston concludes that the Rackla Pluton does not likely belong to the McQuesten Suite (65.2 ± 2.0 Ma).

Skarn and minor hornfels are developed locally within the Bouvette Formation proximal to the intrusions. Skarn grades from distal tremolite-rich (iron-deficient) facies, which are most abundant near the Flat Top Showing (about 1000 m northwest of the pluton), to proximal actinolite-diopside ± garnet ± pyrrhotite (iron-rich) facies, which are found closer to the pluton

and on the margins of some dykes and sills. Massive skarns are mostly developed at contacts between limestone and volcaniclastic horizons. Hornfels is restricted to thin volcaniclastic layers within the Marmot Formation. It is normally rusty weathering and often contains disseminated to semi-massive pyrrhotite. Limestone and dolomite are locally altered to marble and often contain disseminated, light grey scapolite crystals. The scapolite is difficult to recognize on freshly broken surfaces but stands out on weathered surfaces as prismatic randomly orientated crystals.

MINERALIZATION

The **Tiger Zone** is located 3 km west-northwest of the Rackla Pluton in a moderate to steep walled valley. The Tiger Zone is a thick northwesterly trending body of carbonate replacement style gold mineralization hosted by a moderately northeast dipping horizon. It is currently 700 m long, 100 to 200 m wide and up to 96 m thick. Mineralization is developed within and adjacent to a regionally extensive corridor of highly strained rocks that are manifested as a 40 to 150 m wide zone of small scale folding and shearing. The geometry of the mineralized system is defined by a series of stacked and folded limestone horizons intercalated with locally extensive mafic flows and volcaniclastic units.

Most of the exploration has been directed toward the Discovery Horizon, although there is evidence of at least one additional stratabound interval of gold mineralization above the Discovery Horizon. Due to a combination of topography, overburden and stratigraphic orientation, the Discovery Horizon is the only mineralized horizon observed at surface. It is exposed over a 75 m long by 10 m wide area on the east side of Tiger Creek. At the northeast end of this exposure, a hand trench dug in 2009 uncovered moderately oxidized limonite boxwork with remnant sulphide mineralization, capped by highly sericite altered volcaniclastic. Two samples of subcrop were collected in 2008 from the area near this trench. They returned 22.5 g/t gold, greater than 1% arsenic, 415 ppm bismuth and 116 ppm tungsten; and 13.6 g/t gold, greater than 1% arsenic, 410ppm bismuth and 51.9 ppm tungsten.

Gold occurs in both sulphide and oxide facies mineralization. Sulphide mineralization is accompanied by, and developed within, limestone which is replaced by ferruginous dolomite and iron carbonate minerals. Sulphide species consist of disseminated to banded pyrite, with subordinate arsenopyrite and pyrrhotite and minor bismuthinite and sphalerite. Small amounts of disseminated scheelite are also present. The main sulphide minerals exhibit at least three stages of mineralization. The best intersection from sulphide bearing mineralization averaged 4.04 g/t gold over 96.01 m from hole Rau-09-66.

Oxide mineralization is completely devoid of sulphide minerals and ranges from very competent, weakly porous limonitic mud to rubbly porous limonitic grit. The oxide appears texturally amorphous within most intersections but occasionally exhibits residual color banding that may represent relict sulphide textures. Complete oxidation extends up to 150 m from surface. The best oxide grades (e.g. hole Rau-09-19 which assayed 24.07 g/t gold across 28.04 m) and deepest oxidation occur where northerly trending extensional faults intersect the regional structure. The nature of the contacts between the oxide and sulphide facies is poorly understood, as is the gold distribution within the mineralized horizon and within individual sulphide species.

Mineralization at the Tiger Zone remains open to extension along strike and down dip at both ends of the known zone, as well as at depth across a normal fault that locally defines the southwest margin of the favourable structural corridor.

METALLURGICAL AUGER DRILLING

Drilling was done between September 25 and September 26 with an auger drill mounted onto a modified hydraulic system on the back of a John Deere 450 bulldozer. Augering services were provided by 15317 Yukon Ltd. Eight inch (20 cm) diameter auger flutes were mounted on 5 foot (1.5 m) extension steels. Side roads of the existing road system in the Tiger Zone were used as drill pads. Minor levelling was required.

The auger sampling program was designed to bulk sample the oxide zone for detailed metallurgical testing. Collar locations are presented on Figure 9 and in table II.

Table II: Metallurgical Auger Collar Locations

Hole Number	Easting (m)	Northing (m)	Elevation (m)	Total depth (m)
Rau-13-A01	528478	7119035	1221	14.63
Rau-13-A02	528405	7119113	1260	14.63
Rau-13-A03	528420	7119177	1267	14.63
Rau-13-A04	528324	7119257	1307	14.63

Holes were drilled to a depth of 48 feet (14.63m). Hole depth was determined by the number of drill rods available. Each auger stem (5 feet) was logged in detail, photographed, and entirely sampled and placed into individual 5 gallon pails. The samples were sealed and sent to Kappes, Cassiday & Associates in Reno, Nevada for metallurgical testing. Geologic auger logs are listed in Appendix III.

METALLURGICAL TEST PITS

Five excavator test pits were dug with a hoe attachment on a JD450 between September 19 and 20. They were located proximal to the metallurgical auger collar locations on the same drill pad. The pits were to test for gravel and cobble content of the oxide zone, as the auger drill would not provide a representative sample of this. Five gallon pail samples were taken from the base of the pits in the oxide zone, and sent to Kappes, Cassiday & Associates in Reno, Nevada for metallurgical testing. Geologic metallurgical test pit logs are listed in Appendix IV. Below is a brief table summarizing the results:

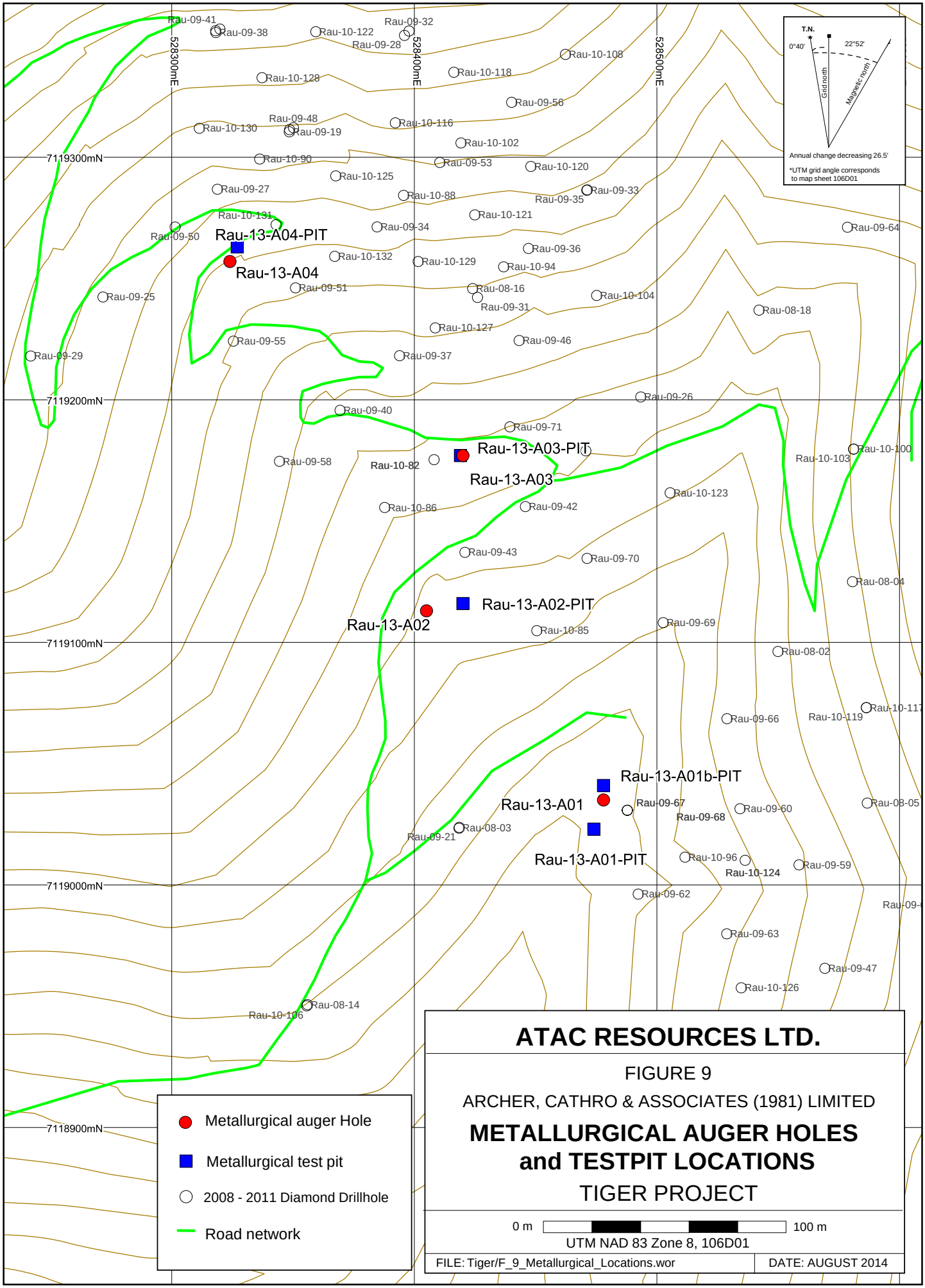

528300mE
528400mE
528500mE
7119300mN
7119200mN
7119100mN
7119000mN
7118900mN
T.N.
0°40'
22°52'
Grid north
Magnetic north
Annual change decreasing 26.5'
*UTM grid angle corresponds to map sheet 106D01
Rau-13-A04-PIT
Rau-13-A04
Rau-13-A03-PIT
Rau-13-A03
Rau-13-A02-PIT
Rau-13-A02
Rau-13-A01b-PIT
Rau-13-A01
Rau-13-A01-PIT
Rau-09-41
Rau-09-38
Rau-10-122
Rau-09-32
Rau-09-28
Rau-10-108
Rau-10-128
Rau-10-118
Rau-09-56
Rau-09-48
Rau-10-130
Rau-09-19
Rau-10-116
Rau-10-102
Rau-10-90
Rau-09-53
Rau-10-120
Rau-10-125
Rau-09-27
Rau-10-88
Rau-09-33
Rau-09-35
Rau-10-131
Rau-10-121
Rau-09-50
Rau-09-34
Rau-09-64
Rau-09-36
Rau-10-132
Rau-10-129
Rau-10-94
Rau-09-51
Rau-08-16
Rau-09-25
Rau-10-104
Rau-09-31
Rau-08-18
Rau-10-127
Rau-09-55
Rau-09-46
Rau-09-29
Rau-09-37
Rau-09-26
Rau-09-40
Rau-09-71
Rau-09-58
Rau-10-82
Rau-10-100
Rau-10-103
Rau-10-123
Rau-10-86
Rau-09-42
Rau-09-43
Rau-09-70
Rau-08-04
Rau-10-85
Rau-09-69
Rau-08-02
Rau-10-117
Rau-09-66
Rau-10-119
Rau-09-67
Rau-09-60
Rau-08-05
Rau-09-68
Rau-08-03
Rau-09-21
Rau-10-96
Rau-10-124
Rau-09-59
Rau-09-62
Rau-09-63
Rau-09-47
Rau-10-126
Rau-08-14
Rau-10-106
Metallurgical auger Hole
Metallurgical test pit
2008 - 2011 Diamond Drillhole
Road network
ATAC RESOURCES LTD.
FIGURE 9
ARCHER, CATHRO & ASSOCIATES (1981) LIMITED
METALLURGICAL AUGER HOLES and TESTPIT LOCATIONS
TIGER PROJECT
0 m
100 m
UTM NAD 83 Zone 8, 106D01
FILE: Tiger/F_9_Metallurgical_Locations.wor
DATE: AUGUST 2014

Table III: Metallurgical Test Pit Summary

Pit #	Total depth (Pad depth + pit depth in ft)	Samples taken	Comments
Rau-13-A01-PIT	13 (3 + 10)	None	Oxide zone not reached
Rau-13-A01-PITb	9 (3 + 6)	3 Pails	Second pit dug 10m north of PITA01 as oxide wasn't reached. Too many boulders to keep digging past 6 feet
Rau-13-A02-PIT	18 (8 + 10)	None	Oxide zone not reached
Rau-13-A03-PIT	15 (3 + 12)	3 pails	
Rau-13-A04-PIT	10 (4 + 6)	3 pails	Permafrost hit at bottom of pit. Could not continue digging.

GEOTECHNICAL AUGER DRILLING

Drilling was done between October 2 and October 3 with an auger drill mounted onto a modified hydraulic system on the back of a John Deere 450 bulldozer. Augering services were provided by 15317 Yukon Ltd. Eight inch (20 cm) diameter auger flutes were mounted on 5 foot (1.5 m) extension steels. 2.83 km of new trail construction was completed for access to the drill site.

The geotechnical auger sampling program was to determine subsurface materials and conditions as a preliminary study for a tailings impoundment location. Collar locations are presented on Figure 10 and in table IV.

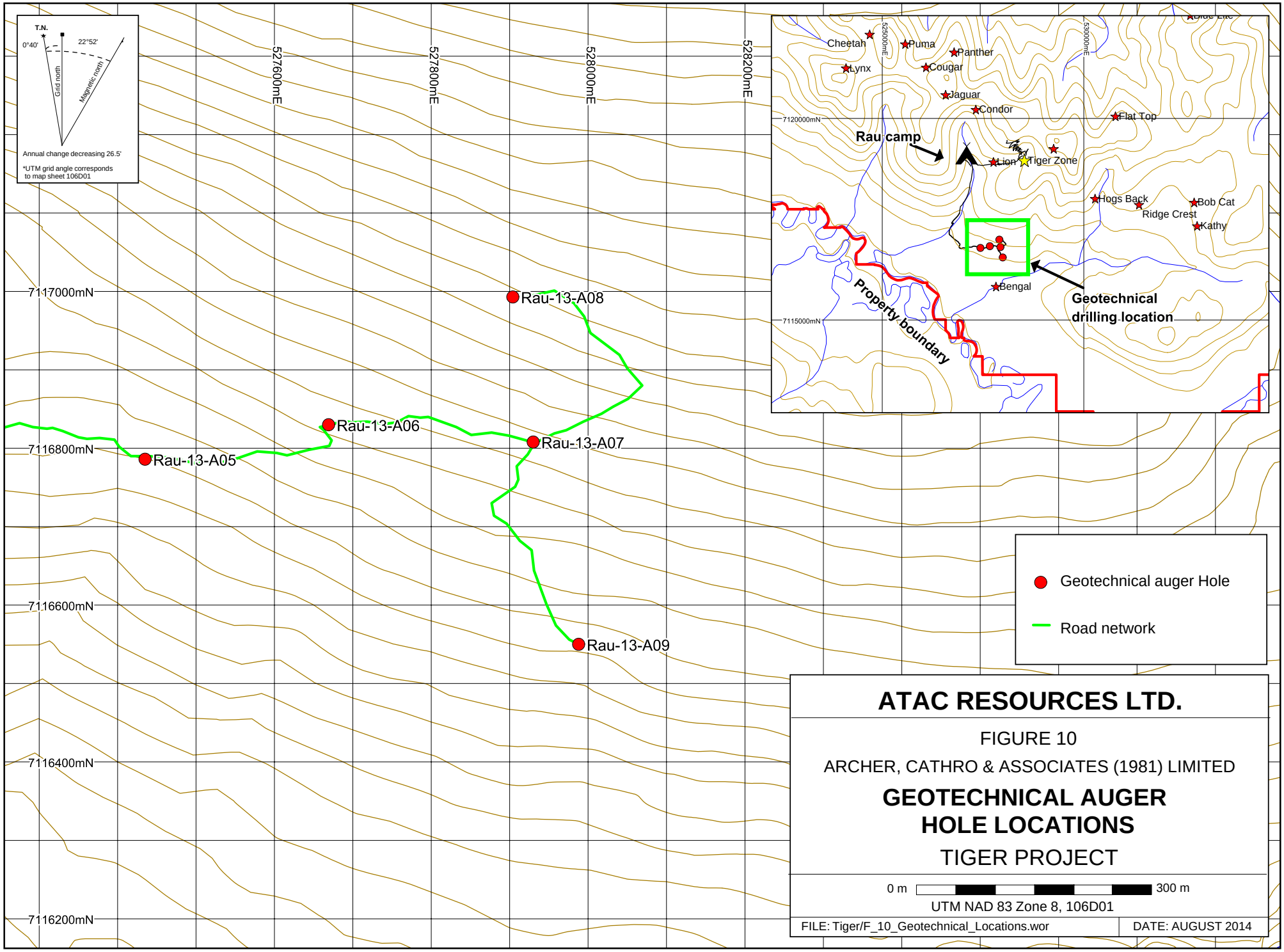
Table IV: Geotechnical Auger Collar Locations

Hole Number	Easting (m)	Northing (m)	Elevation (m)	Depth (m)
Rau-13-A05	527435	7116786	817	8.53
Rau-13-A06	527669	7116880	848	11.28
Rau-13-A07	527930	7116808	875	4.57
Rau-13-A08	527904	7116993	923	3.81
Rau-13-A09	527988	7116550	818	10.06

Holes were drilled on average to a depth of 25 ft (7.62m). Hole depth was determined by location of gravel and cobble rich layers, bedrock or the limit of the hydraulic system on the bulldozer. Each auger stem (5 feet) was logged in detail and photographed. A representative sample was taken every 2.5 feet and larger samples were collected at each change in subsurface strata. The samples have been retained for future geotechnical analysis. Geotechnical auger logs are listed in Appendix V.

ENVIRONMENTAL BASELINE STUDIES

Laberge Environmental has been conducting baseline studies at the western end of the Rackla Gold Property over the past several years. In previous seasons, work has largely been limited to



ATAC RESOURCES LTD.

FIGURE 10

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

GEOTECHNICAL AUGER HOLE LOCATIONS

TIGER PROJECT

0 m — 300 m

UTM NAD 83 Zone 8, 106D01

FILE: Tiger/F_10_Geotechnical_Locations.wor | DATE: AUGUST 2014

seasonal wildlife surveys, which continued throughout 2013. Additional study work in 2013 included a wolverine track study, a collared pika study, vegetation mapping and rare plant assessment, an alpine raptor survey, stream sediment and benthic invertebrate monitoring, and fish surveys.

The moose surveys were conducted in late spring and early fall, and consisted of helicopter-based observation primarily of moose, but with other animal sightings noted. Moose were categorized as female, mature male, immature male or calves at each sighting waypoint. The study corridor covered the Tiger Deposit as well as conceptual winter access routes, both along the existing Wind River Trail and an alternative route through the Rankin Creek valley.

The wolverine track study was conducted in late winter along the Wind River Trail. This study consisted of detailed land-based observations of animal tracks. Observations were taken over six 2 to 3 day trips carried out by local trap line concession holders, who were contracted by Laberge Environmental due to their extensive knowledge of the area.

Pika habitat was studied throughout the alpine areas where development may occur. Only one zone of potential Pika habitat was identified within the development area, due to ground cover conditions. The area of potential habitat was surveyed on foot to identify Pikas and signs of Pika habitation.

Vegetation data was collected throughout the Tiger deposit area, as well as along the potential access road route. Vegetation mapping was initially conducted by review of airphotos. Follow-up field studies verified vegetation characteristics throughout the polygons identified in the desktop study. Rare plant surveys were also conducted at select monitoring sites. Study results found that white spruce is the most common vegetation type throughout the surveyed area. No rare plant species were found at any of the sites investigated.

The raptor survey was conducted by helicopter along cliff faces in development areas, as well as known sites along the potential access route. Signs of old nests were observed, but they did not appear to have been occupied within the last few years. No adult or young birds were observed during the survey.

Stream sediment sampling and analysis was conducted at several sites along the potential access road route. Samples were analyzed for seven metals with potential to be toxic to aquatic organisms. Sediment samples exceeded recommended levels in all sites, with arsenic, cadmium and zinc being the most frequently elevated. A benthic invertebrate survey was also conducted on streams that could be impacted by future development, as benthic invertebrates are a known indicator of watershed health and are a frequently biomonitoring tool to assess long-term conditions. In general, the benthic invertebrate survey indicated good stream quality, with the exception of Cameron Creek, which is naturally elevated in metals.

A fisheries study was also completed on tributaries along the potential access road route and the Beaver and Rackla Rivers, which would potentially be effected by future development of Tiger and the surrounding areas. Seven sites were assessed in drainages which offered potential fish

habitat. Fish were captured, recorded and released using several scientific trapping techniques. Twelve fish were also retained and sent for metal-in-tissue analysis.

Following the completion of the aforementioned individual studies, a comprehensive baseline report on environmental conditions for the Tiger deposit and surrounding areas was prepared. A copy of this report is available in Appendix VI, and includes documentation of the aforementioned studies.

HERITAGE EVALUATION

Matrix Research Ltd. was contracted to perform follow-up heritage assessments for the Tiger project area. This work as comprised of a detailed Heritage Resource Impacts Assessment for the Tiger deposit area itself and the proposed road access routes. This study investigated areas of conflict between possible future developments and previously identified zones of high heritage potential. Specific recommendations were then made for areas of avoidance. The results of this work can be found in Appendix VII.

WATER QUALITY AND CLIMATE MONITORING

J. Gibson Environmental Consulting has been conducting ongoing quarterly water quality and flow monitoring for the Rackla Gold Property including areas surrounding the Tiger Deposit. This work continued throughout this field season, with the addition of monthly monitoring on key stations near the deposit continuing from September 2012. Yearly monitoring of snowpack and continual operation of an on-site weather station also continued. Detailed results of the monitoring studies are noted in Appendix VIII.

As part of their ongoing environmental baseline studies, Laberge Environmental also conducted surface water quality sampling at several stations along the potential access route. Details of these surveys can be found within Laberge's comprehensive baseline report, available in Appendix VI.

GEOTECHNICAL STUDY

Golder Associates Inc. was retained to complete a scoping level analysis of pit slopes for the Tiger deposit. The study used data generated by previous drilling work, and did not require any additional drilling or sampling. Recommendations were for inter-ramp angles of no more than 45 degrees in waste rocks (carbonate and volcaniclastic rock), and 40 degrees in oxide material. The study also concluded that blasting would not be required in oxide material, given its sandy and non-competent nature. A copy of the Golder report is attached in Appendix IX.

DISCUSSION AND CONCLUSIONS

The results of studies conducted to-date indicate that the Tiger deposit is promising and warrants further investigation into economics. In particular, information yielded by current and previous metallurgical testing program suggests that either a heap leach operation or conventional milling facility may be viable. Further assessment of mining and processing should continue with a

focus on examination of site specific challenges so that a reasonable economic assessment of the deposit can be made. While there has been several metallurgical programs completed it is likely that additional test work will be required to better define processing parameters and costs. Environmental work continues to demonstrate that minimal animal activity is located in the immediate vicinity of the project area. Moose habitat does exist along the Beaver River to the south of the deposit, and monitoring should continue in order to establish a reliable set of baseline data before any disturbances occur.

Water monitoring should also continue in order to determine existing conditions and provide a database of yearly and seasonal variability. If the deposit continues to show economic promise and is likely to be advanced, it will be necessary to install hydrological monitoring wells throughout the deposit area to characterize groundwater quality and flows.
The geotechnical study provides a basis for ongoing economic work, but resulted in conservative slope angles due to limitations in available data. If the project demonstrates economic potential with these slopes, or shows favourable sensitivity to increases in slope angles, then additional geotechnical drilling and follow-up study is recommended.

Respectfully submitted,

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Andrew Carne, M.Eng., EIT

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APPENDIX I

STATEMENTS OF QUALIFICATIONS

STATEMENT OF QUALIFICATIONS

I, Heather Friday, engineer and geologist, with business addresses in Whitehorse, Yukon Territory and residential address in Whitehorse, Yukon Territory, hereby certify that:

1. I graduated from the University of British Columbia in 2012 with a B.A.Sc. in Geological Engineering.

2. From 2010 to present, I have been actively engaged in mineral exploration in Yukon Territory and British Columbia.

3. I am an Engineer in Training (EIT) and a Geologist in Training (GIT) with the Association of Professional Engineers and Geoscientists of British Columbia

4. I have personally participated in the fieldwork reported herein and have interpreted all data resulting from this work.

Heather Friday B.A.Sc, EIT, GIT

STATEMENT OF QUALIFICATIONS

I, Andrew Carne, engineer, with business addresses in Whitehorse, Yukon Territory and Vancouver, British Columbia and residential address in Vancouver, British Columbia, hereby certify that:

1. I graduated from the University of British Columbia in 2010 with a B.A.Sc. in Materials Engineering.

2. I graduated from the University of British Columbia in 2012 with an M.Eng. in Civil Engineering.

3. From 2006 to present, I have been actively engaged in mineral exploration in Yukon Territory and British Columbia.

4. I am an Engineer in Training (EIT) with the Association of Professional Engineers and Geoscientists of British Columbia.

5. I have personally overseen the environmental monitoring, heritage assessment, geotechnical study and metallurgical test programs and have interpreted data resulting from this work.

Andrew Carne, M.Eng, EIT

APPENDIX II

STATEMENT OF EXPENDITURES

Statement of Expenditures
Nadaleen Group I, J, K and L
(see attached for list of mineral claims)
March 1, 2014

Labour March to February (includes field, office, expediting and support)

R. Carne – geologist -766 hours at $145/hr	$ 116,623.50
D. Eaton – geologist – 40 hours at $120/hr	5,040.00
J. :Lane – geologist – 148 hours at $96/hr	14,918.40
W. Schneider – expediting – 166 hours at $92/hr	16,035.60
A. Carne – P.Eng. – 670 hours at $85/hr	59,797.50
J. Steven – geologist – 34 hours at $85/hr	3,034.50
J. McArthur – camp manager - 30 days at $680/day	21,420.00
H. Friday – geologist – 61 ¼ days at $560/day	36,015.00
Cody Beck – field assistant – 20 days at $424/day	8,904.00
T. Stefanik – field assistant – 7 days at $424/day	3,116.40
J. Lessard – field assistant – 7 days at $360/day	2,646.00
L. Corbett – expediting – 81 hours at $81/hr	6,889.05
D. Wallinger – expediting – 44 ½ hours at $74/hr	3,457.65
V. Pickering – office -101 ¼ hrs at $64/hr	6,804.00
L. Smith – office- 45 hours at $62/hr	2,929.50
D. Libman – expediting – 17 hours at $55/hr	981.75
	308,612.85

Expenses (including management fee)

Field room and board – 174 mandays @ $135/manday	26,637.66
Matrix Research Ltd.	37,005.28
Laberge Environmental Services	128,200.27
J. Gibson Environmental Consulting	91,041.86
15317 Yukon Inc.	60,725.70
Great River Aviation Ltd.	5,281.61
Nomad Air	21,230.58
ALS Chemex	67,193.65
Fireweed Helicopters – various machines and rates	247,105.53
Horizon Helicopters	5,613.30
Trans North Helicopters	8,141.26
Alkan Air	32,915.73
Golder Associates	46,608.78
	777,701.21

Total	$1,086,314.06

Note: These costs are for the Tiger Deposit which covers all four groupings.

Total claims for Group I, J, K and L = 2,701 claims

Cost per claim = $1,086,314.06/2,701 = $402.19

Cost pro rated for:

Group I (451 claims) – $181,387.50

Group J (750 claims) – $301,642.19

Group K (750 claims) – $301,642.19

Group L (750 claims) – $301,642.18

Statement of Expenditures
Nadaleen Group M (310 claims)
ACX 1-310 mineral claims
March 1, 2014

Expenses (including management fee)

Field room and board (Matrix crew) – 38 mandays at $130/day	$ 5,601.96
EBA	94,407.96
Laberge Environmental	8,192.25
Matrix Research Ltd.	18,464.47
Total	126,666.64

APPENDIX III

AUGER METALLURGICAL DRILLING – GEOLOGICAL AND SAMPLE LOGS

Sample Log

Hole:

From (ft)	To (ft)	Sample Number	Flagging Colour	Weight (lbs)
7.50	13.00	Rau-13-A01-1	Yellow + Lt Green	55.2
13.00	18.00	Rau-13-A01-2	Yellow + Lt Green	53.8
18.00	23.00	Rau-13-A01-3	Yellow + Lt Green	61.1
23.00	28.00	Rau-13-A01-4	Yellow + Lt Green	60.85
28.00	33.00	Rau-13-A01-5	Yellow + Lt Green	80
33.00	38.00	Rau-13-A01-6	Yellow + Lt Green	73.35
38.00	43.00	Rau-13-A01-7	Yellow + Lt Green	68.05
43.00	48.00	Rau-13-A01-8	Yellow + Lt Green	46.1

Sample Log

Hole:

From (ft)	To (ft)	Sample Number	Flagging Colour	Weight (lbs)
8.00	14.00	Rau-13-A01-1	Pink and Light Green	45.2
14.00	18.00	Rau-13-A01-2	Pink and Light Green	48.7
18.00	23.00	Rau-13-A01-3	Pink and Light Green	50.7
23.00	28.00	Rau-13-A01-4	Pink and Light Green	57.25
28.00	33.00	Rau-13-A01-5	Pink and Light Green	61.95
33.00	38.00	Rau-13-A01-6	Pink and Light Green	38.8
38.00	43.00	Rau-13-A01-7	Pink and Light Green	43.8
43.00	48.00	Rau-13-A01-8	Pink and Light Green	43.9

Sample Log

Hole:

From (ft)	To (ft)	Sample Number	Flagging Colour	Weight (lbs)
10.00	18.00	Rau-13-A03-1	Orange and Lt. Green	45
18.00	23.00	Rau-13-A03-2	Orange and Lt. Green	50.5
23.00	28.00	Rau-13-A03-3	Orange and Lt. Green	45
28.00	33.00	Rau-13-A03-4	Orange and Lt. Green	43.5
33.00	38.00	Rau-13-A03-5	Orange and Lt. Green	52.05
38.00	43.00	Rau-13-A03-6	Orange and Lt. Green	37
43.00	48.00	Rau-13-A03-7	Orange and Lt. Green	21.7

Sample Log

Hole:

From (ft)	To (ft)	Sample Number	Flagging Colour	Weight (lbs)
7.50	13.00	Rau-13-A04-1	Light green	57.35
13.00	18.00	Rau-13-A04-2	Light green	33.4
18.00	23.00	Rau-13-A04-3	Light green	66.5
23.00	28.00	Rau-13-A04-4	Light green	66.9
28.00	33.00	Rau-13-A04-5	Light green	66.1
33.00	38.00	Rau-13-A04-6	Light green	64.75
38.00	43.00	Rau-13-A04-7	Light green	57.45
43.00	48.00	Rau-13-A04-8	Light green	55.7

APPENDIX IV

METALLURGICAL TEST PITS – GEOLOGICAL AND SAMPLE LOGS

Tiger 2013 Excavator metallurgical test pits

Pit #1
Pad 3 feet down and pit 3 feet wide, 10 feet long and 10 feet deep (total depth 13 feet)
5 inches of organic material
9 ½ feet of mid grey silty sand material with numerous cobbles and boulders throughout.
Infrequent small pockets and lenses approx. 2 inches thick throughout but main oxide zone not reached.

No samples taken.

Pit#1b (10 m north of Pit#1)
Pad 3 feet down and pit 3 feet wide, 10 feet long and 6 feet deep (total depth 9 feet)
5 inches of organic material
7 ½ feet of mid grey silty sand material with numerous cobbles and boulders throughout.
Occasional oxide lenses and blebs (similar to Pit#1) seen thoughout also.
1 foot orange/red oxide material in many cobbles and boulders.

We had to stop digging at 6 feet deep with the Cat as there were too many boulders and cobbles.
I dug another 6 inches or so by hand at the bottom.

3 pails of samples taken:
13-A01bPIT-1: 5 feet down
reddish oxide – munsell 10RY 3/3
Strong HCl reactivity
13-A01PIT-2: 5 ½ feet down – sidewall
reddish oxide – munsell 10RY 4/2
Strong HCl reactivity
13-A01PIT-3: 6 ½ feet down
orange oxide – munsell 10RY 4/6 to 10RY 4/2
Strong HCl reactivity

Pit #2
Pad 8 feet down and pit 2 ½ feet wide, 10 feet long and 10 feet deep (total depth 18 feet)

1 foot of organics and roots
17 feet of mid grey to brown silty to clayey sand material with frequent gravel and cobble sized rocks. No oxide reached.

1 pail of material taken at the bottom – not oxide – will not get sampled or sent out.

Pit #3
Pad 3 feet down and pit approximately 3 feet wide, 10 feet long and 12 feet deep (total depth 15 feet)

8inches of organics and roots

1 foot of mid grey to brown silty sand with minor cobbles
7 feet of silty-sand with minor cobbles and gravel – a slight orange colour
1 foot of rusty red oxide with very few large rocks
2 feet of intermittent red/grey oxide material – sulphides visible in the grey layers. Very few rocks or cobbles throughout these oxide layers.

3 pails of samples taken:
13-A03PIT-1: bottom of pit
Red oxide – munsell 7.5YR 2.5/3
Strong HCl reactivity
13-A03PIT-2: bottom of pit
Transition between red and grey oxide – munsell 10YR 4/3
Strong HCl reactivity
13-A03PIT-3: bottom of pit
grey oxide with sulphides (?) – munsell 7.5YR 6/4 to 2.5Y 4/2
Strong HCl reactivity

Pit #4
Pad 4 feet down and Pit approximately 4 feet wide and 10 feet long and 5-6 feet deep from the level of the Cat – (total depth 10 feet deep)

8 inches of organics and roots
3 feet of silty sand material (mid grey in colour).
1 foot of oxide – bright orange rust colour - We dug a good foot of non-frozen oxide and then large ice crystals were seen in the oxide (typically 1inch blebs of ice and clear). We managed to continue digging a bit more – mainly chipping out frozen oxide – but it became too frozen to continue. (video taken of chipping away at oxide material).

The oxide had a large percentage of small gravel and cobble sized rocks throughout – typically non-oxidized wall rock?

3 pails of samples taken:
13-A04PIT-1: bottom of pit
This sample had lots of ice initially, so the bucket is only 2/3 full
Orange oxide – munsell 2.5Y 4/4
Strong HCl reactivity
13-A04PIT-2: bottom of pit
Orange oxide – munsell 2.5Y 5/3
Strong HCl reactivity
13-A04PIT-3: bottom of pit
Orange oxide – munsell 2.5Y 5/3
Strong HCl reactivity

hopefully we can return to this pit if it has a chance to thaw.

APPENDIX V

AUGER GEOTECHNICAL DRILLING – GEOLOGICAL AND SAMPLE LOGS

ZONE: TAILINGS AREA - AREA A

SECTION:

HOLE: Rau-13-A05

CLAIM:

Easting 527435mE **Grid East**

Northing 7116786mN **Grid North**

Elevation

Depth 28'

Contractor: Don Pilsworth

Drill: Auger on 450C Cat

Drilling dates: October 3rd, 2013

Logged by: H. Friday

TARGET:

SUMMARY

From (m)	To (m)	Interval	Unit	Comments

SAMPLES

Numbers: M898182 to M898185 and ZZ80239 (soil)

Total: 5

Batch: n/a

Date Sent:

Certificate:

COMMENTS

Hole refusal at 28' - too bouldery/cobbley for drill. Getting stuck.

Geology Log

Hole: **Logger Name:** **Date:**

FOOTAGE			METERAGE			LITHOLOGY			DETAILED DESCRIPTION
From (ft)	To (ft)	Interval (ft)	From (m)	To (m)	Interval (m)	Soil/Rock Type	Colour	HCl Reactivity	
0.00	3.00	3.00	0.00	0.91	0.91	SILT	Dark browney-grey	MS	Dark browney-grey silt with frequent (10%) gravels. Gravels often decomposed and oxidized to a bright orange colour. Soil dry but sticks well to auger stem. Frequent organics.
3.00	8.00	5.00	0.91	2.44	1.52	SILT	Mid grey	S	Mid grey silt with minor (5%) clay and 15% subrounded to rounded gravel. Soil dry but holds well to auger stem. Small 2cm oxidized blebs throughout (decomposed gravel clasts?) bright orange in colour.
8.00	13.00	5.00	2.44	3.96	1.52	SILT	Mid grey	S	Mid grey silt with minor (5%) clay and 20% subrounded to rounded gravel. Soil dry but holds to auger stem well.
13.00	18.00	5.00	3.96	5.49	1.52	SILT	Mid grey	vS	Mid grey silt with moderate (10%) clay and 15% subrounded to rounded gravel. Soil dry but sticks to auger stem well. Very strong HCl reaction.
18.00	21.00	3.00	5.49	6.40	0.91	SILT	Dark grey	vS	Mid grey silt with moderate (10%) clay and 15% subrounded to rounded gravel. Soil dry but sticks to auger stem well. Very strong HCl reaction.
21.00	23.00	2.00	6.40	7.01	0.61	SILT	Dark grey	vS	Dark grey silt with 30% subangular to subrounded gravel. Soil dry and does not stick to the auger stem. Very strong HCl reaction.
23.00	28.00	5.00	7.01	8.53	1.52	SILT	Dark grey	vS	Dark grey silt with 40% subangular to subrounded gravel and cobbles. Soil dry but sticks well to auger stem. Very strong hcl reaction. Drilling very difficult - abundance of gravel/cobbles.
EOH									

n = none, t= <1%, w = 1-3%, f = 3-5%, m = 5-7%, ms = 7-10%, s = 10-15%, l = 15-20%, (write % for >20%)

Sample Log

Hole:

From (ft)	To (ft)	Sample Number	Flagging Colour	Weight
0.00	3.00	M898182	Yellow	
3.00	8.00	M898183	Yellow	
21.00	23.00	M898184	Yellow	
23.00	28.00	M898185	Yellow	
28.00	-	ZZ80239	Soil sample @ bottom of auger	

ZONE: TAILINGS AREA - AREA A

SECTION:

HOLE: Rau-13-A06

CLAIM:

Easting	527669	**Grid East**	
Northing	7116880	**Grid North**	
Elevation			
Depth	37'		

Contractor: Don Pilsworth

Drill: Auger on 450C Cat

Drilling dates: October 3, 2013

Logged by: H. Friday

TARGET:

SUMMARY

From (m)	To (m)	Interval	Unit	Comments

SAMPLES

Numbers: M898179 to M898182 and ZZ80238 (soil)

Total: 4

Batch: n/a

Date Sent:

Certificate:

COMMENTS

Refusal @37' - clay too stiff to drill through. Too much torque on machine.

Geology Log

Hole: **Logger Name:** **Date:**

FOOTAGE			METERAGE			LITHOLOGY			DETAILED DESCRIPTION
From (ft)	To (ft)	Interval (ft)	From (m)	To (m)	Interval (m)	Soil/Rock Type	Colour	HCl Reactivity	
0.00	3.00	3.00	0.00	0.91	0.91	CLAY	Mid bluey-grey	MS	Mid bluey-grey clay with 10% gravel throughout. Gravel typically subrounded. Soil very moist. Small 5cm tan sandy pockets/blebs locally throughout. Chip sample of sandy pocket retained in chip tray.
3.00	8.00	5.00	0.91	2.44	1.52	CLAY	Dark bluey-grey	MS	Dark bluey-grey clay with 20% gravel throughout. Gravel typically subrounded and oxidized. Material sticks very well to auger stem. Soil moist.
8.00	13.00	5.00	2.44	3.96	1.52	CLAY	Dark bluey-grey	MS	Dark bluey-grey clay with 20% gravel throughout. Gravel typically subrounded to subangular. Oxidized coating on select gravel clasts. Soil moist, material sticks very well to auger stem.
13.00	18.00	5.00	3.96	5.49	1.52	CLAY	Dark bluey-grey		Dark bluey-grey clay with 20% gravel throughout. Gravel typically subrounded to subangular. Oxidized coating on select gravel clasts. Soil moist, material sticks very well to auger stem.
18.00	23.00	5.00	5.49	7.01	1.52	CLAY	Very dark bluey-grey	S	Very dark bluey-grey clay with minor (10%) gravel. Gravel much smaller than previous runs (1cm to 1.5cm) and subangular to subrounded. Soil moist and sticks well to auger stem. Strong hcl reactivity.
23.00	28.00	5.00	7.01	8.53	1.52	CLAY	Very dark bluey-grey	S	Very dark bluey-grey clay with minor (10%) gravel. Gravel subrounded to subangular. Soil moist and sticks very well to auger stem.
28.00	33.00	5.00	8.53	10.06	1.52	CLAY	Very dark bluey-grey	S	Very dark bluey-grey clay with minor (10%) gravel. Gravel subrounded to subangular. Soil moist and sticks very well to auger stem.
33.00	37.00	4.00	10.06	11.28	1.22	CLAY	Dark grey	S	Dark grey clay with 15% subangular to subrounded gravel. Soil moist and sticks extremely well to auger. Very difficult drilling.
EOH									

n = none, t= <1%, w = 1-3%, f = 3-5%, m = 5-7%, ms = 7-10%, s = 10-15%, I = 15-20%, (write % for >20%)

Sample Log

Hole:

From (ft)	To (ft)	Sample Number	Flagging Colour	Weight
0.00	3.00	M898179	Yellow	
18.00	23.00	M898180	Yellow	
33.00	37.00	M898181	Yellow	
37.00	-	ZZ80238	Soil sample @ bottom of auger	

ZONE: TAILINGS AREA - AREA A

SECTION:

HOLE: Rau-13-A07

CLAIM:

Easting	527930	**Grid East**	
Northing	7116808	**Grid North**	
Elevation			
Depth	15'		

Contractor: Don Pilsworth

Drill: Auger on 450C Cat

Drilling dates: October 3, 2013

Logged by: H. Friday

TARGET:

SUMMARY

From (m)	To (m)	Interval	Unit	Comments

SAMPLES

Numbers: M898177 to M898178 and ZZ80237 (soil)

Total: 3

Batch: n/a

Date Sent:

Certificate:

COMMENTS

Geology Log

Hole: **Logger Name:** **Date:**

FOOTAGE			METERAGE			LITHOLOGY			DETAILED DESCRIPTION
From (ft)	To (ft)	Interval (ft)	From (m)	To (m)	Interval (m)	Soil/Rock Type	Colour	HCl Reactivity	
0.00	3.00	3.00	0.00	0.91	0.91	SILT	Dark brownish grey	MS	Silt with minor (5%) clay and abundant (30%) gravel. Gravel clasts subangular to subrounded. Material dark brownish grey. Soil moist.
3.00	8.00	5.00	0.91	2.44	1.52	SILT	Dark brownish grey	MS	Silt with moderate (10%) clay and abundant (30%) gravel. Gravel clasts subrounded to subangular. Gravel clasts frequently oxidized on surface. Small 2cm light tan sandy silt blebs/pockets locally throughout stem. Material dark brownish grey. Soil moist.
8.00	13.00	5.00	2.44	3.96	1.52	SILT	Dark grey	S	Dark grey silt with moderate (10%) clay and 10% gravel. Gravel smaller in size than previous runs and mainly oxidized. Very strongly calcareous. Soil dry and sticks to auger stem very well.
13.00	15.00	2.00	3.96	4.57	0.61	SAND	Dark grey	S	Dark grey coarse sand with minor clay (10%) and very little silt (3%). A few gravel clasts throughout (2%). Soil dry. Light grey (bedrock) powder on bit - and very calcaerous - LST? Very difficult drilling @ bedrock.
EOH									

n = none, t= <1%, w = 1-3%, f = 3-5%, m = 5-7%, ms = 7-10%, s = 10-15%, I = 15-20%, (write % for >20%)

Sample Log

Hole:

From (ft)	To (ft)	Sample Number	Flagging Colour	Weight
0.00	3.00	M898177	Yellow	
8.00	13.00	M898178	Yellow	
15.00	-	ZZ80237	Soil sample @ end of auger	

ZONE: TAILINGS AREA - AREA A

SECTION:

HOLE: RAU-13-A08

CLAIM:

Easting	527904	**Grid East**	
Northing	7116993	**Grid North**	
Elevation			
Depth	12.5'		

Contractor: Don Pilsworth

Drill: Auger on 450C Cat

Drilling dates: October 2, 2013

Logged by: H. Friday

TARGET:

SUMMARY

From (m)	To (m)	Interval	Unit	Comments

SAMPLES

Numbers: M898169 to M898172 and ZZ80235

Total: 5 Samples

Batch: n/a

Date Sent:

Certificate:

COMMENTS

Geology Log

Hole: **Logger Name:** **Date:**

FOOTAGE			METERAGE			LITHOLOGY			DETAILED DESCRIPTION
From (ft)	To (ft)	Interval (ft)	From (m)	To (m)	Interval (m)	Soil/Rock Type	Colour	HCl Reactivity	
0.00	6.00	6.00	0.00	1.83	1.83	SILT	Dark grey	-	Predominentaly silt with 2-% clay and minor gravels (5%). Gravel typically rounded. Dark grey in colour. Soil moist.
6.00	8.00	2.00	1.83	2.44	0.61	SILT	Light tan to brown	S	Light tan to brown sandy silt with minor clay (5%) and 10% gravels. Gravel is subrounded to rounded. Soil try and crumbly - minorly plastic in clay matrix.
8.00	12.50	4.50	2.44	3.81	1.37	SILT	Dark grey	MS	Dark grey silty clay with minor gravel (10%). Soil moist. Refulasl at 12.5'
									Very light grey powder from tip of auger bit (bedrock?). Bit warm and powder very HCl reacctive.

n = none, t= <1%, w = 1-3%, f = 3-5%, m = 5-7%, ms = 7-10%, s = 10-15%, I = 15-20%, (write % for >20%)

Sample Log

Hole:

From (ft)	To (ft)	Sample Number	Flagging Colour	Weight
0.00	6.00	M898169		
6.00	8.00	M898170		
8.00	12.50	M898171		
12.50	-	M898172	Sample @ bit	
12.50	-	ZZ80235	Soil sample @ end of auger	

ZONE: TIGER

SECTION:

HOLE: Rau-13-A09

CLAIM:

Easting	527989	**Grid East**	
Northing	7116550	**Grid North**	
Elevation			
Depth	33'		

Contractor: Don Pilsworth

Drill: Auger on 450C Cat

Drilling dates: October 2, 2013

Logged by: H. Friday

TARGET:

SUMMARY

From (m)	To (m)	Interval	Unit	Comments

SAMPLES

Numbers: M898173 to M898176 and ZZ80236

Total: 5 samples

Batch:

Date Sent:

Certificate:

COMMENTS

Geology Log

Hole: **Logger Name:** **Date:**

FOOTAGE			METERAGE			LITHOLOGY			DETAILED DESCRIPTION
From (ft)	To (ft)	Interval (ft)	From (m)	To (m)	Interval (m)	Soil/Rock Type	Colour	HCl Reactivity	
0.00	3.00	3.00	0.00	0.91	0.91	CLAY	Dark grey	W	Silty clay (more clay than silt) with abundant subrounded gravel. Dark grey in colour. Soil moist.
3.00	4.50	1.50	0.91	1.37	0.46	CLAY	Dark grey	W	Silty clay (more clay than silt) with abundant subrounded gravel. Dark grey in colour. Soil moist.
4.50	7.75	3.25	1.37	2.36	0.99	CLAY	Very dark grey	W	Very dark grey clay with minor silts and abundant gravel (20%). Gravel is subrounded. Soil moist and sticks very well to auger stem.
7.75	8.00	0.25	2.36	2.44	0.08	SAND	Light brown/tan	W	Small 8cm light brown silty sand layer. Dry and non-continuous??
8.00	13.00	5.00	2.44	3.96	1.52	CLAY	Dark grey	MS	Dark grey clay with minor (5%) silt and abundant (20%) gravel. Local light tan sandy silt pockets - generally 2-5cm. Soil moist.
13.00	14.00	1.00	3.96	4.27	0.30	CLAY	Dark grey	S	Dark grey clay with minor (5%) silt and abundant (20%) gravel. Local light tan sandy silt pockets - generally 2-5cm. Soil moist.
14.00	18.00	4.00	4.27	5.49	1.22	SILT	Dark grey	MS	Dark grey silt with sand and gravel. Gradual contact from above clay-rich soil. Soil dry.
18.00	23.00	5.00	5.49	7.01	1.52	SILT	Dark grey	MS	Dark grey silt with sand and abundant (20%) gravel. Gravel angular to subrounded. Soil dry.
23.00	25.00	2.00	7.01	7.62	0.61	SILT	Dark grey	MS	Dark grey silt with sand and abundant (20%) gravel. Gravel angular to subrounded. Soil dry.
25.00	33.00	8.00	7.62	10.06	2.44	ARG?	Very dark grey	MS	Very dark grey dry powder with a few argillite fragments throughout. Drilling is very
EOH									

n = none, t= <1%, w = 1-3%, f = 3-5%, m = 5-7%, ms = 7-10%, s = 10-15%, I = 15-20%, (write % for >20%)

Sample Log

Hole:

From (ft)	To (ft)	Sample Number	Flagging Colour	Weight
0.00	3.00	M898173		
4.50	8.00	M898174		
14.00	18.00	M898175		
25.00	33.00	M898176		
33.00	-	ZZ80236	Soil sample @ end of auger	

APPENDIX VI

ENVIRONMENTAL BASELINE REPORT - LABERGE ENVIRONMENTAL

BASELINE ENVIRONMENTAL ASSESSMENTS

FOR THE

TIGER GOLD PROJECT, 2013

For

ATAC Resources Ltd.

Submitted by

Laberge ENVIRONMENTAL SERVICES

June 2014

Cover Photo: Beaver River near fish assessment site RF1, August 2013

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EXECUTIVE SUMMARY

Baseline environmental assessments covering several disciplines were conducted throughout the Tiger Gold Project study area from 2010 to 2013. The specific areas surveyed included the two potential winter road route options from Hanson Lake Road to the Beaver River ice bridge crossing, then on to the Tiger Deposit area and airstrip. This report contains details on wildlife surveys, vegetation and rare plant assessments, fish and benthic invertebrate studies and stream sediment characterization.

Aerial and ground wildlife surveys indicate that moose are the most abundant mammal in the general area. The wetlands of McQuesten Lake and the Beaver River, and the subalpine regions of the Davidson and Patterson ranges appear to be important moose habitats. No other ungulates are prevalent in the area. Furbearers provide some economic importance to trappers and outfitters.

The study area encompasses six vegetation types; white spruce, black spruce, subalpine, alpine, wetland/riparian and post-fire regeneration. No rare plants were documented throughout the assessments.

Concentrations of several metals were high in the stream sediments, typical of undisturbed mineralized areas. Arsenic and zinc values specifically exceeded sediment quality guidelines, including the background and reference sites.

Benthic invertebrate populations were diverse, robust, with significant representation of pollution sensitive insect species at all of the sites sampled, with the exception of Cameron Creek. The community at Cameron Creek is likely impacted by the natural conditions of the water quality. The flow is slightly acidic and many metal parameters exceeded the recommended guidelines for the protection of freshwater aquatic life.

Fish populations appeared healthy and were typical of this region and habitat conditions. Eight fish species were documented in the various drainages within the study area; lake whitefish, round whitefish, slimy sculpin, northern pike, burbot, Chinook salmon, Dolly Varden and Arctic grayling. However, no fish were observed or captured at Cameron Creek, likely for the same reasons as described above.

The wetlands in the Project study area at McQuesten Lake, Clark Lakes, Scougale Lakes and the Beaver River are productive habitat for waterfowl, moose and fish (pike). The access road was initially envisaged to follow the existing Wind River Trail from Hansen Lakes Road to the Beaver River. However, engineering assessments judged this route to be unsuitable. The proposed alternate route skirting the south of the Davidson Range in the Keno Ladue River and Rankin Creek valleys will avoid the McQuesten and Clark Lakes area. The route will meet up with the existing Wind River Trail at the Scougale Creek crossing. It will fall within the white spruce forest well upslope from the wetlands of the Beaver River from the Beaver River crossing to the camp and airstrip.

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1.0 INTRODUCTION

The Tiger Gold Project is located in central Yukon approximately 55 km northeast of Keno City. The project area forms a small interest zone within the staked 185 km of potential strike length, wholly owned by ATAC Resources Ltd (Figure 1.1). Extensive exploration of the Rau Property from 2006 to 2010 focused along a 15 km portion of the Bouvette Formation, on a local ridge system bound by the Beaver and Rackla Rivers. The high grade gold mineralization, known as the Tiger Deposit, is currently 650 m long, 100 to 200 m wide, and up to 96 m thick. Test work conducted by ATAC suggests that the oxide portion of the deposit is potentially amenable to conventional cyanide extraction processes.

There are two potential winter-only land access routes to the Tiger Deposit; the existing Wind River Trail system, and a proposed route that skirts the Davidson Range from the Hanson Lakes Road along the Keno Ladue River / Rankin Creek valley to Clark Lakes where it meets the Wind River Trail. Engineering assessments carried out by EBA at the request of ATAC discouraged the use of the Wind River Trail route from Hanson Lakes to Clark Lakes as a winter road for the required truck traffic. This is due to sections with unfavourable grades, side-slope gradients, narrow trail widths, significant overflow conditions, glaciation, and extensive wetland depressions (EBA, 2013). A desktop exercise in 2008, followed by ground truthing in 2013, resulted in the alternate proposed route through the Rankin Creek valley (EBA, 2013). A portion of the Wind River Trail would be used from Clark Lakes to the Beaver River where an ice bridge would be built seasonally. The winter road would extend to the deposit, and an all-weather road would be built between the deposit and airstrip.

In preparation for an eventual YESAA submission, ATAC Resources Ltd. retained Laberge Environmental Services to conduct several baseline studies regarding the proposed access routes as well as to determine the baseline conditions in and around the Tiger Deposit. In 2010, Laberge completed biophysical assessments along the proposed route within the Keno Ladue River / Rankin Creek valley. Hydrology was the main focus regarding the potential stream crossings with seasonal assessments conducted to determine the hydrology regime throughout the year. Wildlife surveys, fisheries assessments and benthic invertebrate monitoring were also undertaken (Laberge, 2011).

Commencing in the spring of 2012 and carrying through to the winter of 2013, seasonal wildlife surveys were conducted over the complete project area. Vegetation and rare plants surveys were undertaken during the summer of 2013. Aquatic biota (fish and benthic invertebrates) and habitat conditions were also assessed at this time. Quarterly water quality programs have been conducted for several years by Gibson and Associates, supplemented by monthly sampling since 2012. The reporting on the water quality program has been submitted under separate cover.

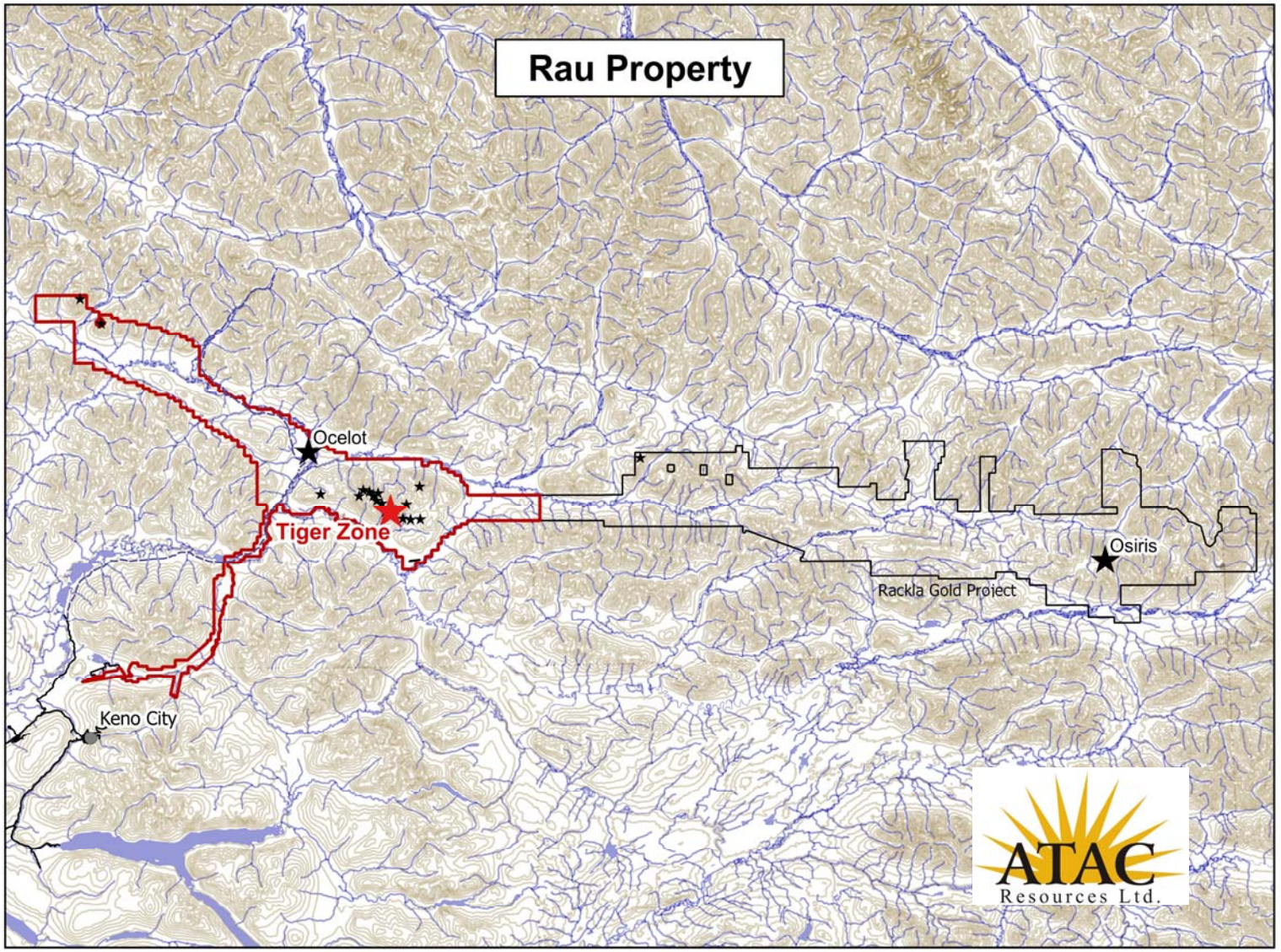


Figure 1.1 The Location of the Tiger Deposit on the Rau Gold Property

2.0 STUDY AREA

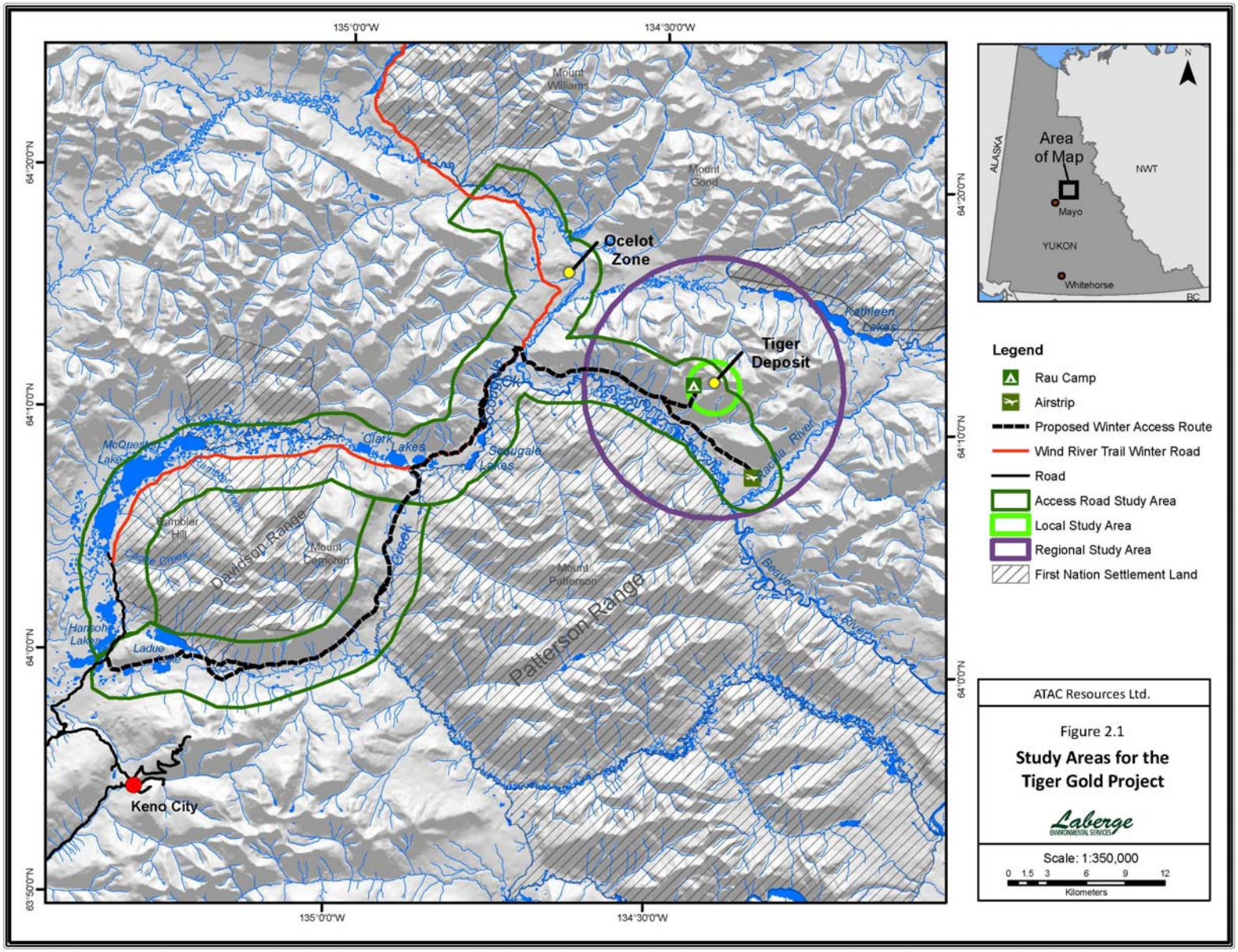
The Tiger Gold Project is located on the Rau Property, in central Yukon, 55 kilometers north of Keno City (Figure 2.1). The Tiger Deposit is situated at approximately 64^{o} 11.567' N 134^{o} 25.976' W, bounded by the Beaver and Rackla Rivers. The project lies within the Na-Cho Nyäk Dun First Nation's (NNDFN) traditional territory. There are settlement lands to the south and north of the Rau Property (Figure 2.1).

The study area for the baseline assessments covers the two potential route options and the Tiger Deposit area (Figure 2.1). This district falls within the northern section of the Yukon Plateau-North ecoregion northeast of the Tintina Trench and hosts considerable potential for metallic mineral deposits (Yukon Ecoregions Working Group, 2006). The glaciated valleys contain numerous wetlands. The project area lies within the Stewart River watershed in a northern boreal forest ecosystem with talus slopes at the higher elevations.

Within the study area, white spruce is the most common vegetation type on the lower slopes of the Tiger Deposit area and along much of the proposed access route alignment. Black spruce forest occurs in the southwestern portion of the exploration property and along the southern portion of the proposed route in the Keno Ladue valley. Wetlands occur along the Beaver River, Wind River Trail and in the Keno Ladue valley. Alpine and subalpine vegetation dominates much of the Tiger Deposit area. The area around the airstrip is in the early stages of regeneration following a fire in 1999. The proposed access route in the lower Rankin Creek valley transects a 1972 burn.

The general climate of the region consists of cold dry winters and warm moister summers. Mean annual temperatures are -5^{o}C in this ecoregion with strong seasonal variability. Elevation plays a key role with the valleys displaying colder winters and warmer summers than areas at higher elevations. Precipitation is relatively moderate with fairly low amounts from December through May. The wettest months tend to be July and August. An Onset Hobo weather station was installed on May 29th, 2011 at the airstrip and records wind speed, wind gusts, wind direction, solar radiation, relative humidity, temperature and rainfall. Gibson and Associates download data from the climate station regularly and this data is submitted under separate cover.

The study area has had very little anthropological ground disturbance. The Wind River Trail has, and continues to be used as a winter access route to the northern areas for trappers, outfitters and exploration. Although there is some evidence of old trails in the lower portion of the Hanson/Ladue/Clark proposed road route, it appears there is very limited utilization of this area. Other than the current exploration activities at the Tiger Deposit, there has been little if any previous disturbance to the unnamed mountain. Therefore, the baseline conditions reported in this report generally reflect reference status.


135°0'0"W
134°30'0"W
64°20'0"N
64°10'0"N
64°0'0"N
63°50'0"N
Mount Williams
Mount Good
Ocelot Zone
Tiger Deposit
Kathleen Lakes
Clark Lakes
Scougale Lakes
McQuesten Lake
Hammer Creek
Gambler Hill
Cache Creek
Davidson Range
Mount Cameron
Hansoh Lakes
Ladue
Ladue River
Mount Patterson
Patterson Range
Beaver River
Keno City
Area of Map
ALASKA
NWT
YUKON
Mayo
Whitehorse
BC
N
Legend
Rau Camp
Airstrip
Proposed Winter Access Route
Wind River Trail Winter Road
Road
Access Road Study Area
Local Study Area
Regional Study Area
First Nation Settlement Land
ATAC Resources Ltd.
Figure 2.1
Study Areas for the Tiger Gold Project
Laberge ENVIRONMENTAL SERVICES
Scale: 1:350,000
0 1.5 3 6 9 12
Kilometers

3.0 WILDLIFE

3.1 Review of Existing Literature

3.1.1 Key Wildlife Areas

Yukon Department of Environment, Habitat Programs Section, maintains an inventory on Wildlife Key Areas (WKA) throughout the Yukon, to ensure that there is enough good quality habitat to maintain wildlife populations (Yukon Environment, 2009). The majority of the study area lies on the lower section of topographical map sheet 106D. There are four WKA maps of this map sheet; i) woodland caribou, mountain goat and black and grizzly bears, ii) sheep, muskrat, beaver and mineral lick, iii) various ungulate and wolf and iv) waterfowl, raptors and grouse (http://www.environmentyukon.ca/maps/view/detail/2/27/313/). A review of these maps indicated there were no WKA for sheep, muskrat, beaver, mineral licks, barren ground caribou, elk, deer, bison, wolf, mountain goat, black bear, grizzly bear or grouse within our study area. Local knowledge reports there is important winter range habitat for woodland caribou throughout the Kathleen Lakes area. This area is also identified by local knowledge as an important winter range habitat for moose, as well the Beaver River north of the proposed river crossing. WKA summer nesting areas of various raptors (peregrine falcon, osprey and bald eagle) are located throughout the McQuesten Lakes area. A WKA for waterfowl covers the wetlands from Rambler Creek to Scougale Creek.

A very small portion of the study area is included on map sheet 105M and no WKAs are identified in or near the study area.

3.1.2 Species at Risk

The Committee on the status of endangered wildlife in Canada (COSEWIC) has identified several species at risk in the Yukon. Below is a listing of species that are or may be found in the Rau project study area.

Special concern:
- Woodland Caribou (Northern Mountain population, *Rangifer tarandus caribou*)
- Grizzly Bear (*Ursus arctos*)
- Wolverine (*Gulo gulo*)
- Collared Pika, (*Ochotona collaris)*
- Horned Grebe,(*Podiceps auritus)*
- Rusty Blackbird, (*Euphagus carolinus*)
- Peregrine Falcon, (*Falco peregrinus*)
- Dolly Varden, (*Salvelinus malma malma*)

Threatened:
- Common Nighthawk, (*Chordeiles minor*)
- Olive-sided Flycatcher, (*Contopus cooperi)*

3.1.3 Previous Studies

There have been some past studies that overlap with parts of the current study area. An intensive

three month field survey was conducted on the McQuesten wetlands in the summer of 1998 by NNDFN and the Yukon College (Sinnott and Mossop, 1998). These wetlands are productive and have high biodiversity. Twenty-four species of water birds were identified (2 loon, 2 grebe, 1 goose, 1 swan, 14 duck and 4 gull). Over half of these were comprised of Lesser Scaup, American wigeon and Ring-neck duck. There were about 1400 breeding ducks (652 dabbling ducks and 474 diving and sea ducks). Besides waterfowl, other species were documented as important components of the wetland community; moose, bears, wolves, beaver, muskrat, raptorial birds (Bald eagle, Osprey and Peregrine Falcon) and 77 songbird species. Northern pike and wood frogs were noted in most of the ponds that were assessed (Sinnott and Mossop, 1998).

Although the Yukon Government has conducted several moose surveys within the boundaries of the Mayo Moose Management Unit, there has been little coverage of the Project study area except for the Davidson Range and the Keno Ladue River valley. This area represents the far northern portion of early winter intensive stratification moose surveys conducted November 5th to 13th in 2006 and from November 2nd to 7th in 2011.

In the spring of 2012, Yukon Department of Environment conducted a grizzly bear denning survey which overlapped with a portion of the current study area. A report on this survey has not been completed, however YG did release some of the data for inclusion in this report.

In March of 2013, the Yukon Department of Environment conducted an intensive stratification moose survey of the Beaver, Rackla and Nadaleen river watersheds, total survey area of 6,069 km^2, which included the mountain housing the Tiger Deposit. Moose were concentrated in willow-rich habitats of river and major creek valleys, and the lower altitude regions of areas burned in the 1970s to 1990s (O'Donoghue *et al*, 2013). A few small groups of moose were observed within our study area in the Beaver and Scougale River valleys.

3.2 METHODS

With the exception of the ground based wolverine track survey and the Pika survey, the wildlife surveys were conducted by helicopter. During camp operations, the on-site helicopter was used. On the other occasions helicopters were based out of Mayo. The wildlife biologist, Grant Lortie, was navigator and initial observer from the front seat with up to two observers in the back. The majority of the flights were conducted under good to excellent visibility conditions. Survey times for each of the seasonal aerial surveys ranged from four to over five hours. All observations were marked with a GPS and downloaded to maps.

Wildlife Research Permits were obtained from Environment Yukon prior to each survey. The detailed results of each survey were submitted to the Manager of Enforcement and Compliance and the regional biologist following each survey.

3.3 RESULTS AND DISCUSSION

This section is presented by species. Applicable photographs are presented within each relevant appendix. All maps and figures are included in the appropriate appendices and some tables have been included with the text.

3.3.1 Moose (*Alces alces*)

Moose, the largest member of the deer family (approximately two meters tall and weighing over 500 kilograms), are a valued species within the study area. They are an important food source for First Nations and non-native hunters, provide enjoyable wildlife viewing opportunities as well as offer economic potential for big game outfitters.

Interviews conducted with the Na-Cho Nyäk Dun First Nation (NNDFN) in 1998 identified the McQuesten wetlands as an important region for moose (Sinnott and Mossop, 1998) and the 1999 community report from the Mayo Renewable Resource Council lists protection goals for these areas. Jimmy Johnny, a local elder, confirms that the McQuesten Lake wetlands area and up through the Clark/Scougale/Beaver River area remain very important moose harvest grounds for NND (Carolyn Uher, pers. comm., 2014).

Moose were the most conspicuous and abundant mammal observed. In general, their seasonal movements can be summarized as follows: calving season in the numerous wetlands throughout the area, post rut aggregations in the subalpine areas notably on the Patterson and Davidson ranges, and sporadic occupation of the willow dominated river and creek valleys in the winter. Thus the habitat types important for moose productivity within the study area are wetlands, willow dominated riparian zones and valleys, and willow dominated subalpine areas. (See section 4.0 for details on the vegetation and habitat types throughout the study area.) All of the moose observations documented throughout the study period have been mapped onto Figure 3.1, in Appendix A. Generally the grouping of two moose indicated a cow with a calf. Moose tracking that was observed during the winter surveys was documented but has not been included in Figure 3.1. The flight tracks of the surveys are displayed in Figure 3.2 (Appendix A). A summary of each survey, including the age classes and sex of the moose where applicable, has been provided in the table below.

TABLE 3-1 OBSERVED MOOSE THROUGHOUT THE STUDY AREA AND STUDY PERIOD

Date	Total Moose	Adult Female	Adult Male	Calf	Immature Male	Unclassified	Comments
March 4, 2010	18	10	7	1	--	--	An estimated further 15 - 20 moose based on tracking
June 11, 2010	21	10	--	8	1	2	Only potential calving wetlands were surveyed
Oct 26, 2010	75	37	25	8	5	--	
June 6&7, 2012	60	30	9	15	2	4	
Nov 13, 2012	156	79	42	17	18	--	
Feb 26, 2013	70	4	7	2	--	57	An estimated further 25 moose based on tracking
June 4, 2013	44	28	5	5	--	6	
Nov 3, 2013	102	60	29	9	4	--	An estimated further 13 moose based on tracking

YG's intensive moose survey conducted in March 2013 documented moose distribution throughout a large study area of which the Tiger Deposit mountain block formed a small portion (Figure 3.3). Within the portion that overlies our study area, small groups of moose were observed along the Beaver River to the south and west of the Tiger Deposit mountain block (Figure 3.4). Our February 2013 survey confirmed very similar sightings. YG counted a total of 389 moose within the 404 blocks surveyed (6069 km^2) and we observed a total of 70 moose within an approximate surveyed area of 500 km^2.

Early winter is the best time of year to estimate abundance of moose due to their concentration in high-altitude open habitats (O'Donoghue *et al*, 2012). In addition, moose can be classified at

this time as the bulls have not yet shed their antlers, allowing for ratios to be calculated (Table 3-2).

TABLE 3-2 EARLY WINTER MOOSE RATIOS

Date	Total Observed	Mature Male : Mature Female	Calf : Cow
October 26, 2010	75	67.6 : 100	21.6 : 100
November 13, 2012	156	53.2 : 100	21.5 : 100
November 3, 2013	103	47.5 : 100	15.0 : 100

The exact areas surveyed were not consistent for each of the above surveys, eliminating an option of direct comparisons, however the data does indicate estimates of abundance and ratios. In 2010, the alternate access route, the Davidson Range and Mount Patterson were surveyed. The Davidson Range and Mount Patterson were again surveyed in 2012 as well as the unnamed mountain range to the north of Clark Lakes and the mountain block where the Tiger Gold Project is located. In 2013 Mount Patterson was again surveyed and also the alternate route from Hanson Lakes to Scougale Creek and along the Beaver River to the airstrip.

In November 2006 and 2011, Yukon Environment conducted an early winter survey in the Mayo Moose Management Area (Ward *et al*, 2006 and O'Donoghue *et al*, 2012). The very northern region of their study area overlapped a section of our current study area; the Davidson Range and Keno Ladue River valley. Their methodology involved dividing the study area into 15 km^2 rectangular blocks, then surveying randomly selected blocks. Typically, for this time of year, subalpine willow flats and creek draws with abundant willows had good numbers of moose. Within the overlap area, a total of 71 moose were documented in 2006. For their complete study area they estimated 43 bulls for every 100 cows. In 2011, 32 moose were observed in the overlap area and an estimated 41 bulls for every 100 cows in the total study area.

These bull cow ratios are somewhat lower than the ratios we documented throughout the study period, however our study area generally encompassed areas of lower accessibility. The Yukon Fish and Wildlife Branch (1996) has suggested that a minimum level of 30 bulls per 100 cows is needed to ensure that most cows are bred. The above discussed bull cow ratios are well above this level indicating a healthy population, however YG has indicated that the harvest of moose in the Mayo area is likely near the upper limit of the sustainable rate.

There was a significant decline in the calf to cow ratio in 2013. During YG's November 2006 survey the estimated calf cow ratio was 36 calves for 100 adult cows. Their November 2011 survey documented 40 calves for every 100 cows. The calf-cow ratios estimated by the Laberge surveys suggest low calf survival, however this data could be biased as the objective of the surveys was to determine moose distribution in the study area. Survival of moose calves does naturally vary among years, but ground-based monitoring and late-winter recruitment surveys suggest that the long-term average in the Mayo area has been adequate for sustaining moose populations (O'Donoghue *et al*, 2012).

There has been reasonable coverage of the Tiger Gold Project study area and Table 3-3 summarizes all the know moose surveys conducted throughout this region.

TABLE 3- 3 ALL KNOWN MOOSE SURVEYS CONDUCTED IN TIGER GOLD PROJECT STUDY AREA			
Survey Area Covering the Proposed Winter Access Road			
Year	**Type of Survey**	**Dates**	**Surveyor**
2006	Intensive stratification	November	YG
2010	Seasonal	March, June, October	Laberge
2011	Intensive stratification	November	YG
2012	Seasonal	June, November	Laberge
2013	Seasonal	February, June, Nov	Laberge
Survey Area Covering the Tiger Deposit Mountain Block			
Year	**Type of Survey**	**Dates**	**Surveyor**
2012	Seasonal	June, November	Laberge
2013	Seasonal	February, June, Nov	Laberge
2013	Intensive stratification	March	YG

3.3.1.1 Moose Harvest

There are three game management areas (GMA) that overlap with the study area, 263, 288 and 405 (Figure 3.5). The last 10 years of moose harvest data (2004 to 2013) have been summarized below in Table 3-4. The numbers represent resident, special guided and non-resident kills. They do not include First Nation's harvest, road kills or poached animals. A total of 167 bull moose have been removed from the three GMAs over this time period with an annual harvest average of 17 animals.

TABLE 3-4 MOOSE HARVEST IN THE RAU STUDY AREA				
Year	**GMA 263**	**GMA 288**	**GMA 405**	**Grand Total**
2004	7	0	11	18
2005	9	6	8	23
2006	4	7	6	17
2007	0	7	6	13
2008	0	6	11	17
2009	2	4	9	15
2010	3	1	10	14
2011	3	3	7	13
2012	1	5	13	19
2013	2	6	10	18
Grand Total	31	45	91	167

3.3.2 Woodland Caribou (*Rangifer tarandus caribou*)

Woodland caribou are much smaller than moose and are about one metre high weighing approximately 150 kilograms, but are larger than barren-ground caribou. Caribou are unique members of the deer family in that both sexes produce antlers. Woodland Caribou roam in small herds moving from the boreal forest in winter, up into the alpine tundra in summer.

The Tiger Gold Project study area lies within an area devoid of any caribou herds (Figure 3.6 in Appendix A). The Bonnet Plume woodland caribou herd lies far to the north and the Hart River and Clear Creek woodland caribou herds are located far to the west.

No caribou were observed in the Tiger Gold Project study area, nor was any sign documented during the aerial surveys conducted by Laberge over the study period. During operation of the Rau camp in late May 2012, the helicopter pilot observed three caribou on Elliot Ridge of Castle Mountain during crew drop offs. This site is located approximately 55 km to the northwest of Rau camp, well outside of the study area.

During their March 2013 survey, YG documented one group of six caribou in the upper reaches of Rackla River and 20 sites with caribou tracks which are displayed in Figure 3.7 in Appendix A. This area is well south of the mapped winter range of the adjacent Bonnet Plume caribou herd and it is uncertain whether these animals are part of that herd (O'Donoghue *et al*, 2013). All of these observations are considerably north of the Tiger Gold Project study area.

According to elders with the Na-Cho Nyäk Dun First Nation, caribou existed in the area and were regularly harvested in the past (Sinnott and Mossop, 1998). Apparently caribou would cross the McQuesten valley and utilize the surrounding low mountains. Mayo Elder Helen Buyck recalls that as a child she saw thousands of caribou gathered at the mouth of the Mayo River crossing on the ice of the Stewart River in the 1930s (Mayo Historical Society, 1999). Currently however, caribou are rare in the Mayo area.

Barren-ground caribou (*Rangifer tarandus grantii*) of the Fortymile herd used to migrate into the Mayo region each winter from its Alaska calving grounds until the mid-1940s (Bleiler *et al*, 2006). There are records and stories of large numbers of caribou during many winters and they formed an important food source for the people. These are likely the caribou referred to above. This herd was decimated in the 1940s and no longer migrates into the area (Bleiler *et al*, 2006).

3.3.3 Dall's Sheep (*Ovis dalli dalli*)

Dall's Sheep, or thinhorn sheep, are widely distributed throughout most mountainous areas of the Yukon. They spend the summer grazing in alpine meadows on mountain peaks and move to their winter range a few kilometers away on leeward south-facing slopes.

There are no documented Wildlife Key Areas for sheep in the Tiger Gold Project study area and no sheep were observed during any of the wildlife surveys. During their March 2013 moose survey, YG documented two sheep sightings; a young ram near Carpenter Creek, well to the northwest of the Rau study area, and a sheep just south of Mount Patterson, which is somewhat south of the Rau study area. There is a small population of approximately 70 sheep living in the McArthur Range which is around 100 km south of the Rau project study area (Bleiler *et al*, 2006).

Sheep were present on Keno Hill until at least 1918. In fact Keno Hill was called Sheep Mountain until 1919. It appears that human activity eliminated this sheep population in the early 1900s (Bleiler *et al*, 2006).

3.3.4 Bear

There are two species of bear that reside in the Tiger Gold Project study area; Grizzly (*Ursus arctos*) and Black (*Ursus americanus*).

Grizzly bears tend to be more common in open tundra and subalpine areas but also range throughout the boreal forest. They generally spend October through to April in a den they have prepared, emerging in the spring to search for food. They are omnivores and their diet consists of plants including berries and roots, small mammals (marmots, ground squirrels), fish, moose and caribou. Grizzly bears have one of the lowest reproduction rates of North American mammals. They usually don't breed until they are eight years old and after a successful litter, will not breed again for three or four years. This, as well as the fact they are sensitive to human disturbance, has earned them the conservation status of vulnerable.

There are no identified Wildlife Key Areas for grizzly or black bears within the Project study area. Only one grizzly bear was observed over the study period; an adult who appeared to be hunting moose calves in the Beaver River valley on June 6th, 2012. Grizzly bear tracks were documented at the outfitters camp on Kathleen Lakes on June 4th, 2013. Old flooded bear tracks were also noted on a small frozen pond in the Keno Ladue River valley on November 3rd, 2013. It was impossible to identify whether these were grizzly or black bear tracks.

In the spring of 2012, YG Wildlife, Whitehorse, conducted a grizzly bear den survey in the Rackla study area (the same study boundaries as the 2013 YG moose survey). A report is currently unavailable but the locations of dens within the Rackla study area have been identified (unpublished YG Environment data). Three of these fall within or close to the Tiger Gold Project study area and are displayed in Figure 3.8 in Appendix A.

Black bears are common in forested areas of the Yukon. They are smaller than grizzly bears and also are omnivores. Three black bears were sighted during the surveys; a boar-sow pair on the eastern slope of the Davidson Range and an individual black bear observed near the trail north of Clark Lakes in June 2012. Black bears were not observed on any other survey. All bear documentation is presented in Table 3-5 below and is displayed on Figure 3.8 in Appendix A.

Table 3-5 Bear Documentation in the Rau Study Area

Date	Location	Species	Number	Details
June 2010	Eastern slope of Mt. Cameron	Black bear	2	A large orange coloured boar and a black sow
June 2010	Near trail north of Clark Lakes	Black bear	1	One adult black bear
April/May 2012	Tiger Zone Mountain block	Grizzly	2	Dens
April/May 2012	Mountain slope near Kathleen Lakes	Grizzly	1	Den
June 2012	Beaver River valley	Grizzly	1	Appears to be hunting calves
June 2013	Kathleen Lakes	Grizzly	1	Tracks at Outfitters camp on Kathleen Lakes
Nov 2013	Pond in Keno Ladue R valley	Bear	1	Old flooded track on pond ice

3.3.4.1 Bear Harvest

As mentioned in Section 3.3.1.1, there are three game management areas (GMA) that overlap with the study area, 263, 288 and 405 (Figure 3.5). Both black and grizzly bears have been harvested from these GMAs. Data for the past 10 years have been summarized in Table 3-6. The numbers represent resident, special guided and non-resident kills. They do not include First

Nation's harvest, road kills or poached animals. Twice as many grizzly bears as black bears were successfully hunted within these GMAs with the majority harvested in GMA 288. A harvest of five black bears occurred over this time period with GMA 405 producing the greatest return with four animals.

TABLE 3-6 BEAR HARVEST IN THE RAU STUDY AREA

Year	GMA 263		GMA 288		GMA 405		Grand Total	
	Black	Grizzly	Black	Grizzly	Black	Grizzly	Black	Grizzly
2004	0	0	0	0	0	0	0	0
2005	0	0	0	1	0	1	0	2
2006	0	0	0	0	0	0	0	0
2007	0	0	0	1	1	1	1	2
2008	0	0	0	2	0	0	0	2
2009	0	0	0	1	0	1	0	2
2010	1	0	0	0	2	0	3	0
2011	0	0	0	1	0	0	0	1
2012	0	0	0	0	0	0	0	0
2013	0	0	0	1	1	0	1	1
Grand Total	1	0	0	7	4	3	5	10

3.3.5 Wolverine (G*ulo gulo*)

Wolverines (*Gulo gulo*) are common in the Yukon, although sightings are rare, and occur in all habitats from forested valleys to alpine and arctic tundra. They are most abundant in mountainous areas that support a variety of habitats and prey. Due to its relatively small size and its solitary habit, the wolverine obtains most of its food through scavenging. Home ranges of wolverine vary from around 100 km^2 to over 700 km^2 depending on the sex and food availability (Yukon Renewable Resources).

A late winter wolverine study was completed on the Wind River Trail in 2013. Keith Hepner and Sonia Stage, owners of McQuesten Lake Enterprises and Trapline #44 concession holders, were contracted by LES to conduct a wolverine track count from February through to late April of 2013. Both are long term Yukon residents and trapline holders with extensive experience working in isolated environments and have considerable knowledge of animal tracks. After conferring with Mark O'Donoghue, the regional biologist in Mayo, appropriate methodology was established.

Six trips consisting of two to three days each were completed along the Wind River Trail from the beginning of the trail to the Blend Claims, a distance of approximately 75 km. Any encountered tracks were marked with flagging with dates observed so that old tracks were not documented during a new survey. Track locations were recorded with a GPS, and temperature and elevation were noted. Wolverine tracks have sometimes been mistaken for wolf or lynx tracks because of the similarity in size, however wolf and lynx have only four toes whereas the wolverine has five. Also a small drag mark is usually evident between the track which is made by its tail.

The tracking results are provided in Table 3-7 and on Figure 3.9, both in Appendix A. Surveys were also conducted April 10 to 11 and April 21 to 22, 2013. Snow conditions were firm and no new tracks were visible on April 10 and 11. By April 21 and 22 significant snow melting had occurred resulting in a heavy crust and it was not possible to discern fresh tracks.

During the study period, four wolverine were trapped; two near Braine Pass, one by the Beaver River and another at Cache Creek. The contractors, as well as trappers in the area, commented on the fact that the number of wolverine tracks observed over the winter seemed very high.

Incidental observations of wolverine tracks were rare during the other wildlife surveys. They were noted at the Cameron Creek sampling site in October 2010, and in February 2013 on the eastern slope of Cameron Mountain near the Rankin valley and at a high elevation on the Tiger Deposit mountain block, north east of the local study area.

3.3.6 Collared Pika (*Ochotona collaris*)

The collared pika (*Ochotona collaris*) is endemic to the Yukon and Alaska where they are found in high alpine tundra meadows living amongst the talus boulder fields and surrounding meadows. Living at elevation, 1200 to 1600 m, in these latitudes means that they are exposed to a strong seasonal environment with short, productive summers followed by long harsh winters with limited food availability (O'Donovan, 2013). Pika do not hibernate but gather food during the short summer to provide them sustenance throughout the winter by gathering grasses and creating 'haypiles' near their dens.

The proposed mine area at the Tiger Deposit lies within talus and alpine habitat, and in light of the COSEWIC designation, a pika survey was conducted in early July 2013. Kieran O'Donovan with two assistants accessed the site by helicopter and conducted the survey on foot on July 6th and 7th. After potential pika habitat was identified, the three surveyors walked in a line abreast formation separated by an approximate distance of 20m, each listening and watching for pika until the entire habitat was covered. All auditory and visual observations of pika were recorded with a handheld GPS, including any sightings of hay piles.

Three zones of pika habitat were identified, one zone of potential pika habitat and three zones of non-suitable pika habitat within the study area (Table 3-8) The possible infrastructure sites (A, B and C) are located below shrub-line and were not surveyed. Habitats below shrub-line are usually inhospitable due to increased predation risk as well as the lack of preferred food items and were not assessed.

TABLE 3- 8 SURVEYED AREAS FOR PIKA AT THE TIGER DEPOSIT

Area	Pika Habitat	Surveyed
Pit	Potential	Yes
Site A	No	No
Site B	No	No
Site C	No	No
East Talus	Yes	Yes
Mid Talus	Yes	Yes
Lower Talus	Yes	Yes

The proposed pit location represents potential pika habitat because it has rocky slopes above shrub-line with access to alpine meadows, however the rocks here are too small to provide adequate cover. Boulder diameter should be 30 to 100 cm to provide appropriate sized interstices for cover (Franken, 2002). One pika was found on the very upper periphery of the pit

zone above the actual location of the proposed pit, and likely will not be directly affected by activities.

A minimum of 21 pika territories were observed within the Tiger Deposit area. The best areas of pika habitat were all situated between the proposed development areas and likely will not be directly affected by potential future mining activities. The best area of pika habitat, complete with abundant boulders close to alpine meadows, was identified in East Talus (Figure 3.10) with 12 pika territories documented (Table 3-9). Five pika territories were identified on the backside of the ridge of the pit, in Mid Talus. The Lower Talus patch near the proposed infrastructure site C had a minimum of three pika territories. Detailed data of the individual locations are provided in Appendix A, Table 3-10.

TABLE 3-9 PIKA OBSERVATIONS IN THE TIGER DEPOSIT, JULY 2014

Talus Patch	Haypiles	Pika	Occupied Territories
East Talus	4	12	12
Mid Talus	2	5	5
Pit Talus	0	2	2
Lower Talus	2	3	3
Total:	8	21	21

Collared pika are individually territorial (Franken 2002, Morrison 2007) and reporting on the number of pika territories is equivalent to reporting on the number of pika. For this report, pika territories are reported rather the number of individual pikas since pika survival is low year to year (Morrison 2007) but the same territories are typically reoccupied each year by newly arrived individuals (O'Donovan, unpublished data).

Although the pika habitat does not directly overlap with the areas of potential future mining activity in the Tiger Deposit, it could exist in a zone of influence associated with development activities. Future surveys will be required to determine if there are any influences on the pika population.

3.3.7 Raptors

For the purposes of this study, raptors refer to Bald Eagle (*Haliaeetus leucocephalus*), Golden Eagle (*Aquila chrysaetos*), Gyrfalcon (*Falco rusticolus*), Peregrine Falcon (*Falco peregrinus*) and Osprey (*Pandion haliaetus*).

On June 29th, 2013, Dave Mossop, bird biologist with the Yukon Research Centre and D. Anderson of the World Centre Birds of Prey, conducted an alpine raptor survey on the Tiger Deposit mountain block.

The helicopter survey was flown at low altitude to examine cliff faces for evidence of use by larger birds of prey, notably Gyrfalcon, Peregrine Falcon and Golden Eagle. The Tiger Deposit mountain block was contoured at approximately the 1200 m level, under excellent conditions. Known sites in the McQuesten Lake and Clark valleys were checked on route to the Tiger Deposit. Specifically these were two Bald Eagles sites, one Osprey, one Golden Eagle and one Peregrine Falcon site. None of these sites were producing young.

Only three cliff faces in the Tiger Deposit mountain block survey area were occupied, with at least two old nests at each cliff. They were stick nests of Golden Eagles but none showed any sign of occupancy in the last few years. No adult birds of prey were observed.

There was recent sign of occupancy in the Scougale Lakes area where three old Golden Eagle stick nests were found on the low north-west facing cliff west of the northern lake. The recent sign of guano suggest that a smaller bird was using the nest such as a Peregrine Falcon or a Gyrfalcon. No adults were observed. No new tree-nests were noted along any of the lower river valleys nor were there any sightings of Osprey or Bald Eagles in the wetlands surveyed.

The surveyed areas were found to be empty of raptors. In is unknown whether this was a result of a poor breeding year, although none of the sites in the upland areas showed any recent sign of occupancy within the last several years.

Incidental observations were documented during the other aerial wildlife surveys. Notable of these were two occupied Bald Eagle nests, each with young, during the June 2012 survey. All observations are summarized in Table 3-11 and displayed on Figure 3.11 in Appendix A.

TABLE 3-11 RAPTORS AND NEST OBSERVATIONS IN THE RAU PROJECT STUDY AREA

Waypoint #	Species	Comments	Date
1	Bald Eagle	Bald eagle pair with young on nest	June 6 & 7, 2012
2	Bald Eagle	Bald eagle pair with young on nest	June 6 & 7, 2012
3	Osprey	Osprey in flight	June 6 & 7, 2012
4	Golden Eagle	flying close to ground	June 4, 2013
5	Golden Eagle	Nest only - unoccupied	June 29, 2013
6	Golden Eagle	Nest only - unoccupied	June 29, 2013
7	Golden Eagle	Nest only - unoccupied	June 29, 2013
8	Falcon	Nest, possibly occupied by Gyfalcon or Peregrin Falcon	June 29, 2013
9	Falcon	Nest, possibly occupied by Gyfalcon or Peregrin Falcon	June 29, 2013
10	Falcon	Nest, possibly occupied by Gyfalcon or Peregrin Falcon	June 29, 2013
11	Bald Eagle	1 bald eagle in flight	Nov 3, 2013
12	Bald Eagle	A pair of bald eagles	Nov 3, 2013

3.3.8 Waterfowl

No intensive waterfowl studies were conducted within the study area, however opportunistic observations were made during the study period. The Beaver and lower Rackla River wetlands were assessed during the June 29th, 2013, alpine raptor survey for breeding waterfowl pairs, with two low passes. Several pairs of Trumpeter Swans were observed on isolated breeding territories but none were producing young. Four pairs were noted in the Clark Lakes area and three pairs in the Beaver and Rackla River valleys. A small group of four adult non-breeders was also observed in the Rackla River. This density of resident swans indicates a relatively rich wetland and is probably at least as productive as the nearby McQuesten wetland (Sinnott and Mossop, 1998).

Incidental observations were documented during the other aerial wildlife surveys, although no attempt was made to note all waterfowl sightings. Trumpeter Swans were frequently documented, especially if it appeared they were nesting. Of interest was the observation of a pair of Trumpeter Swans with five cygnets on Clark Lake during the November 3rd, 2013 aerial survey. It appeared

that the adults were reluctant to leave their offspring who likely were not mature enough to migrate. It is suspected that eventually the adults would abandon the cygnets, who would not survive the winter (D. Mossop, personal communication).

All observations are summarized below in Table 3-12 and displayed on Figure 3.12 in Appendix A.

TABLE 3-12 WATERFOWL OBSERVATIONS, RAU PROJECT AREA

Waypoint #	Species	No.	Comment	Date
1	Diving ducks	~100	unidentified diving ducks	June 6 & 7, 2012
2	Trumpeter Swan	1	One individual	June 6 & 7, 2012
3	Trumpeter Swan	2	Pair	June 6 & 7, 2012
4	Trumpeter Swan	2	Pair – nest on small island	June 6 & 7, 2012
5	Trumpeter Swan	2	Pair	June 6 & 7, 2012
6	Canada Goose	1	One individual	June 6 & 7, 2012
7	Trumpeter Swan	2	Pair	June 6 & 7, 2012
8	Trumpeter Swan	2	Pair – nest site	June 6 & 7, 2012
9	Trumpeter Swan	2	Pair	June 6 & 7, 2012
10	Trumpeter Swan	2	Pair – 2 nest platforms	June 6 & 7, 2012
11	Trumpeter Swan	2	Pair	June 6 & 7, 2012
12	Trumpeter Swan	2	Pair – nest on island	June 6 & 7, 2012
13	Trumpeter Swan	2	Pair	June 6 & 7, 2012
14	Trumpter swan	2	1 pair swimming together	June 4, 2013
15	Trumpter swan	2	1 pair in wetland adjacent to waypoint	June 4, 2013
16	Trumpter swan	2	1 pair in pond	June 4, 2013
17	Trumpter swan	2	1 pair	June 4, 2013
18	Trumpter swan	2	1 pair in pond behind waypoint	June 4, 2013
19	Trumpter swan	4	non breeding group	June 29, 2013
20	Trumpter swan	2	pair	June 29, 2013
21	Trumpter swan	2	pair	June 29, 2013
22	Trumpter swan	2	pair	June 29, 2013
23	Trumpter swan	2	pair	June 29, 2013
24	Trumpter swan	2	pair	June 29, 2013
25	Trumpter swan	2	pair	June 29, 2013
26	Trumpter swan	2	pair	June 29, 2013
27	Ducks	2	unidentified	Nov 3, 2013
28	Trumpeter swan	7	A pair of trumpter swans with 5 cygnets	Nov 3, 2013
29	Mallard ducks	~ 2 dozen		Nov 3, 2013

3.3.9 Amphibians

The only amphibian species found in the region is the wood frog (*Rana sylvatica*). Due to the abundance of wetlands throughout the study area, wood frogs are common. They were noted in 43% of the ponds assessed throughout the McQuesten wetlands in 1998 (Sinnott and Mossop, 1998). Breeding and rearing takes place in the wetlands, but during the summer most adult wood frogs feed on a variety of insects and other invertebrates away from the ponds. Wood frogs were observed during the 2013 vegetation surveys and were noted at plots RV-8, RV-12, RV-13, RV-18, RV-19, RV-26, RV-28 (see Photo #5 in Appendix A), and at the water quality site Keno Ladue, KL, on August 10, 2010.

3.3.10 Incidental Wildlife

Wolves, coyotes, foxes, marten, mink, lynx, wolverine, river otter, beaver and muskrat are to varying degrees, economically important to the registered trapline concession holders, and all species are indigenous to the area (Bleiler *et al*, 2006). There were occasional sightings and sign of furbearers during the various surveys. Wolf tracks were noted on some of the winter surveys. An old kill site was documented near Clark Lakes in March 2010. Beaver and beaver sign were observed in the wetland areas. Tracks of river otter were noted on a couple of occasions near open water.

Four registered trapping concessions overlap with the Tiger Gold Project study area; numbers 44, 45, 82 and 83. Individual trapline harvest data is privileged information and is not available for public review.

4.0 VEGETATION ASSESSMENTS

4.1 BACKGROUND INFORMATION

Vegetation data was collected at the Tiger Deposit of ATAC's Rau mineral exploration property and along the alignment of the proposed winter access route during the summer of 2013.

The objective of this survey was to characterize the major vegetation types occurring on the property and along the proposed access route, inventory the vascular plant species in each vegetation type and to note any rare plant species that may occur.

No previous vegetation assessments or mapping could be located in the available literature.

4.2 METHODS

In 2013 Laberge completed vegetation surveys by means of first isolating habitat zones within the study area, then observing them on the ground in a ‘hands on’ approach. Many specimens were collected for further examination and identification.

4.2.1 Survey Preparations

Prior to the summer field surveys the following preparation was required:

4.2.1.1 Determining the Potential for Rare Plants

Rare plant species that may potentially occur in the study area was derived from the rare species data base maintained by the Yukon Conservation Data Centre and are presented in Table 4-1 below.

TABLE 4-1 RARE VASCULAR PLANT SPECIES POTENTIALLY OCCURRING IN THE BEAVER/RACKLA/KENO LADUE RIVERS REGION

Scientific Name	Common Name	Habitat Type
Botrychium alaskense	Alaska Moonwort	gravel
Polystichum lonchitis	Northern Hollyfern	rocky slopes

TABLE 4-1 RARE VASCULAR PLANT SPECIES POTENTIALLY OCCURRING IN THE BEAVER/RACKLA/KENO LADUE RIVERS REGION		
Potamogeton subsibiricus	Yenisei River Pondweed	shallow water
Potamogeton strictifolius	Straight-leaf Pondweed	shallow water
Koeleria asiatica	Oriental Junegrass	tundra, shale screes
Carex laxa	Weak Sedge	tundra bogs, meadows
Cypripedium guttatum	Spotted Lady's-slipper	open woodlands
Cypripedium parviflorum	Small Yellow Lady's-slipper	moist woodlands
Claytonia scammaniana	Scamman's Springbeauty	alpine tundra
Minuartia yukonensis	Yukon Stitchwort	alpine meadows, scree slopes
Silene uralensis	Ogilvie Mountains Nodding Campion	calcareous soils
Podistera yukonensis	Yukon Woodroot	talus slopes
Primula eximia	Arctic Primrose	wet meadows/stream banks
Armeria maritima	Arctic Thrift	wet tundra
Eritrichium splendens	Showy Forget-Me-Not	rocky alpine slopes
Senecio sheldonensis	Mount Sheldon Groundsel	subalpine meadows

4.2.1.2 Air Photo Interpretation

1:20,000 scale air photos provided by ATAC (flight line G1007028 - flown on July 9, 2010) were used for the preliminary delineation of the major vegetation types occurring on the exploration property and the northern portion of the proposed access route. Additional 1:20,000 scale air photos (flight lines A28300 and A28301 flown on September 8, 1996) were acquired from the Yukon Government's Energy, Mines and Resources Library for examining the vegetation types occurring along the southern portion of the route.

From stereographic pairs of these air photos, vegetation polygons were hand-drawn on 1:50,000 scale topographic maps. These topographic maps, along with the air photos, were used during the 2013 ground-truthing surveys.

4.2.2 Field Surveys

Field surveys were carried out at the Tiger Deposit of ATAC's Rau mineral exploration property and along the alignment of the proposed access road during the period July 28 to August 1, 2013. The field surveys consisted of the inventory of vascular plant species at vegetation monitoring sites. Sites were selected where the vegetation appeared homogeneous and representative of each of the major vegetation types along the route as determined from the air photo interpretation. Helicopter accessibility was also a factor in site selection.

Vegetation was monitored at 28 sites (Table 4-2). These vegetation monitoring sites are shown on the vegetation maps in Appendix B in Figures 4.1 and 4.2.

At each vegetation monitoring site, all vascular plant species observed were recorded. If species were not readily identifiable in the field, specimens were collected for later identification. Many of the collected specimens were able to be identified back at the field camp; others were pressed and dried for later identification. Although non-vascular plant species were not the focus of the 2013 field surveys, notes on their observations were made. Observations on the

dominant tree, shrub, forb and graminoid species were also made. Photographs were taken at each site and are presented in Appendix B.

TABLE 4-2 LOCATION AND TYPE OF VEGETATION SITES

SITE #	EASTING	NORTHING	VEGETATION TYPE
RV1	527110	7118651	White Spruce Vegetation Type
RV2	528476	7119780	Alpine Vegetation Type
RV3	528252	7119202	Subalpine Vegetation Type
RV4	528033	7121511	Subalpine Vegetation Type
RV5	526536	7120880	Alpine Vegetation Type
RV6	527710	7122278	White Spruce Vegetation Type
RV7	532011	7111945	Post-fire Regeneration Burn Vegetation Type
RV8	534552	7119270	Wetland/Riparian Vegetation Type
RV9	534015	7117047	Alpine Vegetation Type
RV10	524464	7121369	Alpine Vegetation Type
RV11	522757	7123030	White Spruce Vegetation Type
RV12	529104	7112275	Wetland/Riparian Vegetation Type
RV13	529164	7113019	Wetland/Riparian Vegetation Type
RV14	529500	7113037	Black Spruce Vegetation Type
RV15	529811	7113414	Black Spruce Vegetation Type
RV16	514124	7120881	Wetland/Riparian Vegetation Type
RV17	512939	7120264	White Spruce Vegetation Type
RV18	511847	7119163	Wetland/Riparian Vegetation Type
RV19	505865	7111801	Wetland/Riparian Vegetation Type
RV20	504698	7106101	Post-fire Regeneration Burn Vegetation Type
RV21	504046	7101014	Post-fire Regeneration Burn Vegetation Type
RV22	504402	7101118	Wetland/Riparian Vegetation Type
RV23	487909	7095702	Black Spruce Vegetation Type
RV24	490905	7096195	Wetland/Riparian Vegetation Type
RV25	497281	7096351	Black Spruce Vegetation Type
RV26	525598	7115995	Wetland/Riparian Vegetation Type
RV27	488535	7096918	Black Spruce Vegetation Type
RV28	524617	7117563	White Spruce Vegetation Type

NAD 27, Canada UTMs

4.3 RESULTS AND DISCUSSION

The following major vegetation types were observed at the Tiger Deposit of ATAC's Rau mineral exploration property and along the proposed winter access route alignment. A map delineating the vegetation types is shown in Figures 4.1 and 4.2 in Appendix B, and a list of all vascular plant species observed at each vegetation monitoring site is also available in Appendix B.

4.3.1 White Spruce Vegetation Type

White Spruce is the most prevalent vegetation type at lower elevations on the mineral exploration property and along the northern portion of the proposed route alignment. It covers most of the access route from the Scougale Creek crossing to the Tiger Deposit. It occurs on

level and southerly-facing slopes as well some of the northerly-facing slopes to the north of the property. White spruce (*Picea glauca*) is the dominant tree species. In some lowland areas white spruce forms a fairly dense closed forest, while on the lower slopes the forest is more open with mature white spruce up to 20 m tall. However, this timber is not considered merchantable due to the remote location and challenges in bringing harvested timber to market. On higher elevation slopes, subalpine fir (*Abies lasiocarpa*) occurs in this vegetation type. Black spruce (*Picea mariana*) may also be found. Other tree species may include Alaskan birch (*Betula neoalaskana*), trembling aspen (*Populus tremuloides*) and balsam poplar (*Populus balsamifera*).

Tall shrubs include mountain alder (*Alnus crispa*) and grey-leaf willow (*Salix glauca*). Low shrubs include dwarf birch (*Betula glandulosa*), shrubby cinquefoil (*Potentilla fruticosa*), prickly rose (*Rosa acicularis*), soapberry (*Shepherdia canadensis*) and Labrador tea (*Ledum groenlandicum*). The ground cover is predominantly lingonberry (*Vaccinium vitis-idaea*), crowberry (*Empetrum nigrum*), bog blueberry (*Vaccinium uliginosum*) and bearberry (*Arctostaphylos rubra*) along with meadow horsetail (*Equisetum pratense*), woodland horsetail (*Equisetum sylvaticum*) and grasses including arctic bluegrass (*Poa arctica*) and northern rough fescue (*Festuca altaica*). A number of forb species also occur (see Appendix B).

4.3.2 Black Spruce Vegetation Type

The Black Spruce vegetation type occurs at the southwestern portion of the mineral exploration property and along the southern portion of the proposed route alignment through the Keno-Ladue valley. It occurs on level to near-level lowlands. This vegetation type is a mosaic of black spruce dominated forests ranging from fairly dense closed stands to nearly treeless peat bogs. Black spruce (*Picea mariana*) is the dominant tree species. White spruce (*Picea glauca*), Alaska birch (*Betula neoalaskana*) and water birch (*Betula occidentalis*) may also occur in this vegetation type.

Tall shrubs include mountain alder (*Alnus crispa*) and grey-leaf willow (*Salix glauca*). Low shrubs include dwarf birch (*Betula glandulosa*), shrubby cinquefoil (*Potentilla fruticosa*), Labrador tea (*Ledum groenlandicum*) and high-bush cranberry (*Viburnum edule*). The ground cover is lingonberry (*Vaccinium vitis-idaea*), crowberry (*Empetrum nigrum*), bog blueberry (*Vaccinium uliginosum*), cloudberry (*Rubus chamaemorus*) and bearberry (*Arctostaphylos rubra*) along with common horsetail (*Equisetum arvense*), sheathed cottongrass (*Eriophorum vaginatum*) and a number of forb species (see Appendix B).

4.3.3 Subalpine Vegetation Type

The Subalpine vegetation type occurs at upper elevations at the Tiger Deposit and surrounding mountains. In this area the subalpine vegetation type occurs on steep upland slopes. Subalpine fir (*Abies lasiocarpa*) is the dominant tree species. Stunted white spruce (*Picea glauca*) occurs occasionally.

Tall shrubs include grey-leaf willow (*Salix glauca*), felt-leaf willow (*Salix alaxensis*) and diamond-leaf willow (*Salix pulchra*). Low shrubs include dwarf birch (*Betula glandulosa*) and common juniper (*Juniperus communis*). The ground cover is bearberry (*Arctostaphylos rubra*), mountain heather (*Cassiope tetragona*), twinflower (*Linnaea borealis*), crowberry (*Empetrum nigrum*), bog

blueberry (*Vaccinium uliginosum*), lingonberry (*Vaccinium vitis-idaea*) and net-veined willow (*Salix reticulata*) along with meadow horsetail (*Equisetum pratense*) and grasses such as northern rough fescue (*Festuca altaica*) and polargrass (*Arctagrostis latifolia*). A large number of forb species also occur (see Appendix B).

4.3.4 Alpine Vegetation Type

The Alpine vegetation type occurs only at the highest elevations of the Tiger Deposit and surrounding mountains. Vegetation ranges from meadows with a high diversity of forbs and graminoids to scree slopes almost devoid of vegetation. Stunted white spruce (*Picea glauca*) and subalpine fir (*Abies lasiocarpa*) occur occasionally.

Alpine meadows in this vegetation type display the highest diversity of dwarf shrubs, forbs and graminoids in the study area (see vegetation monitoring sites RV2 and RV-10 in Appendix B).

4.3.5 Wetland/Riparian Vegetation Type

The Wetland/Riparian vegetation type occurs along the Beaver River to the southwest of the exploration property, along Scougale Creek and along the Keno Ladue River. Small wetlands are found throughout the lowlands to the southwest of the property and along the proposed access route alignment. White spruce (*Picea glauca*) and balsam poplar (*Populus balsamifera*) are the predominant tree species bordering these wetlands and riparian areas. Black spruce (*Picea mariana*) and trembling aspen (*Populus tremuloides*) also occur.

Tall shrubs include river alder (*Alnus incana*), false mountain willow (*Salix pseudomonticola*), felt-leaf willow (*Salix alaxensis*), little-tree willow (*Salix arbusculoides*), Barclay's willow (*Salix barclayi*) and tall blueberry willow (*Salix pseudomyrsinites*). Low shrubs include prickly rose (*Rosa acicularis*), northern Labrador tea *(Ledum decumbens*), shrubby cinquefoil (*Potentilla fruticosa*), and soapberry (*Shepherdia canadensis*). The ground cover is red bearberry (*Arctostaphylos rubra*), bog blueberry (*Vaccinium uliginosum*) and net-veined willow (*Salix reticulata*) along with common horsetail (*Equiestum arvense*), dwarf scouring rush (*Equisetum scirpoides*) and grasses such as blue-joint reed-grass (*Calamagrostis canadensis*) and polargrass (*Arctagrostis latifolia*). A number of forb species also occur (see Appendix B).

Aquatic and emerging vegetation includes common mare's-tail (*Hippuris vulgaris*), Richardson's pondweed (*Potamogeton richardsonii*), burr-reed (*Sparganium* spp.), water sedge (*Carex aquatilis*), beaked sedge (*Carex utriculata*), water arum (*Calla palustris*), marsh five-finger (*Potentilla palustris*) and marsh yellow cress (*Rorippa palustris*).

4.3.6 Post-fire Regeneration Vegetation Type

The southeast section of the proposed winter access route passes through a forested area that was burned in 1999 and is now in the early stages of regeneration. Trembling aspen (*Populus tremuloides*) is the most common colonizing tree species. White spruce (*Picea glauca*), balsam poplar (*Populus balsamifera*) and Alaska birch (*Betula neoalaskana*) also occur.

Tall colonizing shrubs in this burn include Bebb's willow (*Salix bebbiana*) and grey-leaf willow (*Salix glauca*). Low shrubs include dwarf birch (*Betula glandulosa*) and Labrador tea (*Ledum*

groenlandicum). The ground cover is bog blueberry (*Vaccinium uliginosum*), lingonberry (*Vaccinium vitis-idaea*) and twinflower (*Linnaea borealis*) along with northern rough fescue (*Festuca altaica*) and a number of pioneering forb species (see vegetation monitoring site RV-7 in Appendix B).

A 1972 fire burned much of the area along the proposed access route through the lower Rankin Creek valley. Most of this burned area is regenerating black spruce forest including bogs and wetland areas. Colonizing tree species in the Rankin Creek burn are predominantly black spruce (*Picea mariana*) and Alaskan birch (*Betula neoalaskana*) along with lesser numbers of white spruce (*Picea glauca*) and trembling aspen (*Populus tremuloides*).

Tall shrubs in this burn include grey-leaf willow (*Salix glauca*) and diamond-leaf willow (*Salix pulchra*). Low shrubs include dwarf birch (*Betula glandulosa*) and shrubby cinquefoil (*Potentilla fruticosa*). The ground cover is mostly dwarf ericaceous shrubs, forbs and graminoids such as northern rough fescue (*Festuca altaica*), polargrass (*Arctagrostis latifolia*) and spruce muskeg sedge (*Carex lugens*) (see vegetation monitoring site RV-20 in Appendix B).

A fire history map of the study area is included in Appendix B, Figure 4.3.

4.3.7 Summary

White spruce is the most common vegetation type on the lower slopes of the mineral exploration property and along much of the proposed winter access route from Scougale Creek to the Tiger Deposit.

Black spruce forest occurs at the southwestern portion of the mineral exploration property and along the southern portion of the proposed route alignment through the Keno-Ladue valley.

The area around the airstrip is in the early stages of regeneration following a fire in 1999. The proposed access route through the lower Rankin Creek valley transects a 1972 burn.

Alpine and subalpine vegetation types dominate much of the Tiger Deposit.

Wetlands within the study area are most prevalent along the Beaver River to the southwest of the mineral exploration property. They also occur along the proposed access route, particularly in the Keno-Ladue valley.

No rare plant species were noted at the vegetation monitoring sites.

5.0 SURFACE WATER QUALITY

5.1 PREVIOUS STUDIES

With the exception of water quality work conducted by representatives of ATAC Resources, very little data appears to exist in the literature on any of the water bodies within the study area. In 1964 Geological Survey of Canada collected surface water samples from several streams throughout the study area and prepared maps of the data in 1965. Their data is reported as the concentration

of total heavy metals and represents a combined total of zinc, copper and lead, with the majority of the heavy metal comprised of zinc.
In 2009, Environment Canada collected water samples from streams draining the north flank of Keno Hill with Faro Gulch being the only site overlapping with this study.

5.2 METHODS

Surface water quality monitoring was not a component of this baseline survey but samples were collected at the benthic invertebrate and fisheries sites in August 2013 to further characterize habitat conditions. Monthly and quarterly surface water quality monitoring programs have been conducted in the project area over the past few years by Gibson and Associates. Details of these monitoring programs are presented under separate cover.

Water samples for the current study were collected in a fast flowing section of the stream, prior to any other sampling activity. In-situ measurements were taken at each site. Conductivity, water temperature and pH were determined with a handheld Combo Hanna, Model # HI 98130 multi probe meter. Dissolved oxygen measurements were obtained with a YSI 550A dissolved oxygen meter. Instruments were calibrated daily.

All sample bottles were supplied by Exova, Surrey, BC. To be consistent with the current water quality monitoring programs being carried out at the Rau Project, the same parameters were analyzed using the same laboratory, with the exception of cyanide. Cyanide has not been detected in these baseline waters and in an effort to save costs, this parameter was not analyzed during the current survey.

At each sampling location, water samples were collected in a 500 mL plastic bottle for the analyses of physical tests. Samples to be analyzed for total metals were collected in 250 mL plastic bottles and preserved with nitric acid. Dissolved metals samples were filtered into 250 mL plastic bottles in the field using in-line filters with a 0.45 micron pore size and then preserved with nitric acid. Total organic carbon samples were collected in 250 mL plastic bottles and preserved with hydrochloric acid. Samples to be analyzed for nutrients were collected in two 250 mL plastic bottles, one of which was preserved with sulphuric acid. The analytical methods are provided with Exova's report in Appendix C.

As a measure of quality assurance and quality control (QA/QC), one field blank was collected and a travel blank accompanied the survey.

5.2 RESULTS

For purposes of discussion, the study area has been broken into two main sections; water bodies related to the Tiger Deposit study area and water bodies related to the proposed winter access route.

A baseline study was completed in 2010 and water samples were collected from potential stream crossings of the proposed winter access route from the Hanson Lake Road to Scougale Creek. Data from these sites will be discussed briefly here and further details are provided in the report *Biophysical Investigations for the Proposed Rau Road Route, 2010*, by Laberge Environmental Services, January 2011.

The locations of all of the water quality sites are provided in Table 5-1 and Figure 5.1, Appendix C.

TABLE 5-1 SAMPLE SITE LOCATIONS AND DESCRIPTIONS

Site Code	Creek or River	Description	Date Sampled	Easting NAD 83	Northing NAD 83
CI	Creek I	The current proposed road alignment will not cross this creek now.	August 11, 2010	484636	7095551
GG	Gambler Gulch	The current proposed road alignment will not cross this creek now.	August 11, 2010	485256	7095540
GLC	Gambler Ladue Cr	Approximately 300m u/s Ladue Lake	August 6, 2013	488425	7097087
FG	Faro Gulch	Upstream of proposed road	August 11, 2010	489282	7096165
SB	Silver Basin Gulch	Approximately 150 m u/s of Keno Ladue River,	August 11, 2010	491640	7095751
KL	Keno Ladue River	Near proposed road crossing	August 10, 2010	492329	7095937
CC	Cameron Creek	Located in mature white spruce forest at only possible landing site	August 10, 2010	502382	7098167
CA	Creek A	A major tributary to Rankin Creek	August 11, 2010	504495	7105031
SC	Scougale Creek	Location of Wind River Trail Crossing	August 10, 2010	505743	7111949
BR u/s	Beaver River	At general area of winter road crossing	August 6, 2013	514016	7121062
RAU 7	West Creek	Approximately 1km u/s confluence with Beaver River	August 7, 2013	524341	7117802
RAU 11	Camp Creek	Upstream of camp	August 5, 2013	527112	7119085
RAU 12	Pit Creek	Drains the future pit area - drilled area	August 5, 2013	527508	7118799
RAU 9	Camp Creek	Downstream of confluence of RAU 11 and RAU 12	August 5, 2013	527281	7118642
RAU 4	Camp Creek	Near mouth about 100m u/s of confluence with Beaver River	August 5, 2013	525479	7116179
EC	East Creek	Just upstream of confluence with Beaver River	August 6, 2013	527107	7114832
BR d/s	Beaver River	Downstream of all influences, upstream of Rackla River	August 6, 2013	527548	7113316
RR	Rackla River	Approximately 1km u/s confluence with Beaver River	August 5, 2013	531015	7110634

5.3.1 Tiger Deposit and Proposed Winter Access Route to the Airstrip

Of the nine sites sampled in this section, five are regular water quality stations sampled by Gibson and Associates. These are identified with the RAU prefix. The sample sites are arranged in the tables from upstream to downstream to aid in interpretation. Selected parameters portraying the water characteristics at each site are presented in Table 5-2 with comparisons to the CCME guidelines for the protection of freshwater aquatic life. The complete analytical report can be found in Appendix C.

All waters sampled were clear, slightly alkaline ranging from a pH of 7.52 to 8.31, and were well aerated. Temperatures were cool in the creeks draining the Tiger Deposit slopes and ranged from 2.3^{o}C to 6.4^{o}C. The rivers (Beaver and Rackla) had much warmer temperatures, 11.6 ^{o}C to 12.5 ^{o}C.

All sampled waters were very low in nutrients and most metals. The recommended guidelines for aluminum, chromium, copper, iron, lead, mercury, molybdenum and nickel were met at all of the sites. The recommended guideline for arsenic was exceeded at RAU 12 and RAU 9. Arsenic is frequently found in association with gold. RAU 12 drains the potential mine area (open pit) and higher concentrations documented here are not unexpected. Concentrations were lower downstream at RAU 9 but still slightly exceeded the guideline. However, further downstream near the confluence with the Beaver River at RAU 4, levels were well below the CCME guideline.

The toxicity of several metals decreases as the hardness of the water increases. The hardness of the sampled streams was very hard (total hardness of >180 mg/L). The guideline for cadmium depends on the hardness of the sampled waters and is determined using an equation. The calculated guideline was exceeded at East Creek. The concentrations of iron, selenium and zinc exceeded the recommended CCME guidelines at East Creek as well.

TABLE 5-2 SELECTED WATER QUALITY PARAMETERS FOR STREAMS NEAR THE TIGER DEPOSIT

Parameter	Beaver Cr @ rd-xing	RAU 7 (West Cr)	RAU 11	RAU 12	RAU 9	RAU 4	East Cr near mouth	Beaver R d/s	Rackla R near mouth	CCME *
Sampled Date	8/6/2013	8/7/2013	8/5/2013	8/5/2013	8/5/2013	8/5/2013	8/6/2013	8/6/2013	8/5/2013	
Sampled Time	13:50	9:50	7:30	9:15	10:55	13:20	11:30	8:35	14:45	
In-situ water Temperature °C	12.5	5.6	2.3	4.3	4.5	6.4	5.7	11.6	12.3	
Dissolved Oxygen %	95.9	96.4	86.9	88.4	90.3	96.5	92.2	90	93	
Dissolved Oxygen mg/L	10.22	12.1	11.87	11.49	11.64	11.86	11.5	9.66	9.96	
pH Lab at 25°C	8.18	8.14	7.93	8.04	8.12	8.25	8.02	8.11	8.14	6.5 to 9
pH field	8.20	8.34	8.00	8.06	8.15	8.31	7.92	8.24	8.26	6.5 to 9
Conductivity Lab uS/cm	373	379	331	371	369	398	517	364	428	
Conductivity Field uS/cm	381	382	339	378	377	409	530	378	450	
Total Organic Carbon mg/L	1	0.7	0.8	0.8	1.2	1.2	2.1	1.4	1.1	
Total Phosphorus mg/L	<0.003	<0.003	<0.003	<0.003	0.007	0.004	0.009	<0.003	<0.003	
Nitrate - N mg/L	0.03	0.2	0.15	0.29	0.16	0.22	0.07	0.08	0.08	13
Nitrite - N mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.06
Ammonia mg/L	0.14	0.1	<0.01	<0.01	0.02	0.02	0.12	0.08	<0.01	1.44**
Sulfate mg/L	50.7	34.9	19.4	25.3	22.2	31.9	61.8	51.7	74.5	
Chloride mg/L	0.69	0.33	0.53	0.36	0.32	0.39	4.97	0.73	0.96	
Total Suspended Solids mg/L	<2	<2	<2	<2	<2	<2	8	<2	<2	
Alkalinity mg/L as CaCO3	152	172	160	176	181	191	214	146	160	
Total Hardness mg/L	208	212	183	202	205	227	272	195	235	
Total Metals (mg/L)										
Aluminum	0.007	<0.005	<0.005	<0.005	0.011	0.021	0.081	0.019	0.01	0.100
Antimony	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	
Arsenic	0.00023	0.00025	0.00018	**0.00709**	**0.00555**	0.00232	0.0014	0.00041	0.00023	0.005
Cadmium	<0.00001	0.00003	0.00006	0.00002	0.00002	0.00003	**0.00038**	0.00003	0.00003	***
Chromium	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001
Copper	0.0007	0.0006	0.0012	0.0014	0.0022	0.0011	0.0018	0.0012	0.0008	0.004
Iron	0.027	0.006	0.008	0.007	0.295	0.031	**0.421**	0.09	0.043	0.30
Lead	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	0.007
Mercury	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000026
Molybdenum	0.00094	0.0002	0.00095	0.00229	0.00138	0.00125	0.00448	0.00085	0.00083	0.073
Nickel	0.0004	<0.0002	<0.0002	<0.0002	0.0008	<0.0002	0.0161	0.0026	0.0006	0.150
Selenium	0.0005	0.0003	0.0003	0.0003	0.0002	0.0006	**0.0026**	0.0005	0.0006	0.001
Zinc	0.0015	0.0043	0.005	0.0045	0.0032	0.006	**0.0648**	0.0054	0.0024	0.030
Calculated Cadmium Guideline:	0.00006	0.00006	0.00006	0.00006	0.00006	0.00007	0.00008	0.00006	0.00007	

* CCME (1999) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life

** at pH 8 and temp at 5°C

*** Varies with the hardness of the waters in the study area according to the calculation 10{0.86[log(hardness)]-3.2}.

Values in **bold** and shaded indicate that the CCME guideline has been exceeded

5.3.2 Proposed Winter Access Route – Hanson Lake Road to Scougale Creek

As a result of the 2013 field work, the winter road alignment proposed in 2010 has been slightly altered (EBA, 2013). Currently the proposed winter road will no longer cross Creek I or Gambler Gulch, however for completeness they have been included in the tables and the discussion. Instead the winter road will leave the Hanson Lake Road further north and subsequently cross Gambler Ladue Creek, the Creek draining Gambler Lake into Ladue Lake. Of the potential stream crossings in this section, only Gambler Ladue Creek was sampled in 2013. The other data presented in Table 5-3 were collected in August 2010.

The stream temperatures in Keno Ladue River, Scougale Creek and Gambler Ladue Creek were significantly higher (12.0°C to 17.6°C) than in the other streams (4.2°C to 7.3°C). Cameron Creek has slightly acidic waters and did not meet the CCME recommended pH guideline for the protection of freshwater aquatic life. The other streams were slightly alkaline with pH ranging from 7.68 to 8.15. Conductivity ranged from 152 uS/cm at Creek A to 627 uS/cm at Cameron Creek. Gambler Ladue Creek had the highest total organic carbon value at 13.2 mg/L. The major sources of organic carbon in water are from organic matter in soils, aquatic vegetation and aquatic organisms. This site had a great deal of submergent vegetation (see Photo #1 in Appendix C).

Nutrient levels were low where detected. Sulphate concentrations ranged considerably from 27.3

ppm at Creek A to 207 ppm at Silver Basin Gulch. Sulphate enters the aquatic environment through leaching of sedimentary rocks, with natural concentrations ranging from 10 to 80 mg/L (CCREM, 1987). There are no national (CCME) guidelines for sulphate for the protection of aquatic life; however British Columbia has set 100mg/L as a guideline for BC waters. This guideline was exceeded at Faro Gulch, Creek I and Silver Basin.

Hardness values varied considerably throughout this section. Cameron Creek and Creek A had moderately hard waters, Keno Ladue River and Scougale Creek waters were hard and the remaining streams were very hard.

TABLE 5-3 SELECTED WATER QUALITY PARAMETERS FOR STREAMS CROSSING THE PROPOSED LOWER ROUTE

Parameter	Creek I	Gambler Gulch	Gambler Ladue Cr	Faro Gulch	Silver Basin Gulch	Keno Ladue River	Cameron Creek	Creek A	Scougale Creek	CCME *
Sampled Date	8/11/2010	8/11/2010	8/6/2013	8/11/2010	8/11/2010	8/10/2010	8/10/2010	8/11/2010	8/10/2010	
Sampled Time	18:00	16:15	18:00	15:15	12:50	15:15	12:35	10:00	10:00	
In-situ water Temperature ^{o}C	6.8	4.2	17.6	4.6	4.6	12.0	7.3	5.7	15.3	
pH Lab at 25^{o}C	8.15	7.98	7.68	7.97	7.99	7.95	**6.13**	7.81	8.1	6.5 to 9
pH field	8.14	7.93	7.52	8.03	7.88	7.75	**6.28**	7.91	8.19	6.5 to 9
Conductivity Lab uS/cm	620	400	337	418	627	302	181	161	288	
Conductivity Field uS/cm	603	388	347	406	612	292	173	152	283	
Total Organic Carbon mg/L	2.9	4.3	13.2	1	1.7	3.9	<0.5	1	2.8	
Nitrate - N mg/L	0.04	0.09	<0.01	0.11	0.13	0.02	0.06	0.05	0.02	13.0
Nitrite - N mg/L	0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.060
Ammonia mg/L	0.02	<0.01	0.12	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	1.44**
Sulfate mg/L	**151**	96.1	64	**122**	**207**	68.8	74.7	27.3	46	100***
Chloride mg/L	0.41	<0.02	0.12	<0.02	<0.02	0.2	0.19	<0.02	<0.02	
Total Suspended Solids mg/L	50	8	<2	<3	<2	<2	4	17	<2	
Alkalinity mg/L as CaCO3	173	106	110	76	112	83	<5	52	106	
Total Hardness mg/L	346	201	180	205	326	148	75.6	76.2	147	
Total Metals (mg/L)										
Aluminum	**0.604**	**0.155**	0.012	0.007	0.005	0.039	**1.3**	**0.204**	**0.139**	0.100
Antimony	0.0012	<0.0002	0.0006	0.0003	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	
Arsenic	0.0029	0.0011	0.00118	0.0005	0.0006	0.0016	<0.0002	0.0003	0.0004	0.005
Cadmium	**0.00354**	**0.00014**	**0.0001**	**0.00042**	0.00006	0.00004	**0.00118**	**0.0002**	**0.00008**	****
Chromium	**0.0016**	0.0009	<0.0005	<0.0004	<0.0004	0.0006	<0.0004	0.0009	0.0006	0.001
Cobalt	0.00093	0.00034	0.0001	0.00003	0.0001	0.00017	**0.0194**	0.00078	0.00122	0.004
Copper	**0.004**	0.002	0.0014	<0.001	<0.001	0.001	**0.009**	0.002	0.002	0.004
Iron	**1.87**	**0.389**	0.132	0.047	0.086	0.284	**0.334**	**0.328**	0.048	0.30
Lead	**0.0053**	0.0005	0.0002	0.0029	<0.0001	0.0006	<0.0001	0.0006	0.0001	0.004
Mercury	0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000026
Molybdenum	0.001	0.0005	0.00099	0.0003	0.0003	0.0005	<0.1	0.0001	0.0001	0.073
Nickel	0.004	0.004	0.0027	0.001	0.002	0.002	**0.111**	0.021	0.019	0.110
Selenium	**0.0014**	0.001	0.0004	<0.0006	0.0008	<0.0006	<0.0006	<0.0006	<0.0006	0.001
Zinc	**0.4**	0.026	0.0208	**0.038**	0.006	0.009	**0.331**	**0.066**	0.013	0.030
Calculated Cadmium Guideline:	0.00010	0.00006	0.00005	0.00006	0.00009	0.00005	0.00003	0.00003	0.00005	

* CCME (1999) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life

** at pH 8 and temp at 5°C

*** BC guideline

**** Varies with the hardness of the waters in the study area according to the calculation 10{0.86[log(hardness)]-3.2}.

Values in **bold** and shaded indicate that the CCME guideline has been exceeded

The recommended CCME guidelines for arsenic, mercury and molybdenum were met at all of the sites. Concentrations of cadmium exceeded the guideline at all sites with the exception of Silver Basin Gulch and Keno Ladue River.

Cameron Creek, which drains Mount Cameron, displays unique characteristics in relation to the other streams. The creek is slightly acidic (field pH 6.13), milky grey in colour and exhibits high concentrations of aluminum, cadmium, cobalt, copper, iron, nickel and zinc, with most of the parameters exceeding the respective CCME guidelines. Cobalt has two recommended guidelines. Cameron Creek waters fell well under the 0.110mg/L threshold for acute toxic effects

but exceeded the 30 day period average chronic toxic effect threshold of 0.004 mg/L. The greatest concentrations of aluminum, cobalt, copper and nickel throughout the study area were documented in Cameron Creek.

Creek I also appears highly mineralized. The greatest concentrations of cadmium, copper, iron, selenium and zinc, all of which exceeded the CCME guidelines, were documented here. It is speculated that Creek I received tailings and discharge from the Sadie Ladue and Wernecke mines on Keno Hill at some point in the past. Note that the 2013 road realignment will not intersect this creek.

Faro Gulch, which also drains Keno Hill, had concentrations of lead and zinc that exceeded the CCME guidelines. EC collected water samples from Faro Gulch on July 28, 2009, approximately 3.5 km upstream of the 2010 location. Their data shows a total lead concentration of 0.00298 mg/L and a total zinc concentration of 0.0651 mg/L (EC unpublished data).

Levels of aluminum in Gambler Gulch, Creek A and Scougale Creek exceeded the CCME guidelines. Concentrations of iron and zinc also exceeded the CCME guidelines at Creek A. The guideline for iron was exceeded at Gambler Gulch.

The QA/QC program for the August 2013 sampling episode confirmed good field and analytical techniques. The analytical data for the field blank and travel blank are included in Appendix C.

5.3.3 Comparisons with Historic Water Quality

Water samples were collected at some of the station locations in 1964 and 2009. The concentrations of copper, lead and zinc were combined in order that they could be compared to the 1964 data. This data is presented in Table 5-4.

This data set, of course, is far from robust and trends can not be identified. Relatively similar results were obtained for Faro Gulch, RAU 4, East Creek and the Rackla River. Significant differences occurred at Cameron Creek and Creek A.

TABLE 5-4 HEAVY METAL COMPARISONS			
STREAM	**Total Copper, Lead and Zinc (ppm)**		
	LES 2010 & 13	**EC** 2009	**GSC** 1964
Creek I	0.409		
Gambler Gulch	0.029		0.140
Gambler / Ladue Cr	0.022		
Faro Gulch	0.041	0.069	0.040
Silver Basin	0.006		0.001
Keno Ladue River	0.011		
Cameron Creek	0.340		0.030
Creek A	0.069		0.005
Scougale Creek	0.015		0.002
Beaver Cr @ rd-xing	0.002		
RAU 7 (West Cr)	0.005		0.010
RAU 11	0.006		
RAU 12	0.006		
RAU 9	0.005		
RAU 4	0.007		0.010
East Cr near mouth	0.067		0.035
Beaver R d/s	0.007		
Rackla R near mouth	0.003		0.002

The baseline water quality throughout the study area varies considerably and reflects the natural mineralization of the areas being drained.

6.0 STREAM SEDIMENT CHARACTERIZATION

6.1 BACKGROUND INFORMATION

With the exception of stream sediment sampling conducted by the Geological Survey of Canada in 1964, no other geochemical sediment data could be located. The field methodology of analysis GSC used in 1964 was too different from the laboratory techniques used today to allow for any useful comparison.

6.2 METHODS

Composite stream sediment samples were collected from several sites (BR u/s, RAU 7, RAU 11, RAU 12, RAU 9, RAU 4, EC, BR d/s, RR and GL) during the water quality and benthic invertebrate survey conducted in August 2013 (see Figure 5.1 in Appendix C). Fine grained materials were collected from depositional areas using a stainless steel trowel and placed into plastic freezer bags. Samples were kept cool until shipped to Exova in Surrey, BC. At the lab the samples were dried and the portion passing a 100 mesh screen (0.15mm) was acidified and analyzed for 30 metals by ICPMS. The fine portion was targeted as this fraction has a higher potential for exposure to and ingestion by resident biota.

6.3 RESULTS AND DISCUSSION

The analytical results for the stream sediments are presented in Appendix D.

Seven metals were examined in detail as they may be present in the ore bodies and/or have the potential to be toxic to aquatic organisms (Table 6-1). The concentrations of these metals were compared to the CCME (1999) interim freshwater sediment quality guidelines (ISQG) and to the probable effects levels (PEL). Generally, concentrations greater than the PEL have a 50% incidence of creating adverse biological effects.

TABLE 6-1 SUMMARY OF STREAM SEDIMENT METAL CONCENTRATIONS, AUGUST 2013

Site Code	Sample Description	Arsenic mg/kg	Cadmium mg/kg	Chromium mg/kg	Copper mg/kg	Lead mg/kg	Mercury mg/kg	Zinc mg/kg	pH pH
BR u/s	Beaver R @ rd x-ing	**11.3**	**0.855**	**42**	**40**	33	0.06	**197**	8.8
RAU 7	RAU 7, West Cr	**24.1**	**1.74**	18.3	20	**110**	0.06	**580**	8.6
RAU 11	RAU 11, Camp Cr	**35**	**6.76**	**62.8**	**63**	**118**	0.06	**995**	8.5
RAU 12	RAU 12, Pit Cr	**417**	**1.18**	**45**	33	**51.2**	0.01	**305**	8.9
RAU 9	RAU 9, Camp Cr	**202**	**2.41**	**47.4**	33	**57.3**	0.03	**598**	9
RAU 4	RAU 4, Camp Cr	**83**	**2.23**	36.4	**38**	32	**0.24**	**517**	8.1
EC	East Cr	**41**	**3.78**	30.8	**50**	34.4	0.06	**573**	8
BR d/s	Beaver R d/s	**10.7**	**1.38**	31.6	**39**	26	0.1	**286**	7.1
RR	Rackla R	**18.3**	**1.32**	20.8	**43**	**46.5**	0.1	**258**	8.9
GL	Gambler Ladue Cr	**17.8**	**4.45**	21.5	**52**	**148**	0.12	**926**	7
ISQG		5.9	0.6	37.3	35.7	35.0	0.170	123	
PEL		17.0	3.5	90	197.0	91.3	0.486	315	

Note: ISQG = Interim freshwater Sediment Quality Guidelines, in **bold** where exceeded.
PEL = Probable Effects Level (>50% of adverse effects occur above this level), shaded and in **bold** where exceeded.

Arsenic, cadmium and zinc have the potential to be elements of concern in the study area. The ISQG for arsenic was exceeded in the stream sediments from all of the sites and the PEL was exceeded at all locations except the Beaver River stations. The concentration of arsenic in the sediments at RAU 12, 417 ug/g, was the highest in the study area and significantly greater than the PEL of 17 ug/g. As RAU 12 drains the proposed mining area, high concentrations are to be expected in this mineralized area. To put this data into perspective, Environment Canada's database on metals in Yukon stream sediments was examined. Of 2,180 samples where arsenic was detected, concentrations ranged from 0.4 ug/g to 5,190 ug/g with a median of 17.1 ug/g.

The concentrations of cadmium and zinc exceeded the ISQG in all of the streams sediments. The PEL for cadmium was exceeded at RAU 11, East Creek and Gambler/Ladue Creek. These sites also exceeded the PEL for zinc, as well as the stream sediments from RAU 7, RAU 9 and RAU 4. Cadmium is frequently associated with zinc and they both have similar geochemical properties. The greatest concentrations of these two metals were documented in the stream sediments at RAU 11. This site is located upstream of the camp and upstream of potential mining activity.

All sites met the PEL for chromium, however the concentrations in the stream sediments at the upstream site on the Beaver River, RAU 11, RAU12 and RAU 9 exceeded the ISQG.

The ISQG for copper was exceeded at all of the sites with the exception of RAU 7, RAU 12 and RAU 9. All sites met the PEL.

The PEL for lead was exceeded in the samples collected from RAU 7, RAU 11 and Gambler Ladue Creek. The ISQG was exceeded at RAU 12, RAU 9 and the Rackla River.

Mercury concentrations were low and RAU 4 was the only site where the ISQG was exceeded.

The stream sediments ranged from neutral to somewhat alkaline (pH of 7.0 to 9.0).

7.0 BENTHIC INVERTEBRATE SURVEY

Benthic invertebrates are an important component of flowing and standing water habitats; they consume smaller animals and plants, aid in decomposition of organic material and provide an important food source for fish and other animals.

The use of benthic invertebrates as a biomonitoring tool provides a useful measure in which to assess the health of a watershed. Unlike chemical measures, invertebrate assemblages reflect long-term exposure to varying water quality conditions and thus integrate effects of contaminants over time (Rosenberg and Resh, 1993). These organisms are useful in this respect as their abundance and taxonomic diversity respond to a wide range of impacts including sedimentation, organic loading and changes in chemical water quality. Using benthic invertebrates as biomonitoring tools offers many advantages for the following reasons; they are ubiquitous, they are abundant and easy to collect, there are a large number of species offering a spectrum of responses to environmental stress, they are generally sedentary and therefore are representative of local conditions, and they have long life cycles compared to other groups (i.e. periphyton). As such, benthic macroinvertebrates act as continuous monitors of the water they inhabit and therefore can serve as sentinels of change in local conditions. By assessing the benthos populations and their community composition and structure over time, from baseline conditions through to active mining, followed by decommissioning, changes in the populations and community structure could indicate possible impacts to the receiving environments. The gathering of this data prior to any road and mine development provides information on current pre-disturbed baseline conditions.

7.1 BACKGROUND INFORMATION

As far as could be ascertained, no benthic invertebrates assessments have been made in the study area beyond the surveys conducted on behalf of ATAC Resources Ltd by Laberge Environmental Services. In 2010, benthos studies were completed on potential crossings of major streams that fall along the proposed access route from Hanson Lakes – Keno Ladue – Scougale River. During the field season in 2013, further assessments were made along streams crossing the proposed winter access road from the Beaver River to the airstrip and potentially impacted streams from mining activities.

7.2 METHODS

The stream geomorphology varied among sites but generally the dominant characteristics included gravel to cobble substrates with moderate velocities. The exception to this was the site on Gambler-Ladue Creek, a slow velocity creek which had a sand/mud substrate partially covered with submergent vegetation (refer to Photo #1 in Appendix C).

A D-net kick sampler with a 400 micron mesh net was used to collect one composite sample from the sites sampled in 2010, from Gambler-Ladue Creek, and from the Beaver River at the potential road crossing. The kick net was placed downstream of the collector with the flat side of the net

contacting the substrate. The collector "kicked" the bed material while walking upstream in a zig-zag pattern for three minutes, capturing the disturbed benthic fauna and detritus in the net.

Triplicate samples were collected at the other sites and also the Beaver River site using a Surber sampler (area = 0.0920m^2) with a mesh size of 300 microns. Due to the large sized bed material distributed throughout the Beaver River at the potential road crossing site, it was difficult to penetrate the substrate sufficiently with the Surber sampler resulting in a suspected loss of benthic organisms. Consequently, one kick net sample was also collected here to ensure a greater representation of assemblage. The Surber sampler was positioned securely at a random location on the stream bottom, parallel to the water flow. The bed material within the frame was cleaned and washed by hand with the fast flowing current carrying the disturbed bottom fauna and detritus into the collection bag. The remaining sediment was stirred to a 10 cm depth to dislodge invertebrates. The level of effort for each sample and at each site was comparable. Riffle areas were targeted at each site as this habitat supports the greatest density and diversity of invertebrates (Epele et al, 2012). The triplicate samples were collected approximately 5m to 15m apart, starting downstream and moving upstream to minimize substrate disruption and avoid potential contamination. All individual samples represent one square foot (0.0929 m^2) of sampled substrate with the exception of RAU 11A, where three square feet of substrate were sampled.

The captured invertebrates and detritus were transferred from the collection bags to one litre nalgene bottles and preserved with 10% buffered formalin. Samples were shipped by ground transport to an entomologist for sorting, identification and enumeration.

Quality assurance and quality control (QA/QC) procedures for the field component consisted of; ensuring all personnel were adequately trained, sampling methods per site and between sites were consistent, samples were correctly collected, labeled and preserved, equipment was properly maintained, detailed field notes were kept, chain-of-custody forms were used and safe shipping and storage methods were followed, including the air transport while in the field.

Analysis of the benthic invertebrate samples was conducted by Sue Salter of Cordillera Consulting in Summerland, BC. Once the samples were received at the laboratory they were assigned a Cordillera Consulting code (CC#). The first step in the processing was elutriation to remove the field preservative and inorganic debris. The debris (sand and gravel) was discarded after examination under low power microscope for mollusk shells or trichopteran cases. A 5% solution of Rose Bengal stain was added to the sample to aid in sorting efficiency. The sample was evaluated for total numbers and if the numbers were estimated to be greater than 600 the sample was subsampled to achieve a minimum number of 300 organisms. The method of subsampling used was the plankton splitter (Motodo 1959, Van Guelpen 1982 a, b) because there was very fine debris with minimal 'clumpiness'.

The unsorted portion of the debris was labelled and preserved in 80% ethanol. The sorted portion was labelled and preserved in the same fashion for resorting analysis. Sorting and identification was done using a low magnification of a dissecting scope in gridded Petri dishes. Empty snail or bivalve shells, empty caddis fly cases, invertebrate fragments such as legs, gills, antennae etc. were not removed or counted. When organism fragments were encountered, only heads were counted towards the total. Larval and pupa exuviae were not counted. Terrestrial stages and terrestrial drop-ins are indicated as such and do not contribute to the total count. The sorted invertebrates were stored in 80% ethanol in snap cap vials.

The identifications were processed using current literature for the taxa encountered. Chironomids were identified to the level of genus with the aid of slide mounts of head capsules under a compound microscope.

As a measure of QA/QC, three samples were chosen for resorting efficiency. All resorts were greater than 95% and therefore above industry standards.

7.3 RESULTS AND DISCUSSION

All benthos data collected on behalf of ATAC Resources Ltd. are presented in this section. Samples sites are displayed on Figure 5.1 in Appendix C, located at most of the water quality sampling stations, with descriptions provided in the table below.

TABLE 7-1 Sample Site Descriptions, Dates and Methodology

Site Code	Creek or River	Description	Substrate	Date Sampled	Sampling Method
GG	Gambler Gulch	The current proposed road alignment will not cross this creek now.	mostly fines, small gravels	August 11, 2010	Kick Net
GLC	Gambler/Ladue Creek	Approximately 300m u/s Ladue Lake	muddy substrate with some instream vegetation - submerged grass and ---	August 6, 2013	Kick Net
SB	Silver Basin Gulch	Approximately 150 m u/s of Keno Ladue River	red stained gravels, few cobbles	August 11, 2010	Kick Net
CC	Cameron Creek	Located in mature white spruce forest at only possible landing site	mostly cobbles, fine white ppt on rocks	August 10, 2010	Kick Net
BR u/s	Beaver River	At general area of winter road crossing	clean washed large gravels, cobbles and gravels	August 6, 2013	Kick Net and Surber Sampler
RAU 7	West Creek	Approximately 1km u/s confluence with Beaver R	clean washed cobbles and boulders	August 7, 2013	Surber Sampler
RAU 11	Camp Creek	Upstream of camp	clean washed gravels, cobbles and boulders	August 5, 2013	Surber Sampler
RAU 12	Pit Creek	Drains the future pit area, drilled area	clean washed gravels, cobbles and boulders	August 5, 2013	Surber Sampler
RAU 9	Camp Creek	Downstream of confluence of RAU 11 and 12	clean washed gravels, cobbles and lots of large boulders	August 5, 2013	Surber Sampler
RAU 4	Camp Creek	Near mouth about 100m u/s of confluence with Beaver R	small to large gravels, some cobbles but few boulders	August 5, 2013	Surber Sampler
EC	East Creek	Just upstream of confluence with Beaver River	fines, small to large gravels, clean water	August 6, 2013	Surber Sampler
BR d/s	Beaver River	Downstream of all influences, upstream of Rackla R	large gravels, cobbles, most of river substrate is mud	August 6, 2013	Surber Sampler
RR	Rackla River	Approximately 1km u/s confluence with Beaver R	mostly large gravels/small cobbles, brown biofilm on rocks	August 5, 2013	Surber Sampler

In-situ conditions at the time of benthic invertebrate collection are included with the field data for the water component in Tables 5-2 and -5-3, Section 5.3, and have not been reproduced here.

Six phyla were documented; Arthropoda, Mollusca, Annelida, Cnidaria, Tardigrada and Nematoda. A total of 13,164 individual invertebrates, representing 173 different taxonomic groups, were identified within the study area and over the study period. The complete 2013 invertebrate data is presented in Appendix E. The 2010 data has been summarized in Section 7.3 and the raw data is available in a separate report (Laberge, 2011).

7.3.1 Abundance and Diversity

The total number of organisms in each sample is summarized in Table 7-2 (Appendix E). Densities were calculated for the quantitative samples that were collected with the Surber sampler (Table 7-2). Populations between sites can then be compared irrelevant of the number of samples collected per site or the area sampled per sample. The kick and sweep method was used at some of the sites as a collection method. Since the area sampled is unknown when using this method, densities can not be calculated and only the total number of individuals per sample can be reported.

The highest population in a single sample was reported at Gambler/Ladue Creek (2,343 individuals). The community at RAU 11 had the greatest density (6,359 invertebrates/m^2). The community in one of the Beaver River samples at the upstream site had the lowest population with only 23 invertebrates captured. The other two samples had significantly greater numbers. As mentioned in Section 7.2 the substrate here created challenges for the use of the Surber sampler and it is suspected that there was some loss of invertebrates during the collection process. East Creek and Cameron Creek also had very low populations. The depressed population at Cameron Creek is likely related to the quality of the water and of the stream sediments as discussed in Sections 5.3 and 6.3 respectively.

As a measure of community diversity all the different taxonomic groups identified in each sample were tallied. To further characterize the taxonomic wealth of each community, the diversity was related to the population size using the formula: (Diversity – 1) divided by the natural log of the population. These data are also provided in Table 7-2 (Appendix E).

The diversity ranged from 10 different types of organisms identified in one of the samples in East Creek to 44 in Gambler Gulch. When the population is taken into consideration, the richest community was present in one of the samples collected from RAU 12, Pit Creek, with a richness index of 7.2. The least diverse community was documented in RAU 11A with an index of only 2.1.

7.3.2 Community Composition

The triplicate Surber samples were grouped together to determine the overall composition of the benthic community for each location. The proportion of the major taxonomic groups, usually Orders, has been presented as a pie chart for each site in Figure 7.1 (2013) and Figure 7.2 (2010), both in Appendix E. The insect orders Ephemeroptera, Plecoptera, and Diptera formed the majority of most of the populations. The significant exception to this was the benthic community at East Creek where Nematoda formed a large portion of the population along with representation from Diptera and Plecoptera.

These groups can be classified regarding their distribution within each community (Table 7-3, Appendix E). Plecoptera, Ephemeroptera and/or Diptera were the dominant group at each site, except at East Creek where Nematoda was dominant.

As a further refinement of dominance measures, the first, second and third dominant taxon was identified for each sample (Table 7-4, Appendix E). Members of the insect orders were frequently the first dominant taxon in the samples.

7.3.3 EPT

Many aquatic insects require good water quality to thrive. Larvae of mayflies (Ephemeroptera), stoneflies (Plecoptera) and caddisflies (Trichoptera) require clear, clean, well oxygenated water and have very low tolerance to pollution. Analyzing the combined EPT (Ephemeroptera, Plecoptera, Trichoptera) at a site, gives an indication of the overall health of the stream. Table 7-5 summarizes the number of EPT found per site, the number of EPT taxa (richness) and the proportion of EPT in each community. The abundance and percentage of EPT followed the same trend. Cameron Creek had the lowest proportion of EPT in the community (13.2%) and RAU 11 had the highest (83.2%). Compared to the other sites in the study, the communities at East Creek, Beaver River downstream

and Gambler Ladue Creek had relatively lower ratios of EPT.
Streams of high quality usually have the greatest species richness. EPT richness ranged from 2 at Cameron Creek to 27 at the site on the Beaver River at the potential road crossing. Although RAU11 had the greatest amount of EPT in the community, there was only a richness of 6. Stream Keepers has indicated that streams with an EPT richness greater than 8 are of good quality (DFO). Richness values below 5 could indicate that the habitat is compromised in some way.

TABLE 7-5 EPT Abundance, Richness and Proportion

Site	EPT abundance	EPT richness	EPT %
Gambler Gulch	598	7	64.6
Gambler/ Ladue Cr	718	13	30.6
Silver Basin Gulch	1033	10	64.5
Cameron Cr	7	2	13.2
Beaver R @ Road X-ing	762	27	47.3
RAU 7	522	21	66.2
RAU 11	1965	6	83.2
RAU 12	425	15	43.9
RAU 9	234	17	48.1
RAU 4	464	25	50.5
East Cr	32	10	25.8
Beaver R d/s	132	13	23.3
Rackla R	282	18	67.8

A review of the above metrics provides some insight into the general ecological health of the various waterbodies. With the exception of Cameron Creek, all sites typically had robust, diverse benthic invertebrate populations with good representation of pollution sensitive organisms.

The community at Cameron Creek is likely degraded due to the natural water quality of this stream. As discussed in Section 5.3.2, the flow is slightly acidic, turbid, and has high concentrations of many metals which exceed the CCME guidelines. These limiting conditions would inhibit aquatic organisms utilizing this stream system.

The benthic community at East Creek was the only one to be dominated by nematodes. The physical habitat structure of stream corridors is a major determinant of the potential aquatic communities. Although the concentrations of cadmium and zinc exceeded the CCME guidelines for the protection of freshwater aquatic life in the water and in the sediments, the dominance of Nematoda is likely attributed to the muddy mobile substrate with few gravel areas at this site. Nematodes attain their greatest densities in soft muddy substrates of lakes, ponds and streams (Pennak, 1989). However, there was also good representation of sensitive insects with a quarter of the population comprised of EPT.

Arsenic concentrations in the water at RAU 12 and RAU 9 exceeded the CCME guideline (refer to Section 5.3.1). Concentrations of arsenic in the stream sediments at both of these sites greatly exceeded the PEL, indicating that there should be effects to the biota at these two sites (refer to Section 6.3). The benthic data shows however, that the combined EPT formed almost half of each of these communities, suggesting that arsenic is not in a bioavailable form. The major uptake vectors are through the ingestion of metal enriched sediments or suspended particles and/or uptake from solution. The toxicity of arsenic is dependent on speciation. Arsenite (AsO_3^{-3}) forms are

much more toxic to biological species. Metallo-organic forms of arsenic also may be much more bioavailable than inorganic forms; however, organic-bound arsenic is excreted by most species and does not appear to be highly toxic (Luoma, 1983). Without conducting costly speciation analysis, it is unknown what the prevalent form of arsenic is in the Pit / Camp Creek watershed. The waters in this system are very hard with high alkalinity, two factors which help to buffer potential toxicity.

8.0 FISHERIES

8.1 PREVIOUS STUDIES

The Beaver River is a major tributary of the Stewart River and the principle drainage associated with the Tiger Gold Project. The drainage is situated above Fraser Falls, which is considered to be a partial barrier to the upstream movement of fish on the Stewart River. Past aquatic assessments and related fish surveys have primarily focused on the Stewart River and its tributaries downstream of Fraser Falls, especially those linked with the hydroelectric facilities along the Mayo River and at Mayo Lake. To date, thirteen species of fish have been documented in drainages of the lower Stewart River (EDI 2006). Documented species include Arctic grayling (*Thymallus arcticus*), broad whitefish (*Coregonus nasus*), burbot (*Lota lota*), Chinook salmon (*Oncorynchus tshawytscha*), chum salmon (*Oncornchus keta*), lake trout (*Salvelinus namaycush*), inconnu (*Stenodus leucichthys*), lake chub (*Couesius plumbeus*), lake whitefish (*Coregonus clupeaformis*), least cisco (*Coregonus sardinella*), longnose sucker (*Catostomus catostomus*), northern pike (*Esox lucius*), round whitefish (*Coregonus cylindraceum*), and slimy sculpin (*Cottus cognatus*). The most common river-dwelling species are thought to be Arctic Grayling, burbot, Chinook salmon and slimy sculpin. Lake trout, lake whitefish and northern pike are common species within lakes throughout the watershed.

Previous aquatic surveys in the vicinity of the Project area are relatively few. Elson (1974) exclusively captured Arctic grayling juveniles in the East Rackla River as part of a cataloguing project. Subsequent sampling of the mainstem of the Rackla River by Federal Fisheries confirmed the presence of juvenile Chinook salmon and a species of char, likely Dolly Varden (DFO 1999). A single minnow trapping episode in the headwaters of the Nadaleen River by Yukon Environment in 2000 confirmed the presence of Dolly Varden through genetic identification (Foos pers. comm. 2014). Additionally, two lakes near the Rau project area were surveyed as part of a larger lake inventory program completed between 1960 and 1968 by the Department of Fisheries and Oceans (Lindsey *et al* 1981). Documented species in Kathleen Lakes included lake whitefish, Arctic grayling, lake trout, and northern pike. Ladue Lake was found to contain lake whitefish, lake trout, northern pike and burbot.

Laberge Environmental Services (2011) completed an assessment of fish resources along the proposed road alignment to access the Tiger Gold Project in 2010. This consisted of surveying potential stream-crossing locations of five tributary streams that are most likely to contain fish based on observed flow and habitat characteristics. Species captured in decreasing frequency included slimy sculpin, Arctic grayling, lake whitefish and northern pike (Laberge Environmental Services 2011).

8.2 METHODS

A total of seven sites were assessed in drainages associated with the Tiger Gold Project for the presence of fish through August 5 to 7, 2013 (see Figure 8.1 and Table 8-1 in Appendix F). Two sites were located on the mainstem of the Beaver River (RF1 and RF5), one site on the Rackla River near the Beaver River confluence (RF2), and four sites on small tributaries of the Beaver River near the project site (RF3, RF4, RF6 and RF7). Sites RF4, RF6 and RF7 represent sampling locations on Camp Creek, a small drainage that is directly downstream of the Rau property and exploration camp. Site RF5 in the Beaver River was considered to be a reference site well away from any potential impacts.

8.2.1 Habitat Descriptions

A representative section of the stream at each sample site was visually assessed and referenced using a hand held GPS. Bank full widths of each stream were either directly measured with a tape or through the use of a range finder. The water stage, aquatic habitat attributes, channel morphology and the composition of instream and riparian vegetation were recorded. The size composition of the bed material was also characterized. On a macro scale, morphological descriptors of the channel were obtained from looking at online aerial imagery. Representative photographs of the aquatic habitat at each sampling site were obtained and chronicled for each site (Appendix F).

8.2.2 Fish Inventory

Fish sampling was conducted under a scientific collection permit obtained from Fisheries and Oceans Canada. At each site electrofishing and minnow trapping were the primary techniques used to establish fish presence and to collect specimens for the tissue metal analysis. For electrofishing, the conductivity of the water was first noted to assist in the initial setup. A minimum crew size of two people was used during each sampling episode. Captured fish were placed in a bucket filled with clean water. A tally of fish that were observed or “flipped” but avoided capture with the dipnet, was also recorded. Voltage was adjusted to enable fish in the bucket to recover within 5 to 20 seconds. A standard waveform of between 325 to 350 volts and a 15% duty cycle was effectively used throughout the project. Galvanized ¼ inch “Gee” type minnow traps, which were baited with suspended sacs of Yukon River salmon roe, were also utilized at each sampling site using methods described by the Yukon River Panel (2007). Minnow traps were set in various habitat types such as scour pools, side-channels, back channels, undercut banks or in woody debris that offered cover for fish. Between two and six minnow traps were set for an overnight period at each sample site. Soak times were recorded for each trap. At site RF1 two gillnets were additionally set on the river bottom in areas of the river where the water velocity was low. Each net was 23 meters in length and was left to fish for approximately 4 hours. Each net was constructed of 3-ply multifilament mesh that was 6.4 and 7.6 centimeters in size.

All captured fish during the project were measured for either a fork or total length (± 1 mm) and weight (± 0.1 gm). Weight was determined using a digital scale by first blotting excess water from the fish and then placing each fish into a container on the scale. A total length was recorded for slimy sculpin and burbot; a fork length was recorded for all other species. Fish were given time to recover in a bucket before being live-released near their site of capture and

well away from the main current in the stream. A single Dolly Varden was retained, preserved in alcohol and delivered to Yukon Environment for genetic identification.

8.2.3 Fish Tissue Metal Sampling

Twelve slimy sculpin were retained from two sites for ICPMS metal analysis; Camp Creek (RF4) and the background site on the Beaver River (RF5). Generally, the largest specimens from each capture site were euthanized and placed in individual Whirlpac® plastic bags. Fish collections were immediately placed on ice and subsequently frozen within 12 hours. For shipment, samples were packed with ice packs and couriered to the ALS laboratory in Burnaby, BC.

Trace metals in tissue were analyzed by high resolution inductively coupled plasma mass spectrometry (HR-ICPMS) modified from US EPA Method 200.8, (Revision 5.5). The sample preparation procedure is modified from US EPA 200.3. Analytical results were reported on wet weight basis. Wet weight results were quantified from a homogenized wet subsample which was digested according to the method references above. The results have been compared to other data sets from several locations in the Yukon and Alaska.

8.3 RESULTS AND DISCUSSION

8.3.1 Fish Habitat

Fish habitat descriptions for both the 2010 and 2013 survey years are presented in Tables 8-2 and 8-3, respectfully (both in Appendix F). The following discussion is limited to those sites assessed in 2013. More detailed habitat descriptions of assessed sites from the 2010 survey are contained in a report prepared by Laberge Environmental Services (2011).

Beaver River

The Beaver River at sampling location RF1 is characterized by a wide channel that is about 65 meters in width and has several unobstructed entrances into connecting oxbows and shallow wetland areas (Photo #1, Appendix F). This section of the river, roughly extending from the Rackla River upstream to the Scougale Creek confluence, could practically be classified as a lake. The flow of this deep river channel was low in velocity and the substrates were mainly comprised of sand. Sections of gravel were associated with alluvial fans where smaller tributaries connect to the river. The channel was also relatively deep, with depths of over 5 meters in some locations. Willow and mature spruce dominated the riparian region. Deep pools were the most dominant fish cover type. Overhanging vegetation and accumulations of small and large woody debris along the banks also contributed to the abundant fish cover that was observed. The survey was completed at a river stage that was 1 to 2 meters below the bank full width. Many of the slower moving regions of the channel had noticeable and prolific growth of aquatic vascular plants. Large sand bars along the margins of the channel were also common.

Site RF5 is situated on the Beaver River above the Scougale Creek confluence and located just upstream of the proposed road crossing that would provide future access to the Rau property and airstrip. The channel at this location is heavily braided and the substrates were mostly composed of gravel and cobble sized material (Photo #2, Appendix F). Sand filled the interstitial spaces of the substrate and large depositions of sand were observed as point bars along the river margins. The main channel was relatively shallow at the time of the survey. Water velocities at this location were much greater than at site RF1. Extended riffles were common

and some specific locations could be considered as rapids. Several off-channel areas provided slack water habitat and respite for fish. The morphology of the main channel was typically a riffle-pool type. Fish cover mainly consisted of overhanging vegetation, cutbanks and accumulations of small and large woody debris. Overall, habitat cover was considered to be moderate at this location. Riparian vegetation primarily consisted of a mixed forest of balsam poplar and spruce. Tall willows were common on gravel bars and islands.

Camp Creek

Camp Creek is a small south-facing tributary of the Beaver River. The Tiger Deposit and exploration camp associated with the Rau Property are located at its headwaters. Three sites (RF4, RF6 and RF7) were assessed on this stream (Photos 3,4 and 5, Appendix F). The channel was just over one meter in width and relatively shallow throughout its entire length. The surface waters in this stream were notably cold and clear compared to those associated with the mainstem of the Beaver River. The substrate consisted mainly of sand and gravel in the lowest reaches and cobble further upstream in the steeper gradient sections. Overhanging vegetation, cutbanks and shallow scour pools provided the main cover types. Accumulations of small and large woody debris were also evident. The best fish habitat values were located in the lower gradient reaches associated with the Beaver River valley floor, and especially near the confluence. Overall, fish cover in the upper reaches of this small stream was constrained by the steep gradient and modest flows at the time of the survey. While no barriers were observed from the helicopter, the step-pool configuration of the upper reaches likely impedes the upstream movement of fish.

East Creek

Only the lowest reach of this small creek was assessed which was at the confluence with the Beaver River at site RF3 (Photo #6, Appendix F). This small tributary stream is adjacent to the Camp Creek drainage and is also situated in a south facing aspect. The channel was about two meters in width and the substrates were dominated by fine organic material and sand. Fish cover that was present was primarily deep pools, and the occasional accumulation of small and large woody debris. As with Camp Creek, the surface waters of East Creek were noticeably cooler and clear compared to those in the Beaver River.

Rackla River

The Rackla River is a major tributary of the Beaver River. Its drainage basin is situated north-west of the Rau Property. The Rackla River has a higher gradient than the Beaver River. A large depositional area dominates the lowest reaches with several small side channels and large sand bars. Back channels, lateral and lineal riffles, pools and glides were common at sampling site RF2 (Photo #7, Appendix F). Riparian vegetation consist of old growth spruce and tall willow.

The main channel is a classic riffle-pool sequence with a relatively wide channel width of about 40 meters. The surface water was low in turbidity and no aquatic vegetation was apparent on the stream bottom. The main cover types included deep pools and accumulations of small and large woody debris. Cutbanks and overhanging vegetation contributed to the overall fish cover, however, only in locations where the channel was actively eroding the stream bank. Side and point bars composed primarily of sand were common and the channel substrate consisted mainly of gravel and cobble sized material. The large depositional area that characterizes this site may be expected to provide significant storage for ground water (DFO 1999).

8.3.2 Fish Distribution and Abundance

A combined total of eight fish species were documented during the Tiger Gold Project baseline assessments in 2010 and 2013. A listing of the species captured during these surveys is presented below in Table 8-4 and a summary of the numbers caught by drainage is presented in Table 8-5 (Appendix F). A combined total of eight species was represented in the catch from sampling sites during the 2013 study. The most common species encountered were slimy sculpin and Arctic grayling. These species are ubiquitous and commonly occur in rivers, lakes and streams throughout the Yukon River Basin.

TABLE 8-4 SPECIES OF FISH CAPTURED IN THE TIGER GOLD PROJECT STUDY AREA IN AUGUST 2010 AND AUGUST 2013

Scientific Name	Common Name
Coregonus clupeaformis	lake whitefish
Coregonus cylindraceum	round whitefish
Cottus cognatus	slimy sculpin
Esox lucius	northern pike
Lota lota	burbot
Oncorynchus tshawytscha	Chinook salmon
Salvelinus malma	Dolly Varden
Thymallus arcticus	Arctic grayling

Low numbers of juvenile Chinook salmon were documented during this study (Table 8.5, Appendix F). Juveniles were captured at the entrances of two small tributaries of the Beaver River and in the Rackla River mainstem. The modest numbers captured in this study likely reflects, at least partially, the poorer spawning runs in the upper Yukon River Basin over the past decade. The documentation of juvenile Chinook salmon in the Beaver River, and its associated tributaries, confirms that habitat in these drainages are utilized by anadromous salmon for rearing. Juvenile Chinook salmon have also been previously reported to be present in the Rackla River (DFO 1999). While there have been no observations of adult spawners to date, the fact that several maxillary bones of adult salmon were collected along gravel bars of the Beaver River in 2013 is suggestive that the river supports spawning populations. Although Fraser Falls continues to be considered a partial barrier to the upstream movement of anadromous salmon, results from this study would indicate that some portion of the annual Chinook run are able to traverse this obstacle. Nonetheless, the extent of use and distribution of anadromous salmon spawning habitat in the watershed remains unknown.

The capture of a single Dolly Varden in Camp Creek while significant, is not unusual, as this species has been previously documented in other sub drainages of the Beaver River. Sampling of the Rackla River in 1998 captured several specimens in minnow traps. The authors of this

study noted that the species might be more common and widely distributed than the data suggests due to lack of study rather than the rarity of the species (DFO1999). In 2000, Dolly Varden were also captured in a headwater lake associated with the Nadaleen River (Foos pers. com. 2013). Dolly Varden are fairly common in the adjacent Peel River watershed to the north with recorded occurrences in the Peel River mainstem; and in the headwaters of the Blackstone River, Bonnet Plume River, Hart River, Snake River and Wind River sub drainages (Mochnacz *et al* 2010; EDI 2009b).

Other species that were captured include, in decreasing frequency, northern pike, burbot and lake and round whitefish (Table 8-5). Northern pike and lake whitefish prefer a variety of quiet water habitats and can attain a relatively large adult size. The Beaver River, at least the section between the Rackla River and Scougale Creek confluence, is typical habitat for these species. The large wide slow moving channel and the adjacent wetlands provide good cover for all life history stages of these species. The weedy areas relatively close to shore were especially abundant with juvenile northern pike and were easily observed. Adult northern pike are quite sedentary and, except on spawning migrations, usually move less the 0.5 kilometers in a day (Diana *et al* 1977). Lake whitefish primarily feed on benthic organisms in cooler waters of lakes, creeks and rivers. While catches of burbot and round whitefish were modest, these species are commonly encountered throughout the Yukon River Basin.

The length, weight and condition factors for each fish captured during the study are presented in Table 8-6 in Appendix F.

8.3.5 Metal Contaminants in Fish Tissues

Slimy sculpin (*Cottus cognatus*) were chosen as the fish species to examine for metal concentrations in their tissues for this baseline environmental study. They are considered a sentinel species with a small home range and thus reflect the local environment (Arciszewski *et al*, 2010). Slimy Sculpin were collected from two sites, RF4 and RF5. Site RF4 is located on Camp Creek, a small tributary of the Beaver River, which represents the stream most likely to be impacted by any future development of the Tiger Deposit. Site RF5 is considered as a reference site that is well upstream and away from any potential downstream impacts attributable to the Tiger Deposit.

The complete laboratory report of the chemical analysis of 12 whole body slimy sculpin collected from sites RF4 and RF5 is presented in Appendix F. While all efforts were made in the field to store the samples at < -18 °C, samples were compromised at the lab when the storage bin containing the fish tissue samples was removed from the freezer and left at room temperature for 18 days. This caused the sculpin samples to partially decompose. In response to this, ALS conducted a study to determine if the data generated from the rotting samples was valid. Duplicate fish tissues were analyzed with one set being allowed to remain at room temperature prior to analysis. As a result, the lab determined that samples were on average 3% lower in moisture, which would bias the presented wet weights. The effects of ambient sample storage on dry weight parameters, however, could not be seen in experimental data. It was decided that correcting the wet weights for this bias, without the original sample weights and moisture content, would likely not yield accurate results. Any additional sampling of sculpin in the Tiger Gold Project area would increase the statistical confidence of this data set.

Analytical results were expressed in wet weights and compared to other data sets from several locations in Yukon and Alaska.

The current CCME (1999) guidelines for the protection of wildlife consumers of aquatic biota only address those substances for which aquatic food sources are the main route of exposure. These guidelines apply to any aquatic species consumed by wildlife, including fish, shellfish, invertebrates, or aquatic plants. To date, only a few substances have had a guideline developed and include DDT, dioxins and furans, PCBs, toxaphene and methylmercury. These substances are known to bioaccumulate and can be persistent in aquatic food chains. The recommended guideline (TRGs) for these substances represent the tissue residue concentration of the contaminant in an aquatic organism that is not expected to result in adverse effects in predaceous wildlife. With the exception of methyl mercury, there currently are no Canadian fish tissue residue guidelines for the protection of wildlife consumers of aquatic biota for all of the elements tested. Additionally, databases of fresh water fish (INAC 2009; USGS 2011) were also presented to provide an overview of the range of values found naturally in other freshwater populations in the Yukon Territory and broader Yukon River Basin.

For simplicity, seven of the most toxic contaminants in the aquatic environment (As, Cd, Cu, Hg, Pb, Se and Zn) were the focus of this study. A summary of the analytical results of these contaminants in individual slimy sculpin is presented in Table 8-7. Table 8-8 summarizes the averages of the residues found in whole body slimy sculpin collected at the two sites in the Tiger Gold Project area, with comparisons to databases and guidelines.

Arsenic concentrations for individually sampled sculpin were well below the mean concentrations from the NPC and USGS databases. Values from individual fish ranged from 0.07 to 0.54 ug/g. Concentrations in slimy sculpin from site RF4 were more variable and the average was slightly higher than those determined for site RF5.

Cadmium concentrations for individual sampled sculpin at each of the sampled sites approximated those reported in the NPC and USGS databases. The maximum concentration recorded was 0.25 ug/g at site RF4 in Camp Creek. Sculpin from site RF5 had generally lower values for individual fish, averaging 0.09 ug/g. All values for individual fish were well below the maximum cadmium concentrations reported in the NPC and USGS databases.

Sculpin copper concentrations were consistent and did not exceed 0.86 ug/g. Average concentrations between sites were similar (0.61 and 0.67 ug/g) and below reported averages from fish in the NPC and USGS databases.

TABLE 8-7 SLIMY SCULPIN WHOLE BODY METAL CONCENTRATION (ug/g wet weight) FROM CAMP CREEK (RF4) AND THE BEAVER RIVER (RF5), AUGUST 2013

Drainage	Site	Arsenic	Cadmium	Copper	Lead	Mercury	Selenium	Zinc
Camp Creek	**RF4**	0.27	0.13	0.47	0.11	0.027	0.84	52.30
	RF4	0.17	0.13	0.61	0.08	0.014	1.15	49.50
	RF4	0.23	0.25	0.73	0.18	0.020	1.04	80.10
	RF4	0.27	0.13	0.66	0.09	0.010	1.08	42.50
	RF4	0.54	0.09	0.46	0.08	0.013	1.06	50.30
	RF4	0.16	0.11	0.75	0.07	0.014	1.08	46.10
	Mean	0.27	0.14	0.61	0.10	0.016	1.04	53.47
	SD	0.14	0.06	0.13	0.04	0.006	0.11	13.50
Beaver River	**RF5**	0.07	0.09	0.81	0.08	0.009	1.46	38.30
	RF5	0.09	0.09	0.86	0.18	0.013	1.83	34.00
	RF5	0.13	0.13	0.60	0.04	0.022	1.94	39.40
	RF5	0.10	0.07	0.60	0.05	0.017	2.07	31.00
	RF5	0.13	0.08	0.56	0.06	0.011	1.69	37.00
	RF5	0.09	0.07	0.60	0.05	0.014	1.74	38.90
	Mean	0.10	0.09	0.67	0.08	0.014	1.79	36.43
	SD	0.03	0.02	0.13	0.05	0.005	0.21	3.29

Lead concentrations in slimy sculpin were below mean and well below the maximum concentrations reported in the INAC and USGS databases. Values for individual sculpin ranged from 0.04 to 0.18 ug/g.

Methylmercury is a neurotoxin, and the form of mercury that is most easily bioaccumulated in organisms. Mercury in fish is almost entirely methylmercury (Rodgers 1994). Mercury concentrations in sculpin were consistently low at both sites but generally above the detection level of 0.001 ug/g. Concentrations within individual fish ranged from 0.009 to 0.027 ug/g. Concentrations derived form individual fish were all below the Environment Canada tissue residue guideline of 0.033 ug/g for wildlife consumers. The mean and maximum concentrations in whole body sculpin from the INAC database were 0.02 ug/g and 0.17 ug/g, respectfully.

Selenium concentrations of individual sampled sculpin did not exceed 2.07 ug/g. Determined averages for sites RF4 and RF5 were 1.04 and 1.79 ug/g, respectfully. These values approximated averages found for sculpin in the INAC database of 1.7 ug/g.

TABLE 8-8 AVERAGE METAL CONCENTRATIONS (ug/g wet weight) IN WHOLE BODY SLIMY SCULPIN FROM CAMP CREEK AND THE BEAVER RIVER, AUGUST 2013

Drainage	Site	Species	Arsenic	Cadmium	Copper	Lead	Mercury	Selenium	Zinc
Camp Creek	**RF4**	**Slimy sculpin**	0.27	0.14	0.61	0.10	0.016	1.04	53.47
Beaver River	**RF5**	**Slimy sculpin**	0.10	0.09	0.67	0.08	0.014	1.79	36.43
CCME guideline			-	-	-	-	0.033	-	-
NCP Yukon Database Slimy Sculpin	**Maximum**		10.2	1.03	27.6	29.4	0.17	9.0	187.1
	Average (N)		1.9 (72)	0.16 (72)	1.6 (72)	2.4 (72)	0.02 (62)	1.7 (57)	42.2 (72)
USGS Yukon River Database Freshwater Fish	**Maximum**		1.95	1.49	1.49	-	0.65	0.85	56.4
	Average (N)		2.1 (31)	0.07 (9)	0.7 (31)	<0.27	0.24 (31)	0.51 (31)	34.8 (31)

CCME = Canadian Council of Ministers of the Environment, Canadian Guidelines for the Protection of Wildlife Consumers of Aquatic Biota; NCP = INAC, Northern Contaminants Program Yukon Database for slimy sculpin; USGS = US Geological Survey – Biomonitoring of Environmental Status and Trends (BEST) Large Rivers Monitoring Network – Database for freshwater fish.

Zinc concentrations in sculpin were on average higher at site RF4. The maximum concentration for a single sculpin at this site was 80.10 ug/g. The average concentration in sculpin reported in the INAC database was 42.2 ug/g with a maximum concentration of 187.1 ug/g reported in a sculpin from VanGorda Creek. VanGorda Creek is the receiving waters of a historic open pit mine in Faro, Yukon. The USGS database for other freshwater fish averaged 34.8 ug/g with a maximum of 56.4 ug/g reported for a single fish.

Overall, the concentrations of arsenic, cadmium, lead, copper, mercury, selenium and zinc did not appear to be elevated and are considered to be representative of baseline conditions for each of the two sampled sites. While some of the metal concentrations were on average higher for site RF4, compared to the reference site, the presence of the Tiger Deposit mineralization at the headwaters of Camp Creek may provide some explanation.

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APPENDIX A

WILDLIFE SURVEYS

- **Photos**
- **Figures and Tables**

Photo #1: Moose in pond, June 2012.

Photo #2: Moose tracking and bedding area, February 2013.

Photo # 3: Two male moose on Patterson Range, November 2013.

Photo # 4: An adult pair of Trumpeter swans with five cygnets on Clark Lakes, Nov 2013.

Photo # 5: Wood frog at vegetation site RV28, August 7th, 2013.

135°30'0"W 135°0'0"W 134°30'0"W 134°0'0"W

64°20'0"N 64°10'0"N 64°0'0"N

Legend

Time of Year

- Late Winter
- Early Winter
- Late spring/early summer
- RauCamp
- Airstrip
- Proposed Winter Access Route
- Wind River Trail Winter Road
- Road
- Rau Property Outline

Number of Moose

- 49
- 10-20
- 5-10
- 3-4
- 2
- 1

Good

Kathleen Lakes

Clark Lakes

Scougale Lakes

Scougale Ck

McQuesten Lake

Rambler Creek

Rambler Hill

Cache Creek

Mount Cameron

Mount Patterson

Hanson Lakes

Ladue Lake

Keno City

Rackla River

Beaver River

ATAC Resources Ltd.

Figure 3.1

Seasonal Moose Observations (2010, 2012, 2013)

Laberge Environmental Services

0 1.25 2.5 5 7.5 10

Kilometers

LEGEND

- Rau Camp
- Airstrip
- Wind River Trail Winter Road
- Proposed Winter Access Route
- Existing Road
- Rau Property Outline
- Elevation Contour (500' interval)

Wildlife Survey Track

- November 2012
- June 2012
- November 2013
- February 2013
- June 2013

135°30'0"W 135°0'0"W 134°30'0"W 134°0'0"W

64°20'0"N 64°10'0"N 64°0'0"N

Good Kathleen Lakes Clark Lakes Scout Lake Ck Racka River Beaver River McQuesten Lake Rambler Creek Rambler Hill Cache Creek Mount Cameron Mount Patterson Hanson Lake Ladue Lake Keno City

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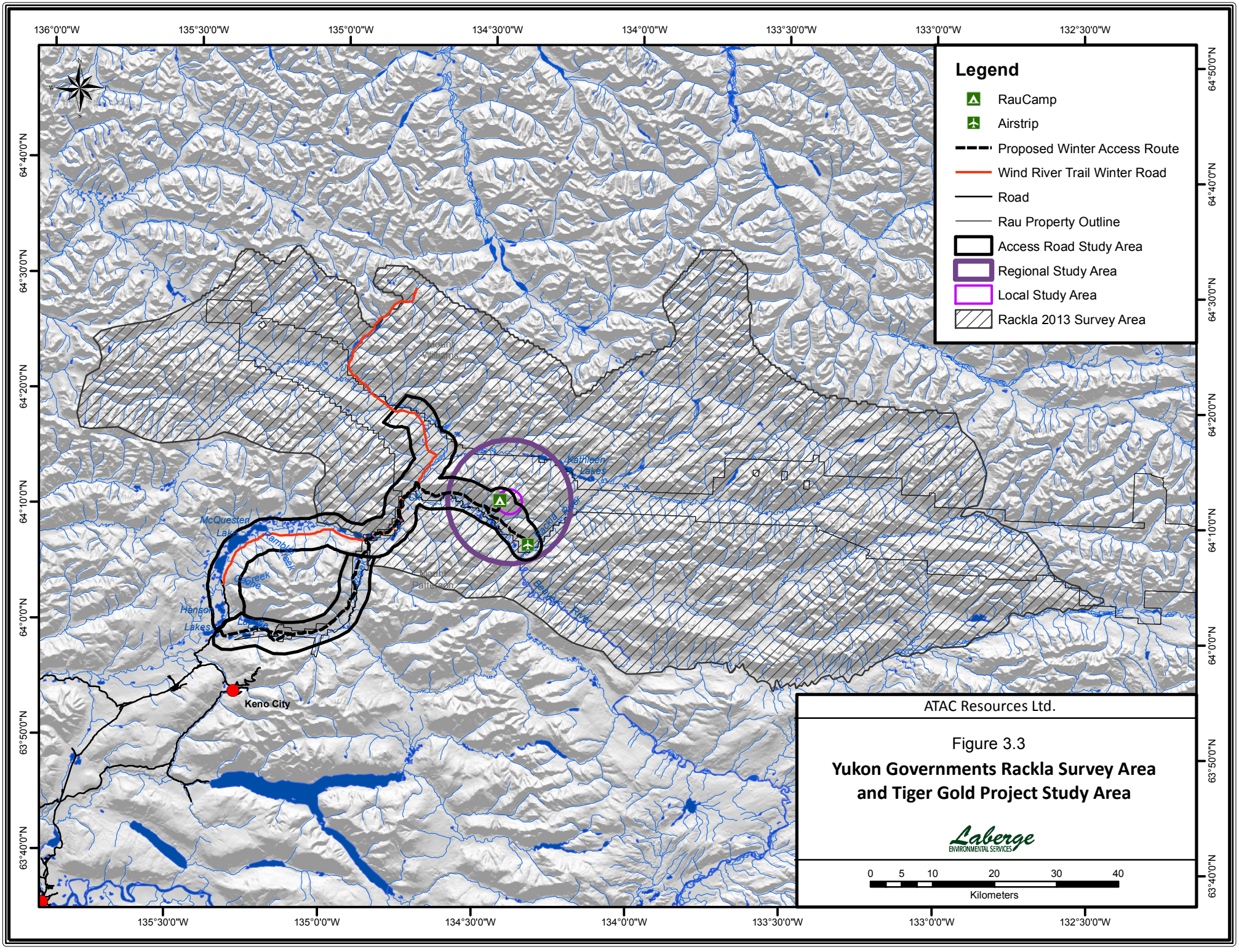
Figure 3.2

Flight Tracks of the Wildlife Surveys

Laberge ENVIRONMENTAL SERVICES

0 1.5 3 6 9 12

Kilometers


136°0'0"W
135°30'0"W
135°0'0"W
134°30'0"W
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133°30'0"W
133°0'0"W
132°30'0"W
64°40'0"N
64°30'0"N
64°20'0"N
64°10'0"N
64°0'0"N
63°50'0"N
63°40'0"N
Legend
RauCamp
Airstrip
Proposed Winter Access Route
Wind River Trail Winter Road
Road
Rau Property Outline
Access Road Study Area
Regional Study Area
Local Study Area
Rackla 2013 Survey Area
Mount Williams
Kathleen Lakes
McQuesten Lake
Hanson Lakes
Mount Patterson
Rackla River
Keno City
ATAC Resources Ltd.
Figure 3.3
Yukon Governments Rackla Survey Area
and Tiger Gold Project Study Area
Laberge
ENVIRONMENTAL SERVICES
0 5 10 20 30 40
Kilometers

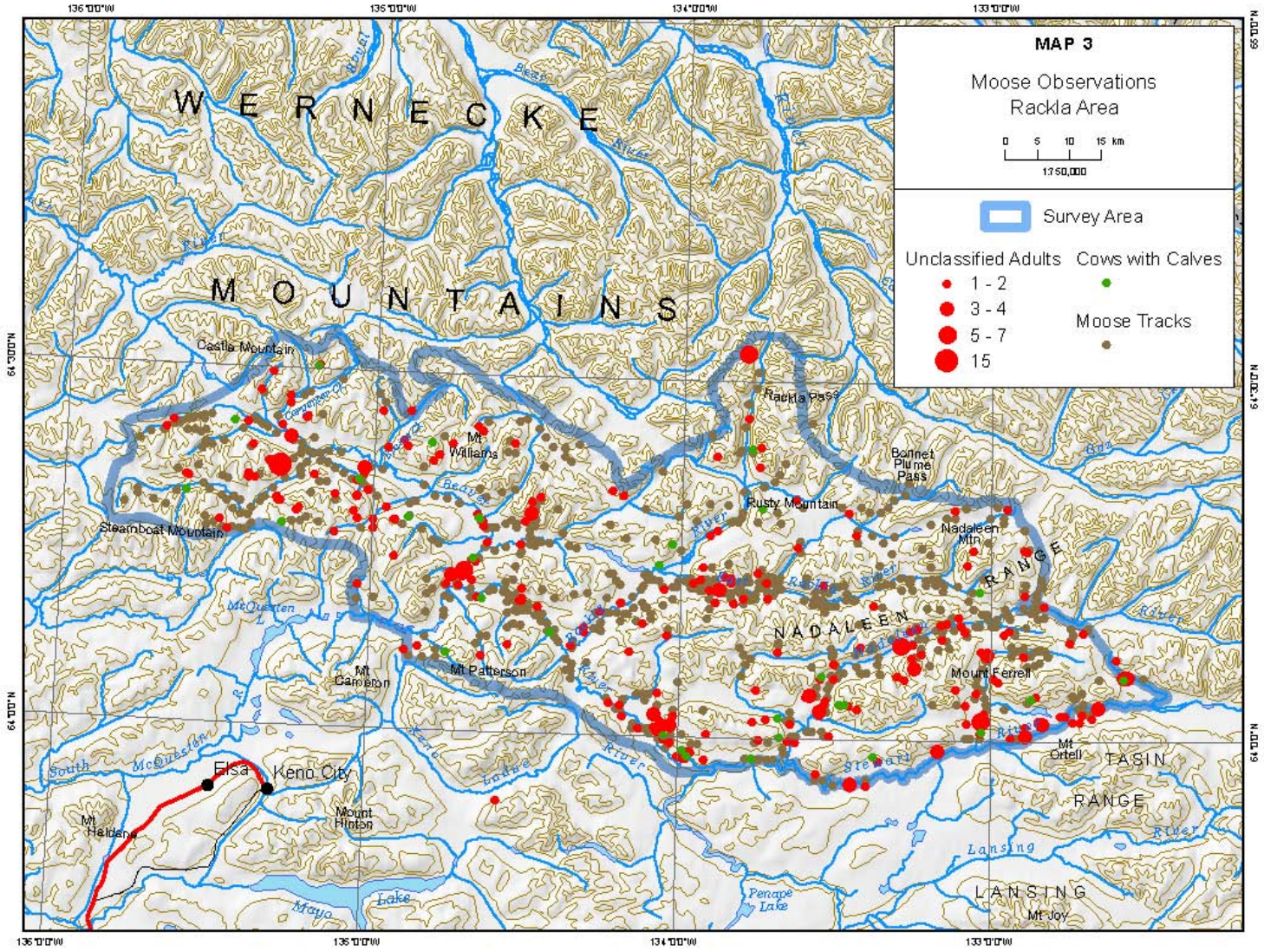


FIGURE 3.4: Moose observations in the Rackla Study Area, March 2013 (O'Donoghue 2013)

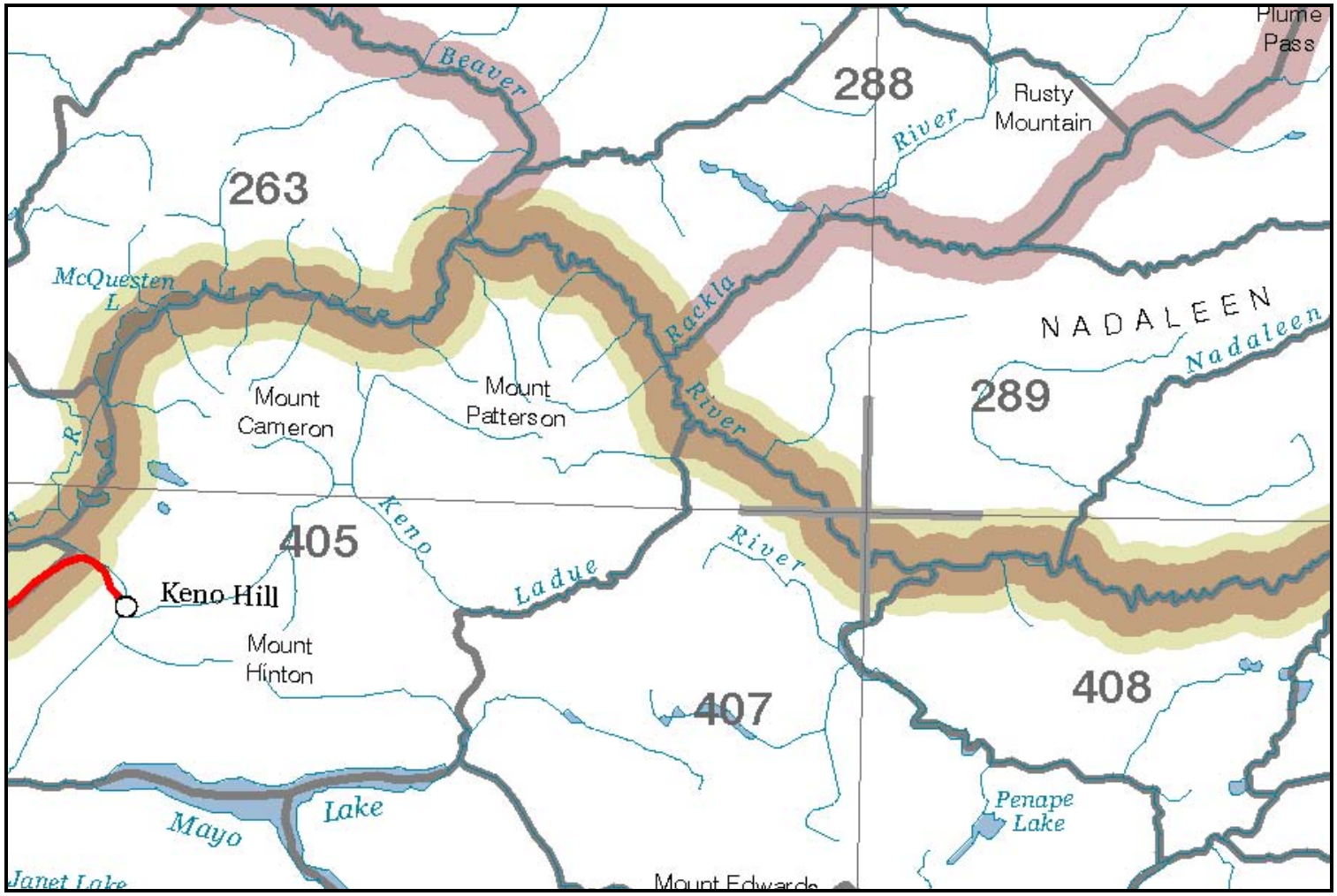


Figure 3.5 : Game Management Areas in the Rau Project Study Area (GMAs 405, 288 and 263)

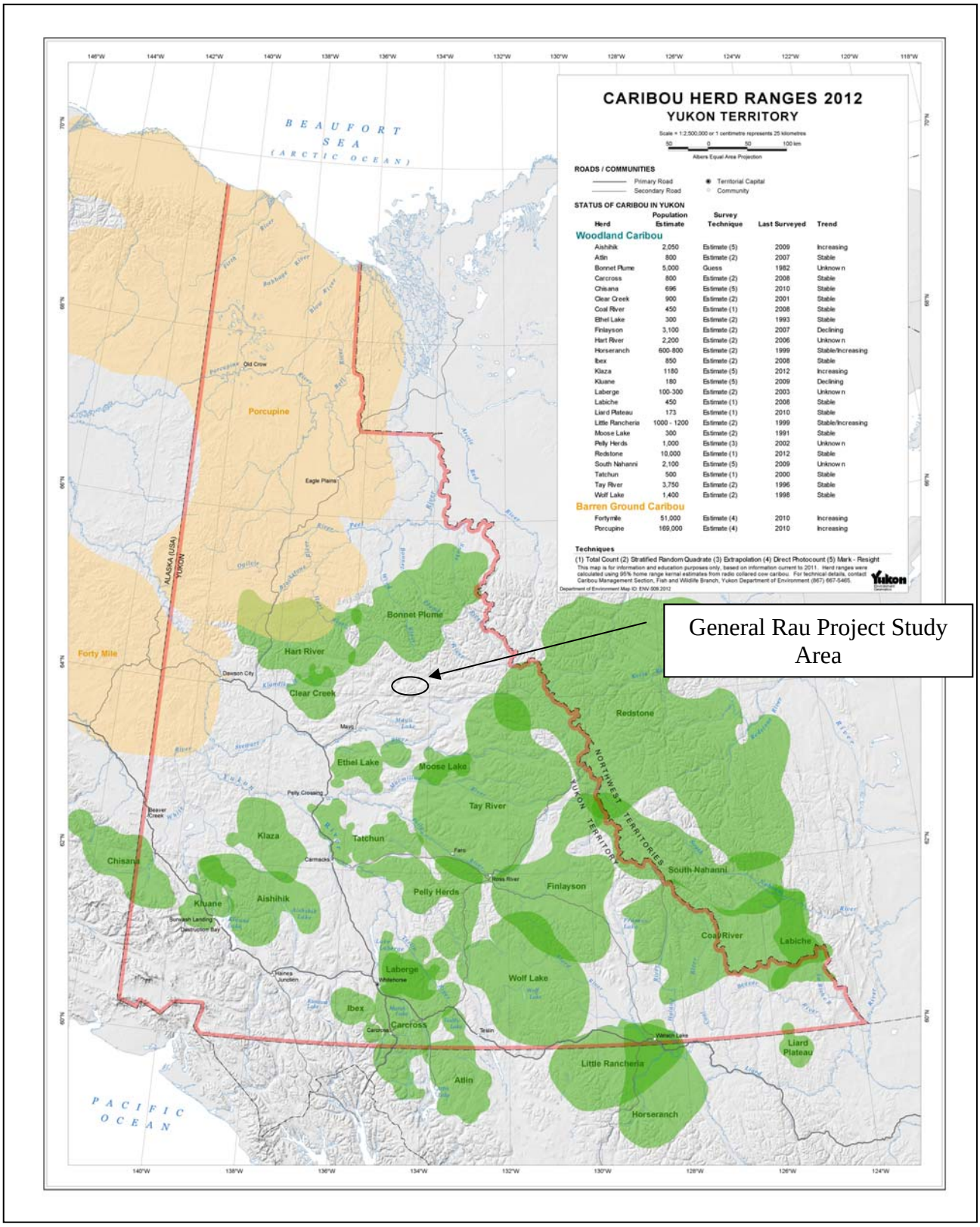


Figure 3.6 Caribou Herd Ranges in the Yukon Territory

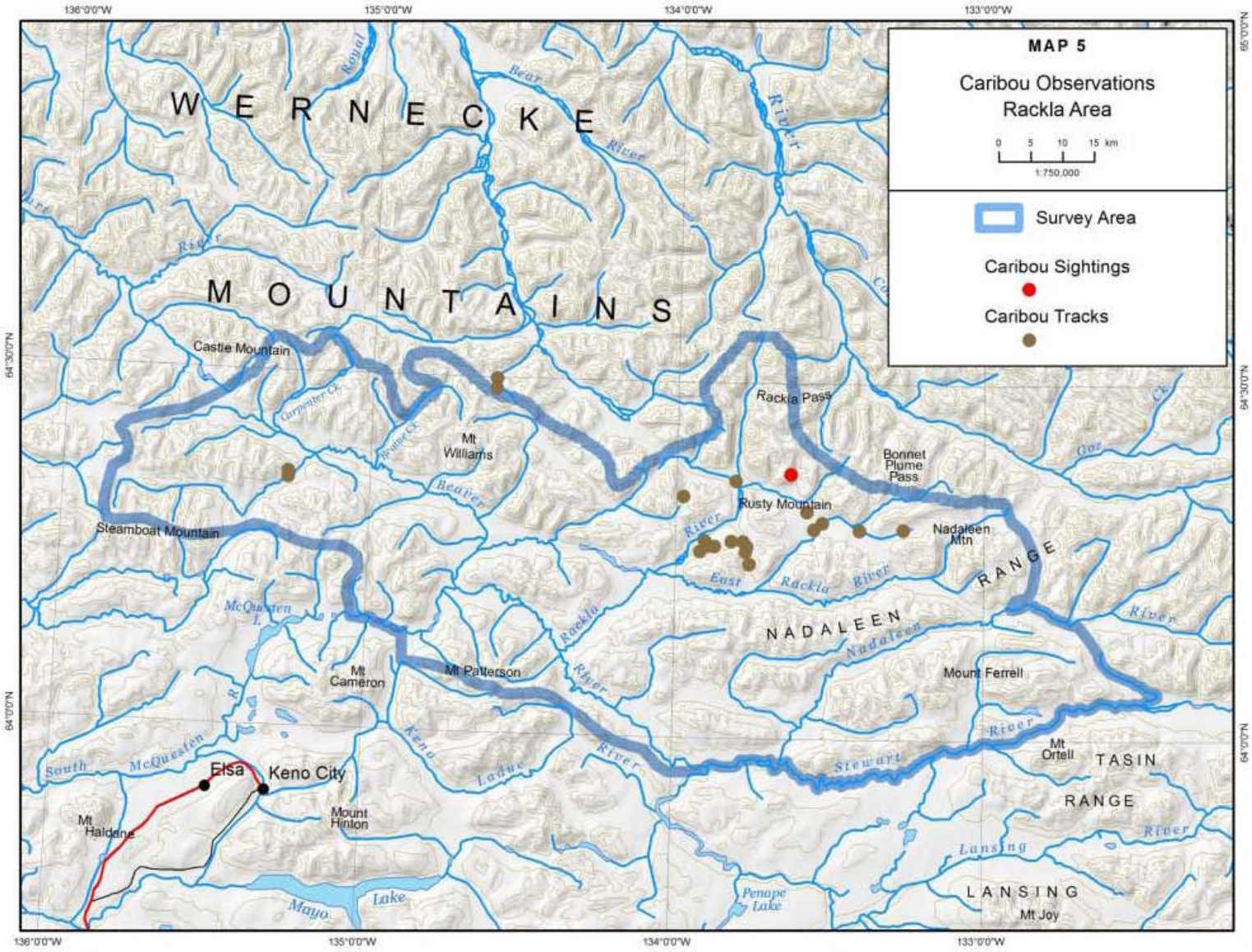
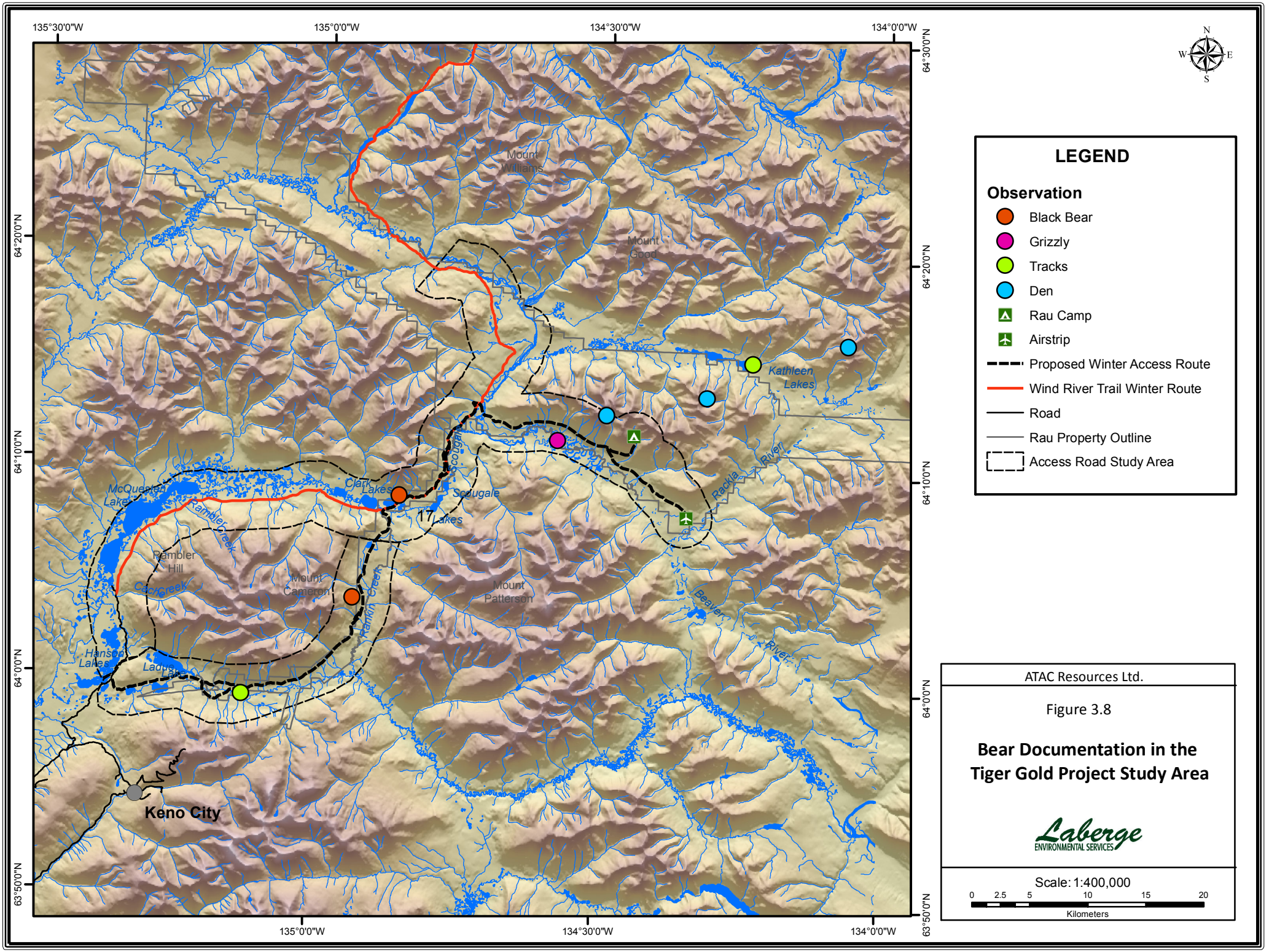


Figure 3.7 Caribou Observations in the Rackla Study Area, March 2013 (O'Donoghue, 2013)


135°30'0"W
135°0'0"W
134°30'0"W
134°0'0"W
64°30'0"N
64°20'0"N
64°10'0"N
64°0'0"N
63°50'0"N
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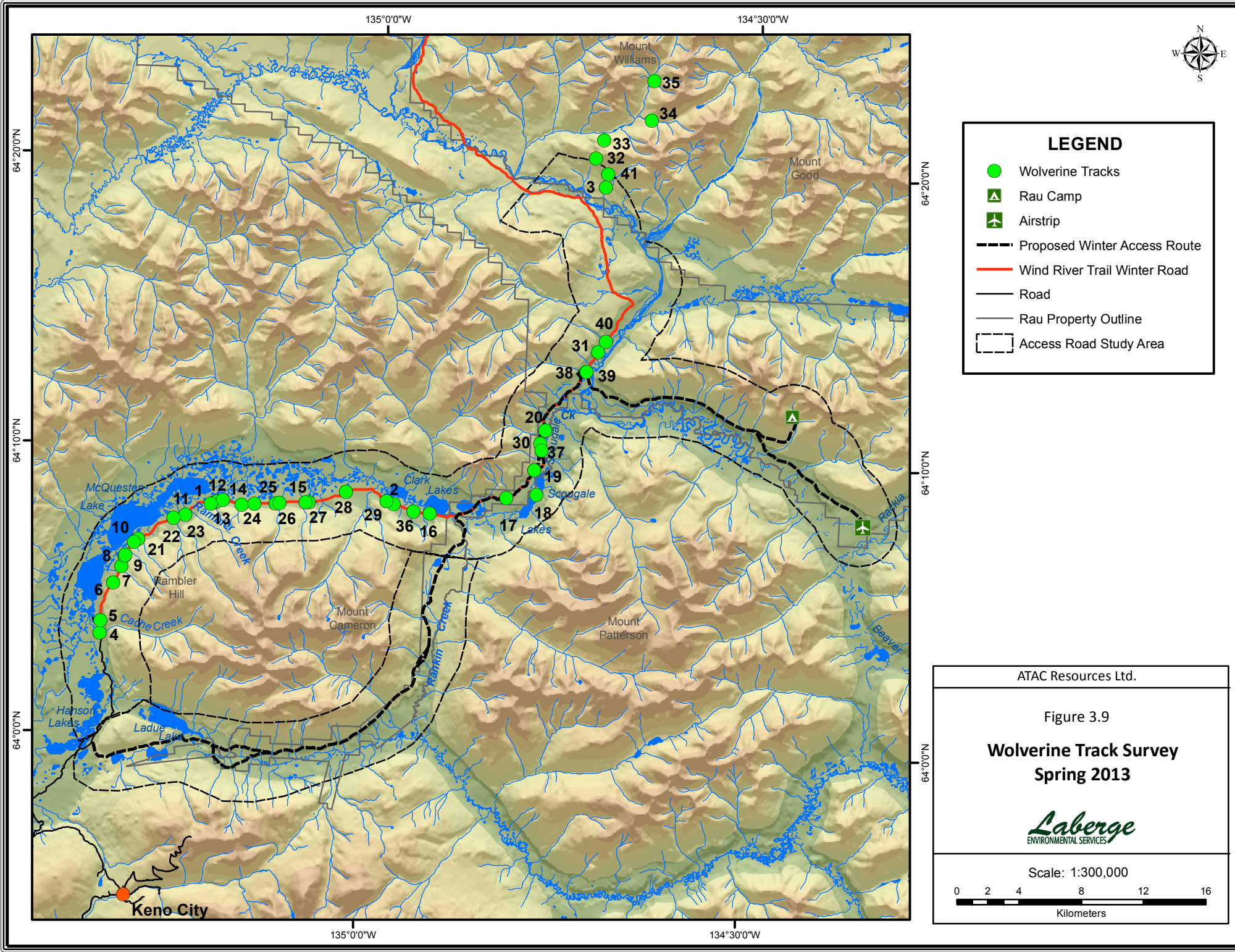
Mount Williams
Mount Good
Kathleen Lakes
Rackla River
Scougale
17 Lakes
Clark Lakes
McQueen Lake
Rambler Creek
Rambler Hill
Cirque Creek
Mount Cameron
Ramlin Creek
Mount Patterson
Beaver River
Hanson Lakes
Ladue
Keno City
LEGEND
Observation
Black Bear
Grizzly
Tracks
Den
Rau Camp
Airstrip
Proposed Winter Access Route
Wind River Trail Winter Route
Road
Rau Property Outline
Access Road Study Area
ATAC Resources Ltd.
Figure 3.8
Bear Documentation in the Tiger Gold Project Study Area
Laberge ENVIRONMENTAL SERVICES
Scale: 1:400,000
0 2.5 5 10 15 20
Kilometers


135°0'0"W
134°30'0"W
64°20'0"N
64°10'0"N
64°0'0"N
N
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Mount Williams
Mount Good
Mount Cameron
Mount Patterson
Rambler Hill
Clark Lakes
Scougale Ck
Scougale Lakes
McQuesten Lake
Rambler Creek
Cache Creek
Rankin Creek
Hanson Lakes
Ladue Lake
Beaver
Keno City
35
34
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41
3
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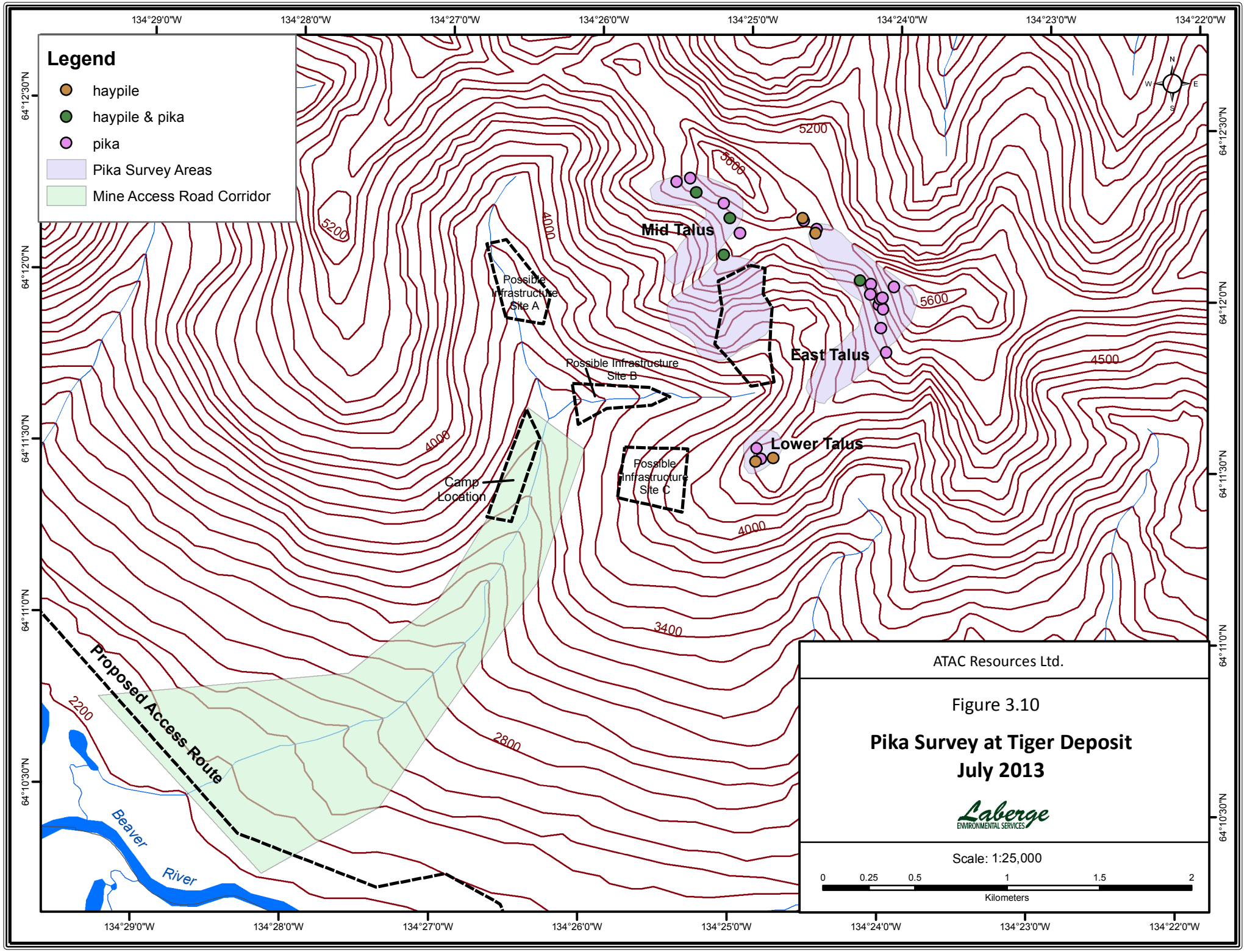
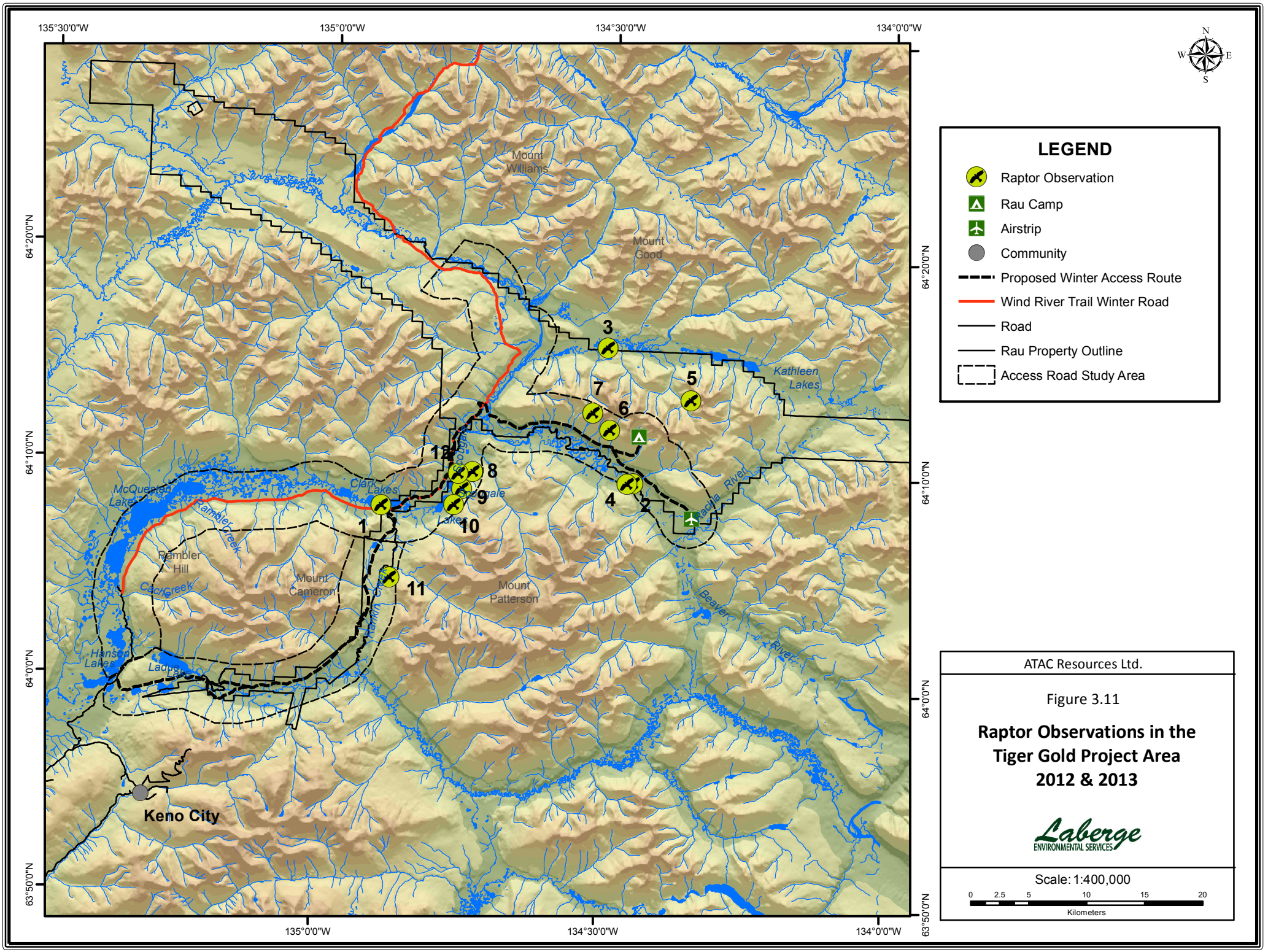
29
36
16
1
12
14
25
15
11
13
24
26
27
10
22
23
21
8
9
7
6
5
4
LEGEND
Wolverine Tracks
Rau Camp
Airstrip
Proposed Winter Access Route
Wind River Trail Winter Road
Road
Rau Property Outline
Access Road Study Area
ATAC Resources Ltd.
Figure 3.9
Wolverine Track Survey
Spring 2013
Laberge
ENVIRONMENTAL SERVICES
Scale: 1:300,000
0 2 4 8 12 16
Kilometers

TABLE 3-7	LOCATIONS AND DESCRIPTIONS OF WOLVERINE TRACKS					
Waypoint #	**Date, 2013**	**Direction of Track**	**Latitude**	**Longitude**	**Elevation feet**	**Air Temp °C**
1	24-Feb	heading north	64° 08.141'	135° 12.309'	2391	-24
2		heading South	64°08.336'	134°58.091'	2409	
3	25-Feb	heading South	64°19.986'	134°41.989'	3015	-30
4	26-Feb	heading South	64°03.484'	135°20.934'	3122	-33
5	5-Mar	heading NW	64° 03.912'	135°20.910'	2332	-27
6		heading east	64°05.241'	135°20.028'	2486	
7		heading East	64°05.806'	135°19.455'	2417	
8		heading west	64°06.151'	135°19.224'	2381	
9		heading east	64°06.209'	135°19.171'	2379	
10		heading east	64°16.770'	135°18.198'	2327	
11		heading north	64°07.696'	135°14.540'	2305	
12		heading west	64°08.190'	135°12.071'	2307	
13		heading east	64°08.237'	135°11.640'	2289	
14		heading east	64°08.117'	135°10.144'	2321	
15		heading west	64°08.290'	135°04.820'	2317	
16		heading west	64°08.054'	134°55.219'	2237	
17		heading east	64°08.696'	134°49.179'	2365	
18	6-Mar	heading west	64°08.843'	134°46.792'	2245	-30
19		heading north	64°09.683'	134°47.025'	2296	
20		heading west	64°11.071'	134°46.272'	2295	
21	16-Mar	heading east	64°06.656'	135°18.515'	2295	-25
22		heading east	64°07.544'	135°15.503'	2340	
23		heading west	64°08.092'	135°12.615'	2348	
24		heading east	64°08.157'	135°09.111'	2337	
25		heading north on skidoo trail	64°08.209'	135°07.464'	2347	
26		track leaving trail heading east	64°08.219'	135°07.162'	2366	
27		heading east	64°08.290'	135°05.082'	2235	
28		heading west	64°08.697'	135°01.925'	2287	
29		heading east	64°08.421'	134°58.670'	2291	
30	17-Mar	heading west	64°10.616'	134°46.646'	2191	-35
31		heading west	64°13.833'	134°42.316'	2283	
32		heading east	64°20.522'	134°43.000'	3233	
33		heading west	64°21.153'	134°42.404'	3408	
34		heading north	64°21.897'	134°38.673'	3557	
35		heading west	64°23.266'	134°38.535'	3782	
36	31-Mar	heading east	64°08.107'	134°56.509'	2241	-13
37	1-Apr	heading east	64°10.376'	134°46.536'	2239	-3
38		heading east	64°13.137'	134°43.195'	2253	
39		heading NE	64°13.135'	134°43.160'	2225	
40		heading west	64°14.205'	134°41.720'	2300	
41		heading east	64°19.542'	134°42.130'	2691	


Legend
haypile
haypile & pika
pika
Pika Survey Areas
Mine Access Road Corridor
134°29'0"W
134°28'0"W
134°27'0"W
134°26'0"W
134°25'0"W
134°24'0"W
134°23'0"W
134°22'0"W
64°12'30"N
64°12'0"N
64°11'30"N
64°11'0"N
64°10'30"N
5200
5600
4000
4500
3400
2800
2200
Mid Talus
East Talus
Lower Talus
Possible Infrastructure Site A
Possible Infrastructure Site B
Possible Infrastructure Site C
Camp Location
Proposed Access Route
Beaver River
N
S
E
W
ATAC Resources Ltd.
Figure 3.10
Pika Survey at Tiger Deposit
July 2013
Laberge ENVIRONMENTAL SERVICES
Scale: 1:25,000
0 0.25 0.5 1 1.5 2
Kilometers

APPENDIX A TABLE 3-10 PIKA AND HAYPILE LOCATIONS WITH COMMENTS

Observation #	Type	Latitude		Longitude		Location	Haypile activity	Notes
		Degrees	Minutes	Degrees	Minutes			
001	pika	64	12.205	134	24.621	East Talus		
002	haypile	64	12.208	134	24.628	East Talus	active	
003	pika	64	12.18	134	24.532	East Talus		
004	haypile	64	12.169	134	24.538	East Talus	active	
005	haypile & pika	64	12.033	134	24.23	East Talus	active	barely active
006	pika	64	12.163	134	25.046	Pit area		
007	haypile & pika	64	12.096	134	25.15	Pit area	inactive	heard pika, did not see
008	haypile & pika	64	12.204	134	25.117	Mid Talus	inactive	
009	pika	64	12.247	134	25.161	Mid Talus		just heard pika, likely feeding in meadow
010	pika	64	12.32	134	25.391	Mid Talus		
011	pika	64	12.308	134	25.482	Mid Talus		
012	haypile & pika	64	12.275	134	25.349	Mid Talus	active	heard pika here and then found haypile nearby
013	pika	64	12.016	134	24.002	East Talus		
014	pika	64	11.9669	134	24.1001	East Talus		very big pika!
015	pika	64	11.9547	134	24.074	East Talus	active	
016	pika	64	11.9847	134	24.0948	East Talus		heard pika, did not see
017	pike	64	12.0222	134	24.1573	East Talus		
018	pika	64	11.9968	134	24.1709	East Talus		heard pika, did not see
019	pika	64	11.8278	134	24.0417	East Talus		heard pika, did not see
020	pika	64	11.9852	134	24.0785	East Talus		heard pika, did not see
021	pika	64	11.8966	134	24.0824	East Talus		heard pika, did not see
022	pika	64	11.535	134	24.891	Lower Talus		just heard this pika in the rocks
023	pika	64	11.505	134	24.859	Lower Talus		saw this pika
024	haypile	64	11.496	134	24.895	Lower Talus	active	
025	haypile	64	11.51	134	24.778	Lower Talus	active	A few small stems in rocks among shrubs and not confirmed it is a pika haypile.


135°30'0"W
135°0'0"W
134°30'0"W
134°0'0"W
64°20'0"N
64°10'0"N
64°0'0"N
63°50'0"N
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Mount Williams
Mount Good
Kathleen Lakes
McQuesten Lake
Clark Lakes
Rambler Creek
Rambler Hill
Mount Cameron
Mount Patterson
Hanson Lakes
Ladue River
Beaver River
Keno City
1
2
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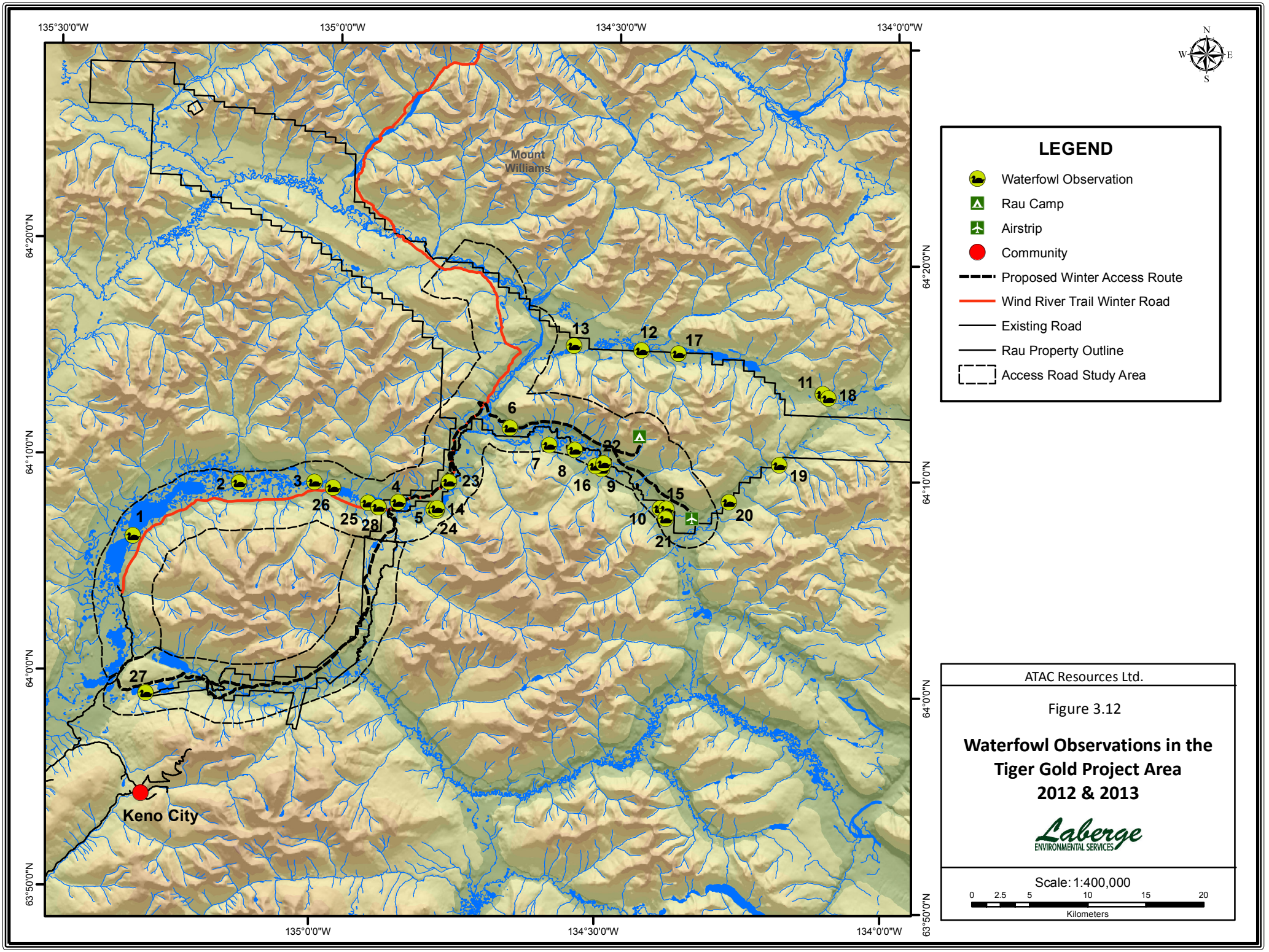
9
10
11
12
LEGEND
Raptor Observation
Rau Camp
Airstrip
Community
Proposed Winter Access Route
Wind River Trail Winter Road
Road
Rau Property Outline
Access Road Study Area
ATAC Resources Ltd.
Figure 3.11
Raptor Observations in the Tiger Gold Project Area 2012 & 2013
Laberge ENVIRONMENTAL SERVICES
Scale: 1:400,000
0 2.5 5 10 15 20
Kilometers


135°30'0"W
135°0'0"W
134°30'0"W
134°0'0"W
64°20'0"N
64°10'0"N
64°0'0"N
63°50'0"N
N
W
E
S
Mount Williams
Keno City
LEGEND
Waterfowl Observation
Rau Camp
Airstrip
Community
Proposed Winter Access Route
Wind River Trail Winter Road
Existing Road
Rau Property Outline
Access Road Study Area
ATAC Resources Ltd.
Figure 3.12
Waterfowl Observations in the Tiger Gold Project Area 2012 & 2013
Laberge ENVIRONMENTAL SERVICES
Scale: 1:400,000
0 2.5 5 10 15 20
Kilometers

APPENDIX B

VEGETATION

- **Photos**
- **Maps**
- **Plant Lists**

APPENDIX B – PHOTOGRAPHS OF VEGETATION MONITORING SITES

Vegetation Monitoring Site at RV-1

Vegetation Monitoring Site RV-2

Vegetation Monitoring Site RV-3

Vegetation Monitoring Site RV-4

Vegetation Monitoring Site RV-5

Vegetation Monitoring Site RV-6

Vegetation Monitoring Site RV-7

Vegetation Monitoring Site RV-8

Vegetation Monitoring Site RV-9

Vegetation Monitoring Site RV-10

Vegetation Monitoring Site RV-11

Vegetation Monitoring Site RV-12

Vegetation Monitoring Site RV-13

Vegetation Monitoring Site RV-14

Vegetation Monitoring Site RV-15

Vegetation Monitoring Site RV-16

Vegetation Monitoring Site RV-17

Vegetation Monitoring Site RV-18

Vegetation Monitoring Site RV-19

Vegetation Monitoring Site RV-20

Vegetation Monitoring Site RV-21

Vegetation Monitoring Site RV-22

Vegetation Monitoring Site RV-23

Vegetation Monitoring Site RV-24

Vegetation Monitoring Site RV-25

Vegetation Monitoring Site RV-26

Vegetation Monitoring Site RV-27

Vegetation Monitoring Site RV-28

Figure 4.1

Vegetation Types within the Tiger Gold Project Property and along the Proposed Access Road

Scale: 1:75,000

Laberge ENVIRONMENTAL SERVICES

Legend

- Vegetation Monitoring Site
- Existing Road
- Proposed Rau Road

Vegetation Type

- White Spruce
- Black Spruce
- Subalpine
- Alpine
- Wetland/Riparian
- Post-burn Regeneration

RV19
RV20
RV21
RV22
RV23
RV24
RV25
RV27

Rambler Creek
Scougale Lakes
Rambler Hill
Mount Cameron
Cache Creek
River
McQuesten
Forbes Hill
Zahn Hill
Stand To Hill
Homestead Creek
Barney Creek
Ladue Lake
Ladue
Hanson
South
Lakes

0 1 2 4 6 8
Kilometers

N

480000 485000 490000 495000 500000 505000

7110000 7105000 7100000 7095000

Figure 4.2

Vegetation Types within the Tiger Gold Project Property and along the Proposed Access Road

Scale: 1:75,000

Laberge ENVIRONMENTAL SERVICES

Legend

- Vegetation Monitoring Site
- Rau Camp
- Proposed Rau Road

Vegetation Type

- White Spruce
- Black Spruce
- Subalpine
- Alpine
- Wetland/Riparian
- Post-burn Regeneration

0 1 2 4 6 8 Kilometers

135°30'0"W
135°0'0"W
134°30'0"W
64°20'0"N
64°10'0"N
64°0'0"N

Mount Good
Kathleen Lakes
Scougale Ck
Clark Lakes
Scougale Lakes
McQuesten Lake
Rambler Creek
Rambler Hill
Cache Creek
Mount Cameron
Mount Patterson
Hanson Lakes
Ladue Lake
Keno City
Beaver River

1952
1959
1971
1972
1982
1989
1993
1994
1998
1999
2010
2011
2012
2013
1984
1986
9990

Legend

- RauCamp
- Airstrip
- Proposed Winter Access Route
- Existing Wind River Trail
- Road
- Rau Property Outline
- Local Study Area
- Regional Study Area
- AccessRdStudyArea

Fire (Year)

- 1946 - 1970
- 1971 - 1980
- 1981 - 1990
- 1991 - 2010
- 2011 - 2013

ATAC Resources Ltd.

Figure 4.3

Tiger Gold Project Area
Fire History

Laberge Environmental Services

Scale:1:225,000

0 1.25 2.5 5 7.5 10
Kilometers

APPENDIX B LISTING OF ALL VEGETATION AT EACH MONITORING SITE

Vegetation Monitoring Site RV-1

White Spruce Vegetation Type **NAD 27 Canada UTM 527110 7118651**

Abies lasiocarpa	subalpine fir
Agropyron trachycaulum	slender wheatgrass
Alnus crispa	mountain alder
Anemone multifida	cut-leaved anemone
Anemone richardsonii	Richardson's anemone
Arctostaphylos rubra	red bearberry
Betula glandulosa	dwarf birch
Carex media	Scandanavian sedge
Carex scirpoidea	rush-like sedge
Cassiope tetragona	four-angled mountain-heather
Dryas integrifolia	smooth-leaved mountain-avens
Empetrum nigrum	crowberry
Epilobium angustifolium	fireweed
Equisetum pratense	meadow horsetail
Ledum groenlandicum	Labrador tea
Lupinus arcticus	arctic lupine
Mertensia paniculata	tall bluebell
Monenses uniflora	single delight
Parrya nudicaulis	nakedstem wallflower
Pedicularis labradorica	Labrador lousewort
Picea glauca	white spruce
Platanthera obtusata	one-leaved rein-orchid
Poa alpina	alpine bluegrass
Poa arctica	arctic bluegrass
Potentilla fruticosa	shrubby cinquefoil
Rosa acicularis	prickly rose
Salix glauca	grey-leaf willow
Salix reticulata	net-veined willow
Vaccinium uligunosum	bog blueberry
Vaccinium vitis-idaea	lingonberry
Valeriana capitata	capitate valerian
Zygadenus elegans	death camas

non-vascular species noted:

Cladina sp.
Peltigera aphthosa
Pleurozium shreberi
Splachnum luteum

Vegetation Monitoring Site RV-2

Alpine Vegetation Type **NAD 27 Canada UTM 528476 7119780**

Abies lasiocarpa	subalpine fir
Anemone multifida	cut-leaved anemone
Anemone narcissiflora	narcissus-flowered anemone
Anemone parviflora	wood anemone
Arnica lessingii	Lessing's arnica
Artemisia norvegica	mountain sagewort
Astragulus umbellatus	hairy arctic milk-vetch
Calamagrostis stricta	narrow reed-grass
Campanula lasiocarpa	mountain harebell
Carex membranacea	fragile sedge
Carex podocarpa	graceful mountain sedge
Carex rariflora	looseflower alpine sedge
Carex scirpoidea	rush-like sedge
Carex vaginata	sheathed sedge
Cassiope tetragona	four-angled mountain-heather
Castilleja hyperborea	northern paintbrush
Chrysanthemum integrifolium	alpine daisy
Dodecatheon frigidum	northern shooting star
Dryas crenulata	mountain-avens
Erigeron grandiflorus	largeflowered fleabane
Erigeron humilis	arctic daisy
Festuca altaica	northern rough fescue
Gentianella propinqua	four-parted gentian
Hedysarum alpinum	bear root
Hierochloe alpina	alpine sweetgrass
Lupinus arcticus	arctic lupine
Luzula arcuata	curved alpine woodrush
Lycopodium alpinum	alpine clubmoss
Oxyria digyna	mountain sorrel
Parrya nudicaulis	nakedstem wallflower
Pedicularis capitata	few-flowered *lousewort*
Pedicularis langsdorfii	Langsdorf's lousewort
Picea glauca	white spruce
Poa alpina	alpine bluegrass
Poa leptocoma	western bog bluegrass
Polemonium acutiflorum	tall Jacob's ladder
Polygonum viviparum	alpine bistort
Potentilla fruticosa	shrubby cinquefoil
Pyrola sp.	wintergreen
Rhodiola integrifolia	western roseroot
Salx alaxensis	felt-leaf willow
Salix glauca	grey-leaf willow
Salix polaris	polar willow

Salix reticulata	net-veined willow
Saxifraga hieracifolia	stiff-stemmed saxifrage
Saxifraga lyalii	red-stemmed saxifrage
Saxifraga nelsoniana	brook saxifrage
Saxifraga oppositifolia	purple mountain saxifrage
Saxifraga tricuspidata	prickly saxifrage
Senecio cymbalaria	dwarf arctic ragwort
Senecio lugens	black-tipped groundsel
Silene acaulis	moss campion
Silene involucrata	arctic lychnis
Solidago multiradiata	northern goldenrod
Taraxacum lyratum	harp dandelion
Trisetum spicatum	spike trisetum
Vaccinium uligunosum	bog blueberry
Vaccinium vitis-idaea	lingonberry
Woodsia alpina	alpine woodsia

non-vascular species noted:

Dactylina arctica
Masonhalea richardsonii
Stereocaulon paschale
Umbilicaria sp.

Vegetation Monitoring Site RV-3

Subalpine Vegetation Type **NAD 27 Canada UTM 528252 7119202**

Abies lasiocarpa	subalpine fir
Achillea millefolium	common yarrow
Aconitum delphinifolium	mountain monkshood
Anemone multifida	cut-leaved anemone
Arctostaphylos rubra	red bearberry
Arnica angustifolia	alpine arnica
Artemisia norvegica	mountain sagewort
Betula glandulosa	dwarf birch
Calamagrostis canadensis	blue-joint reed-grass
Carex media	Scandanavian sedge
Carex podocarpa	graceful mountain sedge
Carex scirpoidea	rush-like sedge
Cassiope tetragona	four-angled mountain-heather
Delphinium glaucum	tall larkspur
Dodecatheon frigidum	northern shooting star
Dryas integrifolia	smooth-leaved mountain-avens
Empetrum nigrum	crowberry
Epilobium angustifolium	fireweed

Epilobium latifolium	broad-leaved willowherb
Equisetum pratense	meadow horsetail
Erigeron acris	bitter fleabane
Festuca altaica	northern rough fescue
Gentianella propinqua	four-parted gentian
Geocaulon lividum	bastard toad-flax
Heracleum lanatum	cow parsnip
Juniperus communis	common juniper
Ledum groenlandicum	Labrador tea
Linnaea borealis	twinflower
Lupinus arcticus	arctic lupine
Mertensia paniculata	tall bluebell
Moehringia lateriflora	blunt-leaved sandwort
Pedicularis labradorica	Labrador lousewort
Pedicularis langsdorfii	Langsdorf's lousewort
Picea glauca	white spruce
Poa alpina	alpine bluegrass
Poa palustris	fowl bluegrass
Polygonum viviparum	alpine bistort
Potentilla fruticosa	shrubby cinquefoil
Pyrola asarifolia	pink wintergreen
Rhodiola integrifolia	western roseroot
Salix glauca	grey-leaf willow
Salix pulchra	diamond-leaf willow
Salix reticulata	net-veined willow
Salx alaxensis	felt-leaf willow
Solidago multiradiata	northern goldenrod
Stellaria longipes	long-stalked starwort
Triseum spicatum	spike trisetum
Vaccinium uligunosum	bog blueberry
Vaccinium vitis-idaea	lingonberry
Valeriana sitchensis	Sitka valerian
Veratum vieride	false hellebore
Zygadenus elegans	death camas

Vegetation Monitoring Site RV-4

Subalpine Vegetation Type **NAD 27 Canada UTM 528033 7121511**

Abies lasiocarpa	subalpine fir
Anemone multifida	cut-leaved anemone
Anemone parviflora	wood anemone
Arctostaphylos rubra	red bearberry
Betula glandulosa	dwarf birch
Carex podocarpa	graceful mountain sedge
Carex scirpoidea	rush-like sedge
Cassiope tetragona	four-angled mountain-heather

Chrysanthemum integrifolium	alpine daisy
Dodecatheon frigidum	northern shooting star
Dryas integrifolia	smooth-leaved mountain-avens
Empetrum nigrum	crowberry
Festuca altaica	northern rough fescue
Ledum groenlandicum	Labrador tea
Lupinus arcticus	arctic lupine
Parrya nudicaulis	nakedstem wallflower
Pedicularis labradorica	Labrador lousewort
Picea glauca	white spruce
Potentilla fruticosa	shrubby cinquefoil
Pyrola sp.	wintergreen
Salix pulchra	diamond-leaf willow
Silene acaulis	moss campion
Tofieldia pusilla	false asphodel
Vaccinium vitis-idaea	lingonberry
Zygadenus elegans	death camas

non-vascular species noted:

Cladina sp.
Cladonia sp.
Peltigera aphthosa
Stereocaulon paschale

Vegetation Monitoring Site RV-5

Alpine Vegetation Type **NAD 27 Canada UTM 526536 7120880**

Anemone multifida	cut-leaved anemone
Arnica lessingii	Lessing's arnica
Astragulus umbellatus	hairy arctic milk-vetch
Carex scirpoidea	rush-like sedge
Chrysanthemum integrifolium	alpine daisy
Dryas crenulata	crenulate mountain-avens
Gentianella propinqua	four-parted gentian
Lycopodium selago	fir clubmoss
Oxytropis huddelsonii	Huddelson's oxytrope
Parrya nudicaulis	nakedstem wallflower
Pedicularis capitata	few-flowered lousewort
Pedicularis lanata	woolly lousewort
Poa leptocoma	western bog bluegrass
Salx arctica	arctic willow
Salix polaris	polar willow
Salix reticulata	net-veined willow
Saxifraga oppositifolia	purple mountain saxifrage

Saxifraga tricuspidata	prickly saxifrage
Senecio hyperborealis	northern groundsel
Silene acaulis	moss campion
Silene uralensis	nodding campion
Trisetum spicatum	spike trisetum

non-vascular species noted:

Dactylina arctica
Stereocaulon paschale

Vegetation Monitoring Site RV-6

White Spruce Vegetation Type **NAD 27 Canada UTM 527710 7122278**

Agropyron boreale	wheatgrass
Agropyron trachycaulum	slender wheatgrass
Abies lasiocarpa	subalpine fir
Aconitum delphinifolium	mountain monkshood
Anemone narcissiflora	narcissus-flowered anemone
Anemone parviflora	wood anemone
Arctagrostis latifolia	polargrass
Arnica angustifolia	alpine arnica
Arnica lessingii	Lessing's arnica
Artemisia norvegica	mountain sagewort
Aster sibiricus	Siberian aster
Betula glandulosa	dwarf birch
Bromus pumpellianus	pumpelly brome
Calamagrostis stricta	narrow reed-grass
Carex scirpoidea	rush-like sedge
Delphinium glaucum	tall larkspur
Dodecatheon frigidum	northern shooting star
Dryas octopetala	white mountain-avens
Epilobium latifolium	broad-leaved willowherb
Equisetum pratense	meadow horsetail
Festuca altaica	northern rough fescue
Galium boreale	northern bedstraw
Gentianella propinqua	four-parted gentian
Hedysarum alpinum	bear root
Linnaea borealis	twinflower
Lupinus arcticus	arctic lupine
Mertensia paniculata	tall bluebell
Monenses uniflora	single delight
Parnassia fimbriata	fringed grass-of-Parnassus
Parnassia kotzebuie	Kotzebue grass-of-Parnassus

Parnassia palustris	northern grass-of-Parnassus
Parrya nudicaulis	nakedstem wallflower
Pedicularis sp.	lousewort
Picea glauca	white spruce
Poa alpina	alpine bluegrass
Polygonum viviparum	alpine bistort
Potentilla fruticosa	shrubby cinquefoil
Rhodiola integrifolia	western roseroot
Salix barclayii	Barclay's willow
Salix reticulata	net-veined willow
Salx alaxensis	felt-leaf willow
Saxifraga serpyllifolia	thyme-leaved saxifrage
Senecio lugens	black-tipped groundsel
Shepherdia canadensis	soapberry
Solidago multiradiata	northern goldenrod
Valeriana sitchensis	Sitka valerian
Zygadenus elegans	death camas

Vegetation Monitoring Site RV-7

Post-fire Regeneration Burn Vegetation Type NAD 27 Canada UTM 532011 7111945

Betula glandulosa	dwarf birch
Betula neoalaskana	Alaska birch
Calamagrostis stricta	narrow reed-grass
Corydalis sempervirens	rock-harlequin
Epilobium angustifolium	fireweed
Erigeron humilis	arctic daisy
Festuca altaica	northern rough fescue
Ledum groenlandicum	Labrador tea
Linnaea borealis	twinflower
Lupinus arcticus	arctic lupine
Monenses uniflora	single delight
Orthilia secunda	one-sided wintergreen
Pedicularis labradorica	Labrador lousewort
Picea glauca	white spruce
Populus balsamifera	balsam poplar
Populus tremuloides	trembling aspen
Pyrola asarifolia	pink wintergreen
Salix bebbiana	Bebb's willow
Salix glauca	grey-leaf willow
Vaccinium uligunosum	bog blueberry
Vaccinium vitis-idaea	lingonberry

Vegetation Monitoring Site RV-8

Wetland/Riparian Vegetation Type **NAD 27 Canada UTM 534552 7119270**

Abies lasiocarpa	subalpine fir
Aconitum delphinifolium	mountain monkshood
Agrostis geminata	rough hair-grass
Anemone parviflora	wood anemone
Arctagrostis latifolia	polargrass
Artemisia norvegica	mountain sagewort
Betula glandulosa	dwarf birch
Calamagrostis canadensis	blue-joint reed-grass
Callitriche verna	vernal water-starwort
Carex aquatilis	water sedge
Carex atherodes	awned sedge
Carex brunnescens	brownish sedge
Carex canescens	short sedge
Carex limosa	shore sedge
Carex macloviana	thick-headed sedge
Carex saxatilis	russet sedge
Empetrum nigrum	crowberry
Epilobium palustre	swamp willowherb
Equisetum fluviatile	swamp horsetail
Festuca altaica	northern rough fescue
Gentianella amarella	northern gentian
Gentianella propinqua	four-parted gentian
Juncus castaneus	chestnut rush
Pedicularis langsdorfii	Langsdorf's lousewort
Petasites sagittatus	arrow-leaved coltsfoot
Phleum alpinum	alpine timothy
Potentilla palustris	marsh five-finger
Ranunculus flammula	lesser spearwort
Rhodiola integrifolia	western roseroot
Rubus acaulis	dwarf raspberry
Rumex arcticus	arctic dock
Salix arbusculoides	little-tree willow
Salix pulchra	diamond-leaf willow
Senecio cymbalaria	dwarf arctic ragwort
Senecio pauciflorus	rayless alpine butterweed
Senecio triangularis	arrow-leaved groundsel
Sibbaldia procumbens	creeping sibbaldia
Sparganium angustifolium	narrow-leaved bur-reed
Spiraea beauverdiana	Beauverd's spiraea
Stellaria longifolia	long-leaved starwort
Vaccinium uligunosum	bog blueberry
Valerian capitata	capitate valerian
Veronica wormskjoldii	alpine speedwell
Viola sp.	violet

non-vascular species noted:

Cladina sp.
Stereocaulon paschale

Vegetation Monitoring Site RV-9

Alpine Vegetation Type **NAD 27 Canada UTM 534015 7117047**

Abies lasiocarpa	subalpine fir
Anemone narcissiflora	narcissus-flowered anemone
Anemone parviflora	wood anemone
Andromeda polifolia	bog rosemary
Arctostaphylos rubra	red bearberry
Arnica angustifolia	alpine arnica
Arnica lessingii	Lessing's arnica
Artemisia norvegica	mountain sagewort
Betula glandulosa	dwarf birch
Calamagrostis canadensis	blue-joint reed-grass
Calamagrostis purpurascens	purple reed-grass
Campanula lasiocarpa	mountain harebell
Carex atrofusca	darkbrown sedge
Cassiope tetragona	four-angled mountain-heather
Empetrum nigrum	crowberry
Epilobium latifolium	broad-leaved willowherb
Festuca altaica	northern rough fescue
Gentianella amarella	northern gentian
Gentianella propinqua	four-parted gentian
Kobresia simpliciuscula	simple bog kobresia
Ledum decumbens	northern Labrador tea
Lupinus arcticus	arctic lupine
Luzula arcuata	curved alpine woodrush
Luzula confusa	northern woodrush
Luzula parviflora	small-flowered woodrush
Lycopodium alpinum	alpine clubmoss
Pedicularis capitata	few-flowered lousewort
Pedicularis labradorica	Labrador lousewort
Pedicularis langsdorfii	Langsdorf's lousewort
Petasites sagittatus	arrow-leaved coltsfoot
Picea glauca	white spruce
Rhodiola integrifolia	western roseroot
Salix glauca	grey-leaf willow
Salix pulchra	diamond-leaf willow
Salix polaris	polar willow
Saxifraga tricuspidata	prickly saxifrage
Sellaginella sibirica	northern spikemoss
Spiraea beauverdiana	Beauverd's spiraea

Vaccinium uligunosum	bog blueberry
Vaccinium vitis-idaea	lingonberry
Veratum vieride	false hellebore

non-vascular species noted:

Cetraria sp.
Cladina sp.
Cladonia sp.
Dactylina arctica

Vegetation Monitoring Site RV-10

Alpine Vegetation Type **NAD 27 Canada UTM 524464 7121369**

Abies lasiocarpa	subalpine fir
Anemone multifida	cut-leaved anemone
Anemone parviflora	wood anemone
Arctostaphylos rubra	red bearberry
Arnica angustifolia	alpine arnica
Calamagrostis lapponica	Kolymen reed-grass
Calamagrostis purpurascens	purple reed-grass
Carex aquatilis	water sedge
Carex consimilis	Bigelow's sedge
Carex gynocrates	northern bog sedge
Carex membranacea	fragile sedge
Carex scirpoidea	rush-like sedge
Cassiope tetragona	four-angled mountain-heather
Castilleja hyperborea	northern paintbrush
Cerastium arvense	mouse-ear chickweed
Dodecatheon frigidum	northern shooting star
Dryas octopetala	white mountain-avens
Epilobium latifolium	broad-leaved willowherb
Equisetum arvense	common horsetail
Erigeron humilis	arctic daisy
Eriophorum triste	cotton-grass
Festuca altaica	northern rough fescue
Gentianella propinqua	four-parted gentian
Hedysarum alpinum	bear root
Oxyria digyna	mountain sorrel
Parnassia kotzebuie	Kotzebue grass-of-Parnassus
Parrya nudicaulis	nakedstem wallflower
Pedicularis capitata	few-flowered lousewort
Petasites sagittatus	arrow-leaved coltsfoot
Picea glauca	white spruce

Poa alpina	alpine bluegrass
Poa arctica	arctic bluegrass
Polygonum viviparum	alpine bistort
Potentilla fruticosa	shrubby cinquefoil
Salx alaxensis	felt-leaf willow
Salx arctica	arctic willow
Salix pulchra	diamond-leaf willow
Salix reticulata	net-veined willow
Saxifraga hieracifolia	stiff-stemmed saxifrage
Saxifraga lyalii	red-stemmed saxifrage
Saxifraga oppositifolia	purple mountain saxifrage
Saxifraga reflexa	Yukon saxifrage
Senecio cymbalaria	dwarf arctic ragwort
Senecio lugens	black-tipped groundsel
Senecio tundricola	tundra groundsel
Shepherdia canadensis	soapberry
Taraxacum lyratum	harp dandelion
Vaccinium uligunosum	bog blueberry
Zygadenus elegans	death camas

Vegetation Monitoring Site RV-11

White Spruce Vegetation Type **NAD 27 Canada UTM 522757 7123030**

Agropyron trachycaulum	slender wheatgrass
Alnus crispa	mountain alder
Anemone narcissiflora	narcissus-flowered anemone
Anemone richardsonii	Richardson's anemone
Arctostaphylos rubra	red bearberry
Arnica angustifolia	alpine arnica
Aster sibiricus	Siberian aster
Betula glandulosa	dwarf birch
Carex rariflora	loose-flowered sedge
Carex scirpoidea	rush-like sedge
Cassiope tetragona	four-angled mountain-heather
Cerastium arvense	mouse-ear chickweed
Chrysanthemum integrifolium	alpine daisy
Dodecatheon frigidum	northern shooting star
Empetrum nigrum	crowberry
Epilobium palustre	swamp willowherb
Equisetum arvense	common horsetail
Festuca altaica	northern rough fescue
Gentianella amarella	northern gentian
Gentianella propinqua	four-parted gentian
Geocaulon lividum	bastard toad-flax
Hedysarum alpinum	bear root

Ledum groenlandicum	Labrador tea
Lupinus arcticus	arctic lupine
Lycopodium alpinum	alpine clubmoss
Mertensia paniculata	tall bluebell
Monenses uniflora	single delight
Parnassia palustris	northern grass-of-Parnassus
Parrya nudicaulis	nakedstem wallflower
Pedicularis labradorica	Labrador lousewort
Pedicularis langsdorfii	Langsdorf's lousewort
Picea glauca	white spruce
Platanthera obtusata	one-leaved rein-orchid
Polygonum viviparum	alpine bistort
Potentilla fruticosa	shrubby cinquefoil
Pyrola minor	lesser wintergreen
Salx alaxensis	felt-leaf willow
Salix glauca	grey-leaf willow
Salix reticulata	net-veined willow
Saxifraga hirculus	yellow marsh saxifrage
Solidago multiradiata	northern goldenrod
Tofieldia pulsilla	false asphodel
Trisetum spicatum	spike trisetum
Vaccinium uligunosum	bog blueberry
Vaccinium vitis-idaea	lingonberry
Valeriana capitata	capitate valerian

non-vascular species noted:

Pleurozium shreberi

Vegetation Monitoring Site RV-12

Wetland/Riparian Vegetation Type **NAD 27 Canada UTM 529104 7112275**

Alnus incana	river alder
Anemone multifida	cut-leaved anemone
Artemisia tilesii	mountain sagewort
Calamagrostis canadensis	blue-joint reed-grass
Carex aquatilis	water sedge
Carex utriculata	beaked sedge
Descurainia incana	tansy mustard
Eleocharis palustris	creeping spike-rush
Equisetum scirpoides	dwarf scouring rush
Hippuris vulgaris	common mare's-tail
Juncus arcticus	arctic rush
Picea glauca	white spruce

Picea mariana	black spruce
Populus tremuloides	trembling aspen
Potamogeton pectinatus	sago pondweed
Potamogeton richardsonii	Richardson's pondweed
Potentilla fruticosa	shrubby cinquefoil
Rosa acicularis	prickly rose
Salix alaxensis	felt-leaf willow
Salix arbusculoides	little-tree willow
Salix pseudomonticola	false mountain willow
Sparganium hyperboreum	northern bur-reed

Vegetation Monitoring Site RV-13

Wetland/Riparian Vegetation Type **NAD 27 Canada UTM 529164 7113019**

Alnus incana	river alder
Arctagrostis latifolia	polargrass
Betula glandulosa	dwarf birch
Calamagrostis canadensis	blue-joint reed-grass
Calla palustris	water arum
Carex aquatilis	water sedge
Carex utriculata	beaked sedge
Cicuta bulbifera	bulbous water-hemlock
Descurainia incana	tansy mustard
Epilobium anagallidifolium	alpine willowherb
Geum macrophyllum	large-leaved avens
Hippuris vulgaris	common mare's-tail
Ledum decumbens	northern Labrador tea
Parnassia palustris	northern grass-of-Parnassus
Picea glauca	white spruce
Potentilla palustris	marsh five-finger
Pyrola asarifolia	pink wintergreen
Rorippa palustris	marsh yellow cress
Rubus acaulis	dwarf raspberry
Salix arbusculoides	little-tree willow
Salix pulchra	diamond-leaf willow
Stellaria longipes	long-stalked starwort

Vegetation Monitoring Site RV-14

Black Spruce Vegetation Type **NAD 27 Canada UTM 529500 7113037**

Arctostaphylos rubra	red bearberry
Betula neoalaskana	Alaska birch
Betula glandulosa	dwarf birch
Carex lugens	spruce muskeg sedge

Empetrum nigrum	crowberry
Equisetum arvense	common horsetail
Eriophorum vaginatum	sheathed cotton-grass
Geocaulon lividum	bastard toad-flax
Hedysarum alpinum	bear root
Ledum groenlandicum	Labrador tea
Lupinus arcticus	arctic lupine
Parnassia palustris	northern grass-of-Parnassus
Pedicularis labradorica	Labrador lousewort
Picea glauca	white spruce
Picea mariana	black spruce
Potentilla fruticosa	shrubby cinquefoil
Pyrola asarifolia	pink wintergreen
Rosa acicularis	prickly rose
Rubus chamaemorus	cloudberry
Rumex arcticus	arctic dock
Salix arctica	arctic willow
Salix glauca	grey-leaf willow
Shepherdia canadensis	soapberry
Spiranthes romanzoffiana	ladies' tresses
Tofieldia pulsilla	false asphodel
Vaccinium uligunosum	bog blueberry
Vaccinium vitis-idaea	lingonberry

non-vascular species noted:

Cladina sp.
Pleurozium shreberi
Sphagnum sp.

Vegetation Monitoring Site RV-15

Black Spruce Vegetation Type **NAD 27 Canada UTM 529811 7113414**

Alnus crispa	mountain alder
Arctostaphylos uva-ursi	kinnikinnick
Betula neoalaskana	Alaska birch
Betula occidentalis	water birch
Cornus canadensis	dwarf dogwood
Festuca altaica	northern rough fescue
Geocaulon lividum	bastard toad-flax
Ledum groenlandicum	Labrador tea
Lycopodium alpinum	alpine clubmoss
Picea mariana	black spruce
Potentilla fruticosa	shrubby cinquefoil
Ribes hudsonianum	black currant

Rosa acicularis	prickly rose
Salix glauca	grey-leaf willow
Saxifraga tricuspidata	prickly saxifrage
Vaccinium uligunosum	bog blueberry
Viburnum edule	highbush cranberry

non-vascular species noted:

Cladina sp.

Vegetation Monitoring Site RV-16

Wetland/Riparian Vegetation Type **NAD 27 Canada UTM 514124 7120881**

Achillea millefolium	common yarrow
Agropyron trachycaulum	slender wheatgrass
Agrostis scabra	ticklegrass
Alnus incana	river alder
Arctostaphylos rubra	red bearberry
Aster sibiricus	Siberian aster
Astragalus alpinus	alpine milk-vetch
Calamagrostis canadensis	blue-joint reed-grass
Calamagrostis stricta	slimstem reed-grass
Carex lachenalii	two-parted sedge
Carex saxatilis	russet sedge
Crepis elegans	elegant hawk's-beard
Dryas drummondii	Drummond's mountain-avens
Epilobium latifolium	broad-leaved willowherb
Erigeron acris	bitter fleabane
Erigeron elatus	swamp fleabane
Eriophorum vaginatum	sheathed cotton-grass
Festuca richardsonii	Richardson's fescue
Galium boreale	northern bedstraw
Geocaulon lividum	bastard toad-flax
Hedysarum alpinum	bear root
Hierochloe odorata	common sweetgrass
Juncus arcticus	arctic rush
Juniperus communis	common juniper
Oxytropis campestris	yellow locoweed
Parnassia palustris	northern grass-of-Parnassus
Pedicularis langsdorfii	Langsdorf's lousewort
Picea glauca	white spruce
Platanthera hyperborea	northern bog orchid
Platanthera obtusata	one-leaved rein-orchid
Populus balsamifera	balsam poplar
Potentilla fruticosa	shrubby cinquefoil
Rosa acicularis	prickly rose

Rubus acaulis	dwarf raspberry
Salix alaxensis	felt-leaf willow
Salix barclayii	Barclay's willow
Senecio indecorus	rayless mountain butterweed
Shepherdia canadensis	soapberry
Solidago multiradiata	northern goldenrod
Wilhelmsia physodes	merckia

Vegetation Monitoring Site RV-17

White Spruce Vegetation Type **NAD 27 Canada UTM 512939 7120264**

Alnus crispa	mountain alder
Arctostaphylos rubra	red bearberry
Betula neoalaskana	Alaska birch
Equisetum sylvaticum	woodland horsetail
Galium boreale	northern bedstraw
Geocaulon lividum	bastard toad-flax
Ledum groenlandicum	Labrador tea
Linnaea borealis	twinflower
Lupinus arcticus	arctic lupine
Mertensia paniculata	tall bluebell
Picea glauca	white spruce
Populus balsamifera	balsam poplar
Populus tremuloides	trembling aspen
Potentilla fruticosa	shrubby cinquefoil
Pyrola grandiflora	arctic wintergreen
Rosa acicularis	prickly rose
Rubus idaeus	red raspberry
Salix glauca	grey-leaf willow
Salix arbusculoides	little-tree willow
Solidago multiradiata	northern goldenrod
Shepherdia canadensis	soapberry
Vaccinium vitis-idaea	lingonberry

non-vascular species noted:

Pleurozium shreberi

Vegetation Monitoring Site RV-18

Wetland/Riparian Vegetation Type **NAD 27 Canada UTM 511847 7119163**

Calamagrostis canadensis	blue-joint reed-grass
Carex aquatilis	water sedge
Carex saxatilis	russet sedge
Carex utriculata	beaked sedge
Eleocharis palustris	creeping spike-rush
Epilobium hornemannii	Hornemann's willowherb
Equisetum fluviatile	swamp horsetail
Equisetum scirpoides	dwarf scouring rush
Glyceria grandis	tall manna grass
Hippuris vulgaris	common mare's-tail
Potamogeton praelongus	white-stem pondweed
Potentilla norvegica	rough cinquefoil
Potentilla hyparctica	arctic cinquefoil
Ranunculus hyperboreus	far-northern buttercup
Ribes sp.	currant
Rorippa palustris	marsh yellow cress
Rubus acaulis	dwarf raspberry
Salix glauca	grey-leaf willow
Salix pulchra	diamond-leaf willow
Senecio indecorus	rayless mountain butterweed
Sparganium multipedunculatum	many-stalked bur-reed
Stellaria crassifolia	fleshy stitchwort
Stellaria media	common starwort

Vegetation Monitoring Site RV-19

Wetland/Riparian Vegetation Type **NAD 27 Canada UTM 505865 7111801**

Achillea millefolium	common yarrow
Agrostis scabra	ticklegrass
Andromeda polifolia	bog rosemary
Arctostaphylos rubra	red bearberry
Betula glandulosa	dwarf birch
Carex aquatilis	water sedge
Carex capillaris	hairlike sedge
Epilobium angustifolium	fireweed
Erigeron humilis	arctic daisy
Gentianella propinqua	four-parted gentian
Hedysarum alpinum	bear root
Hippuris vulgaris	common mare's-tail
Parnassia palustris	northern grass-of-Parnassus
Picea glauca	white spruce
Platanthera hyperborea	northern bog orchid

Potamogeton filiformis	thread-leaved pondweed
Potamogeton gramineus	grass-leaved pondweed
Potamogeton praelongus	white-stem pondweed
Potamogeton zosteriformis	flatstem pondweed
Potentilla fruticosa	shrubby cinquefoil
Rubus acaulis	dwarf raspberry
Salix arbusculoides	little-tree willow
Salix glauca	grey-leaf willow
Salix myrtillifolia	blueberry willow
Salix pulchra	diamond-leaf willow
Shepherdia canadensis	soapberry
Sparganium sp.	bur-reed
Spiranthes romanzoffiana	ladies' tresses
Tofieldia pulsilla	false asphodel
Utricularia vulgaris	common bladderwort
Vaccinium uligunosum	bog blueberry
Valeriana capitata	capitate valerian

Vegetation Monitoring Site RV-20

Post-fire Regeneration Burn Vegetation Type NAD 27 Canada UTM 504698 7106101

Anemone sp.	anemone
Arctagrostis latifolia	polargrass
Arctostaphylos rubra	red bearberry
Betula glandulosa	dwarf birch
Carex lugens	spruce muskeg sedge
Carex scirpoidea	single-spiked sedge
Empetrum nigrum	crowberry
Epilobium angustifolium	fireweed
Equisetum arvense	common horsetail
Equisetum sylvaticum	woodland horsetail
Eriophorum brachyantherum	short-anthered cotton-grass
Festuca altaica	northern rough fescue
Ledum groenlandicum	Labrador tea
Lupinus arcticus	arctic lupine
Parnassia kotzebuie	Kotzebue grass-of-Parnassus
Parnassia palustris	northern grass-of-Parnassus
Pedicularis labradorica	Labrador lousewort
Pedicularis langsdorfii	Langsdorf's lousewort
Picea glauca	white spruce
Picea mariana	black spruce
Platanthera hyperborea	northern bog orchid
Potentilla fruticosa	shrubby cinquefoil
Potentilla palustris	marsh five-finger
Rubus acaulis	dwarf raspberry
Rubus chamaemorus	cloudberry

Rumex arcticus	arctic dock
Salix glauca	grey-leaf willow
Salix pulchra	diamond-leaf willow
Salix reticulata	net-veined willow
Senecio pauperculus	balsam groundsel
Solidago multiradiata	northern goldenrod
Spiranthes romanzoffiana	ladies' tresses
Tofieldia pulsilla	false asphodel
Vaccinium uligunosum	bog blueberry
Vaccinium vitis-idaea	lingonberry

non-vascular species noted:

Cladina sp.
Pleurozium shreberi
Sphagnum sp.

Vegetation Monitoring Site RV-21

Post-fire Regeneration Burn Vegetation Type NAD 27 Canada UTM 504046 7101014

Arctostaphylos rubra	red bearberry
Betula glandulosa	dwarf birch
Betula neoalaskana	Alaska birch
Betula occidentalis	water birch
Calamagrostis purpurascens	purple reed-grass
Dryopteris fragrans	fragrant cliff fern
Empetrum nigrum	crowberry
Epilobium angustifolium	fireweed
Geocaulon lividum	bastard toad-flax
Ledum groenlandicum	Labrador tea
Lycopodium clavatum	running club-moss
Picea glauca	white spruce
Picea mariana	black spruce
Populus balsamifera	balsam poplar
Populus tremuloides	trembling aspen
Ribes triste	red currant
Rosa acicularis	prickly rose
Salix bebbiana	Bebb's willow
Salix glauca	grey-leaf willow
Vaccinium uligunosum	bog blueberry
Vaccinium vitis-idaea	lingonberry

non-vascular species noted:

Cladina sp.
Pleurozium shreberi
Stereocaulon paschale

Vegetation Monitoring Site RV-22

Wetland/Riparian Vegetation Type **NAD 27 Canada UTM 504402 7101118**

Alnus incana	river alder
Anemone richardsonii	Richardson's anemone
Carex aquatilis	water sedge
Carex lasiocarpa	slender sedge
Equisetum pratense	meadow horsetail
Equisetum scirpoides	dwarf scouring rush
Eriophorum brachyantherum	short-anthered cotton-grass
Hedysarum alpinum	bear root
Juncus castaneus	chestnut rush
Myrica gale	sweet gale
Parnassia palustris	northern grass-of-Parnassus
Potentilla fruticosa	shrubby cinquefoil
Rubus acaulis	dwarf raspberry
Salix alaxensis	felt-leaf willow
Salix arbusculoides	little-tree willow
Salix barclayii	Barclay's willow
Vaccinium uligunosum	bog blueberry
Viola sp.	violet

non-vascular species noted:

Pleurozium shreberi

Vegetation Monitoring Site RV-23

Black Spruce Vegetation Type **NAD 27 Canada UTM 487909 7095702**

Andromeda polifolia	bog rosemary
Arctostaphylos rubra	red bearberry
Betula glandulosa	dwarf birch
Carex aquatilis	water sedge
Carex capitata	capitate sedge
Carex capillaris	hairlike sedge
Carex lugens	spruce muskeg sedge

Chamadaphne calyculata	leatherleaf
Empetrum nigrum	crowberry
Eriophorum scheuchzeri	Scheuchzer's cotton-grass
Ledum decumbens	northern Labrador tea
Oxycoccus microcarpus	bog cranberry
Parnassia palustris	northern grass-of-Parnassus
Pedicularis labradorica	Labrador lousewort
Pedicularis lapponica	Lapland lousewort
Picea mariana	black spruce
Polygonum viviparum	alpine bistort
Potentilla fruticosa	shrubby cinquefoil
Rubus acaulis	dwarf raspberry
Rubus chamaemorus	cloudberry
Salix niphoclada	barren-ground willow
Salix polaris	polar willow
Salix reticulata	net-veined willow
Spiranthes romanzoffiana	ladies' tresses
Tofieldia pulsilla	false asphodel
Vaccinium uligunosum	bog blueberry
Vaccinium vitis-idaea	lingonberry

non-vascular species noted:

Cladina sp.
Sphagnum sp.

Vegetation Monitoring Site RV-24

Wetland/Riparian Vegetation Type **NAD 27 Canada UTM 490905 7096195**

Arctophila fulva	pendant grass
Arctostaphylos rubra	red bearberry
Betula glandulosa	dwarf birch
Calamagrostis canadensis	blue-joint reed-grass
Chamadaphne calyculata	leatherleaf
Empetrum nigrum	crowberry
Epilobium ciliatum	northern willowherb
Parnassia palustris	northern grass-of-Parnassus
Pedicularis labradorica	Labrador lousewort
Petasites sagittatus	arrow-leaved coltsfoot
Picea glauca	white spruce
Picea mariana	black spruce
Potamogeton zosteriformis	flatstem pondweed
Potentilla fruticosa	shrubby cinquefoil
Potentilla palustris	marsh five-finger
Ranaunculs aquatilis	white water buttercup

Ranunculus scleratus	celery-leaved buttercup
Rubus acaulis	dwarf raspberry
Rubus chamaemorus	cloudberry
Salix glauca	grey-leaf willow
Salix pulchra	diamond-leaf willow
Sparganium sp.	bur-reed
Spiranthes romanzoffiana	ladies' tresses
Tofieldia pulsilla	false asphodel
Vaccinium uligunosum	bog blueberry
Viola sp.	violet

non-vascular species noted:

Pleurozium shreberi
Sphagnum sp.

Vegetation Monitoring Site RV-25

Black Spruce Vegetation Type **NAD 27 Canada UTM 497281 7096351**

Arctostaphylos rubra	red bearberry
Betula glandulosa	dwarf birch
Calamagrostis canadensis	blue-joint reed-grass
Carex aquatilis	water sedge
Delphinium glaucum	tall larkspur
Empetrum nigrum	crowberry
Epilobium angustifolium	fireweed
Epilobium palustre	swamp willowherb
Equisetum sylvaticum	woodland horsetail
Ledum groenlandicum	Labrador tea
Moehringia lateriflora	blunt-leaved sandwort
Pedicularis langsdorfii	Langsdorf's lousewort
Pedicularis lapponica	Lapland lousewort
Petasites sagittatus	arrow-leaved coltsfoot
Picea glauca	white spruce
Picea mariana	black spruce
Ribes hudsonianum	black currant
Rosa acicularis	prickly rose
Rubus acaulis	dwarf raspberry
Rubus chamaemorus	cloudberry
Salix alaxensis	felt-leaf willow
Salix barclayii	Barclay's willow
Salix glauca	grey-leaf willow
Spiranthes romanzoffiana	ladies' tresses
Stellaria borealis	boreal starwort

Vaccinium uligunosum	bog blueberry
Vaccinium vitis-idaea	lingonberry

non-vascular species noted:

Cetraria sp.
Cladina sp.
Cladonia sp.
Pleurozium shreberi

Vegetation Monitoring Site RV-26

Wetland/Riparian Vegetation Type **NAD 27 Canada UTM 525598 7115995**

Alnus incana	river alder
Arctostaphylos rubra	red bearberry
Betula glandulosa	dwarf birch
Calamagrostis canadensis	blue-joint reed-grass
Epilobium anagallidifolium	alpine willowherb
Equisetum arvense	common horsetail
Parnassia palustris	northern grass-of-Parnassus
Picea glauca	white spruce
Populus balsamifera	balsam poplar
Potentilla fruticosa	shrubby cinquefoil
Potentilla palustris	marsh five-finger
Rubus acaulis	dwarf raspberry
Salix pseudomyrsinites	tall blueberry willow
Salix reticulata	net-veined willow
Vaccinium uligunosum	bog blueberry

non-vascular species noted:

Pleurozium shreberi

Vegetation Monitoring Site RV-27

Black Spruce Vegetation Type **NAD 27 Canada UTM 488535 7096918**

Betula neoalaskana	Alaska birch
Cornus canadensis	dwarf dogwood
Geocaulon lividum	bastard toad-flax
Ledum groenlandicum	Labrador tea
Lupinus arcticus	arctic lupine
Lycopodium annotinum	stiff club-moss
Picea glauca	white spruce

Picea mariana	black spruce
Rosa acicularis	prickly rose
Vaccinium uligunosum	bog blueberry
Vaccinium vitis-idaea	lingonberry

non-vascular species noted:

Cladina sp.
Pleurozium shreberi

Vegetation Monitoring Site RV-28

White Spruce Vegetation Type **NAD 27 Canada UTM 524617 7117563**

Alnus crispa	mountain alder
Andromeda polifolia	bog rosemary
Anemone multifida	cut-leaved anemone
Betula glandulosa	dwarf birch
Dryas integrifolia	smooth-leaved mountain-avens
Equisetum pratense	meadow horsetail
Hedysarum alpinum	bear root
Ledum groenlandicum	Labrador tea
Linnaea borealis	twinflower
Lycopodium annotinum	stiff club-moss
Parnassia palustris	northern grass-of-Parnassus
Pedicularis labradorica	Labrador lousewort
Pedicularis lapponica	Lapland lousewort
Picea glauca	white spruce
Picea mariana	black spruce
Platanthera obtusata	one-leaved rein-orchid
Polygonum viviparum	alpine bistort
Potentilla fruticosa	shrubby cinquefoil
Salix glauca	grey-leaf willow
Salix reticulata	net-veined willow
Spiranthes romanzoffiana	ladies' tresses
Vaccinium uligunosum	bog blueberry

non-vascular species noted:

Pleurozium shreberi

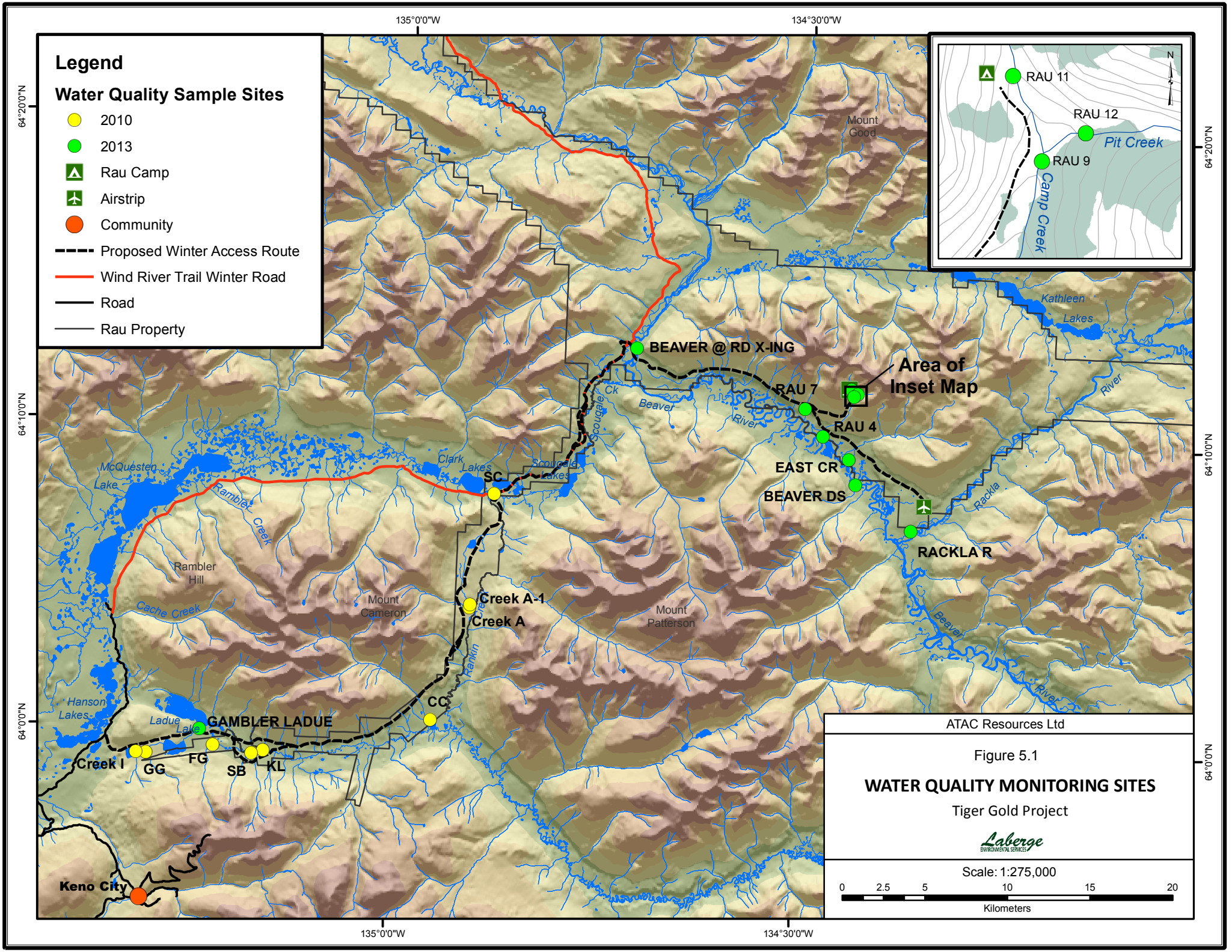
APPENDIX C

WATER QUALITY

- **Photos**
- **Map**
- **Laboratory Analytical Report**

APPENDIX C PHOTOGRAPHS, WATER QUALITY SITES

Photo #1: Gambler Ladue Creek, August 2013.


Legend
Water Quality Sample Sites
2010
2013
Rau Camp
Airstrip
Community
Proposed Winter Access Route
Wind River Trail Winter Road
Road
Rau Property
135°0'0"W
134°30'0"W
64°20'0"N
64°10'0"N
64°0'0"N
RAU 11
RAU 12
RAU 9
Pit Creek
Camp Creek
N
Area of Inset Map
BEAVER @ RD X-ING
RAU 7
RAU 4
EAST CR
BEAVER DS
RACKLA R
SC
Creek A-1
Creek A
CC
GAMBLER LADUE
Creek I
GG
FG
SB
KL
Keno City
Mount Good
Kathleen Lakes
Beaver River
Scougale Ck
Clark Lakes
Scougale Lakes
McQuesten Lake
Rambler Creek
Rambler Hill
Cache Creek
Mount Cameron
Mount Patterson
Rackla River
Rankin Creek
Hanson Lakes
Ladue Lake
ATAC Resources Ltd
Figure 5.1
WATER QUALITY MONITORING SITES
Tiger Gold Project
Laberge ENVIRONMENTAL SERVICES
Scale: 1:275,000
0 2.5 5 10 15 20
Kilometers

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Report Transmission Cover Page

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC - Rau
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	(Repeat)
Sampled By:			
Company:			

Lot ID:	**951573**
Control Number:	B09802
Date Received:	Aug 9, 2013
Date Reported:	Aug 23, 2013
Report Number:	1850849

Contact & Affiliation	Address	Delivery Commitments
Bonnie Burns Laberge Environmental Services	1-405 Ogilvie Street, Box 21072 Whitehorse, Yukon Territory Y1A 6P7 Phone: (867) 668-6838 Fax: (867) 667-6956 Email: bonnieburns@northwestel.net	On [Lot Verification] send (COA) by Email - Multiple Reports On [Report Approval] send (COC, Test Report) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Report Approval] send (Test Report, COC) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report On [Lot Creation] send (COR) by Email - Multiple Reports

Notes To Clients:

- Tellurium was not reported due to instrument issues.
- Report was issued to include retest result for metals analysis on sample 951573-3 as requested by Bonnie Burns on Aug 20, 2013. Previous Report 1850849.
- Sample 951573-3; 4497855 Sample 951573-3: the repeated result for BC Trace Total Metals analysis did not differ significantly from the original; it is within expected precision of the test.
- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.

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Sample Custody

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC - Rau
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	(Repeat)
Sampled By:			
Company:			

Lot ID:	**951573**
Control Number:	B09802
Date Received:	Aug 9, 2013
Date Reported:	Aug 23, 2013
Report Number:	1850849

Sample Disposal Date: September 15, 2013

All samples will be stored until this date unless other instructions are received. Please indicate other requirements below and return this form to the address or fax number on the top of this page.

☐ Extend Sample Storage Until _____ (MM/DD/YY)

The following charges apply to extended sample storage:

Storage for an additional 30 days	$ 2.50 per sample
Storage for an additional 60 days	$ 5.00 per sample
Storage for an additional 90 days	$ 7.50 per sample

☐ Return Sample, collect, to the address below via:

- ☐ Greyhound
- ☐ DHL
- ☐ Purolator
- ☐ Other (specify) _____

Name _____
Company _____
Address _____
_____
Phone _____
Fax _____

Signature _____

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC - Rau
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	(Repeat)
Sampled By:			
Company:			

Lot ID:	**951573**
Control Number:	B09802
Date Received:	Aug 9, 2013
Date Reported:	Aug 23, 2013
Report Number:	1850849

Reference Number	951573-1	951573-2	951573-3
Sample Date	Aug 05, 2013	Aug 05, 2013	Aug 05, 2013
Sample Time	07:30	09:15	10:55
Sample Location			
Sample Description	RAU 11	RAU 12	RAU 9
Matrix	Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	0.8	0.8	1.2	0.5
Ammonia - N		mg/L	<0.01	<0.01	0.02	.01
Phosphorus	Total	mg/L	<0.003	<0.003	0.007	0.003
Metals Dissolved						
Sulfur	Dissolved	mg/L	6.3	8.2	7.2	0.2
Aluminum	Dissolved	mg/L	<0.005	<0.005	<0.005	0.005
Antimony	Dissolved	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Dissolved	mg/L	<0.0002	0.0071	0.0060	0.0002
Barium	Dissolved	mg/L	0.282	0.156	0.201	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	<0.004	<0.004	<0.004	0.004
Cadmium	Dissolved	mg/L	0.00006	0.00002	0.00002	0.00001
Chromium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Cobalt	Dissolved	mg/L	<0.00002	<0.00002	<0.00002	0.00002
Copper	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Lead	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Molybdenum	Dissolved	mg/L	0.00103	0.00213	0.00142	0.0001
Nickel	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Selenium	Dissolved	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L	0.046	0.082	0.072	0.001
Thallium	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	0.0040	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L	0.0012	0.0017	0.0014	0.0004
Vanadium	Dissolved	mg/L	<0.00010	<0.00010	<0.00010	0.0001
Zinc	Dissolved	mg/L	0.005	0.004	0.002	0.001
Zirconium	Dissolved	mg/L	<0.00010	<0.00010	<0.00010	0.0001
Metals Total						
Mercury	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Aluminum	Total	mg/L	<0.005	<0.005	0.008	0.005
Antimony	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Arsenic	Total	mg/L	0.00018	0.00709	0.00576	0.00005

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC - Rau
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	(Repeat)
Sampled By:			
Company:			

Lot ID:	**951573**
Control Number:	B09802
Date Received:	Aug 9, 2013
Date Reported:	Aug 23, 2013
Report Number:	1850849

Reference Number	951573-1	951573-2	951573-3
Sample Date	Aug 05, 2013	Aug 05, 2013	Aug 05, 2013
Sample Time	07:30	09:15	10:55
Sample Location			
Sample Description	RAU 11	RAU 12	RAU 9
Matrix	Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Metals Total - Continued						
Barium	Total	mg/L	0.280	0.162	0.203	0.00005
Beryllium	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Bismuth	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Boron	Total	mg/L	0.003	<0.002	0.004	.002
Cadmium	Total	mg/L	0.00006	0.00002	0.00002	0.00001
Calcium	Total	mg/L	47.0	55.4	55.3	0.05
Chromium	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Cobalt	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Copper	Total	mg/L	0.0012	0.0014	0.0004	0.0001
Iron	Total	mg/L	0.008	0.007	0.020	0.002
Lead	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Total	mg/L	<0.0005	0.0006	<0.0005	0.0005
Magnesium	Total	mg/L	16.0	15.4	16.6	0.04
Manganese	Total	mg/L	<0.001	0.0019	0.0061	0.001
Molybdenum	Total	mg/L	0.00095	0.00229	0.00158	0.00005
Nickel	Total	mg/L	<0.0002	<0.0002	0.0002	0.0002
Potassium	Total	mg/L	0.2	1.0	0.6	0.1
Selenium	Total	mg/L	0.0003	0.0003	0.0002	0.0001
Silicon	Total	mg/L	1.88	2.12	2.12	0.02
Silver	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Sodium	Total	mg/L	0.6	0.8	0.7	0.1
Strontium	Total	mg/L	0.0457	0.0867	0.0723	0.0001
Thallium	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium	Total	mg/L	<0.00001	<0.00001	0.00003	0.00001
Tin	Total	mg/L	<0.0001	0.0042	<0.0001	0.0001
Titanium	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Uranium	Total	mg/L	0.00116	0.00182	0.00156	0.00001
Vanadium	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Zinc	Total	mg/L	0.0050	0.0045	0.0032	0.0005
Zirconium	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Hardness	as CaCO3	mg/L	183	202	206	1
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2	<2	<2	1
Solids	Total Dissolved	mg/L	200	230	220	5
Routine Water						
pH	at 25 °C		7.93	8.04	8.12	

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC - Rau
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	(Repeat)
Sampled By:			
Company:			

Lot ID:	**951573**
Control Number:	B09802
Date Received:	Aug 9, 2013
Date Reported:	Aug 23, 2013
Report Number:	1850849

		Reference Number	951573-1	951573-2	951573-3
		Sample Date	Aug 05, 2013	Aug 05, 2013	Aug 05, 2013
		Sample Time	07:30	09:15	10:55
		Sample Location			
		Sample Description	RAU 11	RAU 12	RAU 9
		Matrix	Water	Water	Water
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water - Continued						
Electrical Conductivity		µS/cm at 25 C	331	371	369	1
Calcium	Dissolved	mg/L	47.2	55.5	55.4	0.1
Iron	Dissolved	mg/L	<0.005	<0.005	0.008	0.005
Magnesium	Dissolved	mg/L	16.2	15.7	16.7	0.1
Manganese	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Potassium	Dissolved	mg/L	0.2	0.9	0.5	0.1
Silicon	Dissolved	mg/L	1.80	2.10	2.08	0.05
Sodium	Dissolved	mg/L	0.6	0.8	0.8	0.1
Bicarbonate		mg/L	195	215	220	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	160	176	181	5
Chloride	Dissolved	mg/L	0.53	0.36	0.32	0.05
Nitrate - N	Dissolved	mg/L	0.15	0.29	0.16	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	19.4	25.3	22.2	0.5
Hardness	as CaCO3	mg/L	185	203	207	5

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC - Rau
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	(Repeat)
Sampled By:			
Company:			

Lot ID:	**951573**
Control Number:	B09802
Date Received:	Aug 9, 2013
Date Reported:	Aug 23, 2013
Report Number:	1850849

Reference Number		951573-4	951573-5	951573-6
Sample Date		Aug 05, 2013	Aug 05, 2013	Aug 06, 2013
Sample Time		13:20	14:45	08:35
Sample Location				
Sample Description		RAU 4	Rackla R	Beaver R d/s
Matrix		Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	1.2	1.1	1.4	0.5
Ammonia - N		mg/L	0.02	<0.01	0.08	.01
Phosphorus	Total	mg/L	0.004	<0.003	<0.003	0.003
Metals Dissolved						
Sulfur	Dissolved	mg/L	10.3	24.5	16.9	0.2
Aluminum	Dissolved	mg/L	<0.005	<0.005	0.010	0.005
Antimony	Dissolved	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Dissolved	mg/L	0.0024	0.0002	0.0004	0.0002
Barium	Dissolved	mg/L	0.136	0.068	0.066	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	<0.004	0.005	<0.004	0.004
Cadmium	Dissolved	mg/L	0.00003	0.00002	0.00003	0.00001
Chromium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Cobalt	Dissolved	mg/L	<0.00002	0.00002	0.00004	0.00002
Copper	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Lead	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L	0.001	0.003	0.003	0.001
Molybdenum	Dissolved	mg/L	0.00136	0.00081	0.00082	0.0001
Nickel	Dissolved	mg/L	<0.001	<0.001	0.002	0.001
Selenium	Dissolved	mg/L	0.0006	0.0006	<0.0006	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L	0.080	0.137	0.161	0.001
Thallium	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L	0.0025	0.0013	0.0010	0.0004
Vanadium	Dissolved	mg/L	0.00012	<0.00010	0.00012	0.0001
Zinc	Dissolved	mg/L	0.005	0.002	0.006	0.001
Zirconium	Dissolved	mg/L	<0.00010	<0.00010	<0.00010	0.0001
Metals Total						
Mercury	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Aluminum	Total	mg/L	0.021	0.010	0.019	0.005
Antimony	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Arsenic	Total	mg/L	0.00232	0.00023	0.00041	0.00005

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC - Rau
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	(Repeat)
Sampled By:			
Company:			

Lot ID:	**951573**
Control Number:	B09802
Date Received:	Aug 9, 2013
Date Reported:	Aug 23, 2013
Report Number:	1850849

Reference Number	951573-4	951573-5	951573-6
Sample Date	Aug 05, 2013	Aug 05, 2013	Aug 06, 2013
Sample Time	13:20	14:45	08:35
Sample Location			
Sample Description	RAU 4	Rackla R	Beaver R d/s
Matrix	Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Metals Total - Continued						
Barium	Total	mg/L	0.135	0.0673	0.0655	0.00005
Beryllium	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Bismuth	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Boron	Total	mg/L	0.002	0.005	0.004	.002
Cadmium	Total	mg/L	0.00003	0.00003	0.00003	0.00001
Calcium	Total	mg/L	57.0	55.1	47.3	0.05
Chromium	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Cobalt	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Copper	Total	mg/L	0.0011	0.0008	0.0012	0.0001
Iron	Total	mg/L	0.031	0.043	0.090	0.002
Lead	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Total	mg/L	0.0011	0.0030	0.0032	0.0005
Magnesium	Total	mg/L	20.6	23.6	18.6	0.04
Manganese	Total	mg/L	0.0038	0.0172	0.0134	0.001
Molybdenum	Total	mg/L	0.00125	0.00083	0.00085	0.00005
Nickel	Total	mg/L	<0.0002	0.0006	0.0026	0.0002
Potassium	Total	mg/L	0.9	0.5	0.6	0.1
Selenium	Total	mg/L	0.0006	0.0006	0.0005	0.0001
Silicon	Total	mg/L	2.58	1.83	2.18	0.02
Silver	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Sodium	Total	mg/L	0.9	2.0	2.1	0.1
Strontium	Total	mg/L	0.0786	0.134	0.155	0.0001
Thallium	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Tin	Total	mg/L	<0.0001	<0.0001	0.0002	0.0001
Titanium	Total	mg/L	0.0006	<0.0005	<0.0005	0.0005
Uranium	Total	mg/L	0.00270	0.00134	0.00106	0.00001
Vanadium	Total	mg/L	0.0002	<0.0001	0.0001	0.0001
Zinc	Total	mg/L	0.0060	0.0024	0.0054	0.0005
Zirconium	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Hardness	as CaCO3	mg/L	227	235	195	1
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2	<2	<2	1
Solids	Total Dissolved	mg/L	236	280	222	5
Routine Water						
pH	at 25 °C		8.25	8.14	8.11	

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC - Rau
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	(Repeat)
Sampled By:			
Company:			

Lot ID:	**951573**
Control Number:	B09802
Date Received:	Aug 9, 2013
Date Reported:	Aug 23, 2013
Report Number:	1850849

		Reference Number	951573-4	951573-5	951573-6
		Sample Date	Aug 05, 2013	Aug 05, 2013	Aug 06, 2013
		Sample Time	13:20	14:45	08:35
		Sample Location			
		Sample Description	RAU 4	Rackla R	Beaver R d/s
		Matrix	Water	Water	Water
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water - Continued						
Electrical Conductivity		µS/cm at 25 C	398	428	364	1
Calcium	Dissolved	mg/L	56.8	56.5	49.1	0.1
Iron	Dissolved	mg/L	<0.005	0.018	0.043	0.005
Magnesium	Dissolved	mg/L	20.8	24.3	19.5	0.1
Manganese	Dissolved	mg/L	<0.001	0.008	0.007	0.001
Potassium	Dissolved	mg/L	0.8	0.5	0.6	0.1
Silicon	Dissolved	mg/L	2.51	1.80	2.17	0.05
Sodium	Dissolved	mg/L	0.9	2.0	2.0	0.1
Bicarbonate		mg/L	233	195	178	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	191	160	146	5
Chloride	Dissolved	mg/L	0.39	0.96	0.73	0.05
Nitrate - N	Dissolved	mg/L	0.22	0.08	0.08	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	31.9	74.5	51.7	0.5
Hardness	as CaCO3	mg/L	227	241	203	5

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC - Rau
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	(Repeat)
Sampled By:			
Company:			

Lot ID:	**951573**
Control Number:	B09802
Date Received:	Aug 9, 2013
Date Reported:	Aug 23, 2013
Report Number:	1850849

Reference Number	951573-7	951573-8	951573-9
Sample Date	Aug 06, 2013	Aug 06, 2013	Aug 06, 2013
Sample Time	11:30	13:50	18:00
Sample Location			
Sample Description	East Cr	Beaver Cr @ rd-xing	Gambler / Ladue Cr
Matrix	Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	2.1	1.0	13.2	0.5
Ammonia - N		mg/L	0.12	0.14	0.12	.01
Phosphorus	Total	mg/L	0.009	<0.003	0.011	0.003
Metals Dissolved						
Sulfur	Dissolved	mg/L	20.4	16.5	21.5	0.2
Aluminum	Dissolved	mg/L	0.010	<0.005	0.007	0.005
Antimony	Dissolved	mg/L	0.0002	<0.0002	0.0006	0.0002
Arsenic	Dissolved	mg/L	0.0009	0.0002	0.0012	0.0002
Barium	Dissolved	mg/L	0.104	0.064	0.041	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	0.012	0.005	<0.004	0.004
Cadmium	Dissolved	mg/L	0.00034	<0.00001	0.00008	0.00001
Chromium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Cobalt	Dissolved	mg/L	0.00020	<0.00002	0.00011	0.00002
Copper	Dissolved	mg/L	0.004	<0.001	0.002	0.001
Lead	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L	0.004	0.003	0.002	0.001
Molybdenum	Dissolved	mg/L	0.00475	0.00089	0.00107	0.0001
Nickel	Dissolved	mg/L	0.017	<0.001	0.003	0.001
Selenium	Dissolved	mg/L	0.0028	<0.0006	<0.0006	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L	0.177	0.161	0.162	0.001
Thallium	Dissolved	mg/L	0.00002	<0.00001	<0.00001	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L	0.0055	0.0011	0.0008	0.0004
Vanadium	Dissolved	mg/L	0.00016	<0.00010	<0.00010	0.0001
Zinc	Dissolved	mg/L	0.057	<0.001	0.019	0.001
Zirconium	Dissolved	mg/L	0.00015	<0.00010	<0.00010	0.0001
Metals Total						
Mercury	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Aluminum	Total	mg/L	0.081	0.007	0.012	0.005
Antimony	Total	mg/L	0.0002	<0.0001	0.0006	0.0001
Arsenic	Total	mg/L	0.00140	0.00023	0.00118	0.00005

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC - Rau
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	(Repeat)
Sampled By:			
Company:			

Lot ID:	**951573**
Control Number:	B09802
Date Received:	Aug 9, 2013
Date Reported:	Aug 23, 2013
Report Number:	1850849

Reference Number	951573-7	951573-8	951573-9
Sample Date	Aug 06, 2013	Aug 06, 2013	Aug 06, 2013
Sample Time	11:30	13:50	18:00
Sample Location			
Sample Description	East Cr	Beaver Cr @ rd-xing	Gambler / Ladue Cr
Matrix	Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Metals Total - Continued						
Barium	Total	mg/L	0.105	0.0666	0.0418	0.00005
Beryllium	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Bismuth	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Boron	Total	mg/L	0.013	0.005	<0.002	.002
Cadmium	Total	mg/L	0.00038	<0.00001	0.00010	0.00001
Calcium	Total	mg/L	76.7	49.8	49.9	0.05
Chromium	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Cobalt	Total	mg/L	0.0003	<0.0001	0.0001	0.0001
Copper	Total	mg/L	0.0018	0.0007	0.0014	0.0001
Iron	Total	mg/L	0.421	0.027	0.132	0.002
Lead	Total	mg/L	0.0002	<0.0001	0.0002	0.0001
Lithium	Total	mg/L	0.0036	0.0031	0.0019	0.0005
Magnesium	Total	mg/L	19.6	20.2	13.5	0.04
Manganese	Total	mg/L	0.0294	0.0034	0.378	0.001
Molybdenum	Total	mg/L	0.00448	0.00094	0.00099	0.00005
Nickel	Total	mg/L	0.0161	0.0004	0.0027	0.0002
Potassium	Total	mg/L	1.8	0.7	0.6	0.1
Selenium	Total	mg/L	0.0026	0.0005	0.0004	0.0001
Silicon	Total	mg/L	2.74	2.35	1.50	0.02
Silver	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Sodium	Total	mg/L	3.4	2.3	1.3	0.1
Strontium	Total	mg/L	0.164	0.166	0.166	0.0001
Thallium	Total	mg/L	0.00002	<0.00001	<0.00001	0.00001
Thorium	Total	mg/L	<0.00001	<0.00001	0.00003	0.00001
Tin	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Titanium	Total	mg/L	0.0037	<0.0005	<0.0005	0.0005
Uranium	Total	mg/L	0.00544	0.00117	0.00083	0.00001
Vanadium	Total	mg/L	0.0005	0.0001	0.0001	0.0001
Zinc	Total	mg/L	0.0648	0.0015	0.0208	0.0005
Zirconium	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Hardness	as CaCO3	mg/L	272	208	180	1
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	8	<2	<2	1
Solids	Total Dissolved	mg/L	342	238	256	5
Routine Water						
pH	at 25 °C		8.02	8.18	7.68	

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC - Rau
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
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Attn:	Bonnie Burns	Acct code:	(Repeat)
Sampled By:			
Company:			

Lot ID:	**951573**
Control Number:	B09802
Date Received:	Aug 9, 2013
Date Reported:	Aug 23, 2013
Report Number:	1850849

Reference Number		951573-7	951573-8	951573-9
Sample Date		Aug 06, 2013	Aug 06, 2013	Aug 06, 2013
Sample Time		11:30	13:50	18:00
Sample Location				
Sample Description		East Cr	Beaver Cr @ rd-xing	Gambler / Ladue Cr
Matrix		Water	Water	Water

Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water - Continued						
Electrical Conductivity		µS/cm at 25 C	517	373	337	1
Calcium	Dissolved	mg/L	79.3	49.9	51.2	0.1
Iron	Dissolved	mg/L	0.036	0.012	0.082	0.005
Magnesium	Dissolved	mg/L	20.4	20.4	14.0	0.1
Manganese	Dissolved	mg/L	0.021	<0.001	0.381	0.001
Potassium	Dissolved	mg/L	1.8	0.6	0.6	0.1
Silicon	Dissolved	mg/L	2.69	2.25	1.51	0.05
Sodium	Dissolved	mg/L	3.5	2.2	1.5	0.1
Bicarbonate		mg/L	260	186	134	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	214	152	110	5
Chloride	Dissolved	mg/L	4.97	0.69	0.12	0.05
Nitrate - N	Dissolved	mg/L	0.07	0.03	<0.01	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	61.8	50.7	64.0	0.5
Hardness	as CaCO3	mg/L	282	208	186	5

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC - Rau
	Box 21072	Name:	Tiger
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	Whitehorse, YT, Canada	LSD:	
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Attn:	Bonnie Burns	Acct code:	(Repeat)
Sampled By:			
Company:			

Lot ID:	**951573**
Control Number:	B09802
Date Received:	Aug 9, 2013
Date Reported:	Aug 23, 2013
Report Number:	1850849

Reference Number	951573-10	951573-11	951573-12
Sample Date	Aug 07, 2013		
Sample Time	09:50		
Sample Location			
Sample Description	RAU 7	Field Blank	Trip Blank
Matrix	Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	0.7	<0.5	<0.5	0.5
Ammonia - N		mg/L	0.10	0.12	<0.01	.01
Phosphorus	Total	mg/L	<0.003	<0.003	<0.003	0.003
Metals Dissolved						
Sulfur	Dissolved	mg/L	11.6	<0.2	0.2	0.2
Aluminum	Dissolved	mg/L	<0.005	<0.005	<0.005	0.005
Antimony	Dissolved	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Dissolved	mg/L	0.0003	<0.0002	<0.0002	0.0002
Barium	Dissolved	mg/L	0.166	<0.001	<0.001	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	<0.004	<0.004	<0.004	0.004
Cadmium	Dissolved	mg/L	0.00003	<0.00001	<0.00001	0.00001
Chromium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Cobalt	Dissolved	mg/L	<0.00002	<0.00002	<0.00002	0.00002
Copper	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Lead	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Molybdenum	Dissolved	mg/L	0.00019	<0.00010	<0.0001	0.0001
Nickel	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Selenium	Dissolved	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L	0.044	<0.001	<0.001	0.001
Thallium	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L	0.0014	<0.0004	<0.0004	0.0004
Vanadium	Dissolved	mg/L	0.00014	<0.00010	<0.0001	0.0001
Zinc	Dissolved	mg/L	0.004	<0.001	<0.001	0.001
Zirconium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Metals Total						
Mercury	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Aluminum	Total	mg/L	<0.005	<0.005	<0.005	0.005
Antimony	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Arsenic	Total	mg/L	0.00025	<0.00005	<0.00005	0.00005

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W: www.exova.com

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC - Rau
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	(Repeat)
Sampled By:			
Company:			

Lot ID:	**951573**
Control Number:	B09802
Date Received:	Aug 9, 2013
Date Reported:	Aug 23, 2013
Report Number:	1850849

Reference Number	951573-10	951573-11	951573-12
Sample Date	Aug 07, 2013		
Sample Time	09:50		
Sample Location			
Sample Description	RAU 7	Field Blank	Trip Blank
Matrix	Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Metals Total - Continued						
Barium	Total	mg/L	0.176	0.00011	0.00011	0.00005
Beryllium	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Bismuth	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Boron	Total	mg/L	<0.002	<0.002	<0.002	.002
Cadmium	Total	mg/L	0.00003	<0.00001	<0.00001	0.00001
Calcium	Total	mg/L	45.2	<0.05	<0.05	0.05
Chromium	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Cobalt	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Copper	Total	mg/L	0.0006	0.0006	0.0010	0.0001
Iron	Total	mg/L	0.006	<0.002	<0.002	0.002
Lead	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Total	mg/L	0.0005	<0.0005	<0.0005	0.0005
Magnesium	Total	mg/L	24.1	<0.04	<0.04	0.04
Manganese	Total	mg/L	0.0012	<0.001	<0.001	0.001
Molybdenum	Total	mg/L	0.00020	<0.00005	<0.00005	0.00005
Nickel	Total	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Potassium	Total	mg/L	0.2	<0.1	<0.1	0.1
Selenium	Total	mg/L	0.0003	<0.0001	<0.0001	0.0001
Silicon	Total	mg/L	2.09	<0.02	<0.02	0.02
Silver	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Sodium	Total	mg/L	0.8	0.4	0.4	0.1
Strontium	Total	mg/L	0.0457	0.0002	0.0003	0.0001
Thallium	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Tin	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Titanium	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Uranium	Total	mg/L	0.00157	<0.00001	<0.00001	0.00001
Vanadium	Total	mg/L	0.0002	<0.0001	0.0001	0.0001
Zinc	Total	mg/L	0.0043	0.0011	0.0008	0.0005
Zirconium	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Hardness	as CaCO3	mg/L	212	<1	<1	1
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2	<2	<2	1
Solids	Total Dissolved	mg/L	232	<5	6	5
Routine Water						
pH	at 25 °C		8.14	6.20	5.77	

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC - Rau
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	(Repeat)
Sampled By:			
Company:			

Lot ID:	**951573**
Control Number:	B09802
Date Received:	Aug 9, 2013
Date Reported:	Aug 23, 2013
Report Number:	1850849

Reference Number		951573-10	951573-11	951573-12
Sample Date		Aug 07, 2013		
Sample Time		09:50		
Sample Location				
Sample Description		RAU 7	Field Blank	Trip Blank
Matrix		Water	Water	Water

Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water - Continued						
Electrical Conductivity		µS/cm at 25 C	379	<1	<1	1
Calcium	Dissolved	mg/L	46.0	0.12	0.34	0.1
Iron	Dissolved	mg/L	0.007	<0.005	<0.005	0.005
Magnesium	Dissolved	mg/L	24.7	<0.10	<0.10	0.1
Manganese	Dissolved	mg/L	<0.001	<0.001	0.031	0.001
Potassium	Dissolved	mg/L	0.2	<0.1	<0.1	0.1
Silicon	Dissolved	mg/L	2.09	<0.05	<0.05	0.05
Sodium	Dissolved	mg/L	0.8	0.4	0.3	0.1
Bicarbonate		mg/L	210	<5	<5	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	172	<5	<5	5
Chloride	Dissolved	mg/L	0.33	<0.05	<0.05	0.05
Nitrate - N	Dissolved	mg/L	0.20	<0.01	<0.01	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	34.9	<0.5	<0.5	0.5
Hardness	as CaCO3	mg/L	216	<5	<5	5

Approved by:

Carol Nam, Dipl. T.
Quality Officer

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Methodology and Notes

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC - Rau
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	(Repeat)
Sampled By:			
Company:			

Lot ID:	**951573**
Control Number:	B09802
Date Received:	Aug 9, 2013
Date Reported:	Aug 23, 2013
Report Number:	1850849

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water (Surrey)	APHA	*	Alkalinity - Titration Method, 2320 B	12-Aug-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	*	Conductivity, 2510 B	12-Aug-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	*	pH - Electrometric Method, 4500-H+ B	12-Aug-13	Exova Surrey
Ammonia-N in Water (Surrey)	APHA	*	Flow Injection Analysis, 4500-NH3 H	13-Aug-13	Exova Surrey
Anions by IEC in water (Surrey)	APHA	*	Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	10-Aug-13	Exova Surrey
BC ICP-MS Total Metals in Water	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	13-Aug-13	Exova Edmonton
BC ICP-MS Total Metals in Water	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	22-Aug-13	Exova Edmonton
BC Trace Total Metals in Water	APHA	*	Inductively Coupled Plasma (ICP) Method, 3120 B	13-Aug-13	Exova Edmonton
BC Trace Total Metals in Water	APHA	*	Inductively Coupled Plasma (ICP) Method, 3120 B	22-Aug-13	Exova Edmonton
Carbon Organic (Total) in water (TOC)	APHA		High-Temperature Combustion Method, 5310 B	13-Aug-13	Exova Edmonton
Mercury Low Level (Total) in water (Surrey)	EPA	*	Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	12-Aug-13	Exova Surrey
Metals SemiTrace (Dissolved) in water (Surrey)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	15-Aug-13	Exova Surrey
Phosphorus - total by Smartchem (Surrey)	APHA	*	Preliminary Acid Hydrolysis, Ascorbic Acid Reduction Method, 4500-P B,E	12-Aug-13	Exova Surrey
Solids Dissolved (Total, Fixed and Volatile) - Surrey	APHA	*	Total Dissolved Solids Dried at 180 C, 2540 C	10-Aug-13	Exova Surrey
Solids Suspended (Total, Fixed and Volatile)	APHA	*	Total Suspended Solids Dried at 103-105'C, 2540 D	10-Aug-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	12-Aug-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	12-Aug-13	Exova Surrey

** Reference Method Modified*

References

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

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Methodology and Notes

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC - Rau
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	(Repeat)
Sampled By:			
Company:			

Lot ID:	**951573**
Control Number:	B09802
Date Received:	Aug 9, 2013
Date Reported:	Aug 23, 2013
Report Number:	1850849

Comments:

- Tellurium was not reported due to instrument issues.
- Report was issued to include retest result for metals analysis on sample 951573-3 as requested by Bonnie Burns on Aug 20, 2013. Previous Report 1850849.
- Sample 951573-3; 4497855 Sample 951573-3: the repeated result for BC Trace Total Metals analysis did not differ significantly from the original; it is within expected precision of the test.
- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.
The test report shall not be reproduced except in full, without the written approval of the laboratory.

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Billing Information

Company: Laberge Env. Services
Address: PO Box 21072
Whitehorse, YT. Y1A6P7
Attention: Bonnie Burns
Phone: 867-668-6838
Cell:
Fax:
E-mail: bonnieburns@northwestel.net
Agreement ID: 66943
Copy of report:

Copy of Report To:

Company: Same
Address:
Attention:
Phone:
Cell:
Fax:
E-mail:
Copy of invoice:

RUSH Priority

Upon filling out this section, client accepts that surcharges will be applied to the analysis

Date Required
As Indicated | All Analysis

When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples.

Signature

Project Information

Project ID: ATAC-Rau
Project Name: Tiger
Project Location:
Legal Location:
PO/AFE#:
Proj. Acct. Code:

Sample Custody (please print)

Sampled by:
Company:
I authorize Exova to proceed with the work indicated on this form:
Date: Initial:

This section for Lab use only

Date/Time stamp: AUG 09 2013 Cal 10.9°C 4pm.

Report Results: E-mail / Mail | Online / Fax | PDF / Excel | QA/QC Report

Special Instructions/Comments (please include contact information including ph. # if different from above).

Include Regulatory Requirements Below:
CCME Freshwater Aquatic Life

Sample Identification	Location	Depth IN CM M	Date/Time sampled	Matrix	Sampling Method	↓ Number of Containers	Alk, pH, EC	Dissolved Trace Metals	Total Trace Metals	Hardness, Hg	TSS, TDS	TOC	TP	SO4	Cl, NO2, NO3, NH3
1 RAU 11			Aug 5/13 @ 7:30	H2O	Grab	6	✓	✓	✓	✓	✓	✓	✓	✓	✓
2 RAU 12			Aug 5/13 @ 9:15	"	"	6	✓	✓	✓	✓	✓	✓	✓	✓	✓
3 RAU 9			Aug 5/13 @ 10:55	"	"	6	✓	✓	✓	✓	✓	✓	✓	✓	✓
4 RAU 4			Aug 5/13 @ 13:20	"	"	6	✓	✓	✓	✓	✓	✓	✓	✓	✓
5 Rackla R			Aug 5/13 @ 14:45	"	"	6	✓	✓	✓	✓	✓	✓	✓	✓	✓
6 Beaver R d/s			Aug 6/13 @ 8:35	"	"	6	✓	✓	✓	✓	✓	✓	✓	✓	✓
7 East Cr			Aug 6/13 @ 11:30	"	"	6	✓	✓	✓	✓	✓	✓	✓	✓	✓
8 Beaver Cr @ rd-xing			Aug 6/13 @ 13:50	"	"	6	✓	✓	✓	✓	✓	✓	✓	✓	✓
9 Gambler/Ledue Cr			Aug 6/13 @ 18:00	"	"	6	✓	✓	✓	✓	✓	✓	✓	✓	✓
10 RAU 7			Aug 7/13 @ 9:50	"	"	6	✓	✓	✓	✓	✓	✓	✓	✓	✓
11 Field Blank						6	✓	✓	✓	✓	✓	✓	✓	✓	✓
12 Travel Blank						6	✓	✓	✓	✓	✓	✓	✓	✓	✓
13															
14															
15															

Enter tests above (√ relevant samples below)

Indicate below any deficiencies in the condition of samples:

- Were Exova supplies used?
- Was there any damage to the shipping container?
- Were the containers packaged well?
- Were any extra samples received (document below)?
- Are samples within recommended holding times/temp?

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

Please indicate any potentially hazardous samples

Page of Control # B09802

Indicate lot number or affix lot label here: 951573

Shipping: COD Y/N
Cooler temp:

and size of coolers received:
Delivery Method:
Waybill:
Received by:

ED 120-00

APPENDIX D

STREAM SEDIMENT QUALITY

- **Laboratory Analytical Report**

Exova
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Report Transmission Cover Page

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC-RAU
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:			
Company:			

Lot ID:	**951914**
Control Number:	B09803
Date Received:	Aug 9, 2013
Date Reported:	Aug 30, 2013
Report Number:	1851894

Contact & Affiliation	Address	Delivery Commitments
Bonnie Burns Laberge Environmental Services	1-405 Ogilvie Street, Box 21072 Whitehorse, Yukon Territory Y1A 6P7 Phone: (867) 668-6838 Fax: (867) 667-6956 Email: bonnieburns@northwestel.net	On [Lot Verification] send (COA) by Email - Multiple Reports On [Report Approval] send (COC, Test Report) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report On [Lot Creation] send (COR) by Email - Multiple Reports

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Sample Custody

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC-RAU
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:			
Company:			

Lot ID:	**951914**
Control Number:	B09803
Date Received:	Aug 9, 2013
Date Reported:	Aug 30, 2013
Report Number:	1851894

Sample Disposal Date: September 29, 2013

All samples will be stored until this date unless other instructions are received. Please indicate other requirements below and return this form to the address or fax number on the top of this page.

☐ Extend Sample Storage Until _____ (MM/DD/YY)

The following charges apply to extended sample storage:

Storage for an additional 30 days	$ 2.50 per sample
Storage for an additional 60 days	$ 5.00 per sample
Storage for an additional 90 days	$ 7.50 per sample

☐ Return Sample, collect, to the address below via:

- ☐ Greyhound
- ☐ DHL
- ☐ Purolator
- ☐ Other (specify) _____

Name _____
Company _____
Address _____
_____
Phone _____
Fax _____

Signature _____

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC-RAU
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:			
Company:			

Lot ID:	**951914**
Control Number:	B09803
Date Received:	Aug 9, 2013
Date Reported:	Aug 30, 2013
Report Number:	1851894

Reference Number	951914-1	951914-2	951914-3
Sample Date	Aug 05, 2013	Aug 05, 2013	Aug 05, 2013
Sample Time	07:30	09:15	10:55
Sample Location			
Sample Description	RAU 11	RAU 12	RAU 9
Matrix	Soil	Soil	Soil

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Hot Water Soluble						
Boron	Hot Water Soluble	mg/kg	0.47	0.23	<1.0	0.2
Metals Strong Acid Digestion						
Mercury	Strong Acid Extractable	mg/kg	0.06	0.01	0.03	0.01
Strong Acid Leachable Metals						
Antimony	Strong Acid Extractable	mg/kg	0.8	0.7	0.5	0.1
Arsenic	Strong Acid Extractable	mg/kg	35.0	417	202	0.1
Barium	Strong Acid Extractable	mg/kg	893	435	522	0.5
Beryllium	Strong Acid Extractable	mg/kg	0.4	0.3	0.4	0.05
Cadmium	Strong Acid Extractable	mg/kg	6.76	1.18	2.41	0.005
Chromium	Strong Acid Extractable	mg/kg	62.8	45.0	47.4	0.25
Cobalt	Strong Acid Extractable	mg/kg	17.8	14.2	15.3	0.05
Copper	Strong Acid Extractable	mg/kg	63	33	33	0.5
Lead	Strong Acid Extractable	mg/kg	118	51.2	57.3	0.05
Lithium	Strong Acid Extractable	mg/kg	10	9	10	0.5
Molybdenum	Strong Acid Extractable	mg/kg	4	1	2	0.5
Nickel	Strong Acid Extractable	mg/kg	63.4	46.0	48.7	0.25
Selenium	Strong Acid Extractable	mg/kg	1.0	0.3	0.5	0.15
Silver	Strong Acid Extractable	mg/kg	0.5	0.3	0.3	0.05
Strontium	Strong Acid Extractable	mg/kg	109	164	130	0.5
Thallium	Strong Acid Extractable	mg/kg	0.18	0.32	0.23	0.025
Tin	Strong Acid Extractable	mg/kg	22	13	5	0.5
Vanadium	Strong Acid Extractable	mg/kg	36.0	28.1	33.6	0.05
Zinc	Strong Acid Extractable	mg/kg	995	305	598	0.5
Soil Acidity						
pH	1:2 Soil:Water	pH	8.5	8.9	9.0	

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC-RAU
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:			
Company:			

Lot ID:	**951914**
Control Number:	B09803
Date Received:	Aug 9, 2013
Date Reported:	Aug 30, 2013
Report Number:	1851894

Reference Number	951914-4	951914-5	951914-6
Sample Date	Aug 05, 2013	Aug 05, 2013	Aug 06, 2013
Sample Time	13:20	14:45	08:35
Sample Location			
Sample Description	RAU 4	Rackla R	Beaver R d/s
Matrix	Soil	Soil	Soil

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Hot Water Soluble						
Boron	Hot Water Soluble	mg/kg	0.39	0.84	0.32	0.2
Metals Strong Acid Digestion						
Mercury	Strong Acid Extractable	mg/kg	0.24	0.10	0.10	0.01
Strong Acid Leachable Metals						
Antimony	Strong Acid Extractable	mg/kg	0.6	1.2	0.5	0.1
Arsenic	Strong Acid Extractable	mg/kg	83.0	18.3	10.7	0.1
Barium	Strong Acid Extractable	mg/kg	895	348	218	0.5
Beryllium	Strong Acid Extractable	mg/kg	0.5	0.6	0.4	0.05
Cadmium	Strong Acid Extractable	mg/kg	2.23	1.32	1.38	0.005
Chromium	Strong Acid Extractable	mg/kg	36.4	20.8	31.6	0.25
Cobalt	Strong Acid Extractable	mg/kg	15.8	13.2	15.1	0.05
Copper	Strong Acid Extractable	mg/kg	38	43	39	0.5
Lead	Strong Acid Extractable	mg/kg	32.0	46.5	26.0	0.05
Lithium	Strong Acid Extractable	mg/kg	16	13	15	0.5
Molybdenum	Strong Acid Extractable	mg/kg	3	3	1	0.5
Nickel	Strong Acid Extractable	mg/kg	50.1	42.0	56.5	0.25
Selenium	Strong Acid Extractable	mg/kg	1.1	0.9	0.7	0.15
Silver	Strong Acid Extractable	mg/kg	0.3	0.3	0.2	0.05
Strontium	Strong Acid Extractable	mg/kg	65	75	64	0.5
Thallium	Strong Acid Extractable	mg/kg	0.26	0.15	0.11	0.025
Tin	Strong Acid Extractable	mg/kg	2	3	3	0.5
Vanadium	Strong Acid Extractable	mg/kg	51.2	29.5	39.1	0.05
Zinc	Strong Acid Extractable	mg/kg	517	258	286	0.5
Soil Acidity						
pH	1:2 Soil:Water	pH	8.1	8.9	7.1	

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC-RAU
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:			
Company:			

Lot ID:	**951914**
Control Number:	B09803
Date Received:	Aug 9, 2013
Date Reported:	Aug 30, 2013
Report Number:	1851894

Reference Number	951914-7	951914-8	951914-9
Sample Date	Aug 06, 2013	Aug 06, 2013	Aug 06, 2013
Sample Time	11:30	13:50	18:00
Sample Location			
Sample Description	East Cr	Beaver Cr@ rd x-ing	Gambler/Laduc Cr
Matrix	Soil	Soil	Soil

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Hot Water Soluble						
Boron	Hot Water Soluble	mg/kg	0.42	0.34	0.34	0.2
Metals Strong Acid Digestion						
Mercury	Strong Acid Extractable	mg/kg	0.06	0.06	0.12	0.01
Strong Acid Leachable Metals						
Antimony	Strong Acid Extractable	mg/kg	1.2	0.6	4.4	0.1
Arsenic	Strong Acid Extractable	mg/kg	41.0	11.3	17.8	0.1
Barium	Strong Acid Extractable	mg/kg	1020	192	236	0.5
Beryllium	Strong Acid Extractable	mg/kg	0.7	0.6	0.3	0.05
Cadmium	Strong Acid Extractable	mg/kg	3.78	0.855	4.45	0.005
Chromium	Strong Acid Extractable	mg/kg	30.8	42.0	21.5	0.25
Cobalt	Strong Acid Extractable	mg/kg	15.0	17.4	14.6	0.05
Copper	Strong Acid Extractable	mg/kg	50	40	52	0.5
Lead	Strong Acid Extractable	mg/kg	34.4	33.0	148	0.05
Lithium	Strong Acid Extractable	mg/kg	14	17	18	0.5
Molybdenum	Strong Acid Extractable	mg/kg	6	2	2	0.5
Nickel	Strong Acid Extractable	mg/kg	84.3	46.3	54.8	0.25
Selenium	Strong Acid Extractable	mg/kg	2.0	0.6	4.4	0.15
Silver	Strong Acid Extractable	mg/kg	0.3	0.2	3.7	0.05
Strontium	Strong Acid Extractable	mg/kg	75	62	42	0.5
Thallium	Strong Acid Extractable	mg/kg	0.33	0.12	0.12	0.025
Tin	Strong Acid Extractable	mg/kg	8	2	2	0.5
Vanadium	Strong Acid Extractable	mg/kg	51.5	46.4	23.1	0.05
Zinc	Strong Acid Extractable	mg/kg	573	197	926	0.5
Soil Acidity						
pH	1:2 Soil:Water	pH	8.0	8.8	7.0	

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC-RAU
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:			
Company:			

Lot ID:	**951914**
Control Number:	B09803
Date Received:	Aug 9, 2013
Date Reported:	Aug 30, 2013
Report Number:	1851894

Reference Number	951914-10
Sample Date	Aug 07, 2013
Sample Time	09:50
Sample Location	
Sample Description	RAU 7
Matrix	Soil

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Hot Water Soluble						
Boron	Hot Water Soluble	mg/kg	0.49			0.2
Metals Strong Acid Digestion						
Mercury	Strong Acid Extractable	mg/kg	0.06			0.01
Strong Acid Leachable Metals						
Antimony	Strong Acid Extractable	mg/kg	0.8			0.1
Arsenic	Strong Acid Extractable	mg/kg	24.1			0.1
Barium	Strong Acid Extractable	mg/kg	392			0.5
Beryllium	Strong Acid Extractable	mg/kg	0.3			0.05
Cadmium	Strong Acid Extractable	mg/kg	1.74			0.005
Chromium	Strong Acid Extractable	mg/kg	18.3			0.25
Cobalt	Strong Acid Extractable	mg/kg	8.4			0.05
Copper	Strong Acid Extractable	mg/kg	20			0.5
Lead	Strong Acid Extractable	mg/kg	110			0.05
Lithium	Strong Acid Extractable	mg/kg	7			0.5
Molybdenum	Strong Acid Extractable	mg/kg	1			0.5
Nickel	Strong Acid Extractable	mg/kg	22.8			0.25
Selenium	Strong Acid Extractable	mg/kg	0.6			0.15
Silver	Strong Acid Extractable	mg/kg	0.3			0.05
Strontium	Strong Acid Extractable	mg/kg	39			0.5
Thallium	Strong Acid Extractable	mg/kg	0.14			0.025
Tin	Strong Acid Extractable	mg/kg	5			0.5
Vanadium	Strong Acid Extractable	mg/kg	34.7			0.05
Zinc	Strong Acid Extractable	mg/kg	580			0.5
Soil Acidity						
pH	1:2 Soil:Water	pH	8.6			

Approved by:

Darren Crichton, BSc, PChem
Operations Manager

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Methodology and Notes

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC-RAU
	Box 21072	Name:	Tiger
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:			
Company:			

Lot ID:	**951914**
Control Number:	B09803
Date Received:	Aug 9, 2013
Date Reported:	Aug 30, 2013
Report Number:	1851894

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Boron in general soil	McKeague	*	Hot Water Soluble Boron - Azomethine -H Method, 4.61	30-Aug-13	Exova Edmonton
Mercury (Hot Block) in Soil	US EPA	*	Determination of Hg in Sediment by Cold Vapor Atomic Absorption Spec, 245.5	30-Aug-13	Exova Edmonton
Metals ICP-MS (BCMOE SALM) in soil	B.C.M.O.E	*	Strong Acid Leachable Metals (SALM) in Soil, V 1.0, SALM	30-Aug-13	Exova Edmonton
pH and Conductivity in general soil 1:2	McKeague	*	1:2 Soil:Water Ratio, 4.12	29-Aug-13	Exova Edmonton

** Reference Method Modified*

References

B.C.M.O.E	B.C. Ministry of Environment
McKeague	Manual on Soil Sampling and Methods of Analysis
US EPA	US Environmental Protection Agency Test Methods

Comments:

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.
The test report shall not be reproduced except in full, without the written approval of the laboratory.

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RUSH Priority
Upon filling out this section, client accepts that surcharges will be applied to the analysis
Date Required
As Indicated | All Analysis
When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples.
Signature

Project Information
Project ID: ATAC - Rau
Project Name: Tiger
Project Location:
Legal Location:
PO/AFE#:
Proj. Acct. Code:

Report Results: E-mail | Mail | Online | Fax | PDF | Excel | QA/QC Report

Special Instructions/Comments (please include contact information including ph. # if different from above).

Include Regulatory Requirements Below:

Sample Custody (please print)
Sampled by:
Company:
I authorize Exova to proceed with the work indicated on this form:
Date: Initial:

This section for Lab use only
LOT: 951914 COC

	Sample Identification	Location	Depth IN CM M	Date/Time sampled	Matrix	Sampling Method	↓	Number of Containers	Dry Sediment Sample — Mix well sieve thru 270 steel screen sieve size	Metals analysis on portion that passes 270 sieve Screen							
1	RAU 11			Aug5/13@7:30	Soil	Composite		1	✓	✓	✓						
2	RAU 12			Aug5/13@9:15	"	"		1	✓	✓	✓						
3	RAU 9			Aug5/13@10:55	"	"		1	✓	✓	✓						
4	RAU 4			Aug5/13@13:20	"	"		1	✓	✓	✓						
5	Rackla R			Aug5/13@14:45	"	"		1	✓	✓	✓						
6	Beaver Rd/S			Aug6/13@8:35	"	"		1	✓	✓	✓						
7	East Cr			Aug6/13@11:30	"	"		1	✓	✓	✓						
8	Beaver Cr@rd x-ing			Aug6/13@13:50	"	"		1	✓	✓	✓						
9	Gambler/Ladue Cr			Aug6/13@18:00	"	"		1	✓	✓	✓						
10	RAU-7			Aug7/13@9:50	"	"		1	✓	✓	✓						
11	~~Field Blank~~																
12	~~Trip Blank~~																
13																	
14																	
15																	

Were Exova supplies used?
Was there any damage to the shipping container?
Were the containers packaged well?
Were any extra samples received (document below)?
Are samples within recommended holding times/temp?

Environmental Sample Information Sheet
Note: Proper completion of this form is required in order to proceed with analysis
Please indicate any potentially hazardous samples

Page of Control # B 09803

Indicate lot number or affix lot label here:
RECEIVED AUG 09 2013 1pm

Shipping: COD Y/N
Cooler temp:

and size of coolers received:
Delivery Method:
Waybill:
Received by:

ED 120-00

APPENDIX E

BENTHIC INVERTEBRATES

- **Photos**
- **Figures**
- **Tables**
- **Raw Benthic Invertebrate Data**

Photo #1: Cobble and large gravel substrate at the Beaver R site at proposed crossing.

Photo #2: Beaver R near Scougale confluence showing wetland areas.

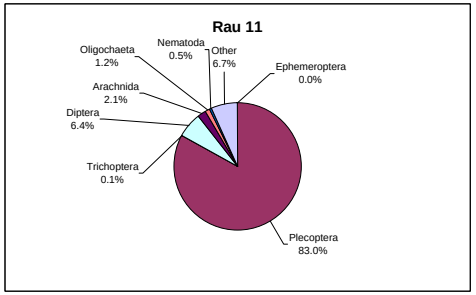
Photo #3: Site at RAU 12.

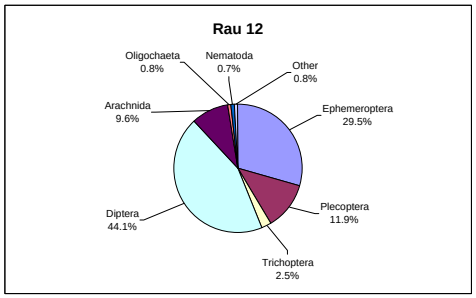
Photo #4: Site at RAU 9.

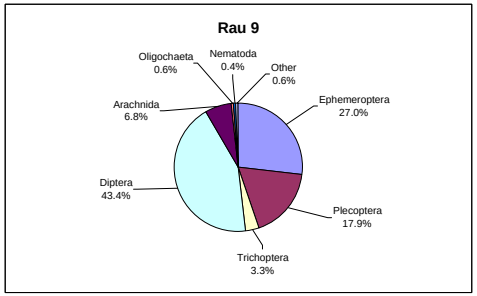
Photo #5: Site at RAU 4.

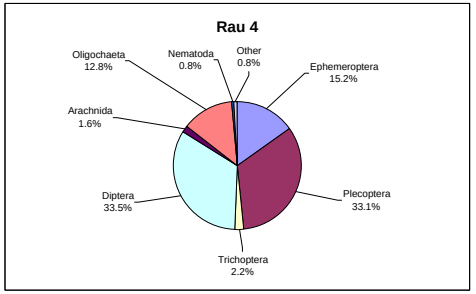
Photo #6 : East Creek site has a substrate of fines and clean small gravels.

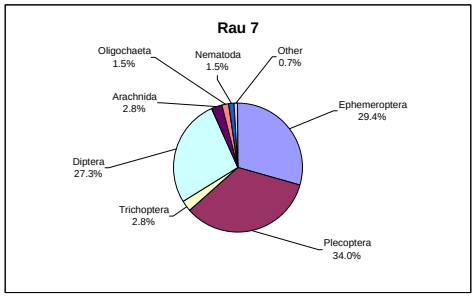
FIGURE 7.1 COMMUNITY COMPOSITION OF BENTHIC INVERTEBRATE TAXONOMIC GROUPS, 2013

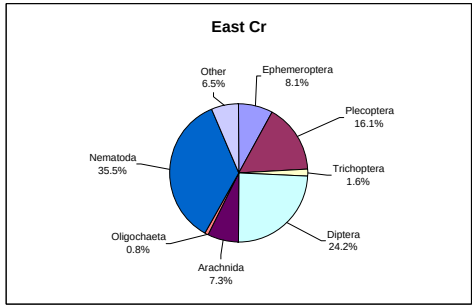


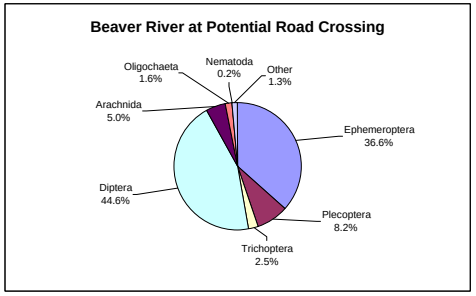


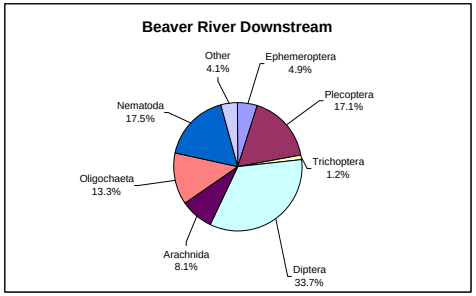


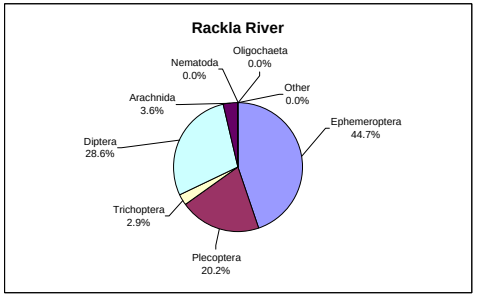


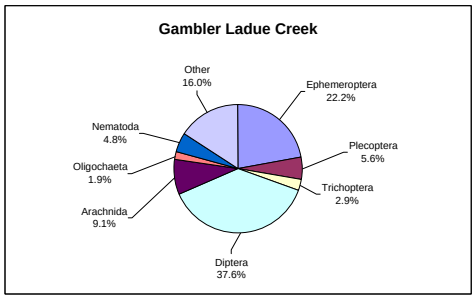








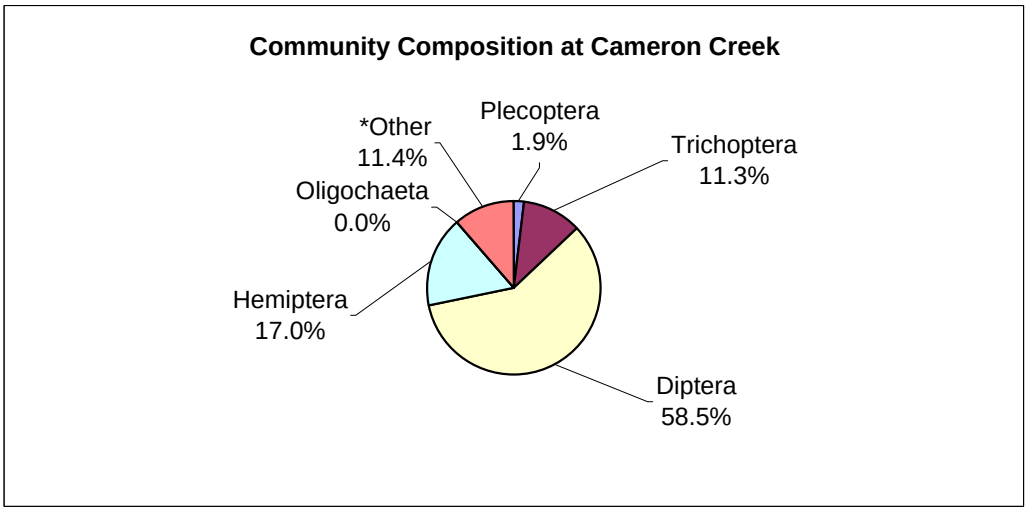


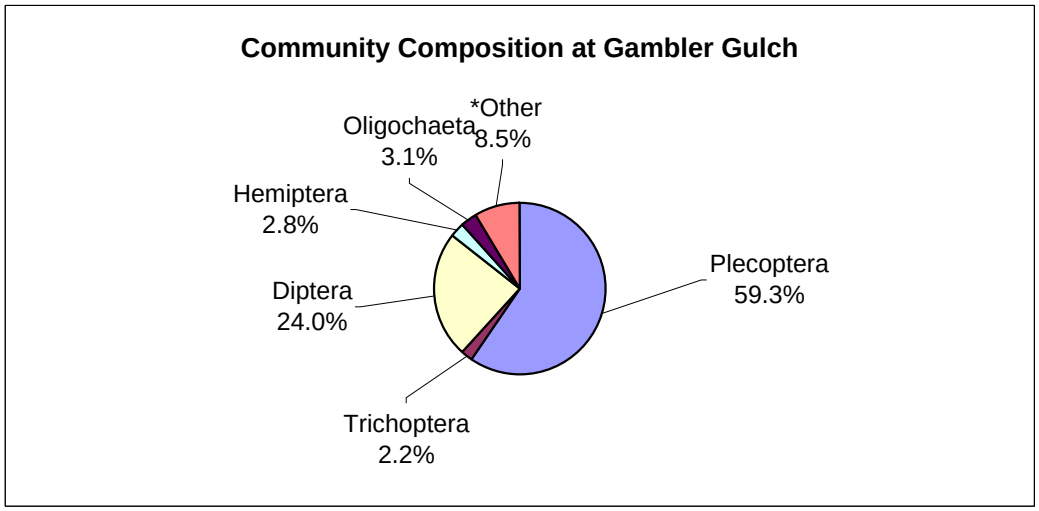


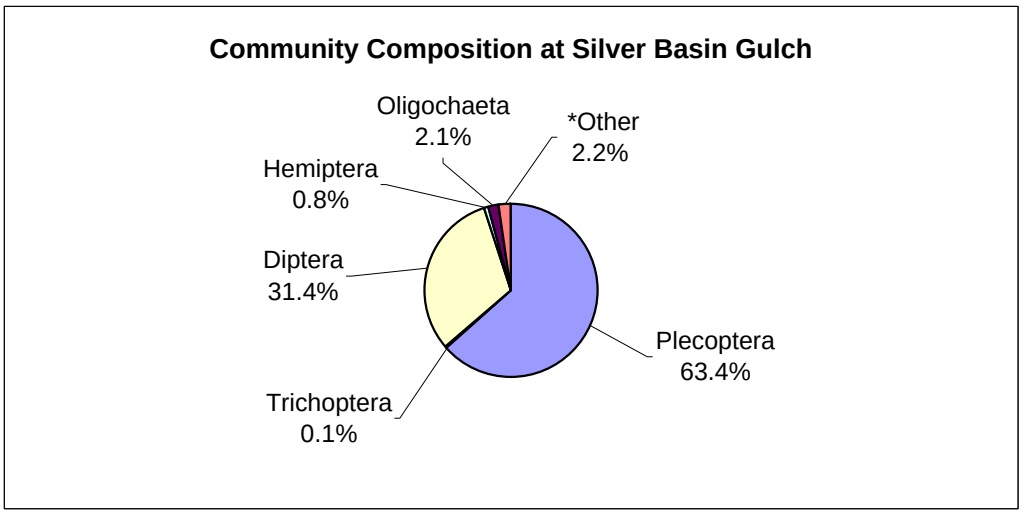
OTHER includes one or more of the following:

Coleoptera
Lepidoptera
Collembola
Amphipoda
Ostracoda
Cladocera
Copepoda
Bivalva
Gastropoda
Cnidaria
Tardigrada
Terrestrials

FIGURE 7.2 COMMUNITY COMPOSITION OF BENTHIC INVERTEBRATE TAXONOMIC GF







NOTE: Other includes one or more of the following: Collembola, Coleoptera, Hydracarina, Hymenoptera, Copepoda,Ostracoda, Bivalva, Aranaea, Ephemeroptera, Insecta

TABLE 7-2 BENTHIC INVERTEBRATE ABUNDANCE & DIVERSITY

Site:	Sample:	Abundance	Diversity	Taxonomic Richness	Totals/ Density	Units
Silver Basin Gulch	Composite	1,601	37	4.9	1,601	na
Gambler/Ladue Cr	Composite	2,343	42	5.3	2,343	na
Gambler Gulch	Composite	926	44	6.3	926	na
Cameron Cr	Composite	53	15	3.5	53	na
Beaver R @ Road X-ing	A	23	11	3.2	1,895	#/m2
Beaver R @ Road X-ing	B	289	32	5.5		
Beaver R @ Road X-ing	C	216	37	6.7		
Beaver R @ Road X-ing	Composite	1,082	40	5.6	1,082	na
RAU 07	A	117	22	4.4	2,831	#/m2
RAU 07	B	308	38	6.5		
RAU 07	C	364	30	4.9		
RAU 11	A	1,464	16	2.1	6,359	#/m2
RAU 11	C	899	17	2.4		
RAU 12	A	133	31	6.1	3,473	#/m2
RAU 12	B	345	43	7.2		
RAU 12	C	490	28	4.4		
RAU 09	A	73	23	5.1	1,744	#/m2
RAU 09	B	293	31	5.3		
RAU 09	C	120	26	5.2		
RAU 04	A	274	34	5.9	3,297	#/m2
RAU 04	B	163	36	6.9		
RAU 04	C	482	36	5.7		
East Cr	A	48	10	2.3	445	#/m2
East Cr	B	38	16	4.1		
East Cr	C	38	20	5.2		
Beaver R d/s	A	174	24	4.5	2,031	#/m2
Beaver R d/s	B	206	39	7.1		
Beaver R d/s	C	186	33	6.1		
Rackla R	A	179	27	5.0	1,493	#/m2
Rackla R	B	116	23	4.6		
Rackla R	C	121	21	4.2		

TABLE 7-3 TAXONOMIC DISTRIBUTION OF BENTHIC INVERTEBRATES					
SITE	**LOCATION**	**DOMINANT** (≥25%)	**SUBDOMINANT** (10% το 24.9%)	**COMMON** (1.0% το 9.9%)	**RARE** (0.1% το 0.9%)
GG	Gambler Gulch	Plecoptera	Diptera	Other Oligochaeta Hemiptera Trichoptera	
GLC	Gambler Ladue Creek	Diptera	Ephemeroptera Other	Archnida Plecoptera Nematoda Trichoptera Oligochaeta	
SB	Silver Basin Gulch	Plecoptera Diptera		Other Oligochaeta	Hemiptera Trichoptera
CC	Cameron Creek	Diptera	Hemiptera Other Trichoptera	Plecoptera	
BR u/s	Beaver River upstream of all influences	Diptera Ephemeroptera		Plecoptera Arachnida Trichoptera Oligochaeta Other	Nematoda
RAU 7	West Creek approx 1 km upstream of Beaver River	Plecoptera Ephemeroptera Diptera		Trichoptera Arachnida Oligochaeta Nematoda	Other
RAU 11	Camp Creek upstream of camp	Plecoptera		Other Diptera Arachnida Oligochaeta	Nematoda Trichoptera
RAU 12	Pit Creek	Diptera Ephemeroptera	Plecoptera	Arachnida Trichoptera	Oligochaeta Other Nematoda
RAU 9	Camp Creek downstream of RAU 11 and RAU 12	Diptera Ephemeroptera	Plecoptera	Arachnida Trichoptera	Oligochaeta Other Nematoda
RAU 4	Camp Creek upstream of Beaver River	Diptera Plecoptera	Ephemeroptera Oligochaeta	Trichoptera Arachnida	Nematoda Other
EC	East Creek just upstream of Beaver River	Nematoda Diptera	Plecoptera	Ephemeroptera Arachnida Other Trichoptera	Oligochaeta
BR d/s	Beaver River downstream of all potential influcences	Diptera	Nematoda Plecoptera Oligochaeta	Arachnida Ephemeroptera Other Trichoptera	
RR	Rackla River	Ephemeroptera Diptera	Plecoptera	Oligochaeta Trichoptera	

TABLE 7-4 **DOMINANCE MEASURES, RAU 2010 AND 2013**

		First Dominant Taxon			Second Dominant Taxon			Third Dominant Taxon		
Site:	Sample:	Taxon	Order or Class	%	Taxon	Order or Class	%	Taxon	Order or Class	%
Gambler Gulch	Comp	Unidentified Plecopterans		59.0%	Chironomidae	Diptera	18.0%	Baetis sp.	Ephemeroptera	2.2%
Gambler/Ladue Cr	Comp	Simulium sp.	Diptera	23.4%	Baetis sp.	Ephemeroptera	15.7%	Heterotrissocladius sp.	Diptera	12.2%
Silver Basin Gulch	Comp	Unidentified Plecopterans		34.9%	Taenionema sp.	Plecoptera	13.5%	Chironomidae	Diptera	13.2%
Cameron Creek	Comp	Unidentified Dipterans		26.4%	Chironomidae	Diptera	22.6%	Homoptera	Homoptera	11.3%
Beaver R u/s	A	Heptageniidae	Ephemeroptera	27.3%	Capniidae	Plecoptera	18.2%	Thienemannimyia group	Diptera	18.2%
Beaver R u/s	B	Tvetenia sp.	Diptera	29.8%	Pericoma sp.	Diptera	16.1%	Ephemerellidae	Ephemeroptera	13.3%
Beaver R u/s	C	Pericoma sp.	Diptera	18.8%	Tvetenia sp.	Diptera	12.2%	Heptageniidae	Ephemeroptera	11.7%
Beaver R u/s	Comp	Ephemerellidae	Ephemeroptera	18.9%	Heptageniidae	Ephemeroptera	12.8%	Tvetenia sp.	Diptera	10.9%
RAU 07	A	Zapada sp.	Plecoptera	31.9%	Heptageniidae	Ephemeroptera	11.2%	Tvetenia sp.	Diptera	11.2%
RAU 07	B	Zapada sp.	Plecoptera	18.6%	Tvetenia sp.	Diptera	14.7%	Baetis bicaudatus	Ephemeroptera	12.4%
RAU 07	C	Zapada sp.	Plecoptera	22.9%	Baetis bicaudatus	Ephemeroptera	15.6%	Heptageniidae	Ephemeroptera	9.9%
RAU 11	A	Capniidae	Plecoptera	42.7%	Nemouridae	Plecoptera	40.4%	Diamesa sp.	Diptera	4.1%
RAU 11	C	Nemouridae	Plecoptera	47.0%	Capniidae	Plecoptera	37.2%	Diamesa sp.	Diptera	4.7%
RAU 12	A	Ameletus	Ephemeroptera	15.9%	Sweltsa sp.	Plecoptera	9.8%	Eukiefferiella sp.	Diptera	9.1%
RAU 12	B	Ameletus	Ephemeroptera	21.2%	Heptageniidae	Ephemeroptera	20.6%	Oreogeton sp.	Diptera	7.1%
RAU 12	C	Hydrobaenus sp.	Diptera	34.2%	Ameletus	Ephemeroptera	19.7%	Oreogeton sp.	Diptera	10.7%
RAU 09	A	Heptageniidae	Ephemeroptera	15.1%	Tvetenia sp.	Diptera	13.7%	Eukiefferiella sp.	Diptera	12.3%
RAU 09	B	Hydrobaenus sp.	Diptera	32.6%	Ameletus	Ephemeroptera	15.8%	Capniidae	Plecoptera	6.9%
RAU 09	C	Heptageniidae	Ephemeroptera	16.9%	Ameletus	Ephemeroptera	14.4%	Capniidae	Plecoptera	11.9%
RAU 04	A	Zapada sp.	Plecoptera	24.1%	Tvetenia sp.	Diptera	18.0%	Baetis bicaudatus	Ephemeroptera	10.5%
RAU 04	B	Zapada sp.	Plecoptera	18.5%	Tvetenia sp.	Diptera	14.8%	Lumbriculidae	Oligochaeta	11.1%
RAU 04	C	Tvetenia sp.	Diptera	25.0%	Zapada sp.	Plecoptera	18.3%	Lumbriculidae	Oligochaeta	13.8%
East Cr	A	Orthocladiinae	Oligochaeta	42.9%	Enchytraeus	Oligochaeta	7.1%	Empididae	Diptera	7.1%
East Cr	B	Cinygmula sp.	Ephemeroptera	13.8%	Chelifera/ Metachela	Diptera	10.3%	Hydrozetidae	Arachnida	10.3%
East Cr	C	Capniidae	Plecoptera	30.3%	Hydrozetidae	Arachnida	9.1%	Epeorus sp.	Ephemeroptera	6.1%
Beaver R d/s	A	Capniidae	Plecoptera	31.6%	Tvetenia sp.	Diptera	9.5%	Tubificinae immature	Oligochaeta	8.4%
Beaver R d/s	B	Orthocladius complex	Oligochaeta	19.7%	Capniidae	Plecoptera	12.0%	Tvetenia sp.	Diptera	10.4%
Beaver R d/s	C	Capniidae	Plecoptera	16.5%	Orthocladius complex	Oligochaeta	12.6%	Tvetenia sp.	Diptera	11.0%
Rackla R	A	Ephemerellidae	Ephemeroptera	15.6%	Heptageniidae	Ephemeroptera	15.6%	Eukiefferiella sp.	Diptera	10.6%
Rackla R	B	Ephemerellidae	Ephemeroptera	39.7%	Heptageniidae	Ephemeroptera	8.6%	Tvetenia sp.	Diptera	6.9%
Rackla R	C	Ephemerellidae	Ephemeroptera	15.7%	Heptageniidae	Ephemeroptera	11.6%	Suwallia sp.	Plecoptera	11.6%

APPENDIX E

BENTHIC INVERTEBRATE DATA, RAU PROJECT, 2013

Site:	RAU 04			RAU 07			RAU 09			RAU 11	
Sample:	A	B	C	A	B	C	A	B	C	A	C
Phylum: Arthropoda											
Subphylum: Hexapoda											
| Class: Insecta											
| Order: Ephemeroptera											
| Family: Ameletidae											
Ameletus				1	1		4	46	17		
| Family: Baetidae				3					1		
Acentrella sp.											
Acerpenna pygmaea											
Baetis bicaudatus	28	12	18	5	38	55					
Baetis sp.	9	3	3	5	2	2					
Baetis tricaudatus group											
| Family: Ephemerellidae											
Drunella coloradensis											
Drunella doddsii											
Drunella sp.											
Serratella sp.											
| Family: Heptageniidae	4	4	4	13	23	35	11	3	20		
Cinygmula sp.	3	3	16		15	26	3	17	8		
Epeorus sp.	4	9	19	1	1	4					
Rhithrogena sp.		1				2			1		
| Family: Leptophlebiidae											
| Order: Plecoptera	3	1	12	5	22	23			5	52	
| Family: Capniidae			11		3	2	2	20	14	584	308
Capnia sp.										4	
| Family: Chloroperlidae	2	10	30	1							
Plumiperla sp.			1								
Suwallia sp.		2		1				1			
Sweltsa sp.	3	2	12					18	3		
| Family: Leuctridae	2	4	5				2				
Perlomyia sp.			1						1		
| Family: Nemouridae										552	389
Amphinemura sp.											
Podmosta sp.										44	29
Zapada columbiana			14	4	2	12		4	1		
Zapada oregonensis group			1		2	4	1	1			
Zapada sp.	64	30	88	37	57	81	1	7	5		
| Family: Perlodidae	1			1		2					
Megarcys sp.	1	1			1			1			
| Family: Taeniopterygidae				2		6					
Taenionema sp.		1	2								
| Order: Trichoptera											
| Family: Apataniidae											
Allomyia sp.									1		
Apatania sp.											
| Family: Brachycentridae											
Brachycentrus sp.											
Micrasema sp.											
| Family: Glossosomatidae											
Glossosoma sp.	3	1	10		2	2					
| Family: Hydropsychidae											
Arctopsyche sp.											
| Family: Hydroptilidae											
Hydroptila sp.											
Oxyethira sp.											
| Family: Limnephilidae			1					11	1		3
Ecclisomyia sp.											
Psychoglypha sp.								2			
| Family: Rhyacophilidae											
Rhyacophila angelita group	1		2	1	4						
Rhyacophila brunnea group											
Rhyacophila hyalinata group						10					
Rhyacophila sp.	1					2					
Rhyacophila vofixa group	1				1			1			

APPENDIX E

BENTHIC INVERTEBRATE DATA, RAU PROJECT, 2013

Site:	RAU 04			RAU 07			RAU 09			RAU 11	
Sample:	A	B	C	A	B	C	A	B	C	A	C
| Order: Coleoptera			1		1						
| Family: Dytiscidae											
| Order: Diptera	1	1	1		4			2	1		
| Family: Ceratopogonidae											
Mallochohelea											
Probezzia sp.											
Sphaeromias sp.											
| Family: Chironomidae											
| Subfamily: Chironominae											
| Tribe: Chironomini											
Paracladopelma sp.											
Polypedilum sp.											
Stictochironomus sp.											
Zavrelia sp.											
| Tribe: Tanytarsini											
Micropsectra sp.			2								
| Subfamily: Diamesinae											
Pseudokiefferiella										4	3
| Tribe: Diamesini											
Diamesa sp.							1		6	56	39
Pagastia sp.		1		7	9	14	6	6			
Pseudodiamesa sp.					1						
| Subfamily: Orthocladiinae					3			3			
Cricotopus sp.							2				
Eukiefferiella sp.		2	11		8	6	9	8	6		16
Heleniella sp.		1									
Heterotrissocladius sp.		1									
Hydrobaenus sp.							2	95			
Hydrosmittia sp.											
Orthocladius complex	7										
Parakiefferiella sp.											
Pseudosmittia sp.		1									
Rheocricotopus sp.					5	9			3		
Synorthocladius sp.											
Thienemanniella	2		3								
Tvetenia sp.	48	24	120	13	45	21	10	3	6		
| Tribe: Corynoneurini											
Corynoneura sp.											
| Tribe: Orthocladiini											
Chaetocladius sp.										4	
| Subfamily: Podonominae											
Paraboreochlus sp.									1		
| Subfamily: Tanypodinae											
| Tribe: Pentaneuriini											
| Tribe: Pentaneurini											
Thienemannimyia group											
| Tribe: Procladiini											
Procladius sp.											
| Family: Dixidae											
Dixa sp.											
| Family: Empididae		2									
Chelifera/ Metachela	19										
Clinocera sp.				2	3	3	1	7	2		
Neoplasta sp.	3	2	2		2	1					
Oreogeton sp.	16	10	11				6	10	5		
Wiedemannia sp.											
| Family: Oreoleptidae											
Oreoleptis torrenticola											
| Family: Psychodidae	1			6	25	15	2		4		
Pericoma sp.											
| Family: Sciomyzidae					2						
| Family: Simuliidae		2			2	1	2				
Gymnopais sp.											3

APPENDIX E

BENTHIC INVERTEBRATE DATA, RAU PROJECT, 2013

Site:	RAU 04			RAU 07			RAU 09			RAU 11	
Sample:	A	B	C	A	B	C	A	B	C	A	C
Helodon sp.	1	3	1								
Prosimulium sp.	1	1			1	1					3
Simulium sp.											
Twinnia sp.										12	11
| Family: Tabanidae											
| Family: Tipulidae			1								
Dicranota sp.	4		2	2	4			1			
Hexatoma sp.											
Molophilus sp.							1				
Rhabdomastix sp.											
| Order: Lepidoptera					1						
| Class: Entognatha											
| Order: Collembola		1			1	1				20	18
Subphylum: Crustacea											
| Class: Malacostraca											
| Order: Amphipoda					2						3
| Family: Hyalellidae											
Hyalella sp.											
| Class: Ostracoda	2		1								
| Class: Branchiopoda											
| Order: Cladocera											
| Family: Daphniidae											
Daphnia sp.											
| Class: Copepoda									1	76	42
Subphylum: Chelicerata											
| Class: Arachnida											
| Order: Trombidiformes					2			2			
| Family: Aturidae							1	1		8	
Aturus											
| Family: Feltriidae											
Feltria sp.		1			1	5					
| Family: Hydryphantidae											
Wandesia sp.	1	1	3				2	1			
| Family: Hygrobatidae											
Atractides sp.											
Hygrobates sp.											
| Family: Lebertiidae											
Lebertia sp.				1			2	10	4	4	
| Family: Sperchontidae											
Sperchon sp.	1	1		2	5		1	5	1		5
Sperchonopsis sp.											
| Family: Torrenticolidae											
Testudacarus sp.											
| Order: Sarcoptiformes											
| Family: Hydrozetidae	2	2	3		1	5	1	1	1	32	
Phylum: Mollusca											
| Class: Bivalvia											
| Order: Veneroida											
| Family: Pisidiidae											
Pisidium sp.											
| Class: Gastropoda			2								
| Order: Basommatophora											
| Family: Lymnaeidae											
Lymnaea sp.											
| Family: Physidae											
Physa sp.											

APPENDIX E

BENTHIC INVERTEBRATE DATA, RAU PROJECT, 2013

Site:	RAU 04			RAU 07			RAU 09			RAU 11	
Sample:	A	B	C	A	B	C	A	B	C	A	C
| Family: Planorbidae											
Gyraulus sp.											
| Order: Heterostropha											
| Family: Valvatidae											
Valvata sincera											
Valvata sp.											
| Order: Hypsogastropoda											
| Family: Hydrobiidae								1			
Phylum: Annelida											
Subphylum: Clitellata											
| Class: Oligochaeta											
| Order: Haplotaxida											
| Family: Haplotaxidae											
Haplotaxis sp.		1									
| Order: Lumbriculida											
| Family: Lumbriculidae	25	18	66							4	3
Rhynchelmis sp.		3	1							8	8
| Order: Tubificida											
| Family: Enchytraeidae											
Enchytraeus	3			3	5	3					5
| Family: Naididae											
Pristina sp.											
| Family: Tubificidae											
Tubifex sp.								2			
| Subfamily: Tubificinae immature	1					1		1			
Phylum: Cnidaria											
| Class: Hydrozoa											
| Order: Anthoathecatae											
| Family: Hydridae											
Hydra sp.											
Phylum: Tardigrada											
Phylum: Nemata	6		1	1	1	10		2			11
Terrestrials									1		
Totals per Sample:	274	163	482	117	308	364	73	293	120	1464	899
Taxonomic Richness per Sample:	34	36	36	22	38	30	23	31	26	16	17
Total per Site:	919			789			486			2363	

APPENDIX E

BENTHIC INVERTEBRATE DATA, RAU PROJECT, 2013

Site:	RAU 12			Beaver R @ Road X-ing			Beaver R @ Road X-ing	Beaver R d/s		
Sample:	A	B	C	A	B	C	D 400µM	A	B	C
Phylum: Arthropoda										
Subphylum: Hexapoda										
| Class: Insecta										
| Order: Ephemeroptera										
| Family: Ameletidae										
Ameletus	21	72	96		1	2	7		1	
| Family: Baetidae								2	2	
Acentrella sp.					5		17		2	
Acerpenna pygmaea										
Baetis bicaudatus					2					
Baetis sp.						1	17			
Baetis tricaudatus group						1	3	1		
| Family: Ephemerellidae					38	16	203		4	5
Drunella coloradensis							3			
Drunella doddsii					1	1	7			
Drunella sp.									1	
Serratella sp.					2					
| Family: Heptageniidae	11	70	12	6	35	25	137	3	6	1
Cinygmula sp.	2	1	1		2	1	13			
Epeorus sp.				1	3	1	23			
Rhithrogena sp.					1		13			
| Family: Leptophlebiidae						2				
| Order: Plecoptera					1	1	3	1	2	2
| Family: Capniidae	1	6	7	4	12	10	13	30	22	30
Capnia sp.										
| Family: Chloroperlidae	1	5	1							
Plumiperla sp.										
Suwallia sp.					3		13			
Sweltsa sp.	13	15	7		3	5	17	1		
| Family: Leuctridae	12	12	2				3			
Perlomyia sp.	10	9								
| Family: Nemouridae		1	1	1						
Amphinemura sp.										
Podmosta sp.										
Zapada columbiana	3	1							1	
Zapada oregonensis group										
Zapada sp.	2	4				2	7	2	2	
| Family: Perlodidae		1			2	2	30	3	1	
Megarcys sp.		1								
| Family: Taeniopterygidae										
Taenionema sp.										
| Order: Trichoptera										
| Family: Apataniidae										
Allomyia sp.	5	4								
Apatania sp.								1	2	2
| Family: Brachycentridae					1		7			
Brachycentrus sp.							3			
Micrasema sp.										
| Family: Glossosomatidae										
Glossosoma sp.										
| Family: Hydropsychidae						1	20			
Arctopsyche sp.						1			1	
| Family: Hydroptilidae										
Hydroptila sp.									1	
Oxyethira sp.										
| Family: Limnephilidae	1	2	10							
Ecclisomyia sp.		1	1							
Psychoglypha sp.										
| Family: Rhyacophilidae										
Rhyacophila angelita group										
Rhyacophila brunnea group							7			
Rhyacophila hyalinata group										
Rhyacophila sp.										
Rhyacophila vofixa group										

APPENDIX E

BENTHIC INVERTEBRATE DATA, RAU PROJECT, 2013

Site:	RAU 12			Beaver R @ Road X-ing			Beaver R @ Road X-ing	Beaver R d/s		
Sample:	A	B	C	A	B	C	D 400µM	A	B	C
| Order: Coleoptera		1								
| Family: Dytiscidae	1									
| Order: Diptera			1							
| Family: Ceratopogonidae					1					
Mallochohelea										1
Probezzia sp.				1			13			
Sphaeromias sp.				2						
| Family: Chironomidae										
| Subfamily: Chironominae										
| Tribe: Chironomini										
Paracladopelma sp.										
Polypedilum sp.										1
Stictochironomus sp.										
Zavrelia sp.					11	12	90			
| Tribe: Tanytarsini										
Micropsectra sp.		6	7		8	7	53	5	11	16
| Subfamily: Diamesinae										
Pseudokiefferiella										
| Tribe: Diamesini										
Diamesa sp.		5								
Pagastia sp.		8				5		6		13
Pseudodiamesa sp.			3							
| Subfamily: Orthocladiinae										
Cricotopus sp.										
Eukiefferiella sp.	12		13		4		37			
Heleniella sp.		1								
Heterotrissocladius sp.									1	
Hydrobaenus sp.	7		167			3				
Hydrosmittia sp.										1
Orthocladius complex			8		7	13	47	5	36	23
Parakiefferiella sp.		4							1	
Pseudosmittia sp.										
Rheocricotopus sp.	4	18								
Synorthocladius sp.	6	7								
Thienemanniella		2								
Tvetenia sp.		8	6		85	26	117	9	19	20
| Tribe: Corynoneurini										
Corynoneura sp.	1					1			1	3
| Tribe: Orthocladiini										
Chaetocladius sp.										
| Subfamily: Podonominae										
Paraboreochlus sp.										
| Subfamily: Tanypodinae		1								
| Tribe: Pentaneuriini								1		6
| Tribe: Pentaneurini										
Thienemannimyia group				4			3		4	
| Tribe: Procladiini										
Procladius sp.										
| Family: Dixidae										
Dixa sp.		1								
| Family: Empididae									2	2
Chelifera/ Metachela						1		1		2
Clinocera sp.		5	25							
Neoplasta sp.									1	
Oreogeton sp.	4	24	52							
Wiedemannia sp.	2	8								
| Family: Oreoleptidae										
Oreoleptis torrenticola										
| Family: Psychodidae		1	2							
Pericoma sp.				1	46	40	77			
| Family: Sciomyzidae										
| Family: Simuliidae	1	1				1				
Gymnopais sp.										

APPENDIX E

BENTHIC INVERTEBRATE DATA, RAU PROJECT, 2013

Site:	RAU 12			Beaver R @ Road X-ing			Beaver R @ Road X-ing	Beaver R d/s		
Sample:	A	B	C	A	B	C	D 400µM	A	B	C
Helodon sp.										
Prosimulium sp.										
Simulium sp.	1									
Twinnia sp.	1	1								
| Family: Tabanidae										
| Family: Tipulidae			1							
Dicranota sp.		1	1							
Hexatoma sp.				1		1				
Molophilus sp.										
Rhabdomastix sp.										
| Order: Lepidoptera										
| Class: Entognatha										
| Order: Collembola		2								
Subphylum: Crustacea										
| Class: Malacostraca										
| Order: Amphipoda	2						3			2
| Family: Hyalellidae										
Hyalella sp.							3			
| Class: Ostracoda				1	2	2	10	1	2	
| Class: Branchiopoda										
| Order: Cladocera										
| Family: Daphniidae										
Daphnia sp.									1	
| Class: Copepoda										3
Subphylum: Chelicerata										
| Class: Arachnida										
| Order: Trombidiformes		1	1	1		1			2	
| Family: Aturidae										
Aturus					2	2		2	6	3
| Family: Feltriidae										
Feltria sp.	1	1			1	3	7	2	5	2
| Family: Hydryphantidae										
Wandesia sp.	1	22	35		1					
| Family: Hygrobatidae										2
Atractides sp.					1	2	7	2	2	1
Hygrobates sp.					1	1	3		1	1
| Family: Lebertiidae										
Lebertia sp.	1	4	12		2	2	10	3	1	4
| Family: Sperchontidae										
Sperchon sp.		1	5		2	2	30		4	2
Sperchonopsis sp.										
| Family: Torrenticolidae										
Testudacarus sp.										1
| Order: Sarcoptiformes										
| Family: Hydrozetidae	1	1	6							
Phylum: Mollusca										
| Class: Bivalvia										
| Order: Veneroida										
| Family: Pisidiidae										
Pisidium sp.	2									
| Class: Gastropoda								1		3
| Order: Basommatophora										
| Family: Lymnaeidae										
Lymnaea sp.										
| Family: Physidae										
Physa sp.										

APPENDIX E

BENTHIC INVERTEBRATE DATA, RAU PROJECT, 2013

Site:	RAU 12			Beaver R @ Road X-ing			Beaver R @ Road X-ing	Beaver R d/s		
Sample:	A	B	C	A	B	C	D 400µM	A	B	C
| Family: Planorbidae										
Gyraulus sp.										
| Order: Heterostropha										
| Family: Valvatidae										
Valvata sincera									2	3
Valvata sp.									2	3
| Order: Hypsogastropoda										
| Family: Hydrobiidae										
Phylum: Annelida										
Subphylum: Clitellata										
| Class: Oligochaeta										
| Order: Haplotaxida										
| Family: Haplotaxidae										
Haplotaxis sp.										
| Order: Lumbriculida										
| Family: Lumbriculidae						14	3	2	3	1
Rhynchelmis sp.	1									
| Order: Tubificida										
| Family: Enchytraeidae										
Enchytraeus	1	1	5			4	3	4	8	8
| Family: Naididae										
Pristina sp.									5	
| Family: Tubificidae									2	4
Tubifex sp.										
| Subfamily: Tubificinae immature					1			8	16	14
Phylum: Cnidaria										
| Class: Hydrozoa										
| Order: Anthoathecatae										
| Family: Hydridae										
Hydra sp.										
Phylum: Tardigrada										
Phylum: Nemata	1	4	2		2	1		78	20	1
Terrestrials										
Totals per Sample:	133	345	490	23	289	216	1082	174	206	186
Taxonomic Richness per Sample:	31	43	28	11	32	37	40	24	39	33
Total per Site:	968			528			1082	566		

APPENDIX E

BENTHIC INVERTEBRATE DATA, RAU PROJECT, 2013

Site:	East Creek			Gambler/Ladue Cr	Rackla River			Total	%
Sample:	A	B	C	400µM	A	B	C		
Phylum: Arthropoda									
Subphylum: Hexapoda									
| Class: Insecta									
| Order: Ephemeroptera									
| Family: Ameletidae									
Ameletus								269	2.5
| Family: Baetidae				13	2	4	2	29	0.3
Acentrella sp.					6	2	1	33	0.3
Acerpenna pygmaea				6				6	0.1
Baetis bicaudatus								158	1.5
Baetis sp.				306			1	349	3.3
Baetis tricaudatus group				50				55	0.5
| Family: Ephemerellidae					28	46	19	359	3.4
Drunella coloradensis								3	0.03
Drunella doddsii					2		2	13	0.1
Drunella sp.								1	0.0
Serratella sp.							1	3	0.03
| Family: Heptageniidae			1		28	10	14	476	4.5
Cinygmula sp.		4	1		6	3	2	127	1.2
Epeorus sp.		2	2		1		4	75	0.7
Rhithrogena sp.					2			20	0.2
| Family: Leptophlebiidae				144				146	1.4
| Order: Plecoptera				6	3	3	9	154	1.5
| Family: Capniidae	1	1	10		2	6	6	1105	10.4
Capnia sp.								4	0.04
| Family: Chloroperlidae					6		1	57	0.5
Plumiperla sp.								1	0.01
Suwallia sp.			1		15	1	14	51	0.5
Sweltsa sp.					5		8	112	1.1
| Family: Leuctridae			2					44	0.4
Perlomyia sp.								21	0.2
| Family: Nemouridae				31				975	9.2
Amphinemura sp.				88				88	0.8
Podmosta sp.								73	0.7
Zapada columbiana								42	0.4
Zapada oregonensis group	1		1					11	0.1
Zapada sp.		2		6		2		399	3.8
| Family: Perlodidae					3			46	0.4
Megarcys sp.		1						6	0.1
| Family: Taeniopterygidae								8	0.1
Taenionema sp.								3	0.03
| Order: Trichoptera				6				6	0.1
| Family: Apataniidae									
Allomyia sp.								10	0.1
Apatania sp.								5	0.05
| Family: Brachycentridae				25				33	0.3
Brachycentrus sp.								3	0.03
Micrasema sp.						1		1	0.01
| Family: Glossosomatidae									
Glossosoma sp.								18	0.2
| Family: Hydropsychidae					6	3	1	31	0.3
Arctopsyche sp.								2	0.02
| Family: Hydroptilidae									
Hydroptila sp.								1	0.01
Oxyethira sp.				31				31	0.3
| Family: Limnephilidae				6				35	0.3
Ecclisomyia sp.								2	0.02
Psychoglypha sp.								2	0.02
| Family: Rhyacophilidae									
Rhyacophila angelita group								8	0.1
Rhyacophila brunnea group						1		8	0.1
Rhyacophila hyalinata group								10	0.1
Rhyacophila sp.		2						5	0.05
Rhyacophila vofixa group								3	0.03

APPENDIX E

BENTHIC INVERTEBRATE DATA, RAU PROJECT, 2013

Site:	East Creek			Gambler/Ladue Cr	Rackla River			Total	%
Sample:	A	B	C	400µM	A	B	C		
								0	0.00
| Order: Coleoptera								3	0.03
| Family: Dytiscidae								1	0.01
| Order: Diptera	1	1	1					14	0.1
| Family: Ceratopogonidae								1	0.01
Mallochohelea								1	0.01
Probezzia sp.								14	0.1
Sphaeromias sp.								2	0.02
| Family: Chironomidae									
| Subfamily: Chironominae									
| Tribe: Chironomini									
Paracladopelma sp.				19				19	0.2
Polypedilum sp.								1	0.01
Stictochironomus sp.				19				19	0.2
Zavrelia sp.				13				126	1.2
| Tribe: Tanytarsini									
Micropsectra sp.						2		117	1.1
| Subfamily: Diamesinae									0.0
Pseudokiefferiella								7	0.1
| Tribe: Diamesini									
Diamesa sp.								107	1.0
Pagastia sp.					4	2	1	82	0.8
Pseudodiamesa sp.								4	0.04
| Subfamily: Orthocladiinae	6							12	0.1
Cricotopus sp.								2	0.02
Eukiefferiella sp.		2	2		19	7	13	175	1.7
Heleniella sp.								2	0.02
Heterotrissocladius sp.				238				240	2.3
Hydrobaenus sp.			1					275	2.6
Hydrosmittia sp.			1					2	0.02
Orthocladius complex		1			13			160	1.5
Parakiefferiella sp.	1							6	0.1
Pseudosmittia sp.								1	0.01
Rheocricotopus sp.								39	0.4
Synorthocladius sp.								13	0.1
Thienemanniella			1	6	1	1		16	0.2
Tvetenia sp.		1			11	8	11	611	5.8
| Tribe: Corynoneurini									
Corynoneura sp.				6				12	0.1
| Tribe: Orthocladiini									
Chaetocladius sp.								4	0.04
| Subfamily: Podonominae									
Paraboreochlus sp.								1	0.01
| Subfamily: Tanypodinae								1	0.01
| Tribe: Pentaneuriini								7	0.1
| Tribe: Pentaneurini									
Thienemannimyia group				56				67	0.6
| Tribe: Procladiini									0.0
Procladius sp.				6				6	0.1
| Family: Dixidae									
Dixa sp.								1	0.01
| Family: Empididae	1			6				13	0.1
Chelifera/ Metachela		3	1	25	1	1		54	0.5
Clinocera sp.								48	0.5
Neoplasta sp.								11	0.1
Oreogeton sp.								138	1.3
Wiedemannia sp.								10	0.1
| Family: Oreoleptidae									
Oreoleptis torrenticola					2			2	0.02
| Family: Psychodidae		2						58	0.5
Pericoma sp.								164	1.5
| Family: Sciomyzidae								2	0.02
| Family: Simuliidae				31		3	1	45	0.4
Gymnopais sp.								3	0.03

APPENDIX E

BENTHIC INVERTEBRATE DATA, RAU PROJECT, 2013

Site:	East Creek			Gambler/Ladue Cr	Rackla River			Total	%
Sample:	A	B	C	400µM	A	B	C		
Helodon sp.								5	0.05
Prosimulium sp.								7	0.1
Simulium sp.		1		456	8		9	475	4.5
Twinnia sp.								25	0.2
| Family: Tabanidae			2					2	0.02
| Family: Tipulidae								2	0.02
Dicranota sp.								15	0.1
Hexatoma sp.								2	0.02
Molophilus sp.								1	0.01
Rhabdomastix sp.	1				1			2	0.02
								0	0.0
| Order: Lepidoptera		2	1					4	0.04
| Class: Entognatha									
| Order: Collembola								43	0.4
Subphylum: Crustacea									
| Class: Malacostraca									
| Order: Amphipoda								12	0.1
| Family: Hyalellidae									
Hyalella sp.								3	0.03
| Class: Ostracoda			2	19				42	0.4
| Class: Branchiopoda									
| Order: Cladocera									
| Family: Daphniidae									
Daphnia sp.	1			231				233	2.2
| Class: Copepoda			1	31				154	1.5
Subphylum: Chelicerata									
| Class: Arachnida									
| Order: Trombidiformes				6	1		1	18	0.2
| Family: Aturidae								10	0.1
Aturus					2	1		18	0.2
| Family: Feltriidae									
Feltria sp.	1					2		32	0.3
| Family: Hydryphantidae									
Wandesia sp.								67	0.6
| Family: Hygrobatidae				13				15	0.1
Atractides sp.				125				140	1.3
Hygrobates sp.				44				51	0.5
| Family: Lebertiidae		1						1	0.01
Lebertia sp.			1	19		5		85	0.8
| Family: Sperchontidae									
Sperchon sp.					1	2		70	0.7
Sperchonopsis sp.				6				6	0.1
| Family: Torrenticolidae									
Testudacarus sp.								1	0.01
| Order: Sarcoptiformes									
| Family: Hydrozetidae		3	3					62	0.6
Phylum: Mollusca									
| Class: Bivalvia									
| Order: Veneroida									
| Family: Pisidiidae				25				25	0.2
Pisidium sp.								2	0.02
| Class: Gastropoda				6				12	0.1
| Order: Basommatophora									
| Family: Lymnaeidae									
Lymnaea sp.				6				6	0.1
| Family: Physidae									
Physa sp.				6				6	0.1

APPENDIX E

BENTHIC INVERTEBRATE DATA, RAU PROJECT, 2013

Site:	East Creek			Gambler/Ladue Cr	Rackla River			Total	%
Sample:	A	B	C	400µM	A	B	C		
| Family: Planorbidae									
Gyraulus sp.				44				44	0.4
| Order: Heterostropha									
| Family: Valvatidae									
Valvata sincera								5	0.05
Valvata sp.								5	0.05
| Order: Hypsogastropoda									
| Family: Hydrobiidae								1	0.01
Phylum: Annelida									
Subphylum: Clitellata									
| Class: Oligochaeta									
| Order: Haplotaxida									
| Family: Haplotaxidae									
Haplotaxis sp.								1	0.01
| Order: Lumbriculida									
| Family: Lumbriculidae								139	1.3
Rhynchelmis sp.								21	0.2
| Order: Tubificida									
| Family: Enchytraeidae									
Enchytraeus	1			38				92	0.9
| Family: Naididae				6				6	0.1
Pristina sp.								5	0.05
| Family: Tubificidae								6	0.1
Tubifex sp.								2	0.02
| Subfamily: Tubificinae immature								42	0.4
Phylum: Cnidaria									
| Class: Hydrozoa									
| Order: Anthoathecatae									
| Family: Hydridae									
Hydra sp.				6				6	0.1
Phylum: Tardigrada			1					1	0.01
Phylum: Nemata	33	9	2	113				298	2.8
Terrestrials								1	0.01
Totals per Sample:	48	38	38	2343	179	116	121	10584	100
Taxonomic Richness per Sample:	10	16	20	42	27	23	21	160	
Total per Site:	124			2343	416				

APPENDIX F

FISHERIES ASSESSMENTS

- **Photos**
- **Maps**
- **Tables**
- **Laboratory Analytical Report**
- **Letter from ALS**

PHOTOGRAPHS – FISH ASSESSMENT SITES, AUGUST 2013

Photo 1 Beaver River sample site RF1, August 2013.

Photo 2 Beaver River sample site RF5, August 2013.

Photo 3 Camp Creek sample site RF6, August 2013.

Photo 4 Camp Creek sample site RF7, August 2013.

Photo 5 Camp Creek sample site RF4 at the confluence with the Beaver River, August 2013.

Photo 6 East Creek sample site RF3 at the confluence with the Beaver River, August 2013.

Photo 7 Rackla River sample site RF2 just upstream of the confluence with the Beaver River, August 2013.

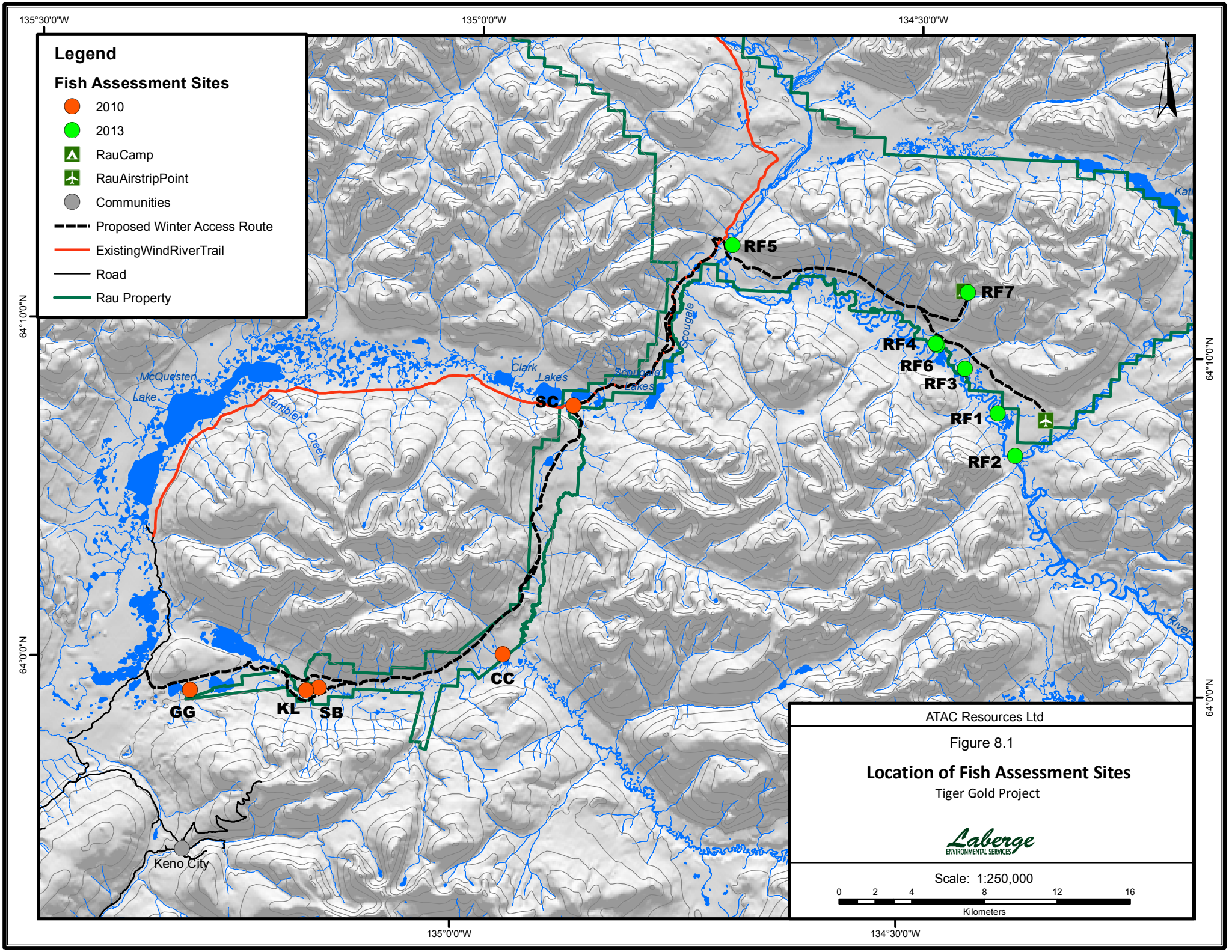

135°30'0"W
135°0'0"W
134°30'0"W
64°10'0"N
64°0'0"N
Legend
Fish Assessment Sites
2010
2013
RauCamp
RauAirstripPoint
Communities
Proposed Winter Access Route
ExistingWindRiverTrail
Road
Rau Property
RF5
RF7
RF4
RF6
RF3
RF1
RF2
SC
CC
GG
KL
SB
McQuesten Lake
Rambler Creek
Clark Lakes
Scougale Lakes
Scougale
Keno City
ATAC Resources Ltd
Figure 8.1
Location of Fish Assessment Sites
Tiger Gold Project
Laberge
ENVIRONMENTAL SERVICES
Scale: 1:250,000
0 2 4 8 12 16
Kilometers

TABLE 8-1 DESCRIPTION OF FISHERIES SITES AND THEIR LOCATIONS, 2010 AND 2103

Site Code	Creek or River	Description	Date Sampled	Easting NAD 83	Northing NAD 83
RF1	Beaver River	Downstream of all influences, upstream of Rackla River	August 5, 2013	529088	7112454
RF5	Beaver River	At general area of winter road crossing	August 6, 2013	514148	7121104
CC	Cameron Creek	Located in mature white spruce forest at only possible landing site	August 10, 2010	502382	7098167
RF4	Camp Creek	Just upstream of confluence with Beaver River	August 6, 2013	525629	7116064
RF6	Camp Creek	Near mouth about 100m u/s of confluence with Beaver River	August 7, 2013	525542	7116172
RF7	Camp Creek	Just downstream of Rackla Camp	August 7, 2013	527206	7119015
RF3	East Creek	Just upstream of confluence with Beaver River	August 6, 2013	527189	7114833
GG	Gambler Gulch	The current proposed road alignment will not cross this creek now.	August 11, 2010	485256	7095540
KL	Keno Ladue River	Near proposed road crossing	August 10, 2010	492329	7095937
RF2	Rackla River	Approximately 500 m u/s confluence with Beaver River	August 5, 2013	530150	7110171
SC	Scougale Creek	Location of Wind River Trail Crossing	August 10, 2010	505743	7111949
SB	Silver Basin Gulch	Approximately 150 m u/s of Keno Ladue River	August 11, 2010	491640	7095751

Table 8-2 Aquatic habitat descriptions of assessed sites within the major drainages of the Rau Property baseline study area, August 2010.

Parameter		Cameron Creek	Gambler Gulch	Keno Ladue River	Scougale Creek	Silver Basin Gulch
Site Characteristics	**Site Code**	CC	GG	KL	SC	SB
	Survey Date	Aug. 10, 2010	Aug. 10, 2010	Aug. 10, 2010	Aug. 10, 2010	Aug. 11, 2010
	Site Elevation (m)	664	744	706	675	722
	Site Survey Length (m)	80	100	100	100	100
Channel	**Channel Width (m)**	7.5	2.4	4.9	30.7	3.8
	Stage	high	moderate	high	high	moderate
Cover	**Cover Abundance (%)**	moderate (~15)	moderate (~20)	abundant (~25)	abundant (~50)	moderate (~15)
	Cover Types	boulders, o/h vegetation, deep pools, undercut banks, small and large woody debris	o/h vegetation, undercut banks, deep pools, small and large woody debris	o/h vegetation, undercut banks, deep pools, small and large woody debris	deep pools, instream vegetation, o/h vegetation, small and large woody debris	o/h vegetation, undercut banks, small woody debris and deep pools

Parameter		Cameron Creek	Gambler Gulch	Keno Ladue River	Scougale Creek	Silver Basin Gulch
Cover	**Instream Vegetation**	none	none	sedges	vascular plants	none
	Riparian Vegetation	mature spruce forest with willow	grasses and willow	grasses and willow	grasses and willow	grasses and willow
Morphology	**Dominant Bed Material**	cobble	gravel	fines	fines	gravel
	Subdominant Bed Material	gravel	fines	gravel	sand	fines
	Morphology	cascade-pool	riffle-pool	riffle-pool	large channel	riffle-pool
	Meander Pattern	sinuous	tortuous meanders	tortuous meanders	sinuous	tortuous meanders
	Islands	occasional	occasional	none	none	none
	Bars	side/point	side/point	side/point	none	side/point
	Confinement	unconfined	unconfined	unconfined	unconfined	unconfined

Table 8-3 Aquatic habitat descriptions of assessed sites within the major drainages of the Rau Property baseline study area, August 2013.

Parameter		Beaver River		Camp Creek			East Creek	Rackla River
Site Characteristics	Site Code	RF1	RF5	RF4	RF6	RF7	RF3	RF2
	Survey Date	Aug 5, 2013	Aug 6, 2013	Aug 6, 2013	Aug 7, 2013	Aug 7, 2013	Aug 6, 2013	Aug 5, 2013
	Site Elevation (m)	645	677	663	665	1,068	662	650
	Site Survey Length (m)	750	260	50	50	100	30	500
Channel	Channel Width (m)	65	60	1.2	1.2	1.0	2.0	40
	Stage	moderate	moderate	moderate	moderate	moderate	moderate	moderate
Cover	Cover Abundance (%)	abundant (~40)	moderate (~20)	moderate (~15)	moderate (~20)	trace (<5)	moderate (~15)	abundant (~25)
	Cover Types	o/h vegetation, deep pools, large and small woody debris	o/h vegetation, cutbanks, large and small woody debris	o/h vegetation and cutbanks	o/h vegetation, small and large woody debris, scour pools and cutbanks	o/h vegetation, boulders	deep pools, small and large woody debris	cutbanks,deep pools, large and small woody debris

Parameter		Beaver River		Camp Creek			East Creek	Rackla River
Cover	**Instream Vegetation**	vascular plants	none	none	none	none	none	none
	Riparian Vegetation	mature spruce forest with willow	mixed spruce and balsam poplar forest with willow	willow and alder	willow and alder	mature spruce forest with willow	mature spruce forest with willow	mature spruce forest with willow
Morphology	**Dominant Bed Material**	sand	gravel	sand	gravel	cobble	fines	gravel
	Subdominant Bed Material	gravel	cobble	gravel	cobble	boulders	gravel	sand
	Morphology	large channel	riffle-pool	step-pool	step-pool	step-pool	riffle-pool	riffle-pool
	Meander Pattern	tortuous meanders	irregular meanders	irregular meanders	irregular meanders	sinuous	irregular	irregular
	Islands	none	overlapping	none	none	none	none	occasional
	Bars	side/point	braided	span	side	side	side	mid channel and side/point
	Confinement	occasionally confined	frequently confined	incised	incised	incised	incised	frequently confined

Table 8-5 Summary of fish captures in drainages associated with the Rau Property baseline study area during August of 2010 and 2013.

Drainage	Sample Site	Capture Method	Sample Effort	Catch								Comments
				Arctic Grayling	Burbot	Chinook Salmon	Dolly Varden	Lake Whitefish	Northern Pike	Round Whitefish	Slimy Sculpin	
Beaver River	RF1	Electro	530 sec	0	0	0	0	0	7	0	2	~ 50 NP and many SS fry observed, adults captured in gillnets
	RF1	NET (2)	4 hr	1	0	0	0	2	1	0	0	
	RF1	MNT (4)	26 hr	0	0	0	0	0	0	0	1	
	RF5	Electro	811	5	1	0	0	0	0	1	12	Schools of AG fry and 4 SS adults observed
	RF5	MNT (6)	14 hr	0	2	0	0	0	0	0	0	
Cameron Creek	CC	Electro	681 sec	0	0	0	0	0	0	0	0	No fish observed
	CC	MNT (3)	22 hr	0	0	0	0	0	0	0	0	
Camp Creek	RF6	Electro	676 sec	1	0	0	1	0	0	0	7	Juvenile NP observed at Beaver River confluence
	RF7	Electro	210 sec	0	0	0	0	0	0	0	0	
	RF4	MNT (2)	22 hr	1	1	1	0	0	0	0	6	
East Creek	RF3	MNT (2)	23 hr	0	0	0	0	0	0	0	2	
Gambler Gulch	GG	Electro	194 sec	0	0	0	0	0	0	0	19	27 SS observed
	GG	MNT (3)	24 hr	0	0	0	0	0	0	0	1	

Drainage	Sample Site	Capture Method	Sample Effort	Catch								Comments
				Arctic Grayling	Burbot	Chinook Salmon	Dolly Varden	Lake Whitefish	Northern Pike	Round Whitefish	Slimy Sculpin	
Keno Ladue River	KL	Angling	20 min	0	0	0	0	0	0	0	0	8 SS and AG/SS fry observed
	KL	Electro	649 sec	5	0	0	0	0	0	0	11	
	KL	MNT (3)	17 hr	0	0	0	0	0	0	0	0	
Rackla River	RF2	Electro	734 sec	2	0	1	0	0	0	1	15	Observed SS and 3 schools of AG fry
	RF2	MNT (4)	21 hr	0	0	0	0	0	0	0	1	
Scougale Creek	SC	Angling	10 min	0	0	0	0	0	0	0	0	
	SC	NET (1)	23 hr	0	0	0	0	2	1	0	0	
	SC	MNT (3)	22 hr	0	0	0	0	0	0	0	0	
Silver Basin Gulch	SB	Electro	510 sec	1	0	0	0	0	0	0	9	
	SB	MNT (3)	17 hr	0	0	0	0	0	0	0	0	
Total				16	4	2	1	4	9	2	86	

MNT = Minnow trap NET = Gillnet Electro = Electroshocker AG = Arctic Grayling BB = Burbot CH = Chinook Salmon

DV = Dolly Varden LW = Lake Whitefish NP = Northern Pike RW = Round Whitefish SS = Slimy Sculpin

TABLE 8-6 LENGTH, WEIGHT AND CONDITION FACTOR FOR EACH FISH CAPTURED THROUGHOUT THE STUDY AREA AND STUDY PERIOD

Sample Site	Species	Length (mm)	Weight (gm)	CF
GG	SS	47	1.2	1.16
GG	SS	51	1.4	1.06
GG	SS	51	1.4	1.06
GG	SS	52	1.4	1.00
GG	SS	52	1.5	1.07
GG	SS	53	1.4	0.94
GG	SS	53	1.4	0.94
GG	SS	55	1.6	0.96
GG	SS	55	1.5	0.90
GG	SS	55	1.7	1.02
GG	SS	55	2.1	1.26
GG	SS	55	2.1	1.26
GG	SS	60	2.3	1.06
GG	SS	62	2.0	0.84
GG	SS	63	2.3	0.92
GG	SS	65	2.8	1.02
GG	SS	72	3.8	1.02
GG	SS	73	4.7	1.21
GG	SS	77	3.9	0.85
GG	SS	83	5.0	0.87
KL	AG	42	0.7	0.94
KL	AG	48	1.0	0.90
KL	AG	51	1.2	0.90
KL	AG	56	2.1	1.20
KL	AG	62	2.5	1.05
KL	SS	41	0.7	1.02
KL	SS	46	0.9	0.92
KL	SS	47	1.0	0.96
KL	SS	55	1.5	0.90
KL	SS	58	2.1	1.08
KL	SS	58	1.8	0.92
KL	SS	59	2.1	1.02
KL	SS	64	3.0	1.14
KL	SS	66	2.8	0.97
KL	SS	68	3.6	1.14
KL	SS	70	3.3	0.96
RF1	AG	370	400	0.79
RF1	LW	465	1,350	1.34
RF1	LW	475	1,450	1.35
RF1	NP	59	1.7	0.83
RF1	NP	82	3.8	0.69
RF1	NP	90	4.8	0.66

TABLE 8-6 LENGTH, WEIGHT AND CONDITION FACTOR FOR EACH FISH CAPTURED THROUGHOUT THE STUDY AREA AND STUDY PERIOD

Sample Site	Species	Length (mm)	Weight (gm)	CF
RF1	NP	92	5.2	0.67
RF1	NP	93	6.5	0.81
RF1	NP	97	6.1	0.67
RF1	NP	97	6.2	0.68
RF1	NP	765	3,350	0.75
RF1	SS	36	0.6	1.29
RF1	SS	55	1.3	0.78
RF1	SS	65	2.5	0.91
RF2	AG	38	0.4	0.73
RF2	AG	38	0.4	0.73
RF2	CH	50	2.1	1.68
RF2	RW	46	0.8	0.82
RF2	SS	32	0.4	1.22
RF2	SS	32	0.3	0.92
RF2	SS	34	0.4	1.02
RF2	SS	34	0.4	1.02
RF2	SS	45	1.3	1.43
RF2	SS	48	1.2	1.09
RF2	SS	50	1.6	1.28
RF2	SS	50	1.2	0.96
RF2	SS	50	1.6	1.28
RF2	SS	56	1.9	1.08
RF2	SS	61	2.2	0.97
RF2	SS	62	2.2	0.92
RF2	SS	62	2.0	0.84
RF2	SS	63	1.9	0.76
RF2	SS	67	2.5	0.83
RF2	SS	75	3.7	0.88
RF3	SS	46	1.0	1.03
RF3	SS	57	2.0	1.08
RF4	AG	62	2.2	0.92
RF4	BB	107	7.8	0.64
RF4	CH	59	2.7	1.31
RF4	SS	52	1.3	0.92
RF4	SS	55	2.0	1.20
RF4	SS	62	1.9	0.80
RF4	SS	67	2.6	0.86
RF4	SS	69	2.3	0.70
RF4	SS	69	2.4	0.73
RF5	AG	36	0.5	1.07
RF5	AG	36	0.4	0.86
RF5	AG	37	0.4	0.79

TABLE 8-6 LENGTH, WEIGHT AND CONDITION FACTOR FOR EACH FISH CAPTURED THROUGHOUT THE STUDY AREA AND STUDY PERIOD

Sample Site	Species	Length (mm)	Weight (gm)	CF
RF5	AG	42	0.7	0.94
RF5	AG	47	1.0	0.96
RF5	BB	155	20.5	0.55
RF5	BB	185	31.6	0.50
RF5	BB	190	29.7	0.43
RF5	RW	50	0.9	0.72
RF5	SS	36	0.5	1.07
RF5	SS	42	0.9	1.21
RF5	SS	45	0.9	0.99
RF5	SS	45	1.0	1.10
RF5	SS	54	1.9	1.21
RF5	SS	56	1.9	1.08
RF5	SS	57	2.0	1.08
RF5	SS	58	2.1	1.08
RF5	SS	61	2.6	1.15
RF5	SS	63	2.4	0.96
RF5	SS	67	2.9	0.96
RF5	SS	75	4.6	1.09
RF6	AG	115	18.3	1.20
RF6	DV	88	7.3	1.07
RF6	SS	50	1.0	0.80
RF6	SS	52	1.3	0.92
RF6	SS	58	1.9	0.97
RF6	SS	62	2.2	0.92
RF6	SS	62	2.6	1.09
RF6	SS	67	2.8	0.93
RF6	SS	71	3.2	0.89
SB	AG	73	4.5	1.16
SB	SS	37	0.5	0.99
SB	SS	44	1.1	1.29
SB	SS	49	1.2	1.02
SB	SS	55	1.6	0.96
SB	SS	61	2.8	1.23
SB	SS	67	3.5	1.16
SB	SS	72	4.4	1.18
SB	SS	76	4.0	0.91
SB	SS	81	5.6	1.05
SC	LW	400	850	1.33
SC	LW	405	800	1.20
SC	NP	500	250	0.20

LABERGE ENVIRONMENTAL
ATTN: Bonnie Burns
PO Box 21072
Whitehorse YT Y1A 6P7

Date Received: 23-SEP-13
Report Date: 07-JAN-14 12:11 (MT)
Version: FINAL REV. 2

Client Phone: 867-668-6838

Certificate of Analysis

Lab Work Order #: L1367088

Project P.O. #: RAU PROJECT
Job Reference:
C of C Numbers:
Legal Site Desc: BEAVER RIVER, YUKON BASELINE FISHERIES ASSESSMENT

Comments: 7-JAN-2014 Please note, samples were stored at room temperature prior to analysis, rather than frozen, as recommended. Although not directly tested, it is not expected that this would have an adverse impact on measured metals concentrations, however, due to the slight volatility of mercury, there may be a minor negative bias with that parameter.

Erin Bolster
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID	L1367088-1	L1367088-2	L1367088-3	L1367088-4	L1367088-5
		Description	TISSUE	TISSUE	TISSUE	TISSUE	TISSUE
		Sampled Date	06-AUG-13	06-AUG-13	06-AUG-13	06-AUG-13	06-AUG-13
		Sampled Time	10:15	10:15	10:15	10:15	10:15
		Client ID	RF4-#1 SLIMY SCULPIN (WHOLE BODY)	RF4-#2 SLIMY SCULPIN (WHOLE BODY)	RF4-#3 SLIMY SCULPIN (WHOLE BODY)	RF4-#4 SLIMY SCULPIN (WHOLE BODY)	RF4-#5 SLIMY SCULPIN (WHOLE BODY)
TISSUE							
Metals	Aluminum (Al)-Total (mg/kg wwt)		34.3	22.8	24.9	28.6	18.8
	Antimony (Sb)-Total (mg/kg wwt)		0.0083	0.0041	0.0092	0.0054	0.0058
	Arsenic (As)-Total (mg/kg wwt)		0.269	0.168	0.232	0.268	0.536
	Barium (Ba)-Total (mg/kg wwt)		14.1	7.26	15.5	7.71	11.7
	Beryllium (Be)-Total (mg/kg wwt)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Bismuth (Bi)-Total (mg/kg wwt)		0.0032	0.0025	<0.0020	<0.0020	0.0031
	Boron (B)-Total (mg/kg wwt)		<0.20	<0.20	<0.20	<0.20	<0.20
	Cadmium (Cd)-Total (mg/kg wwt)		0.131	0.132	0.251	0.127	0.0886
	Calcium (Ca)-Total (mg/kg wwt)		36300	21700	46500	23300	24100
	Cesium (Cs)-Total (mg/kg wwt)		0.0245	0.0168	0.0233	0.0162	0.0210
	Chromium (Cr)-Total (mg/kg wwt)		0.099	0.065	0.066	0.065	0.055
	Cobalt (Co)-Total (mg/kg wwt)		0.0476	0.0491	0.0645	0.0651	0.0373
	Copper (Cu)-Total (mg/kg wwt)		0.467	0.606	0.733	0.656	0.455
	Iron (Fe)-Total (mg/kg wwt)		87.1	56.5	70.2	65.7	53.8
	Lead (Pb)-Total (mg/kg wwt)		0.114	0.083	0.177	0.091	0.080
	Lithium (Li)-Total (mg/kg wwt)		<0.10	<0.10	<0.10	<0.10	<0.10
	Magnesium (Mg)-Total (mg/kg wwt)		544	445	655	426	480
	Manganese (Mn)-Total (mg/kg wwt)		13.3	10.6	33.2	13.2	9.10
	Mercury (Hg)-Total (mg/kg wwt)		0.0274	0.0141	0.0195	0.0096	0.0126
	Molybdenum (Mo)-Total (mg/kg wwt)		0.0258	0.0259	0.0299	0.0347	0.0223
	Nickel (Ni)-Total (mg/kg wwt)		0.186	0.233	0.406	0.247	0.145
	Phosphorus (P)-Total (mg/kg wwt)		18200	12600	24700	14100	14200
	Potassium (K)-Total (mg/kg wwt)		1980	2490	2170	2470	2760
	Rubidium (Rb)-Total (mg/kg wwt)		1.38	1.54	1.66	1.64	2.10
	Selenium (Se)-Total (mg/kg wwt)		0.839	1.15	1.04	1.08	1.06
	Sodium (Na)-Total (mg/kg wwt)		1370	1340	1580	1140	1170
	Strontium (Sr)-Total (mg/kg wwt)		28.3	18.8	38.5	16.2	14.5
	Tellurium (Te)-Total (mg/kg wwt)		<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg wwt)		0.00457	0.00383	0.00413	0.00329	0.00336
	Tin (Sn)-Total (mg/kg wwt)		0.078	0.112	0.089	0.045	0.059
	Uranium (U)-Total (mg/kg wwt)		0.0171	0.00783	0.0272	0.00880	0.0149
	Vanadium (V)-Total (mg/kg wwt)		0.350	0.229	0.397	0.234	0.199
	Zinc (Zn)-Total (mg/kg wwt)		52.3	49.5	80.1	42.5	50.3
	Zirconium (Zr)-Total (mg/kg wwt)		<0.040	<0.040	<0.040	<0.040	<0.040

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1367088-6 TISSUE 06-AUG-13 10:15 RF4-#6 SLIMY SCULPIN (WHOLE BODY)	L1367088-7 TISSUE 06-AUG-13 15:00 RF5-#9 SLIMY SCULPIN (WHOLE BODY)	L1367088-8 TISSUE 06-AUG-13 15:00 RF5-#10 SLIMY SCULPIN (WHOLE BODY)	L1367088-9 TISSUE 06-AUG-13 15:00 RF5-#11 SLIMY SCULPIN (WHOLE BODY)	L1367088-10 TISSUE 06-AUG-13 15:00 RF5-#12 SLIMY SCULPIN (WHOLE BODY)
Sample ID		L1367088-6	L1367088-7	L1367088-8	L1367088-9	L1367088-10
Description		TISSUE	TISSUE	TISSUE	TISSUE	TISSUE
Sampled Date		06-AUG-13	06-AUG-13	06-AUG-13	06-AUG-13	06-AUG-13
Sampled Time		10:15	15:00	15:00	15:00	15:00
Client ID		RF4-#6 SLIMY SCULPIN (WHOLE BODY)	RF5-#9 SLIMY SCULPIN (WHOLE BODY)	RF5-#10 SLIMY SCULPIN (WHOLE BODY)	RF5-#11 SLIMY SCULPIN (WHOLE BODY)	RF5-#12 SLIMY SCULPIN (WHOLE BODY)
TISSUE						
Metals	Aluminum (Al)-Total (mg/kg wwt)	19.2	10.6	128	17.0	6.4
	Antimony (Sb)-Total (mg/kg wwt)	0.0044	0.0027	0.0063	0.0024	0.0029
	Arsenic (As)-Total (mg/kg wwt)	0.157	0.0652	0.0933	0.133	0.101
	Barium (Ba)-Total (mg/kg wwt)	6.06	3.88	4.85	2.73	2.88
	Beryllium (Be)-Total (mg/kg wwt)	<0.0020	<0.0020	0.0045	<0.0020	<0.0020
	Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Boron (B)-Total (mg/kg wwt)	<0.20	<0.20	<0.20	<0.20	<0.20
	Cadmium (Cd)-Total (mg/kg wwt)	0.111	0.0885	0.0927	0.130	0.0653
	Calcium (Ca)-Total (mg/kg wwt)	21200	16300	13500	11100	12100
	Cesium (Cs)-Total (mg/kg wwt)	0.0196	0.0073	0.0205	0.0080	0.0084
	Chromium (Cr)-Total (mg/kg wwt)	0.085	<0.040	0.307	<0.040	<0.040
	Cobalt (Co)-Total (mg/kg wwt)	0.0501	0.0504	0.0913	0.0868	0.0603
	Copper (Cu)-Total (mg/kg wwt)	0.746	0.808	0.860	0.596	0.595
	Iron (Fe)-Total (mg/kg wwt)	43.2	36.9	179	36.6	35.8
	Lead (Pb)-Total (mg/kg wwt)	0.070	0.076	0.182	0.044	0.050
	Lithium (Li)-Total (mg/kg wwt)	<0.10	<0.10	0.11	<0.10	<0.10
	Magnesium (Mg)-Total (mg/kg wwt)	348	400	434	382	507
	Manganese (Mn)-Total (mg/kg wwt)	8.88	5.26	8.91	11.5	10.6
	Mercury (Hg)-Total (mg/kg wwt)	0.0140	0.0091	0.0131	0.0224	0.0174
	Molybdenum (Mo)-Total (mg/kg wwt)	0.0290	0.0202	0.0217	0.0163	0.0155
	Nickel (Ni)-Total (mg/kg wwt)	0.265	0.120	0.272	0.221	0.186
	Phosphorus (P)-Total (mg/kg wwt)	12100	10900	8060	7320	8030
	Potassium (K)-Total (mg/kg wwt)	2600	2970	2610	2510	2930
	Rubidium (Rb)-Total (mg/kg wwt)	1.59	1.52	1.87	1.83	1.67
	Selenium (Se)-Total (mg/kg wwt)	1.08	1.46	1.83	1.94	2.07
	Sodium (Na)-Total (mg/kg wwt)	1130	1150	1040	907	1090
	Strontium (Sr)-Total (mg/kg wwt)	15.5	14.3	12.0	8.95	9.56
	Tellurium (Te)-Total (mg/kg wwt)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg wwt)	0.00370	0.00339	0.00491	0.00299	0.00174
	Tin (Sn)-Total (mg/kg wwt)	0.070	0.045	0.032	0.040	0.039
	Uranium (U)-Total (mg/kg wwt)	0.00575	0.00330	0.00780	0.00327	0.00287
	Vanadium (V)-Total (mg/kg wwt)	0.240	0.181	0.596	0.180	0.088
	Zinc (Zn)-Total (mg/kg wwt)	46.1	38.3	34.0	39.4	31.0
	Zirconium (Zr)-Total (mg/kg wwt)	<0.040	<0.040	0.089	<0.040	<0.040

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1367088-11	L1367088-12			
	Description	TISSUE	TISSUE			
	Sampled Date	06-AUG-13	06-AUG-13			
	Sampled Time	15:00	15:00			
	Client ID	RF5-#13 SLIMY SCULPIN (WHOLE BODY)	RF5-#14 SLIMY SCULPIN (WHOLE BODY)			
Grouping	**Analyte**					
TISSUE						
Metals	Aluminum (Al)-Total (mg/kg wwt)	20.7	11.0			
	Antimony (Sb)-Total (mg/kg wwt)	0.0023	<0.0020			
	Arsenic (As)-Total (mg/kg wwt)	0.129	0.0872			
	Barium (Ba)-Total (mg/kg wwt)	3.23	3.84			
	Beryllium (Be)-Total (mg/kg wwt)	<0.0020	<0.0020			
	Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020			
	Boron (B)-Total (mg/kg wwt)	<0.20	<0.20			
	Cadmium (Cd)-Total (mg/kg wwt)	0.0752	0.0657			
	Calcium (Ca)-Total (mg/kg wwt)	15900	17600			
	Cesium (Cs)-Total (mg/kg wwt)	0.0091	0.0102			
	Chromium (Cr)-Total (mg/kg wwt)	0.064	<0.040			
	Cobalt (Co)-Total (mg/kg wwt)	0.0538	0.0429			
	Copper (Cu)-Total (mg/kg wwt)	0.559	0.601			
	Iron (Fe)-Total (mg/kg wwt)	45.9	34.9			
	Lead (Pb)-Total (mg/kg wwt)	0.056	0.048			
	Lithium (Li)-Total (mg/kg wwt)	<0.10	<0.10			
	Magnesium (Mg)-Total (mg/kg wwt)	362	419			
	Manganese (Mn)-Total (mg/kg wwt)	10.5	9.18			
	Mercury (Hg)-Total (mg/kg wwt)	0.0105	0.0141			
	Molybdenum (Mo)-Total (mg/kg wwt)	0.0141	0.0145			
	Nickel (Ni)-Total (mg/kg wwt)	0.163	0.080			
	Phosphorus (P)-Total (mg/kg wwt)	9420	10600			
	Potassium (K)-Total (mg/kg wwt)	2490	2900			
	Rubidium (Rb)-Total (mg/kg wwt)	1.87	1.96			
	Selenium (Se)-Total (mg/kg wwt)	1.69	1.74			
	Sodium (Na)-Total (mg/kg wwt)	1000	1120			
	Strontium (Sr)-Total (mg/kg wwt)	13.4	14.7			
	Tellurium (Te)-Total (mg/kg wwt)	<0.0040	<0.0040			
	Thallium (Tl)-Total (mg/kg wwt)	0.00258	0.00373			
	Tin (Sn)-Total (mg/kg wwt)	0.045	0.036			
	Uranium (U)-Total (mg/kg wwt)	0.00399	0.00330			
	Vanadium (V)-Total (mg/kg wwt)	0.140	0.129			
	Zinc (Zn)-Total (mg/kg wwt)	37.0	38.9			
	Zirconium (Zr)-Total (mg/kg wwt)	<0.040	<0.040			

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Barium (Ba)-Total	DUP-H	L1367088-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Aluminum (Al)-Total	DUP-H	L1367088-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Beryllium (Be)-Total	DUP-H	L1367088-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Cadmium (Cd)-Total	DUP-H	L1367088-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Cesium (Cs)-Total	DUP-H	L1367088-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Chromium (Cr)-Total	DUP-H	L1367088-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Cobalt (Co)-Total	DUP-H	L1367088-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Iron (Fe)-Total	DUP-H	L1367088-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lead (Pb)-Total	DUP-H	L1367088-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Nickel (Ni)-Total	DUP-H	L1367088-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Thallium (Tl)-Total	DUP-H	L1367088-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Uranium (U)-Total	DUP-H	L1367088-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Vanadium (V)-Total	DUP-H	L1367088-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Zirconium (Zr)-Total	DUP-H	L1367088-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
HG-WET-MICR-CVAF-VA	Tissue	Mercury in Tissue by CVAFS Micro (WET)	EPA 200.3, EPA 245.7

This method is adapted from US EPA Method 200.3 "Sample Procedures for Spectrochemical Determination of Total Recoverable Elements in Biological Tissues" (1996). Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with repeated additions of hydrogen peroxide. Analysis is by atomic fluorescence spectrophotometry or atomic absorption spectrophotometry, adapted from US EPA Method 245.7.

MET-WET-MICR-HRMS-VA	Tissue	Metals in Tissue by HR-ICPMS Micro (WET)	EPA 200.3/200.8

Trace metals in tissue are analyzed by high resolution inductively coupled plasma mass spectrometry (HR-ICPMS) modified from US EPA Method 200.8, (Revision 5.5). The sample preparation procedure is modified from US EPA 200.3. Analytical results are reported on wet weight basis.

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

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

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

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

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

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

Short Holding Time

Rush Processing

L1367088-COFC

COC # _____

Page 1 of 1

Report To				Report Format / Distribution				Service Requested (Rush for routine analysis subject to availability)
Company:	Laberge Environmental Services			☐ Standard ☐ Other				◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Bonnie Burns			☒ PDF	☒ Excel	☐ Digital	☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	P.O. Box 21072			Email 1:	trout@northwestel.net			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Whitehorse, YT			Email 2:	bonnieburns@northwestel.net			○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	867 668 6838	Fax:	867 667 6956	Email 3:				Analysis Request
Invoice To	Same as Report ?	☒ Yes	☐ No	Client / Project Information				
Hardcopy of Invoice with Report?		☒ Yes	☐ No	Job #:				
Company:				PO / AFE:	Rau Project			
Contact:				LSD:	Beaver River,Yukon			
Address:					Baseline Fisheries Assessment			
Phone:		Fax:		Quote #:	Q32609			
Lab Work Order # (lab use only)	L1367088			ALS Contact:	Brent Mack	Sampler:	LABERGE /DES	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Toatl Mercury	Total Metals										
RF4-#1	Slimy Sculpin (Whole Body)	06-Aug-13	10:15	Tissue	X	X										
RF4-#2	Slimy Sculpin (Whole Body)	06-Aug-13	10:15	Tissue	X	X										
RF4-#3	Slimy Sculpin (Whole Body)	06-Aug-13	10:15	Tissue	X	X										
RF4-#4	Slimy Sculpin (Whole Body)	06-Aug-13	10:15	Tissue	X	X										
RF4-#5	Slimy Sculpin (Whole Body)	06-Aug-13	10:15	Tissue	X	X										
RF4-#6	Slimy Sculpin (Whole Body)	06-Aug-13	10:15	Tissue	X	X										
RF5-#9	Slimy Sculpin (Whole Body)	06-Aug-13	15:00	Tissue	X	X										
RF5-#10	Slimy Sculpin (Whole Body)	06-Aug-13	15:00	Tissue	X	X										
RF5-#11	Slimy Sculpin (Whole Body)	06-Aug-13	15:00	Tissue	X	X										
RF5-#12	Slimy Sculpin (Whole Body)	06-Aug-13	15:00	Tissue	X	X										
RF5-#13	Slimy Sculpin (Whole Body)	06-Aug-13	15:00	Tissue	X	X										
RF5-#14	Slimy Sculpin (Whole Body)	06-Aug-13	15:00	Tissue	X	X										

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

Metals analysis : low level detection requires, CCME

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

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			Elise	8pt 23	13:36	15.6 °C				

GENF 18.01 Front

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May 5, 2014

Laberge Environmental Services
PO BOX 21072
Whitehorse, YT
Y1A 6P7

Attention: Bonnie Burns

Dear Ms Burns,

RE: FISH TISSUE STORAGE TEMPERATURE EXCEEDANCE FOR LABERGE ENVIRONMENTAL KEG AND RAU PROJECT -- ALS WORK ORDERS L1367085 & L1367088 -- ALS CORRECTIVE ACTION REPORT (CAR) #10790

On September 23 2013, ALS received 24 samples for ALS work orders L1367085 & L1367088 under the Laberge Projects KEG and RAU (respectively). The ALS tissue storage procedure requires that samples remain at < -18 ˚C until they can be tested. The storage bin holding ALS work orders L1367085 & L1367088 was removed from the freezer and left at ambient temperature for 18 days causing the tissue samples to partially decompose.

In response to our error, ALS initiated a study to review the effects of ambient storage conditions on total metal and moisture results in tissue samples. A root cause investigation of the initial sample handling error was also performed.

To verify if the metals or moisture results for the partially decomposed Laberge tissue samples were affected, ALS performed additional testing. Fish tissue samples were homogenized and divided into 2 subsets. One subset was tested (in triplicate) for trace metals and moisture after homogenization was complete. The second subset was left at room temperature for 18 days under similar conditions experienced by L1367085 & L1367088, then tested (in triplicate) for trace metals and moisture.

Samples left in ambient conditions were on average 3% lower in moisture than those analyzed after homogenization. For samples with a moisture content of around 70%, this moisture loss translates into a metals increase of approximately 10% for the calculated dry weight parameters.

Effects of ambient sample storage could not be seen in the experimental data. Statistical evaluation of the metals data was unable to identify any trends between the two test subsets.

A literature search revealed that the BC MOE will be implementing a new storage requirement for tissues. A comment has been added stating that for vegetation that is dried prior to digestion and reported on a dry weight basis, samples may be stored up to 6 months at ambient temperature (based on BC MOE soil guidelines).

In addition to the test study and literature review, ALS conducted a root cause investigation into the incident. As a result, ALS has updated the appropriate Standard Operating Procedure to ensure correct sample handling steps are followed by all staff.

ALS recognizes and understands the implications of this error and would like to sincerely apologize for the inconveniences experienced by Laberge Environmental and their client. We hope this letter provides an explanation of the issue, its effects, and how we plan to ensure that it does not occur in the future. Please let us know if we can help to resolve this issue in any other way.

Sincerely,

Jerry Holzbecher,
Client Services Manager

Brent Makelki,
Manager Kamloops BC & Whitehorse YT

APPENDIX VII

HERITAGE EVALUATION – MATRIX RESEARCH LTD.

Heritage Resources Impact Assessment Interim Report

Rau Proposed Road Northeastern (Beaver River) Section

Administration			
Permit #	13-17ASR		
Report Date	February 5, 2013	**Matrix File Number**	Y13-027-Rau
Heritage Resources Unit Contact	Ruth Gotthardt ☎ (867) 667-5983 🖷 (867) 667-5377	**Report Author(s)**	Scott Buchanan Ty Heffner

Proponent			
Proponent	ATAC Resources Ltd. 1016-510 West Hastings Street Vancouver, B.C. V6B 1L8	**Contact**	Andrew Carne ☎ (604) 688-2568 🖷 (867) 688-2578

Geographic Reference			
NTS Mapsheet	106 D/02		
UTM (NAD 83)	Zone 8N 522500E, 7118500N	**Area (ha)**	Total: 253 (25.3 km x 0.1 km)
Ecoregion	Mackenzie Mountains	**Elevation (m)**	650- 710 m ASL
Maps Attached	Maps 1, 2, 3, 3.1, 3.2, 3.3, and 4		

First Nation(s)			
First Nation(s)	First Nation of Na-Cho Nyak Dun	**Contact(s)**	Joella Hogan ☎ (867) 996-2265, ext. 116 🖷 (867) 996-2267

Survey Description			
Survey Date	July 29-Aug. 8; Sep. 28-30, 2013	**Survey Type**	HRIA
Field Director	Scott Buchanan	**Participation**	Field crew
Survey Crew	Scott Buchanan, Sam Gallagher, Jodie MacMillan (Matrix) and Ron Peter (NND)		

Development Description

Development Type: Proposed winter road from Hansen Lakes to Rau exploration camp and proposed all weather road from Rau exploration camp to airstrip. This report focuses on the northeastern portion of the proposed road route from the Beaver River crossing to the Rau/Tiger Camp and Rau Airstrip. The preferred routing of the proposed road was changed slightly between the two phases of HRIA fieldwork. Although all fieldwork conducted along both routes considered for this section of proposed road is summarized in this report, management recommendations apply only to the 100 m wide corridor along the revised road location.

Location: This proposed road route is located in east central Yukon, approximately 90 km northeast of Mayo along the north side of Beaver River valley. The northeastern portion of the route that is the subject of this report is located between the Beaver River crossing and the Rau Airstrip that is near the confluence of the Beaver River and the Rackla River.

Management Summary

Two precontact heritage sites identified in 2010 (**LaTt-1** and **LbTt-1**) under Permit 10-25ASR are located more than 200 m outside of this portion of the currently proposed road route. One post-contact heritage site (**LbTu-3**) was identified during the 2013 HRIA field assessment within this portion of the proposed road corridor. The site is confined to a discrete topographic feature and potential impacts to this site can be managed through avoidance of the narrow site landform during development and operation of the proposed road.

Additional high potential areas within the proposed road corridor have been mapped for avoidance in routing the final road design. No impacts to heritage resources are anticipated provided known site locations and areas of elevated heritage potential are avoided.

Archaeological Potential

An initial Heritage Resources Overview Assessment (HROA) was completed for the general corridor design by Matrix Research Ltd. in 2010. Numerous locations of moderate to high heritage site potential were identified along the entire route of the proposed pioneer road. A subsequent 2010 preliminary field reconnaissance (PFR) confirmed site potential and resulted in the identification of nineteen (19) pre-contact site locations distributed throughout the study area.

In 2013 Matrix Research Ltd. was asked to conduct a Heritage Resources Impact Assessment (HRIA) of identified site potential polygons within and adjacent to the proposed road alignment. This report summarizes the results of the HRIA that was undertaken in the summer and autumn of 2013 and provides management recommendations for the revised alignment corridor located east of the Beaver River crossing.

Survey Methodology

Aerial Reconnaissance: General reconnaissance flights over the Beaver River section of the alignment were undertaken with GPS navigation following the proposed road route to mark reference waypoints of potential polygon locations and obvious features for planning assessment fieldwork. Low altitude reconnaissance of individual assessment polygons was conducted to refine ratings of site potential, define extents of fieldwork and mark landing/pick-up locations for coordinating helicopter support and logistic planning throughout the project.

Transects: A 2-3 member field crew conducted traverses of selected heritage potential polygons along the Beaver River segment of the proposed road route. Survey focused on high potential landforms within 50 m either side of the unmarked centreline of the proposed road, using a GPS receiver for navigation and recording field observations. Individual features were rated for heritage potential on the ground and requirements for surface reconnaissance and/or sub-surface testing.

Previous Disturbances / Exposures: All available surface and subsurface exposures including thin ground cover, erosional exposures, terrace edges, tree throws and game trails were inspected for archaeological evidence and other indications of past site use.

Sub-surface testing: Standard 40 cm wide shovel tests were excavated where warranted to further assess the potential of specific landform features with distinct attributes of slope, aspect, setting and definition favourable for site location. Units were excavated to contact with sterile sub-soil, glacio-fluvial deposits or weathered bedrock. All excavated materials were screened through 6 mm stainless mesh to recover archaeological evidence.

Survey Results

Pre-Contact Heritage Sites Found: 0 **Post-Contact Heritage Sites Found: 1**

Testing Strategy:	Judgmental	**Results:**	One post-contact heritage site was identified within the proposed road corridor

Hydrology: East-west section of Beaver River valley between confluences of Scougale Creek and Rackla River.
Vegetation: Highly variable depending on local terrain and drainage factors. Predominantly white and/or black spruce canopy with sparse understory of low shrubs, Labrador tea, alder, scrub birch, white birch and aspen. Ground cover includes moss, lichen, grasses, lingonberry, blueberry, kinnikinnick, wintergreen, and fireweed. Sections of taiga on poorly drained terrace flats.
Terrain: Variably defined terrace bench forms and knolls extending along lower north slopes of valley wall. Relatively broad and level benches in western section of study area taper eastward to intermittent benches, ridges, knolls and outcrop

features set against a sloped valley wall. Numerous palaeo drainage features including dry gullies and kettle ponds within western terrace bench. Isolated zones of permafrost erosional slumps in far eastern portion of study area behind 'cold shadow' of a prominent bedrock ridge formation. Most assessment work was located between 650-710 m elevation.
Sediments: Variable silty clay loam, loess and weathered bedrock, depending on landform, drainage and elevation. Unique black granular mineral formation encountered at shallow depth amidst stony subsoil in testing at western end of study area, adjacent the Beaver River.
Remarks: Surface exposures are common along leading edges of terrace benches/points and under sparse lichen/moss cover in game trails over rocky ridges and knolls. Sifting of shovel test contents was generally quite slow due to heavy moist sediment and/or settings with minimal soil development amidst heavy weathered bedrock fractions below the duff layer.

Results Summary

Post-contact heritage site **LbTu-3** was identified within the impact zone of the proposed road corridor.

Post-Contact Heritage Site(s)

Borden Number:	**LbTu-3**	**Temporary Number:**	**TSN M13-Rau-9**
Site Type:	Subsurface cultural materials/worked glass	**Site Centre (UTM):**	(NAD 83) 8W E515401, N7119926
Site Dimensions (m):	100 m N/S X 45 m E/W	**Assessment Status:**	Partial
Site Boundary Flagging:	Positive test location marked with red flagging tape.	**Site Buffer Width (m):**	Recommended 10 m site buffer beyond recorded extent of site landform.
Site Location: The site is located 1.8 km northeast (55°) of the confluence of Scougale Creek and Beaver River.			
Terrain: Site is situated on a distinct low, narrow, linear rock outcrop ridge rising above a broad flat expanse of poorly drained ground.			
Feature Dimensions (m):	80 m x 25 m (WNW / ESE x NNE / SSW)	**Number of shovel tests:**	6
Hydrology: Beaver River floodplain is located about 400 m south of the site.			
Site Disturbance: None apparent but *in situ* context of post-contact era glass artifact suggests unknown level of post-depositional mixing in sediment pockets over bedrock formation.			

Artifact Type, Quantity and Collection Status:

SURFACE FIND #	ARTIFACT NUMBER AND TYPE	RAW MATERIAL TYPE	MAXIMUM LENGTH (cm)	DEPTH BELOW SURFACE (cm)	COLLECTED Y/N
ST RP1	Flake (n=1)	Clear glass	2.3	20	Y

Site Summary: One of six shovel tests proved positive for cultural material. Current information identifies an episode of post-contact period site use of undetermined extent and function. A single large glass flake was recovered from apparent *in situ* context at depth. The glass flake was examined by YG curatorial staff under low wave UV light to evaluate potential for quartz crystal or leaded glass material identification. Results were negative and the object is most likely commercial glass of late 19th to early/mid 20th century origin which was flaked for expedient production of a cutting edge. The flake has a distinct striking platform and unmodified edges.
Minimum site dimensions include a 10 m buffer around recorded basal outline of the host landform. The location of positive shovel test (ST) RP1 is flagged with red ribbon. The single artifact was recorded and collected for curation at the YG Archaeology Office.

Potential Impacts

Post-contact heritage site **LbTu-3** is located within the proposed road corridor and may sustain impact as a result of the proposed road development unless it can be avoided.

Additional high potential areas within the proposed road corridor have been mapped for avoidance in routing the final road alignment. No impacts to heritage resources are anticipated provided known site locations and areas of elevated heritage potential are avoided.

Recommendations

Management strategies designed to minimize and/or mitigate potential impacts to post-contact heritage site **LbTu-3** are outlined below.

1) Avoidance. No potentially ground or surface-altering development within the identified site buffer. This could be accomplished by maintaining the proposed road centreline in its current location.

If the proponent intends to proceed with development in the site area, then the following strategy may be implemented:

2) Mitigation of the site through systematic data recovery (detailed recording, mapping and collection of heritage artifacts and features).

Provided the above recommendation #1 is followed and no development activities are proposed for areas identified as having elevated heritage potential, no further heritage resource inspections are recommended for the proposed road corridor.

The above-mentioned site(s) are protected by the *Historic Resources Act* (RSY 2002) and the *Archaeological Sites Regulation* (OIC 2003).

To ensure that the discovery of any unanticipated heritage resources is addressed, it is recommended that the proponent inform their personnel and contractors that, in the event that heritage resources are encountered, all development activities in the vicinity of the site must be suspended immediately. The Yukon Archaeology Program must be notified as soon as possible of the existence of the heritage resources and the nature of the disturbance.

The present study was designed solely as a Heritage Resources Impact Assessment. It is not the intent of this report to comment on or evaluate traditional aboriginal use of the proposed development area.

Signed by Ty Heffner, M.A., R.P.C.A. _____

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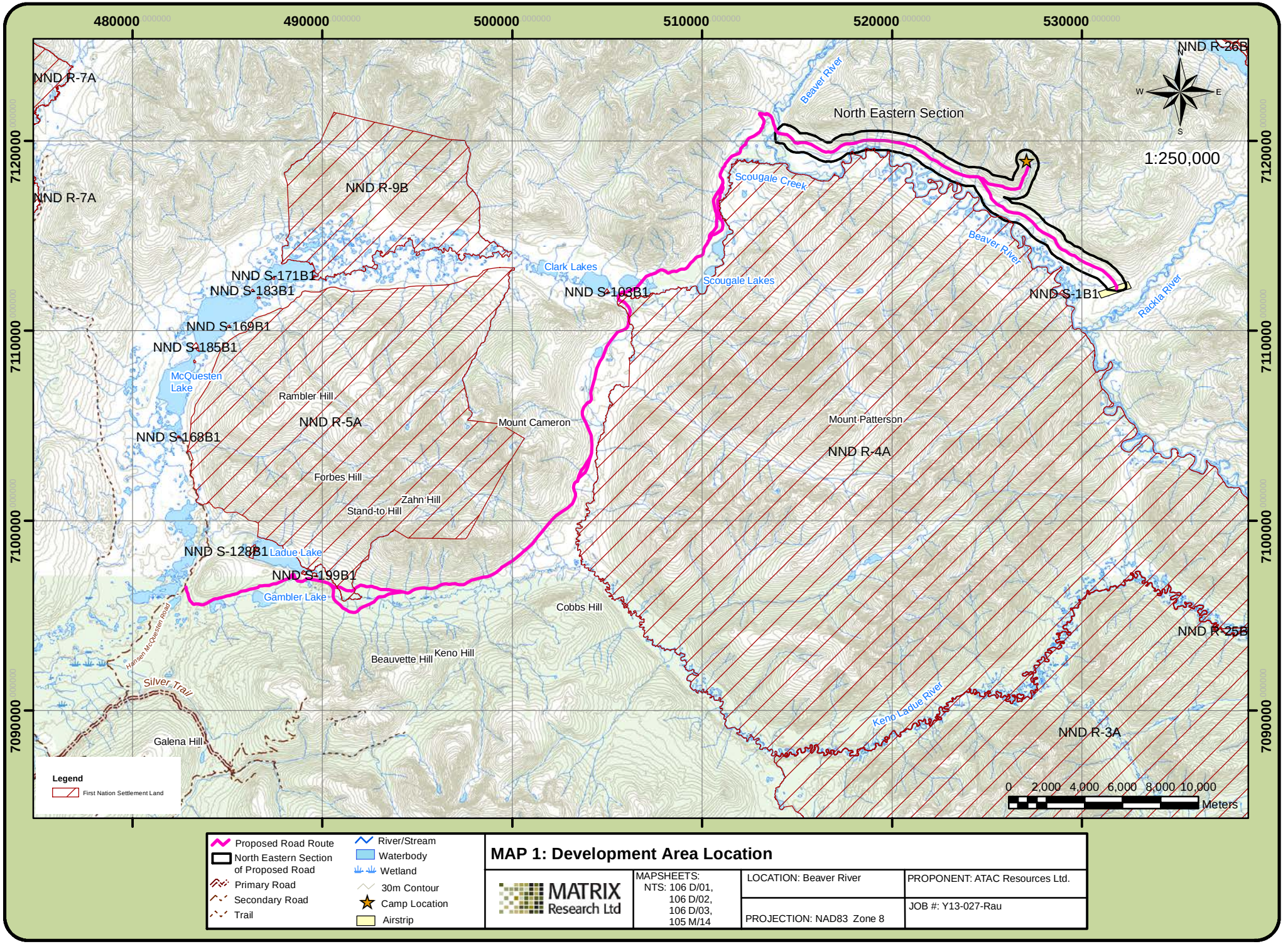
Permit #: 13-17ASR

DATE: 10-02-2014



Proposed Road Route
North Eastern Section of Proposed Road
Primary Road
Secondary Road
Trail
River/Stream
Waterbody
Wetland
30m Contour
Camp Location
Airstrip

MAP 1: Development Area Location

MATRIX Research Ltd

MAPSHEETS:
NTS: 106 D/01, 106 D/02, 106 D/03, 105 M/14

LOCATION: Beaver River

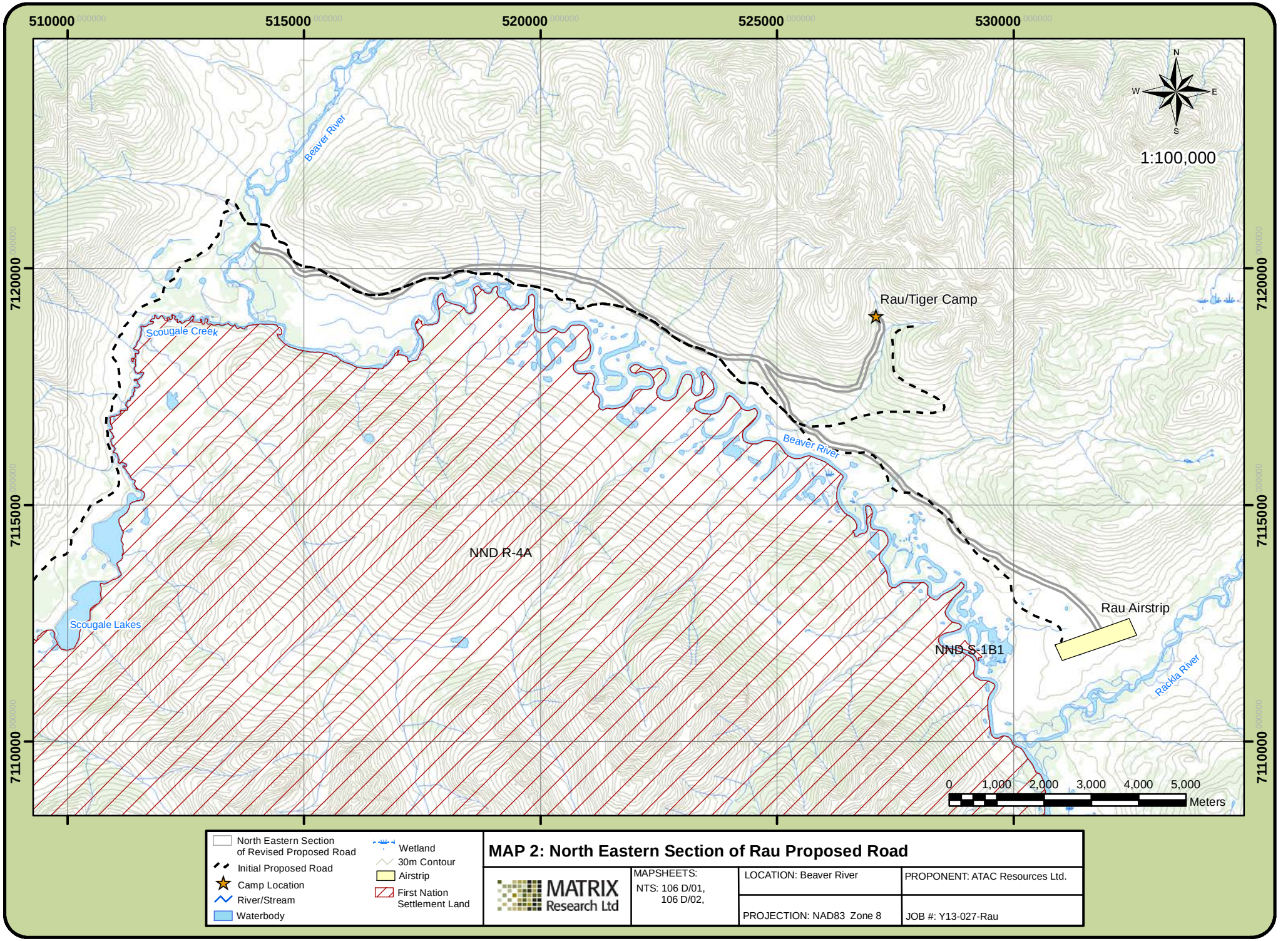
PROPONENT: ATAC Resources Ltd.

PROJECTION: NAD83 Zone 8

JOB #: Y13-027-Rau

Permit #: 13-17ASR

DATE: 11-02-2014



North Eastern Section of Revised Proposed Road
Initial Proposed Road
Camp Location
River/Stream
Waterbody
Wetland
30m Contour
Airstrip
First Nation Settlement Land

MAP 2: North Eastern Section of Rau Proposed Road

MATRIX Research Ltd

MAPSHEETS:
NTS: 106 D/01,
106 D/02,

LOCATION: Beaver River

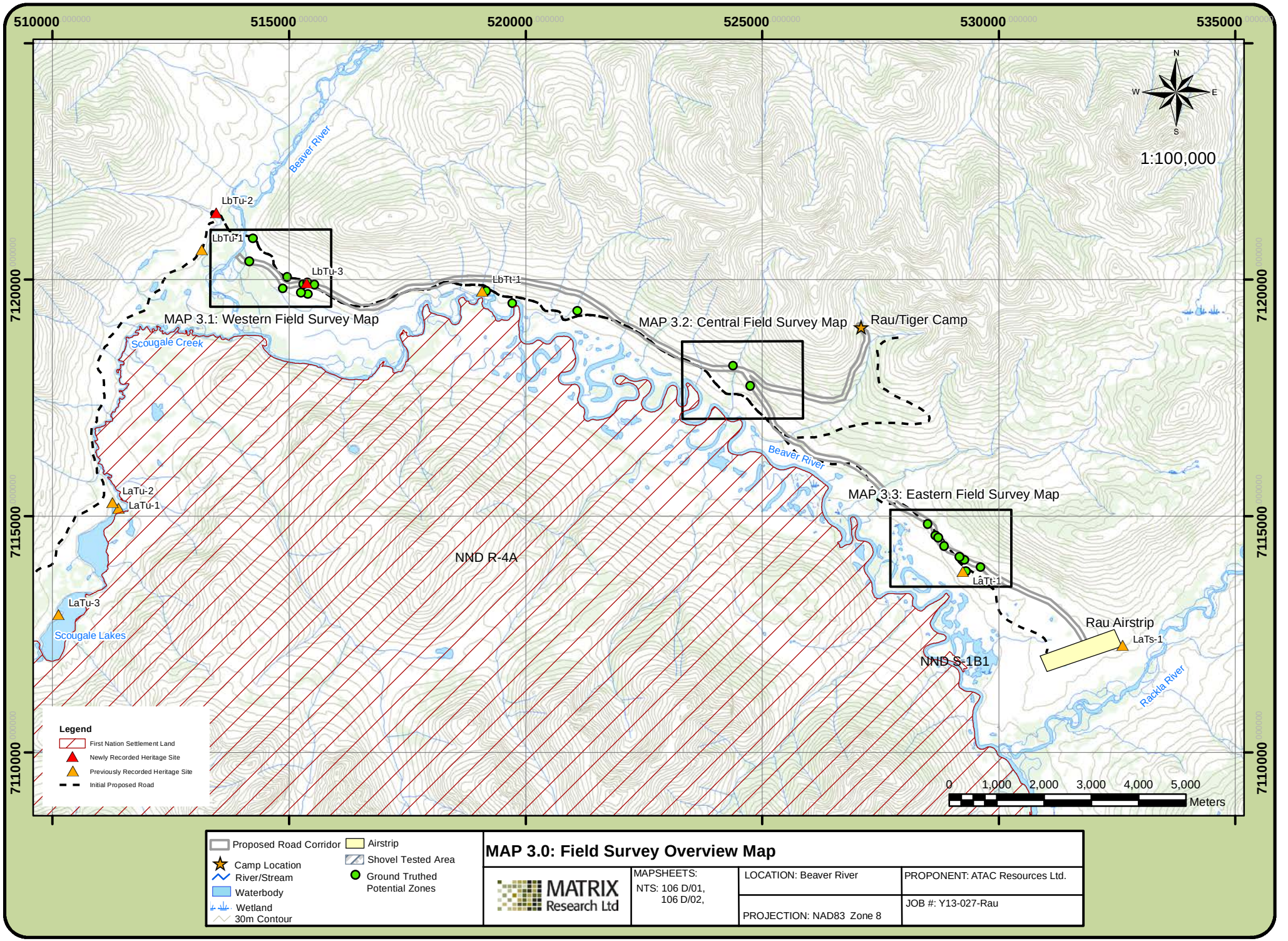
PROPONENT: ATAC Resources Ltd.

PROJECTION: NAD83 Zone 8

JOB #: Y13-027-Rau

Permit #: 13-17ASR

DATE: 11-02-2014



Proposed Road Corridor
Camp Location
River/Stream
Waterbody
Wetland
30m Contour
Airstrip
Shovel Tested Area
Ground Truthed Potential Zones

MAP 3.0: Field Survey Overview Map

MATRIX Research Ltd

MAPSHEETS:
NTS: 106 D/01, 106 D/02,

LOCATION: Beaver River

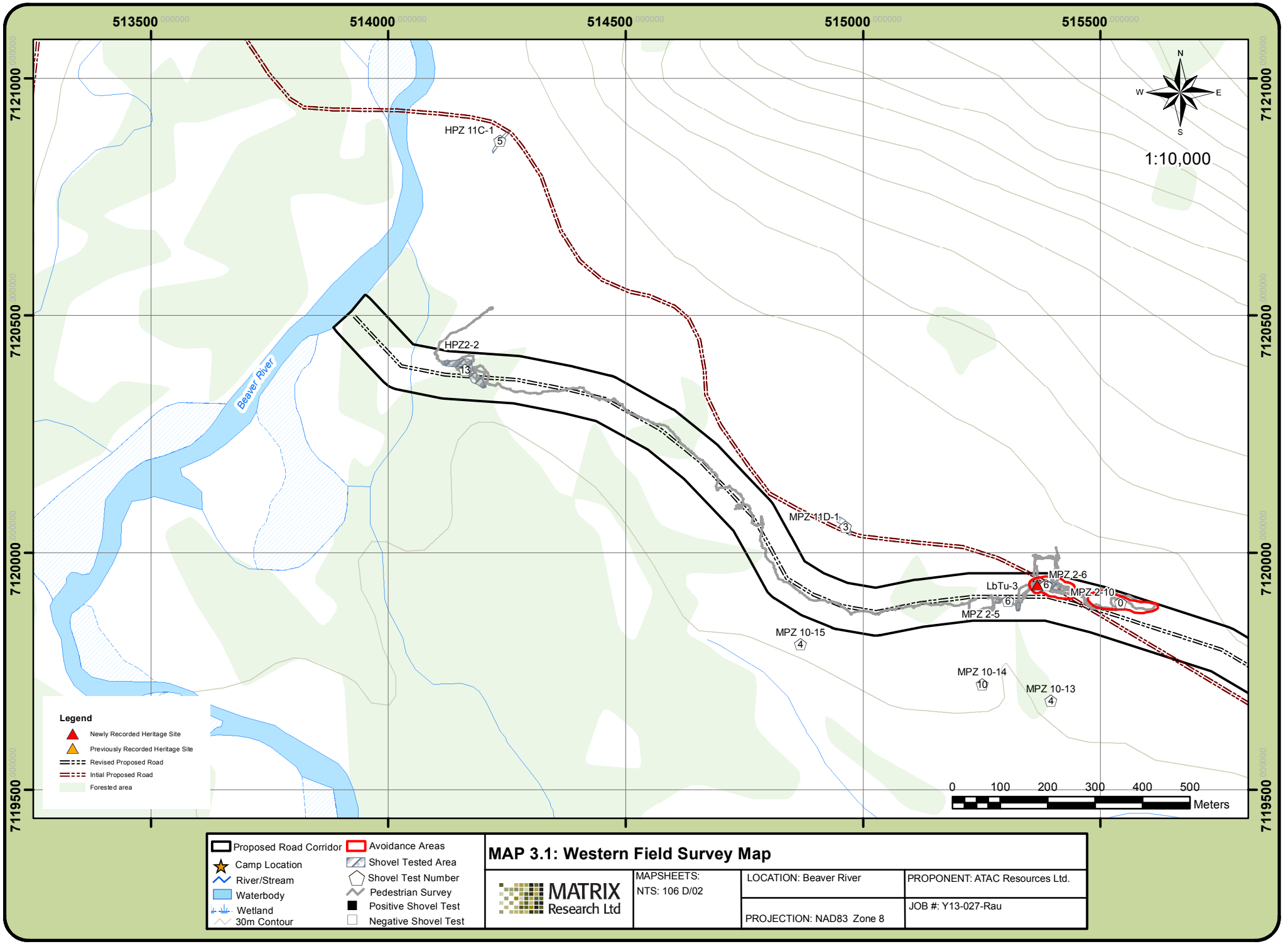
PROPONENT: ATAC Resources Ltd.

PROJECTION: NAD83 Zone 8

JOB #: Y13-027-Rau

Permit #: 13-17ASR

DATE: 11-02-2014



MAP 3.1: Western Field Survey Map

MATRIX Research Ltd

MAPSHEETS: NTS: 106 D/02

LOCATION: Beaver River

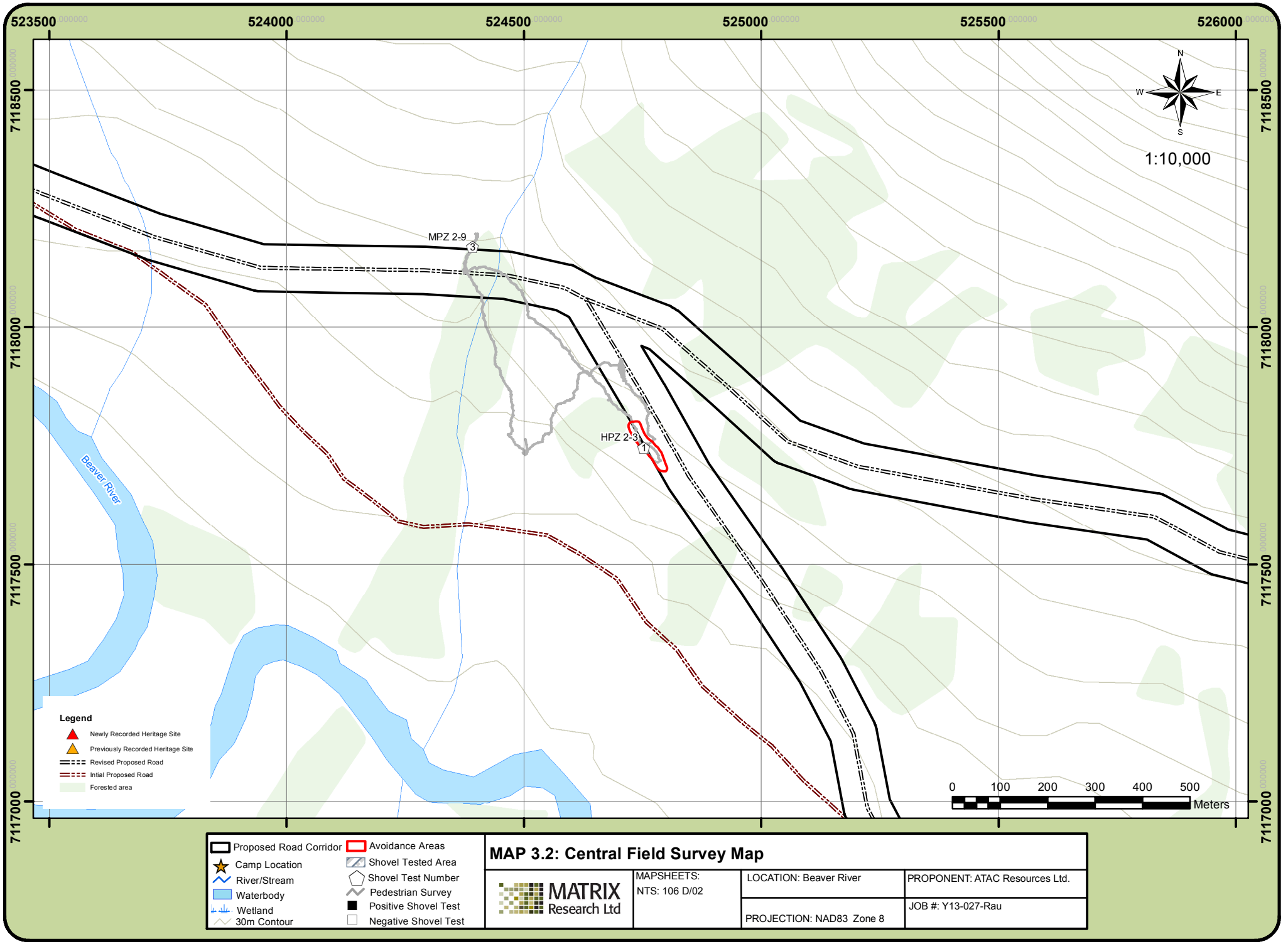
PROPONENT: ATAC Resources Ltd.

PROJECTION: NAD83 Zone 8

JOB #: Y13-027-Rau

Permit #: 13-17ASR

DATE: 11-02-2014



MAP 3.2: Central Field Survey Map

MATRIX Research Ltd

MAPSHEETS: NTS: 106 D/02

LOCATION: Beaver River

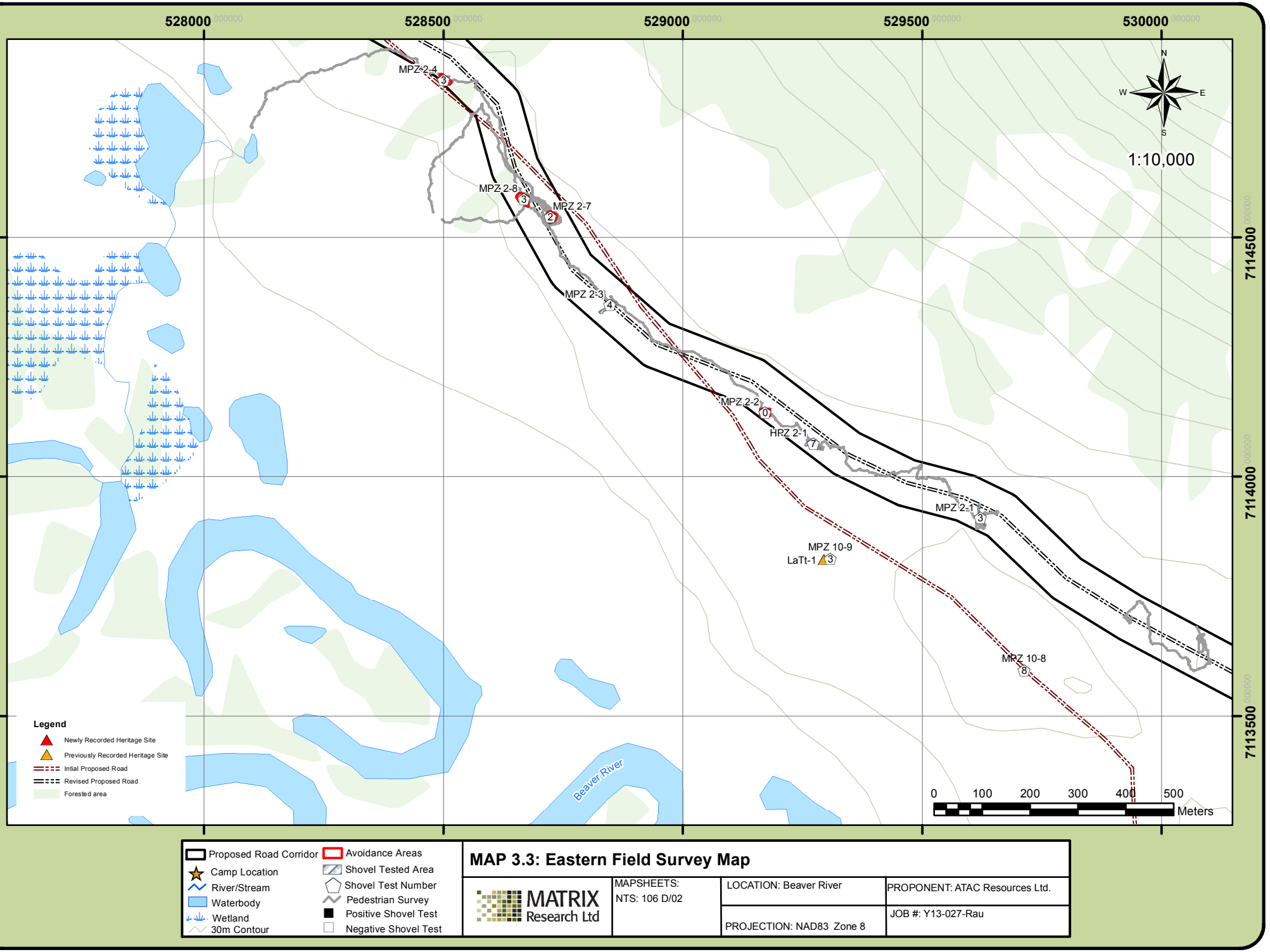
PROPONENT: ATAC Resources Ltd.

PROJECTION: NAD83 Zone 8

JOB #: Y13-027-Rau

Permit #: 13-17ASR

DATE: 11-02-2014



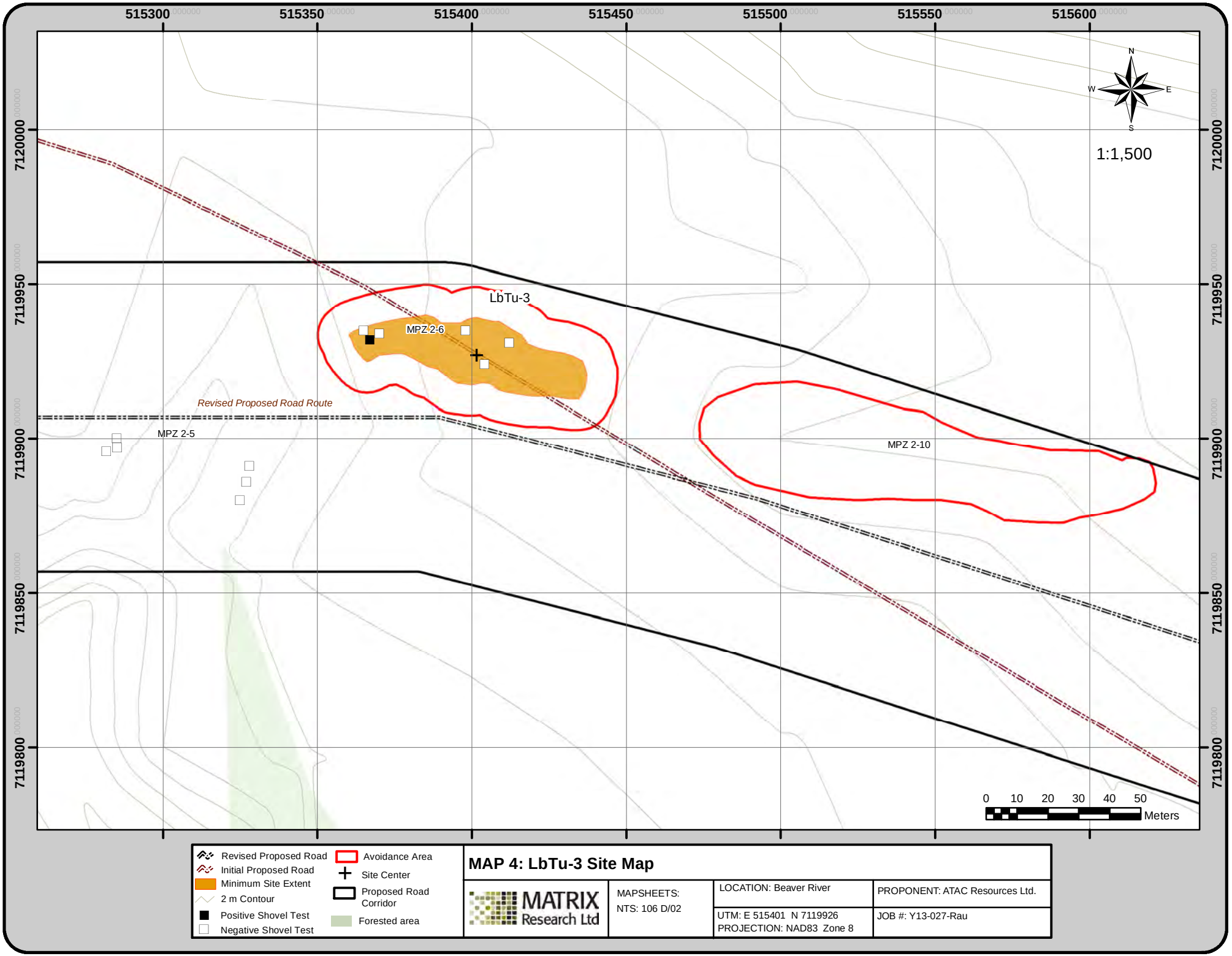
MAP 3.3: Eastern Field Survey Map

MATRIX Research Ltd

MAPSHEETS: NTS: 106 D/02	LOCATION: Beaver River	PROPONENT: ATAC Resources Ltd.
	PROJECTION: NAD83 Zone 8	JOB #: Y13-027-Rau

PERMIT #: 13-17ASR

DATE: 11-02-2014



Revised Proposed Road
Initial Proposed Road
Minimum Site Extent
2 m Contour
Positive Shovel Test
Negative Shovel Test
Avoidance Area
Site Center
Proposed Road Corridor
Forested area

MAP 4: LbTu-3 Site Map

MATRIX Research Ltd

MAPSHEETS:
NTS: 106 D/02

LOCATION: Beaver River

UTM: E 515401 N 7119926
PROJECTION: NAD83 Zone 8

PROPONENT: ATAC Resources Ltd.

JOB #: Y13-027-Rau

APPENDIX VIII

WATER QUALITY AND CLIMATE MONITORING – J. GIBSON

ATAC RESOURCES LTD

RAU PROJECT

ENVIRONMENTAL DATA UPDATE

January and March, 2013

J.Gibson Env. Consulting *Whitehorse YT*

Baseline water quality and hydrology data collection continued with surveys in January and March, 2013.

In January, four tributary stations (Rau # 3, 4, 12 and 13) and one Beaver River receiving waters station (Rau #10) were sampled for water quality.

In March, five tributary stations (Rau #1, 4, 5, 7, 13) and one Beaver River receiving waters station (Rau #10) were sampled for water quality.

In January, repairs to the weather station logger at the airstrip were done and the logger was downloaded.

Water quality data collection consisted of samples for total metals, dissolved metals, total organic carbon, total cyanide and routine chemistry.

There were no Quality Control samples taken during this survey.

Hydrology data collection on both dates consisted of stream flow volume measurements at Stations Rau #4 and #13.

Data Results

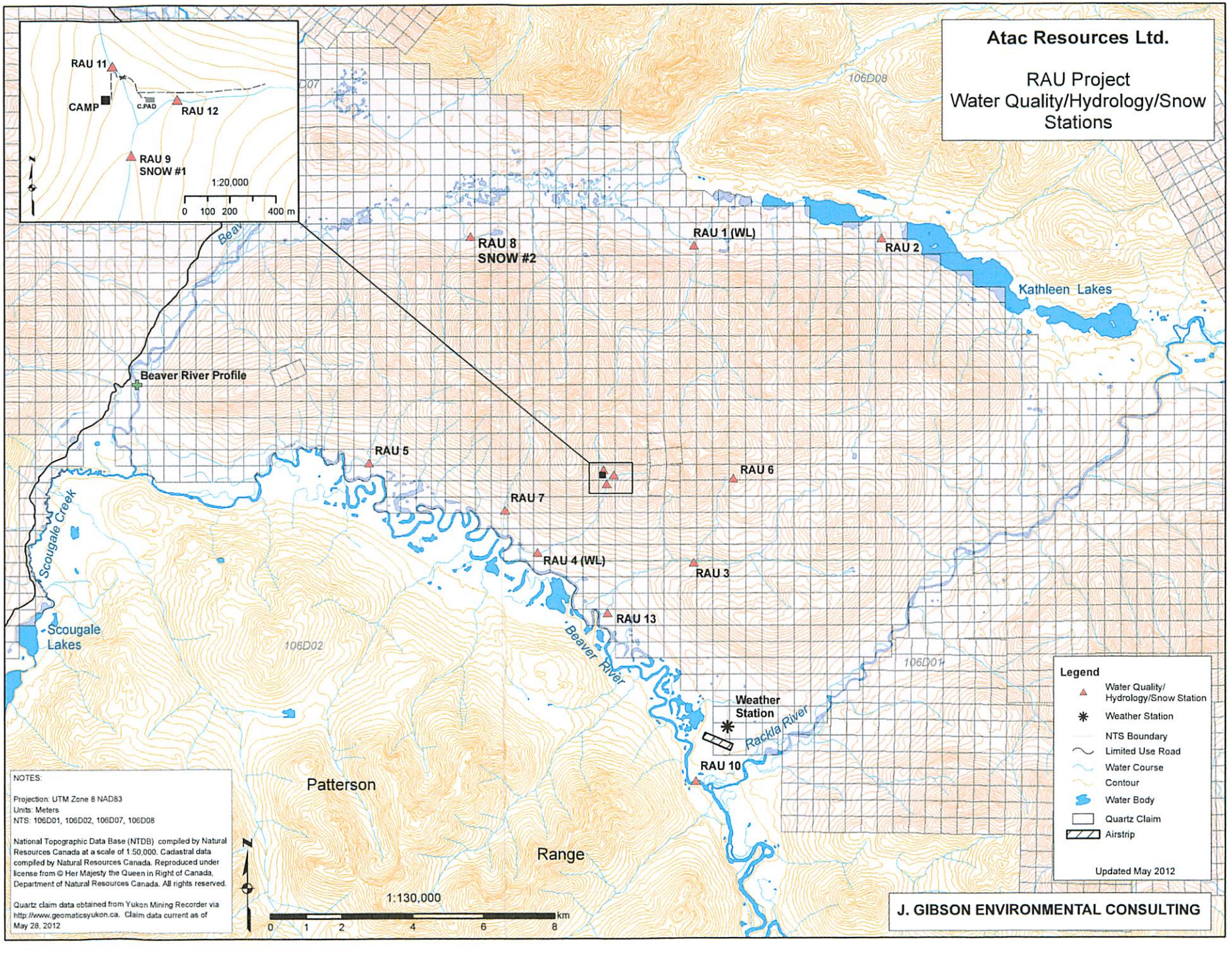
Hydrology

Hydrology data collection consisted of stream flow volume measurements at Stations RAU#4, and #13. Flow volumes were at minimum winter flow stage with full ice cover.

Station RAU#9 remained under thick glacial seepage ice cover. RAU #2 was under heavy overflow ice conditions and not drilled or sampled. Rau #11 was "dry" with no surface flow or channel ice.

Flow measurement results are listed with Routine Chemistry analysis results. A summary of stream flow volumes from July 2010 to March 2013 are listed in Table 4.

Channel conditions in January and March 2013 at most stations were surface ice to 100% coverage. Ice depth for channel with flow was limit to 0.2 meter maximum due to heavy snow load.


Atac Resources Ltd.
RAU Project
Water Quality/Hydrology/Snow Stations
RAU 11
CAMP
C.PAD
RAU 12
RAU 9
SNOW #1
1:20,000
0 100 200 400 m
RAU 8
SNOW #2
RAU 1 (WL)
RAU 2
Kathleen Lakes
Beaver River Profile
RAU 5
RAU 6
RAU 7
RAU 4 (WL)
RAU 3
RAU 13
Scougale Creek
Scougale Lakes
106D02
Beaver River
106D01
Weather Station
Rackla River
RAU 10
Patterson
Range
106D08
106D07
NOTES:
Projection: UTM Zone 8 NAD83
Units: Meters
NTS: 106D01, 106D02, 106D07, 106D08
National Topographic Data Base (NTDB) compiled by Natural Resources Canada at a scale of 1:50,000. Cadastral data compiled by Natural Resources Canada. Reproduced under license from © Her Majesty the Queen in Right of Canada, Department of Natural Resources Canada. All rights reserved.
Quartz claim data obtained from Yukon Mining Recorder via http://www.geomaticsyukon.ca. Claim data current as of May 28, 2012
1:130,000
0 1 2 4 6 8 km
Legend
Water Quality/ Hydrology/Snow Station
Weather Station
NTS Boundary
Limited Use Road
Water Course
Contour
Water Body
Quartz Claim
Airstrip
Updated May 2012
J. GIBSON ENVIRONMENTAL CONSULTING

Beaver River Ice Profile

The Beaver River near the old winter trail crossing was drilled in January for ice/water depths. Results are listed in the following table:

Beaver River Ice Depths

Station	Total Depth (m)	Ice Depth (m)
0.0 to 20.0 m	left/east bank sandbar, thin ice cover, dry	
21.0	1.10	1.10
24.0	1.0	0.95
26.0	1.06	1.0
27.0	1.04	1.0
28.0	1.05	1.0
29.0	1.20	1.15
30.0	1.25	1.15
32.0	1.26	1.15
35.0	1.24	1.10
36.0	1.22	1.16
37.0	1.25	1.18
38.0	1.20	1.14
39.0	1.20	1.10
40.0	1.22	1.04
41.0	1.21	1.10
42.0	1.13	1.10
43.0	1.11	0.91
44.0	0.94	0.92
46.4	right/west bank 0.65 m vertical bank	

Cross section coordinates 64 12 780
134 42 618

Cross section is located between two rock out crops on the left/east bank. There were sections of open water 60-80 meters upstream of the cross section.

Maximum ice depth was 1.18 meters, minimum was 1.0 meters.

Maximum water depth was 0.11 meters. A majority of the water was "standing water" with flow detected between 29.0 and 37.0 meter stations.

The cross section will be redone in early April 2013.

Water Quality

Water quality data is listed in the following tables:

Table 1. January 2013 Routine chemistry analysis results, field measurements and flow volumes

Table 2. January 2013 Total Metals ICP/MS analysis results

Table 3. January 2013 Dissolved Metals ICP/MS analysis results

Table 4. Flow Measurement Summary – RAU Station March 2010 to March 2013

Table 5. March 2013 Routine chemistry analysis results, field measurements and flow volumes

Table 6. March 2013 Total Metals ICP/MS analysis results

Table 7. March 2013 Dissolved Metals ICP/MS analysis results

Listed with the water quality analysis results are the ***Canadian Water Quality Guideline*** values for the Protection of Aquatic Life for waters with a pH > 6.5 and a total hardness value of > 180 mg/L as CaC03.

Also listed are the ***Canadian Drinking Water Guideline*** Maximum Acceptable Concentrations (MAC's) for applicable parameters.

All ***Guideline*** metal values are for total metals.

Analysis values that exceed either ***Guideline*** limit are highlighted in yellow.

Laboratory Analytical Reports are contained in Appendix 1.

Table 1. ATAC Resources - RAU Claims January, 2013.
Routine Chemistry and Field Measurement Results

Parameter	Unit	STATIONS RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7	Detection Limit	DWQ* G.lines	Aquatic** G.lines
Monitoring Frequency		**Quarterly**	**Quarterly**	**Monthly**	**Monthly**	**Quarterly**	**Not in Use**	**Quarterly**			
pH (field)	ru			8.27	8.51						
pH (lab)	ru			7.82	8.1					6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm	No	No	391	387	No	No	No	1		
Water temperature	C	Sample	Sample	0.1	0.2	Sample	Sample	Sample			
Flow Volume(field)	cms			nr	0.046						
Organic Carbon Total	mg/L			1.1	0.7				0.5		
Cyanide Total	mg/L			<0.002	<0.002				0.002	0.2	0.005
Phosphorus Total	mg/L			0.003	0.016				0.003		
Ammonia - N	mg/L			0.12	<0.01						1.37-2.2
Nitrate - N	mg/L			0.21	0.36				0.01	10	
Nitrite - N	mg/L			<0.01	<0.01				0.005	1	0.06
T-Alkalinity	mg/L			181	180				5		
Chloride	mg/L			0.7	0.49				0.05	<250	
Sulfate (SO4)	mg/L			29.9	31.8				0.5		
Hardness	mg CaCO3/L			240	233				5	<500	
Total Suspended Solids	mg/L			<2	<2				2		
Total Dissolved Solids	mg/L			222	212				5	<500	

All results and limits in mg/L unless noted otherwis. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to

Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L

Canadian Water Quality Guidelines

Table 1. ATAC Resources - RAU Claims January, 2013.
Routine Chemistry and Field Measurement Results

		STATIONS								
Parameter	**Unit**	**RAU #8**	**RAU#9**	**RAU#10**	**RAU#11**	**RAU#12**	**RAU#13**	**Detection Limit**	**DWQ* G.lines**	**Aquatic** G.lines**
Monitoring Frequency		**Quarterly**	**Monthly**	**Monthly**	**Monthly**	**Monthly**	**Monthly**			
pH (field)	ru			8.32		8.05	8.11			
pH (lab)	ru			8.0		7.95	7.92		6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm	No	No	408	No	365	700	1		
Water temperature	C	Sample	Sample	0.4	Sample	0.1	0.1			
Flow Volume(field)	cms			nr	Dry	0.003 E	0.033			
Organic Carbon Total	mg/L		glacial	<0.5	ice to	0.6	1.2	0.5		
Cyanide Total	mg/L		seepage	<0.002	invert	<0.002	<0.002	0.002	0.2	0.005
Phosphorus Total	mg/L		ice	<0.003		0.004	0.034	0.003		
Ammonia - N	mg/L			<0.01		<0.01	0.18			1.37-2.2
Nitrate - N	mg/L			0.2		0.41	0.22	0.01	10	
Nitrite - N	mg/L			<0.01		<0.01	<0.01	0.005	1	0.06
T-Alkalinity	mg/L			178		174	261	5		
Chloride	mg/L			1.02		0.06	13.6	0.05	<250	
Sulfate (SO4)	mg/L			47		27.2	124	0.5		
Hardness	mg CaCO3/L			247		224	428	5	<500	
Total Suspended Solids	mg/L			<2		<2	4	2		
Total Dissolved Solids	mg/L			232		208	442	5	<500	

All results and limits in mg/L unless noted otherwis. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L

Table 2. ATAC Resources - RAU Claims January, 2013
Total Metals Analysis Results.

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7	Detection Limit	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L			62.3	55				0.05		
Iron	mg/L			0.003	0.115				0.01	0.3	0.3
Magnesium	mg/L			18.7	21.4				0.05		
Manganese	mg/L			<0.001	0.0108				0.005	0.05	
Potassium	mg/L	No	No	1.3	0.7	No	No	No	0.1		
Silicon	mg/L	Sample	Sample	2.77	2.85	Sample	Sample	Sample	0.05		
Sulfur	mg/L								0.1		
Sodium	mg/L			1	0.6				0.02	<200	
Titanium	mg/L			<0.0005	0.0018				0.001		
Aluminum	mg/L			<0.005	0.051				0.005		0.1
Antimony	mg/L			<0.0001	<0.0001				0.0002	0.006	
Arsenic	mg/L			0.0004	0.00193				0.0002	0.01	
Barium	mg/L			0.118	0.129				0.001	1	
Beryllium	mg/L			<0.00005	<0.00005				0.00004		
Bismuth	mg/L			<0.0001	<0.0001				0.001		
Boron	mg/L			0.02	<0.002				0.004		
Cadmium	mg/L			0.00008	0.00007				0.00001	0.005	0.0018
Chromium	mg/L			<0.0005	<0.0005				0.0004	0.05	0.002
Cobalt	mg/L			<0.0001	<0.0001				0.00002		
Copper	mg/L			0.0008	0.0006				0.001	1	0.004
Lead	mg/L			<0.0001	0.0003				0.0001		
Lithium	mg/L			0.0014	0.0011				0.001		
Mercury	mg/L			<0.0001	<0.0001				0.00001	0.001	
Molybdenum	mg/L			0.00409	0.0012				0.0001		
Nickel	mg/L			0.0005	0.0003				0.001		0.15
Selenium	mg/L			0.0025	0.0008				0.0006	0.01	0.001
Silver	mg/L			<0.00005	<0.00005				0.00001		0.0001
Strontium	mg/L			0.0634	0.0719				0.001		
Tellurium	mg/L								0.0001		
Thallium	mg/L			<0.00001	<0.00001				0.00001		
Thorium	mg/L			<0.00001	<0.00001				0.0004		
Tin	mg/L			<0.0001	<0.0001				0.0001		
Uranium	mg/L			0.0057	0.0027				0.0004	0.02	
Vanadium	mg/L			<0.0001	0.0003				0.0001		
Zinc	mg/L			0.0056	0.0153				0.001	<5	0.03
Zirconium	mg/L			<0.0005	<0.0005				0.0001		

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 2. ATAC Resources - RAU Claims Janaury, 2013
Total Metals Analysis Results.

Parameter	Units	RAU #8	RAU#9	RAU#10	RAU #11	RAU#12	RAU#13	Detection Limit	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L			55.2		58.6	117	0.05		
Iron	mg/L			0.004		0.005	1.2	0.01	0.3	0.3
Magnesium	mg/L			23.4		16.8	28.6	0.05		
Manganese	mg/L	No	No	<0.001	No	<0.001	0.0827	0.005	0.05	
Potassium	mg/L	Sample	Sample	0.6	Sample	0.9	2.9	0.1		
Silicon	mg/L			2.81	Dry	2.4	3.69	0.05		
Sulfur	mg/L		glacial		ice to			0.1		
Sodium	mg/L		ice	2.2	invert	0.5	7.1	0.02	<200	
Titanium	mg/L			<0.0005		<0.0005	0.0012	0.001		
Aluminum	mg/L			<0.005		<0.005	0.064	0.005		0.1
Antimony	mg/L			<0.0001		<0.0001	0.0002	0.0002	0.006	
Arsenic	mg/L			0.0001		0.00753	0.00212	0.0002	0.01	
Barium	mg/L			0.0922		0.151	0.105	0.001	1	
Beryllium	mg/L			<0.00005		<0.00005	0.00008	0.00004		
Bismuth	mg/L			<0.0001		<0.0001	<0.0001	0.001		
Boron	mg/L			0.003		<0.002	0.028	0.004		
Cadmium	mg/L			0.00001		0.00002	0.0014	0.00001	0.005	0.0018
Chromium	mg/L			<0.0005		<0.0005	<0.0005	0.0004	0.05	0.002
Cobalt	mg/L			<0.0001		<0.0001	0.0009	0.00002		
Copper	mg/L			0.0007		0.0003	0.0032	0.001	1	0.004
Lead	mg/L			0.0004		0.0002	0.0002	0.0001		
Lithium	mg/L			0.0026		0.0006	0.0086	0.0005		
Mercury	mg/L			<0.0001		<0.0001	<0.0001	0.00001	0.001	
Molybdenum	mg/L			0.00096		0.00234	0.00979	0.0001		
Nickel	mg/L			<0.0002		<0.0002	0.0616	0.001		0.15
Selenium	mg/L			0.0005		0.0004	0.0074	0.0006	0.01	0.001
Silver	mg/L			<0.00005		<0.00005	<0.00005	0.00001		0.0001
Strontium	mg/L			0.145		0.0803	0.358	0.001		
Tellurium	mg/L							0.0001		
Thallium	mg/L			<0.00001		<0.00001	0.00005	0.00001		
Thorium	mg/L			<0.00001		0.00001	0.00002	0.0004		
Tin	mg/L			<0.0001		<0.0001	<0.0001	0.0001		
Uranium	mg/L			0.0012		0.00188	0.0138	0.0004	0.02	
Vanadium	mg/L			<0.0001		<0.0001	0.0007	0.0001		
Zinc	mg/L			0.0009		0.0047	0.259	0.001	<5	0.03
Zirconium	mg/L			<0.0005		<0.0005	<0.0005	0.0001		

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 3. ATAC Resources - RAU Claims January, 2013.

Dissolved Metals Analysis Results

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7	Detection Limit
Calcium	mg/L			65.2	57.2				0.1
Iron	mg/L			<0.005	<0.005				0.005
Magnesium	mg/L			18.6	22				0.1
Manganese	mg/L			0.001	0.002				0.001
Potassium	mg/L	No	No	1.4	0.7	No	No	No	0.1
Silicon	mg/L	Sample	Sample	2.58	2.71	Sample	Sample	Sample	0.05
Sodium	mg/L			0.8	0.5				0.1
Sulfur	mg/L			9.7	10.2				0.2
Aluminum	mg/L			<0.005	<0.005				0.005
Antimony	mg/L			<0.0002	<0.0002				0.0002
Arsenic	mg/L			0.0004	0.0017				0.0002
Barium	mg/L			0.109	0.12				0.001
Beryllium	mg/L			<0.00004	<0.00004				0.00004
Bismuth	mg/L			<0.001	<0.001				0.001
Boron	mg/L			0.022	<0.004				0.004
Cadmium	mg/L			0.00008	0.00004				0.00001
Chromium	mg/L			0.0019	0.0019				0.0004
Cobalt	mg/L			0.00064	0.00041				0.00002
Copper	mg/L			<0.001	<0.001				0.001
Lead	mg/L			<0.0001	<0.0001				0.0001
Lithium	mg/L			0.002	<0.001				0.001
Molybdenum	mg/L			0.00329	0.00066				0.0001
Nickel	mg/L			0.001	<0.001				0.001
Selenium	mg/L			0.0021	<0.0006				0.0006
Silver	mg/L			0.00001	<0.00001				0.00001
Strontium	mg/L			0.061	0.069				0.001
Titanium	mg/L			<0.010	<0.010				0.01
Tellurium	mg/L			<0.0001	<0.0001				0.0001
Thallium	mg/L			<0.00001	<0.00001				0.00001
Thorium	mg/L			<0.0004	<0.0004				0.0004
Tin	mg/L			<0.0001	<0.0001				0.0001
Uranium	mg/L			0.0058	0.0028				0.0004
Vanadium	mg/L			0.00048	0.00053				0.0001
Zinc	mg/L			0.006	0.01				0.001
Zirconium	mg/L			0.00025	<0.0001				0.0001

Table 3. ATAC Resources - RAU Claims January, 2013.

Dissolved Metals Analysis Results

Parameter	Units	RAU #8	RAU #9	RAU #10	RAU #11	RAU #12	RAU #13	Detection Limit
Calcium	mg/L			59.6		61.6	123	0.1
Iron	mg/L			<0.005		<0.005	0.015	0.005
Magnesium	mg/L			23.9		17	29	0.1
Manganese	mg/L			0.003		<0.001	0.071	0.001
Potassium	mg/L			0.6		1	2.7	0.1
Silicon	mg/L	No	No	2.7	No	2.25	3.36	0.05
Sodium	mg/L	Sample	Sample	1.9	Sample	0.5	5.8	0.1
Sulfur	mg/L			15		8.5	39	0.2
Aluminum	mg/L		glacial	<0.005	ice to	<0.005	0.01	0.005
Antimony	mg/L		ice	<0.0002	invert	<0.0002	0.0002	0.0002
Arsenic	mg/L			<0.0002		0.0085	0.0004	0.0002
Barium	mg/L			0.089		0.142	0.09	0.001
Beryllium	mg/L			<0.00004		<0.00004	<0.00004	0.00004
Bismuth	mg/L			<0.001		<0.001	<0.001	0.001
Boron	mg/L			<0.004		<0.004	0.027	0.004
Cadmium	mg/L			0.00001		0.00003	0.00104	0.00001
Chromium	mg/L			0.0016		0.0017	0.0018	0.0004
Cobalt	mg/L			0.00103		0.00021	0.00137	0.00002
Copper	mg/L			<0.001		<0.001	<0.001	0.001
Lead	mg/L			<0.0001		<0.0001	<0.0001	0.0001
Lithium	mg/L			0.002		<0.001	0.009	0.001
Molybdenum	mg/L			0.00044		0.00172	0.00776	0.0001
Nickel	mg/L			<0.001		<0.001	0.059	0.001
Selenium	mg/L			<0.0006		<0.0006	0.0072	0.0006
Silver	mg/L			<0.00001		<0.00001	<0.00001	0.00001
Strontium	mg/L			0.141		0.08	0.327	0.001
Titanium	mg/L			<0.010		<0.010	<0.010	0.01
Tellurium	mg/L			<0.0001		<0.0001	<0.0001	0.0001
Thallium	mg/L			<0.00001		<0.00001	0.00005	0.00001
Thorium	mg/L			<0.0004		<0.0004	<0.0004	0.0004
Tin	mg/L			<0.0001		<0.0001	<0.0001	0.0001
Uranium	mg/L			0.0012		0.0019	0.0132	0.0004
Vanadium	mg/L			0.00039		0.00042	0.00051	0.0001
Zinc	mg/L			0.002		0.004	0.198	0.001
Zirconium	mg/L			<0.0001		<0.0001	0.0002	0.0001

Table 7. ATAC RESOURCES - Summary of Rau Project Station Flow Volumes 2010-2013

(Cubic meters per second)

	Date																	
Station	**Jul-10**	**10-Sep**	**Mar-11**	**May-11** *May-03*	**May-11** *May-28*	**Jul-11**	**Aug-11**	**Oct-11**	**Mar-12** €	**Apr-12**	**May-12**	**Jun-12**	**Jul-12**	**Sep-12**	**Oct-12**	**Dec-12**	**Jan-13**	**Mar-13**
Rau #1	0.51	0.18	0.059	0.046	1.084 1.153	0.626	0.443	0.261	0.01	nr	0.5253	0.6291	0.3773	0.2533	0.1604	nr	nr	nr
Rau #2	0.20	0.064	nr	nr	0.815	0.411	0.166	0.091	nr	nr	nr	nr	nr	0.0977	nr	nr	nr	nr
Rau #3	0.418	0.187	nr	nr	0.774	0.485	0.317	nr	0.02		nr	0.4218	0.3497	0.185	0.1282	nr	nr	nr
Rau #4	0.088	0.068	0.004	0.032	0.093 0.093	0.072	0.081	0.064	0.008	0.0473	0.0976	0.1152	0.0895	0.062	0.0546	0.05 e	0.046	0.0296
Rau #5	0.024	0.018	nr	nr	0.036	0.039	0.034	0.018	0.0	nr	0.0728	nr	nr	0.034	nr	nr	nr	nr
Rau #6	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr
Rau #7	0.029	0.018	0.008	0.011	0.069	0.046	0.035	0.031	0.006	nr	0.0229	nr	nr	0.023	nr	nr	nr	nr
Rau #8	0.298	0.104	0.006	0.04	0.371	0.413	0.313	0.137	0.005	nr	0.1557	nr	nr	0.179	nr	nr	nr	nr
Rau #9	0.017	0.019	0.002	0.001 E	0.031	0.021	0.033	0.009	0.002	0.0052	0.0186	0.0463	0.0199	0.0064	0.0188	glacial ice	glacial ice	glacial ice
Rau #10	nr	nr	nr	nr	nr	nr	nr	nr	nr	12.31	nr	nr	nr	nr	nr	nr	nr	nr
Rau #11										<0.0001	<0.0001	0.0354	0.0092	0.0009	<0.0005	dry	dry	dry
Rau #12										0.00086	0.0045	0.0103	0.0076	0.0045	0.0036	0.04 e	0.04 e	nr
Rau #13										0.0784	0.5546	0.474	0.3597	0.233	0.1864	0.10e	0.033	0.0206

Table 5. ATAC Resources - RAU Claims March, 2013.
Routine Chemistry and Field Measurement Results

Parameter	Unit	STATIONS							Detection Limit	DWQ* G.lines	Aquatic** G.lines
		RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7			
Monitoring Frequency		Quarterly	Quarterly	Monthly	Monthly	Quarterly	Not in Use	Quarterly			
pH (field)	ru	8.5	Heavy		8.23	8.11		8.23			
pH (lab)	ru	8	Glacial		8.19	7.69		8.16		6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm	302	Seepage		319	529		336	1		
Water temperature	C	0.1	Ice		2.2	0.3		0.6			
Flow Volume(field)	cms	nr			0.0296	nr		nr			
Organic Carbon Total	mg/L	0.7			0.1	1.7		0.5	0.5		
Cyanide Total	mg/L	<0.002			<0.002	<0.002		<0.002	0.002	0.2	0.005
Phosphorus Total	mg/L	0.004			0.007	0.104		0.004	0.003		
Ammonia - N	mg/L	<0.01			0.12	0.13		0.16			1.37-2.2
Nitrate - N	mg/L	0.32			0.39	0.2		0.48	0.01	10	
Nitrite - N	mg/L	0.13			0.1	0.24		0.18	0.005	1	0.06
T-Alkalinity	mg/L	145			182	312		175	5		
Chloride	mg/L	0.16			0.11	0.08		0.2	0.05	<250	
Sulfate (SO4)	mg/L	46.2			30.9	44.1		40.1	0.5		
Hardness	mg CaCO3/L	204			218	392		228	5	<500	
Total Suspended Solids	mg/L	<2			<2	77		4	2		
Total Dissolved Solids	mg/L	228			224	378		234	5	<500	

All results and limits in mg/L unless noted otherwis. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L
Canadian Water Quality Guidelines

Table 5. ATAC Resources - RAU Claims March, 2013.
Routine Chemistry and Field Measurement Results

Parameter	Unit	STATIONS						Detection Limit	DWQ* G.lines	Aquatic** G.lines
		RAU #8	RAU#9	RAU#10	RAU#11	RAU#12	RAU#13			
Monitoring Frequency		Quarterly	Monthly	Monthly	Monthly	Monthly	Monthly			
pH (field)	ru		Heavy	7.91	Dry		8.55			
pH (lab)	ru		Glacial	7.95			7.94		6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm		Seepage	341			565	1		
Water temperature	C		Ice	1			0.3			
Flow Volume(field)	cms			nr			0.021			
Organic Carbon Total	mg/L			0.6			0.9	0.5		
Cyanide Total	mg/L			<0.002			<0.002	0.002	0.2	0.005
Phosphorus Total	mg/L			0.019			0.034	0.003		
Ammonia - N	mg/L			<0.01			0.14			1.37-2.2
Nitrate - N	mg/L			0.16			0.22	0.01	10	
Nitrite - N	mg/L			<0.01			<0.01	0.005	1	0.06
T-Alkalinity	mg/L			183			260	5		
Chloride	mg/L			1.4			12.5	0.05	<250	
Sulfate (SO4)	mg/L			50.1			117	0.5		
Hardness	mg CaCO3/L			243			398	5	<500	
Total Suspended Solids	mg/L			<2			10	2		
Total Dissolved Solids	mg/L			262			454	5	<500	

All results and limits in mg/L unless noted otherwis. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L

Table 6. ATAC Resources - RAU Claims March, 2013
Total Metals Analysis Results.

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7	Detection Limit	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L	68.7			53.4	98.3		47	0.05		
Iron	mg/L	0.024			0.064	1.19		0.014	0.01	0.3	0.3
Magnesium	mg/L	7.82			20.5	35.6		24.9	0.05		
Manganese	mg/L	0.008			0.0082	0.0574		0.0011	0.005	0.05	
Potassium	mg/L	0.4			0.7	1.3		0.2	0.1		
Silicon	mg/L	3.3			2.71	4.13		2.22	0.05		
Sulfur	mg/L								0.1		
Sodium	mg/L	1.3			0.5	1.1		0.4	0.02	<200	
Titanium	mg/L	<0.0005			0.0012	0.0135		<0.0005	0.001		
Aluminum	mg/L	0.017			0.025	0.358		0.006	0.005		0.1
Antimony	mg/L	<0.0001			<0.0001	0.0009		<0.0001	0.0002	0.006	
Arsenic	mg/L	0.0002			0.00169	0.00165		0.00029	0.0002	0.01	
Barium	mg/L	0.115			0.12	0.182		0.153	0.001	1	
Beryllium	mg/L	<0.00005			<0.00005	<0.00005		<0.00005	0.00004		
Bismuth	mg/L	<0.0001			<0.0001	<0.0001		<0.0001	0.001		
Boron	mg/L	0.003			0.003	0.003		0.002	0.004		
Cadmium	mg/L	0.00008			0.00005	0.00182		0.00004	0.00001	0.005	0.0018
Chromium	mg/L	<0.0005			<0.0005	0.0011		<0.0005	0.0004	0.05	0.002
Cobalt	mg/L	<0.0001			<0.0001	0.0009		<0.0001	0.00002		
Copper	mg/L	0.0011			0.0003	0.0048		0.0002	0.001	1	0.004
Lead	mg/L	0.0002			0.0001	0.0022		0.0002	0.0001		
Lithium	mg/L	0.0022			0.0009	0.0026		0.0005	0.001		
Mercury	mg/L	<0.0001			<0.0001	<0.0001		<0.0001	0.00001	0.001	
Molybdenum	mg/L	0.00246			0.00173	0.00648		0.00069	0.0001		
Nickel	mg/L	0.0007			0.002	0.0326		0.0028	0.001		0.15
Selenium	mg/L	0.0038			0.0005	0.0046		0.0003	0.0006	0.01	0.001
Silver	mg/L	<0.00005			<0.00005	<0.00005		<0.00005	0.00001		0.0001
Strontium	mg/L	0.147			0.0732	0.229		0.0424	0.001		
Tellurium	mg/L								0.0001		
Thallium	mg/L	0.00001			<0.00001	0.00006		<0.00001	0.00001		
Thorium	mg/L	<0.00001			0.00001	0.00004		<0.00001	0.0004		
Tin	mg/L	<0.0001			<0.0001	<0.0001		<0.0001	0.0001		
Uranium	mg/L	0.00216			0.00273	0.0129		0.00168	0.0004	0.02	
Vanadium	mg/L	0.0002			0.0002	0.0034		0.0001	0.0001		
Zinc	mg/L	0.0162			0.0128	0.222		0.0054	0.001	<5	0.03
Zirconium	mg/L	<0.0005			<0.0005	<0.0005		<0.0005	0.0001		

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 6. ATAC Resources - RAU Claims March, 2013
Total Metals Analysis Results.

Parameter	Units	RAU #8	RAU#9	RAU#10	RAU #11	RAU#12	RAU#13	Detection Limit	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L			58			111	0.05		
Iron	mg/L			0.02			1.36	0.01	0.3	0.3
Magnesium	mg/L			23.6			26.7	0.05		
Manganese	mg/L			0.0044			0.0782	0.005	0.05	
Potassium	mg/L			0.6			2.8	0.1		
Silicon	mg/L			2.79			3.51	0.05		
Sulfur	mg/L							0.1		
Sodium	mg/L			2.4			6.8	0.02	<200	
Titanium	mg/L			<0.0005			0.0011	0.001		
Aluminum	mg/L			<0.005			0.071	0.005		0.1
Antimony	mg/L			<0.0001			0.0002	0.0002	0.006	
Arsenic	mg/L			0.00021			0.00211	0.0002	0.01	
Barium	mg/L			0.0799			0.0975	0.001	1	
Beryllium	mg/L			<0.00005			0.00007	0.00004		
Bismuth	mg/L			<0.0001			<0.0001	0.001		
Boron	mg/L			0.006			0.028	0.004		
Cadmium	mg/L			0.00002			0.00126	0.00001	0.005	0.0018
Chromium	mg/L			<0.0005			<0.0005	0.0004	0.05	0.002
Cobalt	mg/L			<0.0001			0.0009	0.00002		
Copper	mg/L			0.0005			0.0031	0.001	1	0.004
Lead	mg/L			<0.0001			0.0002	0.0001		
Lithium	mg/L			0.0027			0.008	0.0005		
Mercury	mg/L			<0.0001			<0.0001	0.00001	0.001	
Molybdenum	mg/L			0.00161			0.01	0.0001		
Nickel	mg/L			0.0013			0.0597	0.001		0.15
Selenium	mg/L			0.0008			0.0065	0.0006	0.01	0.001
Silver	mg/L			<0.00005			<0.00005	0.00001		0.0001
Strontium	mg/L			0.172			0.346	0.001		
Tellurium	mg/L							0.0001		
Thallium	mg/L			<0.00001			0.00005	0.00001		
Thorium	mg/L			0.00001			0.00004	0.0004		
Tin	mg/L			<0.0001			<0.0001	0.0001		
Uranium	mg/L			0.0014			0.013	0.0004	0.02	
Vanadium	mg/L			<0.0001			0.0017	0.0001		
Zinc	mg/L			0.002			0.258	0.001	<5	0.03
Zirconium	mg/L			<0.0005			<0.0005	0.0001		

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 7. ATAC Resources - RAU Claims March, 2013.

Dissolved Metals Analysis Results

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7	Detection Limit
Calcium	mg/L	69.9			54.7	95		49.2	0.1
Iron	mg/L	<0.005			<0.005	0.043		0.011	0.005
Magnesium	mg/L	8.03			21.3	33.1		25.4	0.1
Manganese	mg/L	0.003			0.001	0.006		0.002	0.001
Potassium	mg/L	0.3			0.7	1.1		0.2	0.1
Silicon	mg/L	3.11			2.54	3.21		2.14	0.05
Sodium	mg/L	1.3			0.5	0.9		0.5	0.1
Sulfur	mg/L	15.8			10.4	15.6		13.7	0.2
Aluminum	mg/L	<0.005			<0.005	<0.005		0.009	0.005
Antimony	mg/L	<0.0002			<0.0002	0.0008		<0.0002	0.0002
Arsenic	mg/L	<0.0002			0.0016	0.0004		0.0003	0.0002
Barium	mg/L	0.083			0.115	0.131		0.158	0.001
Beryllium	mg/L	<0.00004			<0.00004	<0.00004		<0.00004	0.00004
Bismuth	mg/L	<0.001			<0.001	<0.001		<0.001	0.001
Boron	mg/L	<0.004			<0.004	<0.004		<0.004	0.004
Cadmium	mg/L	0.00008			0.00005	0.00083		0.00004	0.00001
Chromium	mg/L	0.0011			0.001	0.0017		0.0012	0.0004
Cobalt	mg/L	0.00018			<0.00002	0.00007		0.00014	0.00002
Copper	mg/L	<0.001			<0.001	<0.001		<0.001	0.001
Lead	mg/L	<0.0001			<0.0001	<0.0001		<0.0001	0.0001
Lithium	mg/L	0.002			0.001	0.003		<0.001	0.001
Molybdenum	mg/L	0.00182			0.00116	0.00573		0.00022	0.0001
Nickel	mg/L	0.001			<0.001	0.017		<0.001	0.001
Selenium	mg/L	0.0038			<0.0006	0.0046		<0.0006	0.0006
Silver	mg/L	<0.00001			<0.00001	<0.00001		<0.00001	0.00001
Strontium	mg/L	0.14			0.072	0.207		0.044	0.001
Titanium	mg/L	<0.010			<0.010	<0.010		<0.010	0.01
Tellurium	mg/L	<0.0001			<0.0001	<0.0001		<0.0001	0.0001
Thallium	mg/L	<0.00001			<0.00001	0.00001		<0.00001	0.00001
Thorium	mg/L	<0.0004			<0.0004	<0.0004		<0.0004	0.0004
Tin	mg/L	<0.0001			<0.0001	<0.0001		<0.0001	0.0001
Uranium	mg/L	0.0021			0.0028	0.0122		0.0017	0.0004
Vanadium	mg/L	0.00037			0.00032	0.00067		0.00042	0.0001
Zinc	mg/L	0.006			0.01	0.111		0.011	0.001
Zirconium	mg/L	<0.00010			<0.00010	0.00011		<0.00010	0.0001

Table 7. ATAC Resources - RAU Claims March, 2013.

Dissolved Metals Analysis Results

Parameter	Units	RAU #8	RAU #9	RAU #10	RAU #11	RAU #12	RAU #13	Detection Limit
Calcium	mg/L			58			114	0.1
Iron	mg/L			<0.005			0.026	0.005
Magnesium	mg/L			23.8			27.6	0.1
Manganese	mg/L			0.004			0.065	0.001
Potassium	mg/L			0.6			2.6	0.1
Silicon	mg/L			2.59			3.16	0.05
Sodium	mg/L			2.1			5.9	0.1
Sulfur	mg/L			16.9			37.6	0.2
Aluminum	mg/L			<0.005			0.01	0.005
Antimony	mg/L			0.0003			0.0004	0.0002
Arsenic	mg/L			<0.0002			0.0004	0.0002
Barium	mg/L			0.074			0.087	0.001
Beryllium	mg/L			<0.00004			<0.00004	0.00004
Bismuth	mg/L			<0.001			<0.001	0.001
Boron	mg/L			0.005			0.032	0.004
Cadmium	mg/L			0.00002			0.00088	0.00001
Chromium	mg/L			0.0012			0.0013	0.0004
Cobalt	mg/L			0.00007			0.00086	0.00002
Copper	mg/L			<0.001			<0.001	0.001
Lead	mg/L			<0.0001			<0.0001	0.0001
Lithium	mg/L			0.003			0.009	0.001
Molybdenum	mg/L			0.00094			0.00882	0.0001
Nickel	mg/L			0.002			0.058	0.001
Selenium	mg/L			<0.0006			0.0066	0.0006
Silver	mg/L			<0.00001			<0.00001	0.00001
Strontium	mg/L			0.165			0.333	0.001
Titanium	mg/L			<0.010			<0.010	0.01
Tellurium	mg/L			<0.0001			<0.0001	0.0001
Thallium	mg/L			<0.00001			0.00005	0.00001
Thorium	mg/L			<0.0004			<0.0004	0.0004
Tin	mg/L			<0.0001			<0.0001	0.0001
Uranium	mg/L			0.0014			0.0127	0.0004
Vanadium	mg/L			0.00032			0.00047	0.0001
Zinc	mg/L			0.001			0.187	0.001
Zirconium	mg/L			<0.00010			0.00025	0.0001

Water Quality Summary

January 2013

Station RAU #3 exceeds the ***Aquatic Guidelines*** for selenium.

Station RAU #13 exceeds the ***Aquatic Guideline***s for iron, selenium and zinc; and the ***Drinking Water Guidelines*** for iron and manganese.

Stations Rau #1,2,6,7,8,9 and11 were not sampled in January 2013.

March 2013

Station RAU #1 exceeds the ***Aquatic Guidelines*** for selenium and nitrite.

Station RAU #4 exceeds the ***Aquatic Guideline***s for nitrite.

Station RAU #5 exceeds the ***Aquatic Guidelines*** for nitrite aluminum, iron, cadmium, copper, selenium and zinc; and the ***Drinking Water Guidelines*** for manganese and iron.

Station RAU #7 exceeds the ***Aquatic Guideline***s for nitrite.

Receiving waters Station RAU #10 (Beaver River) met all Guideline limits.

Station RAU #13 exceeds the ***Aquatic Guideline***s for iron, selenium and zinc; and the ***Drinking Water Guidelines*** for iron and manganese.

Stations Rau #2,3,6,8,9,11 and 12 were not sampled in March 2013.

Weather Station Data Logger

The weather station / data logger was downloaded at during the January 2013 survey.

Weather station repairs from moose damage in October 2012 were completed in January 2013.

All logger systems were functioning.

Appendix #1

Laboratory Analytical Reports

January and March, 2013

Exova
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Report Transmission Cover Page

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates Box 20913 Whitehorse, YT, Canada Y1A 6P2	ID: Name: Location: LSD:	ATAC Resources Rau Project
Attn:	John Gibson	P.O.:	
Sampled By:	J Gibson	Acct code:	
Company:			

Lot ID:	**915796**
Control Number:	A246264
Date Received:	Jan 18, 2013
Date Reported:	Jan 24, 2013
Report Number:	1798962

Contact & Affiliation	Address	Delivery Commitments
John Gibson J. Gibson & Associates	, Box 20913 Whitehorse, Yukon Territory Y1A 6P2 Phone: (867) 633-4522 Fax: (867) 668-6895 Email: ludditegibson@gmail.com	On [Lot Verification] send (COA) by Email - Single Report On [Report Approval] send (COC, Test Report) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report On [Lot Creation] send (COR) by Email - Single Report

Notes To Clients:

- Analysis was performed on samples 915796-1 to 5 that exceeded the recommended holding time for Total Phosphorus analysis.

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Exova

Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J Gibson
Company:

Project:
ID: ATAC Resources
Name: Rau Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **915796**
Control Number: A246264
Date Received: Jan 18, 2013
Date Reported: Jan 24, 2013
Report Number: 1798962

		Reference Number	915796-1	915796-2	915796-3	
		Sample Date	Jan 16, 2013	Jan 16, 2013	Jan 16, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	RAU #3 / Surface Water	RAU #4 / Surface Water	RAU #10 / Surface Water	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	1.1	0.7	<0.5	0.5
Cyanide	Total	mg/L	<0.002	<0.002	<0.002	0.002
Phosphorus	Total	mg/L	0.003	0.016	<0.003	0.003
Ammonia - N		mg/L	0.12	<0.01	<0.01	.01
Metals Dissolved						
Sulfur	Dissolved	mg/L	9.7	10.2	15.0	0.2
Aluminum	Dissolved	mg/L	<0.005	<0.005	<0.005	0.005
Antimony	Dissolved	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Dissolved	mg/L	0.0004	0.0017	<0.0002	0.0002
Barium	Dissolved	mg/L	0.109	0.120	0.089	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	0.022	<0.004	<0.004	0.004
Cadmium	Dissolved	mg/L	0.00008	0.00004	0.00001	0.00001
Chromium	Dissolved	mg/L	0.0019	0.0019	0.0016	0.0004
Cobalt	Dissolved	mg/L	0.00064	0.00041	0.00103	0.00002
Copper	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Lead	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L	0.002	<0.001	0.002	0.001
Molybdenum	Dissolved	mg/L	0.00329	0.00066	0.00044	0.0001
Nickel	Dissolved	mg/L	0.001	<0.001	<0.001	0.001
Selenium	Dissolved	mg/L	0.0021	<0.0006	<0.0006	0.0006
Silver	Dissolved	mg/L	0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L	0.061	0.069	0.141	0.001
Tellurium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L	0.0058	0.0028	0.0012	0.0004
Vanadium	Dissolved	mg/L	0.00048	0.00053	0.00039	0.0001
Zinc	Dissolved	mg/L	0.006	0.01	0.002	0.001
Zirconium	Dissolved	mg/L	0.00025	<0.0001	<0.0001	0.0001
Metals Total						
Mercury	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Aluminum	Total	mg/L	<0.005	0.051	<0.005	0.005

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J Gibson
Company:

Project:
ID: ATAC Resources
Name: Rau Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **915796**
Control Number: A246264
Date Received: Jan 18, 2013
Date Reported: Jan 24, 2013
Report Number: 1798962

	Reference Number	915796-1	915796-2	915796-3	
	Sample Date	Jan 16, 2013	Jan 16, 2013	Jan 16, 2013	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	RAU #3 / Surface Water	RAU #4 / Surface Water	RAU #10 / Surface Water	
	Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued						
Antimony	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Arsenic	Total	mg/L	0.00040	0.00193	0.00010	0.00005
Barium	Total	mg/L	0.118	0.129	0.0922	0.00005
Beryllium	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Bismuth	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Boron	Total	mg/L	0.020	<0.002	0.003	.002
Cadmium	Total	mg/L	0.00008	0.00007	0.00001	0.00001
Calcium	Total	mg/L	62.3	55.0	55.2	0.05
Chromium	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Cobalt	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Copper	Total	mg/L	0.0008	0.0006	0.0007	0.0001
Iron	Total	mg/L	0.003	0.115	0.004	0.002
Lead	Total	mg/L	<0.0001	0.0003	0.0004	0.0001
Lithium	Total	mg/L	0.0014	0.0011	0.0026	0.0005
Magnesium	Total	mg/L	18.7	21.4	23.4	0.04
Manganese	Total	mg/L	<0.001	0.0108	<0.001	0.001
Molybdenum	Total	mg/L	0.00409	0.00120	0.00096	0.00005
Nickel	Total	mg/L	0.0005	0.0003	<0.0002	0.0002
Potassium	Total	mg/L	1.3	0.7	0.6	0.1
Selenium	Total	mg/L	0.0025	0.0008	0.0005	0.0001
Silicon	Total	mg/L	2.77	2.85	2.81	0.02
Silver	Total	mg/L	<0.00005	<0.00005	<0.00005	0.0005
Sodium	Total	mg/L	1.0	0.6	2.2	0.1
Strontium	Total	mg/L	0.0634	0.0719	0.145	0.0001
Thallium	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Tin	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Titanium	Total	mg/L	<0.0005	0.0018	<0.0005	0.0005
Uranium	Total	mg/L	0.00570	0.00270	0.00120	0.00001
Vanadium	Total	mg/L	<0.0001	0.0003	<0.0001	0.0001
Zinc	Total	mg/L	0.0056	0.0153	0.0009	0.0005
Zirconium	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Hardness	as CaCO3	mg/L	232	225	234	1
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2	<2	<2	2
Solids	Total Dissolved	mg/L	222	212	232	5

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Analytical Report

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**915796**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	A246264
	Box 20913	Name:	Rau Project	Date Received:	Jan 18, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Jan 24, 2013
	Y1A 6P2	LSD:		Report Number:	1798962
Attn:	John Gibson	P.O.:			
Sampled By:	J Gibson	Acct code:			
Company:					

		Reference Number	915796-1	915796-2	915796-3	
		Sample Date	Jan 16, 2013	Jan 16, 2013	Jan 16, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	RAU #3 / Surface Water	RAU #4 / Surface Water	RAU #10 / Surface Water	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water						
pH	at 25 °C		7.82	8.10	8.00	
Electrical Conductivity		µS/cm at 25 C	391	387	408	1
Calcium	Dissolved	mg/L	65.2	57.2	59.6	0.1
Iron	Dissolved	mg/L	<0.005	<0.005	<0.005	0.005
Magnesium	Dissolved	mg/L	18.6	22.0	23.9	0.1
Manganese	Dissolved	mg/L	0.001	0.002	0.003	0.001
Potassium	Dissolved	mg/L	1.4	0.7	0.6	0.1
Silicon	Dissolved	mg/L	2.58	2.71	2.70	0.05
Sodium	Dissolved	mg/L	0.8	0.5	1.9	0.1
Bicarbonate		mg/L	221	220	218	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	181	180	178	5
Chloride	Dissolved	mg/L	0.70	0.49	1.02	0.05
Nitrate - N	Dissolved	mg/L	0.21	0.36	0.20	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	29.9	31.8	47.0	0.5
Hardness	as CaCO3	mg/L	240	233	247	5

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J Gibson
Company:

Project:
ID: ATAC Resources
Name: Rau Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **915796**
Control Number: A246264
Date Received: Jan 18, 2013
Date Reported: Jan 24, 2013
Report Number: 1798962

	Reference Number	915796-4	915796-5		
	Sample Date	Jan 16, 2013	Jan 16, 2013		
	Sample Time	NA	NA		
	Sample Location				
	Sample Description	RAU #12 / Surface Water	RAU #13 / Surface Water		
	Matrix	Water	Water		
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	0.6	1.2		0.5
Cyanide	Total	mg/L	<0.002	<0.002		0.002
Phosphorus	Total	mg/L	0.004	0.034		0.003
Ammonia - N		mg/L	<0.01	0.18		.01
Metals Dissolved						
Sulfur	Dissolved	mg/L	8.5	39.0		0.2
Aluminum	Dissolved	mg/L	<0.005	0.010		0.005
Antimony	Dissolved	mg/L	<0.0002	0.0002		0.0002
Arsenic	Dissolved	mg/L	0.0085	0.0004		0.0002
Barium	Dissolved	mg/L	0.142	0.090		0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004		0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001		0.001
Boron	Dissolved	mg/L	<0.004	0.027		0.004
Cadmium	Dissolved	mg/L	0.00003	0.00104		0.00001
Chromium	Dissolved	mg/L	0.0017	0.0018		0.0004
Cobalt	Dissolved	mg/L	0.00021	0.00137		0.00002
Copper	Dissolved	mg/L	<0.001	<0.001		0.001
Lead	Dissolved	mg/L	<0.0001	<0.0001		0.0001
Lithium	Dissolved	mg/L	<0.001	0.009		0.001
Molybdenum	Dissolved	mg/L	0.00172	0.00776		0.0001
Nickel	Dissolved	mg/L	<0.001	0.059		0.001
Selenium	Dissolved	mg/L	<0.0006	0.0072		0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001		0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010		0.01
Strontium	Dissolved	mg/L	0.080	0.327		0.001
Tellurium	Dissolved	mg/L	<0.0001	<0.0001		0.0001
Thallium	Dissolved	mg/L	<0.00001	0.00005		0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004		0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001		0.0001
Uranium	Dissolved	mg/L	0.0019	0.0132		0.0004
Vanadium	Dissolved	mg/L	0.00042	0.00051		0.0001
Zinc	Dissolved	mg/L	0.004	0.198		0.001
Zirconium	Dissolved	mg/L	<0.0001	0.00020		0.0001
Metals Total						
Mercury	Total	mg/L	<0.0001	<0.0001		0.0001
Aluminum	Total	mg/L	<0.005	0.064		0.005

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J Gibson
Company:

Project:
ID: ATAC Resources
Name: Rau Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **915796**
Control Number: A246264
Date Received: Jan 18, 2013
Date Reported: Jan 24, 2013
Report Number: 1798962

Reference Number	915796-4	915796-5	
Sample Date	Jan 16, 2013	Jan 16, 2013	
Sample Time	NA	NA	
Sample Location			
Sample Description	RAU #12 / Surface Water	RAU #13 / Surface Water	
Matrix	Water	Water	

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Metals Total - Continued						
Antimony	Total	mg/L	<0.0001	0.0002		0.0001
Arsenic	Total	mg/L	0.00753	0.00212		0.00005
Barium	Total	mg/L	0.151	0.105		0.00005
Beryllium	Total	mg/L	<0.00005	0.00008		0.00005
Bismuth	Total	mg/L	<0.0001	<0.0001		0.0001
Boron	Total	mg/L	<0.002	0.028		.002
Cadmium	Total	mg/L	0.00002	0.00140		0.00001
Calcium	Total	mg/L	58.6	117		0.05
Chromium	Total	mg/L	<0.0005	<0.0005		0.0005
Cobalt	Total	mg/L	<0.0001	0.0009		0.0001
Copper	Total	mg/L	0.0003	0.0032		0.0001
Iron	Total	mg/L	0.005	1.20		0.002
Lead	Total	mg/L	0.0002	0.0002		0.0001
Lithium	Total	mg/L	0.0006	0.0086		0.0005
Magnesium	Total	mg/L	16.8	28.6		0.04
Manganese	Total	mg/L	<0.001	0.0827		0.001
Molybdenum	Total	mg/L	0.00234	0.00979		0.00005
Nickel	Total	mg/L	<0.0002	0.0616		0.0002
Potassium	Total	mg/L	0.9	2.9		0.1
Selenium	Total	mg/L	0.0004	0.0074		0.0001
Silicon	Total	mg/L	2.40	3.69		0.02
Silver	Total	mg/L	<0.00005	<0.00005		0.0005
Sodium	Total	mg/L	0.5	7.1		0.1
Strontium	Total	mg/L	0.0803	0.358		0.0001
Thallium	Total	mg/L	<0.00001	0.00005		0.00001
Thorium	Total	mg/L	0.00001	0.00002		0.00001
Tin	Total	mg/L	<0.0001	<0.0001		0.0001
Titanium	Total	mg/L	<0.0005	0.0012		0.0005
Uranium	Total	mg/L	0.00188	0.0138		0.00001
Vanadium	Total	mg/L	<0.0001	0.0007		0.0001
Zinc	Total	mg/L	0.0047	0.259		0.0005
Zirconium	Total	mg/L	<0.0005	<0.0005		0.0005
Hardness	as CaCO3	mg/L	216	410		1
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2	4		2
Solids	Total Dissolved	mg/L	208	442		5

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Analytical Report

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**915796**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	A246264
	Box 20913	Name:	Rau Project	Date Received:	Jan 18, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Jan 24, 2013
	Y1A 6P2	LSD:		Report Number:	1798962
Attn:	John Gibson	P.O.:			
Sampled By:	J Gibson	Acct code:			
Company:					

		Reference Number	915796-4	915796-5		
		Sample Date	Jan 16, 2013	Jan 16, 2013		
		Sample Time	NA	NA		
		Sample Location				
		Sample Description	RAU #12 / Surface Water	RAU #13 / Surface Water		
		Matrix	Water	Water		
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water						
pH	at 25 °C		7.95	7.92		
Electrical Conductivity		µS/cm at 25 C	365	700		1
Calcium	Dissolved	mg/L	61.6	123		0.1
Iron	Dissolved	mg/L	<0.005	0.015		0.005
Magnesium	Dissolved	mg/L	17.0	29.0		0.1
Manganese	Dissolved	mg/L	<0.001	0.071		0.001
Potassium	Dissolved	mg/L	1.0	2.7		0.1
Silicon	Dissolved	mg/L	2.25	3.36		0.05
Sodium	Dissolved	mg/L	0.5	5.8		0.1
Bicarbonate		mg/L	212	318		5
Carbonate		mg/L	<6	<6		6
Hydroxide		mg/L	<5	<5		5
P-Alkalinity	as CaCO3	mg/L	<5	<5		5
T-Alkalinity	as CaCO3	mg/L	174	261		5
Chloride	Dissolved	mg/L	0.06	13.6		0.05
Nitrate - N	Dissolved	mg/L	0.41	0.22		0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01		0.01
Sulfate (SO4)	Dissolved	mg/L	27.2	124		0.5
Hardness	as CaCO3	mg/L	224	428		5

Approved by:

Aaron Zentner, B.SC., P.Chem.
Team Leader - Organics

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Methodology and Notes

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	Rau Project
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J Gibson	Acct code:	
Company:			

Lot ID:	**915796**
Control Number:	A246264
Date Received:	Jan 18, 2013
Date Reported:	Jan 24, 2013
Report Number:	1798962

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water (Surrey)	APHA	* Alkalinity - Titration Method, 2320 B	21-Jan-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	* Conductivity, 2510 B	21-Jan-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	* pH - Electrometric Method, 4500-H+ B	21-Jan-13	Exova Surrey
Ammonia-N in Water (Surrey)	APHA	* Flow Injection Analysis, 4500-NH3 H	22-Jan-13	Exova Surrey
Anions by IEC in water (Surrey)	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	19-Jan-13	Exova Surrey
BC ICP-MS Total Metals in Water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	22-Jan-13	Exova Edmonton
BC Trace Total Metals in Water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	22-Jan-13	Exova Edmonton
Carbon Organic (Total) in water (TOC)	APHA	High-Temperature Combustion Method, 5310 B	21-Jan-13	Exova Edmonton
Cyanide (Total) in water	US EPA	* US EPA method, 335.3	21-Jan-13	Exova Edmonton
Mercury (Total) in water	US EPA	* Determination of Hg in Sediment by Cold Vapor Atomic Absorption Spec, 245.5	22-Jan-13	Exova Edmonton
Metals SemiTrace (Dissolved) in water (Surrey)	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	21-Jan-13	Exova Surrey
Phosphorus - total (low level) - Surrey	APHA	* Preliminary Acid Hydrolysis, Ascorbic Acid Reduction Method, 4500-P B,E	22-Jan-13	Exova Surrey
Solids Dissolved (Total, Fixed and Volatile) - Surrey	APHA	* Total Dissolved Solids Dried at 180 C, 2540 C	19-Jan-13	Exova Surrey
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105'C, 2540 D	19-Jan-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	21-Jan-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	21-Jan-13	Exova Surrey

** Reference Method Modified*

References

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

Comments:

- Analysis was performed on samples 915796-1 to 5 that exceeded the recommended holding time for Total Phosphorus analysis.

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Methodology and Notes

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	Rau Project
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J Gibson	Acct code:	
Company:			

Lot ID:	**915796**
Control Number:	A246264
Date Received:	Jan 18, 2013
Date Reported:	Jan 24, 2013
Report Number:	1798962

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.
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LOT: 915796 COC

umber A246264

ental Sample Information Sheet

pletion of this form is required in order to proceed with analysis

See reverse for your nearest Exova location and proper sampling protocol

Billing Address:	Copy of Report:	**Copy of Report To:**	Copy of invoice:
Company:		Company:	Send invoice to this address for approval ☐
Address: J. Gibson & Associates Box 20111 Whitehorse, YT Y1A 7A2	QA/QC Report ☐	Address:	
Attention: John Gibson	Report Result: e-mail ☐ Results Online ☐	Attention:	Report Result: e-mail ☐ Results Online ☐
Phone: (867)633-4522	Fax ☐	Phone:	Fax ☐
Fax:	Mail ☐	Fax:	Mail ☐
Cell: (867)668-6895		Cell:	
e-mail:		e-mail:	

Information to be included on Report and Invoice

Project ID: ATAC RESOURCES
Project Name: RAU PROJECT
Project Location:
Legal Location:
PO#:
Proj. Acct. Code: 6646
Agreement ID:

PRIORITY

Please contact laboratory prior to submitting any RUSH samples.

Upon filling out this section, client accepts that surcharges will be applied to this analysis.

If not all samples require RUSH, please indicate in special instructions.

Date Required: _____
Signature: _____

Sample Custody (Please Print)
Sampled by: JGIBSON
Company Signature

I authorize Exova to proceed with the work indicated on this form:
Date Initial:

RECEIVED
JAN 18 2012

Received by: Sample Temp. 14.5°C
Waybill #: Date
Company Time

Special Instructions / Comments

RCHEM = pH, EC, TP, N_2:N_3, TALK, Cl, SO_4, HARDT, TSS, TDS.
TW23 field filtered, METALS + NITRIC
TOC + HCl, TCN + NaOH, NH_4 + SULPHURIC

Please indicate which regulations you are required to meet:
☐ Health Canada Drinking Water Quality
☐ Alberta Tier 1
☐ Other: _____

Sample Identification	Location	Depth IN CM M	Date/Time Sampled	Matrix	Sampling Method	Number of Containers	RCHEM	NH4	TOC	TW23+ TMs	TW23+	TCN	Enter tests above (✓ relevant samples below)
RAU #3	SURFACE H2O		Jan 16	H2O	Grab	6	✓	✓	✓	✓	✓	✓	
RAU #4	↓		↓	↓	↓	6	✓	✓	✓	✓	✓	✓	
RAU #10						6	✓	✓	✓	✓	✓	✓	
RAU #12						6	✓	✓	✓	✓	✓	✓	
RAU #13						6	✓	✓	✓	✓	✓	✓	

NOTE: All hazardous samples must be labeled according to WHMIS guidelines.

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Report Transmission Cover Page

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**923593**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	A246269
	Box 20913	Name:	RAU Project	Date Received:	Mar 5, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Mar 11, 2013
	Y1A 6P2	LSD:		Report Number:	1808915
Attn:	John Gibson	P.O.:			
Sampled By:	R.Gibson	Acct code:			
Company:					

Contact & Affiliation	Address	Delivery Commitments
John Gibson J. Gibson & Associates	, Box 20913 Whitehorse, Yukon Territory Y1A 6P2 Phone: (867) 633-4522 Fax: (867) 668-6895 Email: ludditegibson@gmail.com	On [Lot Verification] send (COA) by Email - Single Report On [Report Approval] send (COC, Test Report) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report On [Lot Creation] send (COR) by Email - Single Report

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: R.Gibson
Company:

Project:
ID: ATAC Resources
Name: RAU Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **923593**
Control Number: A246269
Date Received: Mar 5, 2013
Date Reported: Mar 11, 2013
Report Number: 1808915

			Reference Number	923593-1	923593-2	923593-3	
			Sample Date	Mar 02, 2013	Mar 02, 2013	Mar 02, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	RAU # 10 / Surface	RAU # 13 / Surface	RAU # 4 / Surface	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters							
Organic Carbon	Total Nonpurgeable	mg/L		0.6	0.9	0.5	0.5
Cyanide	Total	mg/L		<0.002	<0.002	<0.002	0.002
Phosphorus	Total	mg/L		0.019	0.034	0.007	0.003
Ammonia - N		mg/L		<0.01	0.14	0.12	.01
Metals Dissolved							
Sulfur	Dissolved	mg/L		16.9	37.6	10.4	0.2
Aluminum	Dissolved	mg/L		<0.005	0.010	<0.005	0.005
Antimony	Dissolved	mg/L		0.0003	0.0004	<0.0002	0.0002
Arsenic	Dissolved	mg/L		<0.0002	0.0004	0.0016	0.0002
Barium	Dissolved	mg/L		0.074	0.087	0.115	0.001
Beryllium	Dissolved	mg/L		<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L		<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L		0.005	0.032	<0.004	0.004
Cadmium	Dissolved	mg/L		0.00002	0.00088	0.00005	0.00001
Chromium	Dissolved	mg/L		0.0012	0.0013	0.0010	0.0004
Cobalt	Dissolved	mg/L		0.00007	0.00086	<0.00002	0.00002
Copper	Dissolved	mg/L		<0.001	<0.001	<0.001	0.001
Lead	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L		0.003	0.009	0.001	0.001
Molybdenum	Dissolved	mg/L		0.00094	0.00882	0.00116	0.0001
Nickel	Dissolved	mg/L		0.002	0.058	<0.001	0.001
Selenium	Dissolved	mg/L		<0.0006	0.0066	<0.0006	0.0006
Silver	Dissolved	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L		<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L		0.165	0.333	0.072	0.001
Tellurium	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L		<0.00001	0.00005	<0.00001	0.00001
Thorium	Dissolved	mg/L		<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L		0.0014	0.0127	0.0028	0.0004
Vanadium	Dissolved	mg/L		0.00032	0.00047	0.00032	0.0001
Zinc	Dissolved	mg/L		0.001	0.187	0.010	0.001
Zirconium	Dissolved	mg/L		<0.00010	0.00025	<0.00010	0.0001
Metals Total							
Mercury	Total	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Aluminum	Total	mg/L		<0.005	0.071	0.025	0.005

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ID: ATAC Resources
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Acct code:

Lot ID: **923593**
Control Number: A246269
Date Received: Mar 5, 2013
Date Reported: Mar 11, 2013
Report Number: 1808915

		Reference Number	923593-1	923593-2	923593-3	
		Sample Date	Mar 02, 2013	Mar 02, 2013	Mar 02, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	RAU # 10 / Surface	RAU # 13 / Surface	RAU # 4 / Surface	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued						
Antimony	Total	mg/L	<0.0001	0.0002	<0.0001	0.0001
Arsenic	Total	mg/L	0.00021	0.00211	0.00169	0.00005
Barium	Total	mg/L	0.0799	0.0975	0.120	0.00005
Beryllium	Total	mg/L	<0.00005	0.00007	<0.00005	0.00005
Bismuth	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Boron	Total	mg/L	0.006	0.028	0.003	.002
Cadmium	Total	mg/L	0.00002	0.00126	0.00005	0.00001
Calcium	Total	mg/L	58.0	111	53.4	0.05
Chromium	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Cobalt	Total	mg/L	<0.0001	0.0009	<0.0001	0.0001
Copper	Total	mg/L	0.0005	0.0031	0.0003	0.0001
Iron	Total	mg/L	0.020	1.36	0.064	0.002
Lead	Total	mg/L	<0.0001	0.0002	0.0001	0.0001
Lithium	Total	mg/L	0.0027	0.0080	0.0009	0.0005
Magnesium	Total	mg/L	23.6	26.7	20.5	0.04
Manganese	Total	mg/L	0.0044	0.0782	0.0082	0.001
Molybdenum	Total	mg/L	0.00161	0.0100	0.00173	0.00005
Nickel	Total	mg/L	0.0013	0.0597	0.0020	0.0002
Potassium	Total	mg/L	0.6	2.8	0.7	0.1
Selenium	Total	mg/L	0.0008	0.0065	0.0005	0.0001
Silicon	Total	mg/L	2.79	3.51	2.71	0.02
Silver	Total	mg/L	<0.00005	<0.00005	<0.00005	0.0005
Sodium	Total	mg/L	2.4	6.8	0.5	0.1
Strontium	Total	mg/L	0.172	0.346	0.0732	0.0001
Thallium	Total	mg/L	<0.00001	0.00005	<0.00001	0.00001
Thorium	Total	mg/L	0.00001	0.00004	0.00001	0.00001
Tin	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Titanium	Total	mg/L	<0.0005	0.0011	0.0012	0.0005
Uranium	Total	mg/L	0.00140	0.0130	0.00273	0.00001
Vanadium	Total	mg/L	<0.0001	0.0017	0.0002	0.0001
Zinc	Total	mg/L	0.0020	0.258	0.0128	0.0005
Zirconium	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Hardness	as CaCO3	mg/L	242	387	218	1
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2	10	<2	2
Solids	Total Dissolved	mg/L	262	454	224	5

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: R.Gibson
Company:

Project:
ID: ATAC Resources
Name: RAU Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **923593**
Control Number: A246269
Date Received: Mar 5, 2013
Date Reported: Mar 11, 2013
Report Number: 1808915

		Reference Number	923593-1	923593-2	923593-3	
		Sample Date	Mar 02, 2013	Mar 02, 2013	Mar 02, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	RAU # 10 / Surface	RAU # 13 / Surface	RAU # 4 / Surface	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water						
pH	at 25 °C		7.95	7.94	8.19	
Electrical Conductivity		µS/cm at 25 C	341	565	319	1
Calcium	Dissolved	mg/L	58.0	114	54.7	0.1
Iron	Dissolved	mg/L	<0.005	0.026	<0.005	0.005
Magnesium	Dissolved	mg/L	23.8	27.6	21.3	0.1
Manganese	Dissolved	mg/L	0.004	0.065	0.001	0.001
Potassium	Dissolved	mg/L	0.6	2.6	0.7	0.1
Silicon	Dissolved	mg/L	2.59	3.16	2.54	0.05
Sodium	Dissolved	mg/L	2.1	5.9	0.5	0.1
Bicarbonate		mg/L	224	316	221	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	183	260	182	5
Chloride	Dissolved	mg/L	1.40	12.5	0.11	0.05
Nitrate - N	Dissolved	mg/L	0.16	0.22	0.39	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	0.10	0.01
Sulfate (SO4)	Dissolved	mg/L	50.1	117	30.9	0.5
Hardness	as CaCO3	mg/L	243	398	224	5

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: R.Gibson
Company:

Project:
ID: ATAC Resources
Name: RAU Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **923593**
Control Number: A246269
Date Received: Mar 5, 2013
Date Reported: Mar 11, 2013
Report Number: 1808915

	Reference Number	923593-4	923593-5	923593-6	
	Sample Date	Mar 02, 2013	Mar 02, 2013	Mar 02, 2013	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	RAU # 5 / Surface	RAU # 7 / Surface	RAU # 1 / Surface	
	Matrix	Water	Water	Water	
Analyte	**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters					
Organic Carbon Total Nonpurgeable	mg/L	1.7	0.5	0.7	0.5
Cyanide Total	mg/L	<0.002	<0.002	<0.002	0.002
Phosphorus Total	mg/L	0.104	0.004	0.004	0.003
Ammonia - N	mg/L	0.13	0.16	<0.01	.01
Metals Dissolved					
Sulfur Dissolved	mg/L	15.6	13.7	15.8	0.2
Aluminum Dissolved	mg/L	<0.005	0.009	<0.005	0.005
Antimony Dissolved	mg/L	0.0008	<0.0002	<0.0002	0.0002
Arsenic Dissolved	mg/L	0.0004	0.0003	<0.0002	0.0002
Barium Dissolved	mg/L	0.131	0.158	0.083	0.001
Beryllium Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron Dissolved	mg/L	<0.004	<0.004	<0.004	0.004
Cadmium Dissolved	mg/L	0.00083	0.00004	0.00008	0.00001
Chromium Dissolved	mg/L	0.0017	0.0012	0.0011	0.0004
Cobalt Dissolved	mg/L	0.00007	0.00014	0.00018	0.00002
Copper Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Lead Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium Dissolved	mg/L	0.003	<0.001	0.002	0.001
Molybdenum Dissolved	mg/L	0.00573	0.00022	0.00182	0.0001
Nickel Dissolved	mg/L	0.017	<0.001	0.001	0.001
Selenium Dissolved	mg/L	0.0046	<0.0006	0.0038	0.0006
Silver Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium Dissolved	mg/L	0.207	0.044	0.140	0.001
Tellurium Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium Dissolved	mg/L	0.00001	<0.00001	<0.00001	0.00001
Thorium Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium Dissolved	mg/L	0.0122	0.0017	0.0021	0.0004
Vanadium Dissolved	mg/L	0.00067	0.00042	0.00037	0.0001
Zinc Dissolved	mg/L	0.111	0.011	0.006	0.001
Zirconium Dissolved	mg/L	0.00011	<0.00010	<0.00010	0.0001
Metals Total					
Mercury Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Aluminum Total	mg/L	0.358	0.006	0.017	0.005

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Analytical Report

Bill To: J. Gibson & Associates
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Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: R.Gibson
Company:

Project:
ID: ATAC Resources
Name: RAU Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **923593**
Control Number: A246269
Date Received: Mar 5, 2013
Date Reported: Mar 11, 2013
Report Number: 1808915

		Reference Number	923593-4	923593-5	923593-6	
		Sample Date	Mar 02, 2013	Mar 02, 2013	Mar 02, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	RAU # 5 / Surface	RAU # 7 / Surface	RAU # 1 / Surface	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued						
Antimony	Total	mg/L	0.0009	<0.0001	<0.0001	0.0001
Arsenic	Total	mg/L	0.00165	0.00029	0.00020	0.00005
Barium	Total	mg/L	0.182	0.153	0.115	0.00005
Beryllium	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Bismuth	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Boron	Total	mg/L	0.003	0.002	0.003	.002
Cadmium	Total	mg/L	0.00182	0.00004	0.00008	0.00001
Calcium	Total	mg/L	98.3	47.0	68.7	0.05
Chromium	Total	mg/L	0.0011	<0.0005	<0.0005	0.0005
Cobalt	Total	mg/L	0.0009	<0.0001	<0.0001	0.0001
Copper	Total	mg/L	0.0048	0.0002	0.0011	0.0001
Iron	Total	mg/L	1.19	0.014	0.024	0.002
Lead	Total	mg/L	0.0022	0.0002	0.0002	0.0001
Lithium	Total	mg/L	0.0026	0.0005	0.0022	0.0005
Magnesium	Total	mg/L	35.6	24.9	7.82	0.04
Manganese	Total	mg/L	0.0574	0.0011	0.0080	0.001
Molybdenum	Total	mg/L	0.00648	0.00069	0.00246	0.00005
Nickel	Total	mg/L	0.0326	0.0028	0.0007	0.0002
Potassium	Total	mg/L	1.3	0.2	0.4	0.1
Selenium	Total	mg/L	0.0046	0.0003	0.0038	0.0001
Silicon	Total	mg/L	4.13	2.22	3.30	0.02
Silver	Total	mg/L	<0.00005	<0.00005	<0.00005	0.0005
Sodium	Total	mg/L	1.1	0.4	1.6	0.1
Strontium	Total	mg/L	0.229	0.0424	0.147	0.0001
Thallium	Total	mg/L	0.00006	<0.00001	0.00001	0.00001
Thorium	Total	mg/L	0.00004	<0.00001	<0.00001	0.00001
Tin	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Titanium	Total	mg/L	0.0135	<0.0005	<0.0005	0.0005
Uranium	Total	mg/L	0.0129	0.00168	0.00216	0.00001
Vanadium	Total	mg/L	0.0034	0.0001	0.0002	0.0001
Zinc	Total	mg/L	0.222	0.0054	0.0162	0.0005
Zirconium	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Hardness	as CaCO3	mg/L	392	220	204	1
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	77	4	<2	2
Solids	Total Dissolved	mg/L	378	234	228	5

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Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: R.Gibson
Company:

Project:
ID: ATAC Resources
Name: RAU Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **923593**
Control Number: A246269
Date Received: Mar 5, 2013
Date Reported: Mar 11, 2013
Report Number: 1808915

		Reference Number	923593-4	923593-5	923593-6	
		Sample Date	Mar 02, 2013	Mar 02, 2013	Mar 02, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	RAU # 5 / Surface	RAU # 7 / Surface	RAU # 1 / Surface	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water						
pH	at 25 °C		7.69	8.16	8.00	
Electrical Conductivity		µS/cm at 25 C	529	336	302	1
Calcium	Dissolved	mg/L	95.0	49.2	69.9	0.1
Iron	Dissolved	mg/L	0.043	0.011	<0.005	0.005
Magnesium	Dissolved	mg/L	33.1	25.4	8.03	0.1
Manganese	Dissolved	mg/L	0.006	0.002	0.003	0.001
Potassium	Dissolved	mg/L	1.1	0.2	0.3	0.1
Silicon	Dissolved	mg/L	3.21	2.14	3.11	0.05
Sodium	Dissolved	mg/L	0.9	0.5	1.3	0.1
Bicarbonate		mg/L	381	213	177	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	312	175	145	5
Chloride	Dissolved	mg/L	0.08	0.20	0.16	0.05
Nitrate - N	Dissolved	mg/L	0.20	0.48	0.32	0.01
Nitrite - N	Dissolved	mg/L	0.24	0.18	0.13	0.01
Sulfate (SO4)	Dissolved	mg/L	44.1	40.1	46.2	0.5
Hardness	as CaCO3	mg/L	374	228	208	5

Approved by:

Mathieu Simoneau
Operations Manager

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Methodology and Notes

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	RAU Project
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	R.Gibson	Acct code:	
Company:			

Lot ID:	**923593**
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Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water (Surrey)	APHA	* Alkalinity - Titration Method, 2320 B	06-Mar-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	* Conductivity, 2510 B	06-Mar-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	* pH - Electrometric Method, 4500-H+ B	06-Mar-13	Exova Surrey
Ammonia-N in Water (Surrey)	APHA	* Flow Injection Analysis, 4500-NH3 H	06-Mar-13	Exova Surrey
Anions by IEC in water (Surrey)	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	06-Mar-13	Exova Surrey
BC ICP-MS Total Metals in Water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	07-Mar-13	Exova Edmonton
BC Trace Total Metals in Water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	07-Mar-13	Exova Edmonton
Carbon Organic (Total) in water (TOC)	APHA	High-Temperature Combustion Method, 5310 B	07-Mar-13	Exova Edmonton
Cyanide (Total) in water	US EPA	* US EPA method, 335.3	07-Mar-13	Exova Edmonton
Mercury (Total) in water	US EPA	* Determination of Hg in Sediment by Cold Vapor Atomic Absorption Spec, 245.5	11-Mar-13	Exova Edmonton
Metals SemiTrace (Dissolved) in water (Surrey)	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	05-Mar-13	Exova Surrey
Phosphorus - total (low level) - Surrey	APHA	* Preliminary Acid Hydrolysis, Ascorbic Acid Reduction Method, 4500-P B,E	06-Mar-13	Exova Surrey
Solids Dissolved (Total, Fixed and Volatile) - Surrey	APHA	* Total Dissolved Solids Dried at 180 C, 2540 C	07-Mar-13	Exova Surrey
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105'C, 2540 D	06-Mar-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	05-Mar-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	05-Mar-13	Exova Surrey

** Reference Method Modified*

References

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

Comments:

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Methodology and Notes

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	RAU Project
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	R.Gibson	Acct code:	
Company:			

Lot ID:	**923593**
Control Number:	A246269
Date Received:	Mar 5, 2013
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Report Number:	1808915

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.
The test report shall not be reproduced except in full, without the written approval of the laboratory.

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LOT: 923593 COC

Control Number A246269

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

See reverse for your nearest Exova location and proper sampling protocol

Billing Address:		**Report To:**	Copy of invoice:
Company:		Company:	Send invoice to this address for approval ☐
Address:	J. Gibson & Associates Box 20111 Whitehorse, YT Y1A 7A2	Address:	
	QA/QC Report ☐		03-05-13P03:49 RCVD
Attention:	John Gibson	Attention:	Report Result:
Phone:	(867)633-4522	Phone:	e-mail ☐
Fax:	(867)668-6895	Fax:	Results Online ☐
Cell:		Cell:	Fax ☐
e-mail:	Report Result: e-mail ☐ Results Online ☐ Fax ☐ Mail ☐	e-mail:	Mail ☐

Information to be included on Report and Invoice

Project ID: ATAC RESOURCES
Project Name: RAU PROJECT
Project Location:
Legal Location:
PO#:
Proj. Acct. Code: 6646
Agreement ID:

PRIORITY

Please contact laboratory prior to submitting any RUSH samples.

Upon filling out this section, client accepts that surcharges will be applied to this analysis.

If not all samples require RUSH, please indicate in special instructions.

Date Required: _____
Signature: _____

Sample Custody (Please Print)
Sampled by: RGIBSON
Company _____ Signature Riley Gibson
I authorize Exova to proceed with the work indicated on this form:
Date: March 2/13 Initial: RG
Received by: _____ Sample Temp. 7°C
Waybill #: _____ Date _____
Company _____ Time _____

Special Instructions / Comments

RCHEM=. pH, EC, TP, N2, N3, TALK, CL, SO4, HARDST, TSS, TDS
TW23 field filtered. METALS + NITRIC
TOC + HCL
TCN + NaOH, NH4 + SULFURIC

Please indicate which regulations you are required to meet:
☐ Health Canada Drinking Water Quality
☐ Alberta Tier 1
☐ Other: _____

Sample Identification	Location	Depth IN CM M	Date/Time Sampled	Matrix	Sampling Method	Number of Containers	RCHEM	NH4	TOC	TW24EW + TH2O	TW23EW	TCN	Enter tests above (✓ relevant samples below)
~~RAU~~ # 10	SURFACE		MARCH 2	H2O	GRAB	6	✓	✓	✓	✓	✓	✓	
RAU # 13	↓	/	↓	↓	↓	6	✓	✓	✓	✓	✓	✓	
RAU # 4						6	✓	✓	✓	✓	✓	✓	
RAU # 5						6	✓	✓	✓	✓	✓	✓	
~~RAU~~ # 7						6	✓	✓	✓	✓	✓	✓	
RAU # 1						6	✓	✓	✓	✓	✓	✓	
~~RAU #~~													
~~RAU #~~													
~~RAU #~~													
~~RAU #~~													

NOTE: All hazardous samples must be labeled according to WHMIS guidelines.

Page 1 of 1

OK

APPENDIX 2

Flow Volume Calculations

January and March 2013

Stage Discharge Calculations

Project: **Atac Resources - Rau** **Date:** **10-Jan-13**

Site: **RAU#4**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
0.42	0	0.09	0	0	0
0.6	0.14	0.14	0	0.020	0.0000
0.7	0.13	0.1	0.167	0.013	0.0022
0.8	0.12	0.1	0.423	0.012	0.0051
0.9	0.14	0.1	0.261	0.014	0.0037
1	0.13	0.1	0.423	0.013	0.0055
1.1	0.14	0.1	0.363	0.014	0.0051
1.2	0.14	0.1	0.398	0.014	0.0056
1.3	0.11	0.1	0.406	0.011	0.0045
1.4	0.14	0.1	0.415	0.014	0.0058
1.5	0.14	0.1	0.204	0.014	0.0029
1.6	0.14	0.135	0.295	0.019	0.0056
1.77	0	0.085	0	0.000	0.0000
1.35		1.35			**0.0458**

All velocity readings at 0.6 depth

Staff Gauge: under ice cover

Logger: removed at end of open water season

Channel under ice? complete ice cover - removed for measurement

Method: Price Velocity meter/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Rau** **Date:** **Jan 10,2013**

Site: **RAU#13**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
2.05	0	0.075	0	0	0
2.2	0.14	0.125	0	0.0175	0
2.3	0.18	0.1	0.052	0.018	0.000936
2.4	0.21	0.1	0.64	0.021	0.01344
2.5	0.24	0.1	0.073	0.024	0.001752
2.6	0.26	0.1	0.117	0.026	0.003042
2.7	0.24	0.1	0.17	0.024	0.00408
2.8	0.3	0.1	0.185	0.03	0.00555
2.9	0.32	0.1	0.083	0.032	0.002656
3	0.32	0.1	0.053	0.032	0.001696
3.1	0.3	0.1	0	0.03	0
3.2	0.31	0.1	0	0.031	0
3.3	0.3	0.1	0	0.03	0
3.4	0.3	0.1	0	0.03	0
3.5	0.3	0.125	0	0.0375	0
3.65	0	0.075	0	0	0
1.6		1.6			**0.0332**

All velocity readings at 0.6 depth

Staff Gauge: under ice cover

Data Logger: pulled at end of open water season

Channel under ice? complete ice cover - removed for measurement

Method: Price Velocity meter/ TS Wading Rod

Measurement By: R.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Rau** **Date:** **02-Mar-13**

Site: **RAU#4**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
0	0	0.35	0	0	0
0.7	0.05	0.4	0	0.020	0.0000
0.8	0.05	0.1	0	0.005	0.0000
0.9	0.08	0.1	0.242	0.008	0.0019
1	0.08	0.1	0.217	0.008	0.0017
1.1	0.1	0.1	0.331	0.010	0.0033
1.2	0.12	0.1	0.376	0.012	0.0045
1.3	0.12	0.1	0.36	0.012	0.0043
1.4	0.08	0.1	0.331	0.008	0.0026
1.5	0.08	0.1	0.271	0.008	0.0022
1.6	0.05	0.1	0.323	0.005	0.0016
1.7	0.08	0.1	0.242	0.008	0.0019
1.8	0.08	0.1	0.231	0.008	0.0018
1.9	0.06	0.1	0.221	0.006	0.0013
2	0.06	0.1	0.204	0.006	0.0012
2.1	0.06	0.085	0.196	0.005	0.0010
2.17	0	0.035	0	0.000	0.0000
2.17		2.17			**0.0296**

All velocity readings at 0.6 depth

Staff Gauge: under ice cover

Logger: removed at end of open water season

Channel under ice? complete ice cover - removed for measurement

Method: Price Velocity meter/ TS Wading Rod

Measurement By: R.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Rau** **Date:** **02-Mar-13**

Site: **RAU#13**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
1.7	0	0.05	0	0	0
1.8	0.14	0.1	0.055	0.014	0.0008
1.9	0.18	0.1	0.046	0.018	0.0008
2	0.16	0.1	0.064	0.016	0.0010
2.1	0.18	0.1	0.081	0.018	0.0015
2.2	0.18	0.1	0.083	0.018	0.0015
2.3	0.2	0.1	0.076	0.02	0.0015
2.4	0.2	0.1	0.085	0.02	0.0017
2.5	0.24	0.1	0.081	0.024	0.0019
2.6	0.26	0.1	0.048	0.026	0.0012
2.7	0.28	0.1	0.066	0.028	0.0018
2.8	0.28	0.1	0.048	0.028	0.0013
2.9	0.28	0.1	0.061	0.028	0.0017
3	0.28	0.1	0.067	0.028	0.0019
3.1	0.28	0.1	0.038	0.028	0.0011
3.2	0.26	0.1	0.028	0.026	0.0007
3.3	0.26	0.095	0	0.0247	0
3.39	0	0.045	0	0	0
1.69		1.69			**0.0206**

All velocity readings at 0.6 depth

Staff Gauge: under ice cover

Data Logger: pulled at end of open water season

Channel under ice? complete ice cover - removed for measurement

Method: Price Velocity meter/ TS Wading Rod

Measurement By: R.Gibson

ATAC RESOURCES LTD

RAU PROJECT

ENVIRONMENTAL DATA UPDATE

April and May, 2013

J.Gibson Env. Consulting ***Whitehorse YT***

April and May 2013 – Rau Project Environmental Data Update

Baseline water quality and hydrology data collection continued with "monthly" stations surveyed in April and May, 2013.

In April, three tributary stations (Rau # 4, 12 and 13) and the Beaver River receiving waters station (Rau #10) were sampled for water quality.

In April, Quality Control samples were taken at RAU #4 for total and dissolved metals duplicate samples.

In April, snow surveys were done at Snow #1 and #2 courses.

In April, final repairs to the weather station logger at the airstrip were done and the logger was downloaded.

In May five tributary stations (Rau #3, 4, 11, 12, 13) and the Beaver River receiving waters station (Rau #10) were sampled for water quality.

Water quality data collection consisted of samples for total metals, dissolved metals, total organic carbon, total cyanide and routine chemistry.

Hydrology data collection on both dates consisted of stream flow volume measurements in April at Station Rau #4 and the Beaver River (RAU#10) and in May at Stations RAU #3, #11, #12 and #13.

Data Results

Hydrology April

Hydrology data / stream flow volume measurements in April were at minimum winter flow stage with continuing complete ice cover.

Station RAU#9 remained under thick glacial seepage ice cover.

Rau #11 was "dry" with no surface flow with no channel ice.

RAU #12 had surface flow at less than 1 liter per second with 0.8 meters ice cover.

Hydrology May

Stream flow measurements in May were done at Stations RAU#4 and #13 with flow estimates at RAU#11 and #12.

All stream channels were in early freshet / mid range flow volumes with increasing stage.

Channels at RAU#1, #11 and #12 remained under complete ice or snow cover. RAU#4 and #13 were ice free at cross sections. Station RAU#3 was under partial ice cover with flows on top of channel base ice in sections.

Water Level and barometric pressure data loggers were installed at Stations RAU#1, #4, #11, #12 and #13.

Flow measurement results are listed with Routine Chemistry analysis results. A summary of stream flow volumes from March 2011 to May 2013 are listed in Table 4.

Beaver River Ice Profile

The Beaver River near the old winter trail crossing was drilled in January for ice/water depths. The crossing was re drilled in April. Results are listed in the following table:

Beaver River Ice Depths

	January 2013		**April 2013**	
Station	**Total Depth (m)**	**Ice Depth (m)**	**Total Depth (m)**	**Ice Depth (m)**
0.0 to 20.0 m	left/east bank			
21.0	1.10	1.10		
24.0	1.0	0.95	1.32	1.0
26.0	1.06	1.0		
27.0	1.04	1.0	1.30	1.10
28.0	1.05	1.0		
29.0	1.20	1.15		
30.0	1.25	1.15	1.32	1.0
32.0	1.26	1.15		
35.0	1.24	1.10	1.3	1.20
36.0	1.22	1.16		
37.0	1.25	1.18		
38.0	1.20	1.14	1.30	1.25
39.0	1.20	1.10		
40.0	1.22	1.04		
41.0	1.21	1.10	1.30	1.25
42.0	1.13	1.10		
43.0	1.11	0.91	1.30	1.30
44.0	0.94	0.92		
46.4	right/west bank 0.65 m vertical bank			

Cross section coordinates 64 12 780
134 42 618

Cross section is located between two rock out crops on the left/east bank. There were sections of open water 60-80 meters upstream of the cross section.

Maximum ice depth had increased from 1.18 meters to 1.25 meters, minimum remained at 1.0 meters.

Maximum water depth increased from 0.11 meters to 0.2 meters. A majority of the water was "standing water" with flow detected between 29.0 and 37.0 meter stations.

Snow Survey Data

Snow surveys at Snow #9 in April 2013 show a 3% decrease in snow depth, an 11% decrease in snow density and a 14% decrease in snow water equivalent compared to April of 2012.

Snow surveys at Snow #8 show a 30% decrease in snow depth, a 2% increase in snow density and a 27% decrease in snow water equivalent compared to March 2012.

2013 snow data is listed in Table 9, a summary of 2010 to 2013 snow data in Table10.

Water Quality

Data is listed in the following tables:

Table 1. April 2013 Routine chemistry analysis results, field measurements and flow volumes

Table 2. April 2013 Total Metals ICP/MS analysis results

Table 3. April 2013 Dissolved Metals ICP/MS analysis results

Table 4. Flow Measurement Summary – RAU Station March 2010 to May 2013

Table 5. Quality Control Sample analysis results – RAU#4 April 2013

Table 6. May 2013 Routine chemistry analysis results, field measurements and flow volumes

Table 7. May 2013 Total Metals ICP/MS analysis results

Table 8. May 2013 Dissolved Metals ICP/MS analysis results

Table 1. ATAC Resources - RAU Claims April, 2013.
Routine Chemistry and Field Measurement Results

		STATIONS								
Parameter	**Unit**	**RAU #1**	**RAU #2**	**RAU #3**	**RAU #4**	**RAU #5**	**RAU #6**	**RAU #7**	**DWQ* G.lines**	**Aquatic** G.lines**
Monitoring Frequency		**Quarterly**	**Quarterly**	**Monthly**	**Monthly**	**Quarterly**	**Not in Use**	**Quarterly**		
pH (field)	ru				8.47					
pH (lab)	ru			No	8.17				6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm			Sample	357					
Water temperature	C				0.6					
Flow Volume(field)	cms				0.0395					
Organic Carbon Total	mg/L				0.6					
Cyanide Total	mg/L				<0.002				0.2	0.005
Phosphorus Total	mg/L				0.015					
Ammonia - N	mg/L				0.01					1.37-2.2
Nitrate - N	mg/L				0.29				10	
Nitrite - N	mg/L				<0.01				1	0.06
T-Alkalinity	mg/L				179					
Chloride	mg/L				0.15				<250	
Sulfate (SO4)	mg/L				33.2					
Hardness	mg CaCO3/L				230				<500	
Total Suspended Solids	mg/L				6					
Total Dissolved Solids	mg/L				226				<500	

All results and limits in mg/L unless noted otherwis. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L
Canadian Water Quality Guidelines

Table 1. ATAC Resources - RAU Claims April, 2013.
Routine Chemistry and Field Measurement Results

Parameter	Unit	STATIONS RAU #8	RAU#9	RAU#10	RAU#11	RAU#12	RAU#13	DWQ* G.lines	Aquatic** G.lines
Monitoring Frequency		**Quarterly**	**Monthly**	**Monthly**	**Monthly**	**Monthly**	**Monthly**		
pH (field)	ru		Heavy	8.12	Dry	8.41	8.35		
pH (lab)	ru		Glacial	7.96		7.96	7.98	6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm		Seepage	396		347	668		
Water temperature	C		Ice	0.4		0.001			
Flow Volume(field)	cms			4.76		0.0	0.2		
Organic Carbon Total	mg/L			0.7		0.7	1		
Cyanide Total	mg/L			<0.002		<0.002	<0.002	0.2	0.005
Phosphorus Total	mg/L			<0.003		0.008	0.024		
Ammonia - N	mg/L			0.02		0.03	0.03		1.37-2.2
Nitrate - N	mg/L			0.2		0.36	0.15	10	
Nitrite - N	mg/L			<0.01		<0.01	<0.10	1	0.06
T-Alkalinity	mg/L			181		178	262		
Chloride	mg/L			1.05		0.26	13	<250	
Sulfate (SO4)	mg/L			56		28.2	113		
Hardness	mg CaCO3/L			248		219	412	<500	
Total Suspended Solids	mg/L			<2		<2	12		
Total Dissolved Solids	mg/L			258		210	468	<500	

All results and limits in mg/L unless noted otherwis. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L

Table 2. ATAC Resources - RAU Claims April, 2013
Total Metals Analysis Results.

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L				53.5					
Iron	mg/L				0.118				0.3	0.3
Magnesium	mg/L				21					
Manganese	mg/L				0.01				0.05	
Potassium	mg/L				0.6					
Silicon	mg/L				2.78					
Sulfur	mg/L									
Sodium	mg/L				<0.2				<200	
Titanium	mg/L				0.0018					
Aluminum	mg/L				0.056					0.1
Antimony	mg/L				<0.0002				0.006	
Arsenic	mg/L				0.00187				0.01	
Barium	mg/L				0.13				1	
Beryllium	mg/L				<0.0001					
Bismuth	mg/L				<0.0002					
Boron	mg/L				<0.004					
Cadmium	mg/L				0.00004				0.005	0.0018
Chromium	mg/L				<0.0010				0.05	0.002
Cobalt	mg/L				<0.0002					
Copper	mg/L				0.0005				1	0.004
Lead	mg/L				0.0003					
Lithium	mg/L				<0.0010					
Mercury	mg/L				<0.0001				0.001	
Molybdenum	mg/L				0.00108					
Nickel	mg/L				<0.0004					0.15
Selenium	mg/L				0.0004				0.01	0.001
Silver	mg/L				<0.0001					0.0001
Strontium	mg/L				0.0703					
Tellurium	mg/L									
Thallium	mg/L				<0.00002					
Thorium	mg/L				<0.00002					
Tin	mg/L				<0.0002					
Uranium	mg/L				0.00297				0.02	
Vanadium	mg/L				0.0004					
Zinc	mg/L				0.0148				<5	0.03
Zirconium	mg/L				<0.001					

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 2. ATAC Resources - RAU Claims April, 2013
Total Metals Analysis Results.

Parameter	Units	RAU #8	RAU#9	RAU#10	RAU #11	RAU#12	RAU#13	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L			59.6		57.8	120		
Iron	mg/L			0.016		0.006	1.63	0.3	0.3
Magnesium	mg/L			24.6		16.5	29.2		
Manganese	mg/L			0.0057		<0.002	0.0835	0.05	
Potassium	mg/L			0.6		0.9	2.9		
Silicon	mg/L			2.9		2.36	3.74		
Sulfur	mg/L								
Sodium	mg/L			2.2		<0.2	7.3	<200	
Titanium	mg/L			<0.0010		<0.001	0.0022		
Aluminum	mg/L			<0.010		<0.010	0.11		0.1
Antimony	mg/L			<0.0002		0.0002	0.0003	0.006	
Arsenic	mg/L			0.00019		0.00836	0.00219	0.01	
Barium	mg/L			0.0827		0.156	0.111	1	
Beryllium	mg/L			<0.00010		<0.00010	0.00013		
Bismuth	mg/L			<0.0002		<0.0002	<0.0002		
Boron	mg/L			<0.004		<0.004	0.034		
Cadmium	mg/L			<0.00002		0.00003	0.00142	0.005	0.0018
Chromium	mg/L			<0.001		<0.001	<0.0010	0.05	0.002
Cobalt	mg/L			<0.0002		<0.0002	0.001		
Copper	mg/L			0.0004		0.0005	0.0036	1	0.004
Lead	mg/L			<0.0002		<0.0002	0.0003		
Lithium	mg/L			0.003		<0.0010	0.0102		
Mercury	mg/L			<0.0001		<0.0001	<0.0001	0.001	
Molybdenum	mg/L			0.0009		0.00217	0.011		
Nickel	mg/L			0.0013		<0.0004	0.0661		0.15
Selenium	mg/L			0.001		0.0004	0.0064	0.01	0.001
Silver	mg/L			<0.0001		<0.0001	<0.0001		0.0001
Strontium	mg/L			0.166		0.0826	0.382		
Tellurium	mg/L								
Thallium	mg/L			<0.00002		<0.00002	0.00006		
Thorium	mg/L			<0.00002		<0.00002	<0.00002		
Tin	mg/L			<0.0002		<0.0002	<0.0002		
Uranium	mg/L			0.00141		0.00193	0.0151	0.02	
Vanadium	mg/L			<0.0002		<0.0002	0.0017		
Zinc	mg/L			0.0026		0.0059	0.294	<5	0.03
Zirconium	mg/L			<0.001		<0.001	<0.0010		

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 3. ATAC Resources - RAU Claims April, 2013.
Dissolved Metals Analysis Results

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7
Calcium	mg/L				56.4			
Iron	mg/L				<0.005			
Magnesium	mg/L				21.6			
Manganese	mg/L				<0.001			
Potassium	mg/L				0.6			
Silicon	mg/L				2.49			
Sodium	mg/L				0.5			
Sulfur	mg/L				10.2			
Aluminum	mg/L				<0.005			
Antimony	mg/L				<0.0002			
Arsenic	mg/L				0.0016			
Barium	mg/L				0.119			
Beryllium	mg/L				<0.00004			
Bismuth	mg/L				<0.001			
Boron	mg/L				<0.004			
Cadmium	mg/L				0.00002			
Chromium	mg/L				0.0009			
Cobalt	mg/L				<0.00002			
Copper	mg/L				<0.001			
Lead	mg/L				<0.0001			
Lithium	mg/L				<0.001			
Molybdenum	mg/L				0.00115			
Nickel	mg/L				<0.001			
Selenium	mg/L				<0.0006			
Silver	mg/L				<0.00001			
Strontium	mg/L				0.066			
Titanium	mg/L				<0.010			
Tellurium	mg/L				<0.0001			
Thallium	mg/L				<0.00001			
Thorium	mg/L				<0.0004			
Tin	mg/L				<0.0001			
Uranium	mg/L				0.0031			
Vanadium	mg/L				0.00032			
Zinc	mg/L				0.013			
Zirconium	mg/L				<0.00010			

Table 3. ATAC Resources - RAU Claims April, 2013.
Dissolved Metals Analysis Results

Parameter	Units	RAU #8	RAU #9	RAU #10	RAU #11	RAU #12	RAU #13
Calcium	mg/L			59.8		59.9	118
Iron	mg/L			0.012		<0.005	0.02
Magnesium	mg/L			23.9		16.9	28.6
Manganese	mg/L			<0.001		<0.001	0.067
Potassium	mg/L			0.6		1	2.6
Silicon	mg/L			2.49		2.12	3.17
Sodium	mg/L			2.1		0.7	6.5
Sulfur	mg/L			15.8		8.7	38.5
Aluminum	mg/L			0.008		<0.005	0.009
Antimony	mg/L			<0.0002		<0.0002	0.0002
Arsenic	mg/L			<0.0002		0.0088	0.0004
Barium	mg/L			0.094		0.141	0.088
Beryllium	mg/L			<0.00004		<0.00004	<0.00004
Bismuth	mg/L			<0.001		<0.001	<0.001
Boron	mg/L			<0.004		<0.004	0.028
Cadmium	mg/L			0.00001		0.00008	0.00088
Chromium	mg/L			0.0011		0.0007	0.0009
Cobalt	mg/L			0.00031		0.00027	0.00036
Copper	mg/L			<0.001		<0.001	<0.001
Lead	mg/L			<0.0001		<0.0001	<0.0001
Lithium	mg/L			0.003		<0.001	0.009
Molybdenum	mg/L			0.00096		0.00219	0.00943
Nickel	mg/L			0.001		<0.001	0.056
Selenium	mg/L			<0.0006		<0.0006	0.006
Silver	mg/L			<0.00001		<0.00001	<0.00001
Strontium	mg/L			0.154		0.076	0.329
Titanium	mg/L			<0.010		<0.010	<0.010
Tellurium	mg/L			<0.0001		<0.0001	<0.0001
Thallium	mg/L			<0.00001		<0.00001	0.00006
Thorium	mg/L			<0.0004		<0.0004	<0.0004
Tin	mg/L			<0.0001		<0.0001	<0.0001
Uranium	mg/L			0.0015		0.002	0.0155
Vanadium	mg/L			0.00031		0.00019	0.00036
Zinc	mg/L			0.007		0.009	0.198
Zirconium	mg/L			<0.00010		<0.00010	0.0006

Table 4. ATAC RESOURCES - Summary of Rau Project Station Flow Volumes 2011-2013

(Cubic meters per second)

	Date																	
Station	**Mar-11**	**May-11**	**May-11**	**Jul-11**	**Aug-11**	**Oct-11**	**Mar-12**	**Apr-12**	**May-12**	**Jun-12**	**Jul-12**	**Sep-12**	**Oct-12**	**Dec-12**	**Jan-13**	**Mar-13**	**Apr-13**	**May-13**
		May-03	*May-28*				€											
Rau #1	0.059	0.046	1.084 1.153	0.626	0.443	0.261	0.01	nr	0.5253	0.6291	0.3773	0.2533	0.1604	nr	nr	nr	nr	nr
Rau #2	nr	nr	0.815	0.411	0.166	0.091	nr	nr	nr	nr	nr	0.0977	nr	nr	nr	nr	nr	nr
Rau #3	nr	nr	0.774	0.485	0.317	nr	0.02		nr	0.4218	0.3497	0.185	0.1282	nr	nr	nr	nr	nr
Rau #4	0.004	0.032	0.093 0.093	0.072	0.081	0.064	0.008	0.0473	0.0976	0.1152	0.0895	0.062	0.0546	0.05 e	0.046	0.0296	0.0395	0.0781
Rau #5	nr	nr	0.036	0.039	0.034	0.018	0.0	nr	0.0728	nr	nr	0.034	nr	nr	nr	nr	nr	nr
Rau #6	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr
Rau #7	0.008	0.011	0.069	0.046	0.035	0.031	0.006	nr	0.0229	nr	nr	0.023	nr	nr	nr	nr	nr	nr
Rau #8	0.006	0.04	0.371	0.413	0.313	0.137	0.005	nr	0.1557	nr	nr	0.179	nr	nr	nr	nr	dry	nr
Rau #9	0.002	0.001 E	0.031	0.021	0.033	0.009	0.002	0.0052	0.0186	0.0463	0.0199	0.0064	0.0188	glacial ice	glacial ice	glacial ice	glacial ice	glacial ice
Rau #10	nr	nr	nr	nr	nr	nr	nr	12.31	nr	nr	nr	nr	nr	nr	nr	nr	4.76	nr
Rau #11								<0.0001	<0.0001	0.0354	0.0092	0.0009	<0.0005	dry	dry	dry	dry	0.002
Rau #12								0.00086	0.0045	0.0103	0.0076	0.0045	0.0036	0.04 e	0.04 e	nr	0.001	0.003
Rau #13								0.0784	0.5546	0.474	0.3597	0.233	0.1864	0.10e	0.033	0.0206		0.584

Table 5. Quality Control Samples April 2013, Rau Claims

Total and Dissolved Metals Analysis - Duplicate Samples

Parameter	Units	RAU #4	RAU #4 Duplicate
		Total Metals	
Calcium	mg/L	53.5	53.6
Iron	mg/L	0.118	0.072
Magnesium	mg/L	21	20.5
Manganese	mg/L	0.01	0.0094
Potassium	mg/L	0.6	0.5
Silicon	mg/L	2.78	2.7
Sulfur	mg/L		
Sodium	mg/L	<0.2	<0.2
Titanium	mg/L	0.0018	0.0016
Aluminum	mg/L	0.056	0.033
Antimony	mg/L	<0.0002	<0.0002
Arsenic	mg/L	0.00187	0.00179
Barium	mg/L	0.13	0.139
Beryllium	mg/L	<0.0001	<0.00010
Bismuth	mg/L	<0.0002	<0.0002
Boron	mg/L	<0.004	<0.004
Cadmium	mg/L	0.00004	0.00006
Chromium	mg/L	<0.0010	<0.001
Cobalt	mg/L	<0.0002	<0.0002
Copper	mg/L	0.0005	0.0006
Lead	mg/L	0.0003	0.0003
Lithium	mg/L	<0.0010	0.0011
Mercury	mg/L	<0.0001	<0.0001
Molybdenum	mg/L	0.00108	0.00114
Nickel	mg/L	<0.0004	<0.0004
Selenium	mg/L	0.0004	0.0004
Silver	mg/L	<0.0001	<0.00010
Strontium	mg/L	0.0703	0.0755
Tellurium	mg/L		
Thallium	mg/L	<0.00002	<0.00002
Thorium	mg/L	<0.00002	<0.00002
Tin	mg/L	<0.0002	<0.0002
Uranium	mg/L	0.00297	0.00312
Vanadium	mg/L	0.0004	0.0003
Zinc	mg/L	0.0148	0.0152
Zirconium	mg/L	<0.001	<0.001

Parameter	Units	RAU #4	RAU #4 Duplicate
		Dissolved Metals	
Calcium	mg/L	56.4	54.9
Iron	mg/L	<0.005	<0.005
Magnesium	mg/L	21.6	21
Manganese	mg/L	<0.001	<0.001
Potassium	mg/L	0.6	0.6
Silicon	mg/L	2.49	2.44
Sodium	mg/L	0.5	0.4
Sulfur	mg/L	10.2	9.9
Aluminum	mg/L	<0.005	<0.005
Antimony	mg/L	<0.0002	<0.0002
Arsenic	mg/L	0.0016	0.0014
Barium	mg/L	0.119	0.112
Beryllium	mg/L	<0.00004	<0.00004
Bismuth	mg/L	<0.001	<0.001
Boron	mg/L	<0.004	<0.004
Cadmium	mg/L	0.00002	0.00003
Chromium	mg/L	0.0009	0.001
Cobalt	mg/L	<0.00002	<0.00002
Copper	mg/L	<0.001	<0.001
Lead	mg/L	<0.0001	<0.0001
Lithium	mg/L	<0.001	<0.001
Molybdenum	mg/L	0.00115	0.00117
Nickel	mg/L	<0.001	<0.001
Selenium	mg/L	<0.0006	<0.0006
Silver	mg/L	<0.00001	<0.00001
Strontium	mg/L	0.066	0.064
Titanium	mg/L	<0.010	<0.010
Tellurium	mg/L	<0.0001	<0.0001
Thallium	mg/L	<0.00001	<0.00001
Thorium	mg/L	<0.0004	<0.0004
Tin	mg/L	<0.0001	<0.0001
Uranium	mg/L	0.0031	0.0032
Vanadium	mg/L	0.00032	0.00033
Zinc	mg/L	0.013	0.012
Zirconium	mg/L	<0.00010	<0.00010

Denote >10% variation between samples

Table 6. ATAC Resources - RAU Claims May, 2013.
Routine Chemistry and Field Measurement Results

		STATIONS								
Parameter	**Unit**	**RAU #1**	**RAU #2**	**RAU #3**	**RAU #4**	**RAU #5**	**RAU #6**	**RAU #7**	**DWQ* G.lines**	**Aquatic** G.lines**
Monitoring Frequency		**Quarterly**	**Quarterly**	**Monthly**	**Monthly**	**Quarterly**	**Not in Use**	**Quarterly**		
pH (field)	ru			8.51	8.46					
pH (lab)	ru			7.42	7.9				6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm			111	311					
Water temperature	C			-0.2	0.5					
Flow Volume(field)	cms				0.0781					
Organic Carbon Total	mg/L			26.6	9.8					
Cyanide Total	mg/L			<0.002	<0.002				0.2	0.005
Phosphorus Total	mg/L			0.029	0.013					
Ammonia - N	mg/L			<0.01	0.02					1.37-2.2
Nitrate - N	mg/L			0.04	0.19				10	
Nitrite - N	mg/L			<0.01	<0.01				1	0.06
T-Alkalinity	mg/L			47	138					
Chloride	mg/L			0.18	0.23				<250	
Sulfate (SO4)	mg/L			6.8	25.2					
Hardness	mg CaCO3/L			64	172				<500	
Total Suspended Solids	mg/L			14	3					
Total Dissolved Solids	mg/L			82	174				<500	

All results and limits in mg/L unless noted otherwis. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L
Canadian Water Quality Guidelines

Table 6. ATAC Resources - RAU Claims May, 2013.
Routine Chemistry and Field Measurement Results

Parameter	Unit	STATIONS RAU #8	RAU#9	RAU#10	RAU#11	RAU#12	RAU#13	DWQ* G.lines	Aquatic** G.lines
Monitoring Frequency		**Quarterly**	**Monthly**	**Monthly**	**Monthly**	**Monthly**	**Monthly**		
pH (field)	ru		Heavy	7.98	8.16	8.52	7.95		
pH (lab)	ru		Glacial	7.6	7.61	7.82	7.58	6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm		Seepage	178	141	258	161		
Water temperature	C		Ice	0.2	-0.1	0.3	0.4		
Flow Volume(field)	cms				0.001	0.002	0.5838		
Organic Carbon Total	mg/L			15.8	25	6.9	24.8		
Cyanide Total	mg/L			<0.002	<0.002	<0.002	<0.002	0.2	0.005
Phosphorus Total	mg/L			0.038	0.017	0.007	0.167		
Ammonia - N	mg/L			0.02	0.02	<0.01	0.03		1.37-2.2
Nitrate - N	mg/L			0.06	0.02	0.16	0.03	10	
Nitrite - N	mg/L			<0.01	<0.01	<0.01	<0.01	1	0.06
T-Alkalinity	mg/L			72	70	126	63		
Chloride	mg/L			0.29	0.26	0.21	1.19	<250	
Sulfate (SO4)	mg/L			17.7	2.7	12.9	14.6		
Hardness	mg CaCO3/L			99	80	141	85	<500	
Total Suspended Solids	mg/L			48	<2	<2	117		
Total Dissolved Solids	mg/L			112	104	140	112	<500	

All results and limits in mg/L unless noted otherwis. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L

Table 7. ATAC Resources - RAU Claims May, 2013
Total Metals Analysis Results.

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L			18.3	44.9					
Iron	mg/L			0.896	0.128				0.3	0.3
Magnesium	mg/L			4.72	16.3					
Manganese	mg/L			0.0335	0.011				0.05	
Potassium	mg/L			1.7	1.3					
Silicon	mg/L			2.5	2.26					
Sulfur	mg/L									
Sodium	mg/L			0.3	0.4				<200	
Titanium	mg/L			0.0126	0.0026					
Aluminum	mg/L			0.594	0.072					0.1
Antimony	mg/L			<0.0002	<0.0002				0.006	
Arsenic	mg/L			0.0014	0.00185				0.01	
Barium	mg/L			0.0539	0.104				1	
Beryllium	mg/L			<0.00010	<0.00010					
Bismuth	mg/L			<0.0002	<0.0002					
Boron	mg/L			0.009	<0.004					
Cadmium	mg/L			0.00016	0.00005				0.005	0.0018
Chromium	mg/L			0.0011	<0.001				0.05	0.002
Cobalt	mg/L			0.0003	<0.0002					
Copper	mg/L			0.0034	0.0015				1	0.004
Lead	mg/L			0.0009	<0.0002					
Lithium	mg/L			<0.0010	0.0011					
Mercury	mg/L			<0.0001	<0.0001				0.001	
Molybdenum	mg/L			0.00108	0.00112					
Nickel	mg/L			0.0025	0.0006					0.15
Selenium	mg/L			0.0004	0.0004				0.01	0.001
Silver	mg/L			<0.0001	<0.0001					0.0001
Strontium	mg/L			0.0245	0.0624					
Tellurium	mg/L									
Thallium	mg/L			0.00003	<0.00002					
Thorium	mg/L			0.00006	<0.00002					
Tin	mg/L			<0.0002	<0.0002					
Uranium	mg/L			0.00039	0.00216				0.02	
Vanadium	mg/L			0.0024	0.0003					
Zinc	mg/L			0.0122	0.0139				<5	0.03
Zirconium	mg/L			<0.0010	<0.001					

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 7. ATAC Resources - RAU Claims May, 2013
Total Metals Analysis Results.

Parameter	Units	RAU #8	RAU#9	RAU#10	RAU #11	RAU#12	RAU#13	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L			26	23.7	43	33.4		
Iron	mg/L			0.97	0.033	0.025	2.7	0.3	0.3
Magnesium	mg/L			9.43	6.3	9.72	9.08		
Manganese	mg/L			0.081	0.0022	0.0032	0.12	0.05	
Potassium	mg/L			1.1	3.6	2.1	2.1		
Silicon	mg/L			2.13	1.18	1.61	3.22		
Sulfur	mg/L								
Sodium	mg/L			0.9	<0.2	0.3	1	<200	
Titanium	mg/L			0.0131	<0.001	<0.0010	0.0287		
Aluminum	mg/L			0.426	0.018	<0.010	0.908		0.1
Antimony	mg/L			<0.0002	<0.0002	<0.0002	0.0002	0.006	
Arsenic	mg/L			0.0008	0.00034	0.00775	0.00406	0.01	
Barium	mg/L			0.0435	0.12	0.106	0.0937	1	
Beryllium	mg/L			<0.00010	<0.00010	<0.00010	<0.00010		
Bismuth	mg/L			<0.0002	<0.0002	<0.0002	<0.0002		
Boron	mg/L			<0.004	<0.004	<0.004	0.007		
Cadmium	mg/L			0.00009	0.00016	0.00002	0.00064	0.005	0.0018
Chromium	mg/L			0.001	<0.001	0.0012	0.0013	0.05	0.002
Cobalt	mg/L			0.0007	<0.0002	<0.0002	0.0014		
Copper	mg/L			0.0033	0.0016	0.0046	0.0082	1	0.004
Lead	mg/L			0.001	<0.0002	<0.0002	0.0031		
Lithium	mg/L			0.0021	<0.001	<0.0010	0.0023		
Mercury	mg/L			<0.0001	<0.0001	<0.0001	<0.0001	0.001	
Molybdenum	mg/L			0.00053	0.00026	0.00153	0.00186		
Nickel	mg/L			0.005	0.0006	<0.0004	0.0145		0.15
Selenium	mg/L			0.0003	<0.0002	0.0002	0.0011	0.01	0.001
Silver	mg/L			<0.0001	<0.0001	<0.0001	<0.00010		0.0001
Strontium	mg/L			0.079	0.0226	0.0573	0.063		
Tellurium	mg/L								
Thallium	mg/L			<0.00002	<0.00002	<0.00002	0.00006		
Thorium	mg/L			0.00011	<0.00002	<0.00002	0.0002		
Tin	mg/L			<0.0002	<0.0002	<0.0002	<0.0002		
Uranium	mg/L			0.0004	0.00008	0.00086	0.00159	0.02	
Vanadium	mg/L			0.0014	<0.0002	0.0002	0.0037		
Zinc	mg/L			0.0138	0.0199	0.005	0.0703	<5	0.03
Zirconium	mg/L			<0.0010	<0.001	<0.001	<0.0010		

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 8. ATAC Resources - RAU Claims May, 2013.
Dissolved Metals Analysis Results

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7
Calcium	mg/L			17.9	42			
Iron	mg/L			0.164	0.023			
Magnesium	mg/L			4.8	16.2			
Manganese	mg/L			0.01	<0.001			
Potassium	mg/L			1.6	1.2			
Silicon	mg/L			1.24	1.97			
Sodium	mg/L			0.3	0.4			
Sulfur	mg/L			2.4	8.7			
Aluminum	mg/L			0.085	0.006			
Antimony	mg/L			<0.0002	<0.0002			
Arsenic	mg/L			0.0007	0.0016			
Barium	mg/L			0.04	0.093			
Beryllium	mg/L			<0.00004	<0.00004			
Bismuth	mg/L			<0.001	<0.001			
Boron	mg/L			<0.004	<0.004			
Cadmium	mg/L			0.00009	0.00003			
Chromium	mg/L			0.0004	0.0008			
Cobalt	mg/L			<0.00002	<0.00002			
Copper	mg/L			0.002	<0.001			
Lead	mg/L			0.0002	<0.0001			
Lithium	mg/L			<0.001	<0.001			
Molybdenum	mg/L			0.00097	0.00107			
Nickel	mg/L			0.002	0.001			
Selenium	mg/L			<0.0006	<0.0006			
Silver	mg/L			<0.00001	<0.00001			
Strontium	mg/L			0.022	0.058			
Titanium	mg/L			<0.010	0.015			
Tellurium	mg/L			<0.0001	<0.0001			
Thallium	mg/L			0.00001	<0.00001			
Thorium	mg/L			<0.0004	<0.0004			
Tin	mg/L			<0.0001	<0.0001			
Uranium	mg/L			0.0004	0.0022			
Vanadium	mg/L			0.00045	0.00036			
Zinc	mg/L			0.004	0.009			
Zirconium	mg/L			0.00049	0.00019			

Table 8 ATAC Resources - RAU Claims May, 2013.
Dissolved Metals Analysis Results

Parameter	Units	RAU #8	RAU #9	RAU #10	RAU #11	RAU #12	RAU #13
Calcium	mg/L			24.5	21.9	40.2	23.5
Iron	mg/L			0.104	0.033	0.015	0.362
Magnesium	mg/L			9.16	6.26	9.77	6.31
Manganese	mg/L			0.026	<0.001	<0.001	0.016
Potassium	mg/L			1	3.4	2	1.7
Silicon	mg/L			1.33	1.11	1.47	1.33
Sodium	mg/L			0.8	0.1	0.3	0.7
Sulfur	mg/L			6.2	1.2	4.6	5.1
Aluminum	mg/L			0.022	0.013	<0.005	0.112
Antimony	mg/L			<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	mg/L			0.0004	0.0004	0.0076	0.0011
Barium	mg/L			0.032	0.109	0.1	0.041
Beryllium	mg/L			<0.00004	<0.00004	<0.00004	<0.00004
Bismuth	mg/L			<0.001	<0.001	<0.001	<0.001
Boron	mg/L			<0.004	<0.004	<0.004	<0.004
Cadmium	mg/L			0.00004	0.00014	0.00002	0.00019
Chromium	mg/L			<0.0004	0.0004	0.0008	0.0005
Cobalt	mg/L			0.00011	<0.00002	<0.00002	0.00029
Copper	mg/L			0.001	0.001	<0.001	0.003
Lead	mg/L			<0.0001	<0.0001	<0.0001	0.0003
Lithium	mg/L			0.001	<0.001	<0.001	0.001
Molybdenum	mg/L			0.00047	0.00032	0.00111	0.00156
Nickel	mg/L			0.003	0.001	0.001	0.008
Selenium	mg/L			<0.0006	<0.0006	<0.0006	<0.0006
Silver	mg/L			<0.00001	<0.00001	<0.00001	<0.00001
Strontium	mg/L			0.074	0.021	0.054	0.049
Titanium	mg/L			<0.010	0.011	0.011	<0.010
Tellurium	mg/L			<0.0001	<0.0001	<0.0001	<0.0001
Thallium	mg/L			<0.00001	<0.00001	<0.00001	0.00001
Thorium	mg/L			<0.0004	<0.0004	<0.0004	<0.0004
Tin	mg/L			<0.0001	<0.0001	<0.0001	<0.0001
Uranium	mg/L			<0.0004	<0.0004	0.0009	0.0014
Vanadium	mg/L			0.00026	0.00027	0.00026	0.00065
Zinc	mg/L			0.003	0.019	0.005	0.028
Zirconium	mg/L			0.00023	0.00025	<0.00010	0.00048

Table 9. ATAC RESOURCES/RAU Claims - Snow Survey Data 2013

Measurement	Snow Site #1 *at RAU #9*			Snow Site #2 *at RAU #8*		
	01-Mar-13	**09-Apr-13**		**01-Mar-13**	**09-Apr-13**	
Snow Depth (cm)	No Survey	71.2		No Survey	61.1	
Snow Density (%)		24.9			21.5	
Snow Water Equiv.(mm)		176			131	
Air temp ©		2			1	
# measurements within 5 % mean density		9 of 10			9 of 10	

Note: Values are mean of 10 measurements per site

Table 10. ATAC RESOURCES/RAU Claims - Snow Survey Data 2010, 2011, 2012

Measurement	Snow Site #1 *at RAU #9*					Snow Site #2 *at RAU #8*			
	27-Mar-10	18-Mar-11	12-Mar-12	28-Apr-12	09-Apr-13	27-Mar-10	18-Mar-11	12-Mar-12	09-Apr-13
Snow Depth (cm)	98.6	97.7	117	73.6	71.2	61.5	71.5	87.1	61.1
Snow Density (%)	20.7	22.3	24.3	27.9	24.9	18.7	20.7	21.0	21.5
Snow Water Equiv.(mm)	204	219	285	205	176	115	148	183	131
Air temp ©	-6.2	-8	-15	4	2	-1.8	-6.8	-12	1
# measurements within 5 % mean density	11 of 11	10 of 10	10 of 10	9 of 10	9 of 10	11 of 11	10 of 11	10 of 10	9 of 10

Note: Values are mean of 10 measurements per site

Table 9. 2013 Snow Survey Data

Table 10. Summary of Snow Survey Data 2010 - 2013

Listed with the water quality analysis results are the ***Canadian Water Quality Guideline*** values for the Protection of Aquatic Life for waters with a pH > 6.5 and a total hardness value of > 180 mg/L as CaC03.

Also listed are the ***Canadian Drinking Water Guideline*** Maximum Acceptable Concentrations (MAC's) for applicable parameters.

All ***Guideline*** metal values are for total metals.

Analysis values that exceed either ***Guideline*** limit are highlighted in yellow.

Laboratory Analytical Reports are contained in Appendix 1.

Water Quality Summary

April 2013

Stations RAU #4, #10 and #12 meet all ***Aquatic and Drinking Water Guidelines*** parameters.

Station RAU #13 exceeds the ***Aquatic Guideline***s for iron, selenium and zinc; and the ***Drinking Water Guidelines*** for iron and manganese.

Stations Rau #1, 2, 3, 6, 7, 8, 9 and11 were not sampled in April 2013.

May 2013

Station RAU #3 exceeds the ***Aquatic Guidelines*** for aluminum and iron and the ***Drinking Water Guidelines*** for iron.

Station RAU #10 exceeds the ***Aquatic Guideline***s for aluminum and iron and the ***Drinking Water Guidelines*** for manganese and iron.

Station RAU #12 exceeds the ***Aquatic Guidelines*** for copper.

Station RAU #13 exceeds the ***Aquatic Guideline***s for iron, aluminum, copper, selenium and zinc and the ***Drinking Water Guidelines*** for iron. Page 20

Station RAU #13 exceeds the ***Aquatic Guideline***s for iron, selenium and zinc; and the ***Drinking Water Guidelines*** for iron and manganese.

Stations Rau #1, 2, 6, 8, and 9 were not sampled in May 2013.

Weather Station Data Logger

The weather station / data logger was downloaded during both April and May 2013 surveys.

All logger systems were functioning.

Appendix #1

Laboratory Analytical Reports

April and May, 2013

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Report Transmission Cover Page

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates Box 20913 Whitehorse, YT, Canada Y1A 6P2	ID: Name: Location: LSD:	ATAC Resources RPG-Rau
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**930179**
Control Number:	A246280
Date Received:	Apr 12, 2013
Date Reported:	Apr 18, 2013
Report Number:	1818052

Contact & Affiliation	Address	Delivery Commitments
John Gibson J. Gibson & Associates	, Box 20913 Whitehorse, Yukon Territory Y1A 6P2 Phone: (867) 633-4522 Fax: (867) 668-6895 Email: ludditegibson@gmail.com	On [Lot Verification] send (COA) by Email - Single Report On [Report Approval] send (COC, Test Report) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report On [Lot Creation] send (COR) by Email - Single Report

Notes To Clients:

- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.

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W: www.exova.com

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Analytical Report

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**930179**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	A246280
	Box 20913	Name:	RPG-Rau	Date Received:	Apr 12, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Apr 18, 2013
	Y1A 6P2	LSD:		Report Number:	1818052
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

	Reference Number	930179-1	930179-2	930179-3	
	Sample Date	Apr 10, 2013	Apr 10, 2013	Apr 10, 2013	
	Sample Time	NA	NA	NA	
	Sample Location	Surface	Surface	Surface	
	Sample Description	Rau #4	Rau #10	Rau #12	
	Matrix	Water	Water	Water	
Analyte	**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters					
Organic Carbon Total Nonpurgeable	mg/L	0.6	0.7	0.7	0.5
Cyanide Total	mg/L	<0.002	<0.002	<0.002	0.002
Phosphorus Total	mg/L	0.015	<0.003	0.008	0.003
Ammonia - N	mg/L	0.01	0.02	0.03	.01
Metals Dissolved					
Sulfur Dissolved	mg/L	10.2	15.8	8.7	0.2
Aluminum Dissolved	mg/L	<0.005	0.008	<0.005	0.005
Antimony Dissolved	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic Dissolved	mg/L	0.0016	<0.0002	0.0088	0.0002
Barium Dissolved	mg/L	0.119	0.094	0.141	0.001
Beryllium Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron Dissolved	mg/L	<0.004	<0.004	<0.004	0.004
Cadmium Dissolved	mg/L	0.00002	0.00001	0.00008	0.00001
Chromium Dissolved	mg/L	0.0009	0.0011	0.0007	0.0004
Cobalt Dissolved	mg/L	<0.00002	0.00031	0.00027	0.00002
Copper Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Lead Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium Dissolved	mg/L	<0.001	0.003	<0.001	0.001
Molybdenum Dissolved	mg/L	0.00115	0.00096	0.00219	0.0001
Nickel Dissolved	mg/L	<0.001	0.001	<0.001	0.001
Selenium Dissolved	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Silver Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium Dissolved	mg/L	0.066	0.154	0.076	0.001
Tellurium Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium Dissolved	mg/L	0.0031	0.0015	0.0020	0.0004
Vanadium Dissolved	mg/L	0.00032	0.00031	0.00019	0.0001
Zinc Dissolved	mg/L	0.013	0.007	0.009	0.001
Zirconium Dissolved	mg/L	<0.00010	<0.00010	<0.00010	0.0001
Metals Total					
Mercury Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Aluminum Total	mg/L	0.056	<0.010	<0.010	0.005

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: RPG-Rau
Location:
LSD:
P.O.:
Acct code:

Lot ID: **930179**
Control Number: A246280
Date Received: Apr 12, 2013
Date Reported: Apr 18, 2013
Report Number: 1818052

			Reference Number	930179-1	930179-2	930179-3	
			Sample Date	Apr 10, 2013	Apr 10, 2013	Apr 10, 2013	
			Sample Time	NA	NA	NA	
			Sample Location	Surface	Surface	Surface	
			Sample Description	Rau #4	Rau #10	Rau #12	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued							
Antimony	Total	mg/L		<0.0002	<0.0002	0.0002	0.0001
Arsenic	Total	mg/L		0.00187	0.00019	0.00836	0.00005
Barium	Total	mg/L		0.130	0.0827	0.156	0.00005
Beryllium	Total	mg/L		<0.0001	<0.00010	<0.00010	0.00005
Bismuth	Total	mg/L		<0.0002	<0.0002	<0.0002	0.0001
Boron	Total	mg/L		<0.004	<0.004	<0.004	.002
Cadmium	Total	mg/L		0.00004	<0.00002	0.00003	0.00001
Calcium	Total	mg/L		53.5	59.6	57.8	0.05
Chromium	Total	mg/L		<0.0010	<0.001	<0.001	0.0005
Cobalt	Total	mg/L		<0.0002	<0.0002	<0.0002	0.0001
Copper	Total	mg/L		0.0005	0.0004	0.0005	0.0001
Iron	Total	mg/L		0.118	0.016	0.006	0.002
Lead	Total	mg/L		0.0003	<0.0002	<0.0002	0.0001
Lithium	Total	mg/L		<0.0010	0.0030	<0.0010	0.0005
Magnesium	Total	mg/L		21.0	24.6	16.5	0.04
Manganese	Total	mg/L		0.010	0.0057	<0.002	0.001
Molybdenum	Total	mg/L		0.00108	0.00090	0.00217	0.00005
Nickel	Total	mg/L		<0.0004	0.0013	<0.0004	0.0002
Potassium	Total	mg/L		0.6	0.6	0.9	0.1
Selenium	Total	mg/L		0.0004	0.0010	0.0004	0.0001
Silicon	Total	mg/L		2.78	2.90	2.36	0.02
Silver	Total	mg/L		<0.0001	<0.0001	<0.0001	0.00005
Sodium	Total	mg/L		<0.2	2.2	<0.2	0.1
Strontium	Total	mg/L		0.0703	0.166	0.0826	0.0001
Thallium	Total	mg/L		<0.00002	<0.00002	<0.00002	0.00001
Thorium	Total	mg/L		<0.00002	<0.00002	<0.00002	0.00001
Tin	Total	mg/L		<0.0002	<0.0002	<0.0002	0.0001
Titanium	Total	mg/L		0.0018	<0.0010	<0.001	0.0005
Uranium	Total	mg/L		0.00297	0.00141	0.00193	0.00001
Vanadium	Total	mg/L		0.0004	<0.0002	<0.0002	0.0001
Zinc	Total	mg/L		0.0148	0.0026	0.0059	0.0005
Zirconium	Total	mg/L		<0.001	<0.001	<0.001	0.0005
Hardness	as CaCO3	mg/L		220	250	212	1
Physical and Aggregate Properties							
Solids	Total Suspended	mg/L		6	<2	<2	2
Solids	Total Dissolved	mg/L		226	258	210	5

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Analytical Report

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**930179**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	A246280
	Box 20913	Name:	RPG-Rau	Date Received:	Apr 12, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Apr 18, 2013
	Y1A 6P2	LSD:		Report Number:	1818052
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

		Reference Number	930179-1	930179-2	930179-3	
		Sample Date	Apr 10, 2013	Apr 10, 2013	Apr 10, 2013	
		Sample Time	NA	NA	NA	
		Sample Location	Surface	Surface	Surface	
		Sample Description	Rau #4	Rau #10	Rau #12	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water						
pH	at 25 °C		8.17	7.96	7.96	
Electrical Conductivity		µS/cm at 25 C	357	396	347	1
Calcium	Dissolved	mg/L	56.4	59.8	59.9	0.1
Iron	Dissolved	mg/L	<0.005	0.012	<0.005	0.005
Magnesium	Dissolved	mg/L	21.6	23.9	16.9	0.1
Manganese	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Potassium	Dissolved	mg/L	0.6	0.6	1.0	0.1
Silicon	Dissolved	mg/L	2.49	2.49	2.12	0.05
Sodium	Dissolved	mg/L	0.5	2.1	0.7	0.1
Bicarbonate		mg/L	218	220	216	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	179	181	178	5
Chloride	Dissolved	mg/L	0.15	1.05	0.26	0.05
Nitrate - N	Dissolved	mg/L	0.29	0.20	0.36	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	33.2	56.0	28.2	0.5
Hardness	as CaCO3	mg/L	230	248	219	5

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Bill To:	J. Gibson & Associates	Project:		Lot ID:	**930179**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	A246280
	Box 20913	Name:	RPG-Rau	Date Received:	Apr 12, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Apr 18, 2013
	Y1A 6P2	LSD:		Report Number:	1818052
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

Reference Number	930179-4
Sample Date	Apr 10, 2013
Sample Time	NA
Sample Location	Surface
Sample Description	Rau #13
Matrix	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	1			0.5
Cyanide	Total	mg/L	<0.002			0.002
Phosphorus	Total	mg/L	0.024			0.003
Ammonia - N		mg/L	0.03			.01
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	12			2
Solids	Total Dissolved	mg/L	468			5

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Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: RPG-Rau
Location:
LSD:
P.O.:
Acct code:

Lot ID: **930179**
Control Number: A246280
Date Received: Apr 12, 2013
Date Reported: Apr 18, 2013
Report Number: 1818052

			Reference Number	930179-4	930179-5		
			Sample Date	Apr 10, 2013	Apr 10, 2013		
			Sample Time	NA	NA		
			Sample Location	Surface	Surface		
			Sample Description	Rau #13	Rau #4 Duplicate		
			Matrix	Water	Water		
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Dissolved							
Sulfur	Dissolved	mg/L		38.5	9.9		0.2
Aluminum	Dissolved	mg/L		0.009	<0.005		0.005
Antimony	Dissolved	mg/L		0.0002	<0.0002		0.0002
Arsenic	Dissolved	mg/L		0.0004	0.0014		0.0002
Barium	Dissolved	mg/L		0.088	0.112		0.001
Beryllium	Dissolved	mg/L		<0.00004	<0.00004		0.00004
Bismuth	Dissolved	mg/L		<0.001	<0.001		0.001
Boron	Dissolved	mg/L		0.028	<0.004		0.004
Cadmium	Dissolved	mg/L		0.00088	0.00003		0.00001
Chromium	Dissolved	mg/L		0.0009	0.0010		0.0004
Cobalt	Dissolved	mg/L		0.00036	<0.00002		0.00002
Copper	Dissolved	mg/L		<0.001	<0.001		0.001
Lead	Dissolved	mg/L		<0.0001	<0.0001		0.0001
Lithium	Dissolved	mg/L		0.009	<0.001		0.001
Molybdenum	Dissolved	mg/L		0.00943	0.00117		0.0001
Nickel	Dissolved	mg/L		0.056	<0.001		0.001
Selenium	Dissolved	mg/L		0.0060	<0.0006		0.0006
Silver	Dissolved	mg/L		<0.00001	<0.00001		0.00001
Titanium	Dissolved	mg/L		<0.010	<0.010		0.01
Strontium	Dissolved	mg/L		0.329	0.064		0.001
Tellurium	Dissolved	mg/L		<0.0001	<0.0001		0.0001
Thallium	Dissolved	mg/L		0.00006	<0.00001		0.00001
Thorium	Dissolved	mg/L		<0.0004	<0.0004		0.0004
Tin	Dissolved	mg/L		<0.0001	<0.0001		0.0001
Uranium	Dissolved	mg/L		0.0155	0.0032		0.0004
Vanadium	Dissolved	mg/L		0.00036	0.00033		0.0001
Zinc	Dissolved	mg/L		0.198	0.012		0.001
Zirconium	Dissolved	mg/L		0.00060	<0.00010		0.0001
Metals Total							
Mercury	Total	mg/L		<0.0001	<0.0001		0.0001
Aluminum	Total	mg/L		0.110	0.033		0.005
Antimony	Total	mg/L		0.0003	<0.0002		0.0001
Arsenic	Total	mg/L		0.00219	0.00179		0.00005
Barium	Total	mg/L		0.111	0.139		0.00005
Beryllium	Total	mg/L		0.00013	<0.00010		0.00005
Bismuth	Total	mg/L		<0.0002	<0.0002		0.0001

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: RPG-Rau
Location:
LSD:
P.O.:
Acct code:

Lot ID: **930179**
Control Number: A246280
Date Received: Apr 12, 2013
Date Reported: Apr 18, 2013
Report Number: 1818052

			Reference Number	930179-4	930179-5		
			Sample Date	Apr 10, 2013	Apr 10, 2013		
			Sample Time	NA	NA		
			Sample Location	Surface	Surface		
			Sample Description	Rau #13	Rau #4 Duplicate		
			Matrix	Water	Water		
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued							
Boron	Total	mg/L		0.034	<0.004		.002
Cadmium	Total	mg/L		0.00142	0.00006		0.00001
Calcium	Total	mg/L		120	53.6		0.05
Chromium	Total	mg/L		<0.0010	<0.001		0.0005
Cobalt	Total	mg/L		0.0010	<0.0002		0.0001
Copper	Total	mg/L		0.0036	0.0006		0.0001
Iron	Total	mg/L		1.63	0.072		0.002
Lead	Total	mg/L		0.0003	0.0003		0.0001
Lithium	Total	mg/L		0.0102	0.0011		0.0005
Magnesium	Total	mg/L		29.2	20.5		0.04
Manganese	Total	mg/L		0.0835	0.0094		0.001
Molybdenum	Total	mg/L		0.0110	0.00114		0.00005
Nickel	Total	mg/L		0.0661	<0.0004		0.0002
Potassium	Total	mg/L		2.9	0.5		0.1
Selenium	Total	mg/L		0.0064	0.0004		0.0001
Silicon	Total	mg/L		3.74	2.70		0.02
Silver	Total	mg/L		<0.0001	<0.00010		0.00005
Sodium	Total	mg/L		7.3	<0.2		0.1
Strontium	Total	mg/L		0.382	0.0755		0.0001
Thallium	Total	mg/L		0.00006	<0.00002		0.00001
Thorium	Total	mg/L		<0.00002	<0.00002		0.00001
Tin	Total	mg/L		<0.0002	<0.0002		0.0001
Titanium	Total	mg/L		0.0022	0.0016		0.0005
Uranium	Total	mg/L		0.0151	0.00312		0.00001
Vanadium	Total	mg/L		0.0017	0.0003		0.0001
Zinc	Total	mg/L		0.294	0.0152		0.0005
Zirconium	Total	mg/L		<0.0010	<0.001		0.0005
Hardness	as CaCO3	mg/L		419			1
Routine Water							
pH	at 25 °C			7.98			
Electrical Conductivity		µS/cm at 25 C		668			1
Calcium	Dissolved	mg/L		118	54.9		0.1
Iron	Dissolved	mg/L		0.020	<0.005		0.005
Magnesium	Dissolved	mg/L		28.6	21.0		0.1
Manganese	Dissolved	mg/L		0.067	<0.001		0.001
Potassium	Dissolved	mg/L		2.6	0.6		0.1

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Analytical Report

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**930179**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	A246280
	Box 20913	Name:	RPG-Rau	Date Received:	Apr 12, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Apr 18, 2013
	Y1A 6P2	LSD:		Report Number:	1818052
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

			Reference Number	930179-4	930179-5		
			Sample Date	Apr 10, 2013	Apr 10, 2013		
			Sample Time	NA	NA		
			Sample Location	Surface	Surface		
			Sample Description	Rau #13	Rau #4 Duplicate		
			Matrix	Water	Water		
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water - Continued							
Silicon	Dissolved	mg/L		3.17	2.44		0.05
Sodium	Dissolved	mg/L		6.5	0.4		0.1
Bicarbonate		mg/L		319			5
Carbonate		mg/L		<6			6
Hydroxide		mg/L		<5			5
P-Alkalinity	as CaCO3	mg/L		<5			5
T-Alkalinity	as CaCO3	mg/L		262			5
Chloride	Dissolved	mg/L		13.0			0.05
Nitrate - N	Dissolved	mg/L		0.15			0.01
Nitrite - N	Dissolved	mg/L		<0.10			0.01
Sulfate (SO4)	Dissolved	mg/L		113			0.5
Hardness	as CaCO3	mg/L		412	224		5

Approved by:

Mathieu Simoneau
Operations Manager

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Methodology and Notes

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	RPG-Rau
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**930179**
Control Number:	A246280
Date Received:	Apr 12, 2013
Date Reported:	Apr 18, 2013
Report Number:	1818052

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water (Surrey)	APHA	* Alkalinity - Titration Method, 2320 B	12-Apr-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	* Conductivity, 2510 B	12-Apr-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	* pH - Electrometric Method, 4500-H+ B	12-Apr-13	Exova Surrey
Ammonia-N in Water (Surrey)	APHA	* Flow Injection Analysis, 4500-NH3 H	15-Apr-13	Exova Surrey
Anions by IEC in water (Surrey)	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	12-Apr-13	Exova Surrey
BC ICP-MS Total Metals in Water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	15-Apr-13	Exova Edmonton
BC Trace Total Metals in Water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	15-Apr-13	Exova Edmonton
Carbon Organic (Total) in water (TOC)	APHA	High-Temperature Combustion Method, 5310 B	15-Apr-13	Exova Edmonton
Cyanide (Total) in water	US EPA	* US EPA method, 335.3	17-Apr-13	Exova Edmonton
Mercury (Total) in water	US EPA	* Determination of Hg in Sediment by Cold Vapor Atomic Absorption Spec, 245.5	16-Apr-13	Exova Edmonton
Metals SemiTrace (Dissolved) in water (Surrey)	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	15-Apr-13	Exova Surrey
Phosphorus - total (low level) - Surrey	APHA	* Preliminary Acid Hydrolysis, Ascorbic Acid Reduction Method, 4500-P B,E	15-Apr-13	Exova Surrey
Solids Dissolved (Total, Fixed and Volatile) - Surrey	APHA	* Total Dissolved Solids Dried at 180 C, 2540 C	15-Apr-13	Exova Surrey
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105'C, 2540 D	15-Apr-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	15-Apr-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	15-Apr-13	Exova Surrey

** Reference Method Modified*

References

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

Comments:

- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.

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Methodology and Notes

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	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**930179**
Control Number:	A246280
Date Received:	Apr 12, 2013
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Report Number:	1818052

Please direct any inquiries regarding this report to our Client Services group.
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The test report shall not be reproduced except in full, without the written approval of the laboratory.

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LOT: 930179 COC

Exova

Control Number A246280

Environmental Sample Information Sheet

www.exova.com

Note: Proper completion of this form is required in order to proceed with analysis
See reverse for your nearest Exova location and proper sampling protocol

Billing Address:		Copy of Report:	**Copy of Report To:**		Copy of invoice:
Company:			Company:		Send invoice to this address for approval ☐
Address:	J. Gibson & Associates Box 20111 Whitehorse, YT Y1A 7A2	QA/QC Report ☐	Address:		
		Report Result:		04-12-13P12:30 RCVD	Report Result:
Attention:	John Gibson	e-mail ☐	Attention:		e-mail ☐
Phone:	(867)633-4522	Results Online ☐	Phone:		Results Online ☐
Fax:	(867)668-6895	Fax ☐	Fax:		Fax ☐
Cell:		Mail ☐	Cell:		Mail ☐
e-mail:			e-mail:		

Information to be Included on Report and Invoice

Project ID: ATAC RESOURCES
Project Name: RPG-RAU
Project Location:
Legal Location:
PO#:
Proj. Acct. Code: 6646
Agreement ID:

PRIORITY

Please contact laboratory prior to submitting any RUSH samples.

Upon filling out this section, client accepts that surcharges will be applied to this analysis.

If not all samples require RUSH, please indicate in special instructions.

Date Required: _____
Signature: _____

Sample Custody (Please Print)
Sampled by: J GIBSON
Company _____ Signature

I authorize Exova to proceed with the work indicated on this form:
Date: Apr 8/13 Initial: JG.

Received by:	Sample Temp.
Waybill #:	Date
Company	Time

Special Instructions / Comments
RCHEM = pH, EC, TP, N2, N3, TALK, CL, SO4, HARDT, TSS, TDS
TN23 Field filtered, METALS + NITRIC
TCN + NaOH
TOC + HCL, NH4 + SULFURIC

Please indicate which regulations you are required to meet:
☐ Health Canada Drinking Water Quality
☐ Alberta Tier 1
☐ Other: _____

Sample Identification	Location	Depth IN	Depth CM	Depth M	Date/Time Sampled	Matrix	Sampling Method	Number of Containers	RCHEM	NH4	TOC	TCN	TMETHG+THG	TN23 FLD
									Enter tests above (✓ relevant samples below)					
RAU #4	SURF.		~		Apr 10	H2O	Grab	6	✓	✓	✓	✓	✓	✓
RAU #10	↓				↓	↓	↓	6	✓	✓	✓	✓	✓	✓
RAU #12								4	✓	✓	✓	✓	✓	✓
RAU #13								6	✓	✓	✓	✓	✓	✓
RAU #4 DUPLICATE								2					✓	✓

OK

NOTE: All hazardous samples must be labeled according to WHMIS guidelines.

Page 1 of 1

EDT7-00

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Report Transmission Cover Page

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	RPG-RAU
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**936765**
Control Number:	A246289
Date Received:	May 22, 2013
Date Reported:	May 28, 2013
Report Number:	1828520

Contact & Affiliation	Address	Delivery Commitments
John Gibson J. Gibson & Associates	, Box 20913 Whitehorse, Yukon Territory Y1A 6P2 Phone: (867) 633-4522 Fax: (867) 668-6895 Email: ludditegibson@gmail.com	On [Lot Verification] send (COA) by Email - Single Report On [Report Approval] send (COC, Test Report) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report On [Lot Creation] send (COR) by Email - Single Report

Notes To Clients:

- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.

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Analytical Report

Bill To: J. Gibson & Associates
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Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: RPG-RAU
Location:
LSD:
P.O.:
Acct code:

Lot ID: **936765**
Control Number: A246289
Date Received: May 22, 2013
Date Reported: May 28, 2013
Report Number: 1828520

	Reference Number	936765-1	936765-2	936765-3	
	Sample Date	May 20, 2013	May 20, 2013	May 20, 2013	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Surface / RAU # 3	Surface / RAU # 4	Surface / RAU # 10	
	Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	26.6	9.8	15.8	0.5
Cyanide	Total	mg/L	<0.002	<0.002	<0.002	0.002
Phosphorus	Total	mg/L	0.029	0.013	0.038	0.003
Ammonia - N		mg/L	<0.01	0.02	0.02	.01
Metals Dissolved						
Sulfur	Dissolved	mg/L	2.4	8.7	6.2	0.2
Aluminum	Dissolved	mg/L	0.085	0.006	0.022	0.005
Antimony	Dissolved	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Dissolved	mg/L	0.0007	0.0016	0.0004	0.0002
Barium	Dissolved	mg/L	0.040	0.093	0.032	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	<0.004	<0.004	<0.004	0.004
Cadmium	Dissolved	mg/L	0.00009	0.00003	0.00004	0.00001
Chromium	Dissolved	mg/L	0.0004	0.0008	<0.0004	0.0004
Cobalt	Dissolved	mg/L	<0.00002	<0.00002	0.00011	0.00002
Copper	Dissolved	mg/L	0.002	<0.001	0.001	0.001
Lead	Dissolved	mg/L	0.0002	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L	<0.001	<0.001	0.001	0.001
Molybdenum	Dissolved	mg/L	0.00097	0.00107	0.00047	0.0001
Nickel	Dissolved	mg/L	0.002	0.001	0.003	0.001
Selenium	Dissolved	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L	<0.010	0.015	<0.010	0.01
Strontium	Dissolved	mg/L	0.022	0.058	0.074	0.001
Tellurium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L	0.00001	<0.00001	<0.00001	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L	0.0004	0.0022	<0.0004	0.0004
Vanadium	Dissolved	mg/L	0.00045	0.00036	0.00026	0.0001
Zinc	Dissolved	mg/L	0.004	0.009	0.003	0.001
Zirconium	Dissolved	mg/L	0.00049	0.00019	0.00023	0.0001
Metals Total						
Mercury	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Aluminum	Total	mg/L	0.594	0.072	0.426	0.005

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: RPG-RAU
Location:
LSD:
P.O.:
Acct code:

Lot ID: **936765**
Control Number: A246289
Date Received: May 22, 2013
Date Reported: May 28, 2013
Report Number: 1828520

		Reference Number	936765-1	936765-2	936765-3	
		Sample Date	May 20, 2013	May 20, 2013	May 20, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surface / RAU # 3	Surface / RAU # 4	Surface / RAU # 10	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued						
Antimony	Total	mg/L	<0.0002	<0.0002	<0.0002	0.0001
Arsenic	Total	mg/L	0.00140	0.00185	0.00080	0.00005
Barium	Total	mg/L	0.0539	0.104	0.0435	0.00005
Beryllium	Total	mg/L	<0.00010	<0.00010	<0.00010	0.00005
Bismuth	Total	mg/L	<0.0002	<0.0002	<0.0002	0.0001
Boron	Total	mg/L	0.009	<0.004	<0.004	.002
Cadmium	Total	mg/L	0.00016	0.00005	0.00009	0.00001
Calcium	Total	mg/L	18.3	44.9	26.0	0.05
Chromium	Total	mg/L	0.0011	<0.001	0.0010	0.0005
Cobalt	Total	mg/L	0.0003	<0.0002	0.0007	0.0001
Copper	Total	mg/L	0.0034	0.0015	0.0033	0.0001
Iron	Total	mg/L	0.896	0.128	0.970	0.002
Lead	Total	mg/L	0.0009	<0.0002	0.0010	0.0001
Lithium	Total	mg/L	<0.0010	0.0011	0.0021	0.0005
Magnesium	Total	mg/L	4.72	16.3	9.43	0.04
Manganese	Total	mg/L	0.0335	0.011	0.0810	0.001
Molybdenum	Total	mg/L	0.00108	0.00112	0.00053	0.00005
Nickel	Total	mg/L	0.0025	0.0006	0.0050	0.0002
Potassium	Total	mg/L	1.7	1.3	1.1	0.1
Selenium	Total	mg/L	0.0004	0.0004	0.0003	0.0001
Silicon	Total	mg/L	2.50	2.26	2.13	0.02
Silver	Total	mg/L	<0.0001	<0.0001	<0.0001	0.00005
Sodium	Total	mg/L	0.3	0.4	0.9	0.1
Strontium	Total	mg/L	0.0245	0.0624	0.0790	0.0001
Thallium	Total	mg/L	0.00003	<0.00002	<0.00002	0.00001
Thorium	Total	mg/L	0.00006	<0.00002	0.00011	0.00001
Tin	Total	mg/L	<0.0002	<0.0002	<0.0002	0.0001
Titanium	Total	mg/L	0.0126	0.0026	0.0131	0.0005
Uranium	Total	mg/L	0.00039	0.00216	0.00040	0.00001
Vanadium	Total	mg/L	0.0024	0.0003	0.0014	0.0001
Zinc	Total	mg/L	0.0122	0.0139	0.0138	0.0005
Zirconium	Total	mg/L	<0.0010	<0.001	<0.0010	0.0005
Hardness	as CaCO3	mg/L	65	179	104	1
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	14	3	48	1
Solids	Total Dissolved	mg/L	82	174	112	5

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Lot ID: **936765**
Control Number: A246289
Date Received: May 22, 2013
Date Reported: May 28, 2013
Report Number: 1828520

		Reference Number	936765-1	936765-2	936765-3	
		Sample Date	May 20, 2013	May 20, 2013	May 20, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surface / RAU # 3	Surface / RAU # 4	Surface / RAU # 10	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water						
pH	at 25 °C		7.42	7.90	7.60	
Electrical Conductivity		µS/cm at 25 C	111	311	178	1
Calcium	Dissolved	mg/L	17.9	42.0	24.5	0.1
Iron	Dissolved	mg/L	0.164	0.023	0.104	0.005
Magnesium	Dissolved	mg/L	4.80	16.2	9.16	0.1
Manganese	Dissolved	mg/L	0.010	<0.001	0.026	0.001
Potassium	Dissolved	mg/L	1.6	1.2	1.0	0.1
Silicon	Dissolved	mg/L	1.24	1.97	1.33	0.05
Sodium	Dissolved	mg/L	0.3	0.4	0.8	0.1
Bicarbonate		mg/L	57	169	87	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	47	138	72	5
Chloride	Dissolved	mg/L	0.18	0.23	0.29	0.05
Nitrate - N	Dissolved	mg/L	0.04	0.19	0.06	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	6.8	25.2	17.7	0.5
Hardness	as CaCO3	mg/L	64	172	99	5

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	Reference Number	936765-4	936765-5	936765-6	
	Sample Date	May 20, 2013	May 20, 2013	May 20, 2013	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Surface / RAU # 11	Surface / RAU # 12	Surface / RAU # 13	
	Matrix	Water	Water	Water	
Analyte	**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters					
Organic Carbon Total Nonpurgeable	mg/L	25.0	6.9	24.8	0.5
Cyanide Total	mg/L	<0.002	<0.002	<0.002	0.002
Phosphorus Total	mg/L	0.017	0.007	0.167	0.003
Ammonia - N	mg/L	0.02	<0.01	0.03	.01
Metals Dissolved					
Sulfur Dissolved	mg/L	1.2	4.6	5.1	0.2
Aluminum Dissolved	mg/L	0.013	<0.005	0.112	0.005
Antimony Dissolved	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic Dissolved	mg/L	0.0004	0.0076	0.0011	0.0002
Barium Dissolved	mg/L	0.109	0.10	0.041	0.001
Beryllium Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron Dissolved	mg/L	<0.004	<0.004	<0.004	0.004
Cadmium Dissolved	mg/L	0.00014	0.00002	0.00019	0.00001
Chromium Dissolved	mg/L	0.0004	0.0008	0.0005	0.0004
Cobalt Dissolved	mg/L	<0.00002	<0.00002	0.00029	0.00002
Copper Dissolved	mg/L	0.001	<0.001	0.003	0.001
Lead Dissolved	mg/L	<0.0001	<0.0001	0.0003	0.0001
Lithium Dissolved	mg/L	<0.001	<0.001	0.001	0.001
Molybdenum Dissolved	mg/L	0.00032	0.00111	0.00156	0.0001
Nickel Dissolved	mg/L	0.001	0.001	0.008	0.001
Selenium Dissolved	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Silver Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium Dissolved	mg/L	0.011	0.011	<0.010	0.01
Strontium Dissolved	mg/L	0.021	0.054	0.049	0.001
Tellurium Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium Dissolved	mg/L	<0.00001	<0.00001	0.00001	0.00001
Thorium Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium Dissolved	mg/L	<0.0004	0.0009	0.0014	0.0004
Vanadium Dissolved	mg/L	0.00027	0.00026	0.00065	0.0001
Zinc Dissolved	mg/L	0.019	0.005	0.028	0.001
Zirconium Dissolved	mg/L	0.00025	<0.00010	0.00048	0.0001
Metals Total					
Mercury Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Aluminum Total	mg/L	0.018	<0.010	0.908	0.005

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Analytical Report

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Y1A 6P2
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Sampled By: J.Gibson
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Project:
ID: ATAC Resources
Name: RPG-RAU
Location:
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Acct code:

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			Reference Number	936765-4	936765-5	936765-6	
			Sample Date	May 20, 2013	May 20, 2013	May 20, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	Surface / RAU # 11	Surface / RAU # 12	Surface / RAU # 13	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued							
Antimony	Total	mg/L		<0.0002	<0.0002	0.0002	0.0001
Arsenic	Total	mg/L		0.00034	0.00775	0.00406	0.00005
Barium	Total	mg/L		0.120	0.106	0.0937	0.00005
Beryllium	Total	mg/L		<0.00010	<0.00010	<0.00010	0.00005
Bismuth	Total	mg/L		<0.0002	<0.0002	<0.0002	0.0001
Boron	Total	mg/L		<0.004	<0.004	0.007	.002
Cadmium	Total	mg/L		0.00016	0.00002	0.00064	0.00001
Calcium	Total	mg/L		23.7	43.0	33.4	0.05
Chromium	Total	mg/L		<0.001	0.0012	0.0013	0.0005
Cobalt	Total	mg/L		<0.0002	<0.0002	0.0014	0.0001
Copper	Total	mg/L		0.0016	0.0046	0.0082	0.0001
Iron	Total	mg/L		0.033	0.025	2.70	0.002
Lead	Total	mg/L		<0.0002	<0.0002	0.0031	0.0001
Lithium	Total	mg/L		<0.001	<0.0010	0.0023	0.0005
Magnesium	Total	mg/L		6.30	9.72	9.08	0.04
Manganese	Total	mg/L		0.0022	0.0032	0.120	0.001
Molybdenum	Total	mg/L		0.00026	0.00153	0.00186	0.00005
Nickel	Total	mg/L		0.0006	<0.0004	0.0145	0.0002
Potassium	Total	mg/L		3.6	2.1	2.1	0.1
Selenium	Total	mg/L		<0.0002	0.0002	0.0011	0.0001
Silicon	Total	mg/L		1.18	1.61	3.22	0.02
Silver	Total	mg/L		<0.0001	<0.0001	<0.00010	0.00005
Sodium	Total	mg/L		<0.2	0.3	1.0	0.1
Strontium	Total	mg/L		0.0226	0.0573	0.0630	0.0001
Thallium	Total	mg/L		<0.00002	<0.00002	0.00006	0.00001
Thorium	Total	mg/L		<0.00002	<0.00002	0.00020	0.00001
Tin	Total	mg/L		<0.0002	<0.0002	<0.0002	0.0001
Titanium	Total	mg/L		<0.001	<0.0010	0.0287	0.0005
Uranium	Total	mg/L		0.00008	0.00086	0.00159	0.00001
Vanadium	Total	mg/L		<0.0002	0.0002	0.0037	0.0001
Zinc	Total	mg/L		0.0199	0.0050	0.0703	0.0005
Zirconium	Total	mg/L		<0.001	<0.001	<0.0010	0.0005
Hardness	as CaCO3	mg/L		85	148	121	1
Physical and Aggregate Properties							
Solids	Total Suspended	mg/L		<2	<2	117	1
Solids	Total Dissolved	mg/L		104	140	112	5

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W: www.exova.com

Exova

Analytical Report

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	RPG-RAU
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**936765**
Control Number:	A246289
Date Received:	May 22, 2013
Date Reported:	May 28, 2013
Report Number:	1828520

		Reference Number	936765-4	936765-5	936765-6	
		Sample Date	May 20, 2013	May 20, 2013	May 20, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surface / RAU # 11	Surface / RAU # 12	Surface / RAU # 13	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water						
pH	at 25 °C		7.61	7.82	7.58	
Electrical Conductivity		µS/cm at 25 C	141	258	161	1
Calcium	Dissolved	mg/L	21.9	40.2	23.5	0.1
Iron	Dissolved	mg/L	0.033	0.015	0.362	0.005
Magnesium	Dissolved	mg/L	6.26	9.77	6.31	0.1
Manganese	Dissolved	mg/L	<0.001	<0.001	0.016	0.001
Potassium	Dissolved	mg/L	3.4	2.0	1.7	0.1
Silicon	Dissolved	mg/L	1.11	1.47	1.33	0.05
Sodium	Dissolved	mg/L	0.1	0.3	0.7	0.1
Bicarbonate		mg/L	86	154	77	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	70	126	63	5
Chloride	Dissolved	mg/L	0.26	0.21	1.19	0.05
Nitrate - N	Dissolved	mg/L	0.02	0.16	0.03	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	2.7	12.9	14.6	0.5
Hardness	as CaCO3	mg/L	80	141	85	5

Approved by:

Randy Neumann, BSc
General Manager

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Methodology and Notes

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	RPG-RAU
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**936765**
Control Number:	A246289
Date Received:	May 22, 2013
Date Reported:	May 28, 2013
Report Number:	1828520

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water (Surrey)	APHA	* Alkalinity - Titration Method, 2320 B	23-May-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	* Conductivity, 2510 B	23-May-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	* pH - Electrometric Method, 4500-H+ B	23-May-13	Exova Surrey
Ammonia-N in Water (Surrey)	APHA	* Flow Injection Analysis, 4500-NH3 H	27-May-13	Exova Surrey
Anions by IEC in water (Surrey)	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	23-May-13	Exova Surrey
BC ICP-MS Total Metals in Water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	24-May-13	Exova Edmonton
BC Trace Total Metals in Water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	24-May-13	Exova Edmonton
Carbon Organic (Total) in water (TOC)	APHA	High-Temperature Combustion Method, 5310 B	27-May-13	Exova Edmonton
Cyanide (Total) in water	US EPA	* US EPA method, 335.3	28-May-13	Exova Edmonton
Mercury (Total) in water	US EPA	* Determination of Hg in Sediment by Cold Vapor Atomic Absorption Spec, 245.5	27-May-13	Exova Edmonton
Metals SemiTrace (Dissolved) in water (Surrey)	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	23-May-13	Exova Surrey
Phosphorus - total (low level) - Surrey	APHA	* Preliminary Acid Hydrolysis, Ascorbic Acid Reduction Method, 4500-P B,E	24-May-13	Exova Surrey
Solids Dissolved (Total, Fixed and Volatile) - Surrey	APHA	* Total Dissolved Solids Dried at 180 C, 2540 C	24-May-13	Exova Surrey
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105'C, 2540 D	24-May-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	23-May-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	23-May-13	Exova Surrey

** Reference Method Modified*

References

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

Comments:

- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.

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Methodology and Notes

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	RPG-RAU
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**936765**
Control Number:	A246289
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Report Number:	1828520

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.
The test report shall not be reproduced except in full, without the written approval of the laboratory.

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LOT: 936765 COC

Control Number A246289

nvironmental Sample Information Sheet

ote: Proper completion of this form is required in order to proceed with analysis
See reverse for your nearest Exova location and proper sampling protocol

Billing Address:		**Copy of Report To:**	
Company:		Company:	
Address:	J. Gibson & Associates Box 20111 Whitehorse, YT Y1A 7A2	Address:	
QA/QC Report ☐		Copy of Invoice: ☐	
		Send invoice to this address for approval ☐	
		05-22-13P05:15 RCVD 5.4	
Attention:	John Gibson	Attention:	
Phone:	(867)633-4522	Phone:	
Fax:	(867)668-6895	Fax:	
Cell:		Cell:	
e-mail:		e-mail:	
Report Result: e-mail ☐ Results Online ☐ Fax ☐ Mail ☐		Report Result: e-mail ☐ Results Online ☐ Fax ☐ Mail ☐	

Information to be included on Report and Invoice

Project ID: ATAC RESOURCES
Project Name: RPG-RAU
Project Location:
Legal Location:
PO#:
Proj. Acct. Code: 6646
Agreement ID:

PRIORITY
Please contact laboratory prior to submitting any RUSH samples.
Upon filling out this section, client accepts that surcharges will be applied to this analysis.
If not all samples require RUSH, please indicate in special instructions.

Date Required: _____
Signature: _____

Sample Custody (Please Print)
Sampled by: J GIBSON
Company Signature J Gibs

I authorize Exova to proceed with the work indicated on this form:
Date: Initial: 16

Received by: Sample Temp.
Waybill #: Date
Company Time

Special Instructions / Comments
RCHGM = pH, EC, TP, N_2, N_3, TALK, Cl, SO4, HARDT, TSS, TDS.
TW23 field filtered; MERMS + NITRIC, NH_4 + SULFURIC
TOC + HCl, TCN + NaOH.

LS

Please indicate which regulations you are required to meet: ☐ Health Canada Drinking Water Quality ☐ Alberta Tier 1 ☐ Other: _____

Sample Identification	Location	Depth IN CM M	Date/Time Sampled	Matrix	Sampling Method	Number of Containers	RCHGM	NH4	TOC	TCN	TW2(NO3+NO2)	TW23 diss	Enter tests above (✓ relevant samples below)
RAU #3	SURFACE	—	May20	H_2O	Grab	6	✓	✓	✓	✓	✓	✓	
RAU #4	↓		↓	↓	↓	6	✓	✓	✓	✓	✓	✓	
RAU #10						6	✓	✓	✓	✓	✓	✓	
RAU #11						6	✓	✓	✓	✓	✓	✓	
RAU #12						6	✓	✓	✓	✓	✓	✓	
RAU #13						6	✓	✓	✓	✓	✓	✓	

NOTE: All hazardous samples must be labeled according to WHMIS guidelines.

Page 1 of 1

ED 077-00

APPENDIX 2

Flow Volume Calculations

April and May 2013

Snow Survey Calculations

April 2013

ATAC RESOURCES - RAU PROJECT
Snow Survey Results -April 2013

Snow Survey Calculations

Project: ATAC **Date:** 09-Apr-13 0930 hrs

Course # : RAU Snow #1 at Water RAU #9

Measured by: J.Gibson

Station #	Snow Depth *(cm)*	Core Length *(cm)*	WGT Tube before Sampling	WGT Tube and Core	Snow Water Equiv.	Density %
1	75	49	24	39	15	20.0
2	72	51	24	40	16	22.2
3	71	63	24	42	18	25.3
4	74	61	24	42	18	24.3
5	79	66	24	44	20	25.3
6	73	63	24	43	19	26.0
7	65	63	24	42	18	27.7
8	79	61	24	42	18	22.8
9	59	63	24	41	17	28.8
10	65	59	24	41	17	26.1
Total	712	599	[redacted]		176	248.5
Coverage	71.2	59.9			17.6	24.9

Core length / Snow Depth = 84%

Density Range 20.0 to 28.8 = 8%

ATAC RESOURCES - RAU PROJECT
Snow Survey Results -April 2013

Snow Survey Calculations

Project: ATAC **Date:** 09-Apr-13
1500 hrs

Course # : RAU Snow #2
at Water RAU #8

Measured by: J.Gibson

Station #	Snow Depth *(cm)*	Core Length *(cm)*	WGT Tube before Sampling	WGT Tube and Core	Snow Water Equiv.	Density %
1	56	35	24	35	11	19.6
2	57	37	24	34	10	17.5
3	48	46	24	37	13	27
4	64	48	24	38	14	21.9
5	64	49	24	38	14	21.9
6	64	52	24	39	15	23.4
7	65	45	24	36	12	18.5
8	64	47	24	38	14	21.9
9	63	43	24	37	13	20.6
10	66	54	24	39	15	22.7
Total	611	456	[redacted]		131	215
Coverage	61.1	45.6			13.1	21.5

Core length / Snow Depth = 75%

Density Range 17.5 to 27 = 9.5%

Stage Discharge Calculations

Project: **Atac Resources - Rau** **Date:** **09-Apr-13**

Site: **RAU#4**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
1.02	0	0.065	0	0	0
1.15	0.06	0.115	0.221	0.007	0.0015
1.25	0.08	0.1	0.442	0.008	0.0035
1.35	0.09	0.1	0.217	0.009	0.0020
1.45	0.11	0.1	0.442	0.011	0.0049
1.55	0.11	0.1	0.432	0.011	0.0048
1.65	0.1	0.1	0.415	0.010	0.0042
1.75	0.09	0.1	0.357	0.009	0.0032
1.85	0.12	0.1	0.369	0.012	0.0044
1.95	0.09	0.125	0.331	0.011	0.0037
2.1	0.09	0.175	0.217	0.016	0.0034
2.3	0.06	0.2	0.237	0.012	0.0028
2.5	0.05	0.205	0.106	0.010	0.0011
2.71	0	0.105	0	0.000	0.0000
1.69		1.69			**0.0395**

All velocity readings at 0.6 depth

Staff Gauge: under ice cover

Logger: removed at end of open water season

Channel under ice? complete ice cover - removed for measurement

Method: Price Velocity meter/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Rau** **Date:** **09-Apr-13**

Site: **Beaver River**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
3.84	0	1.08	0	0	0
6	0.33	2.08	0.472	0.6864	0.3240
8	0.52	1.5	0.601	0.78	0.4688
9	0.59	1	0.735	0.59	0.4337
10	0.62	1	0.786	0.62	0.4873
11	0.66	1	0.735	0.66	0.4851
12	0.65	1	0.66	0.65	0.4290
13	0.68	1	0.66	0.68	0.4488
14	0.64	1	0.644	0.64	0.4122
15	0.62	1.5	0.629	0.93	0.5850
17	0.48	2	0.415	0.96	0.3984
19	0.3	2	0.254	0.6	0.1524
21	0.2	2	0.185	0.4	0.0740
23	0.17	2	0.148	0.34	0.0503
25	0.08	1.5	0.093	0.12	0.0112
26	0	0.5	0	0	0.0000
22.16		22.16			**4.7600**

All velocity readings at 0.6 depth

Staff Gauge: no staff gauge at site

Channel under ice? complete ice cover -Ice free section of river

Method: Price Velocity meter/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Rau** **Date:** **May 20,2013**

Site: **RAU#4**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
0.94	0	0.08	0	0	0
1.1	0.09	0.13	0.133	0.012	0.0016
1.2	0.12	0.1	0.483	0.012	0.0058
1.3	0.13	0.1	0.462	0.013	0.0060
1.4	0.08	0.1	0.644	0.008	0.0052
1.5	0.13	0.1	0.629	0.013	0.0082
1.6	0.14	0.1	0.705	0.014	0.0099
1.7	0.11	0.1	0.72	0.011	0.0079
1.8	0.12	0.1	0.705	0.012	0.0085
1.9	0.11	0.1	0.601	0.011	0.0066
2	0.09	0.1	0.495	0.009	0.0045
2.1	0.11	0.1	0.531	0.011	0.0058
2.2	0.1	0.1	0.451	0.010	0.0045
2.3	0.08	0.14	0.331	0.011	0.0037
2.48	0	0.09	0	0.000	0.0000
1.54		1.54			**0.0781**

All velocity readings at 0.6 depth

Staff Gauge: 0.178 m / 0.180 m

Logger: Installed 1030 hrs May 20

Channel under ice? partial ice cover downstream - not in xsection

Method: Price Velocity meter/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Rau** **Date:** **20-May-13**

Site: **RAU #13**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
0.91	0	0.095	0	0	0
1.1	0.47	0.145	0.067	0.06815	0.0046
1.2	0.61	0.1	0.432	0.061	0.0264
1.3	0.62	0.1	0.472	0.062	0.0293
1.4	0.63	0.1	0.944	0.063	0.0595
1.5	0.68	0.1	1.176	0.068	0.0800
1.6	0.66	0.1	1.258	0.066	0.0830
1.7	0.66	0.1	1.151	0.066	0.0760
1.8	0.67	0.15	0.882	0.1005	0.0886
2	0.54	0.2	0.432	0.108	0.0467
2.2	0.51	0.25	0.323	0.1275	0.0412
2.5	0.45	0.4	0.139	0.18	0.0250
3	0.37	0.45	0.106	0.1665	0.0176
3.4	0.33	0.55	0.033	0.1815	0.0060
4.1	0	0.35	0.093	0	0.0000
3.19		3.19			**0.5838**

All velocity readings at 0.6 depth

Staff Gauge: 0.454 m / 0.455 m

Channel under ice? Ice free section

Method: Price Velocity meter/ TS Wading Rod

Measurement By: J.Gibson

ATAC RESOURCES LTD

TIGER PROJECT

ENVIRONMENTAL DATA UPDATE

June and July, 2013

J.Gibson Env. Consulting ***Whitehorse YT***

June and July 2013 – Tiger Project Environmental Data Update

Baseline water quality and hydrology data collection continued with all stations surveyed in June and "monthly" stations surveyed in July, 2013.

In June, all tributary stations (with exception of Rau #7 and #8) and the Beaver River receiving waters station (Rau #10) were sampled for water quality. Flow measurements were done at sample stations. All water level data logger installations were surveyed for elevation changes.

In July, monthly stations (with addition of quarterly stations Rau #7 and #8) were sampled for water quality. Flow measurements were done at sample stations. All water level data logger installations were surveyed for elevation changes.

In July, the weather station logger had a perimeter fence installed.

Data Results

Hydrology June

Hydrology data / stream flow volume measurements in June were at post freshet mid stage under ice free conditions. Station Rau#5 had partial ice cover remaining.

Hydrology July

Stream flow measurements in July were done under decreasing stage approaching summer low flow. Volumes at most stations were approximately one half to one third of volumes measured in June 2013. The exception is Rau #11 which had a consistent flow volume through June and July. There had been little precipitation input in June and July.

Flow measurement results are listed with Routine Chemistry analysis results. A summary of stream flow volumes from March 2011 to July 2013 are listed in Table 4.

Water Quality

Data is listed in the following tables:

Table 1. June 2013 Routine chemistry analysis results, field measurements and flow volumes

Table 2. June 2013 Total Metals ICP/MS analysis results

Table 3. June 2013 Dissolved Metals ICP/MS analysis results

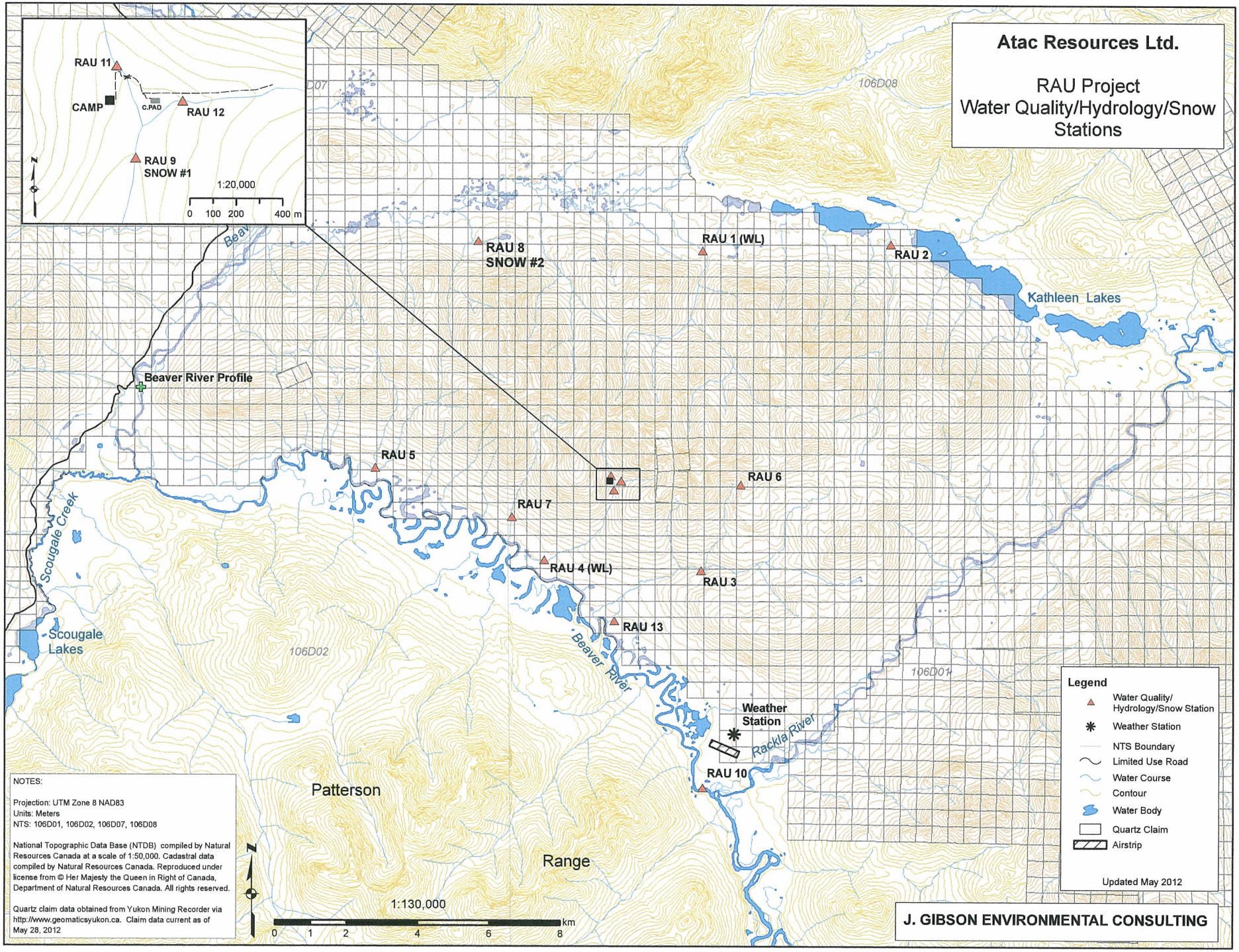
Atac Resources Ltd.
RAU Project
Water Quality/Hydrology/Snow Stations
RAU 11
CAMP
C.PAD
RAU 12
RAU 9
SNOW #1
1:20,000
0 100 200 400 m
RAU 8
SNOW #2
RAU 1 (WL)
RAU 2
Kathleen Lakes
Beaver River Profile
RAU 5
RAU 6
RAU 7
RAU 4 (WL)
RAU 3
RAU 13
Scougale Creek
Scougale Lakes
Beaver River
Rackla River
Weather Station
RAU 10
Patterson
Range
106D08
106D02
106D01
NOTES:
Projection: UTM Zone 8 NAD83
Units: Meters
NTS: 106D01, 106D02, 106D07, 106D08
National Topographic Data Base (NTDB) compiled by Natural Resources Canada at a scale of 1:50,000. Cadastral data compiled by Natural Resources Canada. Reproduced under license from © Her Majesty the Queen in Right of Canada, Department of Natural Resources Canada. All rights reserved.
Quartz claim data obtained from Yukon Mining Recorder via http://www.geomaticsyukon.ca. Claim data current as of May 28, 2012
1:130,000
0 1 2 4 6 8 km
Legend
Water Quality/ Hydrology/Snow Station
Weather Station
NTS Boundary
Limited Use Road
Water Course
Contour
Water Body
Quartz Claim
Airstrip
Updated May 2012
J. GIBSON ENVIRONMENTAL CONSULTING

Table 4. Flow Measurement Summary – RAU Stations to July 2013

Table 5. July 2013 Routine chemistry analysis results, field measurements and flow volumes

Table 6. July 2013 Total Metals ICP/MS analysis results

Table 7. July 2013 Dissolved Metals ICP/MS analysis results

Table 8. Quality Control Sample analysis results – RAU#13 June 2013

Table 9. Quality Control Sample analysis results – RAU#9 July 2013

Table 10. Stream Sediment Analysis results, June 2013

Listed with the water quality analysis results are the ***Canadian Water Quality Guideline*** values for the Protection of Aquatic Life for waters with a pH > 6.5 and a total hardness value of > 180 mg/L as CaC03.

Also listed are the ***Canadian Drinking Water Guideline*** Maximum Acceptable Concentrations (MAC's) for applicable parameters.

All ***Guideline*** metal values are for total metals.

Analysis values that exceed either ***Guideline*** limit are highlighted in yellow.

Laboratory Analytical Reports are contained in Appendix 1.

Water Quality Summary

June 2013 (Monthly + Quarterly Stations)

Stations RAU #1, #4, #11 and #12 meet all ***Aquatic and Drinking Water Guidelines*** parameters.
Station RAU #2 exceeds the ***Aquatic Guidelines*** for aluminum.

Station RAU #3 exceeds the ***Aquatic Guidelines*** for copper, selenium and iron and the ***Drinking Water Guidelines*** for iron.

Station RAU #5 exceeds the ***Aquatic Guidelines*** for aluminum, chromium, copper, selenium, zinc and iron and the ***Drinking Water Guidelines*** for iron and manganese.

Table 1. ATAC Resources - Tiger Project June, 2013.
Routine Chemistry and Field Measurement Results

		STATIONS								
Parameter	**Unit**	**RAU #1**	**RAU #2**	**RAU #3**	**RAU #4**	**RAU #5**	**RAU #6**	**RAU #7**	**DWQ* G.lines**	**Aquatic** G.lines**
Monitoring Frequency		**Quarterly**	**Quarterly**	**Monthly**	**Monthly**	**Quarterly**	**Not in Use**	**Quarterly**		
pH (field)	ru	8.12	7.98	8.1	8.07	8.11				
pH (lab)	ru	8.06	8.01	8.13	8.25	8.12			6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm	250	236	269	368	498				
Water temperature	C	2.1	6.1	5.3	5.8	4.8				
Flow Volume(field)	cms	0.3911	0.1707	nr	0.0599	nr				
Organic Carbon Total	mg/L	4	6	7.1	3.3	4.1				
Cyanide Total	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002			0.2	0.005
Phosphorus Total	mg/L	0.006	0.012	0.021	0.014	0.114				
Ammonia - N	mg/L	0.01	0.02	0.02	0.01	0.02				1.37-2.2
Nitrate - N	mg/L	0.1	0.16	0.06	0.27	0.13			10	
Nitrite - N	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01			1	0.06
T-Alkalinity	mg/L	104	90	127	178	250				
Chloride	mg/L	nr	nr	nr	nr	nr			<250	
Sulfate (SO4)	mg/L	26	31.6	19	28.7	35.5				
Hardness	mg CaCO3/L	138	123	154	214	314			<500	
Total Suspended Solids	mg/L	<2	4	8	<2	66				
Total Dissolved Solids	mg/L	140	144	156	204	276			<500	

All results and limits in mg/L unless noted otherwise. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L
Canadian Water Quality Guidelines

Table 1. ATAC Resources - Tiger Project June, 2013.
Routine Chemistry and Field Measurement Results

Parameter	Unit	STATIONS						DWQ* G.lines	Aquatic** G.lines
		RAU #8	RAU#9	RAU#10	RAU#11	RAU#12	RAU#13		
Monitoring Frequency		Quarterly	Monthly	Monthly	Monthly	Monthly	Monthly		
pH (field)	ru		8.17	8.22	8.2	8.1	8.31		
pH (lab)	ru		8.21	8.11	8.16	8.2	8.12	6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm		315	260	275	355	351		
Water temperature	C		2.4	10.6	6.4	4.1	6.5		
Flow Volume(field)	cms		0.0336	nr	0.0066	0.008	0.3031		
Organic Carbon Total	mg/L		2.3	2.6	2.1	1.8	6.2		
Cyanide Total	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	0.2	0.005
Phosphorus Total	mg/L		0.005	0.023	<0.003	0.003	0.018		
Ammonia - N	mg/L		<0.01	0.01	0.01	0.01	0.02		1.37-2.2
Nitrate - N	mg/L		0.28	0.07	0.17	0.44	0.11	10	
Nitrite - N	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	1	0.06
T-Alkalinity	mg/L		157	104	137	170	147		
Chloride	mg/L		nr	nr	nr	nr	nr	<250	
Sulfate (SO4)	mg/L		17.1	35.8	13.3	20.4	37.6		
Hardness	mg CaCO3/L		179	152	154	196	194	<500	
Total Suspended Solids	mg/L		<2	<2	<2	<2	<2		
Total Dissolved Solids	mg/L		164	146	148	194	208	<500	

All results and limits in mg/L unless noted otherwis. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L

Table 2. ATAC Resources - Tiger Project June, 2013
Total Metals Analysis Results.

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L	44.4	36.1	42.8	54.6	77.3				
Iron	mg/L	0.03	0.277	0.416	0.059	2.56			0.3	0.3
Magnesium	mg/L	6.69	7.97	11.4	18.8	29.4				
Manganese	mg/L	0.0053	0.0376	0.0248	<0.0050	0.104			0.05	
Potassium	mg/L	0.36	0.47	1.02	1.03	1.34				
Silicon	mg/L	1.86	2.49	2.19	2.41	4.62				
Sulfur	mg/L	8.1	9.8	6.3	9	11.3				
Sodium	mg/L	0.66	0.88	0.55	0.48	0.8			<200	
Titanium	mg/L	0.0061	0.0117	0.0052	0.0025	0.0426				
Aluminum	mg/L	0.028	0.135	0.06	0.034	1.28				0.1
Antimony	mg/L	<0.0002	<0.0002	0.0002	<0.0002	0.0012			0.006	
Arsenic	mg/L	0.0002	0.0003	0.001	0.0026	0.003			0.01	
Barium	mg/L	0.086	0.038	0.08	0.125	0.175			1	
Beryllium	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	0.00006				
Bismuth	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010				
Boron	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005				
Cadmium	mg/L	0.00007	<0.00001	0.00008	0.00016	0.00159			0.005	0.0018
Chromium	mg/L	<0.0004	<0.0004	0.0004	<0.0004	0.0028			0.05	0.002
Cobalt	mg/L	0.00006	0.00025	0.00022	0.00007	0.00161				
Copper	mg/L	<0.001	0.001	0.015	<0.001	0.009			1	0.004
Lead	mg/L	<0.0001	0.0003	0.0004	<0.0001	0.0041				
Lithium	mg/L	0.001	0.003	0.001	0.001	0.003				
Mercury	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	0.00003			0.001	
Molybdenum	mg/L	0.001	0.0002	0.0026	0.0012	0.006				
Nickel	mg/L	0.001	0.002	0.006	<0.001	0.033				0.15
Selenium	mg/L	0.002	<0.0006	0.0012	<0.0006	0.0026			0.01	0.001
Silver	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001				0.0001
Strontium	mg/L	0.072	0.071	0.052	0.074	0.167				
Tellurium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				
Thallium	mg/L	<0.00001	<0.00001	0.00001	<0.00001	0.00012				
Thorium	mg/L	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004				
Tin	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				
Uranium	mg/L	0.001	<0.0004	0.0019	0.0025	0.01			0.02	
Vanadium	mg/L	0.0002	0.0004	0.0008	0.0002	0.008				
Zinc	mg/L	0.003	0.003	0.005	0.005	0.203			<5	0.03
Zirconium	mg/L	<0.0001	0.0002	0.0002	<0.0001	0.0004				

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 2. ATAC Resources - Tiger Project June, 2013
Total Metals Analysis Results.

Parameter	Units	RAU #8	RAU#9	RAU#10	RAU #11	RAU#12	RAU#13	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L		48.3	37.3	39.7	54	55.1		
Iron	mg/L		0.047	0.56	0.01	0.011	0.47	0.3	0.3
Magnesium	mg/L		14.3	14.3	13.4	14.9	13.7		
Manganese	mg/L		<0.0050	0.0331	<0.0050	<0.0050	0.0255	0.05	
Potassium	mg/L		0.77	0.73	0.3	1.14	1.58		
Silicon	mg/L		1.85	2.22	1.64	2.03	2.29		
Sulfur	mg/L		5.6	11.4	4.5	6.6	12.2		
Sodium	mg/L		0.32	1.12	0.21	0.37	1.54	<200	
Titanium	mg/L		0.0074	0.0144	<0.0010	0.0034	0.0084		
Aluminum	mg/L		0.024	0.322	<0.005	<0.005	0.133		0.1
Antimony	mg/L		<0.0002	<0.0002	<0.0002	<0.0002	0.0002	0.006	
Arsenic	mg/L		0.0046	0.0005	0.0002	0.0087	0.002	0.01	
Barium	mg/L		0.179	0.05	0.239	0.134	0.08	1	
Beryllium	mg/L		<0.00004	<0.00004	<0.00004	<0.00004	0.00004		
Bismuth	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010		
Boron	mg/L		<0.005	<0.005	<0.005	<0.005	0.006		
Cadmium	mg/L		0.00001	0.00003	0.00004	<0.00001	0.00026	0.005	0.0018
Chromium	mg/L		<0.0004	0.0007	<0.0004	<0.0004	0.0004	0.05	0.002
Cobalt	mg/L		0.00006	0.00047	0.00003	0.00004	0.0003		
Copper	mg/L		<0.001	0.002	<0.001	<0.001	0.005	1	0.004
Lead	mg/L		<0.0001	0.0006	<0.0001	<0.0001	0.0003		
Lithium	mg/L		<0.001	0.003	<0.001	<0.001	0.002		
Mercury	mg/L		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.001	
Molybdenum	mg/L		0.0014	0.0005	0.001	0.0019	0.0034		
Nickel	mg/L		<0.001	0.004	<0.001	<0.001	0.012		0.15
Selenium	mg/L		<0.0006	<0.0006	<0.0006	<0.0006	0.0017	0.01	0.001
Silver	mg/L		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		0.0001
Strontium	mg/L		0.057	0.113	0.036	0.075	0.1		
Tellurium	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Thallium	mg/L		<0.00001	<0.00001	<0.00001	<0.00001	0.00002		
Thorium	mg/L		<0.0004	<0.0004	<0.0004	<0.0004	<0.0004		
Tin	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Uranium	mg/L		0.0014	0.0007	0.0011	0.0017	0.0034	0.02	
Vanadium	mg/L		0.0001	0.001	<0.0001	<0.0001	0.0008		
Zinc	mg/L		0.003	0.007	0.004	0.002	0.044	<5	0.03
Zirconium	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	0.0002		

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 3. ATAC Resources - Tiger Project June, 2013.
Dissolved Metals Analysis Results

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7
Calcium	mg/L	41.6	34.3	38.6	51.2	67.5		
Iron	mg/L	0.007	0.086	0.069	<0.005	0.014		
Magnesium	mg/L	6.27	7.83	10.6	18.1	26		
Manganese	mg/L	<0.001	0.021	0.004	<0.001	0.015		
Potassium	mg/L	0.3	0.3	0.9	1	1		
Silicon	mg/L	1.77	2.12	1.75	2.29	2.76		
Sodium	mg/L	0.6	0.8	0.5	0.5	0.8		
Sulfur	mg/L	8.4	10.1	6.2	9	10.7		
Aluminum	mg/L	0.011	0.025	0.015	<0.005	0.007		
Antimony	mg/L	<0.0002	<0.0002	0.0002	<0.0002	0.0008		
Arsenic	mg/L	0.0002	0.0003	0.0007	0.0026	0.0006		
Barium	mg/L	0.086	0.035	0.075	0.122	0.113		
Beryllium	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004		
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001		
Boron	mg/L	<0.004	<0.004	0.005	<0.004	<0.004		
Cadmium	mg/L	0.00006	0.00002	0.00004	0.00003	0.00032		
Chromium	mg/L	0.0004	<0.0004	<0.0004	0.0005	0.0006		
Cobalt	mg/L	0.00004	0.00016	0.00006	0.00004	0.00013		
Copper	mg/L	<0.001	0.001	0.001	<0.001	<0.001		
Lead	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Lithium	mg/L	0.001	0.003	<0.001	0.001	0.002		
Molybdenum	mg/L	0.00105	0.00033	0.0027	0.00135	0.00692		
Nickel	mg/L	0.001	0.002	0.002	<0.001	0.008		
Selenium	mg/L	0.0017	<0.0006	0.0009	<0.0006	0.0025		
Silver	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		
Strontium	mg/L	0.07	0.07	0.051	0.072	0.159		
Titanium	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010		
Tellurium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Thallium	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	0.00002		
Thorium	mg/L	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004		
Tin	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Uranium	mg/L	0.001	<0.0004	0.0019	0.0025	0.0095		
Vanadium	mg/L	0.00024	0.00015	0.00025	0.00024	0.0006		
Zinc	mg/L	0.004	0.002	0.002	0.006	0.042		
Zirconium	mg/L	0.00012	0.00018	0.00029	<0.00010	0.00023		

Table 3 ATAC Resources - Tiger Project June, 2013.
Dissolved Metals Analysis Results

Parameter	Units	RAU #8	RAU #9	RAU #10	RAU #11	RAU #12	RAU #13
Calcium	mg/L		46	32.4	37.3	51.6	52.5
Iron	mg/L		<0.005	0.028	<0.005	<0.005	0.178
Magnesium	mg/L		13.9	12.7	12.8	14.6	13.4
Manganese	mg/L		<0.001	0.004	<0.001	<0.001	0.009
Potassium	mg/L		0.7	0.4	0.2	1.1	1.4
Silicon	mg/L		1.74	1.71	1.53	1.93	2.01
Sodium	mg/L		0.3	1	0.2	0.4	1.5
Sulfur	mg/L		5.3	11.5	4.2	6.4	12.5
Aluminum	mg/L		<0.005	0.019	<0.005	<0.005	0.022
Antimony	mg/L		<0.0002	<0.0002	<0.0002	<0.0002	0.0002
Arsenic	mg/L		0.0047	0.0004	0.0002	0.0091	0.0017
Barium	mg/L		0.179	0.044	0.232	0.133	0.075
Beryllium	mg/L		<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
Bismuth	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	mg/L		<0.004	<0.004	<0.004	<0.004	0.008
Cadmium	mg/L		0.00002	<0.00001	0.00005	0.00001	0.00022
Chromium	mg/L		<0.0004	<0.0004	0.0006	<0.0004	<0.0004
Cobalt	mg/L		0.00003	0.00013	0.00003	0.00004	0.00018
Copper	mg/L		<0.001	<0.001	<0.001	<0.001	0.002
Lead	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Lithium	mg/L		<0.001	0.002	<0.001	<0.001	0.002
Molybdenum	mg/L		0.00144	0.00063	0.00106	0.00197	0.00347
Nickel	mg/L		<0.001	0.002	<0.001	<0.001	0.011
Selenium	mg/L		<0.0006	<0.0006	<0.0006	<0.0006	0.0018
Silver	mg/L		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Strontium	mg/L		0.056	0.107	0.036	0.075	0.098
Titanium	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010
Tellurium	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Thallium	mg/L		<0.00001	<0.00001	<0.00001	<0.00001	0.00002
Thorium	mg/L		<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Tin	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Uranium	mg/L		0.0014	0.0007	0.001	0.0017	0.0033
Vanadium	mg/L		0.00012	0.00017	0.00016	<0.00010	0.00038
Zinc	mg/L		0.003	0.003	0.005	0.002	0.04
Zirconium	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	0.00024

Table 4. ATAC RESOURCES - Summary of Tiger Project Station Flow Volumes 2011-2013

Station	Date																	
	May-11	Jul-11	Aug-11	Oct-11	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Sep-12	Oct-12	Dec-12	Jan-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13
	May-28				€													
Rau #1	1.084 1.153	0.626	0.443	0.261	0.01	nr	0.5253	0.6291	0.3773	0.2533	0.1604	nr	nr	nr	nr	nr	0.3911	nr
Rau #2	0.815	0.411	0.166	0.091	nr	nr	nr	nr	nr	0.0977	nr	nr	nr	nr	nr	nr	0.1707	nr
Rau #3	0.774	0.485	0.317	nr	0.02		nr	0.4218	0.3497	0.185	0.1282	nr	nr	nr	nr	nr	nr	0.1035
Rau #4	0.093 0.093	0.072	0.081	0.064	0.008	0.0473	0.0976	0.1152	0.0895	0.062	0.0546	0.05 e	0.046	0.0296	0.0395	0.0781	0.0599	0.0346
Rau #5	0.036	0.039	0.034	0.018	0.0	nr	0.0728	nr	nr	0.034	nr	nr	nr	nr	nr	nr	nr	nr
Rau #6	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr
Rau #7	0.069	0.046	0.035	0.031	0.006	nr	0.0229	nr	nr	0.023	nr	nr	nr	nr	nr	nr	nr	nr
Rau #8	0.371	0.413	0.313	0.137	0.005	nr	0.1557	nr	nr	0.179	nr	nr	nr	nr	dry	nr	nr	nr
Rau #9	0.031	0.021	0.033	0.009	0.002	0.0052	0.0186	0.0463	0.0199	0.0064	0.0188	glacial ice	glacial ice	glacial ice	glacial ice	glacial ice	0.0336	0.0183
Rau #10	nr	nr	nr	nr	nr	12.31	nr	nr	nr	nr	nr	nr	nr	nr	4.76	nr	nr	nr
Rau #11						<0.0001	<0.0001	0.0354	0.0092	0.0009	<0.0005	dry	dry	dry	dry	0.002	0.0066	0.0071
Rau #12						0.00086	0.0045	0.0103	0.0076	0.0045	0.0036	0.04 e	0.04 e	nr	0.001	0.003	0.0076	0.0018
Rau #13						0.0784	0.5546	0.474	0.3597	0.233	0.1864	0.10e	0.033	0.0206	nr	0.584	0.3031	0.1397

Table 5. ATAC Resources - Tiger Project July, 2013.
Routine Chemistry and Field Measurement Results

		STATIONS								
Parameter	**Unit**	**RAU #1**	**RAU #2**	**RAU #3**	**RAU #4**	**RAU #5**	**RAU #6**	**RAU #7**	**DWQ* G.lines**	**Aquatic** G.lines**
Monitoring Frequency		**Quarterly**	**Quarterly**	**Monthly**	**Monthly**	**Quarterly**	**Not in Use**	**Quarterly**		
pH (field)	ru			8.02	7.98			7.91		
pH (lab)	ru			8.15	8.2			7.95	6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm			369	383			492		
Water temperature	C			6.1	6.4			5.9		
Flow Volume(field)	cms			0.1035	0.0346			nr		
Organic Carbon Total	mg/L			3.7	1.7			3.3		
Cyanide Total	mg/L			<0.002	<0.002			<0.002	0.2	0.005
Phosphorus Total	mg/L			0.005	0.003			0.106		
Ammonia - N	mg/L			<0.01	<0.01			0.04		1.37-2.2
Nitrate - N	mg/L			0.08	0.23			0.17	10	
Nitrite - N	mg/L			<0.01	<0.01			<0.01	1	0.06
T-Alkalinity	mg/L			185	190			230		
Chloride	mg/L			0.06	0.11			2.5	<250	
Sulfate (SO4)	mg/L			30.3	31.5			53.6		
Hardness	mg CaCO3/L			220	222			316	<500	
Total Suspended Solids	mg/L			<2	<2			102		
Total Dissolved Solids	mg/L			222	226			294	<500	

All results and limits in mg/L unless noted otherwis. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L
Canadian Water Quality Guidelines

Table 5. ATAC Resources - Tiger Project July, 2013.
Routine Chemistry and Field Measurement Results

Parameter	Unit	STATIONS						DWQ* G.lines	Aquatic** G.lines
		RAU #8	RAU#9	RAU#10	RAU#11	RAU#12	RAU#13		
Monitoring Frequency		Quarterly	Monthly	Monthly	Monthly	Monthly	Monthly		
pH (field)	ru	7.78	7.85	7.57	7.85	7.81	7.78		
pH (lab)	ru	8.15	8.14	8.15	8.06	8.1	8.1	6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm	332	338	330	299	347	484		
Water temperature	C	13.1	4.7	16.1	6.2	5.4	7.6		
Flow Volume(field)	cms	nr	0.0183	nr	0.0071	0.002	0.1397		
Organic Carbon Total	mg/L	1.7	1.3	1.6	1	1.4	2.1		
Cyanide Total	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.2	0.005
Phosphorus Total	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	0.004		
Ammonia - N	mg/L	0.03	<0.01	0.04	0.03	0.03	0.03		1.37-2.2
Nitrate - N	mg/L	0.1	0.2	0.05	0.15	0.27	0.1	10	
Nitrite - N	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1	0.06
T-Alkalinity	mg/L	165	177	143	157	180	208		
Chloride	mg/L	0.08	0.07	0.44	0.06	0.05	4.89	<250	
Sulfate (SO4)	mg/L	29.6	21.7	48.1	18.7	24.3	65.7		
Hardness	mg CaCO3/L	199	202	189	177	201	276	<500	
Total Suspended Solids	mg/L	<2	<2	<2	<2	<2	<2		
Total Dissolved Solids	mg/L	198	204	216	184	218	344	<500	

All results and limits in mg/L unless noted otherwis. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L

Table 6. ATAC Resources - Tiger Project July, 2013.
Total Metals Analysis Results.

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L			60.6	55.3			69.9		
Iron	mg/L			0.1	0.05			0.794	0.3	0.3
Magnesium	mg/L			16.8	20.5			34.3		
Manganese	mg/L			0.0077	<0.0050			0.0643	0.05	
Potassium	mg/L			1.13	0.84			1.15		
Silicon	mg/L			2.42	2.4			2.66		
Sulfur	mg/L			9.3	9.8			16.6		
Sodium	mg/L			1.2	0.87			2.28	<200	
Titanium	mg/L			0.005	0.0049			0.0138		
Aluminum	mg/L			0.032	0.027			0.31		0.1
Antimony	mg/L			<0.0002	<0.0002			<0.0002	0.006	
Arsenic	mg/L			0.0007	0.0025			0.0018	0.01	
Barium	mg/L			0.111	0.136			0.124	1	
Beryllium	mg/L			<0.00004	<0.00004			<0.00004		
Bismuth	mg/L			<0.001	<0.001			<0.001		
Boron	mg/L			0.006	<0.005			0.006		
Cadmium	mg/L			0.00004	0.00003			0.00014	0.005	0.0018
Chromium	mg/L			<0.0004	<0.0004			0.0008	0.05	0.002
Cobalt	mg/L			0.00004	0.00003			0.0006		
Copper	mg/L			<0.001	<0.001			0.002	1	0.004
Lead	mg/L			0.0001	<0.0001			0.0034		
Lithium	mg/L			0.002	0.001			0.003		
Mercury	mg/L			<0.00001	<0.00001			<0.00001	0.001	
Molybdenum	mg/L			0.0037	0.0015			0.002		
Nickel	mg/L			<0.001	<0.001			0.003		0.15
Selenium	mg/L			0.0016	0.0006			<0.0006	0.01	0.001
Silver	mg/L			0.00003	<0.00001			<0.00001		0.0001
Strontium	mg/L			0.081	0.079			0.128		
Tellurium	mg/L									
Thallium	mg/L			<0.00001	<0.00001			0.00001		
Thorium	mg/L			<0.0004	<0.0004			<0.0004		
Tin	mg/L			<0.0001	<0.0001			<0.0001		
Uranium	mg/L			0.0028	0.0026			0.0056	0.02	
Vanadium	mg/L			0.0002	0.0002			0.0018		
Zinc	mg/L			0.001	0.007			0.016	<5	0.03
Zirconium	mg/L			0.0011	0.0002			0.0004		

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 6. ATAC Resources - Tiger Project July, 2013.
Total Metals Analysis Results.

Parameter	Units	RAU #8	RAU#9	RAU#10	RAU #11	RAU#12	RAU#13	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L	49.3	53.4	45.5	45	54.5	77.7		
Iron	mg/L	0.011	0.024	0.079	<0.010	<0.010	0.316	0.3	0.3
Magnesium	mg/L	18.4	16.6	18.2	15.7	15.8	19.8		
Manganese	mg/L	<0.0050	<0.0050	0.0143	<0.0050	<0.0050	0.0255	0.05	
Potassium	mg/L	0.29	0.51	0.58	0.15	0.78	1.86		
Silicon	mg/L	1.26	1.92	1.98	1.66	2	2.54		
Sulfur	mg/L	9.3	6.9	14.7	5.7	7.5	19.7		
Sodium	mg/L	0.78	0.71	1.96	0.32	0.74	3.52	<200	
Titanium	mg/L	0.0026	0.0023	0.0042	0.001	0.0041	<0.0010		
Aluminum	mg/L	<0.005	0.012	0.019	<0.005	<0.005	0.028		0.1
Antimony	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.006	
Arsenic	mg/L	0.0003	0.0051	0.0004	0.0002	0.0093	0.0013	0.01	
Barium	mg/L	0.174	0.186	0.058	0.274	0.152	0.101	1	
Beryllium	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004		
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
Boron	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.015		
Cadmium	mg/L	0.00012	0.00002	0.00002	0.00004	0.00001	0.00048	0.005	0.0018
Chromium	mg/L	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.05	0.002
Cobalt	mg/L	<0.00002	<0.00002	0.00005	<0.00002	<0.00002	0.00028		
Copper	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	1	0.004
Lead	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Lithium	mg/L	<0.001	<0.001	0.003	<0.001	<0.001	0.005		
Mercury	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.001	
Molybdenum	mg/L	0.0007	0.0014	0.0008	0.0011	0.0021	0.0058		
Nickel	mg/L	0.001	<0.001	0.002	<0.001	<0.001	0.022		0.15
Selenium	mg/L	0.001	<0.0006	<0.0006	<0.0006	<0.0006	0.0032	0.01	0.001
Silver	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		0.0001
Strontium	mg/L	0.052	0.064	0.139	0.042	0.08	0.184		
Tellurium	mg/L								
Thallium	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00003		
Thorium	mg/L	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004		
Tin	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Uranium	mg/L	0.0035	0.0014	0.0009	0.0011	0.0017	0.0065	0.02	
Vanadium	mg/L	0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0004		
Zinc	mg/L	0.028	0.002	0.002	0.004	0.002	0.083	<5	0.03
Zirconium	mg/L	0.0001	<0.0001	0.0002	<0.0001	<0.0001	0.0005		

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 7. ATAC Resources - Tiger Project July, 2013.
Dissolved Metals Analysis Results

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7
Calcium	mg/L			60.2	56.1			64.2
Iron	mg/L			0.021	<0.005			0.022
Magnesium	mg/L			16.8	20.8			31.1
Manganese	mg/L			0.004	0.002			0.023
Potassium	mg/L			1.1	0.8			1.1
Silicon	mg/L			2.41	2.42			2.31
Sodium	mg/L			1.2	1			2.4
Sulfur	mg/L			9.8	9.9			16.5
Aluminum	mg/L			<0.005	<0.005			0.005
Antimony	mg/L			<0.0002	<0.0002			0.0002
Arsenic	mg/L			0.0006	0.0023			0.0008
Barium	mg/L			0.096	0.131			0.108
Beryllium	mg/L			<0.00004	<0.00004			<0.00004
Bismuth	mg/L			<0.001	<0.001			<0.001
Boron	mg/L			0.006	<0.004			0.007
Cadmium	mg/L			0.00003	0.00003			0.00003
Chromium	mg/L			<0.0004	<0.0004			<0.0004
Cobalt	mg/L			<0.00002	0.00003			0.00006
Copper	mg/L			<0.001	<0.001			<0.001
Lead	mg/L			<0.0001	<0.0001			0.0005
Lithium	mg/L			0.001	0.001			0.003
Molybdenum	mg/L			0.00316	0.00143			0.00241
Nickel	mg/L			<0.001	<0.001			0.001
Selenium	mg/L			0.0013	0.0007			<0.0006
Silver	mg/L			0.00001	<0.00001			<0.00001
Strontium	mg/L			0.072	0.078			0.132
Titanium	mg/L			<0.010	<0.010			<0.010
Tellurium	mg/L							
Thallium	mg/L			<0.00001	<0.00001			<0.00001
Thorium	mg/L			<0.0004	<0.0004			<0.0004
Tin	mg/L			<0.0001	<0.0001			<0.0001
Uranium	mg/L			0.0022	0.0023			0.0053
Vanadium	mg/L			0.00011	0.00012			0.00027
Zinc	mg/L			0.001	0.006			0.008
Zirconium	mg/L			<0.00010	0.00015			0.00031

Table 7. ATAC Resources - Tiger Project July, 2013.
Dissolved Metals Analysis Results

Parameter	Units	RAU #8	RAU #9	RAU #10	RAU #11	RAU #12	RAU #13
Calcium	mg/L	48.8	53.7	49.8	45.2	55.9	77
Iron	mg/L	0.008	0.01	0.037	<0.005	<0.005	0.03
Magnesium	mg/L	18.3	16.6	19.9	15.7	16.2	19.6
Manganese	mg/L	0.001	0.005	0.013	<0.001	<0.001	0.024
Potassium	mg/L	0.3	0.5	0.6	0.1	0.8	1.8
Silicon	mg/L	1.25	1.9	2.09	1.69	1.98	2.51
Sodium	mg/L	0.9	0.9	2.1	0.7	0.9	3.4
Sulfur	mg/L	9.2	6.9	13.6	5.8	7.3	19.5
Aluminum	mg/L	<0.005	<0.005	0.011	<0.005	<0.005	0.013
Antimony	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	mg/L	0.0003	0.0052	0.0004	<0.0002	0.0089	0.0008
Barium	mg/L	0.177	0.188	0.068	0.265	0.145	0.095
Beryllium	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	0.015
Cadmium	mg/L	0.00011	0.00002	0.00002	0.00004	0.00001	0.00041
Chromium	mg/L	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Cobalt	mg/L	<0.00002	<0.00002	0.00003	<0.00002	<0.00002	0.00026
Copper	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	0.0006	0.0006	0.0002	0.0007	0.0001	0.0004
Lithium	mg/L	<0.001	<0.001	0.003	<0.001	<0.001	0.004
Molybdenum	mg/L	0.00073	0.00148	0.00086	0.00109	0.00198	0.0055
Nickel	mg/L	0.001	<0.001	0.002	<0.001	<0.001	0.021
Selenium	mg/L	0.001	<0.0006	<0.0006	<0.0006	<0.0006	0.0031
Silver	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Strontium	mg/L	0.054	0.067	0.161	0.044	0.078	0.178
Titanium	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Tellurium	mg/L						
Thallium	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00003
Thorium	mg/L	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Tin	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Uranium	mg/L	0.0032	0.0013	0.0009	0.001	0.0014	0.0053
Vanadium	mg/L	0.0001	<0.00010	0.00012	<0.00010	<0.00010	0.00018
Zinc	mg/L	0.034	0.003	0.002	0.004	0.002	0.065
Zirconium	mg/L	0.00011	<0.00010	0.00011	<0.00010	<0.00010	0.00045

Table 8. Quality Control Samples June 2013, Tiger Claims

Total Metals Analysis - Duplicate Sample

Parameter	Units	RAU #13	RAU #13 Duplicate
		Total Metals	
Calcium	mg/L	55.1	54
Iron	mg/L	0.47	0.383
Magnesium	mg/L	13.7	13.4
Manganese	mg/L	0.0255	0.0228
Potassium	mg/L	1.58	1.5
Silicon	mg/L	2.29	2.22
Sulfur	mg/L	12.2	12.2
Sodium	mg/L	1.54	1.5
Titanium	mg/L	0.0084	0.0041
Aluminum	mg/L	0.133	0.101
Antimony	mg/L	0.0002	0.0002
Arsenic	mg/L	0.002	0.0019
Barium	mg/L	0.08	0.078
Beryllium	mg/L	0.00004	<0.00004
Bismuth	mg/L	<0.0010	<0.0010
Boron	mg/L	0.006	0.006
Cadmium	mg/L	0.00026	0.00024
Chromium	mg/L	0.0004	<0.0004
Cobalt	mg/L	0.0003	0.00026
Copper	mg/L	0.005	0.002
Lead	mg/L	0.0003	0.0003
Lithium	mg/L	0.002	0.002
Mercury	mg/L	<0.00001	<0.00001
Molybdenum	mg/L	0.0034	0.0033
Nickel	mg/L	0.012	0.012
Selenium	mg/L	0.0017	0.0017
Silver	mg/L	<0.00001	<0.00001
Strontium	mg/L	0.1	0.099
Tellurium	mg/L	<0.0001	<0.0001
Thallium	mg/L	0.00002	0.00002
Thorium	mg/L	<0.0004	<0.0004
Tin	mg/L	<0.0001	<0.0001
Uranium	mg/L	0.0034	0.0033
Vanadium	mg/L	0.0008	0.0006
Zinc	mg/L	0.044	0.042
Zirconium	mg/L	0.0002	0.0001

Denote >10% variation between samples

Table 9. Quality Control Samples July 2013, Tiger Project
Total and Dissolved Metals Analysis - Duplicate Samples

Parameter	Units	RAU #9	RAU #9 Duplicate	Parameter	Units	RAU #9	RAU #9 Duplicate
		Total Metals				Dissolved Metals	
Calcium	mg/L	53.4	53.4	Calcium	mg/L	53.7	53.2
Iron	mg/L	0.024	0.02	Iron	mg/L	0.01	<0.005
Magnesium	mg/L	16.6	16.6	Magnesium	mg/L	16.6	16.5
Manganese	mg/L	<0.0050	<0.0050	Manganese	mg/L	0.005	0.005
Potassium	mg/L	0.51	0.47	Potassium	mg/L	0.5	0.5
Silicon	mg/L	1.92	1.94	Silicon	mg/L	1.9	1.91
Sulfur	mg/L	6.9	6.9	Sodium	mg/L	0.9	0.8
Sodium	mg/L	0.71	0.68	Sulfur	mg/L	6.9	6.8
Titanium	mg/L	0.0023	<0.0010	Aluminum	mg/L	<0.005	<0.005
Aluminum	mg/L	0.012	0.01	Antimony	mg/L	<0.0002	<0.0002
Antimony	mg/L	<0.0002	<0.0002	Arsenic	mg/L	0.0052	0.0051
Arsenic	mg/L	0.0051	0.0054	Barium	mg/L	0.188	0.187
Barium	mg/L	0.186	0.199	Beryllium	mg/L	<0.00004	<0.00004
Beryllium	mg/L	<0.00004	<0.00004	Bismuth	mg/L	<0.001	<0.001
Bismuth	mg/L	<0.001	<0.001	Boron	mg/L	<0.004	<0.004
Boron	mg/L	<0.005	<0.005	Cadmium	mg/L	0.00002	0.00002
Cadmium	mg/L	0.00002	0.00002	Chromium	mg/L	<0.0004	<0.0004
Chromium	mg/L	<0.0004	<0.0004	Cobalt	mg/L	<0.00002	<0.00002
Cobalt	mg/L	<0.00002	<0.00002	Copper	mg/L	<0.001	<0.001
Copper	mg/L	<0.001	<0.001	Lead	mg/L	0.0006	0.0002
Lead	mg/L	<0.0001	<0.0001	Lithium	mg/L	<0.001	<0.001
Lithium	mg/L	<0.001	<0.001	Molybdenum	mg/L	0.00148	0.00148
Mercury	mg/L	<0.00001	<0.00001	Nickel	mg/L	<0.001	<0.001
Molybdenum	mg/L	0.0014	0.0015	Selenium	mg/L	<0.0006	<0.0006
Nickel	mg/L	<0.001	<0.001	Silver	mg/L	<0.00001	<0.00001
Selenium	mg/L	<0.0006	<0.0006	Strontium	mg/L	0.067	0.066
Silver	mg/L	<0.00001	<0.00001	Titanium	mg/L	<0.010	<0.010
Strontium	mg/L	0.064	0.069	Tellurium	mg/L		
Tellurium	mg/L			Thallium	mg/L	<0.00001	<0.00001
Thallium	mg/L	<0.00001	<0.00001	Thorium	mg/L	<0.0004	<0.0004
Thorium	mg/L	<0.0004	<0.0004	Tin	mg/L	<0.0001	<0.0001
Tin	mg/L	<0.0001	<0.0001	Uranium	mg/L	0.0013	0.0014
Uranium	mg/L	0.0014	0.0016	Vanadium	mg/L	<0.00010	<0.00010
Vanadium	mg/L	<0.0001	<0.0001	Zinc	mg/L	0.003	0.002
Zinc	mg/L	0.002	0.002	Zirconium	mg/L	<0.00010	<0.00010
Zirconium	mg/L	<0.0001	<0.0001				

Denote >10% variation between samples

Table 10 . Atac Resources. Tiger Project - Stream Sediment Analysis. June 2013

		RAU #1			RAU #4			
Parameter	***Units***	***REP#1***	***REP#2***	***REP#3***	***REP#1***	***REP#2***	***REP#3***	***Detection Limit***
Sieve 75 micron	***%Ret***	85.2	78.1	84.8	85.8	85.5	84.1	0.1
Texture		Coarse-Grained	Coarse-Grained	Coarse-Grained	Coarse-Grained	Coarse-Grained	Coarse-Grained	
Aluminum	ug/g	8840	8260	8580	11600	11200	11500	1
Antimony	ug/g	2	2.36	2.94	2.4	2.69	2.28	0.5
Arsenic	ug/g	8.82	9.54	8.75	102	97.3	117	0.2
Barium	ug/g	419	450	465	578	608	532	0.03
Beryllium	ug/g	0.448	0.427	0.418	0.284	0.279	0.274	0.02
Bismuth	ug/g	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
Cadmium	ug/g	1.94	1.96	1.96	2.3	2.26	2.44	0.05
Calcium	ug/g	59000	79900	59300	107000	107000	103000	2
Chromium	ug/g	21.8	21	20.3	31.5	31.6	29.6	0.04
Cobalt	ug/g	7.22	7.22	7.38	11.1	10.8	10.8	0.05
Copper	ug/g	12.5	13.1	13.8	13.3	13	11.8	0.05
Iron	ug/g	20500	19600	20600	29200	28600	28700	1
Lead	ug/g	15.8	17	15.5	19	17.5	18	0.3
Lithium	ug/g	19.2	18.4	19	16.6	16.2	16.7	0.1
Magnesium	ug/g	27300	30100	26000	30600	31000	29500	10
Manganese	ug/g	631	620	626	589	581	587	0.3
Molybdenum	ug/g	1.56	1.8	2.05	1.65	1.26	1.4	0.05
Nickel	ug/g	28.7	29	29.6	34.1	35.4	33.2	0.1
Phosphorus	ug/g	780	792	776	1100	925	986	0.5
Potassium	ug/g	748	709	713	883	928	881	5
Selenium	ug/g	<0.25	0.43	0.65	<0.25	<0.25	<0.25	0.3
Silver	ug/g	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	0.2
Sodium	ug/g	156	129	132	96.7	118	95.2	1
Strontium	ug/g	71	67	68.5	91.8	91.4	93.8	0.02
Sulfur	ug/g	543	533	478	597	642	592	1
Thallium	ug/g	0.44	<0.25	<0.25	<0.25	<0.25	<0.25	0.3
Tin	ug/g	0.25	0.71	0.76	<0.20	<0.20	<0.20	0.4
Titanium	ug/g	284	266	257	713	813	732	0.05
Vanadium	ug/g	38.6	35.3	34.6	39.6	38.9	38.9	0.2
Zinc	ug/g	209	239	206	245	247	237	0.1
Zirconium	ug/g	2.6	2.16	2.62	1.88	1.9	1.87	0.05

Station RAU #10 exceeds the ***Aquatic Guidelines*** for aluminum and iron and the ***Drinking Water Guidelines*** for iron.

Station RAU #13 exceeds the ***Aquatic Guideline***s for aluminum, iron, copper, selenium and zinc; and the ***Drinking Water Guidelines*** for iron.

Stations Rau #7 and #8 were not sampled in June 2013.

July 2013 (Monthly Stations)

Station RAU #7 exceeds the ***Aquatic Guidelines*** for aluminum and iron and the ***Drinking Water Guidelines*** for iron and manganese.

Station RAU #8 exceeds the ***Aquatic Guideline***s for selenium.

Station RAU #13 exceeds the ***Aquatic Guidelines*** for iron and selenium and the ***Drinking Water Guidelines*** for iron.

Weather Station Data Logger

The weather station / data logger was downloaded in June and the operational check was good in July. The Temperature / Relative Humidity sensor line had been broken and needs replacing.
A perimeter fence of rebar and snow fencing was installed in July.

Appendix #1

Laboratory Analytical Reports

Surface Waters and Stream Sediments June, 2013

Surface Water July, 2013

Exova
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Report Transmission Cover Page

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**942125**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B05985
	Box 20913	Name:	RGP-RAU	Date Received:	Jun 20, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Jun 27, 2013
	Y1A 6P2	LSD:		Report Number:	1835606
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

Contact & Affiliation	Address	Delivery Commitments
John Gibson J. Gibson & Associates	, Box 20913 Whitehorse, Yukon Territory Y1A 6P2 Phone: (867) 633-4522 Fax: (867) 668-6895 Email: ludditegibson@gmail.com	On [Lot Verification] send (COA) by Email - Single Report On [Report Approval] send (COC, Test Report) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report On [Lot Creation] send (COR) by Email - Single Report

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: RGP-RAU
Location:
LSD:
P.O.:
Acct code:

Lot ID: **942125**
Control Number: B05985
Date Received: Jun 20, 2013
Date Reported: Jun 27, 2013
Report Number: 1835606

	Reference Number	942125-1	942125-2	942125-3	
	Sample Date	Jun 16, 2013	Jun 16, 2013	Jun 16, 2013	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Stream Sed. / RAU #1 Sed #1	Stream Sed. / RAU #1 Sed #2	Stream Sed. / RAU #1 Sed #3	
	Matrix	Soil	Soil	Soil	
Analyte	**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Particle Size Analysis - Wet Sieve					
75 micron sieve % Retained	% by weight	85.2	78.1	84.8	0.1
Texture		Coarse-Grained	Coarse-Grained	Coarse-Grained	
Metals					
Aluminum	ug/g	8840	8260	8580	1
Antimony	ug/g	2.00	2.36	2.94	0.5
Arsenic	ug/g	8.82	9.54	8.75	0.2
Barium	ug/g	419	450	465	0.03
Beryllium	ug/g	0.448	0.427	0.418	0.02
Bismuth	ug/g	<0.5	<0.5	<0.5	0.5
Cadmium	ug/g	1.94	1.96	1.96	0.05
Calcium	ug/g	59000	79900	59300	2
Chromium	ug/g	21.8	21.0	20.3	0.04
Cobalt	ug/g	7.22	7.22	7.38	0.05
Copper	ug/g	12.5	13.1	13.8	0.05
Iron	ug/g	20500	19600	20600	1
Lead	ug/g	15.8	17.0	15.5	0.3
Lithium	ug/g	19.2	18.4	19.0	0.1
Magnesium	ug/g	27300	30100	26000	10
Manganese	ug/g	631	620	626	0.3
Molybdenum	ug/g	1.56	1.80	2.05	0.05
Nickel	ug/g	28.7	29.0	29.6	0.1
Phosphorus	ug/g	780	792	776	0.5
Potassium	ug/g	748	709	713	5
Selenium	ug/g	<0.25	0.43	0.65	0.3
Silver	ug/g	<0.15	<0.15	<0.15	0.2
Sodium	ug/g	156	129	132	1
Strontium	ug/g	71.0	67.0	68.5	0.02
Sulfur	ug/g	543	533	478	1
Thallium	ug/g	0.44	<0.25	<0.25	0.3
Tin	ug/g	0.25	0.71	0.76	0.4
Titanium	ug/g	284	266	257	0.05
Vanadium	ug/g	38.6	35.3	34.6	0.2
Zinc	ug/g	209	239	206	0.1
Zirconium	ug/g	2.60	2.16	2.62	0.05

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: RGP-RAU
Location:
LSD:
P.O.:
Acct code:

Lot ID: **942125**
Control Number: B05985
Date Received: Jun 20, 2013
Date Reported: Jun 27, 2013
Report Number: 1835606

	Reference Number	942125-4	942125-5	942125-6	
	Sample Date	Jun 16, 2013	Jun 16, 2013	Jun 16, 2013	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Stream Sed. / RAU #4 Sed #1	Stream Sed. / RAU #4 Sed #2	Stream Sed. / RAU #4 Sed #3	
	Matrix	Soil	Soil	Soil	
Analyte	**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Particle Size Analysis - Wet Sieve					
75 micron sieve % Retained	% by weight	85.8	85.5	84.1	0.1
Texture		Coarse-Grained	Coarse-Grained	Coarse-Grained	
Metals					
Aluminum	ug/g	11600	11200	11500	1
Antimony	ug/g	2.40	2.69	2.28	0.5
Arsenic	ug/g	102	97.3	117	0.2
Barium	ug/g	578	608	532	0.03
Beryllium	ug/g	0.284	0.279	0.274	0.02
Bismuth	ug/g	<0.5	<0.5	<0.5	0.5
Cadmium	ug/g	2.30	2.26	2.44	0.05
Calcium	ug/g	107000	107000	103000	2
Chromium	ug/g	31.5	31.6	29.6	0.04
Cobalt	ug/g	11.1	10.8	10.8	0.05
Copper	ug/g	13.3	13.0	11.8	0.05
Iron	ug/g	29200	28600	28700	1
Lead	ug/g	19.0	17.5	18.0	0.3
Lithium	ug/g	16.6	16.2	16.7	0.1
Magnesium	ug/g	30600	31000	29500	10
Manganese	ug/g	589	581	587	0.3
Molybdenum	ug/g	1.65	1.26	1.40	0.05
Nickel	ug/g	34.1	35.4	33.2	0.1
Phosphorus	ug/g	1100	925	986	0.5
Potassium	ug/g	883	928	881	5
Selenium	ug/g	<0.25	<0.25	<0.25	0.3
Silver	ug/g	<0.15	<0.15	<0.15	0.2
Sodium	ug/g	96.7	118	95.2	1
Strontium	ug/g	91.8	91.4	93.8	0.02
Sulfur	ug/g	597	642	592	1
Thallium	ug/g	<0.25	<0.25	<0.25	0.3
Tin	ug/g	<0.20	<0.20	<0.20	0.4
Titanium	ug/g	713	813	732	0.05
Vanadium	ug/g	39.6	38.9	38.9	0.2
Zinc	ug/g	245	247	237	0.1
Zirconium	ug/g	1.88	1.90	1.87	0.05

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Analytical Report

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	RGP-RAU
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**942125**
Control Number:	B05985
Date Received:	Jun 20, 2013
Date Reported:	Jun 27, 2013
Report Number:	1835606

Approved by:

Mathieu Simoneau
Operations Manager

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Methodology and Notes

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	RGP-RAU
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**942125**
Control Number:	B05985
Date Received:	Jun 20, 2013
Date Reported:	Jun 27, 2013
Report Number:	1835606

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Metals in solids (Surrey)	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	24-Jun-13	Exova Surrey
Particle Size by Wet Sieve	ASTM	* Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing, C 117 -04	24-Jun-13	Exova Edmonton

** Reference Method Modified*

References

Carter	Soil Sampling and Methods of Analysis.
US EPA	US Environmental Protection Agency Test Methods

Comments:

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.
The test report shall not be reproduced except in full, without the written approval of the laboratory.

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Project Information

Project ID:	ATHC RESOURCES
Project Name:	REP - RAU
Project Location:	
Legal Location:	
PO/AFE#:	
Proj. Acct. Code:	

Billing Information

Company:	J. Gibson & Associates
Address:	
	Whitehorse, YT Y1A 6P2
Attention:	John Gibson
Phone:	(867) 633-4522
Cell:	
Fax:	(867) 668-6895
E-mail:	ludditegibson@gmail.com
Agreement ID:	6646
Copy of report:	X

Copy of Report To:

Company:	J. Gibson & Associates
Address:	
	Whitehorse, YT Y1A 6P2
Attention:	John Gibson
Phone:	(867) 633-4522
Cell:	
Fax:	(867) 668-6895
E-mail:	ludditegibson@gmail.com
Copy of invoice:	X

RUSH Priority

Upon filling out this section, client accepts that surcharges will be applied to the analysis

Date Required | As Indicated | All Analysis

When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples.

Signature

Sample Custody (please print)

Sampled by: J GIBSON

Company:

I authorize Exova to proceed with the work indicated on this form:
Date: JUN 16/13 Initial: JGibson

This section for Lab use only

Date/Time stamp:
06-20-13P02:27 RCVD

Report Results								
	E-mail		Online		PDF		QA/QC Report	
	Mail		Fax		Excel			

Special Instructions/Comments (please include contact information including ph. # if different from above).

STREAM SEDIMENT REPS 1,2,3
TWO STATIONS.

Include Regulatory Requirements Below:

Sample Identification	Location	Depth IN CM M	Date/Time sampled	Matrix	Sampling Method	Number of Containers	METALS	PARTICLE SIZE (INAC SIEVE)						Enter tests above (√ relevant samples below)
1														
2	RAU #1 SED #1	Stream		June 16	SOIL	Grab	1	✓	✓					
3	SED #2	SEDS	✓				1	✓	✓					
4	SED #3						1	✓	✓					
5														
6	RAU #4 SED #1						1	✓	✓					
7	SED #2						1	✓	✓					
8	SED #3						1	✓	✓					
9														
10														
11														
12														
13														
14														
15														

Indicate below any deficiencies in the condition of samples:

	Were Exova supplies used?
	Was there any damage to the shipping container?
	Were the containers packaged well?
	Were any extra samples received (document below)?
OK	All samples within recommended holding times/temp?

ED 120-00

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

Please indicate any potentially hazardous samples

Page of Control # B05985

In LOT: 942125 COC

Shipping:	# and size of coolers received:
COD Y/N	
Cooler temp: 14 C	Delivery Method:
	Waybill:
	Received by:

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Report Transmission Cover Page

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**942151**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B05984
	Box 20913	Name:	RGP-RAU	Date Received:	Jun 20, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Jun 26, 2013
	Y1A 6P2	LSD:		Report Number:	1835636
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

Contact & Affiliation	Address	Delivery Commitments
John Gibson J. Gibson & Associates	, Box 20913 Whitehorse, Yukon Territory Y1A 6P2 Phone: (867) 633-4522 Fax: (867) 668-6895 Email: ludditegibson@gmail.com	On [Lot Verification] send (COA) by Email - Single Report On [Report Approval] send (COC, Test Report) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report On [Lot Creation] send (COR) by Email - Single Report

Notes To Clients:

- Some total metal results were less than dissolved metal results for lot 942151. The results were verified and are within expected measurement uncertainty.
- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: RGP-RAU
Location:
LSD:
P.O.:
Acct code:

Lot ID: **942151**
Control Number: B05984
Date Received: Jun 20, 2013
Date Reported: Jun 26, 2013
Report Number: 1835636

			Reference Number	942151-1	942151-2	942151-3	
			Sample Date	Jun 16, 2013	Jun 16, 2013	Jun 16, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	Surface / RAU #1	Surface / RAU #2	Surface / RAU #3	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters							
Organic Carbon	Total Nonpurgeable	mg/L		4.0	6.0	7.1	0.5
Cyanide	Total	mg/L		<0.002	<0.002	<0.002	0.002
Phosphorus	Total	mg/L		0.006	0.012	0.021	0.003
Ammonia - N		mg/L		0.01	0.02	0.02	.01
Metals Dissolved							
Sulfur	Dissolved	mg/L		8.4	10.1	6.2	0.2
Aluminum	Dissolved	mg/L		0.011	0.025	0.015	0.005
Antimony	Dissolved	mg/L		<0.0002	<0.0002	0.0002	0.0002
Arsenic	Dissolved	mg/L		0.0002	0.0003	0.0007	0.0002
Barium	Dissolved	mg/L		0.086	0.035	0.075	0.001
Beryllium	Dissolved	mg/L		<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L		<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L		<0.004	<0.004	0.005	0.004
Cadmium	Dissolved	mg/L		0.00006	0.00002	0.00004	0.00001
Chromium	Dissolved	mg/L		0.0004	<0.0004	<0.0004	0.0004
Cobalt	Dissolved	mg/L		0.00004	0.00016	0.00006	0.00002
Copper	Dissolved	mg/L		<0.001	0.001	0.001	0.001
Lead	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L		0.001	0.003	<0.001	0.001
Molybdenum	Dissolved	mg/L		0.00105	0.00033	0.00270	0.0001
Nickel	Dissolved	mg/L		0.001	0.002	0.002	0.001
Selenium	Dissolved	mg/L		0.0017	<0.0006	0.0009	0.0006
Silver	Dissolved	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L		<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L		0.070	0.070	0.051	0.001
Tellurium	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Thorium	Dissolved	mg/L		<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L		0.0010	<0.0004	0.0019	0.0004
Vanadium	Dissolved	mg/L		0.00024	0.00015	0.00025	0.0001
Zinc	Dissolved	mg/L		0.004	0.002	0.002	0.001
Zirconium	Dissolved	mg/L		0.00012	0.00018	0.00029	0.0001
Metals Total							
Calcium	Total	mg/L		44.4	36.1	42.8	0.05
Iron	Total	mg/L		0.030	0.277	0.416	0.01

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: RGP-RAU
Location:
LSD:
P.O.:
Acct code:

Lot ID: **942151**
Control Number: B05984
Date Received: Jun 20, 2013
Date Reported: Jun 26, 2013
Report Number: 1835636

		Reference Number	942151-1	942151-2	942151-3	
		Sample Date	Jun 16, 2013	Jun 16, 2013	Jun 16, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surface / RAU #1	Surface / RAU #2	Surface / RAU #3	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued						
Magnesium	Total	mg/L	6.69	7.97	11.4	0.05
Manganese	Total	mg/L	0.0053	0.0376	0.0248	0.005
Potassium	Total	mg/L	0.36	0.47	1.02	0.1
Silicon	Total	mg/L	1.86	2.49	2.19	0.05
Sulfur	Total	mg/L	8.1	9.8	6.3	0.1
Sodium	Total	mg/L	0.66	0.88	0.55	0.02
Titanium	Total	mg/L	0.0061	0.0117	0.0052	0.001
Aluminum	Total	mg/L	0.028	0.135	0.060	0.005
Antimony	Total	mg/L	<0.0002	<0.0002	0.0002	0.0002
Arsenic	Total	mg/L	0.0002	0.0003	0.0010	0.0002
Barium	Total	mg/L	0.086	0.038	0.080	0.001
Beryllium	Total	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Total	mg/L	<0.0010	<0.0010	<0.0010	0.001
Boron	Total	mg/L	<0.005	<0.005	<0.005	0.004
Cadmium	Total	mg/L	0.00007	<0.00001	0.00008	0.00001
Chromium	Total	mg/L	<0.0004	<0.0004	0.0004	0.0004
Cobalt	Total	mg/L	0.00006	0.00025	0.00022	0.00002
Copper	Total	mg/L	<0.001	0.001	0.015	0.001
Lead	Total	mg/L	<0.0001	0.0003	0.0004	0.0001
Lithium	Total	mg/L	0.001	0.003	0.001	0.001
Mercury	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Molybdenum	Total	mg/L	0.0010	0.0002	0.0026	0.0001
Nickel	Total	mg/L	0.001	0.002	0.006	0.001
Selenium	Total	mg/L	0.0020	<0.0006	0.0012	0.0006
Silver	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Strontium	Total	mg/L	0.072	0.071	0.052	0.001
Tellurium	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Total	mg/L	<0.00001	<0.00001	0.00001	0.00001
Thorium	Total	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Total	mg/L	0.001	<0.0004	0.0019	0.0004
Vanadium	Total	mg/L	0.0002	0.0004	0.0008	0.0001
Zinc	Total	mg/L	0.003	0.003	0.005	0.001
Zirconium	Total	mg/L	<0.0001	0.0002	0.0002	0.0001
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2	4	8	1

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Analytical Report

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	RGP-RAU
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**942151**
Control Number:	B05984
Date Received:	Jun 20, 2013
Date Reported:	Jun 26, 2013
Report Number:	1835636

		Reference Number	942151-1	942151-2	942151-3	
		Sample Date	Jun 16, 2013	Jun 16, 2013	Jun 16, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surface / RAU #1	Surface / RAU #2	Surface / RAU #3	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Physical and Aggregate Properties - Continued						
Solids	Total Dissolved	mg/L	140	144	156	5
Routine Water						
pH	at 25 °C		8.06	8.01	8.13	
Electrical Conductivity		µS/cm at 25 C	250	236	269	1
Calcium	Dissolved	mg/L	41.6	34.3	38.6	0.1
Iron	Dissolved	mg/L	0.007	0.086	0.069	0.005
Magnesium	Dissolved	mg/L	6.27	7.83	10.6	0.1
Manganese	Dissolved	mg/L	<0.001	0.021	0.004	0.001
Potassium	Dissolved	mg/L	0.3	0.3	0.9	0.1
Silicon	Dissolved	mg/L	1.77	2.12	1.75	0.05
Sodium	Dissolved	mg/L	0.6	0.8	0.5	0.1
Bicarbonate		mg/L	127	110	154	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	104	90	127	5
Nitrate - N	Dissolved	mg/L	0.10	0.16	0.06	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	26.0	31.6	19.0	0.5
Hardness	as CaCO3	mg/L	130	118	140	5
Hardness	Total	mg CaCO3/L	138	123	154	1

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Analytical Report

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	RGP-RAU
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**942151**
Control Number:	B05984
Date Received:	Jun 20, 2013
Date Reported:	Jun 26, 2013
Report Number:	1835636

		Reference Number	942151-4	942151-5	942151-6	
		Sample Date	Jun 16, 2013	Jun 16, 2013	Jun 16, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surface / RAU #4	Surface / RAU #5	Surface / RAU #9	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	3.3	4.1	2.3	0.5
Cyanide	Total	mg/L	<0.002	<0.002	<0.002	0.002
Phosphorus	Total	mg/L	0.014	0.114	0.005	0.003
Ammonia - N		mg/L	0.01	0.02	<0.01	.01
Metals Dissolved						
Sulfur	Dissolved	mg/L	9.0	10.7	5.3	0.2
Aluminum	Dissolved	mg/L	<0.005	0.007	<0.005	0.005
Antimony	Dissolved	mg/L	<0.0002	0.0008	<0.0002	0.0002
Arsenic	Dissolved	mg/L	0.0026	0.0006	0.0047	0.0002
Barium	Dissolved	mg/L	0.122	0.113	0.179	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	<0.004	<0.004	<0.004	0.004
Cadmium	Dissolved	mg/L	0.00003	0.00032	0.00002	0.00001
Chromium	Dissolved	mg/L	0.0005	0.0006	<0.0004	0.0004
Cobalt	Dissolved	mg/L	0.00004	0.00013	0.00003	0.00002
Copper	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Lead	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L	0.001	0.002	<0.001	0.001
Molybdenum	Dissolved	mg/L	0.00135	0.00692	0.00144	0.0001
Nickel	Dissolved	mg/L	<0.001	0.008	<0.001	0.001
Selenium	Dissolved	mg/L	<0.0006	0.0025	<0.0006	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L	0.072	0.159	0.056	0.001
Tellurium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L	<0.00001	0.00002	<0.00001	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L	0.0025	0.0095	0.0014	0.0004
Vanadium	Dissolved	mg/L	0.00024	0.00060	0.00012	0.0001
Zinc	Dissolved	mg/L	0.006	0.042	0.003	0.001
Zirconium	Dissolved	mg/L	<0.00010	0.00023	<0.00010	0.0001
Metals Total						
Calcium	Total	mg/L	54.6	77.3	48.3	0.05
Iron	Total	mg/L	0.059	2.56	0.047	0.01

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: RGP-RAU
Location:
LSD:
P.O.:
Acct code:

Lot ID: **942151**
Control Number: B05984
Date Received: Jun 20, 2013
Date Reported: Jun 26, 2013
Report Number: 1835636

			Reference Number	942151-4	942151-5	942151-6	
			Sample Date	Jun 16, 2013	Jun 16, 2013	Jun 16, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	Surface / RAU #4	Surface / RAU #5	Surface / RAU #9	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued							
Magnesium	Total	mg/L		18.8	29.4	14.3	0.05
Manganese	Total	mg/L		<0.0050	0.104	<0.0050	0.005
Potassium	Total	mg/L		1.03	1.34	0.77	0.1
Silicon	Total	mg/L		2.41	4.62	1.85	0.05
Sulfur	Total	mg/L		9.0	11.3	5.6	0.1
Sodium	Total	mg/L		0.48	0.80	0.32	0.02
Titanium	Total	mg/L		0.0025	0.0426	0.0074	0.001
Aluminum	Total	mg/L		0.034	1.28	0.024	0.005
Antimony	Total	mg/L		<0.0002	0.0012	<0.0002	0.0002
Arsenic	Total	mg/L		0.0026	0.0030	0.0046	0.0002
Barium	Total	mg/L		0.125	0.175	0.179	0.001
Beryllium	Total	mg/L		<0.00004	0.00006	<0.00004	0.00004
Bismuth	Total	mg/L		<0.0010	<0.0010	<0.0010	0.001
Boron	Total	mg/L		<0.005	<0.005	<0.005	0.004
Cadmium	Total	mg/L		0.00016	0.00159	0.00001	0.00001
Chromium	Total	mg/L		<0.0004	0.0028	<0.0004	0.0004
Cobalt	Total	mg/L		0.00007	0.00161	0.00006	0.00002
Copper	Total	mg/L		<0.001	0.009	<0.001	0.001
Lead	Total	mg/L		<0.0001	0.0041	<0.0001	0.0001
Lithium	Total	mg/L		0.001	0.003	<0.001	0.001
Mercury	Total	mg/L		<0.00001	0.00003	<0.00001	0.00001
Molybdenum	Total	mg/L		0.0012	0.0060	0.0014	0.0001
Nickel	Total	mg/L		<0.001	0.033	<0.001	0.001
Selenium	Total	mg/L		<0.0006	0.0026	<0.0006	0.0006
Silver	Total	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Strontium	Total	mg/L		0.074	0.167	0.057	0.001
Tellurium	Total	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Thallium	Total	mg/L		<0.00001	0.00012	<0.00001	0.00001
Thorium	Total	mg/L		<0.0004	<0.0004	<0.0004	0.0004
Tin	Total	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Uranium	Total	mg/L		0.0025	0.010	0.0014	0.0004
Vanadium	Total	mg/L		0.0002	0.0080	0.0001	0.0001
Zinc	Total	mg/L		0.005	0.203	0.003	0.001
Zirconium	Total	mg/L		<0.0001	0.0004	<0.0001	0.0001
Physical and Aggregate Properties							
Solids	Total Suspended	mg/L		<2	66	<2	1

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: RGP-RAU
Location:
LSD:
P.O.:
Acct code:

Lot ID: **942151**
Control Number: B05984
Date Received: Jun 20, 2013
Date Reported: Jun 26, 2013
Report Number: 1835636

			Reference Number	942151-4	942151-5	942151-6	
			Sample Date	Jun 16, 2013	Jun 16, 2013	Jun 16, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	Surface / RAU #4	Surface / RAU #5	Surface / RAU #9	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Physical and Aggregate Properties - Continued							
Solids	Total Dissolved	mg/L		204	276	164	5
Routine Water							
pH	at 25 °C			8.25	8.12	8.21	
Electrical Conductivity		µS/cm at 25 C		368	498	315	1
Calcium	Dissolved	mg/L		51.2	67.5	46.0	0.1
Iron	Dissolved	mg/L		<0.005	0.014	<0.005	0.005
Magnesium	Dissolved	mg/L		18.1	26.0	13.9	0.1
Manganese	Dissolved	mg/L		<0.001	0.015	<0.001	0.001
Potassium	Dissolved	mg/L		1.0	1.0	0.7	0.1
Silicon	Dissolved	mg/L		2.29	2.76	1.74	0.05
Sodium	Dissolved	mg/L		0.5	0.8	0.3	0.1
Bicarbonate		mg/L		217	304	191	5
Carbonate		mg/L		<6	<6	<6	6
Hydroxide		mg/L		<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L		<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L		178	250	157	5
Nitrate - N	Dissolved	mg/L		0.27	0.13	0.28	0.01
Nitrite - N	Dissolved	mg/L		<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L		28.7	35.5	17.1	0.5
Hardness	as CaCO3	mg/L		202	276	172	5
Hardness	Total	mg CaCO3/L		214	314	179	1

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
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Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: RGP-RAU
Location:
LSD:
P.O.:
Acct code:

Lot ID: **942151**
Control Number: B05984
Date Received: Jun 20, 2013
Date Reported: Jun 26, 2013
Report Number: 1835636

	Reference Number	942151-7	942151-8	942151-9	
	Sample Date	Jun 16, 2013	Jun 16, 2013	Jun 16, 2013	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Surface / RAU #10	Surface / RAU #11	Surface / RAU #12	
	Matrix	Water	Water	Water	
Analyte	**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters					
Organic Carbon Total Nonpurgeable	mg/L	2.6	2.1	1.8	0.5
Cyanide Total	mg/L	<0.002	<0.002	<0.002	0.002
Phosphorus Total	mg/L	0.023	<0.003	0.003	0.003
Ammonia - N	mg/L	0.01	0.01	0.01	.01
Metals Dissolved					
Sulfur Dissolved	mg/L	11.5	4.2	6.4	0.2
Aluminum Dissolved	mg/L	0.019	<0.005	<0.005	0.005
Antimony Dissolved	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic Dissolved	mg/L	0.0004	0.0002	0.0091	0.0002
Barium Dissolved	mg/L	0.044	0.232	0.133	0.001
Beryllium Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron Dissolved	mg/L	<0.004	<0.004	<0.004	0.004
Cadmium Dissolved	mg/L	<0.00001	0.00005	0.00001	0.00001
Chromium Dissolved	mg/L	<0.0004	0.0006	<0.0004	0.0004
Cobalt Dissolved	mg/L	0.00013	0.00003	0.00004	0.00002
Copper Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Lead Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium Dissolved	mg/L	0.002	<0.001	<0.001	0.001
Molybdenum Dissolved	mg/L	0.00063	0.00106	0.00197	0.0001
Nickel Dissolved	mg/L	0.002	<0.001	<0.001	0.001
Selenium Dissolved	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Silver Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium Dissolved	mg/L	0.107	0.036	0.075	0.001
Tellurium Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium Dissolved	mg/L	0.0007	0.0010	0.0017	0.0004
Vanadium Dissolved	mg/L	0.00017	0.00016	<0.00010	0.0001
Zinc Dissolved	mg/L	0.003	0.005	0.002	0.001
Zirconium Dissolved	mg/L	<0.00010	<0.00010	<0.00010	0.0001
Metals Total					
Calcium Total	mg/L	37.3	39.7	54.0	0.05
Iron Total	mg/L	0.560	0.010	0.011	0.01

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Company:

Project:
ID: ATAC Resources
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Acct code:

Lot ID: **942151**
Control Number: B05984
Date Received: Jun 20, 2013
Date Reported: Jun 26, 2013
Report Number: 1835636

	Reference Number	942151-7	942151-8	942151-9	
	Sample Date	Jun 16, 2013	Jun 16, 2013	Jun 16, 2013	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Surface / RAU #10	Surface / RAU #11	Surface / RAU #12	
	Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued						
Magnesium	Total	mg/L	14.3	13.4	14.9	0.05
Manganese	Total	mg/L	0.0331	<0.0050	<0.0050	0.005
Potassium	Total	mg/L	0.73	0.30	1.14	0.1
Silicon	Total	mg/L	2.22	1.64	2.03	0.05
Sulfur	Total	mg/L	11.4	4.5	6.6	0.1
Sodium	Total	mg/L	1.12	0.21	0.37	0.02
Titanium	Total	mg/L	0.0144	<0.0010	0.0034	0.001
Aluminum	Total	mg/L	0.322	<0.005	<0.005	0.005
Antimony	Total	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Total	mg/L	0.0005	0.0002	0.0087	0.0002
Barium	Total	mg/L	0.050	0.239	0.134	0.001
Beryllium	Total	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Total	mg/L	<0.0010	<0.0010	<0.0010	0.001
Boron	Total	mg/L	<0.005	<0.005	<0.005	0.004
Cadmium	Total	mg/L	0.00003	0.00004	<0.00001	0.00001
Chromium	Total	mg/L	0.0007	<0.0004	<0.0004	0.0004
Cobalt	Total	mg/L	0.00047	0.00003	0.00004	0.00002
Copper	Total	mg/L	0.002	<0.001	<0.001	0.001
Lead	Total	mg/L	0.0006	<0.0001	<0.0001	0.0001
Lithium	Total	mg/L	0.003	<0.001	<0.001	0.001
Mercury	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Molybdenum	Total	mg/L	0.0005	0.0010	0.0019	0.0001
Nickel	Total	mg/L	0.004	<0.001	<0.001	0.001
Selenium	Total	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Silver	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Strontium	Total	mg/L	0.113	0.036	0.075	0.001
Tellurium	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium	Total	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Total	mg/L	0.0007	0.0011	0.0017	0.0004
Vanadium	Total	mg/L	0.001	<0.0001	<0.0001	0.0001
Zinc	Total	mg/L	0.007	0.004	0.002	0.001
Zirconium	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2	<2	<2	1

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Analytical Report

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	RGP-RAU
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**942151**
Control Number:	B05984
Date Received:	Jun 20, 2013
Date Reported:	Jun 26, 2013
Report Number:	1835636

		Reference Number	942151-7	942151-8	942151-9	
		Sample Date	Jun 16, 2013	Jun 16, 2013	Jun 16, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surface / RAU #10	Surface / RAU #11	Surface / RAU #12	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Physical and Aggregate Properties - Continued						
Solids	Total Dissolved	mg/L	146	148	194	5
Routine Water						
pH	at 25 °C		8.11	8.16	8.20	
Electrical Conductivity		µS/cm at 25 C	260	275	355	1
Calcium	Dissolved	mg/L	32.4	37.3	51.6	0.1
Iron	Dissolved	mg/L	0.028	<0.005	<0.005	0.005
Magnesium	Dissolved	mg/L	12.7	12.8	14.6	0.1
Manganese	Dissolved	mg/L	0.004	<0.001	<0.001	0.001
Potassium	Dissolved	mg/L	0.4	0.2	1.1	0.1
Silicon	Dissolved	mg/L	1.71	1.53	1.93	0.05
Sodium	Dissolved	mg/L	1.0	0.2	0.4	0.1
Bicarbonate		mg/L	127	167	207	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	104	137	170	5
Nitrate - N	Dissolved	mg/L	0.07	0.17	0.44	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	35.8	13.3	20.4	0.5
Hardness	as CaCO3	mg/L	133	146	189	5
Hardness	Total	mg CaCO3/L	152	154	196	1

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: RGP-RAU
Location:
LSD:
P.O.:
Acct code:

Lot ID: **942151**
Control Number: B05984
Date Received: Jun 20, 2013
Date Reported: Jun 26, 2013
Report Number: 1835636

Reference Number	942151-10
Sample Date	Jun 16, 2013
Sample Time	NA
Sample Location	
Sample Description	Surface / RAU #13
Matrix	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	6.2			0.5
Cyanide	Total	mg/L	<0.002			0.002
Phosphorus	Total	mg/L	0.018			0.003
Ammonia - N		mg/L	0.02			.01
Metals Dissolved						
Sulfur	Dissolved	mg/L	12.5			0.2
Aluminum	Dissolved	mg/L	0.022			0.005
Antimony	Dissolved	mg/L	0.0002			0.0002
Arsenic	Dissolved	mg/L	0.0017			0.0002
Barium	Dissolved	mg/L	0.075			0.001
Beryllium	Dissolved	mg/L	<0.00004			0.00004
Bismuth	Dissolved	mg/L	<0.001			0.001
Boron	Dissolved	mg/L	0.008			0.004
Cadmium	Dissolved	mg/L	0.00022			0.00001
Chromium	Dissolved	mg/L	<0.0004			0.0004
Cobalt	Dissolved	mg/L	0.00018			0.00002
Copper	Dissolved	mg/L	0.002			0.001
Lead	Dissolved	mg/L	<0.0001			0.0001
Lithium	Dissolved	mg/L	0.002			0.001
Molybdenum	Dissolved	mg/L	0.00347			0.0001
Nickel	Dissolved	mg/L	0.011			0.001
Selenium	Dissolved	mg/L	0.0018			0.0006
Silver	Dissolved	mg/L	<0.00001			0.00001
Titanium	Dissolved	mg/L	<0.010			0.01
Strontium	Dissolved	mg/L	0.098			0.001
Tellurium	Dissolved	mg/L	<0.0001			0.0001
Thallium	Dissolved	mg/L	0.00002			0.00001
Thorium	Dissolved	mg/L	<0.0004			0.0004
Tin	Dissolved	mg/L	<0.0001			0.0001
Uranium	Dissolved	mg/L	0.0033			0.0004
Vanadium	Dissolved	mg/L	0.00038			0.0001
Zinc	Dissolved	mg/L	0.040			0.001
Zirconium	Dissolved	mg/L	0.00024			0.0001
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2			1
Solids	Total Dissolved	mg/L	208			5

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Analytical Report

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**942151**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B05984
	Box 20913	Name:	RGP-RAU	Date Received:	Jun 20, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Jun 26, 2013
	Y1A 6P2	LSD:		Report Number:	1835636
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

Reference Number	942151-10
Sample Date	Jun 16, 2013
Sample Time	NA
Sample Location	
Sample Description	Surface / RAU #13
Matrix	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Routine Water						
pH	at 25 °C		8.12			
Electrical Conductivity		µS/cm at 25 C	351			1
Calcium	Dissolved	mg/L	52.5			0.1
Iron	Dissolved	mg/L	0.178			0.005
Magnesium	Dissolved	mg/L	13.4			0.1
Manganese	Dissolved	mg/L	0.009			0.001
Potassium	Dissolved	mg/L	1.4			0.1
Silicon	Dissolved	mg/L	2.01			0.05
Sodium	Dissolved	mg/L	1.5			0.1
Bicarbonate		mg/L	179			5
Carbonate		mg/L	<6			6
Hydroxide		mg/L	<5			5
P-Alkalinity	as CaCO3	mg/L	<5			5
T-Alkalinity	as CaCO3	mg/L	147			5
Nitrate - N	Dissolved	mg/L	0.11			0.01
Nitrite - N	Dissolved	mg/L	<0.01			0.01
Sulfate (SO4)	Dissolved	mg/L	37.6			0.5
Hardness	as CaCO3	mg/L	186			5
Hardness	Total	mg CaCO3/L	194			1

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: RGP-RAU
Location:
LSD:
P.O.:
Acct code:

Lot ID: **942151**
Control Number: B05984
Date Received: Jun 20, 2013
Date Reported: Jun 26, 2013
Report Number: 1835636

		Reference Number	942151-10	942151-11		
		Sample Date	Jun 16, 2013	Jun 16, 2013		
		Sample Time	NA	NA		
		Sample Location				
		Sample Description	Surface / RAU #13	Surface / RAU #13 Duplicate		
		Matrix	Water	Water		
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Calcium	Total	mg/L	55.1	54.0		0.05
Iron	Total	mg/L	0.470	0.383		0.01
Magnesium	Total	mg/L	13.7	13.4		0.05
Manganese	Total	mg/L	0.0255	0.0228		0.005
Potassium	Total	mg/L	1.58	1.50		0.1
Silicon	Total	mg/L	2.29	2.22		0.05
Sulfur	Total	mg/L	12.2	12.2		0.1
Sodium	Total	mg/L	1.54	1.50		0.02
Titanium	Total	mg/L	0.0084	0.0041		0.001
Aluminum	Total	mg/L	0.133	0.101		0.005
Antimony	Total	mg/L	0.0002	0.0002		0.0002
Arsenic	Total	mg/L	0.0020	0.0019		0.0002
Barium	Total	mg/L	0.080	0.078		0.001
Beryllium	Total	mg/L	0.00004	<0.00004		0.00004
Bismuth	Total	mg/L	<0.0010	<0.0010		0.001
Boron	Total	mg/L	0.006	0.006		0.004
Cadmium	Total	mg/L	0.00026	0.00024		0.00001
Chromium	Total	mg/L	0.0004	<0.0004		0.0004
Cobalt	Total	mg/L	0.00030	0.00026		0.00002
Copper	Total	mg/L	0.005	0.002		0.001
Lead	Total	mg/L	0.0003	0.0003		0.0001
Lithium	Total	mg/L	0.002	0.002		0.001
Mercury	Total	mg/L	<0.00001	<0.00001		0.00001
Molybdenum	Total	mg/L	0.0034	0.0033		0.0001
Nickel	Total	mg/L	0.012	0.012		0.001
Selenium	Total	mg/L	0.0017	0.0017		0.0006
Silver	Total	mg/L	<0.00001	<0.00001		0.00001
Strontium	Total	mg/L	0.100	0.099		0.001
Tellurium	Total	mg/L	<0.0001	<0.0001		0.0001
Thallium	Total	mg/L	0.00002	0.00002		0.00001
Thorium	Total	mg/L	<0.0004	<0.0004		0.0004
Tin	Total	mg/L	<0.0001	<0.0001		0.0001
Uranium	Total	mg/L	0.0034	0.0033		0.0004
Vanadium	Total	mg/L	0.0008	0.0006		0.0001
Zinc	Total	mg/L	0.044	0.042		0.001
Zirconium	Total	mg/L	0.0002	0.0001		0.0001

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Analytical Report

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	RGP-RAU
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**942151**
Control Number:	B05984
Date Received:	Jun 20, 2013
Date Reported:	Jun 26, 2013
Report Number:	1835636

Approved by:

Anthony Neumann, MSc
Laboratory Operations Manager

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Methodology and Notes

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	RGP-RAU
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**942151**
Control Number:	B05984
Date Received:	Jun 20, 2013
Date Reported:	Jun 26, 2013
Report Number:	1835636

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water (Surrey)	APHA	* Alkalinity - Titration Method, 2320 B	21-Jun-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	* Conductivity, 2510 B	21-Jun-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	* pH - Electrometric Method, 4500-H+ B	21-Jun-13	Exova Surrey
Ammonia-N in Water (Surrey)	APHA	* Flow Injection Analysis, 4500-NH3 H	25-Jun-13	Exova Surrey
Anions by IEC in water (Surrey)	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	21-Jun-13	Exova Surrey
Carbon Organic (Total) in water (TOC)	APHA	High-Temperature Combustion Method, 5310 B	25-Jun-13	Exova Edmonton
Cyanide (Total) in water	US EPA	* US EPA method, 335.3	24-Jun-13	Exova Edmonton
Mercury Low Level (Total) in water (Surrey)	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	24-Jun-13	Exova Surrey
Metals SemiTrace (Dissolved) in water (Surrey)	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	21-Jun-13	Exova Surrey
Metals SemiTrace (Total) in Water (Surrey)	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	21-Jun-13	Exova Surrey
Phosphorus - total (low level) - Surrey	APHA	* Preliminary Acid Hydrolysis, Ascorbic Acid Reduction Method, 4500-P B,E	21-Jun-13	Exova Surrey
Solids Dissolved (Total, Fixed and Volatile) - Surrey	APHA	* Total Dissolved Solids Dried at 180 C, 2540 C	21-Jun-13	Exova Surrey
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105'C, 2540 D	21-Jun-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	21-Jun-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	21-Jun-13	Exova Surrey
Trace Metals (Total) in Water (Surrey)	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	21-Jun-13	Exova Surrey
Trace Metals (Total) in Water (Surrey)	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	21-Jun-13	Exova Surrey

** Reference Method Modified*

References

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

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Methodology and Notes

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	RGP-RAU
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**942151**
Control Number:	B05984
Date Received:	Jun 20, 2013
Date Reported:	Jun 26, 2013
Report Number:	1835636

Comments:

- Some total metal results were less than dissolved metal results for lot 942151. The results were verified and are within expected measurement uncertainty.
- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.
The test report shall not be reproduced except in full, without the written approval of the laboratory.

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Project Information

Project ID:	ATAC RESOURCES
Project Name:	RGP - RAU
Project Location:	
Legal Location:	
PO/AFE#:	
Proj. Acct. Code:	

Billing Information

Company:	J. Gibson & Associates
Address:	
	Whitehorse, YT Y1A 6P2
Attention:	John Gibson
Phone:	(867) 633-4522
Cell:	
Fax:	(867) 668-6895
E-mail:	ludditegibson@gmail.com
Agreement ID:	6646
Copy of report:	X

Copy of Report To:

Company:	J. Gibson & Associates
Address:	
	Whitehorse, YT Y1A 6P2
Attention:	John Gibson
Phone:	(867) 633-4522
Cell:	
Fax:	(867) 668-6895
E-mail:	ludditegibson@gmail.com
Copy of invoice:	X

RUSH Priority

Upon filling out this section, client accepts that surcharges will be applied to the analysis.

Date Required | As Indicated | All Analysis

When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples.

Signature

Report Results: E-mail / Mail / Online / Fax / PDF / Excel / QA/QC Report

Special Instructions/Comments (please include contact information including ph. # if different from above).

RCHGN = pH, EC, TA, N_2, N_3, TALK, SO4, HARDT, TSS, TDS
METALS + NITRIC NH4 + SULFURIC TCN + NaOH
TN23 Field Filtered TOC + HCL

Include Regulatory Requirements Below:

Sample Custody (please print)

Sampled by: J GIBSON
Company:
I authorize Exova to proceed with the work indicated on this form:
Date: JUN 16/13 Initial: JG

This section for Lab use only

Date/Time stamp:
06-20-13P02:35 RCVD

	Sample Identification	Location	Depth IN CM M	Date/Time sampled	Matrix	Sampling Method	Number of Containers	RCHGN	NH4	TOC	TCN	TN2303 F	TN24 Alk + TH
1	RAU #1	SURF	—	JUN 16	H_2O	Grab	6	✓	✓	✓		✓	✓	✓
2	RAU #2						6	✓	✓	✓		✓	✓	✓
3	RAU #3						6	✓	✓	✓		✓	✓	✓
4	RAU #4						6	✓	✓	✓		✓	✓	✓
5	RAU #5						6	✓	✓	✓		✓	✓	✓
6	RAU #9						6	✓	✓	✓		✓	✓	✓
7	RAU #10						6	✓	✓	✓		✓	✓	✓
8	RAU #11						6	✓	✓	✓		✓	✓	✓
9	RAU #12						6	✓	✓	✓		✓	✓	✓
10	RAU #13						6	✓	✓	✓		✓	✓	✓
11														
12	RAU #13 DUPLICATE						1							✓
13														
14														
15														

Enter tests above (√ relevant samples below)

Indicate below any deficiencies in the condition of samples:

	Were Exova supplies used?
	Was there any damage to the shipping container?
	Were the containers packaged well?
	Were any extra samples received (document below)?
OK	Are samples within recommended holding times/temp?

ED 120-00

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

Please indicate any potentially hazardous samples

Page of Control # B05984

LOT: 942151 COC

Shipping: COD Y/N

Cooler temp: 12 C

and size of coolers received:

Delivery Method:

Waybill:

Received by:

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Report Transmission Cover Page

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**947885**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B05953
	Box 20913	Name:	Tiger Project	Date Received:	Jul 19, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Jul 30, 2013
	Y1A 6P2	LSD:		Report Number:	1842797
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

Contact & Affiliation	Address	Delivery Commitments
John Gibson J. Gibson & Associates	, Box 20913 Whitehorse, Yukon Territory Y1A 6P2 Phone: (867) 633-4522 Fax: (867) 668-6895 Email: ludditegibson@gmail.com	On [Lot Verification] send (COA) by Email - Single Report On [Report Approval] send (COC, Test Report) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report On [Lot Creation] send (COR) by Email - Single Report

Notes To Clients:

- Analysis was performed on sample 947885- 1 to 9 that exceeded the recommended holding time for nitrite/nitrate anions analysis.
- Some total metal results were less than dissolved metal results for lot 947885. The results were verified and are within expected measurement uncertainty.
- Te results could not be provided due to instrument failure.
- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **947885**
Control Number: B05953
Date Received: Jul 19, 2013
Date Reported: Jul 30, 2013
Report Number: 1842797

	Reference Number	947885-1	947885-2	947885-3	
	Sample Date	Jul 17, 2013	Jul 17, 2013	Jul 17, 2013	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	RAU #3	RAU #4	RAU #7	
	Matrix	Water	Water	Water	
Analyte	**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued					
Manganese Total	mg/L	0.0077	<0.0050	0.0643	0.005
Potassium Total	mg/L	1.13	0.84	1.15	0.1
Silicon Total	mg/L	2.42	2.40	2.66	0.05
Sulfur Total	mg/L	9.3	9.8	16.6	0.1
Sodium Total	mg/L	1.20	0.87	2.28	0.02
Titanium Total	mg/L	0.0050	0.0049	0.0138	0.001
Aluminum Total	mg/L	0.032	0.027	0.310	0.005
Antimony Total	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic Total	mg/L	0.0007	0.0025	0.0018	0.0002
Barium Total	mg/L	0.111	0.136	0.124	0.001
Beryllium Total	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth Total	mg/L	<0.001	<0.001	<0.001	0.001
Boron Total	mg/L	0.006	<0.005	0.006	0.004
Cadmium Total	mg/L	0.00004	0.00003	0.00014	0.00001
Chromium Total	mg/L	<0.0004	<0.0004	0.0008	0.0004
Cobalt Total	mg/L	0.00004	0.00003	0.00060	0.00002
Copper Total	mg/L	<0.001	<0.001	0.002	0.001
Lead Total	mg/L	0.0001	<0.0001	0.0034	0.0001
Lithium Total	mg/L	0.002	0.001	0.003	0.001
Mercury Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Molybdenum Total	mg/L	0.0037	0.0015	0.0020	0.0001
Nickel Total	mg/L	<0.001	<0.001	0.003	0.001
Selenium Total	mg/L	0.0016	0.0006	<0.0006	0.0006
Silver Total	mg/L	0.00003	<0.00001	<0.00001	0.00001
Strontium Total	mg/L	0.081	0.079	0.128	0.001
Thallium Total	mg/L	<0.00001	<0.00001	0.00001	0.00001
Thorium Total	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium Total	mg/L	0.0028	0.0026	0.0056	0.0004
Vanadium Total	mg/L	0.0002	0.0002	0.0018	0.0001
Zinc Total	mg/L	0.001	0.007	0.016	0.001
Zirconium Total	mg/L	0.0011	0.0002	0.0004	0.0001
Physical and Aggregate Properties					
Solids Total Suspended	mg/L	<2	<2	102	1
Solids Total Dissolved	mg/L	222	226	294	5

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **947885**
Control Number: B05953
Date Received: Jul 19, 2013
Date Reported: Jul 30, 2013
Report Number: 1842797

			Reference Number	947885-1	947885-2	947885-3	
			Sample Date	Jul 17, 2013	Jul 17, 2013	Jul 17, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	RAU #3	RAU #4	RAU #7	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water							
pH	at 25 °C			8.15	8.20	7.95	
Electrical Conductivity		µS/cm at 25 C		369	383	492	1
Calcium	Dissolved	mg/L		60.2	56.1	64.2	0.1
Iron	Dissolved	mg/L		0.021	<0.005	0.022	0.005
Magnesium	Dissolved	mg/L		16.8	20.8	31.1	0.1
Manganese	Dissolved	mg/L		0.004	0.002	0.023	0.001
Potassium	Dissolved	mg/L		1.1	0.8	1.1	0.1
Silicon	Dissolved	mg/L		2.41	2.42	2.31	0.05
Sodium	Dissolved	mg/L		1.2	1.0	2.4	0.1
Bicarbonate		mg/L		226	232	281	5
Carbonate		mg/L		<6	<6	<6	6
Hydroxide		mg/L		<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L		<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L		185	190	230	5
Chloride	Dissolved	mg/L		0.06	0.11	2.50	0.05
Nitrate - N	Dissolved	mg/L		0.08	0.23	0.17	0.01
Nitrite - N	Dissolved	mg/L		<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L		30.3	31.5	53.6	0.5
Hardness	as CaCO3	mg/L		219	226	288	5
Hardness	Total	mg CaCO3/L		220	222	316	1

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Attn: John Gibson
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Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
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Lot ID: **947885**
Control Number: B05953
Date Received: Jul 19, 2013
Date Reported: Jul 30, 2013
Report Number: 1842797

			Reference Number	947885-4	947885-5	947885-6	
			Sample Date	Jul 17, 2013	Jul 17, 2013	Jul 17, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	RAU #8	RAU #9	RAU #10	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters							
Organic Carbon	Total Nonpurgeable	mg/L		1.7	1.3	1.6	0.5
Cyanide	Total	mg/L		<0.002	<0.002	<0.002	0.002
Phosphorus	Total	mg/L		<0.003	<0.003	<0.003	0.003
Ammonia - N		mg/L		0.03	<0.01	0.04	.01
Metals Dissolved							
Sulfur	Dissolved	mg/L		9.2	6.9	13.6	0.2
Aluminum	Dissolved	mg/L		<0.005	<0.005	0.011	0.005
Antimony	Dissolved	mg/L		<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Dissolved	mg/L		0.0003	0.0052	0.0004	0.0002
Barium	Dissolved	mg/L		0.177	0.188	0.068	0.001
Beryllium	Dissolved	mg/L		<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L		<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L		<0.004	<0.004	<0.004	0.004
Cadmium	Dissolved	mg/L		0.00011	0.00002	0.00002	0.00001
Chromium	Dissolved	mg/L		<0.0004	<0.0004	<0.0004	0.0004
Cobalt	Dissolved	mg/L		<0.00002	<0.00002	0.00003	0.00002
Copper	Dissolved	mg/L		<0.001	<0.001	<0.001	0.001
Lead	Dissolved	mg/L		0.0006	0.0006	0.0002	0.0001
Lithium	Dissolved	mg/L		<0.001	<0.001	0.003	0.001
Molybdenum	Dissolved	mg/L		0.00073	0.00148	0.00086	0.0001
Nickel	Dissolved	mg/L		0.001	<0.001	0.002	0.001
Selenium	Dissolved	mg/L		0.0010	<0.0006	<0.0006	0.0006
Silver	Dissolved	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L		<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L		0.054	0.067	0.161	0.001
Thallium	Dissolved	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Thorium	Dissolved	mg/L		<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L		0.0032	0.0013	0.0009	0.0004
Vanadium	Dissolved	mg/L		0.00010	<0.00010	0.00012	0.0001
Zinc	Dissolved	mg/L		0.034	0.003	0.002	0.001
Zirconium	Dissolved	mg/L		0.00011	<0.00010	0.00011	0.0001
Metals Total							
Calcium	Total	mg/L		49.3	53.4	45.5	0.05
Iron	Total	mg/L		0.011	0.024	0.079	0.01
Magnesium	Total	mg/L		18.4	16.6	18.2	0.05

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Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **947885**
Control Number: B05953
Date Received: Jul 19, 2013
Date Reported: Jul 30, 2013
Report Number: 1842797

			Reference Number	947885-4	947885-5	947885-6	
			Sample Date	Jul 17, 2013	Jul 17, 2013	Jul 17, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	RAU #8	RAU #9	RAU #10	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued							
Manganese	Total	mg/L		<0.0050	<0.0050	0.0143	0.005
Potassium	Total	mg/L		0.29	0.51	0.58	0.1
Silicon	Total	mg/L		1.26	1.92	1.98	0.05
Sulfur	Total	mg/L		9.3	6.9	14.7	0.1
Sodium	Total	mg/L		0.78	0.71	1.96	0.02
Titanium	Total	mg/L		0.0026	0.0023	0.0042	0.001
Aluminum	Total	mg/L		<0.005	0.012	0.019	0.005
Antimony	Total	mg/L		<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Total	mg/L		0.0003	0.0051	0.0004	0.0002
Barium	Total	mg/L		0.174	0.186	0.058	0.001
Beryllium	Total	mg/L		<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Total	mg/L		<0.001	<0.001	<0.001	0.001
Boron	Total	mg/L		<0.005	<0.005	<0.005	0.004
Cadmium	Total	mg/L		0.00012	0.00002	0.00002	0.00001
Chromium	Total	mg/L		<0.0004	<0.0004	<0.0004	0.0004
Cobalt	Total	mg/L		<0.00002	<0.00002	0.00005	0.00002
Copper	Total	mg/L		<0.001	<0.001	<0.001	0.001
Lead	Total	mg/L		0.0001	<0.0001	<0.0001	0.0001
Lithium	Total	mg/L		<0.001	<0.001	0.003	0.001
Mercury	Total	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Molybdenum	Total	mg/L		0.0007	0.0014	0.0008	0.0001
Nickel	Total	mg/L		0.001	<0.001	0.002	0.001
Selenium	Total	mg/L		0.0010	<0.0006	<0.0006	0.0006
Silver	Total	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Strontium	Total	mg/L		0.052	0.064	0.139	0.001
Thallium	Total	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Thorium	Total	mg/L		<0.0004	<0.0004	<0.0004	0.0004
Tin	Total	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Uranium	Total	mg/L		0.0035	0.0014	0.0009	0.0004
Vanadium	Total	mg/L		0.0001	<0.0001	0.0001	0.0001
Zinc	Total	mg/L		0.028	0.002	0.002	0.001
Zirconium	Total	mg/L		0.0001	<0.0001	0.0002	0.0001
Physical and Aggregate Properties							
Solids	Total Suspended	mg/L		<2	<2	<2	1
Solids	Total Dissolved	mg/L		198	204	216	5

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Analytical Report

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Whitehorse, YT, Canada
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Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **947885**
Control Number: B05953
Date Received: Jul 19, 2013
Date Reported: Jul 30, 2013
Report Number: 1842797

		Reference Number	947885-4	947885-5	947885-6	
		Sample Date	Jul 17, 2013	Jul 17, 2013	Jul 17, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	RAU #8	RAU #9	RAU #10	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water						
pH	at 25 °C		8.15	8.14	8.15	
Electrical Conductivity		µS/cm at 25 C	332	338	330	1
Calcium	Dissolved	mg/L	48.8	53.7	49.8	0.1
Iron	Dissolved	mg/L	0.008	0.010	0.037	0.005
Magnesium	Dissolved	mg/L	18.3	16.6	19.9	0.1
Manganese	Dissolved	mg/L	0.001	0.005	0.013	0.001
Potassium	Dissolved	mg/L	0.3	0.5	0.6	0.1
Silicon	Dissolved	mg/L	1.25	1.90	2.09	0.05
Sodium	Dissolved	mg/L	0.9	0.9	2.1	0.1
Bicarbonate		mg/L	201	216	174	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	165	177	143	5
Chloride	Dissolved	mg/L	0.08	0.07	0.44	0.05
Nitrate - N	Dissolved	mg/L	0.10	0.20	0.05	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	29.6	21.7	48.1	0.5
Hardness	as CaCO3	mg/L	197	202	206	5
Hardness	Total	mg CaCO3/L	199	202	189	1

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Project:
ID: ATAC Resources
Name: Tiger Project
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Lot ID: **947885**
Control Number: B05953
Date Received: Jul 19, 2013
Date Reported: Jul 30, 2013
Report Number: 1842797

		Reference Number	947885-7	947885-8	947885-9	
		Sample Date	Jul 17, 2013	Jul 17, 2013	Jul 17, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	RAU #11	RAU #12	RAU #13	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	1	1.4	2.1	0.5
Cyanide	Total	mg/L	<0.002	<0.002	<0.002	0.002
Phosphorus	Total	mg/L	<0.003	<0.003	0.004	0.003
Ammonia - N		mg/L	0.03	0.03	0.03	.01
Metals Dissolved						
Sulfur	Dissolved	mg/L	5.8	7.3	19.5	0.2
Aluminum	Dissolved	mg/L	<0.005	<0.005	0.013	0.005
Antimony	Dissolved	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Dissolved	mg/L	<0.0002	0.0089	0.0008	0.0002
Barium	Dissolved	mg/L	0.265	0.145	0.095	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	<0.004	<0.004	0.015	0.004
Cadmium	Dissolved	mg/L	0.00004	0.00001	0.00041	0.00001
Chromium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Cobalt	Dissolved	mg/L	<0.00002	<0.00002	0.00026	0.00002
Copper	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Lead	Dissolved	mg/L	0.0007	0.0001	0.0004	0.0001
Lithium	Dissolved	mg/L	<0.001	<0.001	0.004	0.001
Molybdenum	Dissolved	mg/L	0.00109	0.00198	0.00550	0.0001
Nickel	Dissolved	mg/L	<0.001	<0.001	0.021	0.001
Selenium	Dissolved	mg/L	<0.0006	<0.0006	0.0031	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L	0.044	0.078	0.178	0.001
Thallium	Dissolved	mg/L	<0.00001	<0.00001	0.00003	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L	0.0010	0.0014	0.0053	0.0004
Vanadium	Dissolved	mg/L	<0.00010	<0.00010	0.00018	0.0001
Zinc	Dissolved	mg/L	0.004	0.002	0.065	0.001
Zirconium	Dissolved	mg/L	<0.00010	<0.00010	0.00045	0.0001
Metals Total						
Calcium	Total	mg/L	45.0	54.5	77.7	0.05
Iron	Total	mg/L	<0.010	<0.010	0.316	0.01
Magnesium	Total	mg/L	15.7	15.8	19.8	0.05

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Project:
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Lot ID: **947885**
Control Number: B05953
Date Received: Jul 19, 2013
Date Reported: Jul 30, 2013
Report Number: 1842797

			Reference Number	947885-7	947885-8	947885-9	
			Sample Date	Jul 17, 2013	Jul 17, 2013	Jul 17, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	RAU #11	RAU #12	RAU #13	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued							
Manganese	Total	mg/L		<0.0050	<0.0050	0.0255	0.005
Potassium	Total	mg/L		0.15	0.78	1.86	0.1
Silicon	Total	mg/L		1.66	2.00	2.54	0.05
Sulfur	Total	mg/L		5.7	7.5	19.7	0.1
Sodium	Total	mg/L		0.32	0.74	3.52	0.02
Titanium	Total	mg/L		0.0010	0.0041	<0.0010	0.001
Aluminum	Total	mg/L		<0.005	<0.005	0.028	0.005
Antimony	Total	mg/L		<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Total	mg/L		0.0002	0.0093	0.0013	0.0002
Barium	Total	mg/L		0.274	0.152	0.101	0.001
Beryllium	Total	mg/L		<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Total	mg/L		<0.001	<0.001	<0.001	0.001
Boron	Total	mg/L		<0.005	<0.005	0.015	0.004
Cadmium	Total	mg/L		0.00004	0.00001	0.00048	0.00001
Chromium	Total	mg/L		<0.0004	<0.0004	<0.0004	0.0004
Cobalt	Total	mg/L		<0.00002	<0.00002	0.00028	0.00002
Copper	Total	mg/L		<0.001	<0.001	0.001	0.001
Lead	Total	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Lithium	Total	mg/L		<0.001	<0.001	0.005	0.001
Mercury	Total	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Molybdenum	Total	mg/L		0.0011	0.0021	0.0058	0.0001
Nickel	Total	mg/L		<0.001	<0.001	0.022	0.001
Selenium	Total	mg/L		<0.0006	<0.0006	0.0032	0.0006
Silver	Total	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Strontium	Total	mg/L		0.042	0.080	0.184	0.001
Thallium	Total	mg/L		<0.00001	<0.00001	0.00003	0.00001
Thorium	Total	mg/L		<0.0004	<0.0004	<0.0004	0.0004
Tin	Total	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Uranium	Total	mg/L		0.0011	0.0017	0.0065	0.0004
Vanadium	Total	mg/L		<0.0001	<0.0001	0.0004	0.0001
Zinc	Total	mg/L		0.004	0.002	0.083	0.001
Zirconium	Total	mg/L		<0.0001	<0.0001	0.0005	0.0001
Physical and Aggregate Properties							
Solids	Total Suspended	mg/L		<2	<2	<2	1
Solids	Total Dissolved	mg/L		184	218	344	5

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **947885**
Control Number: B05953
Date Received: Jul 19, 2013
Date Reported: Jul 30, 2013
Report Number: 1842797

		Reference Number	947885-7	947885-8	947885-9	
		Sample Date	Jul 17, 2013	Jul 17, 2013	Jul 17, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	RAU #11	RAU #12	RAU #13	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water						
pH	at 25 °C		8.06	8.10	8.10	
Electrical Conductivity		µS/cm at 25 C	299	347	484	1
Calcium	Dissolved	mg/L	45.2	55.9	77.0	0.1
Iron	Dissolved	mg/L	<0.005	<0.005	0.030	0.005
Magnesium	Dissolved	mg/L	15.7	16.2	19.6	0.1
Manganese	Dissolved	mg/L	<0.001	<0.001	0.024	0.001
Potassium	Dissolved	mg/L	0.1	0.8	1.8	0.1
Silicon	Dissolved	mg/L	1.69	1.98	2.51	0.05
Sodium	Dissolved	mg/L	0.7	0.9	3.4	0.1
Bicarbonate		mg/L	191	219	254	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	157	180	208	5
Chloride	Dissolved	mg/L	0.06	0.05	4.89	0.05
Nitrate - N	Dissolved	mg/L	0.15	0.27	0.10	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	18.7	24.3	65.7	0.5
Hardness	as CaCO3	mg/L	178	206	273	5
Hardness	Total	mg CaCO3/L	177	201	276	1

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Analytical Report

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**947885**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B05953
	Box 20913	Name:	Tiger Project	Date Received:	Jul 19, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Jul 30, 2013
	Y1A 6P2	LSD:		Report Number:	1842797
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

Reference Number	947885-10
Sample Date	Jul 17, 2013
Sample Time	NA
Sample Location	
Sample Description	RAU #9 Duplicate
Matrix	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Metals Dissolved						
Sulfur	Dissolved	mg/L	6.8			0.2
Aluminum	Dissolved	mg/L	<0.005			0.005
Antimony	Dissolved	mg/L	<0.0002			0.0002
Arsenic	Dissolved	mg/L	0.0051			0.0002
Barium	Dissolved	mg/L	0.187			0.001
Beryllium	Dissolved	mg/L	<0.00004			0.00004
Bismuth	Dissolved	mg/L	<0.001			0.001
Boron	Dissolved	mg/L	<0.004			0.004
Cadmium	Dissolved	mg/L	0.00002			0.00001
Chromium	Dissolved	mg/L	<0.0004			0.0004
Cobalt	Dissolved	mg/L	<0.00002			0.00002
Copper	Dissolved	mg/L	<0.001			0.001
Lead	Dissolved	mg/L	0.0002			0.0001
Lithium	Dissolved	mg/L	<0.001			0.001
Molybdenum	Dissolved	mg/L	0.00148			0.0001
Nickel	Dissolved	mg/L	<0.001			0.001
Selenium	Dissolved	mg/L	<0.0006			0.0006
Silver	Dissolved	mg/L	<0.00001			0.00001
Titanium	Dissolved	mg/L	<0.010			0.01
Strontium	Dissolved	mg/L	0.066			0.001
Thallium	Dissolved	mg/L	<0.00001			0.00001
Thorium	Dissolved	mg/L	<0.0004			0.0004
Tin	Dissolved	mg/L	<0.0001			0.0001
Uranium	Dissolved	mg/L	0.0014			0.0004
Vanadium	Dissolved	mg/L	<0.00010			0.0001
Zinc	Dissolved	mg/L	0.002			0.001
Zirconium	Dissolved	mg/L	<0.00010			0.0001
Metals Total						
Calcium	Total	mg/L	53.4			0.05
Iron	Total	mg/L	0.020			0.01
Magnesium	Total	mg/L	16.6			0.05
Manganese	Total	mg/L	<0.0050			0.005
Potassium	Total	mg/L	0.47			0.1
Silicon	Total	mg/L	1.94			0.05
Sulfur	Total	mg/L	6.9			0.1
Sodium	Total	mg/L	0.68			0.02

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Analytical Report

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**947885**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B05953
	Box 20913	Name:	Tiger Project	Date Received:	Jul 19, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Jul 30, 2013
	Y1A 6P2	LSD:		Report Number:	1842797
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

Reference Number	947885-10
Sample Date	Jul 17, 2013
Sample Time	NA
Sample Location	
Sample Description	RAU #9 Duplicate
Matrix	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Metals Total - Continued						
Titanium	Total	mg/L	<0.0010			0.001
Aluminum	Total	mg/L	0.010			0.005
Antimony	Total	mg/L	<0.0002			0.0002
Arsenic	Total	mg/L	0.0054			0.0002
Barium	Total	mg/L	0.199			0.001
Beryllium	Total	mg/L	<0.00004			0.00004
Bismuth	Total	mg/L	<0.001			0.001
Boron	Total	mg/L	<0.005			0.004
Cadmium	Total	mg/L	0.00002			0.00001
Chromium	Total	mg/L	<0.0004			0.0004
Cobalt	Total	mg/L	<0.00002			0.00002
Copper	Total	mg/L	<0.001			0.001
Lead	Total	mg/L	<0.0001			0.0001
Lithium	Total	mg/L	<0.001			0.001
Mercury	Total	mg/L	<0.00001			0.00001
Molybdenum	Total	mg/L	0.0015			0.0001
Nickel	Total	mg/L	<0.001			0.001
Selenium	Total	mg/L	<0.0006			0.0006
Silver	Total	mg/L	<0.00001			0.00001
Strontium	Total	mg/L	0.069			0.001
Thallium	Total	mg/L	<0.00001			0.00001
Thorium	Total	mg/L	<0.0004			0.0004
Tin	Total	mg/L	<0.0001			0.0001
Uranium	Total	mg/L	0.0016			0.0004
Vanadium	Total	mg/L	<0.0001			0.0001
Zinc	Total	mg/L	0.002			0.001
Zirconium	Total	mg/L	<0.0001			0.0001
Routine Water						
Calcium	Dissolved	mg/L	53.2			0.1
Iron	Dissolved	mg/L	<0.005			0.005
Magnesium	Dissolved	mg/L	16.5			0.1
Manganese	Dissolved	mg/L	0.005			0.001
Potassium	Dissolved	mg/L	0.5			0.1
Silicon	Dissolved	mg/L	1.91			0.05
Sodium	Dissolved	mg/L	0.8			0.1
Hardness	as CaCO3	mg/L	201			5

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Analytical Report

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	Tiger Project
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**947885**
Control Number:	B05953
Date Received:	Jul 19, 2013
Date Reported:	Jul 30, 2013
Report Number:	1842797

Approved by:

Mathieu Simoneau
Operations Manager

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Methodology and Notes

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	Tiger Project
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**947885**
Control Number:	B05953
Date Received:	Jul 19, 2013
Date Reported:	Jul 30, 2013
Report Number:	1842797

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water (Surrey)	APHA	*	Alkalinity - Titration Method, 2320 B	22-Jul-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	*	Conductivity, 2510 B	22-Jul-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	*	pH - Electrometric Method, 4500-H+ B	22-Jul-13	Exova Surrey
Ammonia-N in Water (Surrey)	APHA	*	Flow Injection Analysis, 4500-NH3 H	24-Jul-13	Exova Surrey
Anions by IEC in water (Surrey)	APHA	*	Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	22-Jul-13	Exova Surrey
Carbon Organic (Total) in water (TOC)	APHA		High-Temperature Combustion Method, 5310 B	24-Jul-13	Exova Edmonton
Cyanide (Total) in water	US EPA	*	US EPA method, 335.3	24-Jul-13	Exova Edmonton
Mercury Low Level (Total) in water (Surrey)	EPA	*	Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	23-Jul-13	Exova Surrey
Metals SemiTrace (Dissolved) in water (Surrey)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	22-Jul-13	Exova Surrey
Metals SemiTrace (Total) in Water (Surrey)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	22-Jul-13	Exova Surrey
Phosphorus - total (low level) - Surrey	APHA	*	Preliminary Acid Hydrolysis, Ascorbic Acid Reduction Method, 4500-P B,E	23-Jul-13	Exova Surrey
Solids Dissolved (Total, Fixed and Volatile) - Surrey	APHA	*	Total Dissolved Solids Dried at 180 C, 2540 C	23-Jul-13	Exova Surrey
Solids Suspended (Total, Fixed and Volatile)	APHA	*	Total Suspended Solids Dried at 103-105'C, 2540 D	23-Jul-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	22-Jul-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	29-Jul-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	22-Jul-13	Exova Surrey
Trace Metals (Total) in Water (Surrey)	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	22-Jul-13	Exova Surrey
Trace Metals (Total) in Water (Surrey)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	22-Jul-13	Exova Surrey

** Reference Method Modified*

References

US EPA	US Environmental Protection Agency Test Methods
APHA	Standard Methods for the Examination of Water and Wastewater

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Methodology and Notes

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**947885**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B05953
	Box 20913	Name:	Tiger Project	Date Received:	Jul 19, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Jul 30, 2013
	Y1A 6P2	LSD:		Report Number:	1842797
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

Comments:

- Analysis was performed on sample 947885- 1 to 9 that exceeded the recommended holding time for nitrite/nitrate anions analysis.
- Some total metal results were less than dissolved metal results for lot 947885. The results were verified and are within expected measurement uncertainty.
- Te results could not be provided due to instrument failure.
- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.
The test report shall not be reproduced except in full, without the written approval of the laboratory.

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Billing Information

Company: J. Gibson & Associates
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Whitehorse, YT Y1A 6P2
Attention: John Gibson
Phone: (867) 633-4522
Cell:
Fax: (867) 668-6895
E-mail: ludditegibson@gmail.com
Agreement ID: 6646
Copy of report: X

Copy of Report To:

Company: J. Gibson & Associates
Address:
Whitehorse, YT Y1A 6P2
Attention: John Gibson
Phone: (867) 633-4522
Cell:
Fax: (867) 668-6895
E-mail: ludditegibson@gmail.com
Copy of invoice: X

RUSH Priority

Upon filling out this section, client accepts that surcharges will be applied to the analysis

Date Required
As Indicated | All Analysis

When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples.

Signature

Project Information

Project ID: ATAC RESOURCES
Project Name: TIGER PROJECT
Project Location:
Legal Location:
PO/AFE#:
Proj. Acct. Code:

Report Results

E-mail [ ] | Online [X] | PDF [X] | QA/QC Report [ ]
Mail [ ] | Fax [ ] | Excel [X]

Special Instructions/Comments (please include contact information including ph. # if different from above):
RCHEM = pH, EC, TP, N_2, N_3, TALK, CL, SO4, HARDT, FS, TDS.
TW23 Field filtered
METALS + Nitric
TOC + HCL, NH4 + SULFURIC, TCN + NaOH.

Include Regulatory Requirements Below:

Sample Custody (please print)

Sampled by: J GIBSON
Company:
I authorize Exova to proceed with the work indicated on this form:
Date: JUL 17/13 Initial: JG

This section for Lab use only

Date/Time stamp: 07-19-13 P03:57. RCVD

	Sample Identification	Location	Depth IN CM M	Date/Time sampled	Matrix	Sampling Method	Number of Containers	RCHEM	NH4	TOC	TCN	TOTAL ONEAL	TW23 Field F.
1	RAU #3						6	✓	✓	✓	✓	✓	✓
2	#4						6	✓	✓	✓	✓	✓	✓
3	#7						6	✓	✓	✓	✓	✓	✓
4	#8						6	✓	✓	✓	✓	✓	✓
5	#9						6	✓	✓	✓	✓	✓	✓
6	#10						6	✓	✓	✓	✓	✓	✓
7	#11						6	✓	✓	✓	✓	✓	✓
8	#12						6	✓	✓	✓	✓	✓	✓
9	#13						6	✓	✓	✓	✓	✓	✓
10													
11	RAU #9 DUPLICATE						2					✓	✓
12													
13													
14													
15													

Enter tests above (√ relevant samples below)

Indicate below any deficiencies in the condition of samples:

- Were Exova supplies used?
- Was there any damage to the shipping container?
- Were the containers packaged well?
- Were any extra samples received (document below)?
- Are samples within recommended holding times/temp?

ED 120-00

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

Please indicate any potentially hazardous samples

Page 1 of 1 Control # B05953

In LOT: 947885 COC

Shipping:
COD Y/N
Cooler temp: 8 C

and size of coolers received:
Delivery Method:
Waybill:
Received by:

APPENDIX 2

Flow Volume Calculations

June and July 2013

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **16 Jun,2013 1550 hrs**

Site: **RAU#1**

Point *(m)*	Depth *(meters)*	Width *(meters)*	Velocity *(m/sec)*	Area *(m sq)*	Volume *(cms)*
1.09	0	0.105	0	0	0
1.3	0.13	0.255	0.081	0.033	0.0027
1.6	0.04	0.3	0.552	0.012	0.0066
1.9	0.19	0.3	0.72	0.057	0.0410
2.2	0.24	0.3	0.676	0.072	0.0487
2.5	0.27	0.25	0.69	0.068	0.0466
2.7	0.33	0.2	0.495	0.066	0.0327
2.9	0.29	0.2	0.508	0.058	0.0295
3.1	0.34	0.2	0.944	0.068	0.0642
3.3	0.26	0.2	0.805	0.052	0.0419
3.5	0.16	0.25	0.629	0.040	0.0252
3.8	0.16	0.3	0.462	0.048	0.0222
4.1	0.14	0.3	0.415	0.042	0.0174
4.4	0.12	0.35	0.212	0.042	0.0089
4.8	0.07	0.335	0.155	0.023	0.0036
5.07	0	0.135	0	0.000	0.0000
3.98		3.98			**0.3911**

All velocity readings at 0.6 depth

Staff Gauge 0.067 m at 1550 hrs
0.069 m @ 1615 hrs

Logger: OP check okay

Channel under ice? no channel ice

Method: Price Velocity meter/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **Jun16,2013**

Site: **RAU#2**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
1.26	0	0.12	0	0	0
1.5	0.2	0.27	0.111	0.054	0.0060
1.8	0.18	0.3	0.108	0.054	0.0058
2.1	0.15	0.3	0.308	0.045	0.0139
2.4	0.16	0.3	0.301	0.048	0.0144
2.7	0.22	0.3	0.331	0.066	0.0218
3	0.21	0.3	0.315	0.063	0.0198
3.3	0.24	0.3	0.301	0.072	0.0217
3.6	0.23	0.3	0.323	0.069	0.0223
3.9	0.22	0.3	0.277	0.066	0.0183
4.2	0.16	0.3	0.237	0.048	0.0114
4.5	0.14	0.3	0.17	0.042	0.0071
4.8	0.23	0.28	0.126	0.064	0.0081
5.06	0	0.13	0	0.000	0.0000
3.8		3.8			**0.1707**

All velocity readings at 0.6 depth

Staff Gauge No SG

Data logger reading:no logger

Channel under ice? no channel ice

Method: Price Velocity meter/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **16 June,2013 0932 hrs**

Site: **RAU#4**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
0.98	0	0.06	0	0	0
1.1	0.13	0.11	0.248	0.014	0.0035
1.2	0.1	0.1	0.315	0.010	0.0032
1.3	0.14	0.1	0.256	0.014	0.0036
1.4	0.18	0.1	0.2	0.018	0.0036
1.5	0.18	0.1	0.521	0.018	0.0094
1.6	0.19	0.1	0.521	0.019	0.0099
1.7	0.16	0.1	0.483	0.016	0.0077
1.8	0.12	0.1	0.423	0.012	0.0051
1.9	0.08	0.1	0.391	0.008	0.0031
2	0.08	0.1	0.383	0.008	0.0031
2.1	0.09	0.1	0.339	0.009	0.0031
2.2	0.08	0.1	0.315	0.008	0.0025
2.3	0.05	0.1	0.237	0.005	0.0012
2.4	0.04	0.11	0.231	0.004	0.0010
2.52	0	0.06	0	0.000	0.0000
1.54		1.54			**0.0599**

All velocity readings at 0.6 depth

SG=0.191 m@0932 hrs
0.190 m @ 0950 hrs

Logger: OP check OK

Channel under ice? no channel ice

Method: Price Velocity meter/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **16-Jun-13**

Site: **RAU#9**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
1.47	0	0.04	0	0	0
1.55	0.15	0.09	0.033	0.014	0.0004
1.65	0.15	0.1	0.066	0.015	0.0010
1.75	0.16	0.1	0.076	0.016	0.0012
1.85	0.16	0.1	0.363	0.016	0.0058
1.95	0.15	0.1	0.237	0.015	0.0036
2.05	0.17	0.1	0.196	0.017	0.0033
2.15	0.2	0.1	0.034	0.020	0.0007
2.25	0.21	0.1	0.588	0.021	0.0123
2.35	0.18	0.085	0.339	0.015	0.0052
2.42	0	0.035	0	0.000	0.0000
0.95		0.95			**0.0336**

All velocity readings at 0.6 depth

SG=no SG

Logger: No logger

Channel under ice? no channel ice

Method: Price Velocity meter/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **16 June,2013 1102 hrs**

Site: **RAU#11**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
2.48	0	0.035	0	0	0
2.55	0.1	0.085	0	0.009	0.0000
2.65	0.09	0.1	0.217	0.009	0.0020
2.75	0.1	0.1	0.116	0.010	0.0012
2.85	0.06	0.1	0.032	0.006	0.0002
2.95	0.14	0.1	0.038	0.014	0.0005
3.05	0.12	0.1	0.107	0.012	0.0013
3.15	0.13	0.07	0.158	0.009	0.0014
3.19	0	0.02	0	0.000	0.0000
0.71		0.71			**0.0066**

All velocity readings at 0.6 depth

Staff Gauge 0.078 m @ 1102 hrs
0.079 m @ 1114 hrs

Data logger reading: OP check okay

Channel under ice? no ice

Method: Price Velocity meter/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources -Tiger** **Date:** **16 June,2013 1226 hrs**

Site: **RAU#12**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
1.39	0	0.055	0	0	0
1.5	0.08	0.105	0.064	0.008	0.0005
1.6	0.1	0.1	0.039	0.010	0.0004
1.7	0.11	0.1	0.066	0.011	0.0007
1.8	0.09	0.1	0.117	0.009	0.0011
1.9	0.09	0.1	0.145	0.009	0.0013
2	0.1	0.1	0.155	0.010	0.0016
2.1	0.12	0.115	0.145	0.014	0.0020
2.23	0	0.065	0	0.000	0.0000
0.84		0.84			**0.0076**

All velocity readings at 0.6 depth

SG=0.112 m@1226 hrs
= 0.112 m @ 1237 hrs

Logger: Op check okay

Channel under ice? no channel ice

Method: Price Velocity meter/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **16 Jun,2013 1321 hrs**

Site: **RAU#13**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
1.05	0	0.125	0	0	0
1.3	0.14	0.375	0.083	0.053	0.0044
1.8	0.2	0.4	0.17	0.080	0.0136
2.1	0.16	0.3	0.221	0.048	0.0106
2.4	0.19	0.3	0.192	0.057	0.0109
2.7	0.26	0.25	0.295	0.065	0.0192
2.9	0.3	0.15	0.391	0.045	0.0176
3	0.33	0.1	0.541	0.033	0.0179
3.1	0.33	0.1	0.66	0.033	0.0218
3.2	0.32	0.1	0.882	0.032	0.0282
3.3	0.33	0.1	0.922	0.033	0.0304
3.4	0.31	0.1	0.863	0.031	0.0268
3.5	0.32	0.1	0.845	0.032	0.0270
3.6	0.32	0.1	0.769	0.032	0.0246
3.7	0.29	0.1	0.564	0.029	0.0164
3.8	0.28	0.15	0.472	0.042	0.0198
4	0.29	0.145	0.331	0.042	0.0139
4.09	0	0.045	0	0.000	0.0000
3.04		3.04			**0.3031**

All velocity readings at 0.6 depth

Staff Gauge 0.434 m @ 1321 hrs
0.436 m @ 1343 hrs

Data logger reading: OP check okay

Channel under ice? no channel ice

Method: Price Velocity meter/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **17-Jul-13**

Site: **RAU#3**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
0.71	0	0.095	0	0	0
0.9	0.22	0.245	0.17	0.054	0.0092
1.2	0.31	0.25	0.03	0.078	0.0023
1.4	0.29	0.2	0.248	0.058	0.0144
1.6	0.28	0.2	0.185	0.056	0.0104
1.8	0.25	0.2	0.277	0.050	0.0139
2	0.28	0.2	0.339	0.056	0.0190
2.2	0.26	0.2	0.282	0.052	0.0147
2.4	0.13	0.2	0.221	0.026	0.0057
2.6	0.21	0.2	0.212	0.042	0.0089
2.8	0.23	0.155	0.145	0.036	0.0052
2.91	0	0.055	0	0.000	0.0000
2.2		2.2			**0.1035**

All velocity readings at 0.6 depth

Staff Gauge No SG

Data logger reading:no logger

Channel under ice? no channel ice

Method: Price Velocity meter/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **17 July, 2013**

Site: **RAU#4**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
1.32	0	0.065	0	0	0
1.45	0.1	0.115	0.026	0.012	0.0003
1.55	0.08	0.1	0.301	0.008	0.0024
1.65	0.12	0.1	0.271	0.012	0.0033
1.75	0.16	0.1	0.271	0.016	0.0043
1.85	0.14	0.1	0.423	0.014	0.0059
1.95	0.13	0.1	0.442	0.013	0.0057
2.05	0.12	0.1	0.339	0.012	0.0041
2.15	0.1	0.1	0.315	0.010	0.0032
2.25	0.06	0.1	0.308	0.006	0.0018
2.35	0.04	0.1	0.282	0.004	0.0011
2.45	0.04	0.1	0.254	0.004	0.0010
2.55	0.03	0.125	0.173	0.004	0.0006
2.7	0.03	0.165	0.151	0.005	0.0007
2.88	0	0.09	0	0.000	0.0000
1.56		1.56			**0.0346**

All velocity readings at 0.6 depth

SG=0.107 m@1008 hrs
0.091 m @ 0925 hrs

Logger: OP check ok

Channel under ice? no channel ice

Method: Price Velocity meter/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **17-Jul-13**

Site: **RAU#9**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
1.76	0	0.045	0	0	0
1.85	0.09	0.095	0.016	0.009	0.0001
1.95	0.12	0.1	0.102	0.012	0.0012
2.05	0.13	0.1	0.151	0.013	0.0020
2.15	0.12	0.1	0.074	0.012	0.0009
2.25	0.16	0.1	0.029	0.016	0.0005
2.35	0.18	0.1	0.042	0.018	0.0008
2.45	0.23	0.1	0.026	0.023	0.0006
2.55	0.2	0.09	0.308	0.018	0.0055
2.63	0.21	0.115	0.277	0.024	0.0067
2.78	0	0.075	0	0.000	0.0000
1.02		1.02			**0.0183**

All velocity readings at 0.6 depth

SG=no SG

Logger: No logger

Channel under ice? no channel ice

Method: Price Velocity meter/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **17-Jul-13**

Site: **RAU#11**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
2.67	0	0.065	0	0	0
2.8	0.08	0.115	0	0.009	0.0000
2.9	0.12	0.1	0.097	0.012	0.0012
3	0.1	0.1	0.078	0.010	0.0008
3.1	0.09	0.1	0.248	0.009	0.0022
3.2	0.1	0.1	0.204	0.010	0.0020
3.3	0.08	0.07	0.166	0.006	0.0009
3.34	0	0.02	0	0.000	0.0000
0.67		0.67			**0.0071**

All velocity readings at 0.6 depth

Staff Gauge 0.002 m at 1007 hrs

Data logger reading: OP check ok

Channel under ice? no ice

Method: Price Velocity meter/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **17-Jul-13**

Site: **RAU#12**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
1.11	0	0.045	0	0	0
1.2	0.07	0.095	0.041	0.007	0.0003
1.3	0.08	0.1	0.127	0.008	0.0010
1.4	0.07	0.1	0.029	0.007	0.0002
1.5	0.06	0.1	0.048	0.006	0.0003
1.6	0.07	0.1	0	0.007	0.0000
1.7	0.06	0.14	0	0.008	0.0000
1.88	0	0.09	0	0.000	0.0000
0.77		0.77			**0.0018**

All velocity readings at 0.6 depth

SG=0.091 m@ 1130 hrs
0.091 m at 1138 hrs

Logger: OP check ok

Channel under ice? no channel ice

Method: Price Velocity meter/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **17-Jul-13**

Site: **RAU#13**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
1.41	0	0.095	0	0	0
1.6	0.06	0.245	0.114	0.015	0.0017
1.9	0.09	0.3	0.166	0.027	0.0045
2.2	0.08	0.3	0.176	0.024	0.0042
2.5	0.11	0.25	0.139	0.028	0.0038
2.7	0.17	0.2	0.136	0.034	0.0046
2.9	0.2	0.2	0.196	0.040	0.0078
3.1	0.24	0.15	0.282	0.036	0.0102
3.2	0.24	0.1	0.315	0.024	0.0076
3.3	0.25	0.1	0.442	0.025	0.0111
3.4	0.24	0.1	0.601	0.024	0.0144
3.5	0.24	0.1	0.644	0.024	0.0155
3.6	0.25	0.1	0.601	0.025	0.0150
3.7	0.23	0.15	0.495	0.035	0.0171
3.9	0.2	0.2	0.415	0.040	0.0166
4.1	0.19	0.13	0.231	0.025	0.0057
4.16	0	0.03	0	0.000	0.0000
2.75		2.75			**0.1397**

All velocity readings at 0.6 depth

Staff Gauge 0.358 m at 1244 hrs
0.358 m at 1305 hrs

Data logger reading: OP check ok

Channel under ice? no channel ice

Method: Price Velocity meter/ TS Wading Rod

Measurement By: J.Gibson

ATAC RESOURCES LTD

TIGER PROJECT

ENVIRONMENTAL DATA UPDATE

August and September, 2013

J.Gibson Env. Consulting ***Whitehorse YT***

August and September 2013 – Tiger Project Environmental Data Update

Baseline water quality and hydrology data collection continued with monthly stations surveyed in August and all stations (monthly and quarterly) surveyed in September, 2013.

In August, all monthly tributary stations and the Beaver River receiving water station (Rau #10) were sampled for water quality. Flow measurements were done at sample stations. All water level data logger installations were downloaded and level surveyed for elevation changes.

In September, monthly and quarterly stations were sampled for water quality. Flow measurements were done at sample stations. All water level data logger installations were level surveyed for elevation changes and removed at season's end / ice formation.

In August, further repairs were done to the weather station logger and data was downloaded.

Data Results

Hydrology August

Hydrology data / stream flow volume measurements in August were at summer low flow conditions.

Hydrology September

Hydrology data / stream flow measurements in September saw an increase from August volumes at lower elevation stations. This is attributed to early season snow melt runoff. Higher elevation stations showed significant decrease in volumes from August.

Flow measurement results are listed with Routine Chemistry analysis results. A summary of stream flow volumes for 2012 and 2013 are listed in Table 4.

Water Quality

Data is listed in the following tables:

Table 1. August 2013 Routine chemistry analysis results, field measurements and flow volumes

Table 2. August 2013 Total Metals ICP/MS analysis results

Table 3. August 2013 Dissolved Metals ICP/MS analysis results

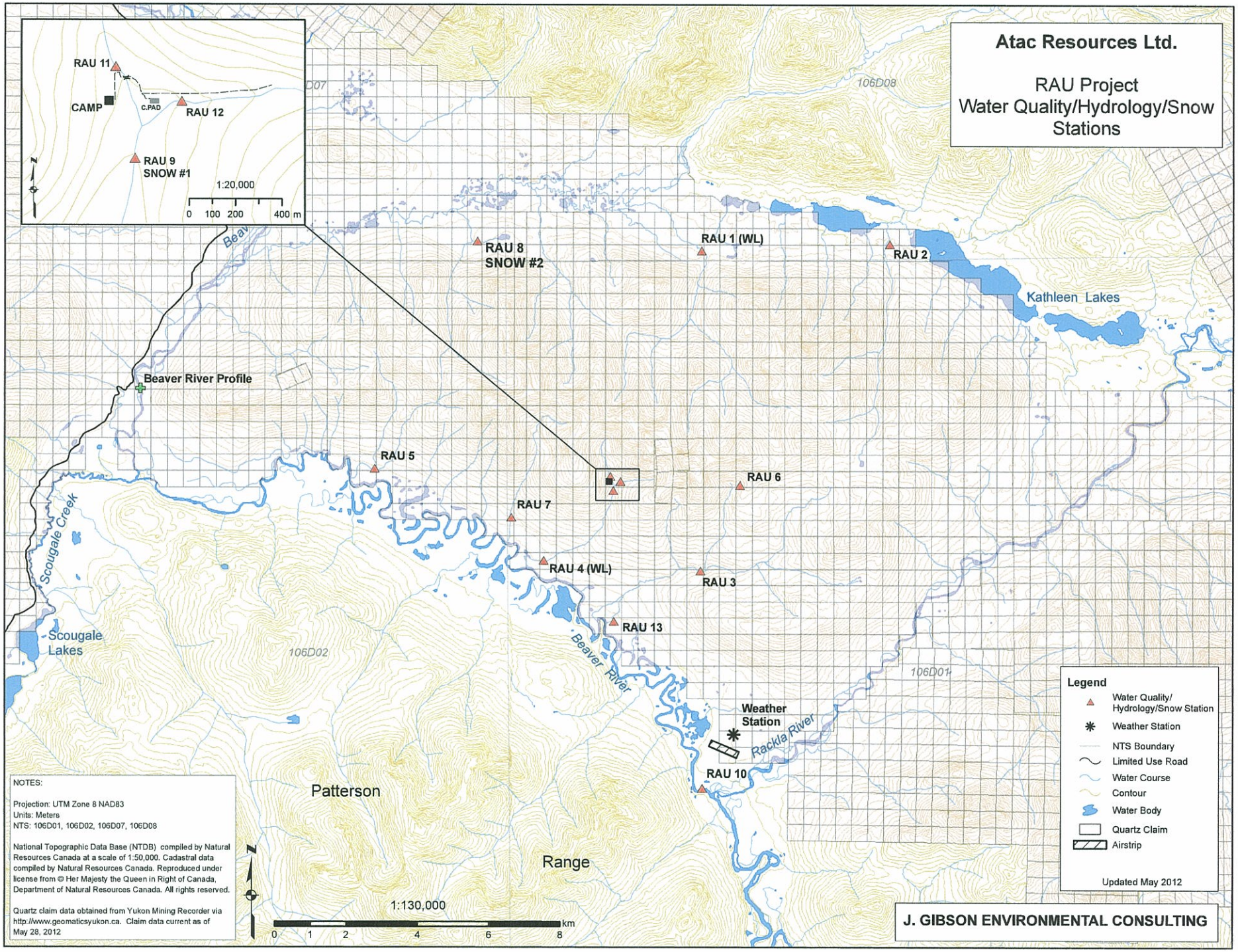
Atac Resources Ltd.
RAU Project
Water Quality/Hydrology/Snow Stations
RAU 11
CAMP
C.PAD
RAU 12
RAU 9
SNOW #1
1:20,000
0 100 200 400 m
RAU 8
SNOW #2
RAU 1 (WL)
RAU 2
Kathleen Lakes
Beaver River Profile
RAU 5
RAU 6
RAU 7
RAU 4 (WL)
RAU 3
RAU 13
Scougale Creek
Scougale Lakes
106D02
106D01
106D08
Beaver River
Weather Station
Rackla River
RAU 10
Patterson
Range
1:130,000
0 1 2 4 6 8 km
Legend
Water Quality/ Hydrology/Snow Station
Weather Station
NTS Boundary
Limited Use Road
Water Course
Contour
Water Body
Quartz Claim
Airstrip
Updated May 2012
NOTES:
Projection: UTM Zone 8 NAD83
Units: Meters
NTS: 106D01, 106D02, 106D07, 106D08
National Topographic Data Base (NTDB) compiled by Natural Resources Canada at a scale of 1:50,000. Cadastral data compiled by Natural Resources Canada. Reproduced under license from © Her Majesty the Queen in Right of Canada, Department of Natural Resources Canada. All rights reserved.
Quartz claim data obtained from Yukon Mining Recorder via http://www.geomaticsyukon.ca. Claim data current as of May 28, 2012
J. GIBSON ENVIRONMENTAL CONSULTING

Table 4. Flow Measurement Summary – RAU Stations to September 2013

Table 5. September 2013 Routine chemistry analysis results, field measurements and Flow volumes

Table 6. September 2013 Total Metals ICP/MS analysis results

Table 7. September 2013 Dissolved Metals ICP/MS analysis results

Table 8. Quality Control Sample analysis results – RAU#11 September 2013

Listed with the water quality analysis results are the ***Canadian Water Quality Guideline*** values for the Protection of Aquatic Life for waters with a pH > 6.5 and a total hardness value of > 180 mg/L as CaC03.

Also listed are the ***Canadian Drinking Water Guideline*** Maximum Acceptable Concentrations (MAC's) for applicable parameters.

All ***Guideline*** metal values are for total metals.

Analysis values that exceed either ***Guideline*** limit are highlighted in yellow.

Laboratory Analytical Reports are contained in Appendix 1.

Water Quality Summary

August 2013 (Monthly Stations)

Stations RAU #4, #9, #10, and #11 met all ***Aquatic and Drinking Water Guidelines*** parameters.

Station RAU #3 exceeds the ***Aquatic Guidelines*** for selenium.

Station RAU #12 exceeds the ***Aquatic Guidelines*** for arsenic.

Station RAU #13 exceeds the ***Aquatic Guideline***s for iron, selenium and zinc; and the ***Drinking Water Guidelines*** for iron.

Table 1. ATAC Resources - Tiger Project August, 2013.
Routine Chemistry and Field Measurement Results

Parameter	Unit	STATIONS							DWQ* G.lines	Aquatic** G.lines
		RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7		
Monitoring Frequency		Quarterly	Quarterly	Monthly	Monthly	Quarterly	Not in Use	Quarterly		
pH (field)	ru			8.08	8.05					
pH (lab)	ru			8.14	8.21				6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm			362	349					
Water temperature	C			2.8	2.8					
Flow Volume(field)	cms	0.1397		0.0883	0.036					
Organic Carbon Total	mg/L			2.5	1.1					
Cyanide Total	mg/L			<0.002	<0.002				0.2	0.005
Phosphorus Total	mg/L			0.003	<0.003					
Ammonia - N	mg/L			0.02	0.02					1.37-2.2
Nitrate - N	mg/L			0.06	0.24				10	
Nitrite - N	mg/L			<0.01	<0.01				1	0.06
T-Alkalinity	mg/L			192	192					
Chloride	mg/L			0.14	0.12				<250	
Sulfate (SO4)	mg/L			34.1	32.4					
Hardness	mg CaCO3/L			218	223				<500	
Total Suspended Solids	mg/L			<2	<2					
Total Dissolved Solids	mg/L			252	224				<500	

All results and limits in mg/L unless noted otherwis. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L
Canadian Water Quality Guidelines

Table 1. ATAC Resources - Tiger Project August, 2013.
Routine Chemistry and Field Measurement Results

Parameter	Unit	STATIONS						DWQ* G.lines	Aquatic** G.lines
		RAU #8	RAU#9	RAU#10	RAU#11	RAU#12	RAU#13		
Monitoring Frequency		Quarterly	Monthly	Monthly	Monthly	Monthly	Monthly		
pH (field)	ru		7.78	7.94	7.76	7.78	7.75		
pH (lab)	ru		8.11	8.14	7.99	8.07	8.1	6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm		322	322	289	326	451		
Water temperature	C		4.7	9.3	2.8	6.1	2.7		
Flow Volume(field)	cms		0.0101	nr	<0.0005	0.0017	0.1364		
Organic Carbon Total	mg/L		1.1	1.5	0.8	0.9	2.2		
Cyanide Total	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	0.2	0.005
Phosphorus Total	mg/L		<0.003	0.032	<0.003	<0.003	0.008		
Ammonia - N	mg/L		0.02	0.02	0.02	0.02	0.02		1.37-2.2
Nitrate - N	mg/L		0.24	0.06	0.17	0.31	0.14	10	
Nitrite - N	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	1	0.06
T-Alkalinity	mg/L		185	148	162	182	214		
Chloride	mg/L		0.08	0.69	<0.05	0.06	4.48	<250	
Sulfate (SO4)	mg/L		23.8	54.8	21.3	25.7	65.7		
Hardness	mg CaCO3/L		205	198	182	204	269	<500	
Total Suspended Solids	mg/L		<2	<2	<2	<2	<2		
Total Dissolved Solids	mg/L		212	218	180	206	314	<500	

All results and limits in mg/L unless noted otherwis. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L

Table 2. ATAC Resources - Tiger Project August, 2013.
Total Metals Analysis Results.

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L			59.7	55.1					
Iron	mg/L			0.075	0.012				0.3	0.3
Magnesium	mg/L			16.7	20.7					
Manganese	mg/L			0.0079	<0.0050				0.05	
Potassium	mg/L			1.12	0.87					
Silicon	mg/L			2.51	2.39					
Sulfur	mg/L			10.3	10.4					
Sodium	mg/L			1.07	0.8				<200	
Titanium	mg/L			<0.0010	<0.0010					
Aluminum	mg/L			0.012	0.007					0.1
Antimony	mg/L			<0.0002	<0.0002				0.006	
Arsenic	mg/L			0.0006	0.0022				0.01	
Barium	mg/L			0.103	0.127				1	
Beryllium	mg/L			<0.00004	<0.00004					
Bismuth	mg/L			<0.0010	<0.001					
Boron	mg/L			<0.005	<0.005					
Cadmium	mg/L			0.00003	0.00003				0.005	0.0018
Chromium	mg/L			<0.0004	<0.0004				0.05	0.002
Cobalt	mg/L			0.00009	0.00007					
Copper	mg/L			<0.001	<0.001				1	0.004
Lead	mg/L			<0.0001	<0.0001					
Lithium	mg/L			0.002	0.001					
Mercury	mg/L			<0.00001	<0.00001				0.001	
Molybdenum	mg/L			0.0031	0.0013					
Nickel	mg/L			0.002	0.001					0.15
Selenium	mg/L			0.0013	0.0007				0.01	0.001
Silver	mg/L			<0.00001	<0.00001					0.0001
Strontium	mg/L			0.082	0.08					
Tellurium	mg/L			<0.0001	<0.0001					
Thallium	mg/L			<0.00001	<0.00001					
Thorium	mg/L			<0.0004	<0.0004					
Tin	mg/L			<0.0001	<0.0001					
Uranium	mg/L			0.0028	0.0028				0.02	
Vanadium	mg/L			<0.0001	<0.0001					
Zinc	mg/L			0.002	0.007				<5	0.03
Zirconium	mg/L			0.0002	<0.0001					

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 2. ATAC Resources - Tiger Project August, 2013.
Total Metals Analysis Results.

Parameter	Units	RAU #8	RAU#9	RAU#10	RAU #11	RAU#12	RAU#13	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L		54.8	47.3	47	55.3	75.4		
Iron	mg/L		0.045	0.105	<0.010	<0.010	0.375	0.3	0.3
Magnesium	mg/L		16.7	19.4	15.8	16	19.6		
Manganese	mg/L		<0.0050	0.0095	<0.0050	<0.0050	0.0262	0.05	
Potassium	mg/L		0.62	0.58	0.2	0.89	1.75		
Silicon	mg/L		2.09	2.06	1.84	2.11	2.6		
Sulfur	mg/L		7.6	17.3	6.8	8.2	20		
Sodium	mg/L		0.65	1.89	0.57	0.74	2.86	<200	
Titanium	mg/L		0.0018	<0.0010	<0.0010	0.0044	0.0013		
Aluminum	mg/L		0.012	0.017	<0.005	<0.005	0.052		0.1
Antimony	mg/L		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.006	
Arsenic	mg/L		0.0063	0.0004	0.0005	0.0221	0.0027	0.01	
Barium	mg/L		0.187	0.061	0.273	0.148	0.097	1	
Beryllium	mg/L		<0.00004	<0.00004	<0.00004	<0.00004	<0.00004		
Bismuth	mg/L		<0.001	<0.0010	<0.001	<0.001	<0.001		
Boron	mg/L		<0.005	<0.005	<0.005	<0.005	0.01		
Cadmium	mg/L		0.00002	0.00003	0.00004	0.00002	0.00051	0.005	0.0018
Chromium	mg/L		<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.05	0.002
Cobalt	mg/L		0.00008	0.00012	0.00006	0.00006	0.00042		
Copper	mg/L		<0.001	<0.001	<0.001	<0.001	0.002	1	0.004
Lead	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Lithium	mg/L		<0.001	0.004	<0.001	<0.001	0.005		
Mercury	mg/L		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.001	
Molybdenum	mg/L		0.0014	0.0008	0.001	0.002	0.0052		
Nickel	mg/L		0.001	0.004	0.001	0.001	0.025		0.15
Selenium	mg/L		<0.0006	<0.0006	0.0008	0.0009	0.0072	0.01	0.001
Silver	mg/L		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		0.0001
Strontium	mg/L		0.073	0.157	0.048	0.083	0.177		
Tellurium	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Thallium	mg/L		<0.00001	<0.00001	<0.00001	<0.00001	0.00002		
Thorium	mg/L		<0.0004	<0.0004	<0.0004	<0.0004	<0.0004		
Tin	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Uranium	mg/L		0.0017	0.0011	0.0011	0.0017	0.0065	0.02	
Vanadium	mg/L		<0.0001	<0.0001	0.0073	0.0081	0.006		
Zinc	mg/L		0.004	0.005	0.006	0.003	0.106	<5	0.03
Zirconium	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 3. ATAC Resources - Tiger Project August, 2013.
Dissolved Metals Analysis Results

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7
Calcium	mg/L			63.7	57.5			
Iron	mg/L			0.034	<0.005			
Magnesium	mg/L			17.9	21.7			
Manganese	mg/L			0.005	<0.001			
Potassium	mg/L			1.2	0.8			
Silicon	mg/L			2.56	2.38			
Sodium	mg/L			1.3	1			
Sulfur	mg/L			11.7	10.5			
Aluminum	mg/L			<0.005	<0.005			
Antimony	mg/L			<0.0002	<0.0002			
Arsenic	mg/L			0.0006	0.0024			
Barium	mg/L			0.1	0.124			
Beryllium	mg/L			<0.00004	<0.00004			
Bismuth	mg/L			<0.001	<0.001			
Boron	mg/L			<0.004	<0.004			
Cadmium	mg/L			0.00005	0.00002			
Chromium	mg/L			<0.0004	<0.0004			
Cobalt	mg/L			0.00009	0.00006			
Copper	mg/L			<0.001	<0.001			
Lead	mg/L			<0.0001	<0.0001			
Lithium	mg/L			0.001	0.001			
Molybdenum	mg/L			0.00306	0.00127			
Nickel	mg/L			0.002	0.002			
Selenium	mg/L			0.0008	<0.0006			
Silver	mg/L			<0.00001	<0.00001			
Strontium	mg/L			0.078	0.077			
Titanium	mg/L			<0.010	<0.010			
Tellurium	mg/L			<0.0001	<0.0001			
Thallium	mg/L			<0.00001	<0.00001			
Thorium	mg/L			<0.0004	<0.0004			
Tin	mg/L			<0.0001	<0.0001			
Uranium	mg/L			0.003	0.0028			
Vanadium	mg/L			0.0004	0.00037			
Zinc	mg/L			0.002	0.006			
Zirconium	mg/L			<0.00010	<0.0001			

Table 3. ATAC Resources - Tiger Project August, 2013.
Dissolved Metals Analysis Results

Parameter	Units	RAU #8	RAU #9	RAU #10	RAU #11	RAU #12	RAU #13
Calcium	mg/L		57	49	49	57.2	78.5
Iron	mg/L		<0.005	0.034	<0.005	<0.005	0.037
Magnesium	mg/L		17.4	20.3	16.5	16.6	20.5
Manganese	mg/L		0.004	0.008	<0.001	<0.001	0.024
Potassium	mg/L		0.6	0.6	0.2	0.9	1.7
Silicon	mg/L		2.1	2.04	1.83	2.12	2.56
Sodium	mg/L		0.8	2	0.6	0.7	3
Sulfur	mg/L		7.8	17.1	6.7	8.2	20.2
Aluminum	mg/L		<0.005	0.008	<0.005	<0.005	0.009
Antimony	mg/L		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	mg/L		0.0067	0.0003	<0.0002	0.0099	0.0012
Barium	mg/L		0.189	0.062	0.271	0.146	0.092
Beryllium	mg/L		<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
Bismuth	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	mg/L		<0.004	<0.004	<0.004	<0.004	0.01
Cadmium	mg/L		0.00002	0.00003	0.00005	0.00001	0.00044
Chromium	mg/L		<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Cobalt	mg/L		0.00006	0.00009	0.00005	0.00006	0.00036
Copper	mg/L		<0.001	<0.001	<0.001	<0.001	0.001
Lead	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Lithium	mg/L		<0.001	0.003	<0.001	<0.001	0.004
Molybdenum	mg/L		0.0014	0.00076	0.00102	0.00188	0.00498
Nickel	mg/L		0.002	0.004	0.001	0.002	0.023
Selenium	mg/L		<0.0006	<0.0006	<0.0006	<0.0006	0.0029
Silver	mg/L		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Strontium	mg/L		0.07	0.154	0.047	0.08	0.17
Titanium	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010
Tellurium	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Thallium	mg/L		<0.00001	<0.00001	<0.00001	<0.00001	0.00002
Thorium	mg/L		<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Tin	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Uranium	mg/L		0.0016	0.0012	0.0012	0.0016	0.0059
Vanadium	mg/L		0.0002	0.0003	0.00024	0.00025	0.00048
Zinc	mg/L		0.002	0.004	0.005	0.002	0.08
Zirconium	mg/L		<0.0001	<0.00010	<0.0001	<0.0001	<0.00010

Table 4. ATAC RESOURCES - Summary of Tiger Project Station Flow Volumes 2012-2013

	Date															
Station	**Mar-12**	**Apr-12**	**May-12**	**Jun-12**	**Jul-12**	**Sep-12**	**Oct-12**	**Dec-12**	**Jan-13**	**Mar-13**	**Apr-13**	**May-13**	**Jun-13**	**Jul-13**	**Aug-13**	**Sep-13**
Rau #1	0.01 €	nr	0.5253	0.6291	0.3773	0.2533	0.1604	nr	nr	nr	nr	nr	0.3911	nr	0.1397	0.3204
Rau #2	nr	nr	nr	nr	nr	0.0977	nr	nr	nr	nr	nr	nr	0.1707	nr	nr	0.1825
Rau #3	0.02		nr	0.4218	0.3497	0.185	0.1282	nr	nr	nr	nr	nr	nr	0.1035	0.0883	0.2417
Rau #4	0.008	0.0473	0.0976	0.1152	0.0895	0.062	0.0546	0.05 e	0.046	0.0296	0.0395	0.0781	0.0599	0.0346	0.036	0.0531
Rau #5	0.0	nr	0.0728	nr	nr	0.034	nr	nr	nr	nr	nr	nr	nr	nr	nr	0.021
Rau #6	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr
Rau #7	0.006	nr	0.0229	nr	nr	0.023	nr	nr	nr	nr	nr	nr	nr	nr	nr	0.0224
Rau #8	0.005	nr	0.1557	nr	nr	0.179	nr	nr	nr	nr	dry	nr	nr	nr	nr	0.2838
Rau #9	0.002	0.0052	0.0186	0.0463	0.0199	0.0064	0.0188	glacial ice	glacial ice	glacial ice	glacial ice	glacial ice	0.0336	0.0183	0.0101	0.0088
Rau #10	nr	12.31	nr	nr	nr	nr	nr	nr	nr	nr	4.76	nr	nr	nr	nr	nr
Rau #11		<0.0001	<0.0001	0.0354	0.0092	0.0009	<0.0005	dry	dry	dry	dry	0.002	0.0066	0.0071	0.0005	0.00001
Rau #12		0.00086	0.0045	0.0103	0.0076	0.0045	0.0036	0.04 e	0.04 e	nr	0.001	0.003	0.0076	0.0018	0.0017	0.0014
Rau #13		0.0784	0.5546	0.474	0.3597	0.233	0.1864	0.10e	0.033	0.0206	nr	0.584	0.3031	0.1397	0.1364	0.33

Table 5. ATAC Resources - Tiger Project September, 2013.
Routine Chemistry and Field Measurement Results

Parameter	Unit	STATIONS							DWQ* G.lines	Aquatic** G.lines
		RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7		
Monitoring Frequency		Quarterly	Quarterly	Monthly	Monthly	Quarterly	Not in Use	Quarterly		
pH (field)	ru	8.18	7.94	8.17	8.24	7.88		8.28		
pH (lab)	ru	8	7.94	8.07	8.1	7.94		8.15	6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm	319	302	368	413	536		375		
Water temperature	C	1.8	1.9	2.5	4.1	1.7		3.2		
Flow Volume(field)	cms	0.3204	0.1825	0.2417	0.0531	0.021		0.0224		
Organic Carbon Total	mg/L	3.9	3.9	3.8	1.8	2.8		1.4		
Cyanide Total	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	0.2	0.005
Phosphorus Total	mg/L	<0.003	<0.003	0.005	<0.003	0.102		<0.003		
Ammonia - N	mg/L	<0.01	<0.01	<0.01	<0.01	0.01		<0.01		1.37-2.2
Nitrate - N	mg/L	0.16	0.29	0.09	0.28	0.1		0.22	10	
Nitrite - N	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	1	0.06
T-Alkalinity	mg/L	135	124	173	195	274		172		
Chloride	mg/L	nr	nr	nr	nr	nr		nr	<250	
Sulfate (SO4)	mg/L	41.2	39.8	34.6	34.6	39.5		38.9		
Hardness	mg CaCO3/L	184	171	208	226	328		210	<500	
Total Suspended Solids	mg/L	<2	<2	<2	<2	72		<2		
Total Dissolved Solids	mg/L	206	192	226	240	322		216	<500	

All results and limits in mg/L unless noted otherwise. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L
Canadian Water Quality Guidelines

Table 5. ATAC Resources - Tiger Project September, 2013.
Routine Chemistry and Field Measurement Results

Parameter	Unit	STATIONS						DWQ* G.lines	Aquatic** G.lines
		RAU #8	RAU#9	RAU#10	RAU#11	RAU#12	RAU#13		
Monitoring Frequency		Quarterly	Monthly	Monthly	Monthly	Monthly	Monthly		
pH (field)	ru	7.94	8.03	8.1	7.83	8.01	8.02		
pH (lab)	ru	7.93	8.03	8.03	7.89	7.95	8.02	6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm	334	368	354	329	369	441		
Water temperature	C	4.5	1.7	5.2	0.8	1.8	3.5		
Flow Volume(field)	cms	0.2838	0.0088	nr	0.0001	0.001	0.33		
Organic Carbon Total	mg/L	1.3	1.6	2	1.1	1.4	3.4		
Cyanide Total	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.2	0.005
Phosphorus Total	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	0.008		
Ammonia - N	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		1.37-2.2
Nitrate - N	mg/L	0.2	0.25	0.07	0.26	0.29	0.13	10	
Nitrite - N	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1	0.06
T-Alkalinity	mg/L	156	184	144	165	178	186		
Chloride	mg/L	nr	nr	nr	nr	nr	nr	<250	
Sulfate (SO4)	mg/L	29.8	24.4	56.4	22.4	26.7	51.5		
Hardness	mg CaCO3/L	188	213	196	192	208	242	<500	
Total Suspended Solids	mg/L	<2	<2	<2	<2	<2	3		
Total Dissolved Solids	mg/L	192	216	222	202	216	266	<500	

All results and limits in mg/L unless noted otherwis. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L

Table 6. ATAC Resources - Tiger Project September, 2013
Total Metals Analysis Results.

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L	60.6	51.6	58.8	58.1	83		46.6		
Iron	mg/L	0.024	0.211	0.077	0.014	1.7		0.025	0.3	0.3
Magnesium	mg/L	7.94	10.2	14.8	19.6	29.3		22.7		
Manganese	mg/L	<0.0050	0.0762	0.0123	<0.0050	0.0841		<0.0050	0.05	
Potassium	mg/L	0.38	0.41	1.21	0.98	1.25		0.33		
Silicon	mg/L	2.45	2.53	2.26	2.36	3.8		1.92		
Sulfur	mg/L	13.9	13.4	10.7	11.1	12.4		12.4		
Sodium	mg/L	1.48	1.64	1.11	0.9	1.24		0.7	<200	
Titanium	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0177		<0.0010		
Aluminum	mg/L	0.012	0.061	0.022	0.007	0.638		0.009		0.1
Antimony	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	0.001		<0.0002	0.006	
Arsenic	mg/L	0.0002	0.0002	0.0005	0.0023	0.0024		0.0003	0.01	
Barium	mg/L	0.086	0.048	0.096	0.129	0.179		0.169	1	
Beryllium	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004		<0.00004		
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		
Boron	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005		
Cadmium	mg/L	0.00012	0.00004	0.00003	0.00002	0.0014		0.00002	0.005	0.0018
Chromium	mg/L	<0.0004	<0.0004	0.0004	0.0004	0.0021		0.0004	0.05	0.002
Cobalt	mg/L	0.00008	0.00036	0.0001	0.00008	0.0013		0.00006		
Copper	mg/L	<0.001	<0.001	<0.001	<0.001	0.005		<0.001	1	0.004
Lead	mg/L	<0.0001	0.0001	<0.0001	<0.0001	0.0028		0.0001		
Lithium	mg/L	0.002	0.003	0.001	0.001	0.003		<0.001		
Mercury	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		<0.00001	0.001	
Molybdenum	mg/L	0.0017	0.0004	0.0026	0.0014	0.0064		0.0001		
Nickel	mg/L	0.002	0.002	0.002	0.001	0.032		0.001		0.15
Selenium	mg/L	0.0037	0.0008	0.0014	0.0008	0.0041		<0.0006	0.01	0.001
Silver	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	0.00005		<0.00001		0.0001
Strontium	mg/L	0.113	0.104	0.08	0.085	0.194		0.044		
Tellurium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001		
Thallium	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	0.00008		<0.00001		
Thorium	mg/L	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004		<0.0004		
Tin	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001		
Uranium	mg/L	0.0018	0.0004	0.0026	0.003	0.0108		0.0016	0.02	
Vanadium	mg/L	0.0003	0.0003	0.0003	0.0002	0.0048		0.0002		
Zinc	mg/L	0.006	0.005	0.003	0.007	0.207		0.006	<5	0.03
Zirconium	mg/L	0.0001	0.0001	0.0001	<0.0001	0.0002		<0.0001		

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 6. ATAC Resources - Tiger Project September, 2013
Total Metals Analysis Results.

Parameter	Units	RAU #8	RAU#9	RAU#10	RAU #11	RAU#12	RAU#13	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L	48.5	59	49	51.8	57.9	69.5		
Iron	mg/L	0.031	0.02	0.111	0.079	<0.010	0.315	0.3	0.3
Magnesium	mg/L	16.2	15.8	18	15.2	15.3	16.6		
Manganese	mg/L	<0.0050	0.0093	0.0121	0.008	<0.0050	0.0237	0.05	
Potassium	mg/L	0.37	0.75	0.59	0.27	1.03	1.64		
Silicon	mg/L	1.48	2.03	2.01	1.82	2.02	2.42		
Sulfur	mg/L	9.4	7.9	15.9	7.1	8.2	15.8		
Sodium	mg/L	0.78	0.77	2.09	0.66	0.8	2.19	<200	
Titanium	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010		
Aluminum	mg/L	0.012	<0.005	0.039	0.035	<0.005	0.061		0.1
Antimony	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.006	
Arsenic	mg/L	0.0004	0.0062	0.0004	0.0003	0.009	0.0019	0.01	
Barium	mg/L	0.187	0.188	0.058	0.276	0.145	0.093	1	
Beryllium	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004		
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
Boron	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		
Cadmium	mg/L	0.00011	0.00001	0.00003	0.00006	0.00001	0.00036	0.005	0.0018
Chromium	mg/L	<0.0004	<0.0004	<0.0004	0.0006	<0.0004	0.0004	0.05	0.002
Cobalt	mg/L	0.00008	0.00006	0.00019	0.0001	0.00006	0.00029		
Copper	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	1	0.004
Lead	mg/L	0.0002	<0.0001	<0.0001	0.0004	<0.0001	0.0001		
Lithium	mg/L	<0.001	<0.001	0.003	<0.001	<0.001	0.003		
Mercury	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.001	
Molybdenum	mg/L	0.0006	0.0014	0.0007	0.001	0.002	0.0035		
Nickel	mg/L	0.002	0.001	0.004	0.001	0.001	0.013		0.15
Selenium	mg/L	0.0008	<0.0006	<0.0006	<0.0006	<0.0006	0.0024	0.01	0.001
Silver	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		0.0001
Strontium	mg/L	0.054	0.075	0.156	0.052	0.082	0.13		
Tellurium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Thallium	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00002		
Thorium	mg/L	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004		
Tin	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Uranium	mg/L	0.0035	0.0017	0.0011	0.0012	0.0018	0.0042	0.02	
Vanadium	mg/L	0.0001	<0.0001	0.0002	0.0002	0.0001	0.0005		
Zinc	mg/L	0.042	0.003	0.006	0.013	0.003	0.055	<5	0.03
Zirconium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 7. ATAC Resources - Tiger Project September, 2013.
Dissolved Metals Analysis Results

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7
Calcium	mg/L	56.9	48.9	55.8	55.4	75.1		44.6
Iron	mg/L	0.006	0.088	0.027	<0.005	0.064		<0.005
Magnesium	mg/L	8.56	11	15.8	21	29.2		24.5
Manganese	mg/L	<0.001	0.053	0.003	<0.001	0.03		<0.001
Potassium	mg/L	0.4	0.4	1.2	0.9	1.1		0.2
Silicon	mg/L	2.43	2.47	2.24	2.32	2.9		1.88
Sodium	mg/L	1.6	1.6	1.2	1	1.3		0.9
Sulfur	mg/L	13.1	12.5	9.9	9.9	11		11.2
Aluminum	mg/L	0.006	0.012	<0.005	<0.005	<0.005		<0.005
Antimony	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	0.0008		<0.0002
Arsenic	mg/L	0.0003	<0.0002	0.0005	0.0024	0.0008		0.0002
Barium	mg/L	0.087	0.046	0.096	0.13	0.129		0.163
Beryllium	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004		<0.00004
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001
Boron	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004		<0.004
Cadmium	mg/L	0.0001	0.00002	0.00003	0.00002	0.00039		0.00002
Chromium	mg/L	0.0012	0.001	0.0012	0.0021	0.0061		0.0049
Cobalt	mg/L	0.00008	0.00029	0.00008	0.00006	0.00024		0.00005
Copper	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001
Lead	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001
Lithium	mg/L	0.002	0.003	0.001	0.001	0.002		<0.001
Molybdenum	mg/L	0.00167	0.00041	0.00262	0.00138	0.00692		0.00012
Nickel	mg/L	0.002	0.002	0.002	0.001	0.012		0.001
Selenium	mg/L	0.0042	0.0006	0.0019	0.0008	0.0057		<0.0006
Silver	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		<0.00001
Strontium	mg/L	0.107	0.098	0.076	0.08	0.173		0.041
Titanium	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010		<0.010
Tellurium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001
Thallium	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	0.00002		<0.00001
Thorium	mg/L	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004		<0.0004
Tin	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001
Uranium	mg/L	0.0016	<0.0004	0.0025	0.003	0.0101		0.0016
Vanadium	mg/L	0.00046	0.00034	0.00042	0.0007	0.00208		0.00146
Zinc	mg/L	0.004	0.002	0.001	0.006	0.068		0.004
Zirconium	mg/L	<0.0001	<0.00010	<0.00010	<0.00010	<0.0001		<0.00010

Table 7 ATAC Resources - Tiger Project September, 2013.
Dissolved Metals Analysis Results

Parameter	Units	RAU #8	RAU #9	RAU #10	RAU #11	RAU #12	RAU #13
Calcium	mg/L	45.8	54.8	45.8	48	54.4	65.7
Iron	mg/L	0.006	0.009	<0.005	<0.005	0.006	0.115
Magnesium	mg/L	17.5	17	19	16	16.2	17.6
Manganese	mg/L	<0.001	0.002	0.001	<0.001	<0.001	0.011
Potassium	mg/L	0.3	0.7	0.5	0.3	0.9	1.6
Silicon	mg/L	1.47	1.98	1.91	1.76	2.04	2.33
Sodium	mg/L	0.8	0.8	1.5	0.7	0.8	2.2
Sulfur	mg/L	8.2	7.2	14.5	6.7	8	15.3
Aluminum	mg/L	<0.005	<0.005	0.028	<0.005	<0.005	0.009
Antimony	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	mg/L	0.0002	0.007	0.0004	0.0002	0.0098	0.0016
Barium	mg/L	0.186	0.18	0.06	0.277	0.146	0.091
Beryllium	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	0.005
Cadmium	mg/L	0.00011	0.00002	0.00004	0.00012	0.00001	0.00027
Chromium	mg/L	0.0046	0.0025	0.002	0.0013	0.0012	0.0013
Cobalt	mg/L	0.00005	0.00006	0.00021	0.00005	0.00006	0.00021
Copper	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Lead	mg/L	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001
Lithium	mg/L	<0.001	<0.001	0.003	<0.001	<0.001	0.002
Molybdenum	mg/L	0.00056	0.0014	0.00064	0.00101	0.00193	0.00344
Nickel	mg/L	0.002	0.001	0.004	0.001	0.001	0.013
Selenium	mg/L	0.0015	<0.0006	0.0007	0.0007	<0.0006	0.0025
Silver	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Strontium	mg/L	0.05	0.07	0.152	0.05	0.079	0.121
Titanium	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Tellurium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Thallium	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00002
Thorium	mg/L	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Tin	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Uranium	mg/L	0.0034	0.0016	0.0011	0.0012	0.0018	0.0042
Vanadium	mg/L	0.00132	0.00075	0.00073	0.00037	0.00036	0.00055
Zinc	mg/L	0.037	0.003	0.006	0.005	0.002	0.049
Zirconium	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Table 8. Quality Control Samples September 2013, Tiger Claims
Total and Dissolved Metals Analysis - Duplicate Sample

Parameter	Units	RAU #11	RAU #11 Duplicate	RAU #11	RAU #11 Duplicate
		Total Metals		Dissolved Metals	
Calcium	mg/L	51.8	51.9	48	48.2
Iron	mg/L	0.079	0.082	<0.005	0.013
Magnesium	mg/L	15.2	15.2	16	16
Manganese	mg/L	0.008	<0.0050	<0.001	<0.001
Potassium	mg/L	0.27	0.29	0.3	0.3
Silicon	mg/L	1.82	1.83	1.76	1.76
Sulfur	mg/L	7.1	6.9	6.7	6.6
Sodium	mg/L	0.66	0.67	0.7	0.7
Titanium	mg/L	<0.0010	<0.0010	<0.010	<0.010
Aluminum	mg/L	0.035	0.037	<0.005	<0.005
Antimony	mg/L	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	mg/L	0.0003	0.0003	0.0002	<0.0002
Barium	mg/L	0.276	0.279	0.277	0.278
Beryllium	mg/L	<0.00004	<0.00004	<0.00004	<0.00004
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001
Boron	mg/L	<0.005	<0.005	<0.004	<0.004
Cadmium	mg/L	0.00006	0.00006	0.00012	0.00005
Chromium	mg/L	0.0006	0.0006	0.0013	0.0008
Cobalt	mg/L	0.0001	0.00009	0.00005	0.00005
Copper	mg/L	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	0.0004	0.0003	<0.0001	<0.0001
Lithium	mg/L	<0.001	<0.001	<0.001	<0.001
Mercury	mg/L	<0.00001	<0.00001	nr	nr
Molybdenum	mg/L	0.001	0.001	0.00101	0.00098
Nickel	mg/L	0.001	0.001	0.001	0.001
Selenium	mg/L	<0.0006	<0.0006	0.0007	<0.0006
Silver	mg/L	<0.00001	<0.00001	<0.00001	<0.00001
Strontium	mg/L	0.052	0.052	0.05	0.048
Tellurium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001
Thallium	mg/L	<0.00001	<0.00001	<0.00001	<0.00001
Thorium	mg/L	<0.0004	<0.0004	<0.0004	<0.0004
Tin	mg/L	<0.0001	<0.0001	<0.0001	<0.0001
Uranium	mg/L	0.0012	0.0013	0.0012	0.0012
Vanadium	mg/L	0.0002	0.0002	0.00037	0.00023
Zinc	mg/L	0.013	0.009	0.005	0.005
Zirconium	mg/L	<0.0001	<0.0001	<0.00010	<0.00010

Denote >10% variation between samples

September 2013 (Monthly + Quarterly Stations)

Stations RAU #4, #7, #9, #10, #11 and #12 met all ***Aquatic and Drinking Water Guidelines*** parameters.

Station RAU #1 exceeds the ***Aquatic Guideline***s for selenium.

Station RAU #2 exceeds the ***Drinking Water Guidelines*** for manganese.

Station RAU #3 exceeds the ***Aquatic Guideline***s for selenium.

Station RAU #5 exceeds the ***Aquatic Guidelines*** for aluminum, chromium, copper, selenium and zinc; and the ***Drinking Water Guidelines*** for iron and manganese.

Station RAU #8 exceeds the ***Aquatic Guideline***s for zinc.

Station RAU #13 exceeds the ***Aquatic Guidelines*** for iron, selenium and zinc; and the ***Drinking Water Guidelines*** for iron.

Weather Station Data Logger

The weather station / data logger was downloaded in August and replacement parts installed for Temperature / Relative Humidity sensor line.
The weather station was downloaded in September and a new solar radiation sensor installed.

The perimeter fence of rebar and snow fencing was intact with some disturbance.

A 2013 weather data report will be issued after January 1, 2014.

Water Level Data Loggers

Water level loggers at Rau #1, #4, #11, #12 and #13 were removed in late September to avoid damage from ice formation.
A 2013 Water Level / Stream Discharge Report for all the above stations will be issued in early 2014.

Appendix #1

Laboratory Analytical Reports

Surface Waters August and September, 2013

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Report Transmission Cover Page

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	Tiger Project
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**955777**
Control Number:	B05979
Date Received:	Aug 30, 2013
Date Reported:	Sep 6, 2013
Report Number:	1852765

Contact & Affiliation	Address	Delivery Commitments
John Gibson J. Gibson & Associates	, Box 20913 Whitehorse, Yukon Territory Y1A 6P2 Phone: (867) 633-4522 Fax: (867) 668-6895 Email: ludditegibson@gmail.com	On [Lot Verification] send (COA) by Email - Single Report On [Report Approval] send (COC, Test Report) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report On [Lot Creation] send (COR) by Email - Single Report

Notes To Clients:

- Some total metal results were less than dissolved metal results for lot 955777. The results were verified and are within expected measurement uncertainty.
- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.

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Exova

Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **955777**
Control Number: B05979
Date Received: Aug 30, 2013
Date Reported: Sep 6, 2013
Report Number: 1852765

			Reference Number	955777-1	955777-2	955777-3	
			Sample Date	Aug 28, 2013	Aug 28, 2013	Aug 28, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	Surf. / RAU #3	Surf. / RAU #4	Surf. / RAU #9	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters							
Organic Carbon	Total Nonpurgeable	mg/L		2.5	1.1	1.1	0.5
Cyanide	Total	mg/L		<0.002	<0.002	<0.002	0.002
Ammonia - N		mg/L		0.02	0.02	0.02	.01
Phosphorus	Total	mg/L		0.003	<0.003	<0.003	0.003
Metals Dissolved							
Sulfur	Dissolved	mg/L		11.7	10.5	7.8	0.2
Aluminum	Dissolved	mg/L		<0.005	<0.005	<0.005	0.005
Antimony	Dissolved	mg/L		<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Dissolved	mg/L		0.0006	0.0024	0.0067	0.0002
Barium	Dissolved	mg/L		0.100	0.124	0.189	0.001
Beryllium	Dissolved	mg/L		<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L		<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L		<0.004	<0.004	<0.004	0.004
Cadmium	Dissolved	mg/L		0.00005	0.00002	0.00002	0.00001
Chromium	Dissolved	mg/L		<0.0004	<0.0004	<0.0004	0.0004
Cobalt	Dissolved	mg/L		0.00009	0.00006	0.00006	0.00002
Copper	Dissolved	mg/L		<0.001	<0.001	<0.001	0.001
Lead	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L		0.001	0.001	<0.001	0.001
Molybdenum	Dissolved	mg/L		0.00306	0.00127	0.00140	0.0001
Nickel	Dissolved	mg/L		0.002	0.002	0.002	0.001
Selenium	Dissolved	mg/L		0.0008	<0.0006	<0.0006	0.0006
Silver	Dissolved	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L		<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L		0.078	0.077	0.070	0.001
Tellurium	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Thorium	Dissolved	mg/L		<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L		0.0030	0.0028	0.0016	0.0004
Vanadium	Dissolved	mg/L		0.00040	0.00037	0.00020	0.0001
Zinc	Dissolved	mg/L		0.002	0.006	0.002	0.001
Zirconium	Dissolved	mg/L		<0.00010	<0.0001	<0.0001	0.0001
Metals Total							
Calcium	Total	mg/L		59.7	55.1	54.8	0.05
Iron	Total	mg/L		0.075	0.012	0.045	0.01

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **955777**
Control Number: B05979
Date Received: Aug 30, 2013
Date Reported: Sep 6, 2013
Report Number: 1852765

			Reference Number	955777-1	955777-2	955777-3	
			Sample Date	Aug 28, 2013	Aug 28, 2013	Aug 28, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	Surf. / RAU #3	Surf. / RAU #4	Surf. / RAU #9	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued							
Magnesium	Total	mg/L		16.7	20.7	16.7	0.05
Manganese	Total	mg/L		0.0079	<0.0050	<0.0050	0.005
Potassium	Total	mg/L		1.12	0.87	0.62	0.1
Silicon	Total	mg/L		2.51	2.39	2.09	0.05
Sulfur	Total	mg/L		10.3	10.4	7.6	0.1
Sodium	Total	mg/L		1.07	0.80	0.65	0.02
Titanium	Total	mg/L		<0.0010	<0.0010	0.0018	0.001
Aluminum	Total	mg/L		0.012	0.007	0.012	0.005
Antimony	Total	mg/L		<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Total	mg/L		0.0006	0.0022	0.0063	0.0002
Barium	Total	mg/L		0.103	0.127	0.187	0.001
Beryllium	Total	mg/L		<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Total	mg/L		<0.0010	<0.001	<0.001	0.001
Boron	Total	mg/L		<0.005	<0.005	<0.005	0.004
Cadmium	Total	mg/L		0.00003	0.00003	0.00002	0.00001
Chromium	Total	mg/L		<0.0004	<0.0004	<0.0004	0.0004
Cobalt	Total	mg/L		0.00009	0.00007	0.00008	0.00002
Copper	Total	mg/L		<0.001	<0.001	<0.001	0.001
Lead	Total	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Lithium	Total	mg/L		0.002	0.001	<0.001	0.001
Mercury	Total	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Molybdenum	Total	mg/L		0.0031	0.0013	0.0014	0.0001
Nickel	Total	mg/L		0.002	0.001	0.001	0.001
Selenium	Total	mg/L		0.0013	0.0007	<0.0006	0.0006
Silver	Total	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Strontium	Total	mg/L		0.082	0.080	0.073	0.001
Tellurium	Total	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Thallium	Total	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Thorium	Total	mg/L		<0.0004	<0.0004	<0.0004	0.0004
Tin	Total	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Uranium	Total	mg/L		0.0028	0.0028	0.0017	0.0004
Vanadium	Total	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Zinc	Total	mg/L		0.002	0.007	0.004	0.001
Zirconium	Total	mg/L		0.0002	<0.0001	<0.0001	0.0001
Physical and Aggregate Properties							
Solids	Total Suspended	mg/L		<2	<2	<2	1

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Analytical Report

Bill To: J. Gibson & Associates
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Box 20913
Whitehorse, YT, Canada
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Attn: John Gibson
Sampled By: J.Gibson
Company:

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			Reference Number	955777-1	955777-2	955777-3	
			Sample Date	Aug 28, 2013	Aug 28, 2013	Aug 28, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	Surf. / RAU #3	Surf. / RAU #4	Surf. / RAU #9	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Physical and Aggregate Properties - Continued							
Solids	Total Dissolved	mg/L		252	224	212	5
Routine Water							
pH	at 25 °C			8.14	8.21	8.11	
Electrical Conductivity		µS/cm at 25 C		362	349	322	1
Calcium	Dissolved	mg/L		63.7	57.5	57.0	0.1
Iron	Dissolved	mg/L		0.034	<0.005	<0.005	0.005
Magnesium	Dissolved	mg/L		17.9	21.7	17.4	0.1
Manganese	Dissolved	mg/L		0.005	<0.001	0.004	0.001
Potassium	Dissolved	mg/L		1.2	0.8	0.6	0.1
Silicon	Dissolved	mg/L		2.56	2.38	2.10	0.05
Sodium	Dissolved	mg/L		1.3	1.0	0.8	0.1
Bicarbonate		mg/L		234	234	226	5
Carbonate		mg/L		<6	<6	<6	6
Hydroxide		mg/L		<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L		<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L		192	192	185	5
Chloride	Dissolved	mg/L		0.14	0.12	0.08	0.05
Nitrate - N	Dissolved	mg/L		0.06	0.24	0.24	0.01
Nitrite - N	Dissolved	mg/L		<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L		34.1	32.4	23.8	0.5
Hardness	as CaCO3	mg/L		233	233	214	5
Hardness	Total	mg CaCO3/L		218	223	205	1

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **955777**
Control Number: B05979
Date Received: Aug 30, 2013
Date Reported: Sep 6, 2013
Report Number: 1852765

		Reference Number	955777-4	955777-5	955777-6	
		Sample Date	Aug 28, 2013	Aug 28, 2013	Aug 28, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surf. / RAU #10	Surf. / RAU #11	Surf. / RAU #12	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	1.5	0.8	0.9	0.5
Cyanide	Total	mg/L	<0.002	<0.002	<0.002	0.002
Ammonia - N		mg/L	0.02	0.02	0.02	.01
Phosphorus	Total	mg/L	0.032	<0.003	<0.003	0.003
Metals Dissolved						
Sulfur	Dissolved	mg/L	17.1	6.7	8.2	0.2
Aluminum	Dissolved	mg/L	0.008	<0.005	<0.005	0.005
Antimony	Dissolved	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Dissolved	mg/L	0.0003	<0.0002	0.0099	0.0002
Barium	Dissolved	mg/L	0.062	0.271	0.146	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	<0.004	<0.004	<0.004	0.004
Cadmium	Dissolved	mg/L	0.00003	0.00005	0.00001	0.00001
Chromium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Cobalt	Dissolved	mg/L	0.00009	0.00005	0.00006	0.00002
Copper	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Lead	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L	0.003	<0.001	<0.001	0.001
Molybdenum	Dissolved	mg/L	0.00076	0.00102	0.00188	0.0001
Nickel	Dissolved	mg/L	0.004	0.001	0.002	0.001
Selenium	Dissolved	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L	0.154	0.047	0.080	0.001
Tellurium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L	0.0012	0.0012	0.0016	0.0004
Vanadium	Dissolved	mg/L	0.00030	0.00024	0.00025	0.0001
Zinc	Dissolved	mg/L	0.004	0.005	0.002	0.001
Zirconium	Dissolved	mg/L	<0.00010	<0.0001	<0.0001	0.0001
Metals Total						
Calcium	Total	mg/L	47.3	47.0	55.3	0.05
Iron	Total	mg/L	0.105	<0.010	<0.010	0.01

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **955777**
Control Number: B05979
Date Received: Aug 30, 2013
Date Reported: Sep 6, 2013
Report Number: 1852765

			Reference Number	955777-4	955777-5	955777-6	
			Sample Date	Aug 28, 2013	Aug 28, 2013	Aug 28, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	Surf. / RAU #10	Surf. / RAU #11	Surf. / RAU #12	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued							
Magnesium	Total	mg/L		19.4	15.8	16.0	0.05
Manganese	Total	mg/L		0.0095	<0.0050	<0.0050	0.005
Potassium	Total	mg/L		0.58	0.20	0.89	0.1
Silicon	Total	mg/L		2.06	1.84	2.11	0.05
Sulfur	Total	mg/L		17.3	6.8	8.2	0.1
Sodium	Total	mg/L		1.89	0.57	0.74	0.02
Titanium	Total	mg/L		<0.0010	<0.0010	0.0044	0.001
Aluminum	Total	mg/L		0.017	<0.005	<0.005	0.005
Antimony	Total	mg/L		<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Total	mg/L		0.0004	0.0005	0.0221	0.0002
Barium	Total	mg/L		0.061	0.273	0.148	0.001
Beryllium	Total	mg/L		<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Total	mg/L		<0.0010	<0.001	<0.001	0.001
Boron	Total	mg/L		<0.005	<0.005	<0.005	0.004
Cadmium	Total	mg/L		0.00003	0.00004	0.00002	0.00001
Chromium	Total	mg/L		<0.0004	<0.0004	<0.0004	0.0004
Cobalt	Total	mg/L		0.00012	0.00006	0.00006	0.00002
Copper	Total	mg/L		<0.001	<0.001	<0.001	0.001
Lead	Total	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Lithium	Total	mg/L		0.004	<0.001	<0.001	0.001
Mercury	Total	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Molybdenum	Total	mg/L		0.0008	0.0010	0.0020	0.0001
Nickel	Total	mg/L		0.004	0.001	0.001	0.001
Selenium	Total	mg/L		<0.0006	0.0008	0.0009	0.0006
Silver	Total	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Strontium	Total	mg/L		0.157	0.048	0.083	0.001
Tellurium	Total	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Thallium	Total	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Thorium	Total	mg/L		<0.0004	<0.0004	<0.0004	0.0004
Tin	Total	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Uranium	Total	mg/L		0.0011	0.0011	0.0017	0.0004
Vanadium	Total	mg/L		<0.0001	0.0073	0.0081	0.0001
Zinc	Total	mg/L		0.005	0.006	0.003	0.001
Zirconium	Total	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Physical and Aggregate Properties							
Solids	Total Suspended	mg/L		<2	<2	<2	1

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **955777**
Control Number: B05979
Date Received: Aug 30, 2013
Date Reported: Sep 6, 2013
Report Number: 1852765

			Reference Number	955777-4	955777-5	955777-6	
			Sample Date	Aug 28, 2013	Aug 28, 2013	Aug 28, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	Surf. / RAU #10	Surf. / RAU #11	Surf. / RAU #12	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Physical and Aggregate Properties - Continued							
Solids	Total Dissolved	mg/L		218	180	206	5
Routine Water							
pH	at 25 °C			8.14	7.99	8.07	
Electrical Conductivity		µS/cm at 25 C		322	289	326	1
Calcium	Dissolved	mg/L		49.0	49.0	57.2	0.1
Iron	Dissolved	mg/L		0.034	<0.005	<0.005	0.005
Magnesium	Dissolved	mg/L		20.3	16.5	16.6	0.1
Manganese	Dissolved	mg/L		0.008	<0.001	<0.001	0.001
Potassium	Dissolved	mg/L		0.6	0.2	0.9	0.1
Silicon	Dissolved	mg/L		2.04	1.83	2.12	0.05
Sodium	Dissolved	mg/L		2.0	0.6	0.7	0.1
Bicarbonate		mg/L		181	198	221	5
Carbonate		mg/L		<6	<6	<6	6
Hydroxide		mg/L		<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L		<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L		148	162	182	5
Chloride	Dissolved	mg/L		0.69	<0.05	0.06	0.05
Nitrate - N	Dissolved	mg/L		0.06	0.17	0.31	0.01
Nitrite - N	Dissolved	mg/L		<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L		54.8	21.3	25.7	0.5
Hardness	as CaCO3	mg/L		206	190	211	5
Hardness	Total	mg CaCO3/L		198	182	204	1

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **955777**
Control Number: B05979
Date Received: Aug 30, 2013
Date Reported: Sep 6, 2013
Report Number: 1852765

Reference Number	955777-7
Sample Date	Aug 28, 2013
Sample Time	NA
Sample Location	
Sample Description	Surf. / RAU #13
Matrix	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	2.2			0.5
Cyanide	Total	mg/L	<0.002			0.002
Ammonia - N		mg/L	0.02			.01
Phosphorus	Total	mg/L	0.008			0.003
Metals Dissolved						
Sulfur	Dissolved	mg/L	20.2			0.2
Aluminum	Dissolved	mg/L	0.009			0.005
Antimony	Dissolved	mg/L	<0.0002			0.0002
Arsenic	Dissolved	mg/L	0.0012			0.0002
Barium	Dissolved	mg/L	0.092			0.001
Beryllium	Dissolved	mg/L	<0.00004			0.00004
Bismuth	Dissolved	mg/L	<0.001			0.001
Boron	Dissolved	mg/L	0.01			0.004
Cadmium	Dissolved	mg/L	0.00044			0.00001
Chromium	Dissolved	mg/L	<0.0004			0.0004
Cobalt	Dissolved	mg/L	0.00036			0.00002
Copper	Dissolved	mg/L	0.001			0.001
Lead	Dissolved	mg/L	<0.0001			0.0001
Lithium	Dissolved	mg/L	0.004			0.001
Molybdenum	Dissolved	mg/L	0.00498			0.0001
Nickel	Dissolved	mg/L	0.023			0.001
Selenium	Dissolved	mg/L	0.0029			0.0006
Silver	Dissolved	mg/L	<0.00001			0.00001
Titanium	Dissolved	mg/L	<0.010			0.01
Strontium	Dissolved	mg/L	0.170			0.001
Tellurium	Dissolved	mg/L	<0.0001			0.0001
Thallium	Dissolved	mg/L	0.00002			0.00001
Thorium	Dissolved	mg/L	<0.0004			0.0004
Tin	Dissolved	mg/L	<0.0001			0.0001
Uranium	Dissolved	mg/L	0.0059			0.0004
Vanadium	Dissolved	mg/L	0.00048			0.0001
Zinc	Dissolved	mg/L	0.080			0.001
Zirconium	Dissolved	mg/L	<0.00010			0.0001
Metals Total						
Calcium	Total	mg/L	75.4			0.05
Iron	Total	mg/L	0.375			0.01

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Analytical Report

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**955777**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B05979
	Box 20913	Name:	Tiger Project	Date Received:	Aug 30, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Sep 6, 2013
	Y1A 6P2	LSD:		Report Number:	1852765
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

Reference Number	955777-7
Sample Date	Aug 28, 2013
Sample Time	NA
Sample Location	
Sample Description	Surf. / RAU #13
Matrix	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Metals Total - Continued						
Magnesium	Total	mg/L	19.6			0.05
Manganese	Total	mg/L	0.0262			0.005
Potassium	Total	mg/L	1.75			0.1
Silicon	Total	mg/L	2.60			0.05
Sulfur	Total	mg/L	20.0			0.1
Sodium	Total	mg/L	2.86			0.02
Titanium	Total	mg/L	0.0013			0.001
Aluminum	Total	mg/L	0.052			0.005
Antimony	Total	mg/L	<0.0002			0.0002
Arsenic	Total	mg/L	0.0027			0.0002
Barium	Total	mg/L	0.097			0.001
Beryllium	Total	mg/L	<0.00004			0.00004
Bismuth	Total	mg/L	<0.001			0.001
Boron	Total	mg/L	0.01			0.004
Cadmium	Total	mg/L	0.00051			0.00001
Chromium	Total	mg/L	<0.0004			0.0004
Cobalt	Total	mg/L	0.00042			0.00002
Copper	Total	mg/L	0.002			0.001
Lead	Total	mg/L	<0.0001			0.0001
Lithium	Total	mg/L	0.005			0.001
Mercury	Total	mg/L	<0.00001			0.00001
Molybdenum	Total	mg/L	0.0052			0.0001
Nickel	Total	mg/L	0.025			0.001
Selenium	Total	mg/L	0.0072			0.0006
Silver	Total	mg/L	<0.00001			0.00001
Strontium	Total	mg/L	0.177			0.001
Tellurium	Total	mg/L	<0.0001			0.0001
Thallium	Total	mg/L	0.00002			0.00001
Thorium	Total	mg/L	<0.0004			0.0004
Tin	Total	mg/L	<0.0001			0.0001
Uranium	Total	mg/L	0.0065			0.0004
Vanadium	Total	mg/L	0.0060			0.0001
Zinc	Total	mg/L	0.106			0.001
Zirconium	Total	mg/L	<0.0001			0.0001
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2			1

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **955777**
Control Number: B05979
Date Received: Aug 30, 2013
Date Reported: Sep 6, 2013
Report Number: 1852765

Reference Number	955777-7
Sample Date	Aug 28, 2013
Sample Time	NA
Sample Location	
Sample Description	Surf. / RAU #13
Matrix	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Physical and Aggregate Properties - Continued						
Solids	Total Dissolved	mg/L	314			5
Routine Water						
pH	at 25 °C		8.10			
Electrical Conductivity		µS/cm at 25 C	451			1
Calcium	Dissolved	mg/L	78.5			0.1
Iron	Dissolved	mg/L	0.037			0.005
Magnesium	Dissolved	mg/L	20.5			0.1
Manganese	Dissolved	mg/L	0.024			0.001
Potassium	Dissolved	mg/L	1.7			0.1
Silicon	Dissolved	mg/L	2.56			0.05
Sodium	Dissolved	mg/L	3.0			0.1
Bicarbonate		mg/L	260			5
Carbonate		mg/L	<6			6
Hydroxide		mg/L	<5			5
P-Alkalinity	as CaCO3	mg/L	<5			5
T-Alkalinity	as CaCO3	mg/L	214			5
Chloride	Dissolved	mg/L	4.48			0.05
Nitrate - N	Dissolved	mg/L	0.14			0.01
Nitrite - N	Dissolved	mg/L	<0.01			0.01
Sulfate (SO4)	Dissolved	mg/L	65.7			0.5
Hardness	as CaCO3	mg/L	280			5
Hardness	Total	mg CaCO3/L	269			1

Approved by:

Randy Neumann, BSc
General Manager

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Methodology and Notes

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	Tiger Project
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**955777**
Control Number:	B05979
Date Received:	Aug 30, 2013
Date Reported:	Sep 6, 2013
Report Number:	1852765

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water (Surrey)	APHA	*	Alkalinity - Titration Method, 2320 B	31-Aug-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	*	Conductivity, 2510 B	31-Aug-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	*	pH - Electrometric Method, 4500-H+ B	31-Aug-13	Exova Surrey
Ammonia-N in Water (Surrey)	APHA	*	Flow Injection Analysis, 4500-NH3 H	03-Sep-13	Exova Surrey
Anions by IEC in water (Surrey)	APHA	*	Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	30-Aug-13	Exova Surrey
Carbon Organic (Total) in water (TOC)	APHA		High-Temperature Combustion Method, 5310 B	03-Sep-13	Exova Edmonton
Cyanide (Total) in water	US EPA	*	US EPA method, 335.3	05-Sep-13	Exova Edmonton
Mercury Low Level (Total) in water (Surrey)	EPA	*	Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	04-Sep-13	Exova Surrey
Metals SemiTrace (Dissolved) in water (Surrey)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	03-Sep-13	Exova Surrey
Metals SemiTrace (Total) in Water (Surrey)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	03-Sep-13	Exova Surrey
Phosphorus - total by Smartchem (Surrey)	APHA	*	Preliminary Acid Hydrolysis, Ascorbic Acid Reduction Method, 4500-P B,E	03-Sep-13	Exova Surrey
Solids Dissolved (Total, Fixed and Volatile) - Surrey	APHA	*	Total Dissolved Solids Dried at 180 C, 2540 C	03-Sep-13	Exova Surrey
Solids Suspended (Total, Fixed and Volatile)	APHA	*	Total Suspended Solids Dried at 103-105'C, 2540 D	03-Sep-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	03-Sep-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	03-Sep-13	Exova Surrey
Trace Metals (Total) in Water (Surrey)	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	03-Sep-13	Exova Surrey
Trace Metals (Total) in Water (Surrey)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	03-Sep-13	Exova Surrey

** Reference Method Modified*

References

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

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W: www.exova.com

Methodology and Notes

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**955777**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B05979
	Box 20913	Name:	Tiger Project	Date Received:	Aug 30, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Sep 6, 2013
	Y1A 6P2	LSD:		Report Number:	1852765
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

Comments:

- Some total metal results were less than dissolved metal results for lot 955777. The results were verified and are within expected measurement uncertainty.
- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.
The test report shall not be reproduced except in full, without the written approval of the laboratory.

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www.exova.com

Billing Information
Company: J. Gibson & Associates
Address:
Whitehorse, YT Y1A 6P2
Attention: John Gibson
Phone: (867) 633-4522
Cell:
Fax: (867) 668-6895
E-mail: ludditegibson@gmail.com
Agreement ID: 6646
Copy of report: X

Copy of Report To:
Company: J. Gibson & Associates
Address:
Whitehorse, YT Y1A 6P2
Attention: John Gibson
Phone: (867) 633-4522
Cell:
Fax: (867) 668-6895
E-mail: ludditegibson@gmail.com
Copy of invoice: X

RUSH Priority
Upon filling out this section, client accepts that surcharges will be applied to the analysis
Date Required
As Indicated | All Analysis
When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples.
Signature

Project Information
Project ID: ATAC RESOURCES
Project Name: TIGER PROJECT
Project Location:
Legal Location:
PO/AFE#:
Proj. Acct. Code:

Report Results: E-mail / Mail / Online / Fax / PDF / Excel / QA/QC Report

Sample Custody (please print)
Sampled by: B GIBSON
Company:
I authorize Exova to proceed with the work indicated on this form:
Date: Aug 29/13 Initial: BG.

This section for Lab use only
Date/Time stamp: 08-30-13P02:38 RCVD

Special Instructions/Comments (please include contact information including ph. # if different from above).
RCHTOM = pH, EC, TP, N_2, N_3, TALK, HARDT, SO_4, Cl, TSS + TDS
METALS + NITRIC, NH_4 + SULFURIC
TOC + Hcl, TCN + NaOH

Include Regulatory Requirements Below:

	Sample Identification	Location	Depth IN CM M	Date/Time sampled	Matrix	Sampling Method	Number of Containers	RCHTOM	TOC	NH_4	TM2 (Short Thg)	TM2 (Low P)	Enter tests above (√ relevant samples below)
1	RAU #3	SURF	—	AUG 28/13	H2O	Grab	6	✓	✓	✓	✓	✓	
2													
3	#4	↓	↓	↓	↓	↓	6	✓	✓	✓	✓	✓	
4													
5	#9						6	✓	✓	✓	✓	✓	
6													
7	#10						6	✓	✓	✓	✓	✓	
8													
9	#11						6	✓	✓	✓	✓	✓	
10													
11	#12						6	✓	✓	✓	✓	✓	
12													
13	#13						6	✓	✓	✓	✓	✓	
14													
15	#15						6	✓	✓	✓	✓	✓	

Indicate below any deficiencies in the condition of samples:
- Were Exova supplies used?
- Was there any damage to the shipping container?
- Were the containers packaged well?
- Were any extra samples received (document below)?
- Are samples within recommended holding times/temp?

ED 120-00

Environmental Sample Information Sheet
Note: Proper completion of this form is required in order to proceed with analysis
Please indicate any potentially hazardous samples

Page 1 of 1 Control # B05979

In LOT: 955777 COC

Shipping:
COD Y/N
Cooler temp: 11 C

and size of coolers received:
Delivery Method:
Waybill:
Received by:

Exova
#104, 19575-55 A Ave.
Surrey, British Columbia
V3S 8P8, Canada

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Report Transmission Cover Page

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	Tiger Project
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**962233**
Control Number:	B14609
Date Received:	Oct 1, 2013
Date Reported:	Oct 8, 2013
Report Number:	1861089

Contact & Affiliation	Address	Delivery Commitments
John Gibson J. Gibson & Associates	, Box 20913 Whitehorse, Yukon Territory Y1A 6P2 Phone: (867) 633-4522 Fax: (867) 668-6895 Email: ludditegibson@gmail.com	On [Lot Verification] send (COA) by Email - Single Report On [Report Approval] send (COC, Test Report) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report On [Lot Creation] send (COR) by Email - Single Report

Notes To Clients:

- Sample 962233-9 was not field filtered and preserved for dissolved metals.
- Analysis was performed on samples 962233-1 to 13 that exceeded the recommended holding time for nitrite/nitrate anions analysis.
- Some total metal results were less than dissolved metal results for lot 962233. The results were verified and are within expected measurement uncertainty.
- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **962233**
Control Number: B14609
Date Received: Oct 1, 2013
Date Reported: Oct 8, 2013
Report Number: 1861089

			Reference Number	962233-1	962233-2	962233-3	
			Sample Date	Sep 28, 2013	Sep 28, 2013	Sep 28, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	Surf / RAU #1	Surf / RAU #2	Surf / RAU #3	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters							
Organic Carbon	Total Nonpurgeable	mg/L		3.9	3.9	3.8	0.5
Cyanide	Total	mg/L		<0.002	<0.002	<0.002	0.002
Ammonia - N		mg/L		<0.01	<0.01	<0.01	.01
Phosphorus	Total	mg/L		<0.003	<0.003	0.005	0.003
Metals Dissolved							
Sulfur	Dissolved	mg/L		13.1	12.5	9.9	0.2
Aluminum	Dissolved	mg/L		0.006	0.012	<0.005	0.005
Antimony	Dissolved	mg/L		<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Dissolved	mg/L		0.0003	<0.0002	0.0005	0.0002
Barium	Dissolved	mg/L		0.087	0.046	0.096	0.001
Beryllium	Dissolved	mg/L		<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L		<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L		<0.004	<0.004	<0.004	0.004
Cadmium	Dissolved	mg/L		0.00010	0.00002	0.00003	0.00001
Chromium	Dissolved	mg/L		0.0012	0.0010	0.0012	0.0004
Cobalt	Dissolved	mg/L		0.00008	0.00029	0.00008	0.00002
Copper	Dissolved	mg/L		<0.001	<0.001	<0.001	0.001
Lead	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L		0.002	0.003	0.001	0.001
Molybdenum	Dissolved	mg/L		0.00167	0.00041	0.00262	0.0001
Nickel	Dissolved	mg/L		0.002	0.002	0.002	0.001
Selenium	Dissolved	mg/L		0.0042	0.0006	0.0019	0.0006
Silver	Dissolved	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L		<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L		0.107	0.098	0.076	0.001
Tellurium	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Thorium	Dissolved	mg/L		<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L		0.0016	<0.0004	0.0025	0.0004
Vanadium	Dissolved	mg/L		0.00046	0.00034	0.00042	0.0001
Zinc	Dissolved	mg/L		0.004	0.002	0.001	0.001
Zirconium	Dissolved	mg/L		<0.0001	<0.00010	<0.00010	0.0001
Metals Total							
Calcium	Total	mg/L		60.6	51.6	58.8	0.05
Iron	Total	mg/L		0.024	0.211	0.077	0.01

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **962233**
Control Number: B14609
Date Received: Oct 1, 2013
Date Reported: Oct 8, 2013
Report Number: 1861089

		Reference Number	962233-1	962233-2	962233-3	
		Sample Date	Sep 28, 2013	Sep 28, 2013	Sep 28, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surf / RAU #1	Surf / RAU #2	Surf / RAU #3	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued						
Magnesium	Total	mg/L	7.94	10.2	14.8	0.05
Manganese	Total	mg/L	<0.0050	0.0762	0.0123	0.005
Potassium	Total	mg/L	0.38	0.41	1.21	0.1
Silicon	Total	mg/L	2.45	2.53	2.26	0.05
Sulfur	Total	mg/L	13.9	13.4	10.7	0.1
Sodium	Total	mg/L	1.48	1.64	1.11	0.02
Titanium	Total	mg/L	<0.0010	<0.0010	<0.0010	0.001
Aluminum	Total	mg/L	0.012	0.061	0.022	0.005
Antimony	Total	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Total	mg/L	0.0002	0.0002	0.0005	0.0002
Barium	Total	mg/L	0.086	0.048	0.096	0.001
Beryllium	Total	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Total	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Total	mg/L	<0.005	<0.005	<0.005	0.004
Cadmium	Total	mg/L	0.00012	0.00004	0.00003	0.00001
Chromium	Total	mg/L	<0.0004	<0.0004	0.0004	0.0004
Cobalt	Total	mg/L	0.00008	0.00036	0.00010	0.00002
Copper	Total	mg/L	<0.001	<0.001	<0.001	0.001
Lead	Total	mg/L	<0.0001	0.0001	<0.0001	0.0001
Lithium	Total	mg/L	0.002	0.003	0.001	0.001
Mercury	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Molybdenum	Total	mg/L	0.0017	0.0004	0.0026	0.0001
Nickel	Total	mg/L	0.002	0.002	0.002	0.001
Selenium	Total	mg/L	0.0037	0.0008	0.0014	0.0006
Silver	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Strontium	Total	mg/L	0.113	0.104	0.080	0.001
Tellurium	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium	Total	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Total	mg/L	0.0018	0.0004	0.0026	0.0004
Vanadium	Total	mg/L	0.0003	0.0003	0.0003	0.0001
Zinc	Total	mg/L	0.006	0.005	0.003	0.001
Zirconium	Total	mg/L	0.0001	0.0001	0.0001	0.0001
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2	<2	<2	1

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Analytical Report

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Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **962233**
Control Number: B14609
Date Received: Oct 1, 2013
Date Reported: Oct 8, 2013
Report Number: 1861089

			Reference Number	962233-1	962233-2	962233-3	
			Sample Date	Sep 28, 2013	Sep 28, 2013	Sep 28, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	Surf / RAU #1	Surf / RAU #2	Surf / RAU #3	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Physical and Aggregate Properties - Continued							
Solids	Total Dissolved	mg/L		206	192	226	5
Routine Water							
pH	at 25 °C			8.00	7.94	8.07	
Electrical Conductivity		µS/cm at 25 C		319	302	368	1
Calcium	Dissolved	mg/L		56.9	48.9	55.8	0.1
Iron	Dissolved	mg/L		0.006	0.088	0.027	0.005
Magnesium	Dissolved	mg/L		8.56	11.0	15.8	0.1
Manganese	Dissolved	mg/L		<0.001	0.053	0.003	0.001
Potassium	Dissolved	mg/L		0.4	0.4	1.2	0.1
Silicon	Dissolved	mg/L		2.43	2.47	2.24	0.05
Sodium	Dissolved	mg/L		1.6	1.6	1.2	0.1
Bicarbonate		mg/L		164	151	211	5
Carbonate		mg/L		<6	<6	<6	6
Hydroxide		mg/L		<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L		<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L		135	124	173	5
Nitrate - N	Dissolved	mg/L		0.16	0.29	0.09	0.01
Nitrite - N	Dissolved	mg/L		<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L		41.2	39.8	34.6	0.5
Hardness	as CaCO3	mg/L		177	167	205	5
Hardness	Total	mg CaCO3/L		184	171	208	1

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Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **962233**
Control Number: B14609
Date Received: Oct 1, 2013
Date Reported: Oct 8, 2013
Report Number: 1861089

	Reference Number	962233-4	962233-5	962233-6	
	Sample Date	Sep 27, 2013	Sep 29, 2013	Sep 29, 2013	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Surf / RAU #4	Surf / RAU #5	Surf / RAU #7	
	Matrix	Water	Water	Water	
Analyte	**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters					
Organic Carbon Total Nonpurgeable	mg/L	1.8	2.8	1.4	0.5
Cyanide Total	mg/L	<0.002	<0.002	<0.002	0.002
Ammonia - N	mg/L	<0.01	0.01	<0.01	.01
Phosphorus Total	mg/L	<0.003	0.102	<0.003	0.003
Metals Dissolved					
Sulfur Dissolved	mg/L	9.9	11.0	11.2	0.2
Aluminum Dissolved	mg/L	<0.005	<0.005	<0.005	0.005
Antimony Dissolved	mg/L	<0.0002	0.0008	<0.0002	0.0002
Arsenic Dissolved	mg/L	0.0024	0.0008	0.0002	0.0002
Barium Dissolved	mg/L	0.130	0.129	0.163	0.001
Beryllium Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron Dissolved	mg/L	<0.004	<0.004	<0.004	0.004
Cadmium Dissolved	mg/L	0.00002	0.00039	0.00002	0.00001
Chromium Dissolved	mg/L	0.0021	0.0061	0.0049	0.0004
Cobalt Dissolved	mg/L	0.00006	0.00024	0.00005	0.00002
Copper Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Lead Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium Dissolved	mg/L	0.001	0.002	<0.001	0.001
Molybdenum Dissolved	mg/L	0.00138	0.00692	0.00012	0.0001
Nickel Dissolved	mg/L	0.001	0.012	0.001	0.001
Selenium Dissolved	mg/L	0.0008	0.0057	<0.0006	0.0006
Silver Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium Dissolved	mg/L	0.080	0.173	0.041	0.001
Tellurium Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium Dissolved	mg/L	<0.00001	0.00002	<0.00001	0.00001
Thorium Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium Dissolved	mg/L	0.0030	0.0101	0.0016	0.0004
Vanadium Dissolved	mg/L	0.00070	0.00208	0.00146	0.0001
Zinc Dissolved	mg/L	0.006	0.068	0.004	0.001
Zirconium Dissolved	mg/L	<0.00010	<0.0001	<0.00010	0.0001
Metals Total					
Calcium Total	mg/L	58.1	83.0	46.6	0.05
Iron Total	mg/L	0.014	1.70	0.025	0.01

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Bill To: J. Gibson & Associates
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Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
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Lot ID: **962233**
Control Number: B14609
Date Received: Oct 1, 2013
Date Reported: Oct 8, 2013
Report Number: 1861089

			Reference Number	962233-4	962233-5	962233-6	
			Sample Date	Sep 27, 2013	Sep 29, 2013	Sep 29, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	Surf / RAU #4	Surf / RAU #5	Surf / RAU #7	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued							
Magnesium	Total	mg/L		19.6	29.3	22.7	0.05
Manganese	Total	mg/L		<0.0050	0.0841	<0.0050	0.005
Potassium	Total	mg/L		0.98	1.25	0.33	0.1
Silicon	Total	mg/L		2.36	3.80	1.92	0.05
Sulfur	Total	mg/L		11.1	12.4	12.4	0.1
Sodium	Total	mg/L		0.90	1.24	0.70	0.02
Titanium	Total	mg/L		<0.0010	0.0177	<0.0010	0.001
Aluminum	Total	mg/L		0.007	0.638	0.009	0.005
Antimony	Total	mg/L		<0.0002	0.001	<0.0002	0.0002
Arsenic	Total	mg/L		0.0023	0.0024	0.0003	0.0002
Barium	Total	mg/L		0.129	0.179	0.169	0.001
Beryllium	Total	mg/L		<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Total	mg/L		<0.001	<0.001	<0.001	0.001
Boron	Total	mg/L		<0.005	<0.005	<0.005	0.004
Cadmium	Total	mg/L		0.00002	0.00140	0.00002	0.00001
Chromium	Total	mg/L		0.0004	0.0021	0.0004	0.0004
Cobalt	Total	mg/L		0.00008	0.00130	0.00006	0.00002
Copper	Total	mg/L		<0.001	0.005	<0.001	0.001
Lead	Total	mg/L		<0.0001	0.0028	0.0001	0.0001
Lithium	Total	mg/L		0.001	0.003	<0.001	0.001
Mercury	Total	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Molybdenum	Total	mg/L		0.0014	0.0064	0.0001	0.0001
Nickel	Total	mg/L		0.001	0.032	0.001	0.001
Selenium	Total	mg/L		0.0008	0.0041	<0.0006	0.0006
Silver	Total	mg/L		<0.00001	0.00005	<0.00001	0.00001
Strontium	Total	mg/L		0.085	0.194	0.044	0.001
Tellurium	Total	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Thallium	Total	mg/L		<0.00001	0.00008	<0.00001	0.00001
Thorium	Total	mg/L		<0.0004	<0.0004	<0.0004	0.0004
Tin	Total	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Uranium	Total	mg/L		0.0030	0.0108	0.0016	0.0004
Vanadium	Total	mg/L		0.0002	0.0048	0.0002	0.0001
Zinc	Total	mg/L		0.007	0.207	0.006	0.001
Zirconium	Total	mg/L		<0.0001	0.0002	<0.0001	0.0001
Physical and Aggregate Properties							
Solids	Total Suspended	mg/L		<2	72	<2	1

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Analytical Report

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	Tiger Project
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**962233**
Control Number:	B14609
Date Received:	Oct 1, 2013
Date Reported:	Oct 8, 2013
Report Number:	1861089

		Reference Number	962233-4	962233-5	962233-6	
		Sample Date	Sep 27, 2013	Sep 29, 2013	Sep 29, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surf / RAU #4	Surf / RAU #5	Surf / RAU #7	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Physical and Aggregate Properties - Continued						
Solids	Total Dissolved	mg/L	240	322	216	5
Routine Water						
pH	at 25 °C		8.10	7.94	8.15	
Electrical Conductivity		µS/cm at 25 C	413	536	375	1
Calcium	Dissolved	mg/L	55.4	75.1	44.6	0.1
Iron	Dissolved	mg/L	<0.005	0.064	<0.005	0.005
Magnesium	Dissolved	mg/L	21.0	29.2	24.5	0.1
Manganese	Dissolved	mg/L	<0.001	0.030	<0.001	0.001
Potassium	Dissolved	mg/L	0.9	1.1	0.2	0.1
Silicon	Dissolved	mg/L	2.32	2.90	1.88	0.05
Sodium	Dissolved	mg/L	1.0	1.3	0.9	0.1
Bicarbonate		mg/L	238	335	209	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	195	274	172	5
Nitrate - N	Dissolved	mg/L	0.28	0.10	0.22	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	34.6	39.5	38.9	0.5
Hardness	as CaCO3	mg/L	225	308	212	5
Hardness	Total	mg CaCO3/L	226	328	210	1

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **962233**
Control Number: B14609
Date Received: Oct 1, 2013
Date Reported: Oct 8, 2013
Report Number: 1861089

	Reference Number	962233-7	962233-8	962233-9	
	Sample Date	Sep 28, 2013	Sep 28, 2013	Sep 28, 2013	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Surf / RAU #8	Surf / RAU #9	Surf / RAU #10	
	Matrix	Water	Water	Water	
Analyte	**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters					
Organic Carbon Total Nonpurgeable	mg/L	1.3	1.6	2.0	0.5
Cyanide Total	mg/L	<0.002	<0.002	<0.002	0.002
Ammonia - N	mg/L	<0.01	<0.01	<0.01	.01
Phosphorus Total	mg/L	<0.003	<0.003	<0.003	0.003
Metals Dissolved					
Sulfur Dissolved	mg/L	8.2	7.2	14.5	0.2
Aluminum Dissolved	mg/L	<0.005	<0.005	0.028	0.005
Antimony Dissolved	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic Dissolved	mg/L	0.0002	0.0070	0.0004	0.0002
Barium Dissolved	mg/L	0.186	0.180	0.060	0.001
Beryllium Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron Dissolved	mg/L	<0.004	<0.004	<0.004	0.004
Cadmium Dissolved	mg/L	0.00011	0.00002	0.00004	0.00001
Chromium Dissolved	mg/L	0.0046	0.0025	0.0020	0.0004
Cobalt Dissolved	mg/L	0.00005	0.00006	0.00021	0.00002
Copper Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Lead Dissolved	mg/L	<0.0001	<0.0001	0.0002	0.0001
Lithium Dissolved	mg/L	<0.001	<0.001	0.003	0.001
Molybdenum Dissolved	mg/L	0.00056	0.00140	0.00064	0.0001
Nickel Dissolved	mg/L	0.002	0.001	0.004	0.001
Selenium Dissolved	mg/L	0.0015	<0.0006	0.0007	0.0006
Silver Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium Dissolved	mg/L	0.050	0.070	0.152	0.001
Tellurium Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium Dissolved	mg/L	0.0034	0.0016	0.0011	0.0004
Vanadium Dissolved	mg/L	0.00132	0.00075	0.00073	0.0001
Zinc Dissolved	mg/L	0.037	0.003	0.006	0.001
Zirconium Dissolved	mg/L	<0.00010	<0.00010	<0.00010	0.0001
Metals Total					
Calcium Total	mg/L	48.5	59.0	49.0	0.05
Iron Total	mg/L	0.031	0.020	0.111	0.01

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **962233**
Control Number: B14609
Date Received: Oct 1, 2013
Date Reported: Oct 8, 2013
Report Number: 1861089

	Reference Number	962233-7	962233-8	962233-9	
	Sample Date	Sep 28, 2013	Sep 28, 2013	Sep 28, 2013	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Surf / RAU #8	Surf / RAU #9	Surf / RAU #10	
	Matrix	Water	Water	Water	
Analyte	**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued					
Magnesium Total	mg/L	16.2	15.8	18.0	0.05
Manganese Total	mg/L	<0.0050	0.0093	0.0121	0.005
Potassium Total	mg/L	0.37	0.75	0.59	0.1
Silicon Total	mg/L	1.48	2.03	2.01	0.05
Sulfur Total	mg/L	9.4	7.9	15.9	0.1
Sodium Total	mg/L	0.78	0.77	2.09	0.02
Titanium Total	mg/L	<0.0010	<0.0010	<0.0010	0.001
Aluminum Total	mg/L	0.012	<0.005	0.039	0.005
Antimony Total	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic Total	mg/L	0.0004	0.0062	0.0004	0.0002
Barium Total	mg/L	0.187	0.188	0.058	0.001
Beryllium Total	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth Total	mg/L	<0.001	<0.001	<0.001	0.001
Boron Total	mg/L	<0.005	<0.005	<0.005	0.004
Cadmium Total	mg/L	0.00011	0.00001	0.00003	0.00001
Chromium Total	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Cobalt Total	mg/L	0.00008	0.00006	0.00019	0.00002
Copper Total	mg/L	<0.001	<0.001	<0.001	0.001
Lead Total	mg/L	0.0002	<0.0001	<0.0001	0.0001
Lithium Total	mg/L	<0.001	<0.001	0.003	0.001
Mercury Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Molybdenum Total	mg/L	0.0006	0.0014	0.0007	0.0001
Nickel Total	mg/L	0.002	0.001	0.004	0.001
Selenium Total	mg/L	0.0008	<0.0006	<0.0006	0.0006
Silver Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Strontium Total	mg/L	0.054	0.075	0.156	0.001
Tellurium Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium Total	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium Total	mg/L	0.0035	0.0017	0.0011	0.0004
Vanadium Total	mg/L	0.0001	<0.0001	0.0002	0.0001
Zinc Total	mg/L	0.042	0.003	0.006	0.001
Zirconium Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Physical and Aggregate Properties					
Solids Total Suspended	mg/L	<2	<2	<2	1

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Analytical Report

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**962233**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B14609
	Box 20913	Name:	Tiger Project	Date Received:	Oct 1, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Oct 8, 2013
	Y1A 6P2	LSD:		Report Number:	1861089
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

			Reference Number	962233-7	962233-8	962233-9	
			Sample Date	Sep 28, 2013	Sep 28, 2013	Sep 28, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	Surf / RAU #8	Surf / RAU #9	Surf / RAU #10	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Physical and Aggregate Properties - Continued							
Solids	Total Dissolved	mg/L		192	216	222	5
Routine Water							
pH	at 25 °C			7.93	8.03	8.03	
Electrical Conductivity		µS/cm at 25 C		334	368	354	1
Calcium	Dissolved	mg/L		45.8	54.8	45.8	0.1
Iron	Dissolved	mg/L		0.006	0.009	<0.005	0.005
Magnesium	Dissolved	mg/L		17.5	17.0	19.0	0.1
Manganese	Dissolved	mg/L		<0.001	0.002	0.001	0.001
Potassium	Dissolved	mg/L		0.3	0.7	0.5	0.1
Silicon	Dissolved	mg/L		1.47	1.98	1.91	0.05
Sodium	Dissolved	mg/L		0.8	0.8	1.5	0.1
Bicarbonate		mg/L		191	224	176	5
Carbonate		mg/L		<6	<6	<6	6
Hydroxide		mg/L		<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L		<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L		156	184	144	5
Nitrate - N	Dissolved	mg/L		0.20	0.25	0.07	0.01
Nitrite - N	Dissolved	mg/L		<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L		29.8	24.4	56.4	0.5
Hardness	as CaCO3	mg/L		186	207	193	5
Hardness	Total	mg CaCO3/L		188	213	196	1

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **962233**
Control Number: B14609
Date Received: Oct 1, 2013
Date Reported: Oct 8, 2013
Report Number: 1861089

			Reference Number	962233-10	962233-11	962233-12	
			Sample Date	Sep 28, 2013	Sep 28, 2013	Sep 28, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	Surf / RAU #11	Surf / RAU #11 Duplicate	Surf / RAU #12	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Dissolved							
Sulfur	Dissolved	mg/L		6.7	6.6	8.0	0.2
Aluminum	Dissolved	mg/L		<0.005	<0.005	<0.005	0.005
Antimony	Dissolved	mg/L		<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Dissolved	mg/L		0.0002	<0.0002	0.0098	0.0002
Barium	Dissolved	mg/L		0.277	0.278	0.146	0.001
Beryllium	Dissolved	mg/L		<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L		<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L		<0.004	<0.004	<0.004	0.004
Cadmium	Dissolved	mg/L		0.00012	0.00005	0.00001	0.00001
Chromium	Dissolved	mg/L		0.0013	0.0008	0.0012	0.0004
Cobalt	Dissolved	mg/L		0.00005	0.00005	0.00006	0.00002
Copper	Dissolved	mg/L		<0.001	<0.001	<0.001	0.001
Lead	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L		<0.001	<0.001	<0.001	0.001
Molybdenum	Dissolved	mg/L		0.00101	0.00098	0.00193	0.0001
Nickel	Dissolved	mg/L		0.001	0.001	0.001	0.001
Selenium	Dissolved	mg/L		0.0007	<0.0006	<0.0006	0.0006
Silver	Dissolved	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L		<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L		0.050	0.048	0.079	0.001
Tellurium	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L		<0.00001	<0.00001	<0.00001	0.00001
Thorium	Dissolved	mg/L		<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L		0.0012	0.0012	0.0018	0.0004
Vanadium	Dissolved	mg/L		0.00037	0.00023	0.00036	0.0001
Zinc	Dissolved	mg/L		0.005	0.005	0.002	0.001
Zirconium	Dissolved	mg/L		<0.00010	<0.00010	<0.00010	0.0001
Metals Total							
Calcium	Total	mg/L		51.8	51.9	57.9	0.05
Iron	Total	mg/L		0.079	0.082	<0.010	0.01
Magnesium	Total	mg/L		15.2	15.2	15.3	0.05
Manganese	Total	mg/L		0.0080	<0.0050	<0.0050	0.005
Potassium	Total	mg/L		0.27	0.29	1.03	0.1
Silicon	Total	mg/L		1.82	1.83	2.02	0.05
Sulfur	Total	mg/L		7.1	6.9	8.2	0.1

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **962233**
Control Number: B14609
Date Received: Oct 1, 2013
Date Reported: Oct 8, 2013
Report Number: 1861089

	Reference Number	962233-10	962233-11	962233-12	
	Sample Date	Sep 28, 2013	Sep 28, 2013	Sep 28, 2013	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Surf / RAU #11	Surf / RAU #11 Duplicate	Surf / RAU #12	
	Matrix	Water	Water	Water	
Analyte	**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued					
Sodium Total	mg/L	0.66	0.67	0.80	0.02
Titanium Total	mg/L	<0.0010	<0.0010	<0.0010	0.001
Aluminum Total	mg/L	0.035	0.037	<0.005	0.005
Antimony Total	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic Total	mg/L	0.0003	0.0003	0.0090	0.0002
Barium Total	mg/L	0.276	0.279	0.145	0.001
Beryllium Total	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth Total	mg/L	<0.001	<0.001	<0.001	0.001
Boron Total	mg/L	<0.005	<0.005	<0.005	0.004
Cadmium Total	mg/L	0.00006	0.00006	0.00001	0.00001
Chromium Total	mg/L	0.0006	0.0006	<0.0004	0.0004
Cobalt Total	mg/L	0.00010	0.00009	0.00006	0.00002
Copper Total	mg/L	<0.001	<0.001	<0.001	0.001
Lead Total	mg/L	0.0004	0.0003	<0.0001	0.0001
Lithium Total	mg/L	<0.001	<0.001	<0.001	0.001
Mercury Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Molybdenum Total	mg/L	0.0010	0.0010	0.0020	0.0001
Nickel Total	mg/L	0.001	0.001	0.001	0.001
Selenium Total	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Silver Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Strontium Total	mg/L	0.052	0.052	0.082	0.001
Tellurium Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium Total	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium Total	mg/L	0.0012	0.0013	0.0018	0.0004
Vanadium Total	mg/L	0.0002	0.0002	0.0001	0.0001
Zinc Total	mg/L	0.013	0.009	0.003	0.001
Zirconium Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Routine Water					
pH at 25 °C		7.89		7.95	
Electrical Conductivity	µS/cm at 25 C	329		369	1
Calcium Dissolved	mg/L	48.0	48.2	54.4	0.1
Iron Dissolved	mg/L	<0.005	0.013	0.006	0.005
Magnesium Dissolved	mg/L	16.0	16.0	16.2	0.1
Manganese Dissolved	mg/L	<0.001	<0.001	<0.001	0.001

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Project:
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LSD:
P.O.:
Acct code:

Lot ID: **962233**
Control Number: B14609
Date Received: Oct 1, 2013
Date Reported: Oct 8, 2013
Report Number: 1861089

		Reference Number	962233-10	962233-11	962233-12	
		Sample Date	Sep 28, 2013	Sep 28, 2013	Sep 28, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surf / RAU #11	Surf / RAU #11 Duplicate	Surf / RAU #12	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water - Continued						
Potassium	Dissolved	mg/L	0.3	0.3	0.9	0.1
Silicon	Dissolved	mg/L	1.76	1.76	2.04	0.05
Sodium	Dissolved	mg/L	0.7	0.7	0.8	0.1
Bicarbonate		mg/L	201		217	5
Carbonate		mg/L	<6		<6	6
Hydroxide		mg/L	<5		<5	5
P-Alkalinity	as CaCO3	mg/L	<5		<5	5
T-Alkalinity	as CaCO3	mg/L	165		178	5
Nitrate - N	Dissolved	mg/L	0.26		0.29	0.01
Nitrite - N	Dissolved	mg/L	<0.01		<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	22.4		26.7	0.5
Hardness	as CaCO3	mg/L	186	186	202	5
Hardness	Total	mg CaCO3/L	192		208	1

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Analytical Report

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**962233**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B14609
	Box 20913	Name:	Tiger Project	Date Received:	Oct 1, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Oct 8, 2013
	Y1A 6P2	LSD:		Report Number:	1861089
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

			Reference Number	962233-10	962233-12	962233-13	
			Sample Date	Sep 28, 2013	Sep 28, 2013	Sep 27, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	Surf / RAU #11	Surf / RAU #12	Surf / RAU #13	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters							
Organic Carbon	Total Nonpurgeable	mg/L		1.1	1.4	3.4	0.5
Cyanide	Total	mg/L		<0.002	<0.002	<0.002	0.002
Ammonia - N		mg/L		<0.01	<0.01	<0.01	.01
Phosphorus	Total	mg/L		<0.003	<0.003	0.008	0.003
Physical and Aggregate Properties							
Solids	Total Suspended	mg/L		<2	<2	3	1
Solids	Total Dissolved	mg/L		202	216	266	5

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **962233**
Control Number: B14609
Date Received: Oct 1, 2013
Date Reported: Oct 8, 2013
Report Number: 1861089

Reference Number	962233-13
Sample Date	Sep 27, 2013
Sample Time	NA
Sample Location	
Sample Description	Surf / RAU #13
Matrix	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Metals Dissolved						
Sulfur	Dissolved	mg/L	15.3			0.2
Aluminum	Dissolved	mg/L	0.009			0.005
Antimony	Dissolved	mg/L	<0.0002			0.0002
Arsenic	Dissolved	mg/L	0.0016			0.0002
Barium	Dissolved	mg/L	0.091			0.001
Beryllium	Dissolved	mg/L	<0.00004			0.00004
Bismuth	Dissolved	mg/L	<0.001			0.001
Boron	Dissolved	mg/L	0.005			0.004
Cadmium	Dissolved	mg/L	0.00027			0.00001
Chromium	Dissolved	mg/L	0.0013			0.0004
Cobalt	Dissolved	mg/L	0.00021			0.00002
Copper	Dissolved	mg/L	0.001			0.001
Lead	Dissolved	mg/L	<0.0001			0.0001
Lithium	Dissolved	mg/L	0.002			0.001
Molybdenum	Dissolved	mg/L	0.00344			0.0001
Nickel	Dissolved	mg/L	0.013			0.001
Selenium	Dissolved	mg/L	0.0025			0.0006
Silver	Dissolved	mg/L	<0.00001			0.00001
Titanium	Dissolved	mg/L	<0.010			0.01
Strontium	Dissolved	mg/L	0.121			0.001
Tellurium	Dissolved	mg/L	<0.0001			0.0001
Thallium	Dissolved	mg/L	0.00002			0.00001
Thorium	Dissolved	mg/L	<0.0004			0.0004
Tin	Dissolved	mg/L	<0.0001			0.0001
Uranium	Dissolved	mg/L	0.0042			0.0004
Vanadium	Dissolved	mg/L	0.00055			0.0001
Zinc	Dissolved	mg/L	0.049			0.001
Zirconium	Dissolved	mg/L	<0.00010			0.0001
Metals Total						
Calcium	Total	mg/L	69.5			0.05
Iron	Total	mg/L	0.315			0.01
Magnesium	Total	mg/L	16.6			0.05
Manganese	Total	mg/L	0.0237			0.005
Potassium	Total	mg/L	1.64			0.1
Silicon	Total	mg/L	2.42			0.05
Sulfur	Total	mg/L	15.8			0.1

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Analytical Report

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**962233**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B14609
	Box 20913	Name:	Tiger Project	Date Received:	Oct 1, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Oct 8, 2013
	Y1A 6P2	LSD:		Report Number:	1861089
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

Reference Number	962233-13
Sample Date	Sep 27, 2013
Sample Time	NA
Sample Location	
Sample Description	Surf / RAU #13
Matrix	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Metals Total - Continued						
Sodium	Total	mg/L	2.19			0.02
Titanium	Total	mg/L	<0.0010			0.001
Aluminum	Total	mg/L	0.061			0.005
Antimony	Total	mg/L	<0.0002			0.0002
Arsenic	Total	mg/L	0.0019			0.0002
Barium	Total	mg/L	0.093			0.001
Beryllium	Total	mg/L	<0.00004			0.00004
Bismuth	Total	mg/L	<0.001			0.001
Boron	Total	mg/L	<0.005			0.004
Cadmium	Total	mg/L	0.00036			0.00001
Chromium	Total	mg/L	0.0004			0.0004
Cobalt	Total	mg/L	0.00029			0.00002
Copper	Total	mg/L	0.001			0.001
Lead	Total	mg/L	0.0001			0.0001
Lithium	Total	mg/L	0.003			0.001
Mercury	Total	mg/L	<0.00001			0.00001
Molybdenum	Total	mg/L	0.0035			0.0001
Nickel	Total	mg/L	0.013			0.001
Selenium	Total	mg/L	0.0024			0.0006
Silver	Total	mg/L	<0.00001			0.00001
Strontium	Total	mg/L	0.130			0.001
Tellurium	Total	mg/L	<0.0001			0.0001
Thallium	Total	mg/L	0.00002			0.00001
Thorium	Total	mg/L	<0.0004			0.0004
Tin	Total	mg/L	<0.0001			0.0001
Uranium	Total	mg/L	0.0042			0.0004
Vanadium	Total	mg/L	0.0005			0.0001
Zinc	Total	mg/L	0.055			0.001
Zirconium	Total	mg/L	<0.0001			0.0001
Routine Water						
pH	at 25 °C		8.02			
Electrical Conductivity		µS/cm at 25 C	441			1
Calcium	Dissolved	mg/L	65.7			0.1
Iron	Dissolved	mg/L	0.115			0.005
Magnesium	Dissolved	mg/L	17.6			0.1
Manganese	Dissolved	mg/L	0.011			0.001

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Analytical Report

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**962233**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B14609
	Box 20913	Name:	Tiger Project	Date Received:	Oct 1, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Oct 8, 2013
	Y1A 6P2	LSD:		Report Number:	1861089
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

Reference Number	962233-13
Sample Date	Sep 27, 2013
Sample Time	NA
Sample Location	
Sample Description	Surf / RAU #13
Matrix	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Routine Water - Continued						
Potassium	Dissolved	mg/L	1.6			0.1
Silicon	Dissolved	mg/L	2.33			0.05
Sodium	Dissolved	mg/L	2.2			0.1
Bicarbonate		mg/L	226			5
Carbonate		mg/L	<6			6
Hydroxide		mg/L	<5			5
P-Alkalinity	as CaCO3	mg/L	<5			5
T-Alkalinity	as CaCO3	mg/L	186			5
Nitrate - N	Dissolved	mg/L	0.13			0.01
Nitrite - N	Dissolved	mg/L	<0.01			0.01
Sulfate (SO4)	Dissolved	mg/L	51.5			0.5
Hardness	as CaCO3	mg/L	237			5
Hardness	Total	mg CaCO3/L	242			1

Approved by:

Mathieu Simoneau
Operations Manager

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Methodology and Notes

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**962233**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B14609
	Box 20913	Name:	Tiger Project	Date Received:	Oct 1, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Oct 8, 2013
	Y1A 6P2	LSD:		Report Number:	1861089
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water (Surrey)	APHA	*	Alkalinity - Titration Method, 2320 B	02-Oct-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	*	Conductivity, 2510 B	02-Oct-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	*	pH - Electrometric Method, 4500-H+ B	02-Oct-13	Exova Surrey
Ammonia-N in Water (Surrey)	APHA	*	Flow Injection Analysis, 4500-NH3 H	03-Oct-13	Exova Surrey
Anions by IEC in water (Surrey)	APHA	*	Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	03-Oct-13	Exova Surrey
Carbon Organic (Total) in water (TOC)	APHA		High-Temperature Combustion Method, 5310 B	03-Oct-13	Exova Edmonton
Cyanide (Total) in water	US EPA	*	US EPA method, 335.3	04-Oct-13	Exova Edmonton
Mercury Low Level (Total) in water (Surrey)	EPA	*	Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	04-Oct-13	Exova Surrey
Metals SemiTrace (Dissolved) in water (Surrey)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	03-Oct-13	Exova Surrey
Metals SemiTrace (Total) in Water (Surrey)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	03-Oct-13	Exova Surrey
Phosphorus - total by Smartchem (Surrey)	APHA	*	Preliminary Acid Hydrolysis, Ascorbic Acid Reduction Method, 4500-P B,E	03-Oct-13	Exova Surrey
Solids Dissolved (Total, Fixed and Volatile) - Surrey	APHA	*	Total Dissolved Solids Dried at 180 C, 2540 C	03-Oct-13	Exova Surrey
Solids Suspended (Total, Fixed and Volatile)	APHA	*	Total Suspended Solids Dried at 103-105'C, 2540 D	03-Oct-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	03-Oct-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	03-Oct-13	Exova Surrey
Trace Metals (Total) in Water (Surrey)	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	03-Oct-13	Exova Surrey
Trace Metals (Total) in Water (Surrey)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	03-Oct-13	Exova Surrey

** Reference Method Modified*

References

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

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Methodology and Notes

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**962233**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B14609
	Box 20913	Name:	Tiger Project	Date Received:	Oct 1, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Oct 8, 2013
	Y1A 6P2	LSD:		Report Number:	1861089
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

Comments:

- Sample 962233-9 was not field filtered and preserved for dissolved metals.
- Analysis was performed on samples 962233-1 to 13 that exceeded the recommended holding time for nitrite/nitrate anions analysis.
- Some total metal results were less than dissolved metal results for lot 962233. The results were verified and are within expected measurement uncertainty.
- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.
The test report shall not be reproduced except in full, without the written approval of the laboratory.

Terms and Conditions: www.exova.ca/terms&conditions

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Project Information

Project ID:	ATAC RESOURCES
Project Name:	TIGER PROJECT
Project Location:	
Legal Location:	
PO/AFE#:	
Proj. Acct. Code:	

Billing Information

Company:	J. Gibson & Associates
Address:	Whitehorse, YT Y1A 6P2
Attention:	John Gibson
Phone:	(867) 633-4522
Cell:	
Fax:	(867) 668-6895
E-mail:	luddite gibson@gmail.com
Agreement ID:	6646
Copy of report:	X

Copy of Report To:

Company:	J. Gibson & Associates
Address:	Whitehorse, YT Y1A 6P2
Attention:	John Gibson
Phone:	(867) 633-4522
Cell:	
Fax:	(867) 668-6895
E-mail:	luddite gibson@gmail.com
Copy of invoice:	X

RUSH Priority

Upon filling out this section, client accepts that surcharges will be applied to the analysis

Date Required | As Indicated | All Analysis

When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples.

Signature

Sample Custody (please print)

Sampled by: J GIBSON

Company:

I authorize Exova to proceed with the work indicated on this form:
Date: Sept 30/13 Initial: JG

This section for Exova use only

Date/Time stamp:

RECEIVED
OCT 01 2013

Report Results: E-mail / Mail / Online / Fax / PDF / Excel / QA/QC Report

Special Instructions/Comments (please include contact information including ph. # if different from above):

RCHON = pH, EC, TP, N_2, N_3, TALK, HARDT, SO4, TSS + TDS.

TWI23(F), METALS + NITRIC, NH4 + SULFURIC TOC + HCl

Include Regulatory Requirements Below:

	Sample Identification	Location	Depth IN CM M	Date/Time sampled	Matrix	Sampling Method	↓ Number of Containers	Enter tests above (√ relevant samples below) RCHON	NH4	TOC	TWI23ew(F)	TWI23ew THG	TCN
1	RAW #1	SURF		Sept 28	H2O	Grab	6	√	√	√		√	√
2	2	↓	/	Sept 28			6	√	√	√		√	√
3	3			Sept 28.	√	√	6	√	√	√		√	√
4	4			Sept 27			6	√	√	√		√	√
5	RAW 5			Sept 29			6	√	√	√		√	√
6	7			Sept 29			6	√	√	√		√	√
7	8			Sept 28			6	√	√	√		√	√
8	9			Sept 28.			6	√	√	√		√	√
9	10			Sept 28.			6	√	√	√		√	√
10	RAW 11			Sept 28			6	√	√	√		√	√
11	RAW 11 DUPLICATE			Sept 28			2					√	√
12	12			Sept 28.			6	√	√	√		√	√
13	13			Sept 27.			6	√	√	√		√	√
14													
15													

Indicate below any deficiencies in the condition of samples:

- Were Exova supplies used?
- Was there any damage to the shipping container?
- Were the containers packaged well?
- Were any extra samples received (document below)?
- Are samples within recommended holding times/temp?

ED 120-00

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

Please indicate any potentially hazardous samples

Page 1 of 1 Control # B14609

In LOT: 962233 COC

Shipping:
COD Y/N
Cooler temp: 7.1

and size of coolers received:
Delivery Method:
Waybill:
Received by:

APPENDIX 2

Flow Volume Calculations

August and September 2013

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **28-Aug-13**

Site: **RAU#1**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
0.91	0	0.145	0	0	0
1.2	0.12	0.295	0.169	0.035	0.0060
1.5	0.08	0.25	0.444	0.020	0.0089
1.7	0.22	0.2	0.325	0.044	0.0143
1.9	0.12	0.2	0.497	0.024	0.0119
2.1	0.25	0.15	0.254	0.038	0.0095
2.2	0.27	0.1	0.179	0.027	0.0048
2.3	0.25	0.1	0.114	0.025	0.0029
2.4	0.24	0.1	0.318	0.024	0.0076
2.5	0.28	0.1	0.453	0.028	0.0127
2.6	0.27	0.1	0.616	0.027	0.0166
2.7	0.24	0.1	0.474	0.024	0.0114
2.8	0.19	0.15	0.464	0.029	0.0132
3	0.19	0.2	0.409	0.038	0.0155
3.2	0.06	0.3	0.189	0.018	0.0034
3.6	0.08	0.425	0.026	0.034	0.0009
4.05	0	0.225	0	0.000	0.0000
3.14		3.14			**0.1397**

All velocity readings at 0.6 depth

Staff Gauge: 0.018 m @1210 hrs

Logger: OP check Ok - downloaded

Channel under ice? ice free

Method: Price Velocity meter #2/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **28-Aug-13**
1140 hrs

Site: **RAU#3**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
1.35	0	0.025	0	0	0
1.4	0.28	0.1	0.235	0.028	0.0066
1.55	0.24	0.15	0.171	0.036	0.0062
1.7	0.22	0.15	0.085	0.033	0.0028
1.85	0.17	0.15	0.165	0.026	0.0042
2	0.22	0.15	0.298	0.033	0.0098
2.15	0.34	0.15	0.235	0.051	0.0120
2.3	0.36	0.15	0.169	0.054	0.0091
2.45	0.3	0.15	0.165	0.045	0.0074
2.6	0.24	0.15	0.143	0.036	0.0051
2.75	0.22	0.15	0.211	0.033	0.0070
2.9	0.14	0.15	0.192	0.021	0.0040
3.05	0.16	0.15	0.264	0.024	0.0063
3.2	0.16	0.15	0.251	0.024	0.0060
3.35	0.04	0.175	0.245	0.007	0.0017
3.55	0	0.1	0	0.000	0.0000
2.2		2.2			**0.0883**

All velocity readings at 0.6 depth

Staff Gauge:no staff gauge

Logger: no logger

Channel under ice? ice free

Method: Price Velocity meter#2/ TS Wading Rod

Measurement By: G.Ford

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **28-Aug-13**

Site: **RAU#4**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
0.87	0	0.065	0	0	0
1	0.08	0.115	0	0.009	0.0000
1.1	0.08	0.1	0.353	0.008	0.0028
1.2	0.11	0.1	0.225	0.011	0.0025
1.3	0.12	0.1	0.417	0.012	0.0050
1.4	0.16	0.1	0.386	0.016	0.0062
1.5	0.15	0.1	0.401	0.015	0.0060
1.6	0.11	0.1	0.372	0.011	0.0041
1.7	0.09	0.1	0.311	0.009	0.0028
1.8	0.04	0.1	0.311	0.004	0.0012
1.9	0.05	0.1	0.28	0.005	0.0014
2	0.06	0.15	0.245	0.009	0.0022
2.2	0.04	0.18	0.251	0.007	0.0018
2.36	0	0.08	0	0.000	0.0000
1.49		1.49			**0.0360**

All velocity readings at 0.6 depth

Staff Gauge: 0.134m m @ 0935 / 0.136 m@ 1006

Logger:

Channel under ice? ice free

Method: Price Velocity meter#2/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **28-Aug-13**

Site: **RAU #9**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
1.26	0	0.07	0	0	0
1.4	0.13	0.12	0.02	0.0156	0.0003
1.5	0.12	0.1	0.032	0.012	0.0004
1.6	0.11	0.1	0	0.011	0.0000
1.7	0.14	0.1	0.061	0.014	0.0009
1.8	0.14	0.1	0.036	0.014	0.0005
1.9	0.13	0.1	0.13	0.013	0.0017
2	0.16	0.1	0.304	0.016	0.0049
2.1	0.15	0.105	0.094	0.0158	0.0015
2.21	0	0.055	0	0	0.0000
0.95		0.95			**0.0101**

All velocity readings at 0.6 depth

Staff Gauge: No SG

Channel under ice? Ice free

Method: Price Velocity meter#2/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **28-Aug-13**

Site: **RAU#12**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
0.35	0	0.025	0	0	0
0.4	0.08	0.075	0.047	0.006	0.0003
0.5	0.08	0.1	0.143	0.008	0.0011
0.6	0.06	0.1	0.022	0.006	0.0001
0.7	0.07	0.1	0	0.007	0.0000
0.8	0.08	0.1	0.021	0.008	0.0002
0.9	0.08	0.12	0	0.010	0.0000
1.04	0	0.07	0	0.000	0.0000
0.69		0.69			**0.0017**

All velocity readings at 0.6 depth

Staff Gauge: 0.084 m @ 1433 / 0.084 m@ 1448

Logger: OP Check Ok - downloaded

Channel under ice? ice free

Method: Price Velocity meter#2/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **28-Aug-13**

Site: **RAU#13**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
0.82	0	0.09	0	0	0
1	0.06	0.29	0.038	0.017	0.0007
1.4	0.09	0.4	0.169	0.036	0.0061
1.8	0.07	0.4	0.158	0.028	0.0044
2.2	0.15	0.3	0.152	0.045	0.0068
2.4	0.19	0.2	0.165	0.038	0.0063
2.6	0.23	0.15	0.251	0.035	0.0087
2.7	0.24	0.1	0.291	0.024	0.0070
2.8	0.245	0.1	0.417	0.025	0.0102
2.9	0.25	0.1	0.543	0.025	0.0136
3	0.24	0.1	0.661	0.024	0.0159
3.1	0.25	0.1	0.631	0.025	0.0158
3.2	0.24	0.1	0.509	0.024	0.0122
3.3	0.22	0.1	0.409	0.022	0.0090
3.4	0.21	0.15	0.401	0.032	0.0126
3.6	0.19	0.13	0.291	0.025	0.0072
3.66	0	0.03	0	0.000	0.0000
2.84		2.84			**0.1364**

All velocity readings at 0.6 depth

Staff Gauge: 0.368m @ 1042 / 0.368m @ 1103

Logger: OP check OK - downloaded

Channel under ice? ice free

Method: Price Velocity meter#2/ TS Wading Rod

Measurement By: J.Gibson

ATAC RESOURCES LTD

TIGER PROJECT

ENVIRONMENTAL DATA UPDATE

October and November, 2013

J.Gibson Env. Consulting ***Whitehorse YT***

October and November 2013 – Tiger Project Environmental Data Update

Baseline water quality and hydrology data collection continued with monthly stations surveyed in October and November, 2013.

In October and November, all monthly tributary stations and the Beaver River receiving water station (Rau #10) were sampled for water quality. Flow measurements were done at two sample stations.

All water level data logger installations were removed in late September prior to ice forming.

In October, the weather station logger was checked and data was downloaded.

Data Results

Hydrology October

Hydrology data / stream flow volumes were in early winter flow conditions with some input from snowmelt. There was minimal surface or anchor ice formation.

Hydrology November

Hydrology data / stream flow measurements in November saw a decrease of 25% volume and an increase in ice cover. Most stream channel were ice covered to 5 cm thickness.

Flow measurement results are listed with Routine Chemistry analysis results. A summary of stream flow volumes for 2012 and 2013 are listed in Table 4.

Water Quality

Data is listed in the following tables:

Table 1. October 2013 Routine chemistry analysis results, field measurements and flow volumes

Table 2. October 2013 Total Metals ICP/MS analysis results

Table 3. October 2013 Dissolved Metals ICP/MS analysis results

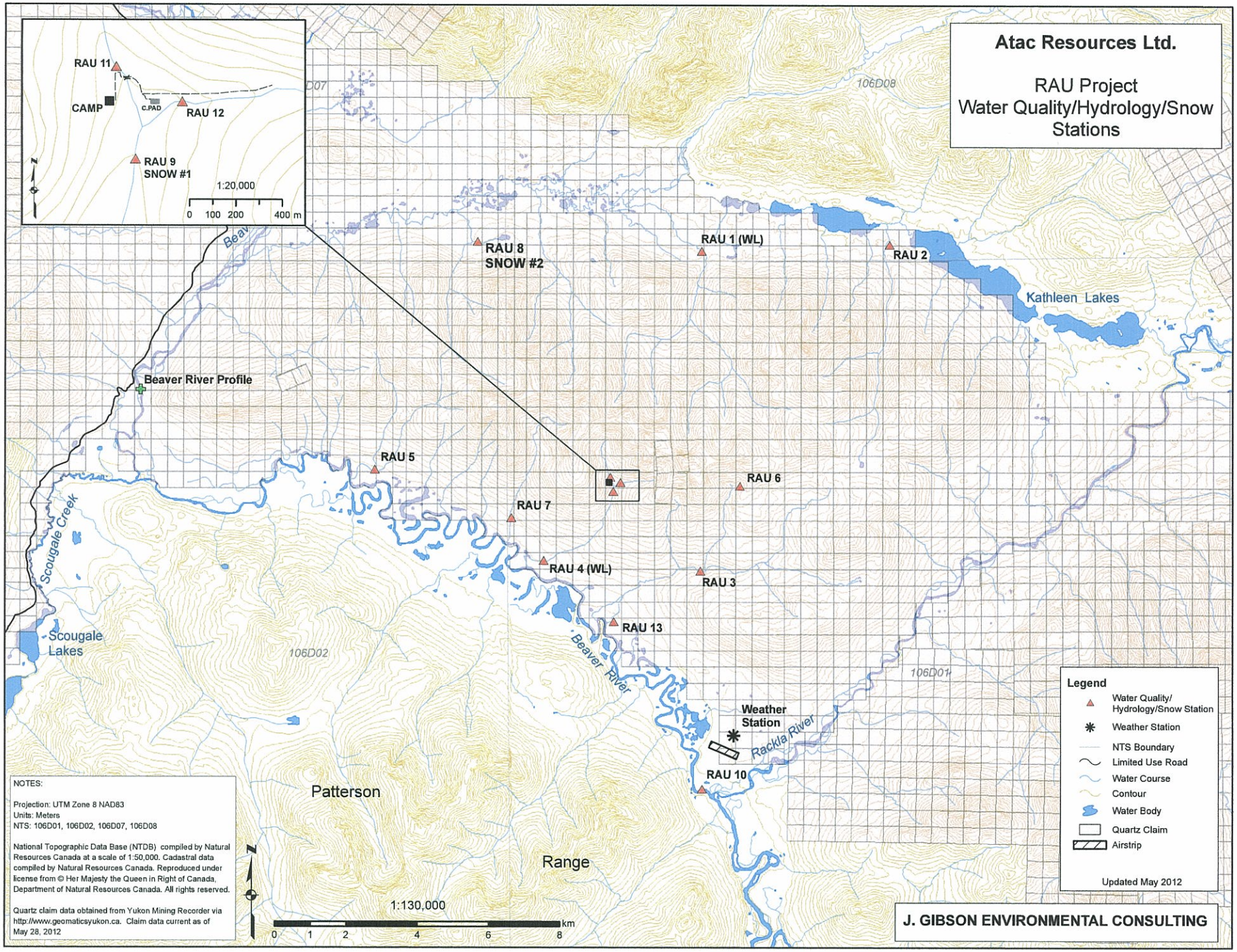
Atac Resources Ltd.
RAU Project
Water Quality/Hydrology/Snow Stations
RAU 11
CAMP
C.PAD
RAU 12
RAU 9
SNOW #1
1:20,000
0 100 200 400 m
RAU 8
SNOW #2
RAU 1 (WL)
RAU 2
Kathleen Lakes
Beaver River Profile
RAU 5
RAU 6
RAU 7
RAU 4 (WL)
RAU 3
RAU 13
Scougale Creek
Scougale Lakes
106D02
106D07
106D08
106D01
Beaver River
Rackla River
Weather Station
RAU 10
Patterson
Range
NOTES:
Projection: UTM Zone 8 NAD83
Units: Meters
NTS: 106D01, 106D02, 106D07, 106D08
National Topographic Data Base (NTDB) compiled by Natural Resources Canada at a scale of 1:50,000. Cadastral data compiled by Natural Resources Canada. Reproduced under license from © Her Majesty the Queen in Right of Canada, Department of Natural Resources Canada. All rights reserved.
Quartz claim data obtained from Yukon Mining Recorder via http://www.geomaticsyukon.ca. Claim data current as of May 28, 2012
1:130,000
0 1 2 4 6 8 km
Legend
Water Quality/ Hydrology/Snow Station
Weather Station
NTS Boundary
Limited Use Road
Water Course
Contour
Water Body
Quartz Claim
Airstrip
Updated May 2012
J. GIBSON ENVIRONMENTAL CONSULTING

Table 4. Flow Measurement Summary – RAU Stations to November 2013

Table 5. November 2013 Routine chemistry analysis results, field measurements and Flow volumes

Table 6. November 2013 Total Metals ICP/MS analysis results

Table 7. November 2013 Dissolved Metals ICP/MS analysis results

Table 8. Quality Control Sample analysis results – RAU#4 October 2013

Listed with the water quality analysis results are the ***Canadian Water Quality Guideline*** values for the Protection of Aquatic Life for waters with a pH > 6.5 and a total hardness value of > 180 mg/L as CaC03.

Also listed are the ***Canadian Drinking Water Guideline*** Maximum Acceptable Concentrations (MAC's) for applicable parameters.

All ***Guideline*** metal values are for total metals.

Analysis values that exceed either ***Guideline*** limit are highlighted in yellow.

Laboratory Analytical Reports are contained in Appendix 1.

Water Quality Summary

October 2013 (Monthly Stations)

Stations RAU #4, #9, #10, and #11 met all ***Aquatic and Drinking Water Guidelines*** parameters.

Station RAU #3 exceeds the ***Aquatic Guidelines*** for selenium.

Station RAU #12 exceeds the ***Aquatic Guidelines*** for arsenic.

Station RAU #13 exceeds the ***Aquatic Guideline***s for iron, selenium and zinc; and the ***Drinking Water Guidelines*** for iron.

Table 1. ATAC Resources - Tiger Project October, 2013.
Routine Chemistry and Field Measurement Results

		STATIONS								
Parameter	**Unit**	**RAU #1**	**RAU #2**	**RAU #3**	**RAU #4**	**RAU #5**	**RAU #6**	**RAU #7**	**DWQ* G.lines**	**Aquatic** G.lines**
Monitoring Frequency		**Quarterly**	**Quarterly**	**Monthly**	**Monthly**	**Quarterly**	**Not in Use**	**Quarterly**		
pH (field)	ru			8.26	8.27					
pH (lab)	ru			8.15	8.2				6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm			323	317					
Water temperature	C			0.7	1.5					
Flow Volume(field)	cms			nr	0.0454					
Organic Carbon Total	mg/L			2.7	1.2					
Cyanide Total	mg/L			<0.002	<0.002				0.2	0.005
Phosphorus Total	mg/L			0.005	0.003					
Ammonia - N	mg/L			<0.01	<0.01					1.37-2.2
Nitrate - N	mg/L			0.14	0.34				10	
Nitrite - N	mg/L			<0.01	<0.01				1	0.06
T-Alkalinity	mg/L			192	189					
Chloride	mg/L			0.13	0.13				<250	
Sulfate (SO4)	mg/L			34.2	31.7					
Hardness	mg CaCO3/L			231	232				<500	
Total Suspended Solids	mg/L			<2	<2					
Total Dissolved Solids	mg/L			254	254				<500	

All results and limits in mg/L unless noted otherwis. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L
Canadian Water Quality Guidelines

Table 1. ATAC Resources - Tiger Project October, 2013.
Routine Chemistry and Field Measurement Results

Parameter	Unit	STATIONS						DWQ* G.lines	Aquatic** G.lines
		RAU #8	RAU#9	RAU#10	RAU#11	RAU#12	RAU#13		
Monitoring Frequency		Quarterly	Monthly	Monthly	Monthly	Monthly	Monthly		
pH (field)	ru		8.14	8.25	7.98	8.17	8.06		
pH (lab)	ru		8.1	8.12	8.04	8.1	8.11	6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm		288	321	269	294	398		
Water temperature	C		0.5	0.1	0.3	0.8	0.5		
Flow Volume(field)	cms				0.00001		0.1777		
Organic Carbon Total	mg/L		0.7	1	0.7	0.6	1.5		
Cyanide Total	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	0.2	0.005
Phosphorus Total	mg/L		0.003	0.006	0.003	<0.003	0.011		
Ammonia - N	mg/L		<0.01	0.01	<0.01	<0.01	<0.01		1.37-2.2
Nitrate - N	mg/L		0.28	0.12	0.22	0.37	0.18	10	
Nitrite - N	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01	1	0.06
T-Alkalinity	mg/L		178	160	164	175	207		
Chloride	mg/L		0.1	0.52	0.11	0.07	3.38	<250	
Sulfate (SO4)	mg/L		22.4	50.4	19.3	24.7	59.4		
Hardness	mg CaCO3/L		206	218	193	208	274	<500	
Total Suspended Solids	mg/L		<2	<2	<2	<2	<2		
Total Dissolved Solids	mg/L		230	252	220	242	318	<500	

All results and limits in mg/L unless noted otherwis. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L

Table 2. ATAC Resources - Tiger Project October, 2013.

Total Metals Analysis Results.

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L			61.2	55.6					
Iron	mg/L			0.096	<0.010				0.3	0.3
Magnesium	mg/L			19	22.5					
Manganese	mg/L			0.0094	<0.0050				0.05	
Potassium	mg/L			1.37	1					
Silicon	mg/L			2.65	2.57					
Sulfur	mg/L			11.7	11.1					
Sodium	mg/L			1.21	0.89				<200	
Titanium	mg/L			<0.0010	0.0036					
Aluminum	mg/L			0.024	0.008					0.1
Antimony	mg/L			<0.0002	<0.0002				0.006	
Arsenic	mg/L			0.0006	0.0022				0.01	
Barium	mg/L			0.106	0.13				1	
Beryllium	mg/L			<0.00004	<0.00004					
Bismuth	mg/L			<0.0010	<0.0010					
Boron	mg/L			0.011	0.005					
Cadmium	mg/L			0.00004	0.00003				0.005	0.0018
Chromium	mg/L			<0.0004	0.0005				0.05	0.002
Cobalt	mg/L			0.0001	0.00006					
Copper	mg/L			<0.001	<0.001				1	0.004
Lead	mg/L			<0.0001	<0.0001					
Lithium	mg/L			0.002	0.001					
Mercury	mg/L			<0.00001	<0.00001				0.001	
Molybdenum	mg/L			0.0032	0.0014					
Nickel	mg/L			0.002	0.001					0.15
Selenium	mg/L			0.0018	<0.0006				0.01	0.001
Silver	mg/L			<0.00001	<0.00001					0.0001
Strontium	mg/L			0.09	0.083					
Tellurium	mg/L			<0.0001	<0.0001					
Thallium	mg/L			<0.00001	<0.00001					
Thorium	mg/L			<0.0004	<0.0004					
Tin	mg/L			<0.0001	<0.0001					
Uranium	mg/L			0.003	0.003				0.02	
Vanadium	mg/L			0.0002	0.0002					
Zinc	mg/L			0.003	0.007				<5	0.03
Zirconium	mg/L			<0.0001	<0.0001					

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 2. ATAC Resources - Tiger Project October, 2013.
Total Metals Analysis Results.

Parameter	Units	RAU #8	RAU#9	RAU#10	RAU #11	RAU#12	RAU#13	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L		53.3	50	47.1	54.3	74.5		
Iron	mg/L		0.013	0.108	<0.010	<0.010	0.498	0.3	0.3
Magnesium	mg/L		17.8	22.7	18.3	17.5	21.4		
Manganese	mg/L		<0.0050	0.0113	<0.0050	<0.0050	0.0312	0.05	
Potassium	mg/L		0.65	0.72	0.31	0.96	1.93		
Silicon	mg/L		2.07	2.34	1.91	2.16	2.77		
Sulfur	mg/L		8	17	7	8.8	20.2		
Sodium	mg/L		0.72	2.27	0.69	0.75	2.97	<200	
Titanium	mg/L		<0.0010	0.0037	0.0037	0.0014	0.0041		
Aluminum	mg/L		<0.005	0.038	<0.005	<0.005	0.085		0.1
Antimony	mg/L		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.006	
Arsenic	mg/L		0.0058	0.0003	<0.0002	0.0088	0.002	0.01	
Barium	mg/L		0.189	0.065	0.288	0.142	0.101	1	
Beryllium	mg/L		<0.00004	<0.00004	<0.00004	<0.00004	<0.00004		
Bismuth	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010		
Boron	mg/L		<0.005	<0.005	<0.005	<0.005	0.01		
Cadmium	mg/L		0.00002	0.00002	0.00006	0.00002	0.00052	0.005	0.0018
Chromium	mg/L		0.0004	0.0004	0.0004	<0.0004	0.0006	0.05	0.002
Cobalt	mg/L		0.00006	0.00018	0.00005	0.00005	0.0004		
Copper	mg/L		<0.001	<0.001	<0.001	<0.001	0.002	1	0.004
Lead	mg/L		<0.0001	0.0001	<0.0001	<0.0001	0.0002		
Lithium	mg/L		<0.001	0.003	<0.001	<0.001	0.004		
Mercury	mg/L		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.001	
Molybdenum	mg/L		0.0016	0.0008	0.0012	0.0022	0.0045		
Nickel	mg/L		0.001	0.003	<0.001	0.001	0.02		0.15
Selenium	mg/L		<0.0006	<0.0006	<0.0006	<0.0006	0.003	0.01	0.001
Silver	mg/L		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		0.0001
Strontium	mg/L		0.072	0.165	0.049	0.082	0.161		
Tellurium	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Thallium	mg/L		<0.00001	<0.00001	<0.00001	<0.00001	0.00001		
Thorium	mg/L		<0.0004	<0.0004	<0.0004	<0.0004	<0.0004		
Tin	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Uranium	mg/L		0.0017	0.0012	0.0014	0.0018	0.0055	0.02	
Vanadium	mg/L		0.0001	0.0002	<0.0001	<0.0001	0.0006		
Zinc	mg/L		0.004	0.004	0.006	0.004	0.09	<5	0.03
Zirconium	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	0.0001		

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 3. ATAC Resources - Tiger Project October, 2013.

Dissolved Metals Analysis Results

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7
Calcium	mg/L			59.8	54.4			
Iron	mg/L			0.032	0.015			
Magnesium	mg/L			17.2	20.6			
Manganese	mg/L			0.005	<0.001			
Potassium	mg/L			1.2	0.9			
Silicon	mg/L			2.39	2.38			
Sodium	mg/L			1.4	1			
Sulfur	mg/L			10.8	10.4			
Aluminum	mg/L			<0.005	<0.005			
Antimony	mg/L			<0.0002	<0.0002			
Arsenic	mg/L			0.0005	0.0022			
Barium	mg/L			0.101	0.127			
Beryllium	mg/L			<0.00004	<0.00004			
Bismuth	mg/L			<0.001	<0.001			
Boron	mg/L			<0.004	<0.004			
Cadmium	mg/L			0.00003	0.00002			
Chromium	mg/L			<0.0004	<0.0004			
Cobalt	mg/L			0.00006	0.00005			
Copper	mg/L			<0.001	<0.001			
Lead	mg/L			<0.0001	<0.0001			
Lithium	mg/L			0.002	0.001			
Molybdenum	mg/L			0.00298	0.0014			
Nickel	mg/L			0.002	0.001			
Selenium	mg/L			0.0017	<0.0006			
Silver	mg/L			<0.00001	<0.00001			
Strontium	mg/L			0.087	0.08			
Titanium	mg/L			<0.010	<0.010			
Tellurium	mg/L			<0.0001	<0.0001			
Thallium	mg/L			<0.00001	<0.00001			
Thorium	mg/L			<0.0004	<0.0004			
Tin	mg/L			<0.0001	<0.0001			
Uranium	mg/L			0.0028	0.003			
Vanadium	mg/L			0.00043	0.00043			
Zinc	mg/L			0.002	0.006			
Zirconium	mg/L			0.00013	<0.00010			

Table 3. ATAC Resources - Tiger Project October, 2013.
Dissolved Metals Analysis Results

Parameter	Units	RAU #8	RAU #9	RAU #10	RAU #11	RAU #12	RAU #13
Calcium	mg/L		52.8	48.6	45.1	53.3	72.7
Iron	mg/L		0.01	0.01	<0.005	0.01	0.064
Magnesium	mg/L		16.5	20.6	16.4	16	19.6
Manganese	mg/L		0.004	0.003	<0.001	<0.001	0.022
Potassium	mg/L		0.6	0.6	0.2	0.8	1.7
Silicon	mg/L		1.89	2.14	1.78	1.97	2.48
Sodium	mg/L		0.8	2.2	0.7	0.8	2.7
Sulfur	mg/L		7.3	16	6.4	8	18.6
Aluminum	mg/L		<0.005	<0.005	<0.005	<0.005	0.014
Antimony	mg/L		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	mg/L		0.0061	0.0002	<0.0002	0.0096	0.001
Barium	mg/L		0.184	0.06	0.275	0.136	0.092
Beryllium	mg/L		<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
Bismuth	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Boron	mg/L		<0.004	<0.004	<0.004	<0.004	0.008
Cadmium	mg/L		0.00002	0.00002	0.00004	0.00001	0.00043
Chromium	mg/L		<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Cobalt	mg/L		0.00005	0.00011	0.00005	0.00005	0.00031
Copper	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Lithium	mg/L		<0.001	0.003	<0.001	<0.001	0.004
Molybdenum	mg/L		0.00151	0.00082	0.00118	0.00206	0.0044
Nickel	mg/L		<0.001	0.003	<0.001	<0.001	0.018
Selenium	mg/L		<0.0006	<0.0006	<0.0006	<0.0006	0.0032
Silver	mg/L		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Strontium	mg/L		0.072	0.162	0.047	0.079	0.155
Titanium	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010
Tellurium	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Thallium	mg/L		<0.00001	<0.00001	<0.00001	<0.00001	0.00002
Thorium	mg/L		<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Tin	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Uranium	mg/L		0.0017	0.0012	0.0013	0.0018	0.0056
Vanadium	mg/L		0.00037	0.00031	0.00041	0.0005	0.00058
Zinc	mg/L		0.003	0.002	0.004	0.003	0.076
Zirconium	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	0.00014

Table 4. ATAC RESOURCES - Summary of Tiger Project Station Flow Volumes 2012-2013

	Date																
Station	**Apr-12**	**May-12**	**Jun-12**	**Jul-12**	**Sep-12**	**Oct-12**	**Dec-12**	**Jan-13**	**Mar-13**	**Apr-13**	**May-13**	**Jun-13**	**Jul-13**	**Aug-13**	**Sep-13**	**Oct-13**	**Nov-13**
Rau #1	nr	0.5253	0.6291	0.3773	0.2533	0.1604	nr	nr	nr	nr	nr	0.3911	nr	0.1397	0.3204		
Rau #2	nr	nr	nr	nr	0.0977	nr	nr	nr	nr	nr	nr	0.1707	nr	nr	0.1825		
Rau #3		nr	0.4218	0.3497	0.185	0.1282	nr	nr	nr	nr	nr	nr	0.1035	0.0883	0.2417		
Rau #4	0.0473	0.0976	0.1152	0.0895	0.062	0.0546	0.05 e	0.046	0.0296	0.0395	0.0781	0.0599	0.0346	0.036	0.0531	0.0454	0.0348
Rau #5	nr	0.0728	nr	nr	0.034	nr	nr	nr	nr	nr	nr	nr	nr	nr	0.021		
Rau #6	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr		
Rau #7	nr	0.0229	nr	nr	0.023	nr	nr	nr	nr	nr	nr	nr	nr	nr	0.0224		
Rau #8	nr	0.1557	nr	nr	0.179	nr	nr	nr	nr	dry	nr	nr	nr	nr	0.2838		
Rau #9	0.0052	0.0186	0.0463	0.0199	0.0064	0.0188	glacial ice	glacial ice	glacial ice	glacial ice	glacial ice	0.0336	0.0183	0.0101	0.0088		
Rau #10	12.31	nr	nr	nr	nr	nr	nr	nr	nr	4.76	nr	nr	nr	nr	nr		
Rau #11	<0.0001	<0.0001	0.0354	0.0092	0.0009	<0.0005	dry	dry	dry	dry	0.002	0.0066	0.0071	0.0005	0.00001		
Rau #12	0.00086	0.0045	0.0103	0.0076	0.0045	0.0036	0.04 e	0.04 e	nr	0.001	0.003	0.0076	0.0018	0.0017	0.0014		
Rau #13	0.0784	0.5546	0.474	0.3597	0.233	0.1864	0.10e	0.033	0.0206	nr	0.584	0.3031	0.1397	0.1364	0.33	0.1777	

Table 5. ATAC Resources - Tiger Project November, 2013.
Routine Chemistry and Field Measurement Results

		STATIONS								
Parameter	**Unit**	**RAU #1**	**RAU #2**	**RAU #3**	**RAU #4**	**RAU #5**	**RAU #6**	**RAU #7**	**DWQ* G.lines**	**Aquatic** G.lines**
Monitoring Frequency		**Quarterly**	**Quarterly**	**Monthly**	**Monthly**	**Quarterly**	**Not in Use**	**Quarterly**		
pH (field)	ru			8.1	8.05					
pH (lab)	ru			7.99	8.07				6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm			383	361					
Water temperature	C			-0.3	0.5					
Flow Volume(field)	cms			nr	0.0348					
Organic Carbon Total	mg/L			1.9	0.9					
Cyanide Total	mg/L			<0.002	<0.002				0.2	0.005
Phosphorus Total	mg/L			0.004	<0.003					
Ammonia - N	mg/L			0.01	<0.01					1.37-2.2
Nitrate - N	mg/L			0.16	0.33				10	
Nitrite - N	mg/L			<0.01	<0.01				1	0.06
T-Alkalinity	mg/L			201	187					
Chloride	mg/L			0.1	0.12				<250	
Sulfate (SO4)	mg/L			34.2	32.5					
Hardness	mg CaCO3/L			249	238				<500	
Total Suspended Solids	mg/L			<2	<2					
Total Dissolved Solids	mg/L			276	256				<500	

All results and limits in mg/L unless noted otherwise. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L
Canadian Water Quality Guidelines

Table 5. ATAC Resources - Tiger Project November, 2013.
Routine Chemistry and Field Measurement Results

Parameter	Unit	STATIONS RAU #8	RAU#9	RAU#10	RAU#11	RAU#12	RAU#13	DWQ* G.lines	Aquatic** G.lines
Monitoring Frequency		**Quarterly**	**Monthly**	**Monthly**	**Monthly**	**Monthly**	**Monthly**		
pH (field)	ru		7.84	7.84		7.98	7.91		
pH (lab)	ru		7.86	7.91	Dry	7.91	7.91	6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm		341	388		351	506		
Water temperature	C		-0.1	0.3		0	-0.3		
Flow Volume(field)	cms		nr	nr		nr	nr		
Organic Carbon Total	mg/L		1.1	1		1	1.6		
Cyanide Total	mg/L		<0.002	<0.002		<0.002	<0.002	0.2	0.005
Phosphorus Total	mg/L		<0.003	<0.003		0.02	0.006		
Ammonia - N	mg/L		<0.01	<0.01		<0.01	0.01		1.37-2.2
Nitrate - N	mg/L		0.25	0.17		0.41	0.22	10	
Nitrite - N	mg/L		<0.01	<0.01		<0.01	<0.01	1	0.06
T-Alkalinity	mg/L		184	175		177	222		
Chloride	mg/L		0.12	0.21		0.08	5.04	<250	
Sulfate (SO4)	mg/L		22	53.2		25.8	71.1		
Hardness	mg CaCO3/L		218	237		214	314	<500	
Total Suspended Solids	mg/L		<2	<2		<2	<2		
Total Dissolved Solids	mg/L		228	268		236	352	<500	

All results and limits in mg/L unless noted otherwis. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L

Table 6. ATAC Resources - Tiger Project November, 2013
Total Metals Analysis Results.

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L			66.1	62.3					
Iron	mg/L			0.112	0.02				0.3	0.3
Magnesium	mg/L			18.3	22.4					
Manganese	mg/L			0.016	0.0058				0.05	
Potassium	mg/L			1.4	1					
Silicon	mg/L			2.76	2.84					
Sulfur	mg/L									
Sodium	mg/L			1.2	0.9				<200	
Titanium	mg/L			<0.0010	<0.0010					
Aluminum	mg/L			0.028	<0.010					0.1
Antimony	mg/L			<0.0002	<0.0002				0.006	
Arsenic	mg/L			0.00058	0.00227				0.01	
Barium	mg/L			0.109	0.138				1	
Beryllium	mg/L			<0.00010	<0.00010					
Bismuth	mg/L			<0.0002	<0.0002					
Boron	mg/L			0.029	0.009					
Cadmium	mg/L			0.00004	0.00003				0.005	0.0018
Chromium	mg/L			<0.0010	<0.0010				0.05	0.002
Cobalt	mg/L			<0.0002	<0.0002					
Copper	mg/L			0.001	0.0006				1	0.004
Lead	mg/L			<0.0002	<0.0002					
Lithium	mg/L			<0.0010	<0.0010					
Mercury	mg/L								0.001	
Molybdenum	mg/L			0.00325	0.00143					
Nickel	mg/L			0.0007	0.0005					0.15
Selenium	mg/L			0.0017	0.0008				0.01	0.001
Silver	mg/L			<0.00010	<0.00010					0.0001
Strontium	mg/L			0.081	0.0794					
Tellurium	mg/L									
Thallium	mg/L			<0.00002	<0.00002					
Thorium	mg/L			<0.00002	<0.00002					
Tin	mg/L			<0.0002	<0.0002					
Uranium	mg/L			0.003	0.00325				0.02	
Vanadium	mg/L			0.0002	<0.0002					
Zinc	mg/L			0.0031	0.0125				<5	0.03
Zirconium	mg/L			<0.0010	<0.0010					

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 6. ATAC Resources - Tiger Project November, 2013
Total Metals Analysis Results.

Parameter	Units	RAU #8	RAU#9	RAU#10	RAU #11	RAU#12	RAU#13	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L		57.6	57.8		60.7	87.7		
Iron	mg/L		0.065	0.029		0.018	0.407	0.3	0.3
Magnesium	mg/L		17.8	23.5		17.2	22		
Manganese	mg/L		0.0054	0.0047		0.0037	0.0351	0.05	
Potassium	mg/L		0.3	0.7		1	2.1		
Silicon	mg/L		2.07	2.68		2.33	2.93		
Sulfur	mg/L		nr	nr	Dry	nr	nr		
Sodium	mg/L		0.6	2.4		0.8	3.4	<200	
Titanium	mg/L		0.0011	<0.0010		<0.0010	<0.0010		
Aluminum	mg/L		0.028	<0.010		0.01	0.033		0.1
Antimony	mg/L		<0.0002	<0.0002		<0.0002	<0.0002	0.006	
Arsenic	mg/L		0.00031	0.00018		0.00873	0.00144	0.01	
Barium	mg/L		0.238	0.0858		0.156	0.104	1	
Beryllium	mg/L		<0.00010	<0.00010		<0.00010	<0.00010		
Bismuth	mg/L		<0.0002	<0.0002		<0.0002	<0.0002		
Boron	mg/L		0.004	0.004		<0.004	0.014		
Cadmium	mg/L		0.00005	<0.00002		0.00002	0.00065	0.005	0.0018
Chromium	mg/L		<0.0010	<0.0010		<0.0010	<0.0010	0.05	0.002
Cobalt	mg/L		<0.0002	<0.0002		<0.0002	0.0003		
Copper	mg/L		0.0005	0.0005		0.0008	0.0015	1	0.004
Lead	mg/L		<0.0002	<0.0002		<0.0002	<0.0002		
Lithium	mg/L		<0.0010	0.0024		<0.0010	0.0037		
Mercury	mg/L		nr	nr		nr	nr	0.001	
Molybdenum	mg/L		0.00095	0.00098		0.00234	0.00557		
Nickel	mg/L		<0.0004	0.0014		<0.0004	0.0249		0.15
Selenium	mg/L		0.0002	0.0007		0.0005	0.0038	0.01	0.001
Silver	mg/L		<0.00010	<0.00010		<0.00010	<0.00010		0.0001
Strontium	mg/L		0.0596	0.16		0.0806	0.188		
Tellurium	mg/L		nr	nr		nr	nr		
Thallium	mg/L		<0.00002	<0.00002		<0.00002	0.00003		
Thorium	mg/L		<0.00002	<0.00002		<0.00002	<0.00002		
Tin	mg/L		<0.0002	<0.0002		<0.0002	<0.0002		
Uranium	mg/L		0.00155	0.00143		0.00203	0.00753	0.02	
Vanadium	mg/L		<0.0002	<0.0002		<0.0002	0.0005		
Zinc	mg/L		0.0073	0.0026		0.0045	0.112	<5	0.03
Zirconium	mg/L		<0.0010	<0.0010		<0.0010	<0.0010		

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 7. ATAC Resources - Tiger Project November, 2013.

Dissolved Metals Analysis Results

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7
Calcium	mg/L			68.4	59.6			
Iron	mg/L			0.024	<0.005			
Magnesium	mg/L			19	21.6			
Manganese	mg/L			0.001	<0.001			
Potassium	mg/L			1.4	0.9			
Silicon	mg/L			2.58	2.45			
Sodium	mg/L			1.4	1			
Sulfur	mg/L			11.2	10.6			
Aluminum	mg/L			<0.005	<0.005			
Antimony	mg/L			<0.0002	<0.0002			
Arsenic	mg/L			0.0005	0.0022			
Barium	mg/L			0.105	0.125			
Beryllium	mg/L			<0.00004	<0.00004			
Bismuth	mg/L			<0.001	<0.001			
Boron	mg/L			<0.004	<0.004			
Cadmium	mg/L			0.00003	0.00002			
Chromium	mg/L			<0.0004	<0.0004			
Cobalt	mg/L			0.00006	0.00005			
Copper	mg/L			<0.001	<0.001			
Lead	mg/L			<0.0001	<0.0001			
Lithium	mg/L			0.001	0.001			
Molybdenum	mg/L			0.0031	0.00119			
Nickel	mg/L			0.001	<0.001			
Selenium	mg/L			0.0018	0.0007			
Silver	mg/L			<0.00001	<0.00001			
Strontium	mg/L			0.086	0.08			
Titanium	mg/L			<0.010	<0.010			
Tellurium	mg/L			<0.0001	<0.0001			
Thallium	mg/L			<0.00001	<0.00001			
Thorium	mg/L			<0.0004	<0.0004			
Tin	mg/L			<0.0001	<0.0001			
Uranium	mg/L			0.0029	0.0028			
Vanadium	mg/L			0.00019	0.00016			
Zinc	mg/L			0.002	0.007			
Zirconium	mg/L			<0.00010	<0.00010			

Table 7 ATAC Resources - Tiger Project November, 2013.

Dissolved Metals Analysis Results

Parameter	Units	RAU #8	RAU #9	RAU #10	RAU #11	RAU #12	RAU #13
Calcium	mg/L		57.6	56.6		58.2	88.5
Iron	mg/L		<0.005	<0.005		<0.005	0.008
Magnesium	mg/L		17.9	23.2		16.6	22.5
Manganese	mg/L		<0.001	<0.001		<0.001	0.022
Potassium	mg/L		0.3	0.8		0.9	2.2
Silicon	mg/L		1.9	2.37	Dry	2.04	2.68
Sodium	mg/L		0.8	2.4		0.9	3.6
Sulfur	mg/L		7.3	16.1		8.4	22.6
Aluminum	mg/L		<0.005	<0.005		<0.005	0.008
Antimony	mg/L		<0.0002	<0.0002		<0.0002	<0.0002
Arsenic	mg/L		0.0003	<0.0002		0.008	0.0005
Barium	mg/L		0.235	0.077		0.142	0.092
Beryllium	mg/L		<0.00004	<0.00004		<0.00004	<0.00004
Bismuth	mg/L		<0.001	<0.001		<0.001	<0.001
Boron	mg/L		<0.004	<0.004		<0.004	0.012
Cadmium	mg/L		0.00004	0.00001		0.00002	0.00054
Chromium	mg/L		<0.0004	<0.0004		<0.0004	<0.0004
Cobalt	mg/L		0.00005	0.00007		0.00005	0.00036
Copper	mg/L		<0.001	<0.001		<0.001	<0.001
Lead	mg/L		<0.0001	<0.0001		<0.0001	<0.0001
Lithium	mg/L		<0.001	0.003		<0.001	0.004
Molybdenum	mg/L		0.00084	0.00078		0.00192	0.00518
Nickel	mg/L		<0.001	0.002		0.001	0.023
Selenium	mg/L		<0.0006	<0.0006		<0.0006	0.0038
Silver	mg/L		<0.00001	<0.00001		<0.00001	<0.00001
Strontium	mg/L		0.062	0.156		0.079	0.191
Titanium	mg/L		<0.010	<0.010		<0.010	<0.010
Tellurium	mg/L		<0.0001	<0.0001		<0.0001	<0.0001
Thallium	mg/L		<0.00001	<0.00001		<0.00001	0.00002
Thorium	mg/L		<0.0004	<0.0004		<0.0004	<0.0004
Tin	mg/L		<0.0001	<0.0001		<0.0001	<0.0001
Uranium	mg/L		0.0014	0.0012		0.0017	0.0068
Vanadium	mg/L		0.00019	<0.00010		<0.00010	0.00029
Zinc	mg/L		0.005	0.002		0.005	0.099
Zirconium	mg/L		<0.00010	<0.00010		<0.00010	<0.00010

Table 8. Quality Control Samples October 2013, Tiger Claims
Total Metals Analysis - Duplicate Sample

Parameter	Units	RAU #4 Total	RAU #4 Duplicate Total Metals
Calcium	mg/L	55.6	55.1
Iron	mg/L	<0.010	<0.010
Magnesium	mg/L	22.5	22.4
Manganese	mg/L	<0.0050	<0.0050
Potassium	mg/L	1	0.99
Silicon	mg/L	2.57	2.56
Sulfur	mg/L	11.1	11.1
Sodium	mg/L	0.89	0.93
Titanium	mg/L	0.0036	<0.0010
Aluminum	mg/L	0.008	0.007
Antimony	mg/L	<0.0002	<0.0002
Arsenic	mg/L	0.0022	0.0024
Barium	mg/L	0.13	0.131
Beryllium	mg/L	<0.00004	<0.00004
Bismuth	mg/L	<0.0010	<0.0010
Boron	mg/L	0.005	<0.005
Cadmium	mg/L	0.00003	0.00004
Chromium	mg/L	0.0005	<0.0004
Cobalt	mg/L	0.00006	0.00006
Copper	mg/L	<0.001	<0.001
Lead	mg/L	<0.0001	<0.0001
Lithium	mg/L	0.001	0.001
Mercury	mg/L	<0.00001	<0.00001
Molybdenum	mg/L	0.0014	0.0014
Nickel	mg/L	0.001	0.001
Selenium	mg/L	<0.0006	0.0007
Silver	mg/L	<0.00001	<0.00001
Strontium	mg/L	0.083	0.084
Tellurium	mg/L	<0.0001	<0.0001
Thallium	mg/L	<0.00001	<0.00001
Thorium	mg/L	<0.0004	<0.0004
Tin	mg/L	<0.0001	<0.0001
Uranium	mg/L	0.003	0.003
Vanadium	mg/L	0.0002	0.0001
Zinc	mg/L	0.007	0.008
Zirconium	mg/L	<0.0001	<0.0001

Denote >10% variation between samples

November 2013 (Monthly Stations)

Stations RAU #4, #7, #9, #10, #11 and #12 met all ***Aquatic and Drinking Water Guidelines*** parameters.

Station RAU #1 exceeds the ***Aquatic Guideline***s for selenium.

Station RAU #2 exceeds the ***Drinking Water Guidelines*** for manganese.

Station RAU #3 exceeds the ***Aquatic Guideline***s for selenium.

Station RAU #5 exceeds the ***Aquatic Guidelines*** for aluminum, chromium, copper, selenium and zinc; and the ***Drinking Water Guidelines*** for iron and manganese.

Station RAU #8 exceeds the ***Aquatic Guideline***s for zinc.

Station RAU #13 exceeds the ***Aquatic Guidelines*** for iron, selenium and zinc; and the ***Drinking Water Guidelines*** for iron.

Weather Station Data Logger

The weather station / data logger was downloaded in October. All sensors appear to be operational.

The perimeter fence of rebar and snow fencing was intact with some disturbance.

A 2013 weather data report will be issued after January 1, 2014.

Water Level Data Loggers

Water level loggers at Rau #1, #4, #11, #12 and #13 were removed in late September to avoid damage from ice formation.
A 2013 Water Level / Stream Discharge Report for all the above stations will be issued in early 2014.

Appendix #1

Laboratory Analytical Reports

Surface Waters October and November, 2013

Exova
#104, 19575-55 A Ave.
Surrey, British Columbia
V3S 8P8, Canada

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: Surrey@exova.com
W: www.exova.com

Report Transmission Cover Page

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**969159**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B14623
	Box 20913	Name:	Tiger Project	Date Received:	Oct 31, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Nov 6, 2013
	Y1A 6P2	LSD:		Report Number:	1872633
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

Contact & Affiliation	Address	Delivery Commitments
John Gibson J. Gibson & Associates	, Box 20913 Whitehorse, Yukon Territory Y1A 6P2 Phone: (867) 633-4522 Fax: (867) 668-6895 Email: ludditegibson@gmail.com	On [Lot Verification] send (COA) by Email - Single Report On [Report Approval] send (COC, Test Report) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report On [Lot Creation] send (COR) by Email - Single Report

Notes To Clients:

- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.
- Some total metal results were less than dissolved metal results for lot 969159. The results were verified and are within expected measurement uncertainty.

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **969159**
Control Number: B14623
Date Received: Oct 31, 2013
Date Reported: Nov 6, 2013
Report Number: 1872633

		Reference Number	969159-1	969159-2	969159-3	
		Sample Date	Oct 29, 2013	Oct 29, 2013	Oct 29, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surf. / RAU # 3	Surf. / RAU # 4	Surf. / RAU # 4 Duplicate	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Calcium	Total	mg/L	61.2	55.6	55.1	0.05
Iron	Total	mg/L	0.096	<0.010	<0.010	0.01
Magnesium	Total	mg/L	19.0	22.5	22.4	0.05
Manganese	Total	mg/L	0.0094	<0.0050	<0.0050	0.005
Potassium	Total	mg/L	1.37	1.00	0.99	0.1
Silicon	Total	mg/L	2.65	2.57	2.56	0.05
Sulfur	Total	mg/L	11.7	11.1	11.1	0.1
Sodium	Total	mg/L	1.21	0.89	0.93	0.02
Titanium	Total	mg/L	<0.0010	0.0036	<0.0010	0.001
Aluminum	Total	mg/L	0.024	0.008	0.007	0.005
Antimony	Total	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Total	mg/L	0.0006	0.0022	0.0024	0.0002
Barium	Total	mg/L	0.106	0.130	0.131	0.001
Beryllium	Total	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Total	mg/L	<0.0010	<0.0010	<0.0010	0.001
Boron	Total	mg/L	0.011	0.005	<0.005	0.004
Cadmium	Total	mg/L	0.00004	0.00003	0.00004	0.00001
Chromium	Total	mg/L	<0.0004	0.0005	<0.0004	0.0004
Cobalt	Total	mg/L	0.00010	0.00006	0.00006	0.00002
Copper	Total	mg/L	<0.001	<0.001	<0.001	0.001
Lead	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Total	mg/L	0.002	0.001	0.001	0.001
Mercury	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Molybdenum	Total	mg/L	0.0032	0.0014	0.0014	0.0001
Nickel	Total	mg/L	0.002	0.001	0.001	0.001
Selenium	Total	mg/L	0.0018	<0.0006	0.0007	0.0006
Silver	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Strontium	Total	mg/L	0.090	0.083	0.084	0.001
Tellurium	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium	Total	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Total	mg/L	0.0030	0.0030	0.0030	0.0004
Vanadium	Total	mg/L	0.0002	0.0002	0.0001	0.0001
Zinc	Total	mg/L	0.003	0.007	0.008	0.001
Zirconium	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **969159**
Control Number: B14623
Date Received: Oct 31, 2013
Date Reported: Nov 6, 2013
Report Number: 1872633

		Reference Number	969159-1	969159-2	969159-4	
		Sample Date	Oct 29, 2013	Oct 29, 2013	Oct 29, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surf. / RAU # 3	Surf. / RAU # 4	Surf. / RAU # 9	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	2.7	1.2	0.7	0.5
Cyanide	Total	mg/L	<0.002	<0.002	<0.002	0.002
Ammonia - N		mg/L	<0.01	<0.01	<0.01	.01
Phosphorus	Total	mg/L	0.005	0.003	0.003	0.003
Metals Dissolved						
Sulfur	Dissolved	mg/L	10.8	10.4	7.3	0.2
Aluminum	Dissolved	mg/L	<0.005	<0.005	<0.005	0.005
Antimony	Dissolved	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Dissolved	mg/L	0.0005	0.0022	0.0061	0.0002
Barium	Dissolved	mg/L	0.101	0.127	0.184	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	<0.004	<0.004	<0.004	0.004
Cadmium	Dissolved	mg/L	0.00003	0.00002	0.00002	0.00001
Chromium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Cobalt	Dissolved	mg/L	0.00006	0.00005	0.00005	0.00002
Copper	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Lead	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L	0.002	0.001	<0.001	0.001
Molybdenum	Dissolved	mg/L	0.00298	0.00140	0.00151	0.0001
Nickel	Dissolved	mg/L	0.002	0.001	<0.001	0.001
Selenium	Dissolved	mg/L	0.0017	<0.0006	<0.0006	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L	0.087	0.080	0.072	0.001
Tellurium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L	0.0028	0.0030	0.0017	0.0004
Vanadium	Dissolved	mg/L	0.00043	0.00043	0.00037	0.0001
Zinc	Dissolved	mg/L	0.002	0.006	0.003	0.001
Zirconium	Dissolved	mg/L	0.00013	<0.00010	<0.00010	0.0001
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2	<2	<2	1
Solids	Total Dissolved	mg/L	254	254	230	5

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **969159**
Control Number: B14623
Date Received: Oct 31, 2013
Date Reported: Nov 6, 2013
Report Number: 1872633

			Reference Number	969159-1	969159-2	969159-4	
			Sample Date	Oct 29, 2013	Oct 29, 2013	Oct 29, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	Surf. / RAU # 3	Surf. / RAU # 4	Surf. / RAU # 9	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water							
pH	at 25 °C			8.15	8.20	8.10	
Electrical Conductivity		µS/cm at 25 C		323	317	288	1
Calcium	Dissolved	mg/L		59.8	54.4	52.8	0.1
Iron	Dissolved	mg/L		0.032	0.015	0.010	0.005
Magnesium	Dissolved	mg/L		17.2	20.6	16.5	0.1
Manganese	Dissolved	mg/L		0.005	<0.001	0.004	0.001
Potassium	Dissolved	mg/L		1.2	0.9	0.6	0.1
Silicon	Dissolved	mg/L		2.39	2.38	1.89	0.05
Sodium	Dissolved	mg/L		1.4	1.0	0.8	0.1
Bicarbonate		mg/L		234	231	216	5
Carbonate		mg/L		<6	<6	<6	6
Hydroxide		mg/L		<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L		<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L		192	189	178	5
Chloride	Dissolved	mg/L		0.13	0.13	0.10	0.05
Nitrate - N	Dissolved	mg/L		0.14	0.34	0.28	0.01
Nitrite - N	Dissolved	mg/L		<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L		34.2	31.7	22.4	0.5
Hardness	as CaCO3	mg/L		220	220	200	5
Hardness	Total	mg CaCO3/L		231	232	206	1

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **969159**
Control Number: B14623
Date Received: Oct 31, 2013
Date Reported: Nov 6, 2013
Report Number: 1872633

		Reference Number	969159-4	969159-5	969159-6	
		Sample Date	Oct 29, 2013	Oct 29, 2013	Oct 29, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surf. / RAU # 9	Surf. / RAU # 10	Surf. / RAU # 11	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Calcium	Total	mg/L	53.3	50.0	47.1	0.05
Iron	Total	mg/L	0.013	0.108	<0.010	0.01
Magnesium	Total	mg/L	17.8	22.7	18.3	0.05
Manganese	Total	mg/L	<0.0050	0.0113	<0.0050	0.005
Potassium	Total	mg/L	0.65	0.72	0.31	0.1
Silicon	Total	mg/L	2.07	2.34	1.91	0.05
Sulfur	Total	mg/L	8.0	17.0	7.0	0.1
Sodium	Total	mg/L	0.72	2.27	0.69	0.02
Titanium	Total	mg/L	<0.0010	0.0037	0.0037	0.001
Aluminum	Total	mg/L	<0.005	0.038	<0.005	0.005
Antimony	Total	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Total	mg/L	0.0058	0.0003	<0.0002	0.0002
Barium	Total	mg/L	0.189	0.065	0.288	0.001
Beryllium	Total	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Total	mg/L	<0.0010	<0.0010	<0.0010	0.001
Boron	Total	mg/L	<0.005	<0.005	<0.005	0.004
Cadmium	Total	mg/L	0.00002	0.00002	0.00006	0.00001
Chromium	Total	mg/L	0.0004	0.0004	0.0004	0.0004
Cobalt	Total	mg/L	0.00006	0.00018	0.00005	0.00002
Copper	Total	mg/L	<0.001	<0.001	<0.001	0.001
Lead	Total	mg/L	<0.0001	0.0001	<0.0001	0.0001
Lithium	Total	mg/L	<0.001	0.003	<0.001	0.001
Mercury	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Molybdenum	Total	mg/L	0.0016	0.0008	0.0012	0.0001
Nickel	Total	mg/L	0.001	0.003	<0.001	0.001
Selenium	Total	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Silver	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Strontium	Total	mg/L	0.072	0.165	0.049	0.001
Tellurium	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium	Total	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Total	mg/L	0.0017	0.0012	0.0014	0.0004
Vanadium	Total	mg/L	0.0001	0.0002	<0.0001	0.0001
Zinc	Total	mg/L	0.004	0.004	0.006	0.001
Zirconium	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **969159**
Control Number: B14623
Date Received: Oct 31, 2013
Date Reported: Nov 6, 2013
Report Number: 1872633

	Reference Number	969159-5	969159-6	969159-7	
	Sample Date	Oct 29, 2013	Oct 29, 2013	Oct 29, 2013	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Surf. / RAU # 10	Surf. / RAU # 11	Surf. / RAU # 12	
	Matrix	Water	Water	Water	
Analyte	**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters					
Organic Carbon Total Nonpurgeable	mg/L	1	0.7	0.6	0.5
Cyanide Total	mg/L	<0.002	<0.002	<0.002	0.002
Ammonia - N	mg/L	0.01	<0.01	<0.01	.01
Phosphorus Total	mg/L	0.006	0.003	<0.003	0.003
Metals Dissolved					
Sulfur Dissolved	mg/L	16.0	6.4	8.0	0.2
Aluminum Dissolved	mg/L	<0.005	<0.005	<0.005	0.005
Antimony Dissolved	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic Dissolved	mg/L	0.0002	<0.0002	0.0096	0.0002
Barium Dissolved	mg/L	0.060	0.275	0.136	0.001
Beryllium Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron Dissolved	mg/L	<0.004	<0.004	<0.004	0.004
Cadmium Dissolved	mg/L	0.00002	0.00004	0.00001	0.00001
Chromium Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Cobalt Dissolved	mg/L	0.00011	0.00005	0.00005	0.00002
Copper Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Lead Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium Dissolved	mg/L	0.003	<0.001	<0.001	0.001
Molybdenum Dissolved	mg/L	0.00082	0.00118	0.00206	0.0001
Nickel Dissolved	mg/L	0.003	<0.001	<0.001	0.001
Selenium Dissolved	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Silver Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium Dissolved	mg/L	0.162	0.047	0.079	0.001
Tellurium Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium Dissolved	mg/L	0.0012	0.0013	0.0018	0.0004
Vanadium Dissolved	mg/L	0.00031	0.00041	0.00050	0.0001
Zinc Dissolved	mg/L	0.002	0.004	0.003	0.001
Zirconium Dissolved	mg/L	<0.00010	<0.00010	<0.00010	0.0001
Physical and Aggregate Properties					
Solids Total Suspended	mg/L	<2	<2	<2	1
Solids Total Dissolved	mg/L	252	220	242	5

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Analytical Report

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**969159**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B14623
	Box 20913	Name:	Tiger Project	Date Received:	Oct 31, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Nov 6, 2013
	Y1A 6P2	LSD:		Report Number:	1872633
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

		Reference Number	969159-5	969159-6	969159-7	
		Sample Date	Oct 29, 2013	Oct 29, 2013	Oct 29, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surf. / RAU # 10	Surf. / RAU # 11	Surf. / RAU # 12	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water						
pH	at 25 °C		8.12	8.04	8.10	
Electrical Conductivity		µS/cm at 25 C	321	269	294	1
Calcium	Dissolved	mg/L	48.6	45.1	53.3	0.1
Iron	Dissolved	mg/L	0.010	<0.005	0.010	0.005
Magnesium	Dissolved	mg/L	20.6	16.4	16.0	0.1
Manganese	Dissolved	mg/L	0.003	<0.001	<0.001	0.001
Potassium	Dissolved	mg/L	0.6	0.2	0.8	0.1
Silicon	Dissolved	mg/L	2.14	1.78	1.97	0.05
Sodium	Dissolved	mg/L	2.2	0.7	0.8	0.1
Bicarbonate		mg/L	195	200	213	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	160	164	175	5
Chloride	Dissolved	mg/L	0.52	0.11	0.07	0.05
Nitrate - N	Dissolved	mg/L	0.12	0.22	0.37	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	50.4	19.3	24.7	0.5
Hardness	as CaCO3	mg/L	206	180	199	5
Hardness	Total	mg CaCO3/L	218	193	208	1

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Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **969159**
Control Number: B14623
Date Received: Oct 31, 2013
Date Reported: Nov 6, 2013
Report Number: 1872633

		Reference Number	969159-7	969159-8		
		Sample Date	Oct 29, 2013	Oct 29, 2013		
		Sample Time	NA	NA		
		Sample Location				
		Sample Description	Surf. / RAU # 12	Surf. / RAU # 13		
		Matrix	Water	Water		
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Calcium	Total	mg/L	54.3	74.5		0.05
Iron	Total	mg/L	<0.010	0.498		0.01
Magnesium	Total	mg/L	17.5	21.4		0.05
Manganese	Total	mg/L	<0.0050	0.0312		0.005
Potassium	Total	mg/L	0.96	1.93		0.1
Silicon	Total	mg/L	2.16	2.77		0.05
Sulfur	Total	mg/L	8.8	20.2		0.1
Sodium	Total	mg/L	0.75	2.97		0.02
Titanium	Total	mg/L	0.0014	0.0041		0.001
Aluminum	Total	mg/L	<0.005	0.085		0.005
Antimony	Total	mg/L	<0.0002	<0.0002		0.0002
Arsenic	Total	mg/L	0.0088	0.0020		0.0002
Barium	Total	mg/L	0.142	0.101		0.001
Beryllium	Total	mg/L	<0.00004	<0.00004		0.00004
Bismuth	Total	mg/L	<0.0010	<0.0010		0.001
Boron	Total	mg/L	<0.005	0.01		0.004
Cadmium	Total	mg/L	0.00002	0.00052		0.00001
Chromium	Total	mg/L	<0.0004	0.0006		0.0004
Cobalt	Total	mg/L	0.00005	0.00040		0.00002
Copper	Total	mg/L	<0.001	0.002		0.001
Lead	Total	mg/L	<0.0001	0.0002		0.0001
Lithium	Total	mg/L	<0.001	0.004		0.001
Mercury	Total	mg/L	<0.00001	<0.00001		0.00001
Molybdenum	Total	mg/L	0.0022	0.0045		0.0001
Nickel	Total	mg/L	0.001	0.020		0.001
Selenium	Total	mg/L	<0.0006	0.0030		0.0006
Silver	Total	mg/L	<0.00001	<0.00001		0.00001
Strontium	Total	mg/L	0.082	0.161		0.001
Tellurium	Total	mg/L	<0.0001	<0.0001		0.0001
Thallium	Total	mg/L	<0.00001	0.00001		0.00001
Thorium	Total	mg/L	<0.0004	<0.0004		0.0004
Tin	Total	mg/L	<0.0001	<0.0001		0.0001
Uranium	Total	mg/L	0.0018	0.0055		0.0004
Vanadium	Total	mg/L	<0.0001	0.0006		0.0001
Zinc	Total	mg/L	0.004	0.090		0.001
Zirconium	Total	mg/L	<0.0001	0.0001		0.0001

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Exova

Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **969159**
Control Number: B14623
Date Received: Oct 31, 2013
Date Reported: Nov 6, 2013
Report Number: 1872633

Reference Number	969159-8
Sample Date	Oct 29, 2013
Sample Time	NA
Sample Location	
Sample Description	Surf. / RAU # 13
Matrix	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	1.5			0.5
Cyanide	Total	mg/L	<0.002			0.002
Ammonia - N		mg/L	<0.01			.01
Phosphorus	Total	mg/L	0.011			0.003
Metals Dissolved						
Sulfur	Dissolved	mg/L	18.6			0.2
Aluminum	Dissolved	mg/L	0.014			0.005
Antimony	Dissolved	mg/L	<0.0002			0.0002
Arsenic	Dissolved	mg/L	0.0010			0.0002
Barium	Dissolved	mg/L	0.092			0.001
Beryllium	Dissolved	mg/L	<0.00004			0.00004
Bismuth	Dissolved	mg/L	<0.001			0.001
Boron	Dissolved	mg/L	0.008			0.004
Cadmium	Dissolved	mg/L	0.00043			0.00001
Chromium	Dissolved	mg/L	<0.0004			0.0004
Cobalt	Dissolved	mg/L	0.00031			0.00002
Copper	Dissolved	mg/L	<0.001			0.001
Lead	Dissolved	mg/L	<0.0001			0.0001
Lithium	Dissolved	mg/L	0.004			0.001
Molybdenum	Dissolved	mg/L	0.00440			0.0001
Nickel	Dissolved	mg/L	0.018			0.001
Selenium	Dissolved	mg/L	0.0032			0.0006
Silver	Dissolved	mg/L	<0.00001			0.00001
Titanium	Dissolved	mg/L	<0.010			0.01
Strontium	Dissolved	mg/L	0.155			0.001
Tellurium	Dissolved	mg/L	<0.0001			0.0001
Thallium	Dissolved	mg/L	0.00002			0.00001
Thorium	Dissolved	mg/L	<0.0004			0.0004
Tin	Dissolved	mg/L	<0.0001			0.0001
Uranium	Dissolved	mg/L	0.0056			0.0004
Vanadium	Dissolved	mg/L	0.00058			0.0001
Zinc	Dissolved	mg/L	0.076			0.001
Zirconium	Dissolved	mg/L	0.00014			0.0001
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2			1
Solids	Total Dissolved	mg/L	318			5

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Analytical Report

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**969159**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B14623
	Box 20913	Name:	Tiger Project	Date Received:	Oct 31, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Nov 6, 2013
	Y1A 6P2	LSD:		Report Number:	1872633
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

Reference Number	969159-8
Sample Date	Oct 29, 2013
Sample Time	NA
Sample Location	
Sample Description	Surf. / RAU # 13
Matrix	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Routine Water						
pH	at 25 °C		8.11			
Electrical Conductivity		µS/cm at 25 C	398			1
Calcium	Dissolved	mg/L	72.7			0.1
Iron	Dissolved	mg/L	0.064			0.005
Magnesium	Dissolved	mg/L	19.6			0.1
Manganese	Dissolved	mg/L	0.022			0.001
Potassium	Dissolved	mg/L	1.7			0.1
Silicon	Dissolved	mg/L	2.48			0.05
Sodium	Dissolved	mg/L	2.7			0.1
Bicarbonate		mg/L	252			5
Carbonate		mg/L	<6			6
Hydroxide		mg/L	<5			5
P-Alkalinity	as CaCO3	mg/L	<5			5
T-Alkalinity	as CaCO3	mg/L	207			5
Chloride	Dissolved	mg/L	3.38			0.05
Nitrate - N	Dissolved	mg/L	0.18			0.01
Nitrite - N	Dissolved	mg/L	<0.01			0.01
Sulfate (SO4)	Dissolved	mg/L	59.4			0.5
Hardness	as CaCO3	mg/L	262			5
Hardness	Total	mg CaCO3/L	274			1

Approved by:

Randy Neumann, BSc
General Manager

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Methodology and Notes

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	Tiger Project
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**969159**
Control Number:	B14623
Date Received:	Oct 31, 2013
Date Reported:	Nov 6, 2013
Report Number:	1872633

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water (Surrey)	APHA	*	Alkalinity - Titration Method, 2320 B	01-Nov-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	*	Conductivity, 2510 B	01-Nov-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	*	pH - Electrometric Method, 4500-H+ B	01-Nov-13	Exova Surrey
Ammonia-N in Water (Surrey)	APHA	*	Flow Injection Analysis, 4500-NH3 H	04-Nov-13	Exova Surrey
Anions by IEC in water (Surrey)	APHA	*	Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	01-Nov-13	Exova Surrey
Carbon Organic (Total) in water (TOC)	APHA		High-Temperature Combustion Method, 5310 B	04-Nov-13	Exova Edmonton
Cyanide (Total) in water	US EPA	*	US EPA method, 335.3	04-Nov-13	Exova Edmonton
Mercury Low Level (Total) in water (Surrey)	EPA	*	Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	04-Nov-13	Exova Surrey
Metals SemiTrace (Dissolved) in water (Surrey)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	01-Nov-13	Exova Surrey
Metals SemiTrace (Total) in Water (Surrey)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	01-Nov-13	Exova Surrey
Phosphorus - total by Smartchem (Surrey)	APHA	*	Preliminary Acid Hydrolysis, Ascorbic Acid Reduction Method, 4500-P B,E	04-Nov-13	Exova Surrey
Solids Dissolved (Total, Fixed and Volatile) - Surrey	APHA	*	Total Dissolved Solids Dried at 180 C, 2540 C	01-Nov-13	Exova Surrey
Solids Suspended (Total, Fixed and Volatile)	APHA	*	Total Suspended Solids Dried at 103-105'C, 2540 D	01-Nov-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	01-Nov-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	06-Nov-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	01-Nov-13	Exova Surrey
Trace Metals (Total) in Water (Surrey)	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	01-Nov-13	Exova Surrey
Trace Metals (Total) in Water (Surrey)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	01-Nov-13	Exova Surrey

** Reference Method Modified*

References

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

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Methodology and Notes

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**969159**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B14623
	Box 20913	Name:	Tiger Project	Date Received:	Oct 31, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Nov 6, 2013
	Y1A 6P2	LSD:		Report Number:	1872633
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

Comments:

- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.
- Some total metal results were less than dissolved metal results for lot 969159. The results were verified and are within expected measurement uncertainty.

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.
The test report shall not be reproduced except in full, without the written approval of the laboratory.

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Billing Information

Company: J. Gibson & Associates
Address: Whitehorse, YT Y1A 6P2
Attention: John Gibson
Phone: (867) 633-4522
Cell:
Fax: (867) 668-6895
E-mail: ludditegibson@gmail.com
Agreement ID: 6646
Copy of report: X

Copy of Report To:

Company: J. Gibson & Associates
Address: Whitehorse, YT Y1A 6P2
Attention: John Gibson
Phone: (867) 633-4522
Cell:
Fax: (867) 668-6895
E-mail: ludditegibson@gmail.com
Copy of invoice: X

RUSH Priority

Upon filling out this section, client accepts that surcharges will be applied to the analysis

Date Required
As Indicated | All Analysis

When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples.

Signature

Project Information

Project ID: ATAC RESOURCES
Project Name: TIGER PROJECT
Project Location:
Legal Location:
PO/AFE#:
Proj. Acct. Code:

Sample Custody (please print)

Sampled by: J GIBSON
Company:
I authorize Exova to proceed with the work indicated on this form:
Date: OCT 30/13 Initial: JG

This section for Lab use only

Date/Time stamp: OCT 31 2013

Report Results: E-mail / Mail; Online / Fax; PDF / Excel; QA/QC Report

Special Instructions/Comments (please include contact information including ph. # if different from above).

RCHEM = pH, EC, TP, N_2, N_3, TALK, HARDT, CL, SO4, TSS, TDS
TW23 FIELD FILTERED, NH4 + SULFURIC
TW23 + TW24 + NITRIC, TOC+HCL, TCN+NaOH

Include Regulatory Requirements Below:

	Sample Identification	Location	Depth IN CM M	Date/Time sampled	Matrix	Sampling Method	Number of Containers	RCHEM	NH4	TOC	TCN	TW23 FIELD FILTERED	TW23+TW24
1	RAW #3	SURF	1	OCT 29	H2O	Grab	6	✓	✓	✓	✓	✓	✓
2	RAW #4	↓					6	✓	✓	✓	✓	✓	✓
3	RAW #4 DUPLICATE				↓	↓	1	✓	✓	✓	✓		✓
4	RAW #9						6	✓	✓	✓	✓	✓	✓
5	#10						6	✓	✓	✓	✓	✓	✓
6	#11						6	✓	✓	✓	✓	✓	✓
7	#12						6	✓	✓	✓	✓	✓	✓
8	#13						6	✓	✓	✓	✓	✓	✓
9													
10													
11													
12													
13													
14													
15													

Enter tests above (√ relevant samples below)

Indicate below any deficiencies in the condition of samples:

- Were Exova supplies used?
- Was there any damage to the shipping container?
- Were the containers packaged well?
- Were any extra samples received (document below)?
- Are samples within recommended holding times/temp?

ED 120-00

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

Please indicate any potentially hazardous samples

Page 1 of 1

Control # B14623

LOT: 969159 COC

Shipping:
COD Y/N
Cooler temp: 9 C

and size of coolers received:
Delivery Method:
Waybill:
Received by:

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Surrey, British Columbia
V3S 8P8, Canada

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Report Transmission Cover Page

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**972441**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B14629
	Box 20913	Name:	Tiger Project	Date Received:	Nov 18, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Nov 22, 2013
	Y1A 6P2	LSD:		Report Number:	1877678
Attn:	John Gibson	P.O.:			
Sampled By:	R.Gibson	Acct code:			
Company:					

Contact & Affiliation	Address	Delivery Commitments
John Gibson J. Gibson & Associates	, Box 20913 Whitehorse, Yukon Territory Y1A 6P2 Phone: (867) 633-4522 Fax: (867) 668-6895 Email: ludditegibson@gmail.com	On [Lot Verification] send (COA) by Email - Single Report On [Report Approval] send (COC, Test Report) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report On [Lot Creation] send (COR) by Email - Single Report

Notes To Clients:

- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: R.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **972441**
Control Number: B14629
Date Received: Nov 18, 2013
Date Reported: Nov 22, 2013
Report Number: 1877678

		Reference Number	972441-1	972441-2	972441-3	
		Sample Date	Nov 16, 2013	Nov 16, 2013	Nov 16, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surf / RAU #3	Surf / RAU #4	Surf / RAU #9	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	1.9	0.9	1.1	0.5
Cyanide	Total	mg/L	<0.002	<0.002	<0.002	0.002
Ammonia - N		mg/L	0.01	<0.01	<0.01	.01
Phosphorus	Total	mg/L	0.004	<0.003	<0.003	0.003
Metals Dissolved						
Sulfur	Dissolved	mg/L	11.2	10.6	7.3	0.2
Aluminum	Dissolved	mg/L	<0.005	<0.005	<0.005	0.005
Antimony	Dissolved	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Dissolved	mg/L	0.0005	0.0022	0.0003	0.0002
Barium	Dissolved	mg/L	0.105	0.125	0.235	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	<0.004	<0.004	<0.004	0.004
Cadmium	Dissolved	mg/L	0.00003	0.00002	0.00004	0.00001
Chromium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Cobalt	Dissolved	mg/L	0.00006	0.00005	0.00005	0.00002
Copper	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Lead	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L	0.001	0.001	<0.001	0.001
Molybdenum	Dissolved	mg/L	0.00310	0.00119	0.00084	0.0001
Nickel	Dissolved	mg/L	0.001	<0.001	<0.001	0.001
Selenium	Dissolved	mg/L	0.0018	0.0007	<0.0006	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L	0.086	0.080	0.062	0.001
Tellurium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L	0.0029	0.0028	0.0014	0.0004
Vanadium	Dissolved	mg/L	0.00019	0.00016	0.00019	0.0001
Zinc	Dissolved	mg/L	0.002	0.007	0.005	0.001
Zirconium	Dissolved	mg/L	<0.00010	<0.00010	<0.00010	0.0001
Metals Total						
Aluminum	Total	mg/L	0.028	<0.010	0.028	0.005
Antimony	Total	mg/L	<0.0002	<0.0002	<0.0002	0.0001

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: R.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **972441**
Control Number: B14629
Date Received: Nov 18, 2013
Date Reported: Nov 22, 2013
Report Number: 1877678

			Reference Number	972441-1	972441-2	972441-3	
			Sample Date	Nov 16, 2013	Nov 16, 2013	Nov 16, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	Surf / RAU #3	Surf / RAU #4	Surf / RAU #9	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued							
Arsenic	Total	mg/L		0.00058	0.00227	0.00031	0.00005
Barium	Total	mg/L		0.109	0.138	0.238	0.00005
Beryllium	Total	mg/L		<0.00010	<0.00010	<0.00010	0.00005
Bismuth	Total	mg/L		<0.0002	<0.0002	<0.0002	0.0001
Boron	Total	mg/L		0.029	0.009	0.004	.002
Cadmium	Total	mg/L		0.00004	0.00003	0.00005	0.00001
Calcium	Total	mg/L		66.1	62.3	57.6	0.05
Chromium	Total	mg/L		<0.0010	<0.0010	<0.0010	0.0005
Cobalt	Total	mg/L		<0.0002	<0.0002	<0.0002	0.0001
Copper	Total	mg/L		0.0010	0.0006	0.0005	0.0001
Iron	Total	mg/L		0.112	0.020	0.065	0.002
Lead	Total	mg/L		<0.0002	<0.0002	<0.0002	0.0001
Lithium	Total	mg/L		<0.0010	<0.0010	<0.0010	0.0005
Magnesium	Total	mg/L		18.3	22.4	17.8	0.04
Manganese	Total	mg/L		0.016	0.0058	0.0054	0.001
Molybdenum	Total	mg/L		0.00325	0.00143	0.00095	0.00005
Nickel	Total	mg/L		0.0007	0.0005	<0.0004	0.0002
Potassium	Total	mg/L		1.4	1.0	0.3	0.1
Selenium	Total	mg/L		0.0017	0.0008	0.0002	0.0001
Silicon	Total	mg/L		2.76	2.84	2.07	0.02
Silver	Total	mg/L		<0.00010	<0.00010	<0.00010	0.00005
Sodium	Total	mg/L		1.2	0.9	0.6	0.1
Strontium	Total	mg/L		0.0810	0.0794	0.0596	0.0001
Thallium	Total	mg/L		<0.00002	<0.00002	<0.00002	0.00001
Thorium	Total	mg/L		<0.00002	<0.00002	<0.00002	0.00001
Tin	Total	mg/L		<0.0002	<0.0002	<0.0002	0.0001
Titanium	Total	mg/L		<0.0010	<0.0010	0.0011	0.0005
Uranium	Total	mg/L		0.00300	0.00325	0.00155	0.00001
Vanadium	Total	mg/L		0.0002	<0.0002	<0.0002	0.0001
Zinc	Total	mg/L		0.0031	0.0125	0.0073	0.0005
Zirconium	Total	mg/L		<0.0010	<0.0010	<0.0010	0.0005
Physical and Aggregate Properties							
Solids	Total Suspended	mg/L		<2	<2	<2	1
Solids	Total Dissolved	mg/L		276	256	228	5
Routine Water							
pH	at 25 °C			7.99	8.07	7.86	

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Whitehorse, YT, Canada
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Attn: John Gibson
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ID: ATAC Resources
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Acct code:

Lot ID: **972441**
Control Number: B14629
Date Received: Nov 18, 2013
Date Reported: Nov 22, 2013
Report Number: 1877678

		Reference Number	972441-1	972441-2	972441-3	
		Sample Date	Nov 16, 2013	Nov 16, 2013	Nov 16, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surf / RAU #3	Surf / RAU #4	Surf / RAU #9	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water - Continued						
Electrical Conductivity		µS/cm at 25 C	383	361	341	1
Calcium	Dissolved	mg/L	68.4	59.6	57.6	0.1
Iron	Dissolved	mg/L	0.024	<0.005	<0.005	0.005
Magnesium	Dissolved	mg/L	19.0	21.6	17.9	0.1
Manganese	Dissolved	mg/L	0.001	<0.001	<0.001	0.001
Potassium	Dissolved	mg/L	1.4	0.9	0.3	0.1
Silicon	Dissolved	mg/L	2.58	2.45	1.90	0.05
Sodium	Dissolved	mg/L	1.4	1.0	0.8	0.1
Bicarbonate		mg/L	245	228	224	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	201	187	184	5
Chloride	Dissolved	mg/L	0.10	0.12	0.12	0.05
Nitrate - N	Dissolved	mg/L	0.16	0.33	0.25	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	34.2	32.5	22.0	0.5
Hardness	as CaCO3	mg/L	249	238	218	5
Hardness	Total	mg CaCO3/L	258	245	219	1

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: R.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **972441**
Control Number: B14629
Date Received: Nov 18, 2013
Date Reported: Nov 22, 2013
Report Number: 1877678

		Reference Number	972441-4	972441-5	972441-6	
		Sample Date	Nov 16, 2013	Nov 16, 2013	Nov 16, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surf / RAU #10	Surf / RAU #12	Surf / RAU #13	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	1	1.0	1.6	0.5
Cyanide	Total	mg/L	<0.002	<0.002	<0.002	0.002
Ammonia - N		mg/L	<0.01	<0.01	0.01	.01
Phosphorus	Total	mg/L	<0.003	0.020	0.006	0.003
Metals Dissolved						
Sulfur	Dissolved	mg/L	16.1	8.4	22.6	0.2
Aluminum	Dissolved	mg/L	<0.005	<0.005	0.008	0.005
Antimony	Dissolved	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Dissolved	mg/L	<0.0002	0.0080	0.0005	0.0002
Barium	Dissolved	mg/L	0.077	0.142	0.092	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	<0.004	<0.004	0.012	0.004
Cadmium	Dissolved	mg/L	0.00001	0.00002	0.00054	0.00001
Chromium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Cobalt	Dissolved	mg/L	0.00007	0.00005	0.00036	0.00002
Copper	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Lead	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L	0.003	<0.001	0.004	0.001
Molybdenum	Dissolved	mg/L	0.00078	0.00192	0.00518	0.0001
Nickel	Dissolved	mg/L	0.002	0.001	0.023	0.001
Selenium	Dissolved	mg/L	<0.0006	<0.0006	0.0038	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L	0.156	0.079	0.191	0.001
Tellurium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L	<0.00001	<0.00001	0.00002	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L	0.0012	0.0017	0.0068	0.0004
Vanadium	Dissolved	mg/L	<0.00010	<0.00010	0.00029	0.0001
Zinc	Dissolved	mg/L	0.002	0.005	0.099	0.001
Zirconium	Dissolved	mg/L	<0.00010	<0.00010	<0.00010	0.0001
Metals Total						
Aluminum	Total	mg/L	<0.010	0.010	0.033	0.005
Antimony	Total	mg/L	<0.0002	<0.0002	<0.0002	0.0001

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: R.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **972441**
Control Number: B14629
Date Received: Nov 18, 2013
Date Reported: Nov 22, 2013
Report Number: 1877678

		Reference Number	972441-4	972441-5	972441-6	
		Sample Date	Nov 16, 2013	Nov 16, 2013	Nov 16, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surf / RAU #10	Surf / RAU #12	Surf / RAU #13	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued						
Arsenic	Total	mg/L	0.00018	0.00873	0.00144	0.00005
Barium	Total	mg/L	0.0858	0.156	0.104	0.00005
Beryllium	Total	mg/L	<0.00010	<0.00010	<0.00010	0.00005
Bismuth	Total	mg/L	<0.0002	<0.0002	<0.0002	0.0001
Boron	Total	mg/L	0.004	<0.004	0.014	.002
Cadmium	Total	mg/L	<0.00002	0.00002	0.00065	0.00001
Calcium	Total	mg/L	57.8	60.7	87.7	0.05
Chromium	Total	mg/L	<0.0010	<0.0010	<0.0010	0.0005
Cobalt	Total	mg/L	<0.0002	<0.0002	0.0003	0.0001
Copper	Total	mg/L	0.0005	0.0008	0.0015	0.0001
Iron	Total	mg/L	0.029	0.018	0.407	0.002
Lead	Total	mg/L	<0.0002	<0.0002	<0.0002	0.0001
Lithium	Total	mg/L	0.0024	<0.0010	0.0037	0.0005
Magnesium	Total	mg/L	23.5	17.2	22.0	0.04
Manganese	Total	mg/L	0.0047	0.0037	0.0351	0.001
Molybdenum	Total	mg/L	0.00098	0.00234	0.00557	0.00005
Nickel	Total	mg/L	0.0014	<0.0004	0.0249	0.0002
Potassium	Total	mg/L	0.7	1.0	2.1	0.1
Selenium	Total	mg/L	0.0007	0.0005	0.0038	0.0001
Silicon	Total	mg/L	2.68	2.33	2.93	0.02
Silver	Total	mg/L	<0.00010	<0.00010	<0.00010	0.00005
Sodium	Total	mg/L	2.4	0.8	3.4	0.1
Strontium	Total	mg/L	0.160	0.0806	0.188	0.0001
Thallium	Total	mg/L	<0.00002	<0.00002	0.00003	0.00001
Thorium	Total	mg/L	<0.00002	<0.00002	<0.00002	0.00001
Tin	Total	mg/L	<0.0002	<0.0002	<0.0002	0.0001
Titanium	Total	mg/L	<0.0010	<0.0010	<0.0010	0.0005
Uranium	Total	mg/L	0.00143	0.00203	0.00753	0.00001
Vanadium	Total	mg/L	<0.0002	<0.0002	0.0005	0.0001
Zinc	Total	mg/L	0.0026	0.0045	0.112	0.0005
Zirconium	Total	mg/L	<0.0010	<0.0010	<0.0010	0.0005
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2	<2	<2	1
Solids	Total Dissolved	mg/L	268	236	352	5
Routine Water						
pH	at 25 °C		7.91	7.91	7.91	

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: R.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **972441**
Control Number: B14629
Date Received: Nov 18, 2013
Date Reported: Nov 22, 2013
Report Number: 1877678

		Reference Number	972441-4	972441-5	972441-6	
		Sample Date	Nov 16, 2013	Nov 16, 2013	Nov 16, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surf / RAU #10	Surf / RAU #12	Surf / RAU #13	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water - Continued						
Electrical Conductivity		µS/cm at 25 C	388	351	506	1
Calcium	Dissolved	mg/L	56.6	58.2	88.5	0.1
Iron	Dissolved	mg/L	<0.005	<0.005	0.008	0.005
Magnesium	Dissolved	mg/L	23.2	16.6	22.5	0.1
Manganese	Dissolved	mg/L	<0.001	<0.001	0.022	0.001
Potassium	Dissolved	mg/L	0.8	0.9	2.2	0.1
Silicon	Dissolved	mg/L	2.37	2.04	2.68	0.05
Sodium	Dissolved	mg/L	2.4	0.9	3.6	0.1
Bicarbonate		mg/L	213	216	270	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	175	177	222	5
Chloride	Dissolved	mg/L	0.21	0.08	5.04	0.05
Nitrate - N	Dissolved	mg/L	0.17	0.41	0.22	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	53.2	25.8	71.1	0.5
Hardness	as CaCO3	mg/L	237	214	314	5
Hardness	Total	mg CaCO3/L	246	221	320	1

Approved by:

Mathieu Simoneau
Operations Manager

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Methodology and Notes

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**972441**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B14629
	Box 20913	Name:	Tiger Project	Date Received:	Nov 18, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Nov 22, 2013
	Y1A 6P2	LSD:		Report Number:	1877678
Attn:	John Gibson	P.O.:			
Sampled By:	R.Gibson	Acct code:			
Company:					

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water (Surrey)	APHA	* Alkalinity - Titration Method, 2320 B	19-Nov-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	* Conductivity, 2510 B	19-Nov-13	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	* pH - Electrometric Method, 4500-H+ B	19-Nov-13	Exova Surrey
Ammonia-N in Water (Surrey)	APHA	* Flow Injection Analysis, 4500-NH3 H	21-Nov-13	Exova Surrey
Anions by IEC in water (Surrey)	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	19-Nov-13	Exova Surrey
BC ICP-MS Total Metals in Water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	21-Nov-13	Exova Edmonton
BC Trace Total Metals in Water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	21-Nov-13	Exova Edmonton
Carbon Organic (Total) in water (TOC)	APHA	High-Temperature Combustion Method, 5310 B	21-Nov-13	Exova Edmonton
Carbon Organic (Total) in water (TOC)	APHA	High-Temperature Combustion Method, 5310 B	22-Nov-13	Exova Edmonton
Cyanide (Total) in water	US EPA	* US EPA method, 335.3	21-Nov-13	Exova Edmonton
Metals SemiTrace (Dissolved) in water (Surrey)	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	19-Nov-13	Exova Surrey
Phosphorus - total by Smartchem (Surrey)	APHA	* Preliminary Acid Hydrolysis, Ascorbic Acid Reduction Method, 4500-P B,E	20-Nov-13	Exova Surrey
Solids Dissolved (Total, Fixed and Volatile) - Surrey	APHA	* Total Dissolved Solids Dried at 180 C, 2540 C	20-Nov-13	Exova Surrey
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105'C, 2540 D	20-Nov-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	19-Nov-13	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	19-Nov-13	Exova Surrey

** Reference Method Modified*

References

US EPA	US Environmental Protection Agency Test Methods
APHA	Standard Methods for the Examination of Water and Wastewater

Comments:

- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.

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Methodology and Notes

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	Tiger Project
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	R.Gibson	Acct code:	
Company:			

Lot ID:	**972441**
Control Number:	B14629
Date Received:	Nov 18, 2013
Date Reported:	Nov 22, 2013
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Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.
The test report shall not be reproduced except in full, without the written approval of the laboratory.

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Project Information

Project ID: ATAC RESOURCES
Project Name: TIGER PROJECT
Project Location:
Legal Location:
PO/AFE#:
Proj. Acct. Code:

Billing Information

Company: J. Gibson & Associates
Address: Whitehorse, YT Y1A 6P2
Attention: John Gibson
Phone: (867) 633-4522
Cell:
Fax: (867) 668-6895
E-mail: ludditegibson@gmail.com
Agreement ID: 6646
Copy of report: X

Copy of Report To:

Company: J. Gibson & Associates
Address: Whitehorse, YT Y1A 6P2
Attention: John Gibson
Phone: (867) 633-4522
Cell:
Fax: (867) 668-6895
E-mail: ludditegibson@gmail.com
Copy of invoice: X

RUSH Priority

Upon filling out this section, client accepts that surcharges will be applied to the analysis

Date Required
As Indicated | All Analysis

When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples.

Signature

Sample Custody (please print)

Sampled by: R. GIBSON
Company: —
I authorize Exova to proceed with the work indicated on this form:
Date: Nov 17/13 Initial: RG.

This section for Lab use only

Date/Time stamp: NOV 18 2013

Report Results: [X] E-mail [ ] Mail [ ] Online [ ] Fax
[X] PDF [X] Excel
[ ] QA/QC Report

Special Instructions/Comments (please include contact information including ph. # if different from above).
RCHEM = pH, EC, TP, N_2, N_3, TALK, CL, SO4, THARD, TSS, TDS
TW23 Field filtered, METALS+NITRIC
NH4 + SULFURIC, TOC+HCL, TCN+NaOH.

Include Regulatory Requirements Below:

Sample Identification	Location	Depth IN CM M	Date/Time sampled	Matrix	Sampling Method	Number of Containers	RCHEM	NH4	TOC		TW24ew	TW23ew (F)		TCN
1 RAU #3	SURF.	—	Nov 16	H2O	Grab	6	✓	✓	✓		✓	✓		✓
2														
3 #4	↓		↓	↓	↓	6	✓	✓	✓		✓	✓		✓
4														
5 #9						6	✓	✓	✓		✓	✓		✓
6														
7 #10						6	✓	✓	✓		✓	✓		✓
8														
9 #12						6	✓	✓	✓		✓	✓		✓
10														
11 #13						6	✓	✓	✓		✓	✓		✓
12														
13														
14														
15														

Enter tests above (√ relevant samples below)

Indicate below any deficiencies in the condition of samples:

- Were Exova supplies used?
- Was there any damage to the shipping container?
- Were the containers packaged well?
- Were any extra samples received (document below)?
- Are samples within recommended holding times/temp?

ED 120-00

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

Please indicate any potentially hazardous samples

Page 1 of 1

Control # B14629

LOT: 972441 COC

Shipping:
COD Y/N
Cooler temp: 3°C

and size of coolers received:
Delivery Method:
Waybill:
Received by:

APPENDIX #2

Flow Volume Calculations

October and November 2013

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **29 Oct, 2013**

Site: **RAU#13**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
1.15	0	0.175	0	0	0
1.5	0.09	0.375	0.143	0.034	0.0048
1.9	0.08	0.3	0.229	0.024	0.0055
2.1	0.09	0.25	0.22	0.023	0.0050
2.4	0.13	0.3	0.189	0.039	0.0074
2.7	0.22	0.3	0.235	0.066	0.0155
3	0.27	0.225	0.379	0.061	0.0230
3.15	0.27	0.15	0.497	0.041	0.0201
3.3	0.28	0.15	0.677	0.042	0.0284
3.45	0.27	0.15	0.736	0.041	0.0298
3.6	0.26	0.15	0.503	0.039	0.0196
3.75	0.24	0.15	0.318	0.036	0.0114
3.9	0.25	0.145	0.196	0.036	0.0071
4.04	0	0.07	0	0.000	0.0000
2.89		2.89			**0.1777**

All velocity readings at 0.6 depth

Staff Gauge: 0.396m

Logger: logger pulled September

Channel under ice? partial ice upstream
No anchor ice

Method: Price Velocity meter#2/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **29 Oct, 2013**

Site: **RAU#13**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
1.15	0	0.175	0	0	0
1.5	0.09	0.375	0.143	0.034	0.0048
1.9	0.08	0.3	0.229	0.024	0.0055
2.1	0.09	0.25	0.22	0.023	0.0050
2.4	0.13	0.3	0.189	0.039	0.0074
2.7	0.22	0.3	0.235	0.066	0.0155
3	0.27	0.225	0.379	0.061	0.0230
3.15	0.27	0.15	0.497	0.041	0.0201
3.3	0.28	0.15	0.677	0.042	0.0284
3.45	0.27	0.15	0.736	0.041	0.0298
3.6	0.26	0.15	0.503	0.039	0.0196
3.75	0.24	0.15	0.318	0.036	0.0114
3.9	0.25	0.145	0.196	0.036	0.0071
4.04	0	0.07	0	0.000	0.0000
2.89		2.89			**0.1777**

All velocity readings at 0.6 depth

Staff Gauge: 0.396m

Logger: logger pulled September

Channel under ice? partial ice upstream
No anchor ice

Method: Price Velocity meter#2/ TS Wading Rod

Measurement By: J.Gibson

Stage Discharge Calculations

Project: **Atac Resources - Tiger** **Date:** **15-Nov-13**

Site: **RAU#4**

Point *(m)*	**Depth** *(meters)*	**Width** *(meters)*	**Velocity** *(m/sec)*	**Area** *(m sq)*	**Volume** *(cms)*
0.3	0	0.05	0	0	0
0.4	0.05	0.1	0	0.005	0.0000
0.5	0.08	0.1	0	0.008	0.0000
0.6	0.1	0.1	0.089	0.010	0.0009
0.7	0.1	0.1	0.298	0.010	0.0030
0.8	0.12	0.1	0.207	0.012	0.0025
0.9	0.12	0.1	0.24	0.012	0.0029
1	0.12	0.1	0.291	0.012	0.0035
1.1	0.1	0.1	0.372	0.010	0.0037
1.2	0.12	0.1	0.425	0.012	0.0051
1.3	0.1	0.1	0.379	0.010	0.0038
1.4	0.08	0.1	0.474	0.008	0.0038
1.5	0.06	0.1	0.074	0.006	0.0004
1.6	0.08	0.1	0.311	0.008	0.0025
1.7	0.04	0.1	0.259	0.004	0.0010
1.8	0.04	0.1	0.245	0.004	0.0010
1.9	0.04	0.1	0.169	0.004	0.0007
2	0.02	0.09	0	0.002	0.0000
2.08	0	0.04	0	0.000	0
1.78		1.78			**0.0348**

All velocity readings at 0.6 depth

Staff Gauge: under ice conditions

Logger: pulled in September

Channel under ice? 50% surface ice covered
No anchor ice

Method: Price Velocity meter#2/ TS Wading Rod

Measurement By: R.Gibson

ATAC RESOURCES LTD

TIGER PROJECT

ENVIRONMENTAL DATA UPDATE

December, 2013

J.Gibson Env. Consulting ***Whitehorse YT***

December 2013 – Tiger Project Environmental Data Update

Baseline water quality and hydrology data collection continued with monthly and quarterly stations surveyed in December, 2013.

In December, all monthly, quarterly tributary stations and the Beaver River receiving water station (Rau #10) were sampled for water quality. Station RAU#2 had overflow ice buildup to 0.45 meter depth – site was drilled but no water encountered.

All water level data logger installations were removed in late September prior to ice forming.

In December, the weather station logger was checked and data was downloaded.

Potential winter road crossing sites on Scoudale Creek and the Beaver River were drilled for ice / water depths.

Data Results

Hydrology December

Hydrology data / stream flow volumes were in early winter flow conditions. There was total surface ice cover on all stream channels. There was no anchor ice formation.
No flow measurements were obtained in December.

Water Quality

Data is listed in the following tables:

Table 1. December 2013 Routine chemistry analysis results and field measurements

Table 2. December 2013 Total Metals ICP/MS analysis results

Table 3. December 2013 Dissolved Metals ICP/MS analysis results

Table 4. Flow Measurement Summary – RAU Stations to December 2013

Table 5. Quality Control Sample analysis results – RAU#13 December 2013

Table 6. Ice Depth Measurements – Scoudale Creek and Beaver River.

Listed with the water quality analysis results are the ***Canadian Water Quality Guideline*** values for the Protection of Aquatic Life for waters with a pH > 6.5 and a total hardness value of > 180 mg/L as CaC03.

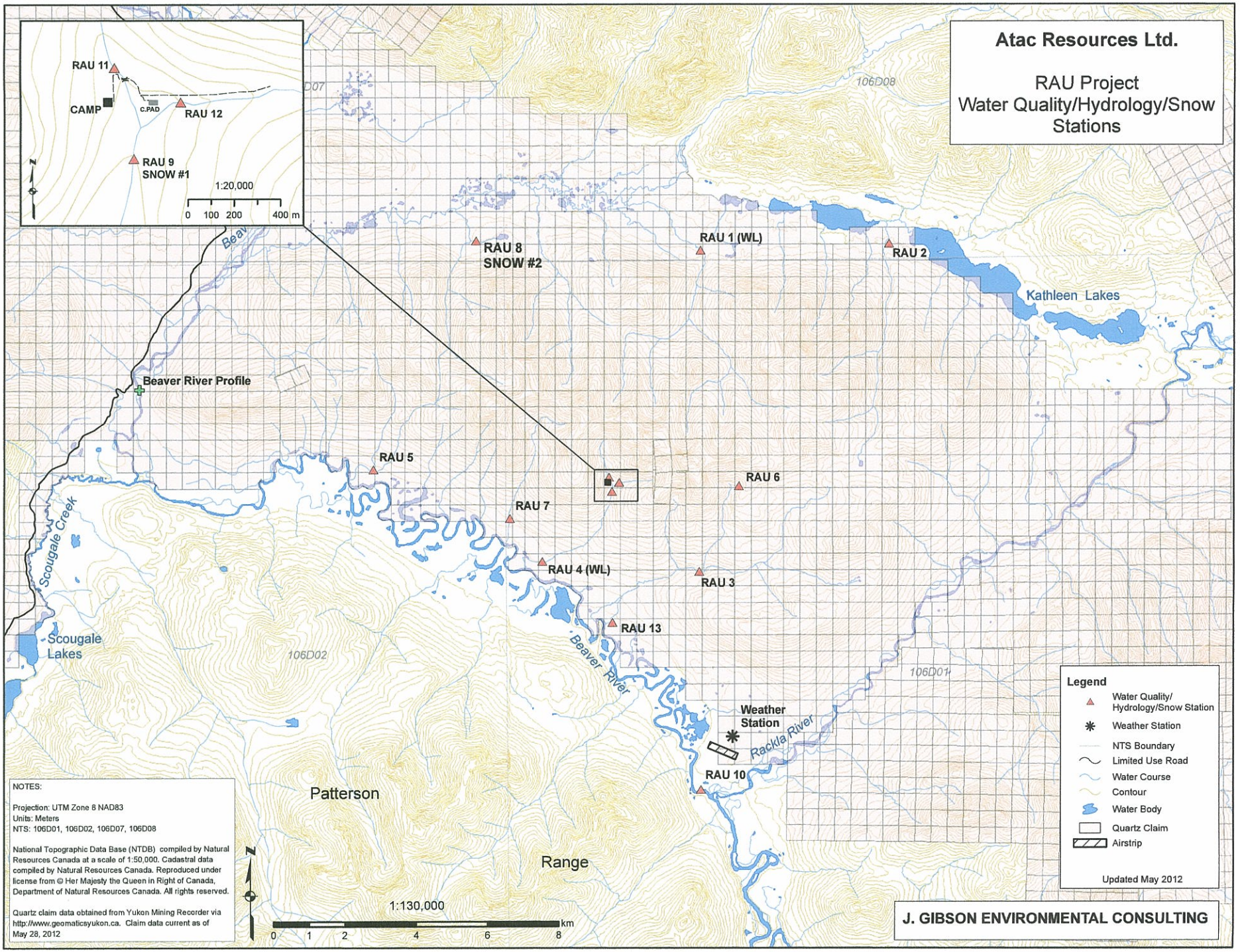
Atac Resources Ltd.
RAU Project
Water Quality/Hydrology/Snow Stations
RAU 11
CAMP
C.PAD
RAU 12
RAU 9
SNOW #1
1:20,000
0 100 200 400 m
RAU 8
SNOW #2
RAU 1 (WL)
RAU 2
Kathleen Lakes
Beaver River Profile
RAU 5
RAU 6
RAU 7
RAU 4 (WL)
RAU 3
RAU 13
Scougale Creek
Scougale Lakes
106D02
106D08
106D01
Beaver River
Rackla River
Weather Station
RAU 10
Patterson
Range
1:130,000
0 1 2 4 6 8 km
Legend
Water Quality/ Hydrology/Snow Station
Weather Station
NTS Boundary
Limited Use Road
Water Course
Contour
Water Body
Quartz Claim
Airstrip
Updated May 2012
NOTES:
Projection: UTM Zone 8 NAD83
Units: Meters
NTS: 106D01, 106D02, 106D07, 106D08
National Topographic Data Base (NTDB) compiled by Natural Resources Canada at a scale of 1:50,000. Cadastral data compiled by Natural Resources Canada. Reproduced under license from © Her Majesty the Queen in Right of Canada, Department of Natural Resources Canada. All rights reserved.
Quartz claim data obtained from Yukon Mining Recorder via http://www.geomaticsyukon.ca. Claim data current as of May 28, 2012
J. GIBSON ENVIRONMENTAL CONSULTING

Table 1. ATAC Resources - Tiger Project December, 2013.
Routine Chemistry and Field Measurement Results

		STATIONS								
Parameter	**Unit**	**RAU #1**	**RAU #2**	**RAU #3**	**RAU #4**	**RAU #5**	**RAU #6**	**RAU #7**	**DWQ* G.lines**	**Aquatic** G.lines**
Monitoring Frequency		**Quarterly**	**Quarterly**	**Monthly**	**Monthly**	**Quarterly**	**Not in Use**	**Quarterly**		
pH (field)	ru	8.09		8.51	8.14	7.43		7.71		
pH (lab)	ru	7.68	No	7.74	7.95	7.39		7.95	6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm	338	flow	405	364	583		346		
Water temperature	C	-0.1		0.1	0.6	-0.5		0.1		
Flow Volume(field)	cms	nr		nr	nr	nr		nr		
Organic Carbon Total	mg/L	0.8		1.2	0.6	1.5		0.6		
Cyanide Total	mg/L	<0.002		<0.002	<0.002	<0.002		<0.002	0.2	0.005
Phosphorus Total	mg/L	0.003		0.007	0.004	0.032		0.004		
Ammonia - N	mg/L	<0.01		0.02	0.01	0.02		<0.01		1.37-2.2
Nitrate - N	mg/L	0.2		0.2	0.27	0.15		0.39	10	
Nitrite - N	mg/L	<0.01		<0.01	<0.01	<0.01		<0.01	1	0.06
T-Alkalinity	mg/L	142		206	186	315		173		
Chloride	mg/L	0.11		0.16	0.11	0.53		0.1	<250	
Sulfate (SO4)	mg/L	48.7		31.8	29.2	45		34.8		
Hardness	mg CaCO3/L	211		260	237	389		224	<500	
Total Suspended Solids	mg/L	<2		<2	<2	19		<2		
Total Dissolved Solids	mg/L	238		262	236	382		228	<500	

All results and limits in mg/L unless noted otherwise. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L
Canadian Water Quality Guidelines

Table 1. ATAC Resources - Tiger Project December, 2013.
Routine Chemistry and Field Measurement Results

Parameter	Unit	STATIONS						DWQ* G.lines	Aquatic** G.lines
		RAU #8	RAU#9	RAU#10	RAU#11	RAU#12	RAU#13		
Monitoring Frequency		Quarterly	Monthly	Monthly	Monthly	Monthly	Monthly		
pH (field)	ru	8.18	7.95	8.03		7.93	7.94		
pH (lab)	ru	7.83	7.76	7.74	No	7.76	7.77	6.5-8.5	6.5-9
Electrical Conductivity (lab)	uS/cm	364	342	387	Flow	357	554		
Water temperature	C	0.2	0.2	0.1		0.0	-0.3		
Flow Volume(field)	cms	nr	nr	nr		0.002	nr		
Organic Carbon Total	mg/L	0.5	0.8	0.7		0.6	1.2		
Cyanide Total	mg/L	<0.002	<0.002	<0.002		<0.002	<0.002	0.2	0.005
Phosphorus Total	mg/L	<0.003	0.015	<0.003		0.003	0.006		
Ammonia - N	mg/L	<0.01	0.01	0.01		0.01	0.02		1.37-2.2
Nitrate - N	mg/L	0.28	0.3	0.19		0.43	0.25	10	
Nitrite - N	mg/L	<0.01	<0.01	<0.01		<0.01	<0.01	1	0.06
T-Alkalinity	mg/L	181	181	175		178	235		
Chloride	mg/L	0.13	0.08	0.88		0.06	7.14	<250	
Sulfate (SO4)	mg/L	36.7	24.4	47.6		24.3	82.9		
Hardness	mg CaCO3/L	240	229	247		225	344	<500	
Total Suspended Solids	mg/L	<2	4	<2		<2	<2		
Total Dissolved Solids	mg/L	240	234	256		234	378	<500	

All results and limits in mg/L unless noted otherwis. Nr = no sample/reading

DWQ* Guidelines are Maximum Acceptable Concentrations according to
Canadian Drinking Water Quality

Aquatic** Guidelines are for protection of aquatic life in waters with pH >6.5 and Hardness as CaC03 >180 mg/L

Table 2. ATAC Resources - Tiger Project December, 2013
Total Metals Analysis Results.

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L	67.2		68.1	57.6	99.3		47.2		
Iron	mg/L	0.014		0.11	0.022	0.921		0.025	0.3	0.3
Magnesium	mg/L	8.02		19.7	21.5	34.6		25.5		
Manganese	mg/L	0.0046		0.0154	0.0043	0.0632		0.0012	0.05	
Potassium	mg/L	0.3		1.4	0.8	1.3		0.1		
Silicon	mg/L	3.24		2.98	2.78	3.61		2.29		
Sulfur	mg/L									
Sodium	mg/L	1.5		1.2	0.8	1.3		0.7	<200	
Titanium	mg/L	<0.0005		0.001	<0.0005	0.0044		0.0005		
Aluminum	mg/L	0.005		0.023	0.01	0.128		0.015		0.1
Antimony	mg/L	<0.0001		<0.0001	<0.0001	0.001		<0.0001	0.006	
Arsenic	mg/L	0.0002		0.00075	0.00224	0.00138		0.00031	0.01	
Barium	mg/L	0.0865		0.117	0.134	0.167		0.161	1	
Beryllium	mg/L	<0.00005		<0.00005	<0.00005	<0.00005		<0.00005		
Bismuth	mg/L	<0.0001		<0.0001	<0.0001	<0.0001		<0.0001		
Boron	mg/L	<0.002		0.006	<0.002	<0.002		<0.002		
Cadmium	mg/L	0.00009		0.00005	0.00004	0.00085		0.00003	0.005	0.0018
Chromium	mg/L	<0.0005		<0.0005	<0.0005	<0.0005		<0.0005	0.05	0.002
Cobalt	mg/L	<0.0001		<0.0001	<0.0001	0.0006		<0.0001		
Copper	mg/L	0.0003		0.0015	0.0002	0.0016		0.0002	1	0.004
Lead	mg/L	<0.0001		<0.0001	<0.0001	0.0007		0.0002		
Lithium	mg/L	0.0016		0.0012	0.0009	0.0025		<0.0005		
Mercury	mg/L	<0.00001			<0.00001	<0.00001			0.001	
Molybdenum	mg/L	0.00194		0.00383	0.0014	0.0101		0.0002		
Nickel	mg/L	0.001		0.0009	<0.0002	0.0193		<0.0002		0.15
Selenium	mg/L	0.0042		0.002	0.0008	0.0046		0.0004	0.01	0.001
Silver	mg/L	<0.00005		<0.00005	<0.00005	<0.00005		<0.00005		0.0001
Strontium	mg/L	0.136		0.0903	0.0795	0.23		0.0427		
Tellurium	mg/L									
Thallium	mg/L	0.00001		<0.00001	<0.00001	0.00004		<0.00001		
Thorium	mg/L	0.00002		0.00001	<0.00001	0.00001		<0.00001		
Tin	mg/L	<0.0001		<0.0001	<0.0001	<0.0001		<0.0001		
Uranium	mg/L	0.00209		0.00327	0.00281	0.0175		0.0017	0.02	
Vanadium	mg/L	0.0002		0.0002	0.0001	0.0015		0.0002		
Zinc	mg/L	0.0046		0.0029	0.0079	0.127		0.0057	<5	0.03
Zirconium	mg/L	<0.0005		<0.0005	<0.0005	<0.0005		<0.0005		

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 2. ATAC Resources - Tiger Project December, 2013
Total Metals Analysis Results.

Parameter	Units	RAU #8	RAU#9	RAU#10	RAU #11	RAU#12	RAU#13	DWQ* G.Lines	Aquatic** G.Lines
Calcium	mg/L	57.9	59.5	55.7		58.6	93.2		
Iron	mg/L	0.009	0.117	0.019		0.017	0.393	0.3	0.3
Magnesium	mg/L	21.4	17.6	23.2		16.9	23.5		
Manganese	mg/L	0.0013	0.0294	0.0034		0.0013	0.0437	0.05	
Potassium	mg/L	0.3	0.7	0.6		0.8	2.3		
Silicon	mg/L	2.14	2.38	2.69		2.33	3.1		
Sulfur	mg/L								
Sodium	mg/L	0.7	0.7	2.4		0.7	4.4	<200	
Titanium	mg/L	<0.0005	0.0029	<0.0005		<0.0005	0.0005		
Aluminum	mg/L	<0.005	0.046	<0.005		<0.005	0.022		0.1
Antimony	mg/L	<0.0001	<0.0001	<0.0001		<0.0001	0.0001	0.006	
Arsenic	mg/L	0.00028	0.00648	0.00017		0.00874	0.00121	0.01	
Barium	mg/L	0.183	0.18	0.08		0.153	0.103	1	
Beryllium	mg/L	<0.00005	<0.00005	<0.00005		<0.00005	<0.00005		
Bismuth	mg/L	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001		
Boron	mg/L	<0.002	<0.002	0.003		<0.002	0.018		
Cadmium	mg/L	0.00016	0.00003	0.00001		0.00002	0.00076	0.005	0.0018
Chromium	mg/L	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005	0.05	0.002
Cobalt	mg/L	<0.0001	<0.0001	<0.0001		<0.0001	0.0004		
Copper	mg/L	0.0003	0.0003	0.0003		0.0002	0.0013	1	0.004
Lead	mg/L	<0.0001	0.0002	<0.0001		<0.0001	<0.0001		
Lithium	mg/L	0.0008	<0.0005	0.0027		<0.0005	0.0054		
Mercury	mg/L	<0.00001		<0.00001		<0.00001		0.001	
Molybdenum	mg/L	0.00079	0.00184	0.00091		0.00231	0.00687		
Nickel	mg/L	0.0021	0.0002	0.0013		0.0007	0.0336		0.15
Selenium	mg/L	0.0021	0.0003	0.0007		0.0004	0.0047	0.01	0.001
Silver	mg/L	<0.00005	<0.00005	<0.00005		<0.00005	<0.00005		0.0001
Strontium	mg/L	0.0637	0.0789	0.16		0.0838	0.236		
Tellurium	mg/L								
Thallium	mg/L	<0.00001	<0.00001	<0.00001		<0.00001	0.00003		
Thorium	mg/L	<0.00001	<0.00001	<0.00001		<0.00001	<0.00001		
Tin	mg/L	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001		
Uranium	mg/L	0.00552	0.00184	0.0013		0.00189	0.00904	0.02	
Vanadium	mg/L	<0.0001	0.0002	<0.0001		<0.0001	0.0003		
Zinc	mg/L	0.065	0.0061	0.0019		0.0033	0.145	<5	0.03
Zirconium	mg/L	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005		

nr=no sample or analysis done

Exceeds either Guideline Limit

Table 3. ATAC Resources - Tiger Project December, 2013.
Dissolved Metals Analysis Results

Parameter	Units	RAU #1	RAU #2	RAU #3	RAU #4	RAU #5	RAU #6	RAU #7
Calcium	mg/L	70.5		70.6	58.6	99		47.7
Iron	mg/L	<0.005		0.047	0.014	0.37		<0.005
Magnesium	mg/L	8.53		20.4	22	34.4		25.6
Manganese	mg/L	<0.001		<0.001	<0.001	0.035		<0.001
Potassium	mg/L	0.5		1.5	1	1.4		0.2
Silicon	mg/L	2.9		2.66	2.52	3.03		2.01
Sodium	mg/L	1.6		1.3	0.9	1.4		0.8
Sulfur	mg/L	15.7		10.8	10	15.3		11.7
Aluminum	mg/L	<0.005		<0.005	<0.005	<0.005		<0.005
Antimony	mg/L	<0.0002		<0.0002	<0.0002	0.001		<0.0002
Arsenic	mg/L	<0.0002		0.0006	0.0021	0.0008		0.0002
Barium	mg/L	0.082		0.11	0.122	0.142		0.152
Beryllium	mg/L	<0.00004		<0.00004	<0.00004	<0.00004		<0.00004
Bismuth	mg/L	<0.001		<0.001	<0.001	<0.001		<0.001
Boron	mg/L	<0.004		0.005	<0.004	<0.004		<0.004
Cadmium	mg/L	0.00011		0.00004	0.00002	0.00033		0.00002
Chromium	mg/L	<0.0004		<0.0004	<0.0004	<0.0004		<0.0004
Cobalt	mg/L	0.00007		0.00006	0.00005	0.00034		0.00004
Copper	mg/L	<0.001		<0.001	<0.001	0.001		<0.001
Lead	mg/L	<0.0001		<0.0001	<0.0001	<0.0001		<0.0001
Lithium	mg/L	0.002		0.002	0.001	0.003		<0.001
Molybdenum	mg/L	0.0017		0.00348	0.0012	0.00953		0.00015
Nickel	mg/L	0.002		0.002	<0.001	0.016		<0.001
Selenium	mg/L	0.0042		0.0018	<0.0006	0.005		<0.0006
Silver	mg/L	<0.00001		<0.00001	<0.00001	<0.00001		<0.00001
Strontium	mg/L	0.13		0.088	0.074	0.22		0.04
Titanium	mg/L	<0.010		<0.010	<0.010	<0.010		<0.010
Tellurium	mg/L	<0.0001		<0.0001	<0.0001	<0.0001		<0.0001
Thallium	mg/L	<0.00001		<0.00001	<0.00001	0.00002		<0.00001
Thorium	mg/L	<0.0004		<0.0004	<0.0004	<0.0004		<0.0004
Tin	mg/L	<0.0001		<0.0001	<0.0001	<0.0001		<0.0001
Uranium	mg/L	0.0019		0.0031	0.0025	0.0147		0.0017
Vanadium	mg/L	0.00038		0.0004	0.0003	0.00108		0.00037
Zinc	mg/L	0.006		0.003	0.007	0.095		0.004
Zirconium	mg/L	<0.00010		0.00011	<0.00010	0.0001		<0.00010

Table 3 ATAC Resources - Tiger Project December, 2013.
Dissolved Metals Analysis Results

Parameter	Units	RAU #8	RAU #9	RAU #10	RAU #11	RAU #12	RAU #13
Calcium	mg/L	59.8	61.4	58.6		60.7	97.2
Iron	mg/L	<0.005	<0.005	<0.005		<0.005	0.038
Magnesium	mg/L	22.1	18.4	24.4		17.8	24.6
Manganese	mg/L	<0.001	0.002	<0.001		<0.001	0.032
Potassium	mg/L	0.4	0.8	0.8		1	2.5
Silicon	mg/L	1.92	2.07	2.41		2.06	2.78
Sodium	mg/L	0.9	0.8	2.4		0.8	3.8
Sulfur	mg/L	12.4	8.2	16.1		8.5	25.4
Aluminum	mg/L	<0.005	<0.005	<0.005		<0.005	0.005
Antimony	mg/L	<0.0002	<0.0002	<0.0002		<0.0002	<0.0002
Arsenic	mg/L	0.0002	0.0063	<0.0002		0.008	0.0005
Barium	mg/L	0.173	0.167	0.075		0.144	0.096
Beryllium	mg/L	<0.00004	<0.00004	<0.00004		<0.00004	<0.00004
Bismuth	mg/L	<0.001	<0.001	<0.001		<0.001	<0.001
Boron	mg/L	<0.004	<0.004	<0.004		<0.004	0.015
Cadmium	mg/L	0.00016	0.00003	0.00003		<0.00001	0.00069
Chromium	mg/L	<0.0004	<0.0004	<0.0004		<0.0004	<0.0004
Cobalt	mg/L	0.00005	0.00006	0.00006		0.00005	0.00043
Copper	mg/L	<0.001	<0.001	<0.001		<0.001	<0.001
Lead	mg/L	<0.0001	<0.0001	<0.0001		<0.0001	0.0001
Lithium	mg/L	<0.001	<0.001	0.003		<0.001	0.006
Molybdenum	mg/L	0.00067	0.00162	0.00077		0.00191	0.00608
Nickel	mg/L	0.003	0.001	0.002		0.001	0.032
Selenium	mg/L	0.0019	<0.0006	<0.0006		<0.0006	0.005
Silver	mg/L	<0.00001	<0.00001	<0.00001		<0.00001	<0.00001
Strontium	mg/L	0.061	0.075	0.153		0.076	0.221
Titanium	mg/L	<0.010	<0.010	<0.010		<0.010	<0.010
Tellurium	mg/L	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001
Thallium	mg/L	<0.00001	<0.00001	<0.00001		<0.00001	0.00003
Thorium	mg/L	<0.0004	<0.0004	<0.0004		<0.0004	<0.0004
Tin	mg/L	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001
Uranium	mg/L	0.0051	0.0016	0.0012		0.0017	0.0083
Vanadium	mg/L	0.00032	0.00033	0.0003		0.00024	0.00043
Zinc	mg/L	0.065	0.003	0.002		0.003	0.138
Zirconium	mg/L	<0.00010	<0.00010	<0.00010		<0.00010	0.00012

Table 4. ATAC RESOURCES - Summary of Tiger Project Station Flow Volumes 2012-2013

	Date															
Station	**Apr-12**	**May-12**	**Jun-12**	**Jul-12**	**Sep-12**	**Oct-12**	**Dec-12**	**Jan-13**	**Mar-13**	**Apr-13**	**May-13**	**Jun-13**	**Jul-13**	**Aug-13**	**Sep-13**	**Oct-13**	**Nov-13**
Rau #1	nr	0.5253	0.6291	0.3773	0.2533	0.1604	nr	nr	nr	nr	nr	0.3911	nr	0.1397	0.3204		
Rau #2	nr	nr	nr	nr	0.0977	nr	nr	nr	nr	nr	nr	0.1707	nr	nr	0.1825		
Rau #3		nr	0.4218	0.3497	0.185	0.1282	nr	nr	nr	nr	nr	nr	0.1035	0.0883	0.2417		
Rau #4	0.0473	0.0976	0.1152	0.0895	0.062	0.0546	0.05 e	0.046	0.0296	0.0395	0.0781	0.0599	0.0346	0.036	0.0531	0.0454	0.0348
Rau #5	nr	0.0728	nr	nr	0.034	nr	nr	nr	nr	nr	nr	nr	nr	nr	0.021		
Rau #6	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr		
Rau #7	nr	0.0229	nr	nr	0.023	nr	nr	nr	nr	nr	nr	nr	nr	nr	0.0224		
Rau #8	nr	0.1557	nr	nr	0.179	nr	nr	nr	nr	dry	nr	nr	nr	nr	0.2838		
Rau #9	0.0052	0.0186	0.0463	0.0199	0.0064	0.0188	glacial ice	glacial ice	glacial ice	glacial ice	glacial ice	0.0336	0.0183	0.0101	0.0088		
Rau #10	12.31	nr	nr	nr	nr	nr	nr	nr	nr	4.76	nr	nr	nr	nr	nr		
Rau #11	<0.0001	<0.0001	0.0354	0.0092	0.0009	<0.0005	dry	dry	dry	dry	0.002	0.0066	0.0071	0.0005	0.00001		
Rau #12	0.00086	0.0045	0.0103	0.0076	0.0045	0.0036	0.04 e	0.04 e	nr	0.001	0.003	0.0076	0.0018	0.0017	0.0014		
Rau #13	0.0784	0.5546	0.474	0.3597	0.233	0.1864	0.10e	0.033	0.0206	nr	0.584	0.3031	0.1397	0.1364	0.33	0.1777	

Table 5. Quality Control Samples December 2013, Tiger Claims
Total and Dissolved Metals Analysis - Duplicate Samples

Parameter	Units	RAU #13	RAU #13 Duplicate	RAU #13	RAU #13 Duplicate
		Total Metals		Dissolved Metals	
Calcium	mg/L	93.2	93.8	97.2	96.4
Iron	mg/L	0.393	0.389	0.038	0.09
Magnesium	mg/L	23.5	23.6	24.6	24.6
Manganese	mg/L	0.0437	0.0441	0.032	0.032
Potassium	mg/L	2.3	2.3	2.5	2.4
Silicon	mg/L	3.1	3.1	2.78	2.78
Sulfur	mg/L			25.4	25.6
Sodium	mg/L	4.4	4.2	3.8	4.2
Titanium	mg/L	0.0005	<0.0005	<0.010	<0.010
Aluminum	mg/L	0.022	0.019	0.005	<0.005
Antimony	mg/L	0.0001	0.0001	<0.0002	<0.0002
Arsenic	mg/L	0.00121	0.00122	0.0005	0.0005
Barium	mg/L	0.103	0.102	0.096	0.095
Beryllium	mg/L	<0.00005	<0.00005	<0.00004	<0.00004
Bismuth	mg/L	<0.0001	<0.0001	<0.001	<0.001
Boron	mg/L	0.018	0.018	0.015	0.016
Cadmium	mg/L	0.00076	0.00074	0.00069	0.00066
Chromium	mg/L	<0.0005	<0.0005	<0.0004	<0.0004
Cobalt	mg/L	0.0004	0.0004	0.00043	0.00044
Copper	mg/L	0.0013	0.0013	<0.001	<0.001
Lead	mg/L	<0.0001	<0.0001	0.0001	<0.0001
Lithium	mg/L	0.0054	0.0053	0.006	0.006
Mercury	mg/L				
Molybdenum	mg/L	0.00687	0.00692	0.00608	0.00612
Nickel	mg/L	0.0336	0.034	0.032	0.032
Selenium	mg/L	0.0047	0.0048	0.005	0.0051
Silver	mg/L	<0.00005	<0.00005	<0.00001	<0.00001
Strontium	mg/L	0.236	0.233	0.221	0.225
Tellurium	mg/L			<0.0001	<0.0001
Thallium	mg/L	0.00003	0.00003	0.00003	0.00003
Thorium	mg/L	<0.00001	<0.00001	<0.0004	<0.0004
Tin	mg/L	<0.0001	<0.0001	<0.0001	<0.0001
Uranium	mg/L	0.00904	0.00921	0.0083	0.0081
Vanadium	mg/L	0.0003	0.0003	0.00043	0.00036
Zinc	mg/L	0.145	0.149	0.138	0.138
Zirconium	mg/L	<0.0005	<0.0005	0.00012	0.00011

Denote >10% variation between samples

Also listed are the ***Canadian Drinking Water Guideline*** Maximum Acceptable Concentrations (MAC's) for applicable parameters.

All ***Guideline*** metal values are for total metals.

Analysis values that exceed either ***Guideline*** limit are highlighted in yellow.

Laboratory Analytical Reports are contained in Appendix 1.

Water Quality Summary

December 2013 (Monthly and Quarterly Stations)

Stations RAU #4, #7, #9, #10, and #12 met all ***Aquatic and Drinking Water Guidelines*** parameters limits.

Station RAU #1 exceeds the ***Aquatic Guidelines*** for selenium.

Station RAU #3 exceeds the ***Aquatic Guidelines*** for iron and selenium; and the ***Drinking Water Guidelines*** for iron.

Station RAU #5 exceeds the ***Aquatic Guideline***s for iron, aluminum, selenium and zinc; and the ***Drinking Water Guidelines*** for iron and manganese.

Station RAU #8 exceeds the ***Aquatic Guidelines*** for selenium and zinc.

Station RAU #13 exceeds the ***Aquatic Guideline***s for iron, selenium and zinc; and the ***Drinking Water Guidelines*** for iron.

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Weather Station Data Logger

The weather station / data logger was downloaded in December.

The perimeter fence of rebar and snow fencing was intact with some disturbance.

A 2013 weather data report will be issued after January 1, 2014.

Ice Crossings – Scoudale Creek and Beaver River

Scoudale Creek had very limited ice cover. Both banks had less than 1 cm ice depth under snow cover. Ice depth in mid channel was less than 10 cm (including overflow ice).
A dry shelf extended 4 meters out from the right bank.
Animal tracks did not cross the channel.

The 2013 Beaver River ice cross section is located approximately 80 meters downstream of the 2012 drilled cross section.
The Beaver River had ice depths of 0.34 meter to 0.80 meters thickness. The right bank and out 30 meters width is sandbar. Water depth greater than 0.1 meters was not encountered until the 50 meter width mark.
Flow was found between the 50 to 72 meters width, more flow / less ice.
Maximum water depth was 0.81 meters.

Ice measurement results are listed in Table 6.

Table 6. Ice Crossing Measurements 2013/2014.

Scoudale Creek

Date: 09-Dec-13 **Temperature:** - 18 C

UTM Coords:	7111956 mN	Lat/Longs	64 08.042
	505737 mE		134 52.928

	Distance (m)	Total Depth (m)	Ice Depth (m)	Water Depth (m)	Notes
R.Bank	0	0	0	0	
	4.0	Ice shelf - dry beneath			
	4.3	0.35	0	0.35	snow ontop light ice crust
	4.55	0.42	0.05	0.38	
	6.0	0.75	0.1	0.65	
	6 +	poor ice conditions - open water against left bank			
		animal tracks do not cross the channel.			

Beaver River

Date: 09-Dec-13 **Temperature:** - 20 C

UTM Coords:	7120553 mN	Approx 80 m downstream of site
	513889 mE	drilled in 2012

	Distance (m)	Total Depth (m)	Ice Depth (m)	Water Depth (m)	Notes
R.Bank	0.9	0	0	0	
	30.0	sandbar 0.9 to 30.0 m			
	38.0	0.51	0.51	0	
	41.0	0.48	0.48	0	overflow/white ice 0.2 m
	44.0	0.56	0.54	0.02	
	47.0	0.64	0.60	0.04	
	50.0	0.85	0.80	0.05	
	54.0	1.06	0.55	0.51	overflow/white ice 0.05 m
	57.0	1.12	0.36	0.76	
	60.0	1.15	0.34	0.81	
	65.0	1.05	0.34	0.71	
	69.0	1.08	0.38	0.70	
	72.0	0	0	0	

Note: Right Bank determined while looking downstream
White ice / overflow ice 50% strength of clear ice

Appendix #1

Laboratory Analytical Reports

Surface Waters December, 2013

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Report Transmission Cover Page

Bill To:	J. Gibson & Associates	Project:	
Report To:	J. Gibson & Associates	ID:	ATAC Resources
	Box 20913	Name:	Tiger Project
	Whitehorse, YT, Canada	Location:	
	Y1A 6P2	LSD:	
Attn:	John Gibson	P.O.:	
Sampled By:	J.Gibson	Acct code:	
Company:			

Lot ID:	**976847**
Control Number:	B14631
Date Received:	Dec 12, 2013
Date Reported:	Dec 18, 2013
Report Number:	1883651

Contact & Affiliation	Address	Delivery Commitments
John Gibson J. Gibson & Associates	, Box 20913 Whitehorse, Yukon Territory Y1A 6P2 Phone: (867) 633-4522 Fax: (867) 668-6895 Email: ludditegibson@gmail.com	On [Lot Verification] send (COA) by Email - Single Report On [Report Approval] send (COC, Test Report) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report On [Lot Creation] send (COR) by Email - Single Report

Notes To Clients:

- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.

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Exova

Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **976847**
Control Number: B14631
Date Received: Dec 12, 2013
Date Reported: Dec 18, 2013
Report Number: 1883651

		Reference Number	976847-1	976847-2	976847-3	
		Sample Date	Dec 09, 2013	Dec 08, 2013	Dec 09, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surf. / RAU #1	Surf. / RAU #3	Surf. / RAU #4	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	0.8	1.2	0.6	0.5
Cyanide	Total	mg/L	<0.002	<0.002	<0.002	0.002
Ammonia - N		mg/L	<0.01	0.02	0.01	.01
Phosphorus	Total	mg/L	0.003	0.007	0.004	0.003
Metals Dissolved						
Sulfur	Dissolved	mg/L	15.7	10.8	10.0	0.2
Aluminum	Dissolved	mg/L	<0.005	<0.005	<0.005	0.005
Antimony	Dissolved	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Dissolved	mg/L	<0.0002	0.0006	0.0021	0.0002
Barium	Dissolved	mg/L	0.082	0.110	0.122	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	<0.004	0.005	<0.004	0.004
Cadmium	Dissolved	mg/L	0.00011	0.00004	0.00002	0.00001
Chromium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Cobalt	Dissolved	mg/L	0.00007	0.00006	0.00005	0.00002
Copper	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Lead	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L	0.002	0.002	0.001	0.001
Molybdenum	Dissolved	mg/L	0.00170	0.00348	0.00120	0.0001
Nickel	Dissolved	mg/L	0.002	0.002	<0.001	0.001
Selenium	Dissolved	mg/L	0.0042	0.0018	<0.0006	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L	0.130	0.088	0.074	0.001
Tellurium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L	0.0019	0.0031	0.0025	0.0004
Vanadium	Dissolved	mg/L	0.00038	0.00040	0.00030	0.0001
Zinc	Dissolved	mg/L	0.006	0.003	0.007	0.001
Zirconium	Dissolved	mg/L	<0.00010	0.00011	<0.00010	0.0001
Metals Total						
Mercury	Total	mg/L	<0.00001		<0.00001	0.00001
Aluminum	Total	mg/L	0.005	0.023	0.010	0.005

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **976847**
Control Number: B14631
Date Received: Dec 12, 2013
Date Reported: Dec 18, 2013
Report Number: 1883651

	Reference Number	976847-1	976847-2	976847-3	
	Sample Date	Dec 09, 2013	Dec 08, 2013	Dec 09, 2013	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Surf. / RAU #1	Surf. / RAU #3	Surf. / RAU #4	
	Matrix	Water	Water	Water	
Analyte	**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued					
Antimony Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Arsenic Total	mg/L	0.00020	0.00075	0.00224	0.00005
Barium Total	mg/L	0.0865	0.117	0.134	0.00005
Beryllium Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Bismuth Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Boron Total	mg/L	<0.002	0.006	<0.002	.002
Cadmium Total	mg/L	0.00009	0.00005	0.00004	0.00001
Calcium Total	mg/L	67.2	68.1	57.6	0.05
Chromium Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Cobalt Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Copper Total	mg/L	0.0003	0.0015	0.0002	0.0001
Iron Total	mg/L	0.014	0.110	0.022	0.002
Lead Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium Total	mg/L	0.0016	0.0012	0.0009	0.0005
Magnesium Total	mg/L	8.02	19.7	21.5	0.04
Manganese Total	mg/L	0.0046	0.0154	0.0043	0.001
Molybdenum Total	mg/L	0.00194	0.00383	0.00140	0.00005
Nickel Total	mg/L	0.0010	0.0009	<0.0002	0.0002
Potassium Total	mg/L	0.3	1.4	0.8	0.1
Selenium Total	mg/L	0.0042	0.0020	0.0008	0.0001
Silicon Total	mg/L	3.24	2.98	2.78	0.02
Silver Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Sodium Total	mg/L	1.5	1.2	0.8	0.1
Strontium Total	mg/L	0.136	0.0903	0.0795	0.0001
Thallium Total	mg/L	0.00001	<0.00001	<0.00001	0.00001
Thorium Total	mg/L	0.00002	0.00001	<0.00001	0.00001
Tin Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Titanium Total	mg/L	<0.0005	0.0010	<0.0005	0.0005
Uranium Total	mg/L	0.00209	0.00327	0.00281	0.00001
Vanadium Total	mg/L	0.0002	0.0002	0.0001	0.0001
Zinc Total	mg/L	0.0046	0.0029	0.0079	0.0005
Zirconium Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Hardness as CaCO3	mg/L	201	251	232	1
Physical and Aggregate Properties					
Solids Total Suspended	mg/L	<2	<2	<2	1
Solids Total Dissolved	mg/L	238	262	236	5

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Analytical Report

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**976847**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B14631
	Box 20913	Name:	Tiger Project	Date Received:	Dec 12, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Dec 18, 2013
	Y1A 6P2	LSD:		Report Number:	1883651
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

			Reference Number	976847-1	976847-2	976847-3	
			Sample Date	Dec 09, 2013	Dec 08, 2013	Dec 09, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	Surf. / RAU #1	Surf. / RAU #3	Surf. / RAU #4	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water							
pH	at 25 °C			7.68	7.74	7.95	
Electrical Conductivity		µS/cm at 25 C		338	405	364	1
Calcium	Dissolved	mg/L		70.5	70.6	58.6	0.1
Iron	Dissolved	mg/L		<0.005	0.047	0.014	0.005
Magnesium	Dissolved	mg/L		8.53	20.4	22.0	0.1
Manganese	Dissolved	mg/L		<0.001	<0.001	<0.001	0.001
Potassium	Dissolved	mg/L		0.5	1.5	1.0	0.1
Silicon	Dissolved	mg/L		2.90	2.66	2.52	0.05
Sodium	Dissolved	mg/L		1.6	1.3	0.9	0.1
Bicarbonate		mg/L		173	251	227	5
Carbonate		mg/L		<6	<6	<6	6
Hydroxide		mg/L		<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L		<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L		142	206	186	5
Chloride	Dissolved	mg/L		0.11	0.16	0.11	0.05
Nitrate - N	Dissolved	mg/L		0.20	0.20	0.27	0.01
Nitrite - N	Dissolved	mg/L		<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L		48.7	31.8	29.2	0.5
Hardness	as CaCO3	mg/L		211	260	237	5

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **976847**
Control Number: B14631
Date Received: Dec 12, 2013
Date Reported: Dec 18, 2013
Report Number: 1883651

	Reference Number	976847-4	976847-5	976847-6	
	Sample Date	Dec 09, 2013	Dec 09, 2013	Dec 09, 2013	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Surf. / RAU #5	Surf. / RAU #7	Surf. / RAU #8	
	Matrix	Water	Water	Water	
Analyte	**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters					
Organic Carbon Total Nonpurgeable	mg/L	1.5	0.6	0.5	0.5
Cyanide Total	mg/L	<0.002	<0.002	<0.002	0.002
Ammonia - N	mg/L	0.02	<0.01	<0.01	.01
Phosphorus Total	mg/L	0.032	0.004	<0.003	0.003
Metals Dissolved					
Sulfur Dissolved	mg/L	15.3	11.7	12.4	0.2
Aluminum Dissolved	mg/L	<0.005	<0.005	<0.005	0.005
Antimony Dissolved	mg/L	0.0010	<0.0002	<0.0002	0.0002
Arsenic Dissolved	mg/L	0.0008	0.0002	0.0002	0.0002
Barium Dissolved	mg/L	0.142	0.152	0.173	0.001
Beryllium Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron Dissolved	mg/L	<0.004	<0.004	<0.004	0.004
Cadmium Dissolved	mg/L	0.00033	0.00002	0.00016	0.00001
Chromium Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Cobalt Dissolved	mg/L	0.00034	0.00004	0.00005	0.00002
Copper Dissolved	mg/L	0.001	<0.001	<0.001	0.001
Lead Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium Dissolved	mg/L	0.003	<0.001	<0.001	0.001
Molybdenum Dissolved	mg/L	0.00953	0.00015	0.00067	0.0001
Nickel Dissolved	mg/L	0.016	<0.001	0.003	0.001
Selenium Dissolved	mg/L	0.0050	<0.0006	0.0019	0.0006
Silver Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium Dissolved	mg/L	0.220	0.040	0.061	0.001
Tellurium Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium Dissolved	mg/L	0.00002	<0.00001	<0.00001	0.00001
Thorium Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium Dissolved	mg/L	0.0147	0.0017	0.0051	0.0004
Vanadium Dissolved	mg/L	0.00108	0.00037	0.00032	0.0001
Zinc Dissolved	mg/L	0.095	0.004	0.065	0.001
Zirconium Dissolved	mg/L	0.00010	<0.00010	<0.00010	0.0001
Metals Total					
Mercury Total	mg/L	<0.00001		<0.00001	0.00001
Aluminum Total	mg/L	0.128	0.015	<0.005	0.005

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **976847**
Control Number: B14631
Date Received: Dec 12, 2013
Date Reported: Dec 18, 2013
Report Number: 1883651

		Reference Number	976847-4	976847-5	976847-6	
		Sample Date	Dec 09, 2013	Dec 09, 2013	Dec 09, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surf. / RAU #5	Surf. / RAU #7	Surf. / RAU #8	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued						
Antimony	Total	mg/L	0.0010	<0.0001	<0.0001	0.0001
Arsenic	Total	mg/L	0.00138	0.00031	0.00028	0.00005
Barium	Total	mg/L	0.167	0.161	0.183	0.00005
Beryllium	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Bismuth	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Boron	Total	mg/L	<0.002	<0.002	<0.002	.002
Cadmium	Total	mg/L	0.00085	0.00003	0.00016	0.00001
Calcium	Total	mg/L	99.3	47.2	57.9	0.05
Chromium	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Cobalt	Total	mg/L	0.0006	<0.0001	<0.0001	0.0001
Copper	Total	mg/L	0.0016	0.0002	0.0003	0.0001
Iron	Total	mg/L	0.921	0.025	0.009	0.002
Lead	Total	mg/L	0.0007	0.0002	<0.0001	0.0001
Lithium	Total	mg/L	0.0025	<0.0005	0.0008	0.0005
Magnesium	Total	mg/L	34.6	25.5	21.4	0.04
Manganese	Total	mg/L	0.0632	0.0012	0.0013	0.001
Molybdenum	Total	mg/L	0.0101	0.00020	0.00079	0.00005
Nickel	Total	mg/L	0.0193	<0.0002	0.0021	0.0002
Potassium	Total	mg/L	1.3	0.1	0.3	0.1
Selenium	Total	mg/L	0.0046	0.0004	0.0021	0.0001
Silicon	Total	mg/L	3.61	2.29	2.14	0.02
Silver	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Sodium	Total	mg/L	1.3	0.7	0.7	0.1
Strontium	Total	mg/L	0.230	0.0427	0.0637	0.0001
Thallium	Total	mg/L	0.00004	<0.00001	<0.00001	0.00001
Thorium	Total	mg/L	0.00001	<0.00001	<0.00001	0.00001
Tin	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Titanium	Total	mg/L	0.0044	0.0005	<0.0005	0.0005
Uranium	Total	mg/L	0.0175	0.00170	0.00552	0.00001
Vanadium	Total	mg/L	0.0015	0.0002	<0.0001	0.0001
Zinc	Total	mg/L	0.127	0.0057	0.0650	0.0005
Zirconium	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Hardness	as CaCO3	mg/L	391	223	232	1
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	19	<2	<2	1
Solids	Total Dissolved	mg/L	382	228	240	5

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **976847**
Control Number: B14631
Date Received: Dec 12, 2013
Date Reported: Dec 18, 2013
Report Number: 1883651

			Reference Number	976847-4	976847-5	976847-6	
			Sample Date	Dec 09, 2013	Dec 09, 2013	Dec 09, 2013	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	Surf. / RAU #5	Surf. / RAU #7	Surf. / RAU #8	
			Matrix	Water	Water	Water	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water							
pH	at 25 °C			7.39	7.95	7.83	
Electrical Conductivity		µS/cm at 25 C		583	346	364	1
Calcium	Dissolved	mg/L		99.0	47.7	59.8	0.1
Iron	Dissolved	mg/L		0.370	<0.005	<0.005	0.005
Magnesium	Dissolved	mg/L		34.4	25.6	22.1	0.1
Manganese	Dissolved	mg/L		0.035	<0.001	<0.001	0.001
Potassium	Dissolved	mg/L		1.4	0.2	0.4	0.1
Silicon	Dissolved	mg/L		3.03	2.01	1.92	0.05
Sodium	Dissolved	mg/L		1.4	0.8	0.9	0.1
Bicarbonate		mg/L		384	212	221	5
Carbonate		mg/L		<6	<6	<6	6
Hydroxide		mg/L		<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L		<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L		315	173	181	5
Chloride	Dissolved	mg/L		0.53	0.10	0.13	0.05
Nitrate - N	Dissolved	mg/L		0.15	0.39	0.28	0.01
Nitrite - N	Dissolved	mg/L		<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L		45.0	34.8	36.7	0.5
Hardness	as CaCO3	mg/L		389	224	240	5

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Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **976847**
Control Number: B14631
Date Received: Dec 12, 2013
Date Reported: Dec 18, 2013
Report Number: 1883651

	Reference Number	976847-7	976847-8	976847-9	
	Sample Date	Dec 08, 2013	Dec 08, 2013	Dec 08, 2013	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Surf. / RAU #9	Surf. / RAU #10	Surf. / RAU #12	
	Matrix	Water	Water	Water	
Analyte	**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters					
Organic Carbon Total Nonpurgeable	mg/L	0.8	0.7	0.6	0.5
Cyanide Total	mg/L	<0.002	<0.002	<0.002	0.002
Ammonia - N	mg/L	0.01	0.01	0.01	.01
Phosphorus Total	mg/L	0.015	<0.003	0.003	0.003
Metals Dissolved					
Sulfur Dissolved	mg/L	8.2	16.1	8.5	0.2
Aluminum Dissolved	mg/L	<0.005	<0.005	<0.005	0.005
Antimony Dissolved	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic Dissolved	mg/L	0.0063	<0.0002	0.0080	0.0002
Barium Dissolved	mg/L	0.167	0.075	0.144	0.001
Beryllium Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron Dissolved	mg/L	<0.004	<0.004	<0.004	0.004
Cadmium Dissolved	mg/L	0.00003	0.00003	<0.00001	0.00001
Chromium Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Cobalt Dissolved	mg/L	0.00006	0.00006	0.00005	0.00002
Copper Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Lead Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium Dissolved	mg/L	<0.001	0.003	<0.001	0.001
Molybdenum Dissolved	mg/L	0.00162	0.00077	0.00191	0.0001
Nickel Dissolved	mg/L	0.001	0.002	0.001	0.001
Selenium Dissolved	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Silver Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium Dissolved	mg/L	0.075	0.153	0.076	0.001
Tellurium Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium Dissolved	mg/L	0.0016	0.0012	0.0017	0.0004
Vanadium Dissolved	mg/L	0.00033	0.00030	0.00024	0.0001
Zinc Dissolved	mg/L	0.003	0.002	0.003	0.001
Zirconium Dissolved	mg/L	<0.00010	<0.00010	<0.00010	0.0001
Metals Total					
Mercury Total	mg/L		<0.00001	<0.00001	0.00001
Aluminum Total	mg/L	0.046	<0.005	<0.005	0.005

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **976847**
Control Number: B14631
Date Received: Dec 12, 2013
Date Reported: Dec 18, 2013
Report Number: 1883651

	Reference Number	976847-7	976847-8	976847-9	
	Sample Date	Dec 08, 2013	Dec 08, 2013	Dec 08, 2013	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Surf. / RAU #9	Surf. / RAU #10	Surf. / RAU #12	
	Matrix	Water	Water	Water	
Analyte	**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued					
Antimony Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Arsenic Total	mg/L	0.00648	0.00017	0.00874	0.00005
Barium Total	mg/L	0.180	0.0800	0.153	0.00005
Beryllium Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Bismuth Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Boron Total	mg/L	<0.002	0.003	<0.002	.002
Cadmium Total	mg/L	0.00003	0.00001	0.00002	0.00001
Calcium Total	mg/L	59.5	55.7	58.6	0.05
Chromium Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Cobalt Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Copper Total	mg/L	0.0003	0.0003	0.0002	0.0001
Iron Total	mg/L	0.117	0.019	0.017	0.002
Lead Total	mg/L	0.0002	<0.0001	<0.0001	0.0001
Lithium Total	mg/L	<0.0005	0.0027	<0.0005	0.0005
Magnesium Total	mg/L	17.6	23.2	16.9	0.04
Manganese Total	mg/L	0.0294	0.0034	0.0013	0.001
Molybdenum Total	mg/L	0.00184	0.00091	0.00231	0.00005
Nickel Total	mg/L	0.0002	0.0013	0.0007	0.0002
Potassium Total	mg/L	0.7	0.6	0.8	0.1
Selenium Total	mg/L	0.0003	0.0007	0.0004	0.0001
Silicon Total	mg/L	2.38	2.69	2.33	0.02
Silver Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Sodium Total	mg/L	0.7	2.4	0.7	0.1
Strontium Total	mg/L	0.0789	0.160	0.0838	0.0001
Thallium Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Tin Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Titanium Total	mg/L	0.0029	<0.0005	<0.0005	0.0005
Uranium Total	mg/L	0.00184	0.00130	0.00189	0.00001
Vanadium Total	mg/L	0.0002	<0.0001	<0.0001	0.0001
Zinc Total	mg/L	0.0061	0.0019	0.0033	0.0005
Zirconium Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Hardness as CaCO3	mg/L	221	234	216	1
Physical and Aggregate Properties					
Solids Total Suspended	mg/L	4	<2	<2	1
Solids Total Dissolved	mg/L	234	256	234	5

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Analytical Report

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**976847**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B14631
	Box 20913	Name:	Tiger Project	Date Received:	Dec 12, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Dec 18, 2013
	Y1A 6P2	LSD:		Report Number:	1883651
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

		Reference Number	976847-7	976847-8	976847-9	
		Sample Date	Dec 08, 2013	Dec 08, 2013	Dec 08, 2013	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Surf. / RAU #9	Surf. / RAU #10	Surf. / RAU #12	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water						
pH	at 25 °C		7.76	7.74	7.76	
Electrical Conductivity		µS/cm at 25 C	342	387	357	1
Calcium	Dissolved	mg/L	61.4	58.6	60.7	0.1
Iron	Dissolved	mg/L	<0.005	<0.005	<0.005	0.005
Magnesium	Dissolved	mg/L	18.4	24.4	17.8	0.1
Manganese	Dissolved	mg/L	0.002	<0.001	<0.001	0.001
Potassium	Dissolved	mg/L	0.8	0.8	1.0	0.1
Silicon	Dissolved	mg/L	2.07	2.41	2.06	0.05
Sodium	Dissolved	mg/L	0.8	2.4	0.8	0.1
Bicarbonate		mg/L	220	213	217	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	181	175	178	5
Chloride	Dissolved	mg/L	0.08	0.88	0.06	0.05
Nitrate - N	Dissolved	mg/L	0.30	0.19	0.43	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	24.4	47.6	24.3	0.5
Hardness	as CaCO3	mg/L	229	247	225	5

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Analytical Report

Bill To:	J. Gibson & Associates	Project:		Lot ID:	**976847**
Report To:	J. Gibson & Associates	ID:	ATAC Resources	Control Number:	B14631
	Box 20913	Name:	Tiger Project	Date Received:	Dec 12, 2013
	Whitehorse, YT, Canada	Location:		Date Reported:	Dec 18, 2013
	Y1A 6P2	LSD:		Report Number:	1883651
Attn:	John Gibson	P.O.:			
Sampled By:	J.Gibson	Acct code:			
Company:					

Reference Number	976847-10
Sample Date	Dec 08, 2013
Sample Time	NA
Sample Location	
Sample Description	Surf. / RAU #13
Matrix	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	1.2			0.5
Cyanide	Total	mg/L	<0.002			0.002
Ammonia - N		mg/L	0.02			.01
Phosphorus	Total	mg/L	0.006			0.003
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2			1
Solids	Total Dissolved	mg/L	378			5

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **976847**
Control Number: B14631
Date Received: Dec 12, 2013
Date Reported: Dec 18, 2013
Report Number: 1883651

		Reference Number	976847-10	976847-11		
		Sample Date	Dec 08, 2013	Dec 08, 2013		
		Sample Time	NA	NA		
		Sample Location				
		Sample Description	Surf. / RAU #13	Surf. / RAU #13 Duplicate		
		Matrix	Water	Water		
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Dissolved						
Sulfur	Dissolved	mg/L	25.4	25.6		0.2
Aluminum	Dissolved	mg/L	0.005	<0.005		0.005
Antimony	Dissolved	mg/L	<0.0002	<0.0002		0.0002
Arsenic	Dissolved	mg/L	0.0005	0.0005		0.0002
Barium	Dissolved	mg/L	0.096	0.095		0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004		0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001		0.001
Boron	Dissolved	mg/L	0.015	0.016		0.004
Cadmium	Dissolved	mg/L	0.00069	0.00066		0.00001
Chromium	Dissolved	mg/L	<0.0004	<0.0004		0.0004
Cobalt	Dissolved	mg/L	0.00043	0.00044		0.00002
Copper	Dissolved	mg/L	<0.001	<0.001		0.001
Lead	Dissolved	mg/L	0.0001	<0.0001		0.0001
Lithium	Dissolved	mg/L	0.006	0.006		0.001
Molybdenum	Dissolved	mg/L	0.00608	0.00612		0.0001
Nickel	Dissolved	mg/L	0.032	0.032		0.001
Selenium	Dissolved	mg/L	0.0050	0.0051		0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001		0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010		0.01
Strontium	Dissolved	mg/L	0.221	0.225		0.001
Tellurium	Dissolved	mg/L	<0.0001	<0.0001		0.0001
Thallium	Dissolved	mg/L	0.00003	0.00003		0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004		0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001		0.0001
Uranium	Dissolved	mg/L	0.0083	0.0081		0.0004
Vanadium	Dissolved	mg/L	0.00043	0.00036		0.0001
Zinc	Dissolved	mg/L	0.138	0.138		0.001
Zirconium	Dissolved	mg/L	0.00012	0.00011		0.0001
Metals Total						
Aluminum	Total	mg/L	0.022	0.019		0.005
Antimony	Total	mg/L	0.0001	0.0001		0.0001
Arsenic	Total	mg/L	0.00121	0.00122		0.00005
Barium	Total	mg/L	0.103	0.102		0.00005
Beryllium	Total	mg/L	<0.00005	<0.00005		0.00005
Bismuth	Total	mg/L	<0.0001	<0.0001		0.0001
Boron	Total	mg/L	0.018	0.018		.002

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Analytical Report

Bill To: J. Gibson & Associates
Report To: J. Gibson & Associates
Box 20913
Whitehorse, YT, Canada
Y1A 6P2
Attn: John Gibson
Sampled By: J.Gibson
Company:

Project:
ID: ATAC Resources
Name: Tiger Project
Location:
LSD:
P.O.:
Acct code:

Lot ID: **976847**
Control Number: B14631
Date Received: Dec 12, 2013
Date Reported: Dec 18, 2013
Report Number: 1883651

	Reference Number	976847-10	976847-11		
	Sample Date	Dec 08, 2013	Dec 08, 2013		
	Sample Time	NA	NA		
	Sample Location				
	Sample Description	Surf. / RAU #13	Surf. / RAU #13 Duplicate		
	Matrix	Water	Water		
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total - Continued						
Cadmium	Total	mg/L	0.00076	0.00074		0.00001
Calcium	Total	mg/L	93.2	93.8		0.05
Chromium	Total	mg/L	<0.0005	<0.0005		0.0005
Cobalt	Total	mg/L	0.0004	0.0004		0.0001
Copper	Total	mg/L	0.0013	0.0013		0.0001
Iron	Total	mg/L	0.393	0.389		0.002
Lead	Total	mg/L	<0.0001	<0.0001		0.0001
Lithium	Total	mg/L	0.0054	0.0053		0.0005
Magnesium	Total	mg/L	23.5	23.6		0.04
Manganese	Total	mg/L	0.0437	0.0441		0.001
Molybdenum	Total	mg/L	0.00687	0.00692		0.00005
Nickel	Total	mg/L	0.0336	0.0340		0.0002
Potassium	Total	mg/L	2.3	2.3		0.1
Selenium	Total	mg/L	0.0047	0.0048		0.0001
Silicon	Total	mg/L	3.10	3.10		0.02
Silver	Total	mg/L	<0.00005	<0.00005		0.00005
Sodium	Total	mg/L	4.4	4.2		0.1
Strontium	Total	mg/L	0.236	0.233		0.0001
Thallium	Total	mg/L	0.00003	0.00003		0.00001
Thorium	Total	mg/L	<0.00001	<0.00001		0.00001
Tin	Total	mg/L	<0.0001	<0.0001		0.0001
Titanium	Total	mg/L	0.0005	<0.0005		0.0005
Uranium	Total	mg/L	0.00904	0.00921		0.00001
Vanadium	Total	mg/L	0.0003	0.0003		0.0001
Zinc	Total	mg/L	0.145	0.149		0.0005
Zirconium	Total	mg/L	<0.0005	<0.0005		0.0005
Hardness	as CaCO3	mg/L	329			1
Routine Water						
pH	at 25 °C		7.77			
Electrical Conductivity		µS/cm at 25 C	554			1
Calcium	Dissolved	mg/L	97.2	96.4		0.1
Iron	Dissolved	mg/L	0.038	0.090		0.005
Magnesium	Dissolved	mg/L	24.6	24.6		0.1
Manganese	Dissolved	mg/L	0.032	0.032		0.001
Potassium	Dissolved	mg/L	2.5	2.4		0.1
Silicon	Dissolved	mg/L	2.78	2.78		0.05

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Project Information

Project ID: ATAC RESOURCES
Project Name: TIGER PROJECT
Project Location:
Legal Location:
PO/AFE#:
Proj. Acct. Code:

Billing Information

Company: J. Gibson & Associates
Address: Whitehorse, YT Y1A 6P2
Attention: John Gibson
Phone: (867) 633-4522
Cell:
Fax: (867) 668-6895
E-mail: luddite gibson@gmail.com
Agreement ID: 6646
Copy of report: X

Copy of Report To:

Company: J. Gibson & Associates
Address: Whitehorse, YT Y1A 6P2
Attention: John Gibson
Phone: (867) 633-4522
Cell:
Fax: (867) 668-6895
E-mail: luddite gibson@gmail.com
Copy of invoice: X

RUSH Priority

Upon filling out this section, client accepts that surcharges will be applied to the analysis

Date Required
As Indicated | All Analysis

When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples.

Signature

Sample Custody (please print)

Sampled by: J. GIBSON
Company: —
I authorize Exova to proceed with the work indicated on this form:
Date: Dec 10/13 Initial: JG

This section for Lab use only

Date/Time stamp: RECEIVED DEC 12 2013

Report Results: E-mail / Mail / Online / Fax / PDF / Excel / QA/QC Report

Special Instructions/Comments (please include contact information including ph. # if different from above).

RCHEM =

TW23 Field Filtered, METMST NITRIC, TCN + NaOH
NH4 ts SULFURIC, TOC + HCL, THg + HCL

Include Regulatory Requirements Below:

Sample Identification	Location	Depth IN CM M	Date/Time sampled	Matrix	Sampling Method	Number of Containers	RCHEM	TOC	NH4	TCN	TW24ew	TW23 ew (F)	THg
1 RAW #1	SURF		Dec 9	H2O	Grab	7	✓	✓	✓	✓	✓	✓	✓
2 #3			Dec 8			6	✓	✓	✓	✓	✓	✓	
3 #4	↓		9	↓	↓	7	✓	✓	✓	✓	✓	✓	✓
4 #5			9			7	✓	✓	✓	✓	✓	✓	✓
5 #7			9			6	✓	✓	✓	✓	✓	✓	
6 #8			Dec 9			7	✓	✓	✓	✓	✓	✓	✓
7 #9			8			6	✓	✓	✓	✓	✓	✓	
8 #10			8			7	✓	✓	✓	✓	✓	✓	✓
9 #17			8			7	✓	✓	✓	✓	✓	✓	✓
10 #13			8			6	✓	✓	✓	✓	✓	✓	
11 #13 DUPLICATE			Dec 8								✓	✓	
12													
13													
14													
15													

Enter tests above (√ relevant samples below)

Indicate below any deficiencies in the condition of samples:

- Were Exova supplies used?
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- Were the containers packaged well?
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ED 120-00

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

Please indicate any potentially hazardous samples

Page 1 of 1 Control # B14631

LOT: 976847 COC

Shipping: COD Y/N
Cooler temp: 5 C

and size of coolers received:
Delivery Method:
Waybill:
Received by:

APPENDIX IX

GEOTECHNICAL STUDY REPORT – GOLDER ASSOCIATES LTD.

REPORT

TIGER ZONE PROJECT

YUKON TERRITORY, CANADA

REPORT ON

SCOPING LEVEL PIT SLOPE EVALUATION

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January 27, 2014 **1302357**

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1.0 INTRODUCTION

Golder Associates Inc. (Golder) is pleased to provide this Scoping level review with pit slope design recommendations for ATAC Resources Limited's (ATAC) Tiger Zone gold project. The Tiger Zone is one of several mineralized areas within ATAC's Rau Property. The project site is located approximately 75 kilometers northeast of Mayo, Yukon Territory, Canada.

1.1 Scope of Work

The Scope of Work for this Scoping level study was defined in Golder's Proposal of October 30, 2013, "Scoping Level Pit Slope Design Study, Tiger Zone, Rau Property, Yukon Territory, Canada," as providing Scoping level geotechnical input and pit slope design recommendations based on a review of available information.

1.2 Method of Work

The method of work was outlined in Golder's Proposal, and included:

- Collection and review of available data, including geologic model, core logs, and core photographs
- A site visit to review site conditions and exploration core
- Development of scoping-level pit slope design recommendations based on available data
- Recommendations for a geotechnical program to support a pre-feasibility level slope design
- Documentation of the study in an engineering report

The work was initiated by a kickoff meeting in ATAC's Vancouver office on November 14, 2013 that was attended by Rob Carne, President of ATAC; Graham Downs, Chief Executive Officer, ATAC; and George Lightwood, Senior Geotechnical Engineer with Golder's Reno office. Others at the meeting included Andrew Carne, Project Engineer, and Heather Friday, Geologist, both with Archer Cathro, and Associates, Limited (Archer Cathro), and Sabrey Hafez, Senior Mining Engineer, with Tetra Tech of Vancouver, British Columbia. Archer Cathro provides geological consulting services for ATAC, and their geologists logged the Tiger Zone core. Tetra Tech provides mining engineering services, including pit design, for ATAC.

George Lightwood visited the project site with Heather Friday and Sabrey Hafez on November 15 and 16, 2013. The purpose of this site visit was to primarily review exploration core and surface features of the pit area. The project site cannot be accessed by permanent roads, so we flew to the site in a helicopter. Since daylight hours are limited during the late fall, we only spent about a total of 12 hours at the site over the two days. There was about one-half to one meter of snow at the project site, so it was not possible to observe rock outcrops in the pit area; however, it was possible to observe the physiographic features of the project area.

1.3 Available Data

Information available for ATAC to support this pit slope evaluation includes:

- NI43-101 report (Stroshein, et. al., 2011)
- An Assessment report (Dumala, 2011)
- Core Photographs
- A database containing geology, assay data, and geotechnical data from the 132 coreholes drilled by ATAC Resources in the Tiger Zone.
- Geologic logs and photographs of auger cuttings from the mineralized (Oxide) materials
- Preliminary pit design

1.4 Planned Pit Development

A preliminary pit shell for Tiger Zone was provided to Golder and is shown in Figure 1.1. The pit is approximately 850 m long, 200 to 300 m wide and is about 100 m deep. The highest slope will be about 300 m high on the north side of the pit. The long axis of the pit follows the trend of the mineralization, which is to the northwest. The mineralized material, designated Oxide in Figure 1.1, will be mined from the pit and placed on heap leach pads to recover gold.

2.0 SITE CONDITIONS

2.1 Topography and Vegetation

The Tiger Zone project is located in the Nadalen Range of the Selwyn Mountains and is drained by creeks that flow into rivers that are part of the Yukon River watershed. The pit is located on the south and west facing slopes of Rackla Ridge and the elevation of the ground surface ranges from about 1200 to 1600 m in the pit area. Existing slopes in the pit area range from about 25 to 40 degrees. Photographs of the project site and pit area are shown in Figure 2.1.

The slopes in the pit area are typically covered with vegetation consisting of moss, low shrubs, and mature black spruce. The tree-line is at approximately 1500 m (Dumala, 2011). Except where drill roads have been cut into the slopes, there are few outcrops of bedrock in the pit area.

2.2 Climate

The area that includes the Tiger Zone property has a subarctic climate. Weather data obtained from Environment, Canada (2014) indicates that in Mayo, the nearest town with published weather data, the average daily temperatures range from 23 degrees Celsius in summer to -21 degrees in winter. Extreme temperatures can range from -52 degrees C to 36 degrees Celsius. Winters are long and cold and below freezing temperatures occur about 230 days each year. The project area is typically snow free from June to September.

Mayo receives about 200 mm of rain and 150 cm of snow annually. Most of the rain falls between May and September with most snowfall from October to April. At the time of the site visit to the Tiger Zone, there was about one-quarter to one-half meter of snow on the ground.

Permafrost is reported to exist at lower elevations in the project area. Permafrost has not been identified in the pit area except possibly at a few locations on north facing slopes at low elevations (Andrew Carne, 2014).

2.3 Regional Geology

The regional geology is described in the reports by Dumala (2011) and Stroshein, et. al.(2011). The following discussion of the regional and site geology is based on these reports.

The Rau Property, which includes the Tiger Zone, occurs within a band of regional-scale thrust and high angle reverse faults that imbricate the rocks of the Selwyn Basin and the Mackenzie Platform. The stratigraphic sequence of the Selwyn Basin consists of regionally metamorphosed, basinal sediments of Neoproterozoic to Paleozoic age. The stratigraphic sequence of the Makenzie Platform consists dominantly of shallow water carbonate and clastic sediments that were deposited between the Mid-Proterozoic Eon through the Paleozoic Era.

The project area underwent compressional orogenesis and thrusting during the Jurassic to Cretaceous Periods. During the late Cretaceous Period, felsic plutons intruded the sedimentary sequence; however, the thrusting pre-dates the intrusions. A second compressional orogenic event accompanied by emplacement of felsic intrusions occurred during the Neogene period about 65 Ma.

The Rau Property lies within a northwest trending thrust package bounded by the west-northwest trending Dawson Thrust to the south and the similarly trending Kathleen Lakes Fault to the north. The stratigraphic units within this package of sediments form open folds that are aligned parallel to the thrusts and plunge gently to the southeast. Several high angle faults are inferred on the property.

2.4 Site Geology

ATAC developed a geologic model of the pit area using GEMS, a computerized geologic modelling and mine program developed by Gemcom, Software International, Inc. The Tiger Zone mineralization projected into the pit slopes is shown in Figure 1.1. ATAC provided Golder with a set of sections that show the location of the mineralization, major rock units, and faults in the pit area. Typical sections are provided in Figures 2.2 through 2.5.

2.4.1 Lithology

The mineralization at the Tiger Zone is hosted in carbonate rocks of the Paleozoic Bouvette Formation. The Bouvette Formation was deposited between the Cambrian and Devonian Periods and consists of limestones and dolostones with minor quartzite. The Bouvette Formation contains thin interbedded horizons of volcanic and volcaniclastic rock of the Marmot Formation that range in thickness from a few to about 20 meters thick.

Stroshein et. al. (2011) indicates that the carbonate units typically consist of crinoid wackestone and lime mudstone and some units lack layering and sedimentary structures. The volcanic units consist of green-grey amygdaloidal flows, and the volcaniclastic units consist of sericitized silt- to mud-grade material presumed to be of volcanic origin. No volcanic units appear to be located in the pit area; however, the volcaniclastic units will be exposed in the east side of the pit shown in Figure 2.2 through 2.5.

The geologic logs of the coreholes indicate that the rocks units in the pit area consist primarily of:

- Limestone
- Dolomite
- Marble
- Volcaniclastic Rock
- Oxide (mineralized rock)

The position of the Oxide and Volcaniclastic Rock in the pit and the pit slopes are shown in Figures 2.2 through 2.5. The unlabeled rock units shown in these figures consist either of Limestone, Dolomite, or Marble.

The mineralized material is included in the rock unit designated Oxide in the geologic model and on the geologic logs of the coreholes. Stroshein et. al. describes the oxide as a "very competent, weakly porous limonitic mud to rubbly porous limonitic grit." It contains a high proportion of limonite, goethite, and siderite giving the rock a color that ranges from a deep red to orange rust color to dark brown (Stroshein, et al., 2011). Our review of the core on site indicated that much of the Oxide is poorly indurated and friable, though it is sufficiently competent to hold together when cored.

2.4.2 Structure

2.4.2.1 Major Structures

Major structures that can affect pit slope stability consist of faults and contacts between geologic units. Faults have been interpreted from coreholes and are shown in Figures 2.2 through 2.3. The faults in the pit area typically strike approximately to the northwest, similar to the trend of the mineralization and dip steeply to the east and west.

A significant fault, referred to as the "Footwall" fault truncates the mineralized material (Oxide) pit area to the southwest. This faults strikes approximately north-northwest and dips to the northeast at approximately 80 degrees. The amount of displacement on this fault is not known, but the Limestone to in the footwall of Footwall fault may be considerably older than the Limestone in the hanging wall of the Footwall fault (Rob Carne, 2013).

Based on the sections shown in Figures 2.2 through 2.3, the Volcaniclastic rock forms a layer 10 to 40 meters thick with open folds. The overall dip of this layer ranges from 50 to 80 degrees to the northeast. It only occurs on the east side of the pit and dips into the pit slope.

2.4.2.2 Minor Structure

Minor structures noted in the geologic logs include joints, bedding planes, foliation, and veins. These structures were observed in the core, and the geologic logs indicate the relative orientation (angle to core axis) of these structures. Joints, bedding planes, and foliation can form discontinuities that are planes of weakness in the rock mass. Veins can form planes of weakness when there is a significant difference between the strength of the vein material and the wall rock. At the Tiger Zone, veins are unlikely to form planes of weakness based on our review of the core.

2.4.3 Alteration

Alteration changes the chemical or mineralogical composition of rock and can thus either reduce or increase the strength of intact rock. Alteration is not described in the reports by Stroshein et. al. (2011) and Dumala (2011); however, alteration minerals noted in the geologic logs include Dolomite, Sericite, Calcite (Calcification), and Oxide (Oxidation).

Dolomitization and calcification can change the fabric of the rock and can results in the destruction or cementation of primary structures, particularly bedding planes, so as to create a stronger rock mass. Intense seritization can weaken the rock or reduce the strength of rock discontinuities, particularly if the sericite is localized along joint and bedding plane surfaces.

In the Tiger Zone, oxidation of consists primarily of weathering of sulfide mineralization to iron hydroxides and oxides. The effect of oxidation of sulfides is typically to reduce the strength of the intact rock.

While not a form of alteration, marbleization can also affect the rock mass properties. During Marbleization, the recrystallization of calcite can destroy primary structures such as bedding planes that may form planes of weakness.

2.4.4 Mineralization

Stroshein et. al. (2011) indicates that mineralization at the Tiger Zone consists of sediment-hosted gold mineralization. The gold occurs in both oxide and sulfide mineralization; however, only oxide mineralization will be mined.

2.4.5 Weathering

Both mechanical and chemical weathering of the rock mass has affected the properties of the rock mass in the pit area. The frequent freeze-thaw cycles typical of sub-arctic climates has resulted in fracturing of the rock mass near the ground surface due to frost wedging. The oxidation of the sulfides in the mineralized rock (Oxide) has significantly weakened the intact rock to the extent that much of the Oxide appears to have a soil-like character.

2.5 Geotechnical Investigations

There are no prior, or existing, geotechnical investigations for pit slopes at the Tiger Zone.

2.5.1 Surface Mapping

Geologic mapping of the pit area has not been performed. Low shrubs and moss and a layer of broken rock and soil occur at the surface, so there are few suitable exposures from which to observe the characteristics of the rock mass and measure structure orientations.

2.5.2 Geotechnical Logging of Coreholes

ATAC has drilled 132 coreholes within the project area as part of their mineral exploration program. The core drilling was performed for mineral resource studies and the geologic logs include rock type descriptions, alteration minerals, and descriptions of minor structures intersecting the core.

As shown in Figures 2.2 through 2.5, most of the coreholes plunge to the southeast so they intersect the mineralized zone. A few coreholes were drilled at an angle to the northeast. Based on the location and number of the coreholes in the pit slopes, the geology of the pit slopes is well defined for a Scoping level project.

We combined the geologic logs into a database containing all coreholes. The percent of each rock type in the database by drilled length and the average core recovery for the major rock units are as follows:

Table 2.1: Major Rock Units Encountered in Exploration Coreholes

Rock Type	Rock Code	Drilled Length (meters)	Average Core Recovery[1] (percent)	Percent of Total Length Core[2]
Limestone	LST	14347	89.9	60
Dolomite	DOL	3131	90.8	13
Oxide	OX	2765	66.8	12
Volcaniclastic	VOL	2365	90.3	10
Marble	MBL	1161	91.4	5

Notes: 1. Weighted by Length
2. Major rock units only.

Ninety-three percent of the core in the 132 coreholes was classified as one of the rock units listed in Table 2.1, and these units will be exposed in the pit slopes. Other rock units encountered during coring include the Leopard Zone (LEP), Overburden (OVB), and other units. The Leopard Zone occurs below the bottom of the pit shell shown in Figure 1.1. Other units represent only a very small proportion of the rock mass, typically less than one percent of the total core drilled, and we did not consider them in our data analysis.

No core drilling for pit slope geotechnical studies has been performed; however, ATAC geologists collected the following geotechnical data from each of the exploration coreholes:

- Core Recovery
- Rock Quality Designation
- Rock Strength
- Weathering

During the site visit, we reviewed core from coreholes 09-41, 10-72, and 10-132. The purpose of this review was to observe the geotechnical properties of the core and particularly the condition of rock discontinuities formed by minor structures in the core. We also collected representative samples of core for laboratory tests. These core samples are stored in ATAC's warehouse in Whitehorse, YT to provide rock core samples for laboratory testing in future pit slope studies.

2.5.3 Auger Holes

Four auger holes were drilled by ATAC in 2013 to collect bulk samples of the Oxide for metallurgical testing. According to Heather Friday, Geologist for Archer Cathro, each auger hole was drilled with a five inch diameter continuous flight auger to a depth of 48 feet. The holes were advanced in stages by advancing the auger five feet and then tripping the string of five-foot long auger sections out of the hole to obtain samples. The samples were sealed in five gallon buckets and shipped to Kappes, Cassiday & Associates, Inc. (KCA) in Reno, Nevada for metallurgical tests. KCA measured the moisture content of each sample. A list of auger holes, sample depths and moisture content for each sample is provided in Appendix A.

ATAC provided Golder with geologic logs of the auger holes. They also provided photographs of the auger sections containing the cuttings as each section was lifted out of the hole. We reviewed the geologic logs, photographs, and also the samples stored at KCA's laboratory. We selected representative samples of Oxide from the auger holes for the soil index and direct shear tests performed as part of this study. The results of these tests are presented in Section 3.

2.6 Hydrogeology

There are no observation wells or piezometers in the pit area. Drillers reported that groundwater was not encountered in the coreholes and groundwater is not expected to be encountered in the pit.

The geologic logs of the auger holes do not indicate that these holes encountered groundwater; however, auger cuttings from RAU-13-A01 appear to be wet based on the photographs taken during drilling. This hole was drilled in a small drainage that crosses the pit area. The wet auger cuttings indicate groundwater may be encountered in the Oxide at shallow depths near the drainage.

3.0 LABORATORY TESTING

Soil index tests were performed on representative samples of the Oxide obtained from the auger holes. The tests were performed at Golder's laboratory in Lakewood, Colorado, and the test results are provided in Appendix B – Results of Laboratory Testing.

3.1 Soil Index Tests

The results of the soil index tests (particle size, Atterberg Limits, and specific gravity of soil particles) on the Oxide are summarized in Table 3.1.

Table 3.1: Soil Index Test Results for Oxide

Auger Hole	Sample Number	Sample Depth (feet)	USCS Symbol[1]	Soil Description	Atterberg Limits[2]			Specific Gravity of Soil Particles (g/cc)
					LL	PL	PI	
RAU-13-A01	2	13 - 18	SM	Silty sand with gravel	NP	NP	NP	-
RAU-13-A01	4	23 - 28	ML	Sandy silt	NP	NP	NP	-
RAU-13-A02	5	28 - 33	SM	Sandy silt	34	33	1	-
RAU-13-A03	3	23 - 28	SM	Silty sand	NP	NP	NP	3.28
RAU-13-A04	3	18 - 23	SM	Silty sand with gravel	28	24	4	-
RAU-13-A04	5	28 – 33	ML	Sandy silt	28	25	3	

Notes: 1. USCS = Unified Soil Classification System
2. LL = Liquid Limit, PL = Plastic Limit, PI = Plastic Index, NP = Non-plastic

These test results indicate that when the Oxide is disaggregated, it consists of silty sand (SM) and silt (ML). The fines in the silty sand are either non-plastic or consist of low plasticity silt (ML).

The specific gravity of the soil particles is 3.28 and indicates that the Oxide contains a higher proportion of iron oxides and hydroxides (Magnetite, Hematite, Limonite, Goethite) compared to soils composed of primarily quartz, calcite and dolomite.

3.2 Direct Shear Tests

Consolidated drained direct shear tests were performed on re-compacted samples of Oxide. A separate specimen was prepared for each normal load increment (500, 1000, and 1500 kPa). Each specimen was consolidated and sheared at a rate sufficiently slow to provide drainage so effective strength properties could be obtained. The resulting Mohr-Coulomb shear strength parameters are provided in Table 3.2.

Table 3.2: Mohr Coulomb Shear Strength Parameters from Direct Shear Tests

Auger Hole	Sample Number	Sample Depth (feet)	Average Dry Density[1] (kN/m^3)	Average Water Content[1] (percent)	Effective Mohr-Coulomb Shear Strength Parameters			
					Peak		Residual	
					Friction Angle (degrees)	Cohesion (kPa)	Friction Angle (degrees)	Cohesion (kPa)
RAU-13-A03	3	23 - 28	21.2	15.7	32	256	37	31

Notes: 1. Average Dry Density and Water Content of the three test specimens

The residual and peak friction angles are within a range (30 to 40 degrees) typical of dense to very dense silty sand and silt (Navfac, 1986). The value for cohesion in Table 3.2 results from performing a linear regression through pairs of peak normal and shear stress. The actual shear strength envelope for the re-compacted Oxide is probably non-linear at low stresses (Terzaghi, et al., 1996) which is typical for a very dense granular soil.

The results of the direct shear tests indicate a residual friction angle greater than the peak friction angle. Typically, the residual friction angle will be equal to or less than the peak friction angle. The plot of shear strength versus displacement for the specimens indicates a well-defined peak strength for the specimen sheared at an applied normal stress of 500 kPa, and less well defined peaks for the specimens tested with applied normal loads of 1000 and 1500 kPa. The difference in the shape of the stress-displacement curves may due to differences in specimen preparation, particularly compaction of the soil in the shear ring.

Our experience indicates that shear strength properties obtained from direct shear tests on disturbed samples of highly weathered rock such as the Oxide are typically lower than shear strength properties obtained from direct shear and consolidated undrained triaxial tests on “undisturbed” core samples. The shear strength parameters listed in Table 3.2 are preliminary, and appropriate only for Scoping level slope stability analyses.

4.0 GEOTECHNICAL CHARACTERIZATION

The data sources described previously were used to characterize the geotechnical properties of the rock units. These characteristics are used in empirical estimates of the rock mass shear strength properties used in slope stability analyses. They also allow us to obtain an understanding of the controls on pit slope stability based on rock mass strength, degree of fracturing, and structure orientations; and they allow us to select the appropriate mining methods, particularly blasting techniques, to maximize pit slope angles and produce stable bench faces.

4.1 Rock Strength

The rock strength for each core interval was recorded by ATAC geologists. ATAC uses the term “hardness” during geotechnical logging to describe the resistance of the rock to break under an applied load; however, for this report we will use the term “strength” in accordance with typical geotechnical engineering practice. The field classification and identification used by ATAC to estimate rock strength is approximately equivalent to the International Society for Rock Mechanics Classification (ISRM). The ISRM Strength Classification is correlated with approximate ranges of the Unconfined Compressive Strength (UCS) as shown in Table 4.1.

Table 4.1: ATAC and ISRM Rock Strength Classifications

ATAC Strength Classification		ISRM Strength Classification and UCS		
Classification and Code[1]	**Field Identification[1]**	**ISRM Strength (R)**	**Field Identification**	**UCS (MPa)**
Extremely Weak (EW)	Can be readily indented, grooved or gouged with fingernail, or carved with a knife. Breaks with light pressure.	R0	Indented with thumbnail	0.25-1
Very Weak (VW)	Can be grooved or gouged easily by knife or sharp pick with light pressure, can be scratched with fingernail. Breaks with light to moderate manual pressure	R1	Crumbles under firm blow with point of geological hammer, can be peeled with a pocket knife	1-5
Weak (W)	Can be grooved or gouged easily by knife or sharp pick with moderate or heavy pressure. Core or fragment breaks with light hammer blow to heavy manual pressure.	R2	Can be peeled with a pocket knife with difficulty, shallow indentations made by a firm blow of geologic hammer	5-25
Medium Strong (MS)	Can be scratched with knife or sharp pick with light or moderate pressure. Core or fragment breaks with moderate hammer blow.	R3	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with a single firm blow of geological hammer	25-50
Strong (S)	Can be scratched with knife or sharp pick with difficulty (heavy pressure). Heavy hammer blow required to break specimen.	R4	Specimen requires more than one blow of geologic hammer to fracture it	50-100
Very Strong (VS)	Cannot be scratched with knife or sharp pick. Core or fragment breaks with repeated heavy hammer blows.	R5	Specimen requires many blows of geological hammer to fracture it	100-250
Extremely Strong (ES)	Core or fragment cannot be scratched with knife or sharp pick; can only be chipped with repeated heavy hammer blows	R6	Specimen can only be chipped with geological hammer	>250

Notes: 1. From ATAC Manual for Core Handling

The rock strength data collected by ATAC indicates that all rock types can range in strength from Extremely Weak to Very Strong; however, the typical ISRM rock strength classification for each of the major units is provided in Table 4.2.

Table 4.2: Typical Rock Strength of Major Rock Units

Rock Type	Rock Code	Typical Rock Strength[1]	ISRM Rock Strength Classification
Limestone	LST	R3	Medium Strong
Dolomite	DOL	R3	Medium Strong
Oxide	OX	R0	Extremely Weak
Volcaniclastic	VOL	R3	Medium Strong
Marble	MBL	R3	Medium Strong

Notes: 1. Greater than 50 percent of the core was assigned this strength

Table 4.2 indicate that the Limestone, Dolomite, Volcaniclastic, and Marble were typically classified as Medium Strong (R3, 25 < UCS < 50 MPa) rock. Based on our review of the rock core while on site, some of the Limestone, Dolomite, and Marble may consist of Strong (R4, 50 < UCS < 100 MPa) rock; however, no laboratory tests were performed to confirm our observations. Carbonate rocks can be difficult to classify by the field identification methods listed in Table 4.1 because rocks composed primarily of calcite and dolomite can be scratched with a steel knife point or scribe, and foliated rocks will often break with one blow of hammer along the foliation although this is not an indication of the intact strength of the rock material between foliation planes. Stacey and Read (2009) indicate that the strength of limestone, dolomite, and marble can range from Medium Strong (R3, 25 < UCS <50 MPa) to Very Strong (R5, 100 < UCS <250 MPa).

The Oxide is classified as an Extremely Weak (R0, 0.25 < UCS < 1.0 MPa) rock and is consistent with our review of the core.

4.2 Weathering

ATAC records the degree of weathering of each core run based on the following classification:

Table 4.3: ATAC Weathering Classification[1]

Classification	Code	Field Identification
Fresh	FR	No weathering effect visible to naked eye
Slightly weathered	SW	Visible change in appearance but not significant change in strength
Moderately weathered	MW	Visible change in appearance and with significant loss in strength
Highly weathered	HW	Shows considerable change in appearance and loss in strength. Material is still a rock but normally very weak
Extremely weathered	EW	Has soil properties and often shows complete change in appearance

Notes: 1. ATAC Manual for Core Handling

For this project the weathering is related to the strength of the rock and can be used to identify those portions of the rock core that are soil-like. The typical degree of weathering for each rock unit is as follows:

Table 4.4: Typical Degree of Weathering of Major Rock Units

Rock Type	Rock Code	Degree of Weathering[1]	Weathering Classification
Limestone	LST	FR to SW	Fresh to Slightly Weathered
Dolomite	DOL	FR to SW	Fresh to Slightly Weathered
Oxide	OX	EW	Extremely Weathered
Volcaniclastic	VOL	FR to SW	Fresh to Slightly Weathered
Marble	MBL	FR to SW	Fresh to Slightly Weathered

Notes: 1. Greater than 50 percent of the core was assigned these weathering classifications

Table 4.4 indicates that the Limestone, Dolomite, Marble, and Volcaniclastic rocks are typically Fresh to Slightly Weathered. The Oxide is typically Extremely Weathered, indicating it has soil-like characteristics.

4.3 Rock Fracturing

ATAC measures the Rock Quality Designation (RQD) for each core run and this data can be used to assess the degree of rock fracturing. RQD is the percentage of sound core recovered in lengths of 10 cm or greater (Deere, 1964) and can be correlated to discontinuity spacing as shown in Table 4.5.

Table 4.5: Rock Quality Designation (RQD) System

RQD (percent)	Rock Quality Classification	Approximate Discontinuity Spacing (mm)[1]
0-25	Very Poor	< 70
25-50	Poor	70 to 100
50-75	Fair	100 to 150
75-90	Good	150 to 300
90-100	Excellent	> 300

Notes: 1. Based on correlation between RQD and mean discontinuity spacing by Bieniawski (1989).

Typical and average values for RQD for each of the major rock units are shown in Table 4.4

Table 4.6: Typical and Average RQD of Major Rock Units

Rock Type	Rock Code	Typical Range of RQD	Average RQD[2]	Rock Quality Classification[3]
Limestone	LST	36 to 89	61	Fair
Dolomite	DOL	59 to 92	71	Fair
Oxide	OX	0	6	Very Poor
Volcaniclastic	VOL	34 to 86	59	Fair
Marble	MBL	52 to 95	71	Fair

Notes: 1. 50 percent of the core is within this range
2. Weighted average based on core length
3. Rock Quality Classification from Table 4.5 based on Average RQD

Based on the RQD values listed in Table 4.6, the Limestone, Dolomite, Volcaniclastic, and Marble are all classified as having Fair (50 < RQD < 75 percent) Rock Quality. The average value of RQD for the Dolomite and Marble are somewhat greater than the average RQD for the Limestone and indicate that the Dolomite and Marble are less fractured than the Limestone. The Rock Quality of the Oxide is Very Poor (0 <RQD < 25 percent) indicating its soil-like nature.

4.4 Structure

Structures that form planes of weakness in the rock upon which sliding may occur are of interest in pit slope stability studies. Wide fault zones containing highly fractured rock also limit the ability to form steep stable benches.

Minor structures that form discontinuities in the rock mass consist predominantly of joints, foliation, and bedding planes. The Limestone contains structures described in the geologic logs as bedding planes, foliation and joints. Based on our review of the core and geologic logs, the Marble and Dolomite typically contain joints, but are not foliated. The dominant structure of the Volcaniclastic is foliation which may be closely spaced.

In the core we reviewed on site, joints in the Limestone are typically planar and smooth to very rough with either no surface coating or a coating of iron oxide on the joint surface. Joints in Marble and Dolomite are very rough and typically contain no infilling. Where the Limestone and Volcaniclastic Rocks are foliated, the discontinuities may be planar, smooth, and typically have a coating of sericite on the joint surface. Joints with thick infillings of low strength clay were not observed in the core during the site visit.

No structure orientation data is available from either structure mapping or oriented core. The foliation is thought to have approximately the same orientation as the Footwall Fault that truncates the Oxide mineralization to the southwest; that is, the foliation likely dips steeply to the northeast.

4.5 Rock Mass Rating

Bieniawski's (1976) Rock Mass Rating (RMR_{76}) classification system was used to provide a quantitative measure of rock mass quality. This system incorporates unconfined compressive strength (UCS), Rock Quality Designation (RQD), joint spacing, joint condition (as defined by Joint Condition Rating), and groundwater condition to characterize rock masses. Each of these parameters is assigned a numerical rating, and the sum of the rating values yields an RMR_{76} rating from 0 (very poor quality rock mass) to 100 (very good quality rock mass). For this study, we used RMR_{76} to estimate the rock mass strength of the Limestone, Dolomite, Volcaniclastic Rock and Marble for use in slope stability studies. A Groundwater Rating of 10 (dry) is assigned to the rock mass as groundwater is not a property of the rock mass. The RMR_{76} classification system is summarized in Table 4.7.

Table 4.7: Summary of Rock Mass Rating (RMR_{76}) System[1]

Parameter	Range of Values[2]						
UCS (MPa) Rating	>200Mpa **(15)**	100-200 MPa **(12)**	50-100 MPa **(7)**	25-50Mpa **(4)**	10-25 **(2)**	<3-10 **(1)**	1-3 **(0)**
RQD Rating	90-100% **(20)**	75-90% **(17)**	50-75% **(13)**	25-50% **(8)**	< 25% **(3)**		
Joint Spacing Rating	>3m **(30)**	1-3m **(25)**	0.3-1m **(20)**	50-300mm **(10)**	< 50mm **(5)**		
Joint Condition Rating	Very rough No separation Hard wall rock **(25)**	Slightly rough Separation < 1mm Hard wall rock **(20)**	Slightly rough Separation < 1mm Soft wall rock **(12)**	Slickensides, Separation or gouge < 5mm **(6)**	Soft gouge or Separation > 5mm **(0)**		
Groundwater Rating	Completely Dry **(10)**		Moist **(7)**	Mod. Pressure **(4)**	Severe **(0)**		
Total RMR_{76} Value (Sum of Ratings for 5 Items) =							
Rating	**100 – 81**	**80 – 61**	**60 – 41**	**40 – 21**	**20 – 0**		
Description	I – Very Good	II – Good	III – Fair	IV – Poor	V – Very Poor		

Notes: 1. Rating system from Bieniawski, 1976.
2. Rating values are shown in parentheses.

For determination of the typical RMR_{76} for each rock unit, we assumed the typical Rock Strength (Table 4.2), Weathering Index (Table 4.4) and RQD (Table 4.6) assigned to each rock type is representative of the rock type throughout the project area. The Joint Condition Rating (JCR) assigned to each rock type was based on the joint characteristics we observed in the exploration core during the site visit, We assume that this JCR is representative for each rock unit regardless of location. These are appropriate assumptions for this Scoping level study. However, for Pre-feasibility and Feasibility level studies, we would assign the ratings for each parameter in Table 4.7 to each core interval and then calculate RMR_{76} for each core interval.

Based on the results of our data analysis of the RQD, rock strength, and weathering data, the Limestone, Dolomite, and Marble are similar, so we combined them into one unit referred to as Carbonate Rocks.

Table 4.8: Typical RMR_{76} for Major Rock Types

Geotechnical Unit		UCS[1]	RQD[2]	Joint Spacing[2]	Joint Condition	Ground-water	RMR_{76}	Rock Mass Quality
Carbonate Rocks (Limestone, Dolomite, and Marble)	Value or Condition	25 to 50 MPa	50 to 75 %	100 to 150 mm	Very to Slightly Rough with hard rock contacts	dry	59	Fair
	Rating	4	13	10	22	10		
Volcani-clastic	Value or Condition	25 to 50 MPa	50 to 75 %	100 to 150 mm	Slightly rough with hard rock contacts	dry	57	Fair
	Rating	4	13	10	20	10		
Oxide	Value or Condition	< 1 MPa	<25 %	<50 mm	Decomposed Rock Mass with rock blocks > 5 mm separation	10	16	Very Poor
	Rating	0	3	3	0	10		

Notes: 1. typical value from Table 4.2; 2. Typical value from Table 4.5

The Rock Mass Rating values shown in Table 4.7 indicate that the Rock Mass Quality of the Carbonate Rocks (Limestone, Dolomite, and Marble) and Volcaniclastic is typically Fair ($40 < RMR_{76} < 60$) Quality rock mass. The Rock Mass Quality of the Oxide is typically Very Poor ($0 < RMR_{76} < 20$).

The manner in which we performed our data analysis assumes that each rock type has a characteristic Rock Mass Quality that applies to each rock type throughout the project area. In actuality, the Rock Mass Quality will vary from place to place. The spatial variation of the Rock Mass Quality, RQD, and rock strength is typically evaluated during Pre-Feasibility Level pit slope studies.

4.6 Geotechnical Units

We divided the soil and rock masses into geotechnical units. Slopes of similar orientation and height developed within the same geotechnical unit should generally perform similarly. Geotechnical units may be subdivisions of rock types if there are significant variations in their mechanical and structural characteristics. Alternatively, geotechnical units may combine several geologic or lithologic units if mechanical and structural characteristics of the units are similar.

Based on the RQD, rock strength, and weathering data collected by ATAC for the exploration core and summarized in Table 4.1, 4.3 and 4.5, and our observation of the exploration core, we divided the rock masses into the following geotechnical units for this scoping level study.

- Carbonate Rocks
- Volcaniclastic
- Oxide

The Carbonate Rock includes Limestone, Dolomite, and Marble. The Dolomite and Marble have not been modelled as separate geologic units in the existing geologic model, so their location in the pit slopes is not defined. They have similar properties based on the strength and weathering data collected by ATAC; however, they may be slightly less fractured and are less likely to be foliated based on our review of the core and core photographs.

4.6.1 Carbonate Rock

The Carbonate Rock is typically a Medium Strong (R3, 25 < UCS < 50 MPa) rock with a variable degree of rock fracturing that will form a blocky rock mass. The RQD measurements (Table 4.6) indicate that its Rock Quality ranges from Poor (25 < RQD < 50) to Good (75 < RQD < 90), but is typically Fair (50 < RQD < 75). Where the limestone is dolomitized or marbleized, the rock strength will likely be higher strength and less fractured. Fair Quality Rock Masses consisting of Medium Strong Rock are characterized as typically having high shear strength relative to the slope height, so strength-controlled instability of inter-ramp and overall slopes is not anticipated. Given that the Rock Quality is greater than “Fair Quality” (RQD = 50 to 75) it may be difficult to pre-split the rock, which is essential for safely maximizing slope angles. It should be possible to form bench faces in this rock by trim blasting. Examples of typical core consisting of Carbonate rock are shown in Figure 4.1

4.6.2 Volcaniclastic Rock

The Volcaniclastic Rock is a Medium Strong (R3, 25 < UCS < 50 MPa) rock with a variable degree of rock fracturing that will produce a blocky or seamy rock mass. Similar to the Carbonate Rock, the RQD measurements (Table 4.6) indicate that most of the rock consists of Poor (25 < RQD < 50) to Good (75 < RQD < 90) Quality rock, but it is typically Fair (50 < RQD < 75) Quality rock. The Volcaniclastic Rock appears as 10 to 20 meter thick layers in the cross sections shown in Figures 2.2 through 2.5, it and dips to the northeast. Based on geologic interpretations, the foliation in the Volcaniclastic Rock also dips to the northeast and into the bench faces, a favorable orientation for bench slope stability. The rock mass shear strength is high relative to the slope height, and the ability to form steep slopes will be dependent upon the steepness of stable bench faces that can be developed in this unit. Typical core from the Volcaniclastic Rock showing the foliation is shown in Figure 4.2

4.6.3 Oxide

The Oxide is classified as an Extremely Weak Rock (R0, 0.25 < UCS < 1 MPa). The mineralization and weathering processes in this unit have destroyed the primary structures in the rock and it is highly fractured. To estimate its engineering behavior in pit slopes, the Oxide should be considered to consist of a very dense silty sand or very hard silt with low plasticity. It strength in pit slopes is dependent primarily on the frictional strength it develops under load rather than its intact strength. Its ability to form steep pit slopes of significant height will be dependent upon its shear strength. Our experience with similar

materials is that this material can be mechanically excavated without blasting. These materials will readily erode where exposed in the pit slopes.

Where the water content of the Oxide is greater than about 20 percent, the Oxide is likely nearly saturated. That is, the voids in the soil mass are almost completely filled with water. The depth of seasonal frost penetration could range from about 1 to 2 meters on exposed surfaces. Silty sands and silts are susceptible to significant strength loss upon thawing in the summer months, particularly when they are nearly saturated. Degradation and erosion of benches excavated in Oxide should be anticipated during the summer thaw. Figure 4.2 shows typical core obtained in the Oxide.

5.0 STABILITY EVALUATION

5.1 Potential Stability Controls

Pit slope stability in competent rock is generally controlled by structural conditions and operating practices. Pervasive structures such as joints commonly control bench-scale stability, while individual faults, shears, contacts, and other continuous structures that can develop along bedding or foliation can control large-scale stability, and bench-scale stability locally.

Rock mass failures are generally limited to very high slopes in competent rock masses or smaller slopes in weak rock masses. Our preliminary stability evaluation consists of evaluating the potential control of pervasive and large-scale structures on bench and inter-ramp slope stability. We also assessed the risk of rock mass instability for overall slopes qualitatively based on rock mass characteristics, and on slope stability analyses and slope performance in similar materials at other open pit mines.

Where there are no structural controls on pit slope stability, and the rock mass strength precludes rock mass failure, stability and safely achievable slope designs are controlled by operating practices. We evaluated operating practices, particularly blasting methods, based on the characteristics of the geotechnical units defined by their RQD, RMR_{76}, and ISRM Rock Strength Classification.

5.2 Structurally Controlled Stability

The stability of slopes in competent rock can be controlled by structures, or combinations of structures that define kinematic failure modes. These involve movement of intact blocks along one or more discontinuities, typically in planar, wedge, toppling, or combination modes. Stability with respect to these failure modes is a function of slope orientation, discontinuity orientation, discontinuity shear strength, groundwater conditions, and external forces. Structures that could potentially control stability at the Tiger Zone include bedding, joints, foliation, faults, and contacts.

Kinematic failure modes can affect bench-scale, inter-ramp, or overall slopes, depending on the continuity of the structures. As such, persistence is an important consideration in evaluating the significance of any potential failure modes that are indicated. Bedding, foliation, fault, and contact structures may be continuous on an overall slope scale. Joints generally have more limited continuity, but until exposure during mining allows persistence to be evaluated directly, prominent structures such as the foliation that may form a control on bench stability should be considered continuous on an inter-ramp scale.

There is currently little quantitative data on the distribution of structures and their orientations in the Tiger Zone. However, the geological model enables a preliminary assessment of potential structural controls on slope stability. This assessment is based on assumed geological conditions and will need to be confirmed by additional studies, particularly by oriented core measurements.

5.2.1 Large-Scale Structurally Controlled Stability

Faults strike to the northwest and dip steeply to the east and west (Figures 2.2 through 2.5). Faults in these orientations could not control large-scale slope stability because they dip more steeply than the design slope angles. Any instability related to these faults would be expected to be bench-scale or multi-bench instability limited to the immediate vicinity of the fault zones due to locally low rock mass strength. Where such conditions exist, it is sometimes possible to excavate the pit slope such that if falls in the footwall of the fault zone, for example, stability is improved if the pit wall is excavated into the footwall of the Footwall fault as shown in Figure 2.5

5.2.2 Bench-Scale Stability

Bench-scale stability will be controlled by structures with limited continuity, such as joints, and also by continuous structures such as foliation and faults where they are present. Foliation is expected to be the primary structural control of bench stability. As described previously, foliation is thought to dip steeply to the northeast in the Volcaniclastic Rock; it will dip into the pit slopes, an orientation favorable for stability.

The orientations of the joint and bedding planes in the Limestone are not defined. Widely spaced and rough joints are unlikely to form a control on bench slope stability over extensive areas of the pit. The high RQD values in the Carbonate Rocks, particularly those composed of Marble and Dolomite, suggest that jointing may not be so ubiquitous and wide spread in these rock units to form a control on the steepness of bench faces.

Bench-scale stability will also be controlled by both rock quality in terms of fracture intensity, and operating procedures of blasting and scaling. Rock quality and operating practices will limit stable bench face angles where structural conditions are favorable.

5.3 Stability of Benches and Inter-ramp Slopes in Oxide

Figure 1.1 indicates that slopes in Oxide could be up to 50 to 60 m high in the northern portion of the pit. While the Oxide is not actually a sanded dolomite, it has similar engineering properties and we expect it to behave similarly in pit slopes. Our experience indicates that these materials can be benched and the benches are stable slopes as long as they remain dry. Over time the benches are susceptible to erosion. At an open pit mine in Nevada, we have observed stable pit slopes excavated at 55 degrees and up to 50 m high in sanded dolomite.

These materials are friable and prone to erosion. As the material erodes from bench faces and crests, it accumulates and fills catch benches so they no longer provide good rockfall catchment. Eventually, the material forms talus slopes at the angle of repose at the base of the pit slope.

In areas such as Nevada with cold, semi-arid climates, erosion of bench faces may occur slowly so as to not fill benches during mining in small pits with short lives. Due to the subarctic climate with its increased frost penetration, rapid snowmelt, and decreased evaporation rates, the erosion of benches may be more rapid and severe in the Tiger Zone pit.

The depth of seasonal frost at the project site could be up to several meters. Upon thawing, the Oxide may lose strength, particularly if it is near saturation either due to groundwater or surface water infiltration. The thawed material would be easily eroded by surface water flowing onto benches from snowmelt or precipitation. The unanticipated loss of benches in the Oxide due to erosion and thaw weakening may require step-outs be left in the pit. Consideration should be given to scheduling and equipment selection during Pre-feasibility and Feasibility level studies to select appropriate mining methods to lessen the impact of bench erosion in the Oxide.

In the subarctic, where ground water is trapped behind frozen rock and soil, high pore pressures can develop that result in bench and inter-ramp slope instability. Surface drainage controls at the pit perimeter and on benches can reduce the amount of infiltration into benches and improve bench face stability. These controls should be evaluated and developed further during Pre-feasibility level studies.

5.4 Rock Mass Stability

Where there is no simple structural control of stability, estimates of rock mass strength are used to evaluate the stability of slopes in rock masses. The slope of greatest concern is the high slope on the north side of the proposed pit (Section A-A' in Figure 5.1). We evaluated the stability of this slope by performing a limiting equilibrium slope stability analysis using the program Slide 6.0 (Rocscience, 2012).

The weight of the soil and rock in pit slopes creates shear stresses within those slopes. Pore pressure in the slope reduces the available effective shear strength of the rock mass. If the shear stresses are greater than the available effective shear strength over large zones within the slope, the pit slope will become unstable. The likelihood for pit slope instability due to shear through the soil and rock mass comprising the pit slopes was evaluated by performing limiting equilibrium slope stability analyses using Spencer's Method of Slices (Spencer, 1967) as implemented in the computer program Slide 6.0 (Rocscience, 2012). Spencer's method is an "accurate" method that satisfies both horizontal and vertical force and moment equilibrium. It provides calculated factors-of-safety (FOS) that are comparable to values calculated by other "accurate" methods.

In evaluating slope stability by limiting equilibrium methods, a FOS that represents the ratio of the resistance along the slip surface (mobilized through soil or rock mass strength) over the driving forces destabilizing the slide mass is computed for trial surfaces through the soil or rock mass. The FOS for each trial surface is calculated and the minimum FOS provides an indication of the level of stability of the

slope. Algorithms programmed within Slide generate trial slope surfaces and identify the surface with the lowest FOS (critical surface). Typical minimum acceptable FOS for open pit mine slopes are on the order 1.2 to 1.3 for overall slopes where the consequences of failure are low, and are up to 1.5 for slopes containing critical facilities and access ramps (Read and Stacey, 2009).

5.4.1 Generalized Hoek-Brown Failure Criterion

The results of soil shear strength tests, such as were performed on the Oxide, can be used directly in slope stability analyses. It is inappropriate however to use the results of small-scale laboratory tests on intact rock to directly estimate the shear strength of rock masses containing fractures. Defects in the rock mass reduce the shear strength to a value less than the shear strength of the intact rock obtained by UCS and triaxial tests of samples of rock core. The most reliable estimates of the rock mass shear strength are obtained from the back analysis of failed slopes, and reliable lower bound estimates can be obtained from back analyses of stable slopes. In-situ tests can sometimes be conducted on representative volumes of rock mass, but high quality in-situ tests are expensive and are usually not justified unless the impacts of slope failure are great. If there are no comparable slope failures in similar rock masses, the rock mass shear strength can be estimated through the use of empirical rock mass shear strength criteria. For this study, we estimated the rock mass shear strength based on the method initially developed by Hoek and Brown (1980) and subsequently modified based on experience (Hoek and Brown, 1988; Hoek et. al., 2002).

The Hoek-Brown rock mass strength criterion is the most widely accepted method of estimating rock mass shear strength in rock masses comprised of brittle, fractured rock such as the Carbonate and Volcaniclastic Rock at the Tiger Zone project. Hoek and Brown's rock mass strength criterion is based on empirical results and utilizes the RMR classification system developed by Bieniawski (1976).

The generalized Hoek-Brown criterion (Hoek, et al., 2002) defines the relationship between major principal stress and minor principal stress at failure based on the following equation:

$$\sigma'_1 = \sigma'_3 + \sigma_{ci}\left(m_b \frac{\sigma'_3}{\sigma_{ci}} + s\right)^a$$

where:

σ'_1 = the major effective principal stress at failure

σ'_3 = the minor effective principal stress (confining stress)

m_b, s, a = Hoek-Brown material constants for jointed rock mass

σ_{ci} = the uniaxial compressive strength of intact rock

Values for m and s vary with rock mass quality and rock type, with the upper limits of the value ranges defined by m and s for intact rock (i.e., intact core samples). Triaxial compressive strength testing data

can be used to determine m for intact rock (termed m_i); alternatively, published data can be used if triaxial test data is unavailable. The value of *s* for intact rock is 1.

Given the values of m_i and s for intact rock, the parameters m and s for the broken rock mass are calculated based on the following equations (Hoek et al., 2002); in effect, these equations reduce m and s from the values for intact rock based on the rock mass quality, as indicated by the measured RMR_{76}. A disturbance factor which relates to the effects of blasting/excavation and stress relief on rock mass integrity is also applied:

$$m_b = m_i \, exp\left(\frac{RMR_{76} - 100}{28 - 14D}\right)$$

$$s = exp\left(\frac{RMR_{76} - 100}{9 - 3D}\right)$$

where D is a factor that depends on the degree of disturbance that the rock mass has been subjected to by blast damage and stress relaxation. D varies from 0 for undisturbed rock to 1 for very disturbed rock.

Hoek et al. (2002) provide the following expression for determining a value for constant a that is a function of RMR_{76}:

$$a = \frac{1}{2} + \frac{1}{6}\left[exp\left(\frac{-RMR_{76}}{15}\right) - exp\left(\frac{-20}{3}\right)\right]$$

Given the uncertainty in the results of slope stability analyses based on rock mass shear strength estimates, the appropriate use of such analyses is not necessarily as a design tool to select an appropriate slope height and slope angle based on safety factors, but rather as a basis for semi-quantitative estimates of the likelihood that rock mass shear strength is a controlling factor in slope design. If stability analyses using conservative assumptions indicate reasonable safety factors, our experience suggests that rock mass failure is unlikely to be a controlling factor. If unacceptable safety factors are calculated, additional evaluation of the potential for, and the impacts from, a rock mass failure would be required. These evaluations might include evaluation of the impact of unstable slopes on mine plans and incorporation of design elements and operating practices to reduce the impact of potential rock mass failure mechanisms. They may also include additional engineering studies and laboratory testing depending on the failure mechanism.

5.4.2 Design Material Properties

5.4.2.1 Rock Mass

The Hoek-Brown shear strength criteria requires the estimation of the UCS and material constant, m_i, of the intact rock; the rock mass quality (RMR_{76}); and an estimate of the degree of disturbance of the rock mass as defined by a disturbance parameter, *D*. We developed Hoek-Brown shear strength parameters

for the Carbonate Rock based on the typical geotechnical parameters presented in Section 4. We did not develop parameters for the Volcaniclastic Rock because it does not occur in Section A-A' shown in Figure 5.1

Since no laboratory UCS tests or field point load tests are available, we assumed that the UCS of the Carbonate rock is the average value of Medium Strength (R3, 25 < UCS < 50 MPa); that is the UCS is equal to 37 MPa.

A material constant, m_i, can be determined from triaxial tests on intact rock; however, these are often not available for Scoping level studies. Hoek and Karzulovic (2000) indicate that the value of m_i for limestone and dolomite can range from 6 to 15; we used an average m_i of 10 for our analyses.

We assumed a value of RMR_{76} of 59 for the Carbonate Rock corresponding to the typical value of RMR_{76} in Table 4.8.

A disturbance factor, D, of 0 was selected for use in our analysis. This is an appropriate value to use for shear surfaces extending deep into the rock mass where stress relaxation or damage due to blasting is unlikely to occur (Hoek, 2012).

A summary of the values of UCS, RMR_{76}, m_i, and D used in the Hoek-Brown Failure Criterion formulas to obtain the Hoek-Brown rock mass shear strength parameters m_b, s, and a used in our analyses are provided in Table 5.1.

Table 5.1: Design Rock Mass Properties

Geotechnical Unit	Unit Weight (kN/m^3)	UCS (MPa)	RMR_{76}	Hoek-Brown Failure Criterion Parameters				
				m_i	D	m_b	s	a
Carbonate Rocks	28	37	59	10	0	1.0326	0.00022	0.5099

5.4.2.2 Oxide

Design shear strength parameters for our slope stability analysis were estimated from the direct shear tests presented in Section 3. The following properties were used in the analysis:

- Friction angle = 32 degrees
- Cohesion = 250 kPa
- Unit Weight = 24 kN/m^3

5.5 Stability Analyses

Figures 5.2 and 5.3 show the configuration of the slope corresponding to the Section A-A' in Figure 5.1. In the sections used in the analyses, the portion of the slope consisting of Oxide is somewhat larger than is

indicated in Section A-A' to simplify that analysis. This adds an additional degree of conservatism into the analyses.

Important assumptions of the analyses include:

- The rock mass is accurately characterized by the average value of rock strength and RQD assigned to the core by ATAC geologists and the value of RMR_{76} assigned to the rock mass in Table 4.8.
- The strength of the Oxide can be represented by the results of direct shear tests on remolded material.
- A disturbance factor, *D*, of 0 applied to rock mass strength estimates implies that good quality, controlled blasting will be used near the pit walls to minimize disturbance of the rock mass due to blasting
- The shear surface in the rock mass does not follow unfavorably oriented major structures.

For the stability analyses, we considered three slope geometries to evaluate the stability of the current design and also the potential for steepening the pit slopes. Case 1 (Inter-ramp Slope Angle (IRA) in Carbonate Rock = 45 degrees, IRA in Oxide = 30 degrees). In Cases 2 and 3 we steepened the IRA in the Carbonate Rock in 5 degree increments and by 10 degree increments in the Oxide to evaluate if steeper pit slopes would be stable. The slope configurations we evaluated are shown in Figure 5.2 and 5.3. These slope configurations assume that if the inter-ramp slope angles in the Carbonate Rock and Oxide were steeper the amount of stripping would be reduced so the slopes shown in Figure 5.2 and 5.3 are not as high as the slope shown in Figure 5.1.

The regional groundwater table is thought to be located below the pit; however, there are no groundwater measurements to verify this. Perched water is frequently encountered in rock masses, and joints and open fractures may be great enough to allow the water contained in the rock mass to drain freely; however, the degree of drainage will not be known until the pit is excavated. We performed one set of analyses assuming the slope is fully depressurized (most favorable conditions), which corresponds to the groundwater condition thought to most likely exist.

To evaluate the effects of less favorable groundwater conditions we also modelled partial saturation by assuming a range of pore pressure coefficients. The pore pressure coefficient is a convenient way to express the pore pressure in a slope. This pore pressure is expressed as a function of depth below the slope. The pore pressure coefficient (r_u) defines pore water pressure as:

$$u = r_u * \gamma(t) * z$$

Where:

u= pore pressure
r_u=pore pressure coefficient
γ(t) = total unit weight of material
z=depth of soil above point where pore pressure is defined

A pore pressure coefficient of 0.1 might exist if there is locally perched groundwater. A pore pressure coefficient of 0.2 might be representative of a condition where the pit intersects a regional groundwater table that located at a depth equal to about one-half of the slope height.

The results of all of the analyses are summarized in Table 5.3.

Table 5.3: Summary of Scoping Level Slope Stability Analyses for Section A-A'

Case	Inter-ramp Slope Angle (degrees)		Factor-of-Safety for Indicated Groundwater Condition[1]		
	Carbonate Rock	Oxide	Fully-Drained	r_u=0.1	r_u=0.2
1 (Current design in Figure 1.1)	45	30	1.68	1.46	1.24
2	50	40	1.53	1.33	1.12
3	55	50	1.36	1.16	0.96

Note: 1. r_u = pore pressure coefficient

Acceptable factors-of-safety (Factor of Safety $\geq$ 1.3) for overall slopes in open pit mines (Read and Stacey, 2009) were obtained for all cases for the fully drained slopes over a range of inter-ramp slope angles. These stability analyses also indicate we would not anticipate slope instability due to overstressing of the rock mass even if Oxide material occurs at the toe for the pit as shown in Figure 1.1 for fully drained conditions. Unacceptable factors-of-safety (FOS < 1.3) were obtained where high pore pressure conditions exist (r_u = 0.2) for all slope angles and for moderate pore pressures (r_u = 0.1) for the slope angles assumed for Case 3. These results suggest that there is potential for increasing the design slope angles provided groundwater and structural conditions are favorable

6.0 SLOPE DESIGN

Our preliminary geotechnical characterization and stability analyses indicate that neither rock mass shear strength nor major structures form a control on the stability of pit slopes in Carbonate and Volcaniclastic Rock. Even where Oxide occurs at the toe of the slope, the shear strength of the Oxide and Carbonate and Volcaniclastic Rock is sufficiently high so as to not form a control on the stability of the pit providing pore pressures are low or the rock mass is fully drained. In this case, the inter-ramp slope angles are limited by achievable bench configurations.

Based on our preliminary investigations and understanding of the geology of the Tiger Zone, the orientation and persistence of the rock fabric, in this case the joints, foliation and bedding planes does not place a control on the stability of the bench faces. Where structure does not control bench stability, the bench face angle is controlled by operating practice, particularly blasting, and excavation methods and bench face scaling.

Given a stable bench configuration, the inter-ramp slope angle can be obtained by:

$$IRA = \arctan (H / (W + H \cot (B)))$$

Where IRA is the inter-ramp slope angle, W is the catch bench width, H is the bench height, and B is the bench face angle. The relationship between bench face angle, catch bench width, bench height and inter-ramp slope angle is shown in Figure 6.1.

Effective catch benches should be developed to retain rocks falling from the scaled bench faces. The width of catch benches is selected based on empirical guidelines and experience. A commonly used empirical criterion for catch bench width is the Modified Ritchie Criterion (Ryan and Pryor, 2000) as follows:

$$W = 4.5 + 0.2H$$

Where W is the minimum width of the catch bench a bench of height, H, both in meters.

The Modified Ritchie Criterion was developed based on empirical studies that correlated rockfall travel distance with the height of steep rock slopes (Ritchie, 1963). It is suitable for estimating catch bench width for steep bench faces in hard rock where fall of rock from the bench face is the primary mode of rockfall. Site-specific experience, where this is available, can also be used to select the design catch bench width. A typical minimum catch bench width that is effective for retaining rockfalls from steep bench faces is on the order of 8 meters.

In some provinces in Canada, the design width of catch benches is prescribed in safety regulations. For example, in British Columbia (2008), the minimum width of catch benches is specified to be 8 m. Based on a review of regulations, we did not identify similar regulations specifying minimum catch bench width for Yukon Territory (2010).

If strong structural control at flatter angles is lacking, the following BFA ranges are typically achievable, depending on rock quality and blasting methods:

- Standard production blasting (including Buffer blasting) – 55-65 degrees
- Effective controlled blasting (Trim Blasting) – 65-70 degrees
- Best-case controlled blasting (Pre-splitting) – 70-80 degrees

Design bench height is dependent on the reach of excavating equipment and the ore control requirements. Production benches can be stacked where feasible to optimize inter-ramp slope angles. Assuming the mining will be accomplished in 5 m high production benches, effective scaling of bench faces, and the benches are stacked to leave catch benches at 10, 15, and 20 meter vertical intervals, the maximum achievable inter-ramp slope angles are then as follows:

Table 6.1: Inter-ramp Slope Angle based on Bench Configuration

Vertical Separation between Stacked 5–m high Benches (m)	Catch Bench Width (m)	Blasting Method	Bench Face Angle (degrees)	Inter-ramp Slope Angle (degrees)
10 (double benching)	6.5	Standard Production Blasting	65	42
15 (triple benching)	7.5		65	46
20 (quad benching)	8.5		65	48
10 (double benching)	6.5	Trim Blasting	70	45
15 (triple benching)	7.5		70	50
20 (quad benching)	8.5		70	52
10 (double benching)	6.5	Pre-splitting	75	47
15 (triple benching)	7.5		75	52
20 (quad benching)	8.5		75	55

For this project, a conservative design assumption is that bench face angles of 70 degrees can be achieved by double benching (10 m high benches), trim blasting and effective bench face scaling in Carbonate and Volcaniclastic Rock. For this case, the corresponding inter-ramp slope is 45 degrees if 6.5 m catch benches are left in the pit slope.

If the rock conditions are better than anticipated, it may be possible to form steeper bench face angles by pre-splitting the Carbonate and Volcaniclastic Rock. Alternatively, if triple benching can be accomplished

so that a 7.5 m wide catch bench is left every 15 vertical m or an 8.5 m wide catch bench every 20 m, then it may be possible to achieve inter-ramp slope angles of 50 degree or steeper in the Carbonate Rock.

The stability analyses indicate that the inter-ramp slope angle in the Oxide is not a control on overall pit slope stability providing the slope is fully drained. The steepness of inter-ramp slope angles in the Oxide then depend on the ability to maintain catch benches in the slope. Triple benching is likely to be difficult in the Oxide; however, it should be possible to double bench so as to leave a 6.5 meter wide catch bench in the slope every 10 meters. Assuming benches in Oxide formed by machine excavation and trimmed with a dozer to form bench faces at 0.5H:1V (about 63 degrees), the corresponding inter-ramp slope angle is 40 degrees.

Over time, the benches in the Oxide will erode and debris will accumulate on and fill the catch benches. As the benches erode, the inter-ramp slopes in the Oxide will approach the angle of repose of the material. For the Oxide, this is approximately 37 degrees based on the direct shear tests presented in Section 3. The rate at which the benches will fill with debris from erosion will depend on site specific conditions, and may not be known until the pit is developed. To add an additional degree of conservatism to the design, we recommend that in areas of the pit where inter-ramp slopes are greater than 30 m high, the inter-ramp slope angle in the Oxide be limited to 35 degrees for the Scoping level study.

7.0 CONCLUSIONS

7.1 General

Based on the geotechnical data available, rock quality and structural conditions generally appear favorable for the development of moderate to steep inter-ramp slopes within the competent Carbonate and the Volcaniclastic Rocks providing future studies do not indicate unfavorable joint and foliation orientations. The steepness of the inter-ramp slopes will likely be dependent on the ability to form steep, stable bench faces and on the bench configuration during mining.

Specific conclusions supported by our characterization and stability evaluation include:

- Faults are not expected to form large plane shear and wedge failures so they do not form a control on overall pit slope stability
- Rock mass shear strength of the Carbonate and Volcaniclastic Rock is sufficiently high that the potential for overall slope failure due to overstressing the rock mass is indicated to be low.
- Where Oxide occurs in the toe of the slope, the limiting equilibrium analyses indicates the potential for rock mass shear failure is within acceptable limits for the expected groundwater conditions (fully drained) and likely range of inter-ramp slope angles achievable in the Carbonate and Volcaniclastic Rocks.
- Steep bench face angles should be generally achievable with careful blasting, excavation and scaling where structure orientations are favorable for bench stability.
- The benches in Oxide will be stable if developed by careful excavation method (no blasting to form bench faces) and trimmed, but will likely deteriorate to the extent that catch benches are lost due to erosion.

Engineering geologic conditions that may require significantly different slope angles are:

- Unfavorable structural orientations that result in bench face instability
- Zones of intense fracturing along faults that could result in bench face instability or generate rockfall from steep bench faces
- Local perched groundwater trapped behind frozen bench faces, particularly in the Oxide
- Severe and rapid erosion and loss of catch benches in the Oxide

7.2 Risks

Risks of rock mass failure appear to be low in the competent rock units (Carbonate and Volcaniclastic Rock) even where the Oxide occurs at the toe of the slope. Risk to rock slope stability therefore pertain primarily to geological risks related to the undocumented orientation of joints and foliation or presence of large, unfavorably oriented structures and the potential for encountering highly fractured rock adjacent to faults. For slope composed of Oxide, the risk to slope stability pertains to the loss of catch benches due to erosion and thaw weakening of the benches.

There are risks associated with mining at high latitudes that do not occur in more temperate climates. Besides thaw instability of the Oxide, seasonal freezing of bench faces can result in trapped water behind bench faces that in turn result in localized instability. Control of surface water for an open pit operating in the subarctic can be critical to achieving bench face stability.

7.3 Opportunities

Based on the geotechnical data and providing the orientation of jointing and foliation in the competent rock units is favorable, the Carbonate and Volcaniclastic rocks are generally favorable for development of steep slopes. Where there is no evident structural control, stability will be controlled by mining practice and there is the potential to maximize slope angles by implementing best operating practices in blasting, excavation, and scaling. Such practices will typically increase perimeter blasting costs. However, they should result in more stable and safer pit slopes, maximize safely achievable inter-ramp slope angles, and decrease scaling costs.

Realizing these opportunities at the Pre-feasibility level would require that ATAC:

- Determine the orientation of minor structures in the Carbonate and Volcaniclastic Rocks by structural measurements on oriented core
- Include the geotechnical data in the corehole database in the GEMS database, locations of weak and highly fractured Carbonate and Volcaniclastic Rock can be projected into the pit slopes

8.0 RECOMMENDATIONS

8.1 Scoping-Level Slope Design Recommendations

For bedrock slopes where the Oxide does not occur in the toe of slope, there is indicated to be little potential for either rock mass or structural control of overall or inter-ramp slope angles. Achievable pit slope angles in the bedrock (Carbonate and Volcaniclastic Rocks) will be determined by the bench configurations that can be developed and maintained safely. Bench configurations are defined by production bench height, achievable bench face angle (BFA), and catch bench width, all of which combine to define the inter-ramp slope angle (IRA) as shown in Figure 6.1. Since catch bench width for a given bench height is constant according to our design criteria, maximizing the IRA will be contingent on excavating the BFA as steep as possible.

The block model has been developed assuming blocks are 5 m high; this is the typical bench height required for grade control in small open pit gold mines. Stacking benches will be required to achieve moderate to steep inter-ramp slope angles. While it is premature to determine the most suitable bench configuration for optimized slope design, available data indicate that moderate to steep inter-ramp slope angles should be feasible in strong rock units (Carbonate and Volcaniclastic Rocks) and moderate slope angels should be feasible in the Oxide.

The scoping-level slope design recommendations in Table 8.1 are based on our current understanding of geotechnical conditions at the site, and assumptions regarding operating practices as noted.

Table 8.1: Scoping Level Pit Slope Design Recommendations

Geotechnical Unit	Inter-ramp Slope Angle (degrees)	Assumptions[1]
Carbonate Rock (Limestone, Dolomite and Marble) **Volcaniclastic Rock**	45	Trim Blasting Bench Height = 10 m (double benching) Bench Face Angle = 70 degrees Minimum Catch Bench Width = 6.5 m
Oxide (< 30 m high)	40	Buffer blasting (if required to loosen the Oxide)[2] Trim bench face by machine Bench Height = 10 m Bench Face Angle = 63 degrees Minimum Catch Bench Width = 6.5 m
Oxide (> 30 m high)	35	Buffer blasting (if required to loosen the Oxide)[2] Bench faces trimmed by dozer or excavator Bench Height = 10 m Bench Face Angle = 63 degrees Minimum Catch Bench Width = 10 m

Notes: 1. See Figure 6.1 for definition of bench height, catch bench width, bench face angle, and inter-ramp slope angle
2. No blasting in soil-like Oxide

If additional geologic modelling and geotechnical studies indicate that waste rock (Carbonate Rock and Volcaniclastic) has a low degree of fracturing in the pit slopes, consists of Medium Strong (R3, 25 < UCS <50 MPa) rock with Good to Excellent (75 < RQD < 100) Rock Quality with no adversely oriented systematic structure, it may be possible to excavate inter-ramp slopes as steep as 50 to 55 degrees. This condition may exist in the Dolomite and Marble on the west side of the pit.

Details of benching configurations should be resolved during Pre-feasibility and Feasibility-level studies. Details of surface water control and scheduling should also be resolved during the Pre-feasibility and feasibility level studies.

Flatter slope designs may be required if unexpected highly fractured zones or unfavorably oriented structures are encountered in the Fair Quality, Medium Strong Carbonate and Volcaniclastic Rock; if high pore pressure conditions are encountered in the Oxide; or if erosion and thaw instability of the benches in the Oxide is severe.

8.2 Recommended Geotechnical Program to Support Pre-Feasibility Pit Slope Designs

Pre-Feasibility and Feasibility level pit slope designs should be based on factual data that documents geotechnical conditions in the vicinity of the pit slopes with a level of reliability that is consistent with ore reserve estimates. This should be achieved by a program of core drilling and testing to support feasibility-level pit slope design analyses.

The Occupational Health and Safety Act for Yukon Territory also requires that a design report be prepared and maintained for operating mines (Yukon Territory, 2010). The information required in this design report can most efficiently be collected during Pre-Feasibility and Feasibility Level pit slope design studies.

The following sections describe a program that should be completed to support Pre-Feasibility level pit slope designs. The geotechnical drilling program outlined will be sufficient for a Feasibility-level study if it documents favorable subsurface geotechnical conditions to a degree that enables reliable interpretation and projection of geotechnical conditions to all important slope sectors. However, if the geotechnical drilling program identifies unfavorable conditions, or does not document conditions sufficiently to enable reliable extrapolation of conditions to all important pit slopes using the geotechnical and geologic models, additional geotechnical core drilling would be required to fill the geotechnical data gaps in order to support Feasibility-level pit slope designs.

8.2.1 Geologic Modelling

The data already collected by ATAC provides a good basis for developing a computerized geologic model. We recommend that the RQD, Weathering, and Rock Strength data be included in this model. Projection of this data into the pit slopes should enable us to identify locations where steep bench faces can be obtained.

Wire frame models of the major faults shown in the cross sections should be prepared and projected into the pit slopes. These projections can be used to identify large structurally controlled failures and combined with the RQD data indicate where fractured rock zones are likely to occur in the pit slopes or near bench faces.

The geologic model containing RQD, Weathering, Rock Strength and models of major faults in addition to the lithologic models should be completed prior to finalizing the location of any future geotechnical coreholes.

8.2.2 Exploration Core Drilling

Basic geotechnical data of RQD, degree of weathering, and a field strength estimate should be logged for all exploration cores to support further development of a geotechnical model of rock mass quality and structure.

8.2.3 Geotechnical Drilling

8.2.3.1 Geotechnical Core Logging

Geotechnical coreholes should be drilled in the areas of the proposed pit walls to allow characterization of the rock mass and to help identify any pervasive structures or major faults that may influence bench slope performance. These coreholes should be logged to obtain detailed geotechnical information used to calculate Rock Mass Rating (RMR – Table 6.2). Additionally, the core should be oriented to identify structural sets that may control stability.

Targets for drilling should include:

- The Limestone in the highest (north) pit slope.
- The Limestone and Volcaniclastic in the east wall of the pit
- The Limestone, Dolomite, and Marble in the west wall of the pit
- The fault that truncates the Oxide on the southwest
- The Oxide where it will be exposed in the west and north walls of the pit.

The geotechnical coreholes should be inclined at about 60°, drilled into the pit walls, and pierce the walls around 1/3 of the height from the pit bottom, and should extend to the depth of the pit bottom. We estimate five or six geotechnical coreholes will be required for the Pre-Feasibility Study.

The final locations of the geotechnical coreholes should be determined based on the geologic model and discussions with site personnel to ensure that the locations are representative and accessible. To the extent practical, geotechnical coreholes can be located to provide additional information for resources estimates, condemnation purposes, or waste rock characterization.

Geotechnical coreholes should be logged to collect data including RQD, lithology, total core recovery, fracture frequency, ISRM strength index, joint condition (JCR), and weathering/alteration index. Fracture characteristics should also be documented by collecting detailed information on the individual fractures within each run, such as depth, type, shape, roughness, infilling type, and infilling thickness. Triple tube (HQ-3) coring is the preferred method of drilling for geotechnical purposes to maximize core recovery and minimize disturbance in sensitive material. The triple tube system enables the core to be viewed and logged in as close to its in situ condition as possible, and minimizes disturbance during transfer of core from the split tubes to the core box or sample tray. The drilling company should provide extra split tubes to temporarily store the core until it has been logged. Many companies have old split tubes available; if these are not available the drillers should supply suitable materials for temporarily storing core, such as split PVC tubing of an appropriate diameter, or angle iron core trays.

Drilling quality, and driller knowledge and experience, are important considerations in implementing a successful geotechnical core drilling program. We recommend contracting a drilling company that will staff the project with drillers experienced in geotechnical core drilling and that will provide all necessary equipment and supplies.

8.2.3.2 Core Orientation

Design of pit slopes in rock generally requires oriented coring to provide joint, bedding, foliation and discontinuity data to support design. Obtaining orientations for discontinuities in drill core can be accomplished by several mechanical methods or by using televiewer surveys. Several methods can produce acceptable results in good quality rock.

We understand that ATAC Resources uses the the Reflex Ace Core Tool (ACT) for core orientation at other properties and their geologists are experienced in its use. Golder experience is that of the currently available mechanical methods, the ACT core orientation system, when used properly, can provide good results over a wide range of conditions. ACT system is an appropriate core orientation system for use at ATAC's Tiger Zone project. Where mechanical core orientation systems are used, it is critical that quality control checks, including comparing the orientation reference line from one run to the next, be conducted during drilling operations and structural orientation data be plotted on stereonets as it is collected. Minor variations in procedures and lack of care by drilling company personnel can reduce the reliability of structural orientations collected by these methods to the extent that the data is useless. When mechanical methods of core orientation are used, we recommend that the drilling operation be staffed with a geologist

familiar in the correct use of these tools to make sure that drilling company personnel are using the appropriate techniques for core orientation and marking the core.

In poor rock quality rock, fracturing of the core commonly limits the ability to achieve reliable orientations using mechanical methods, and televiewer surveys generally enable more reliable orientation. Structures that intersect the borehole walls are clearly identifiable in televiewer images, but televiewer images by themselves often do not allow positive identification of structure type, or whether structures are “open” or “healed”. Televiewer images also do not allow evaluation of discontinuity properties (roughness, infilling type, etc.). Positive evaluation of these details requires correlation of the televiewer image logs with drill core. Televiewer surveys are performed after drilling is completed, so there is a risk of hole collapse and the loss of data due to inaccessibility; this is not a risk with mechanical methods. Compared to mechanical core orientation methods, there is less risk of obtaining unreliable data from televiewer surveys as it does not depend on the experience and care of the drilling company personnel to correctly use the orientation equipment and mark the core.

8.2.3.3 Drillhole Surveys

We recommend that the geotechnical coreholes be surveyed using a gyroscopic system. The survey data will be used to correct the ‘apparent’ measured structural orientations to ‘true’ orientations. It is our experience that this method produces more consistently accurate surveys.

8.2.3.4 Field Strength Testing

Point load testing should be implemented to measure strength of selected representative core samples to support the field strength classification system.

8.2.3.5 Laboratory Testing

Laboratory testing should include:

- compressive strength (UCS) testing on representative core samples from different geotechnical and alteration units for calibration of field point load tests
- soil index tests on gouge from fault zones and Oxide
- direct shear tests on gouge from fault zones
- direct shear tests on discontinuities, particularly foliation, in rock
- consolidated undrained triaxial tests with pore pressure measurements (CU/pp triaxial tests) on undisturbed samples of Oxide
- direct shear tests on intact samples of Oxide

The triaxial tests on the Oxide provide the most reliable estimates of shear strength of these materials; however, such samples can be difficult to obtain. The direct shear tests on intact samples is less reliable but easier to perform, and the results of these tests provide a check on the results of the triaxial tests. We recommend that both triaxial and direct shear tests be performed.

8.2.4 Surface Mapping

The vegetation and cover of soil and fractured rock at the surface make obtaining structure orientation measurements difficult; however, to the extent this can be accomplished such data is useful for providing a check on structure orientation measurements obtained from oriented core.

8.2.5 Pre-Feasibility Level Analysis and Pit Slope Design

The geologic model and the geotechnical investigation program should be used to develop a geotechnical model that characterizes the important mechanical and structural characteristics of the geotechnical units and supports the slope design process. Important elements of the engineering evaluation and feasibility level design should include:

- Evaluate and document structural characteristics and domains
- Characterize rock strength from field and laboratory testing
- Develop geotechnical model based on latest geologic model and geotechnical investigation
- Consider all surface and subsurface structural data spatially relative to pit slope locations to assess significance of any systematic variability
- Confirm overall slope stability using rock mass characterization and engineering analyses
- Evaluate large-scale and bench-scale structural controls of stability
- Develop bench configurations based on production bench heights, structural controls, and predicted blast performance and operating practices
- Develop standards for catch bench development and bench scaling consistent with slope design recommendations
- Develop preliminary perimeter blast designs to be used as a basis for estimating drilling equipment capital costs, and drilling and blasting operating costs
- Assess risks and opportunities for recommended slope designs
- Define ongoing geotechnical program appropriate to support risk management and pit slope optimization
- Document investigation, testing, model development, analyses, slope design recommendations, operating practices required, and recommended monitoring program in an engineering report

9.0 CLOSING

It has been a pleasure to work with ATAC personnel on this project. This report has been prepared for the exclusive use of ATAC and their consultants in preparation of a PEA for the Tiger Zone. If a substantial period of time elapses between the date of this report and the time design and development of the final pit occurs, we recommend that we review our conclusions and recommendations to account for new data that may be been developed in the time elapsed.

Respectfully,

GOLDER ASSOCIATES INC.

George Lightwood
Senior Engineer

GL/ap

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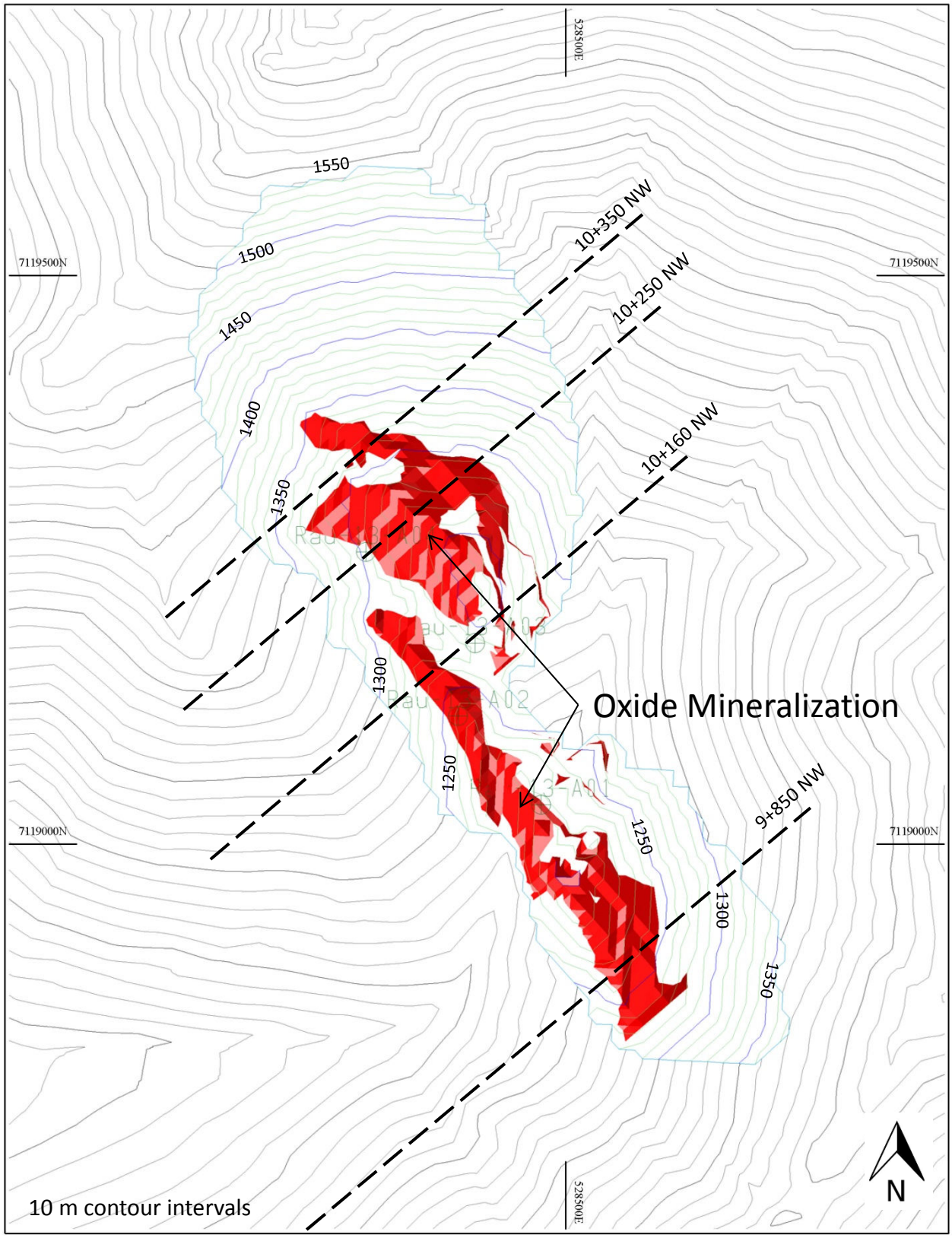
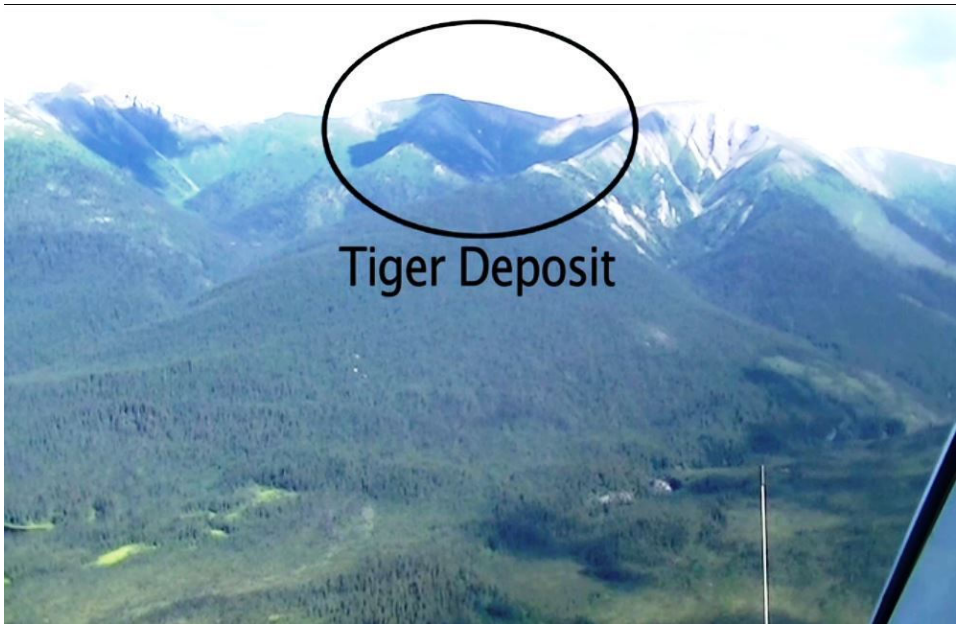
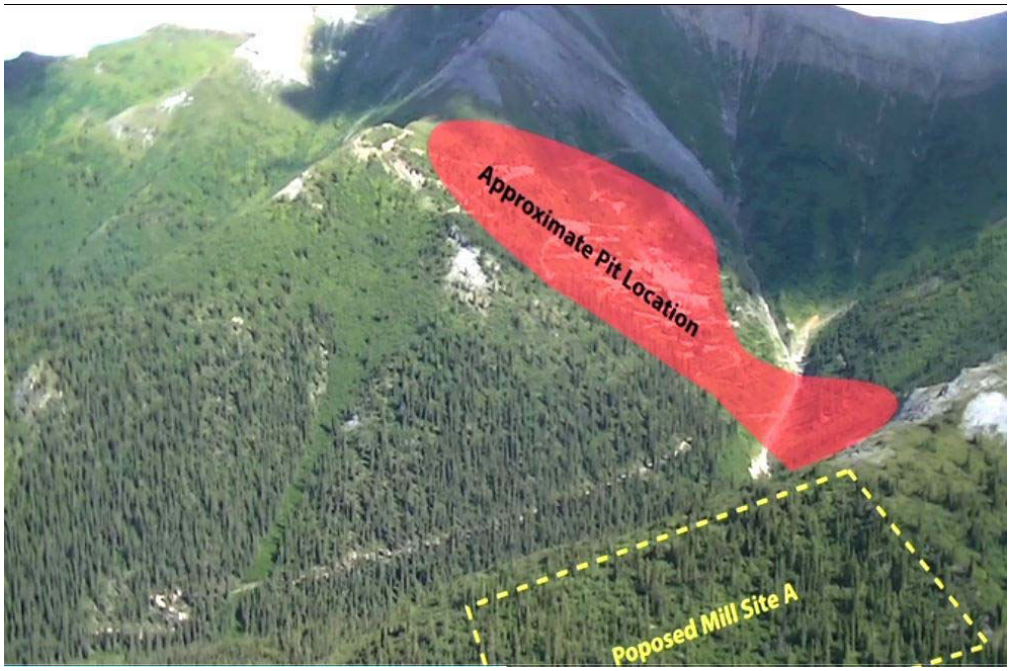
FIGURES



ATAC RESOURCES LTD. TIGER ZONE, RAU PROPERTY YT, CANADA	Drawn GL	Date 27 Jan 2014	Project Number 1302357
	Title **Figure 1.1** **Pit Shell and Oxide Mineralization**		



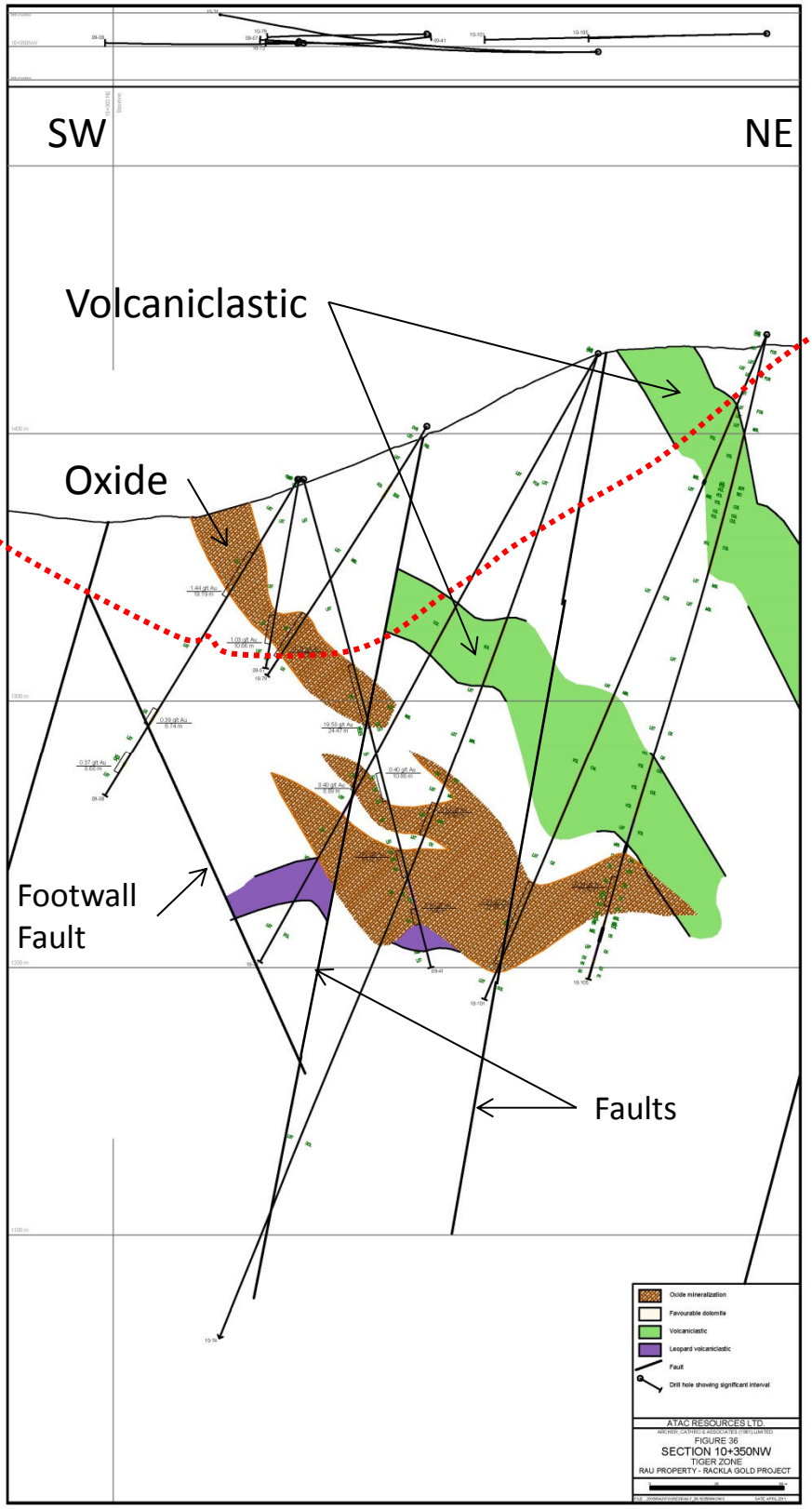
Tiger Zone Deposit



Pit Location

Note: Photographs provided by ATAC Flyover on July 19, 2013

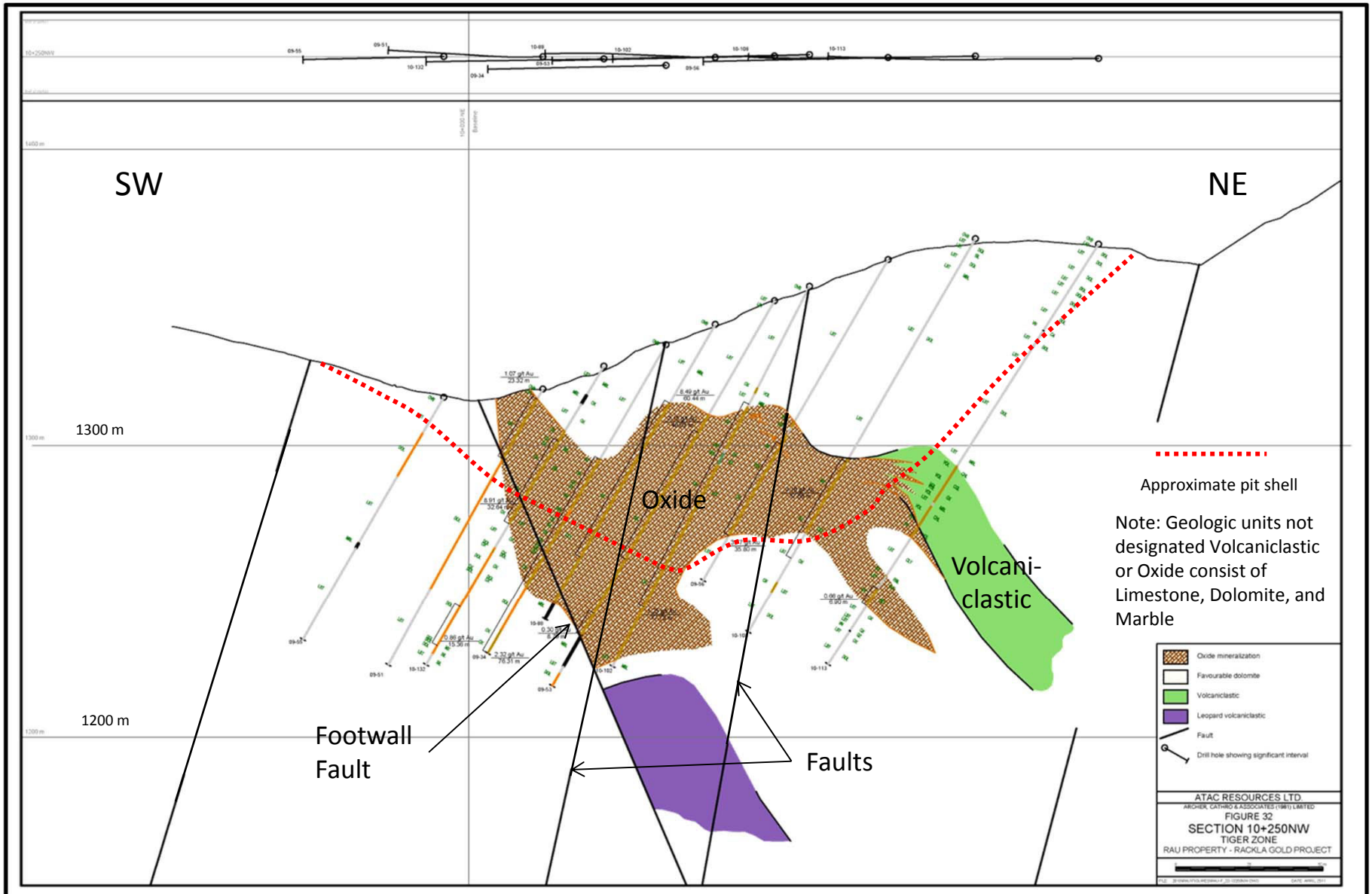
ATAC RESOURCES LTD. TIGER ZONE, RAU PROPERTY YT, CANADA	Drawn GL	Date 27 Jan 2014	Project Number 1302357
	Title **Figure 2.1** **Site Photographs**		



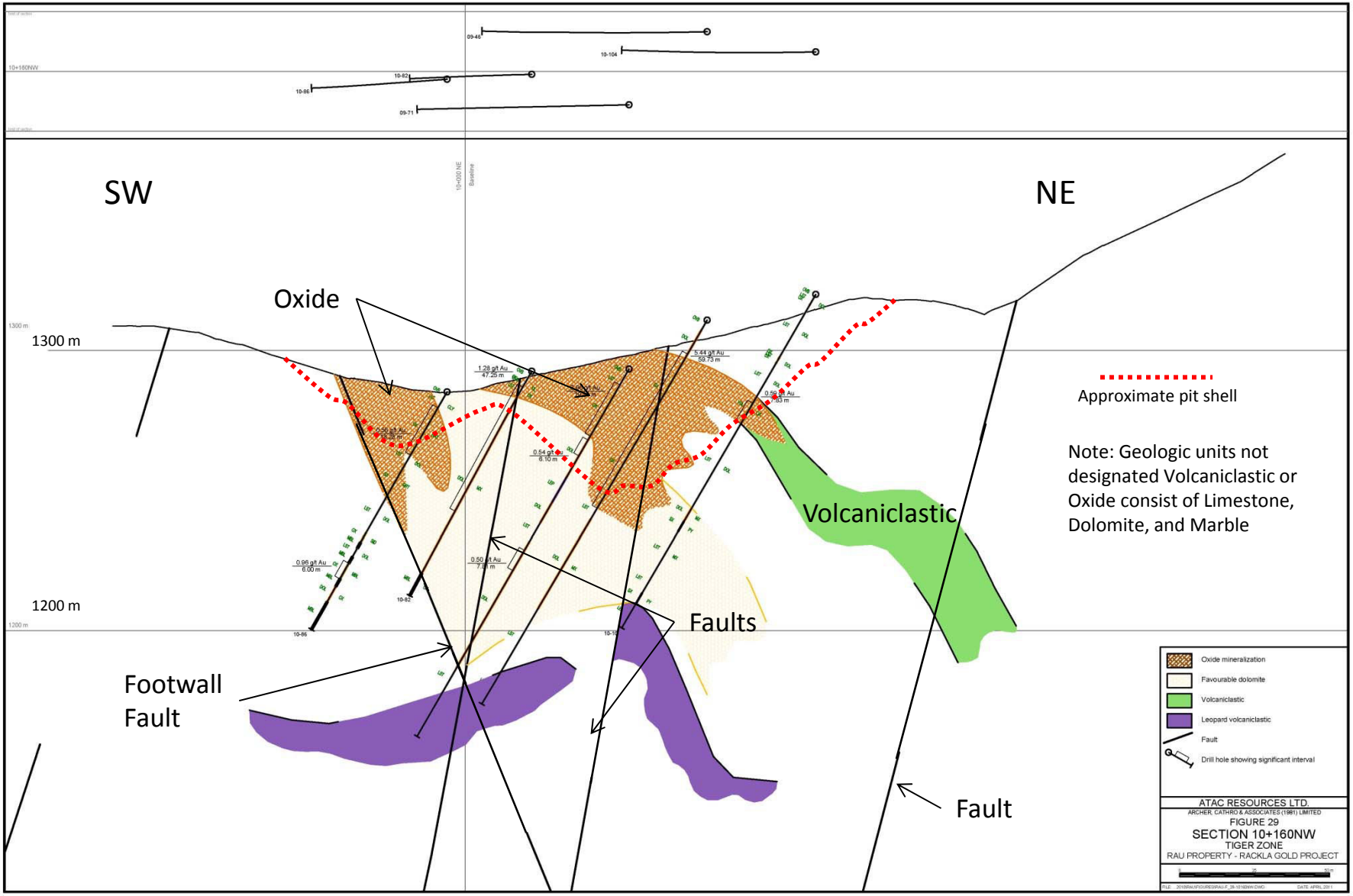
Approximate pit outline

Note: Geologic units not designated Volcaniclastic or Oxide consist of Limestone, Dolomite, and Marble.

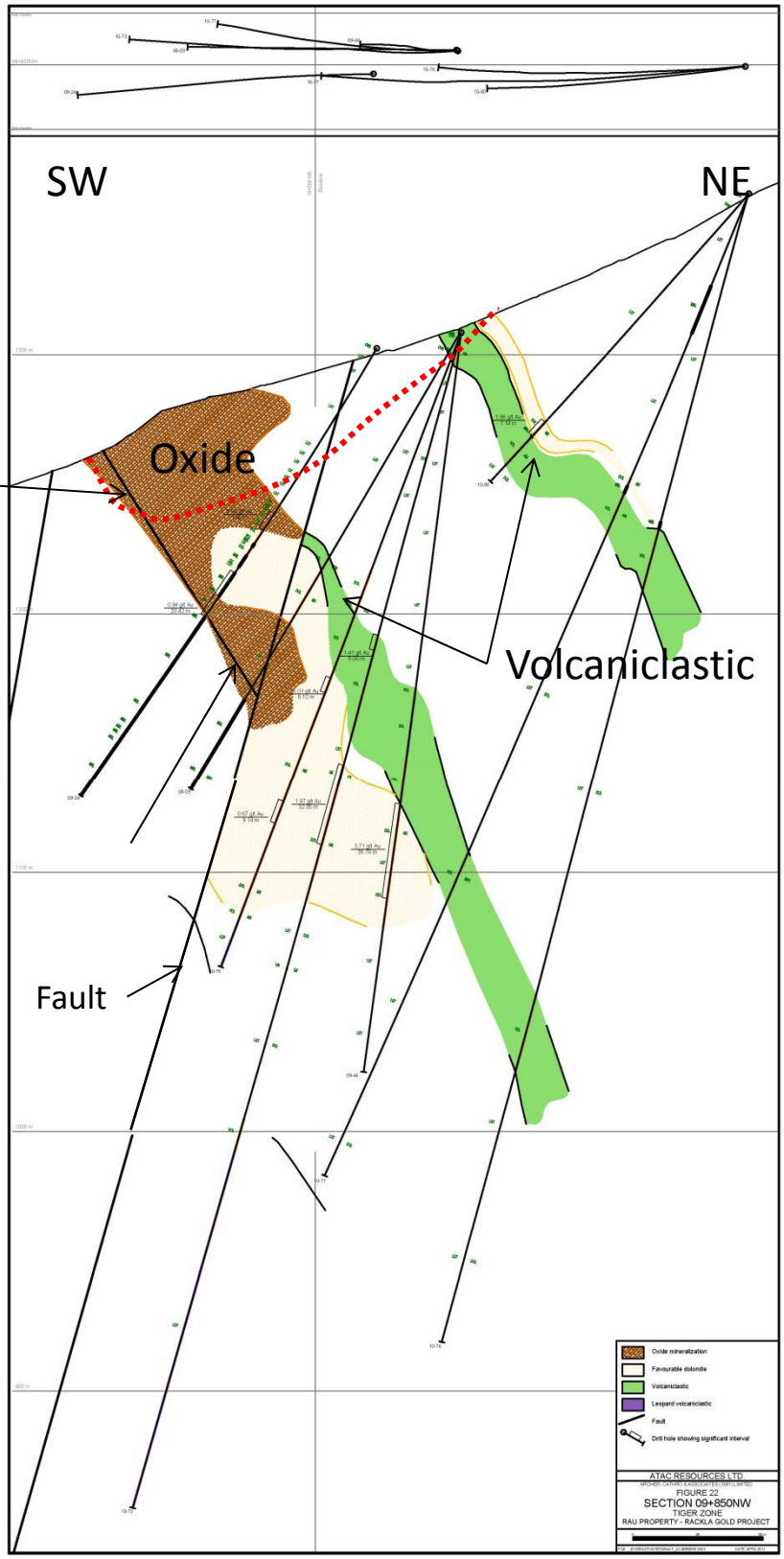
ATAC RESOURCES LTD. TIGER ZONE, RAU PROPERTY YT, CANADA	Drawn GL	Date 27 Jan 2014	Project Number 1302357
	Title **Figure 2.2** **Section 10+350NW**		



Golder Associates / ATAC Resources Ltd.	ATAC RESOURCES LTD. TIGER ZONE, RAU PROPERTY YT, CANADA	Drawn	GL	Date	27 Jan 2014	Project Number	1302357
		Title	**Figure 2.3** **Section 10+250NW**				



ATAC RESOURCES LTD. TIGER ZONE, RAU PROPERTY YT, CANADA	Drawn GL	Date 27 Jan 2014	Project Number 1302357
	Title **Figure 2.4** **Section 10+160NW**		



Approximate pit outline

Note: Geologic units not designated Volcaniclastic or Oxide consist of Limestone, Dolomite, and Marble.

ATAC RESOURCES LTD. TIGER ZONE, RAU PROPERTY YT, CANADA	Drawn GL	Date 27 Jan 2014	Project Number 1302357
Golder Associates	Title **Figure 2.5** **Section 09+850 NW**		

Limestone

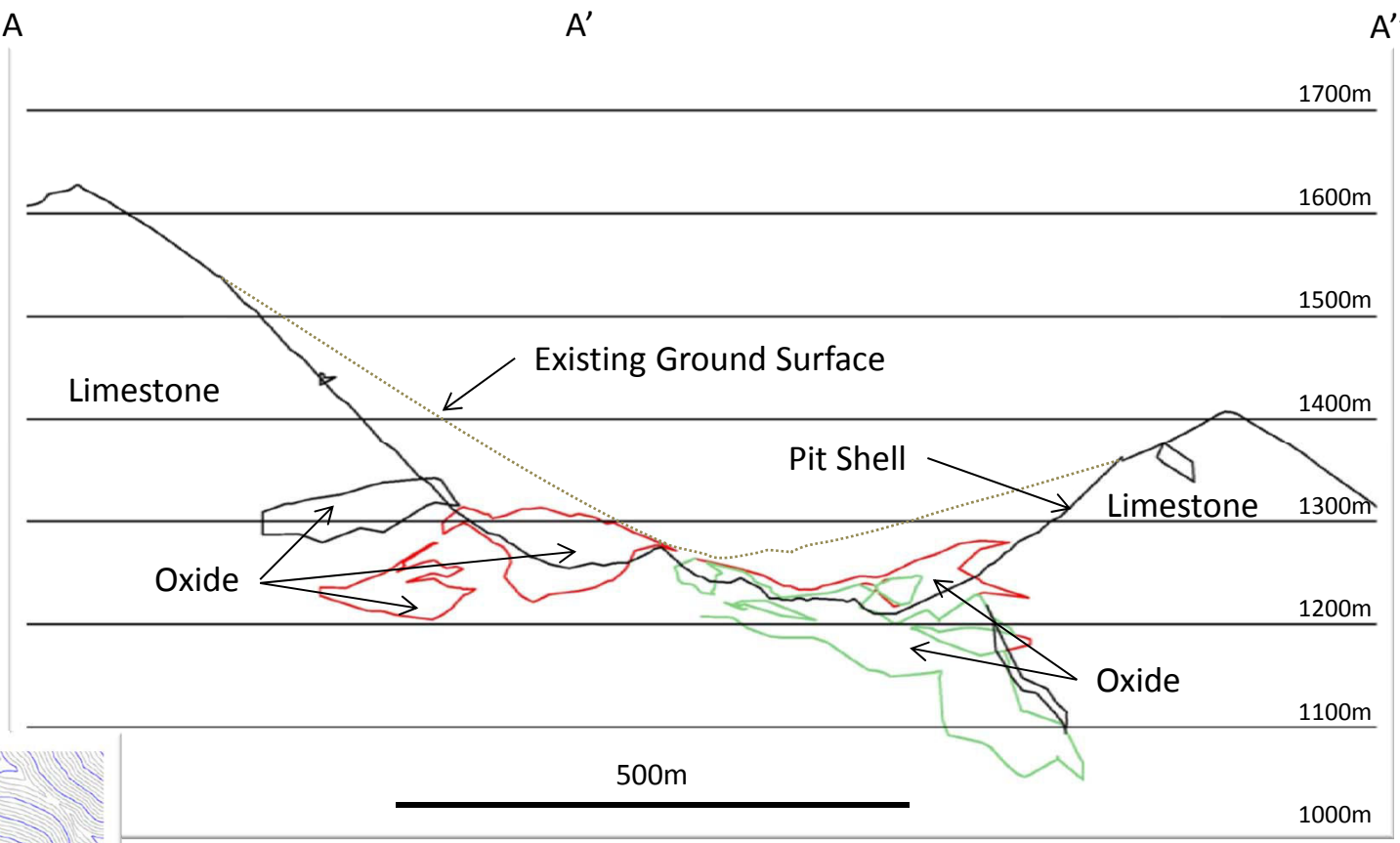
Dolomite

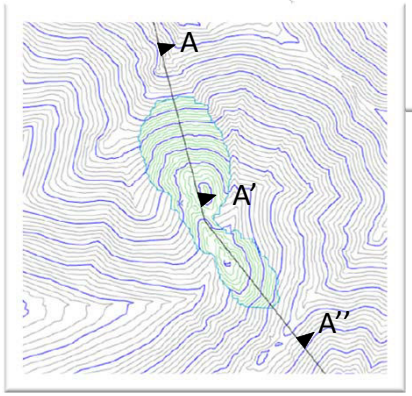
ATAC RESOURCES LTD. TIGER ZONE, RAU PROPERTY YT, CANADA	Drawn GL	Date 27 Jan 2014	Project Number 1302357
	Title **Figure 4.1** **Core Photographs of Carbonate Rock**		

Volcaniclastic

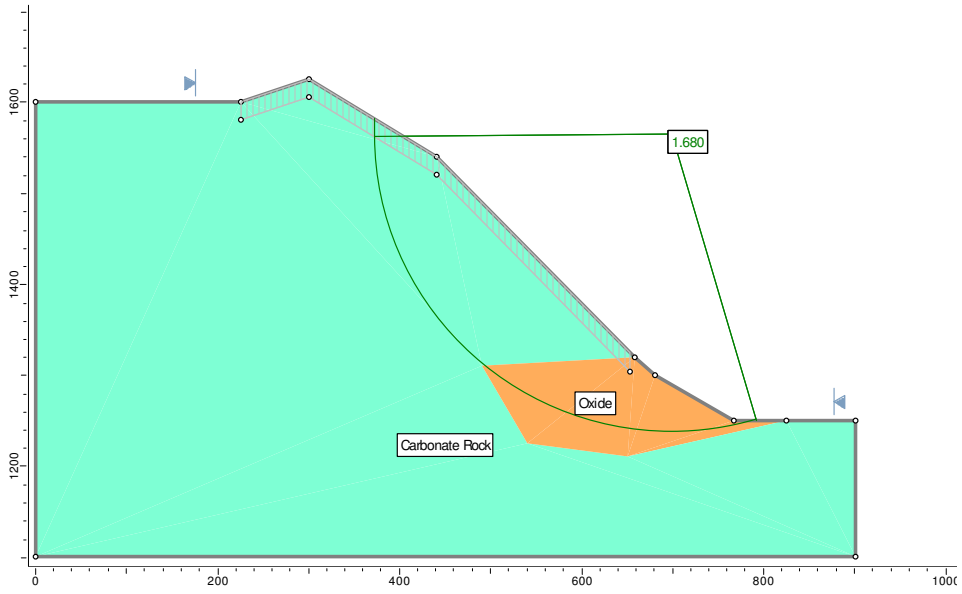
Oxide

ATAC RESOURCES LTD. TIGER ZONE, RAU PROPERTY YT, CANADA	Drawn GL	Date 27 Jan 2014	Project Number 1302357
Golder Associates	Title **Figure 4.2** **Core Photographs of Volcaniclastic Rock and Oxide**		

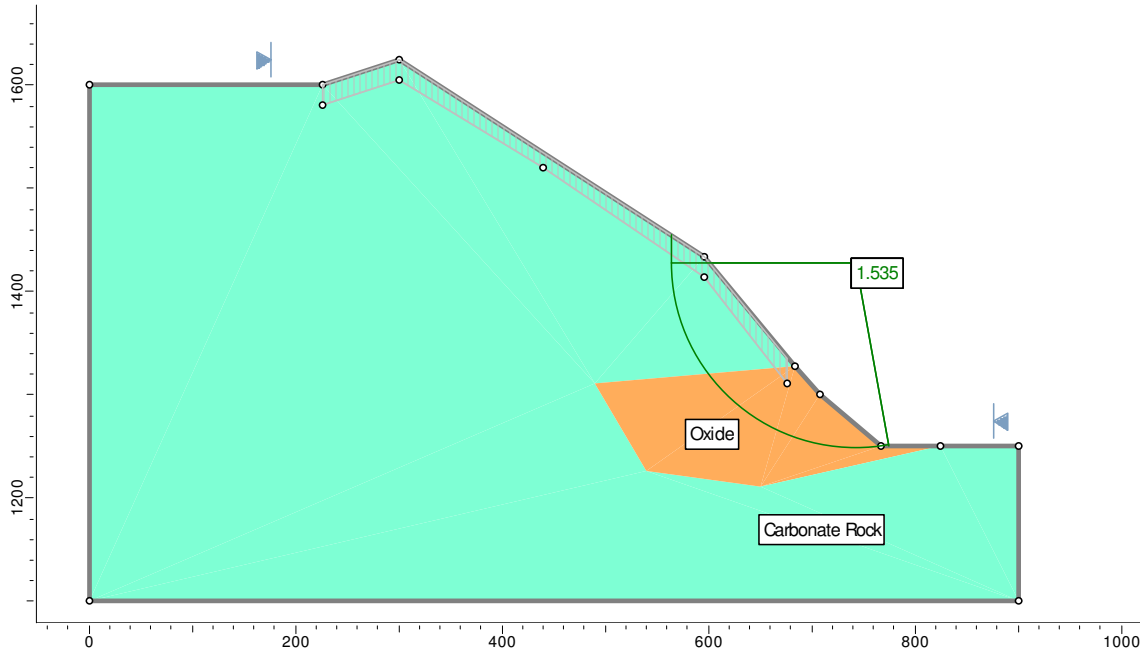




Golder Associates / ATAC Resources Ltd.	ATAC RESOURCES LTD. TIGER ZONE, RAU PROPERTY YT, CANADA	Drawn	GL	Date	27 Jan 2014	Project Number	1302357
		Title	**Figure 5.1** **Section A-A''**				



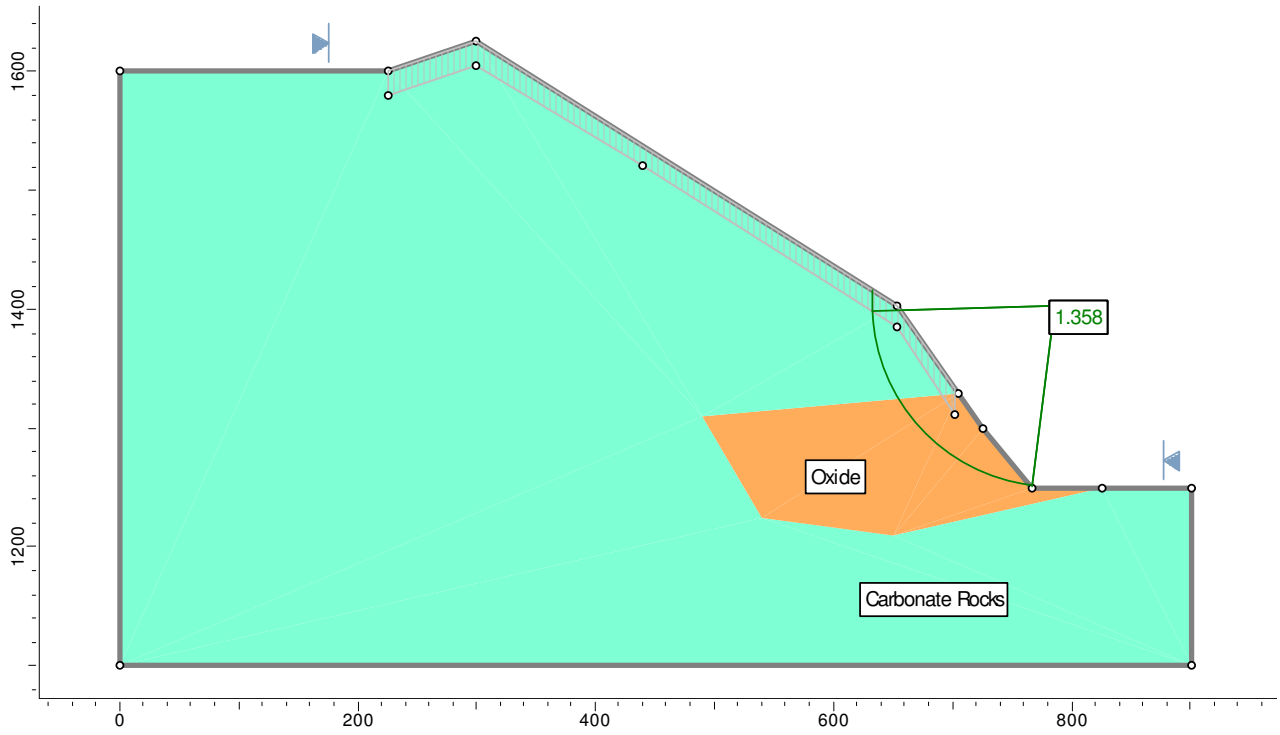
Case 1 – Fully Drained
IRA: 45 deg. in Carbonate Rock, 30 deg. in Oxide



Case 2 – Fully Drained
IRA: 50 deg. in Carbonate Rock, 40 deg. in Oxide

Notes: All distances in meters
See Table 5.2 for other groundwater conditions

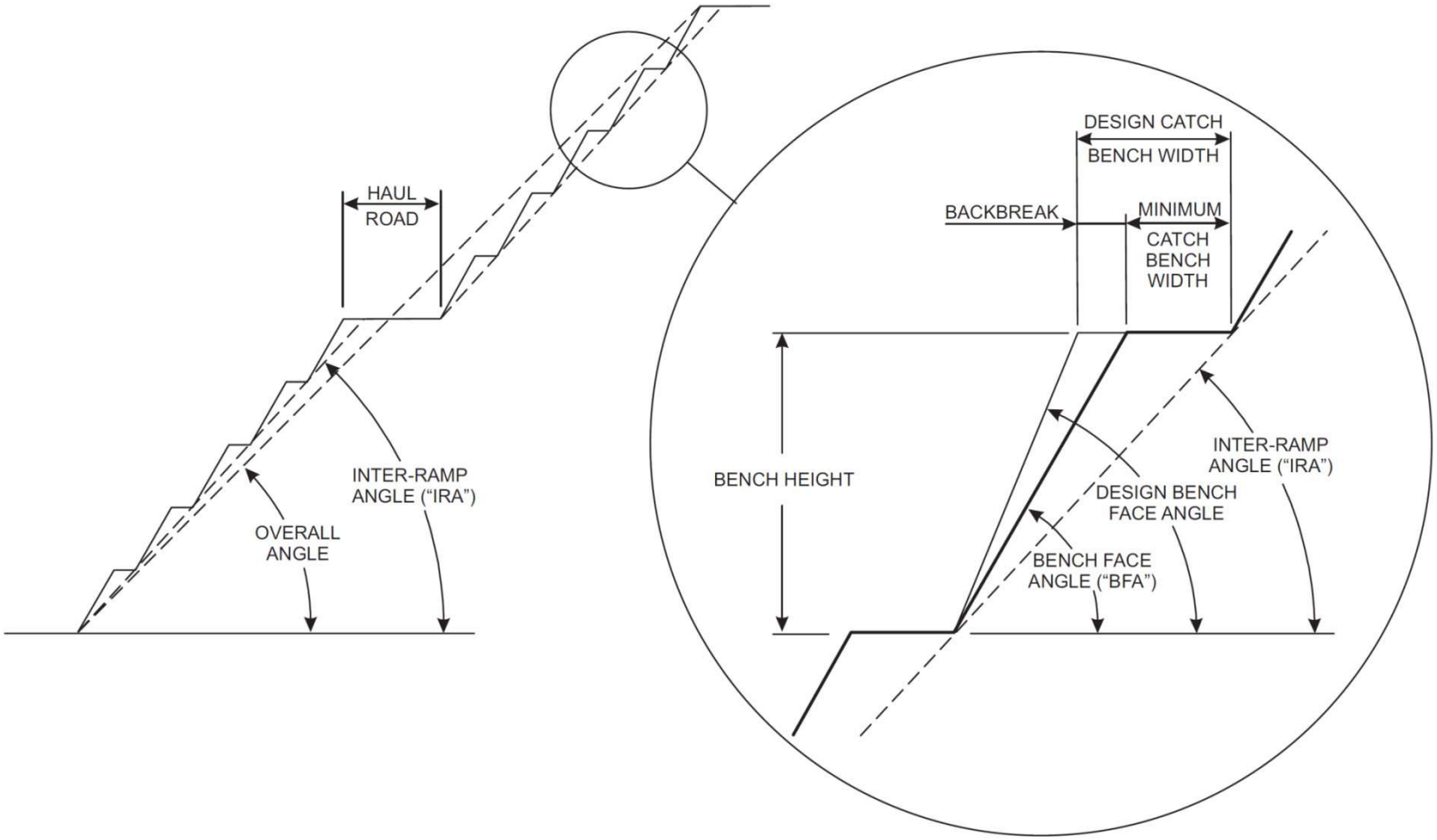
ATAC RESOURCES LTD. TIGER ZONE, RAU PROPERTY YT, CANADA	Drawn GL	Date 27 Jan 2014	Project Number 1302357
	Title **Figure 5.2** **Results of Slope Stability Analyses (1 of 2)**		



Case 3 – Fully Drained
IRA: 55 deg. in Carbonate Rock, 50 deg. in Oxide

Notes: All distances in meters
See Table 5.2 for other groundwater conditions

ATAC RESOURCES LTD. TIGER ZONE, RAU PROPERTY YT, CANADA	Drawn GL	Date 27 Jan 2014	Project Number 130-0709
	Title **Figure 5.3** **Results of Slope Stability Analyses (2 of 2)**		



Golder Associates / ATAC Resources Ltd.	ATAC RESOURCES LTD. TIGER ZONE, RAU PROPERTY YT, CANADA	Drawn	GL	Date	27 Jan 2014	Project Number	1302357
		Title	**Figure 6.1** **Slope Terminology**				

APPENDIX A
SOIL DESCRIPTIONS AND MOISTURE CONTENTS FOR AUGER HOLE SAMPLES

Hole: Rau-13-A01 **Elevation** 1221 m **Easting** 528478

Depth 48 feet **Northing** 7119035

From (ft)	To (ft)	Soil type	Sample Number	Laboratory Test (Yes/No)	Gravel %	Sand %	Fines%	Soil Classification and Description (group name, color, moisture content, plasticity of fines)	USCS Group Symbol	Comments	Moisture Content
7.5	13.0	OXI	Rau-13-A01-1	No				SILTY GRAVEL with sand, orange brown, moist-wet, NP fines	GM	Recent transport with FeOx, 1.5" max clast size	11.0%
13.0	18.0	OXI	Rau-13-A01-2	Yes	39	39	22	SILTY SAND with gravel, dark orange brown, wet, NP fines	SM	2" max clast size	26.4%
18.0	23.0	OXI	Rau-13-A01-3	No				SILTY SAND with gravel, dark orange brown, moist-wet, NP fines	SM	1" max clast size, heavy FeOx	24.2%
23.0	28.0	OXI	Rau-13-A01-4	Yes	6	43	51	SANDY SILT, dark reddish-brown, wet, NP fines	ML	gravel clasts consist of into FeOx clumps of fine sand and silt	25.5%
28.0	33.0	OXI	Rau-13-A01-5	No				SANDY SILT with gravel, dark reddish-brown, moist-wet, NP fines	ML	weathered clasts, many remain competent	16.6%
33.0	38.0	OXI	Rau-13-A01-6	No				SANDY SILT, dark red, wet, NP fines, fine sand	ML	clumps of FeOx appear to be weathered clasts of gravel	26.0%
38.0	43.0	OXI	Rau-13-A01-7	No				SANDY SILT, dark reddish-brown, wet, NP fines, fine sand	ML	clumps of FeOx appear to be weathered clasts of gravel	34.2%
43.0	48.0	OXI	Rau-13-A01-8	No				SANDY SILT with gravel, dark reddish-brown, wet, NP fines	ML	clumps of FeOx appear to be weathered clasts of gravel	26.0%

Hole: Rau-13-A02 **Elevation** 1260 m **Easting** 528405 mE

Depth 48 feet **Northing** 7119113 mN

From (ft)	To (ft)	Soil type	Sample Number	Laboratory Test (Yes/No)	Gravel %	Sand %	Fines%	Soil Classification and Description (group name, color, moisture content, plasticity of fines)	USCS Group Symbol	Comments	Moisture Content
8.00	14.00	OVB	Rau-13-A02-1	No				SILTY SAND with gravel, grey-brown, moist, NP fines	SM	Includes recent transported soils	8.8%
14.00	18.00	OXI	Rau-13-A02-2	No				SILTY SAND with gravel, brown-orange-brown, moist, NP fines	SM	Includes recent transported soils	8.1%
18.00	23.00	OXI	Rau-13-A02-3	No				SILTY SAND, reddish brown, moist, NP fines	SM		14.7%
23.00	28.00	OXI	Rau-13-A02-4	No				SILTY SAND, dark-brown-reddish-black, moist, NP fines	SM		19.4%
28.00	33.00	OXI	Rau-13-A02-5	Yes	8	46	46	SILTY SAND, dark-reddish-brown, moist, NP fines	SM		20.9%
33.00	38.00	OXI	Rau-13-A02-6	No				SILTY SAND, dark-reddish-brown, moist, NP fines	SM	trace organics	20.2%
38.00	43.00	OXI	Rau-13-A02-7	No				SILTY SAND, dark-reddish-brown, moist, NP fines	SM	near optimum water content	18.0%
43.00	48.00	OXI	Rau-13-A02-8	No				dark-reddish-brown, moist-wet, NP fines	SM	water saturated soil	22.0%

Hole: Rau-13-A03

Elevation 1267 m
Depth 48 feet

Easting 528420 mE
Northing 7119177 mN

From (ft)	To (ft)	Soil type	Sample Number	Laboratory Test (Yes/No)	Gravel %	Sand %	Fines%	Soil Classification and Description (group name, color, moisture content, plasticity of fines)	USCS Group Symbol	Comments	Moisture Content
10.00	18.00	OXI	Rau-13-A03-1	No				SILTY SAND, reddish-brown, moist, NP fines	SM	very fine grained sand or silt	14.8%
18.00	23.00	OXI	Rau-13-A03-2	No				SILTY SAND, reddish-brown, moist, NP fines	SM	very fine grained sand or silt	15.4%
23.00	28.00	OXI	Rau-13-A03-3	Yes	13	53	34	SILTY SAND, reddish-brown, moist, NP fines, fine-medium sand	SM	very fine grained sand or silt	12.6%
28.00	33.00	OXI	Rau-13-A03-4	No				SILTY SAND, reddish-brown, moist, NP fines	SM	very fine grained sand or silt	11.5%
33.00	38.00	OXI	Rau-13-A03-5	No				SILTY SAND, reddish-brown, moist, NP fines	SM	washed soil over #200 seive, approx 35% fines by visual estimate	11.9%
38.00	43.00	OXI	Rau-13-A03-6	No				SILTY SAND, reddish-brown, moist, NP fines	SM		14.3%
43.00	48.00	OXI	Rau-13-A03-7	No				SILTY SAND, reddish-brown, moist, NP fines	SM		10.7%

Hole: Rau-13-A04

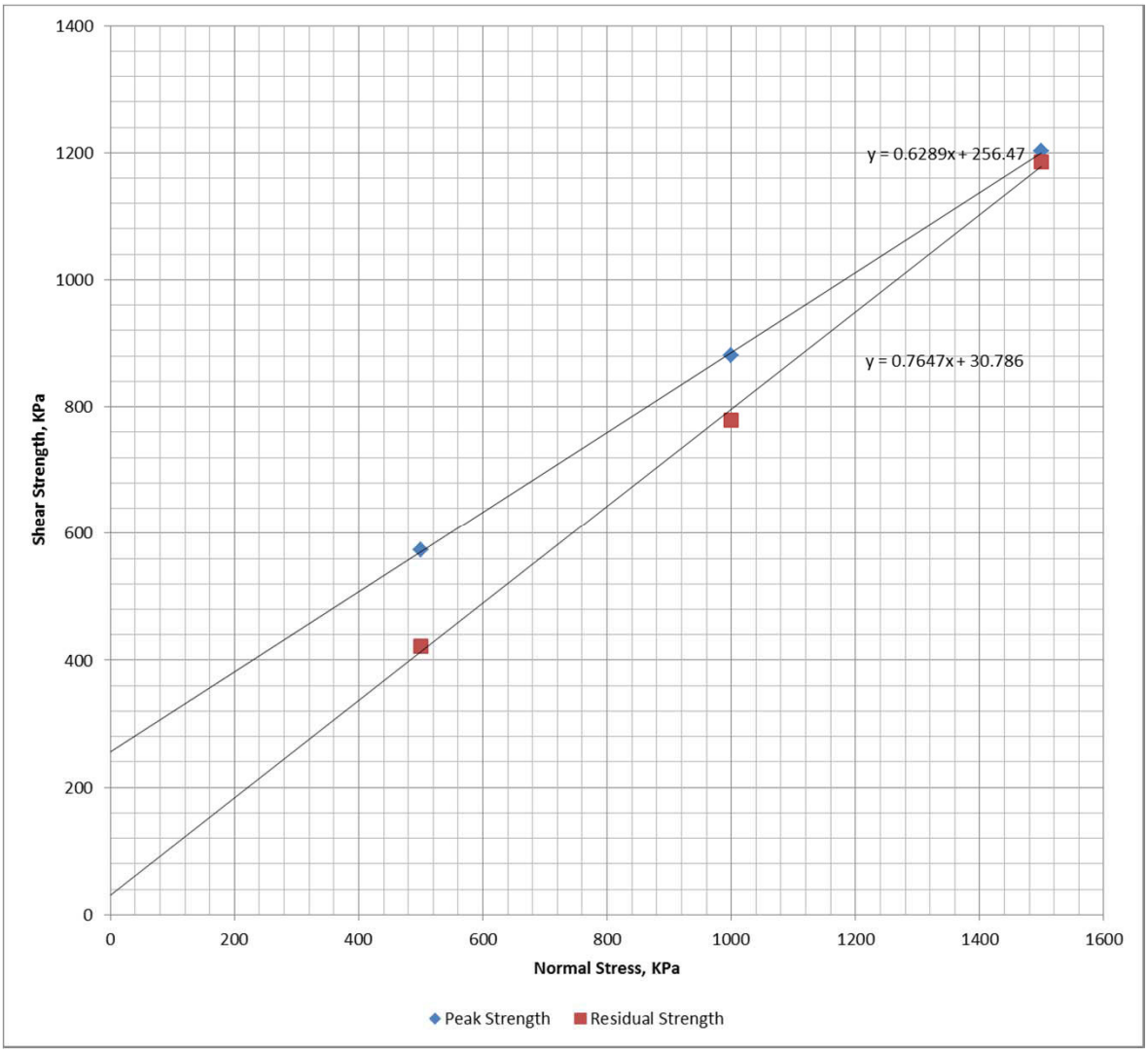
Elevation 1307 m
Depth 48 feet

Easting 528324 mE
Northing 7119257 mN

From (ft)	To (ft)	Soil type	Sample Number	Laboratory Test (Yes/No)	Gravel %	Sand %	Fines%	Soil Classification and Description (group name, color, moisture content, plasticity of fines)	USCS Group Symbol	Comments	Moisture Content
3.00	13.00	OXI	Rau-13-A03-1	No				SILTY SAND with gravel, very loose, orange-reddish-brown, moist, NP fines	SM		13.1%
13.00	18.00	OXI	Rau-13-A03-2	No				SILTY SAND, very loose, reddish-brown, moist, NP fines	SM		19.6%
18.00	23.00	OXI	Rau-13-A03-3	Yes	18	37	45	SILTY SAND with gravel, very loose, reddish-brown, moist, NP fines	SM	trace organics	16.1%
23.00	28.00	OXI	Rau-13-A03-4	No				SILTY SAND, very loose, reddish, moist, NP fines	SM		16.2%
28.00	33.00	OXI	Rau-13-A03-5	Yes	4	31	65	SILT, medium dense, reddish-brown, wet, NP fines	ML		19.0%
33.00	38.00	OXI	Rau-13-A03-6	No				SILT, medium dense, reddish-brown, wet, NP fines	ML		20.5%
38.00	43.00	OXI	Rau-13-A03-7	No				SILT, medium dense, reddish-brown, wet, NP fines	ML		19.1%
43.00	48.00	OXI	Rau-13-A03-8	No				SILT, medium dense, reddish-brown, wet, NP fines	ML		20.8

Notes: Soil Descriptions and USCS Classification by Visual Manual Methods for Samples without Laboratory Testing
NP = Non-Plastic
Moisture Contents Provided by Kappes, Cassiday & Assoc., Reno, NV

APPENDIX B
LABORATORY TESTING RESULTS



Effective Mohr- Coulomb Shear Strength Properties:

Peak: Friction Angle = 32deg.
Cohesion = 256 kPa

Residual: Friction Angle = 37 deg.
Cohesion = 31 kPa

ATAC RESOURCES LTD. TIGER ZONE, RAU PROPERTY YT, CANADA	Drawn GL	Date 01/27/14	Project Number 1302357
	Title **Figure B-1** **Results of Direct Shear Test on Oxide**		

Boring or Test Pit:	A03-3		Boring or Test Pit:	A03-3		Boring or Test Pit:	A03-3	
Sample:	--		Sample:	--		Sample:	--	
Depth:	23-28	ft	Depth:	23-28	ft	Depth:	23-28	ft
Point No.:	1		Point No.:	2		Point No.:	3	
	Initial			**Initial**			**Initial**	
Thickness =	2.990	cm	Thickness =	2.987	cm	Thickness =	2.992	cm
Diameter =	6.337	cm	Diameter =	6.337	cm	Diameter =	6.337	cm
Wet Mass =	224.75	g	Wet Mass =	224.90	g	Wet Mass =	221.19	g
Area =	31.54	cm^2	Area =	31.54	cm^2	Area =	31.54	cm^2
Volume =	94.30	cm^3	Volume =	94.22	cm^3	Volume =	94.38	cm^3
Specific Gravity =	3.28	(ASTM D854)	Specific Gravity =	3.28	(ASTM D854)	Specific Gravity =	3.28	(ASTM D854)
Dry Mass of Solids =	198.54	g	Dry Mass of Solids =	199.73	g	Dry Mass of Solids =	195.92	g
Moisture Content =	13.2%		Moisture Content =	12.6%		Moisture Content =	12.9%	
Wet Unit Weight =	23.37	kN/m^3	Wet Unit Weight =	23.41	kN/m^3	Wet Unit Weight =	22.98	kN/m^3
Dry Unit Weight =	20.65	kN/m^3	Dry Unit Weight =	20.79	kN/m^3	Dry Unit Weight =	20.36	kN/m^3
Void Ratio =	0.56		Void Ratio =	0.54		Void Ratio =	0.58	
Percent Saturation =	78%		Percent Saturation =	76%		Percent Saturation =	73%	
	Pre-Shear			**Pre-Shear**			**Pre-Shear**	
Thickness =	2.911	cm	Thickness =	2.910	cm	Thickness =	2.905	cm
Diameter =	6.337	cm	Diameter =	6.337	cm	Diameter =	6.337	cm
Area =	31.54	cm^2	Area =	31.54	cm^2	Area =	31.54	cm^2
Volume =	91.81	cm^3	Volume =	91.78	cm^3	Volume =	91.64	cm^3
Moisture Content =	15.6%		Moisture Content =	15.4%		Moisture Content =	16.2%	
Wet Unit Weight =	24.5	kN/m^3	Wet Unit Weight =	24.6	kN/m^3	Wet Unit Weight =	24.4	kN/m^3
Dry Unit Weight =	21.2	kN/m^3	Dry Unit Weight =	21.3	kN/m^3	Dry Unit Weight =	21.0	kN/m^3
Void Ratio =	0.51		Void Ratio =	0.50		Void Ratio =	0.53	
Percent Saturation =	100%		Percent Saturation =	100%		Percent Saturation =	100%	
Shear Rate =	0.0838	mm/min	Shear Rate =	0.0838	mm/min	Shear Rate =	0.0838	mm/min
Normal Stress =	500	kPa	Normal Stress =	1,000	kPa	Normal Stress =	1,500	kPa

Notes:

Sample description: Silty sand, dark reddish brown, moist

Atterberg limits: LL = NP PL = NP PI = NP (ASTM D4318)

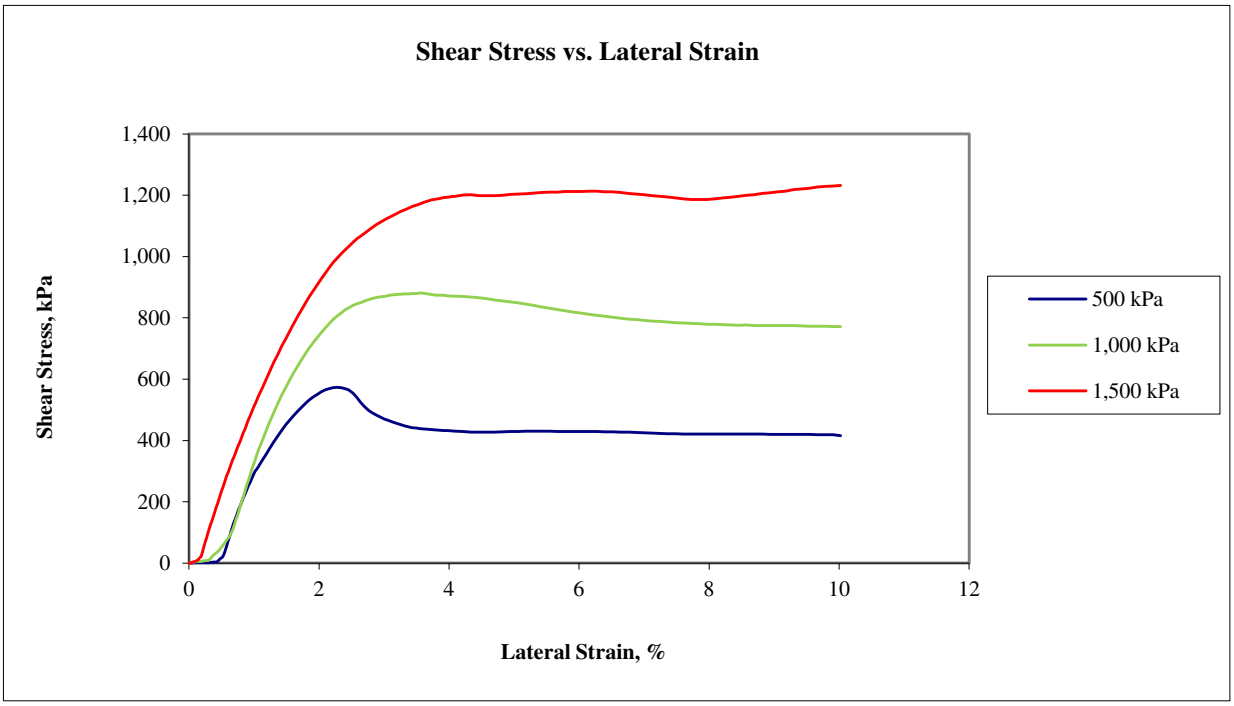
Percent finer: 1.91 cm = 99% No. 4 = 87% No. 200 = 34% (ASTM D422, refer to separate report)

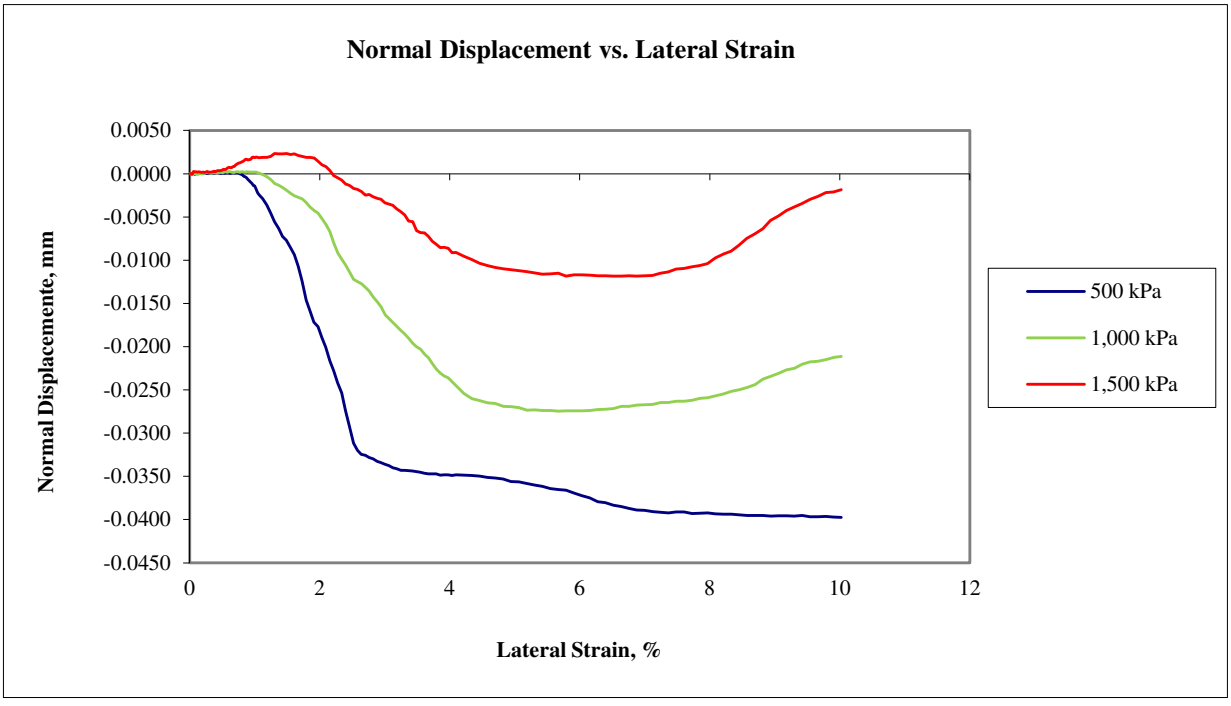
Specimen type: [ ] Intact [X] Reconstituted Remold targets: 20.50 kN/m3 (dry) at 14.0% moisture

Inundation: Yes

Apparatus: 6.35 -mm nominal diameter box, GeoTac automated test system, GeoJac loading system

Golder Associates Inc.	**Title:** ASTM D3080 CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT SAMPLE AND TEST DATA				
Job Short Title: ATAC/Pit Slope Study/BC					
Sample: A03-3 @ 23 - 28 ft.	**Technician:** PRH	**Reviewed:** CCS	**Date:** 12/23/2013	**Job Number:** 1302357.2	**Figure:** 1





Golder Associates Inc.	**Title:** ASTM D3080 CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT SHEAR STRESS AND NORMAL DISPLACEMENT PLOTS				
Job Short Title: ATAC/Pit Slope Study/BC					
Sample: A03-3 @ 23 - 28 ft.	**Technician:** PRH	**Reviewed:** CCS	**Date:** 12/23/2013	**Job Number:** 1302357.2	**Figure:** 2

Consolidation Data Used to Determine Shear Rate

The shear rate for Point No. 1 was based on ASTM D3080 guidance for:

-USCS classification of SW-SM, SP-SM, or SM

-Minimum time to failure = 60 min

-Soil other than normally consolidated fine-grained soil

-Displacement at failure = 5.1 mm

The shear rate for Point No. 2 was based on ASTM D3080 guidance for:

-USCS classification of SW-SM, SP-SM, or SM

-Minimum time to failure = 60 min

-Soil other than normally consolidated fine-grained soil

-Displacement at failure = 5.1 mm

The shear rate for Point No. 3 was based on ASTM D3080 guidance for:

-USCS classification of SW-SM, SP-SM, or SM

-Minimum time to failure = 60 min

-Soil other than normally consolidated fine-grained soil

-Displacement at failure = 5.1 mm

Normal Stress, kPa	Normal Displacement, mm	Load Duration, min
Point No. 1		
5	0.0072	60
500	0.0718	795
Point No. 2		
5	-0.0005	60
1,000	0.0777	795
Point No. 3		
5	-0.0017	60
1,500	0.0887	795

Golder Associates Inc.

Title: ASTM D3080 CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT CONSOLIDATION DATA

Job Short Title: ATAC/Pit Slope Study/BC

Sample:	Technician:	Reviewed:	Date:	Job Number:	Figure:
A03-3 @ 23 - 28 ft.	PRH	CCS	12/23/2013	1302357.2	3

Point No.:	1	
Normal Stress =	500	kPa
Shear Rate =	0.0838	mm/min

Shear Stress	Lateral Strain	Normal Displacement
kPa	%	mm
1	0.1	-0.0001
1	0.2	0.0000
1	0.3	0.0000
3	0.4	0.0000
17	0.5	0.0000
58	0.6	0.0001
129	0.7	0.0001
189	0.8	-0.0001
244	0.9	-0.0006
283	1.0	-0.0014
451	1.5	-0.0077
551	2.0	-0.0177
565	2.5	-0.0292
476	2.9	-0.0334
440	3.5	-0.0345
432	4.0	-0.0348
427	4.5	-0.0350
429	4.9	-0.0356
430	5.4	-0.0362
430	5.9	-0.0369
429	6.4	-0.0381
426	6.9	-0.0389
422	7.5	-0.0391
421	8.0	-0.0392
421	8.5	-0.0394
420	8.9	-0.0396
420	9.4	-0.0395
419	9.9	-0.0397

Point No.:	2	
Normal Stress =	1,000	kPa
Shear Rate =	0.0838	mm/min

Shear Stress	Lateral Strain	Normal Displacement
kPa	%	mm
4	0.1	0.0000
6	0.2	0.0000
9	0.3	0.0001
29	0.4	0.0001
47	0.5	0.0001
76	0.6	0.0001
120	0.7	0.0002
189	0.8	0.0002
260	0.9	0.0002
316	1.0	0.0002
575	1.5	-0.0019
736	2.0	-0.0046
833	2.5	-0.0114
869	2.9	-0.0154
879	3.5	-0.0200
871	4.0	-0.0236
866	4.5	-0.0262
852	4.9	-0.0270
836	5.4	-0.0274
819	5.9	-0.0274
805	6.4	-0.0272
794	6.9	-0.0267
784	7.5	-0.0263
779	8.0	-0.0259
776	8.5	-0.0250
775	8.9	-0.0234
774	9.4	-0.0220
771	9.9	-0.0212

Point No.:	3	
Normal Stress =	1,500	kPa
Shear Rate =	0.0838	mm/min

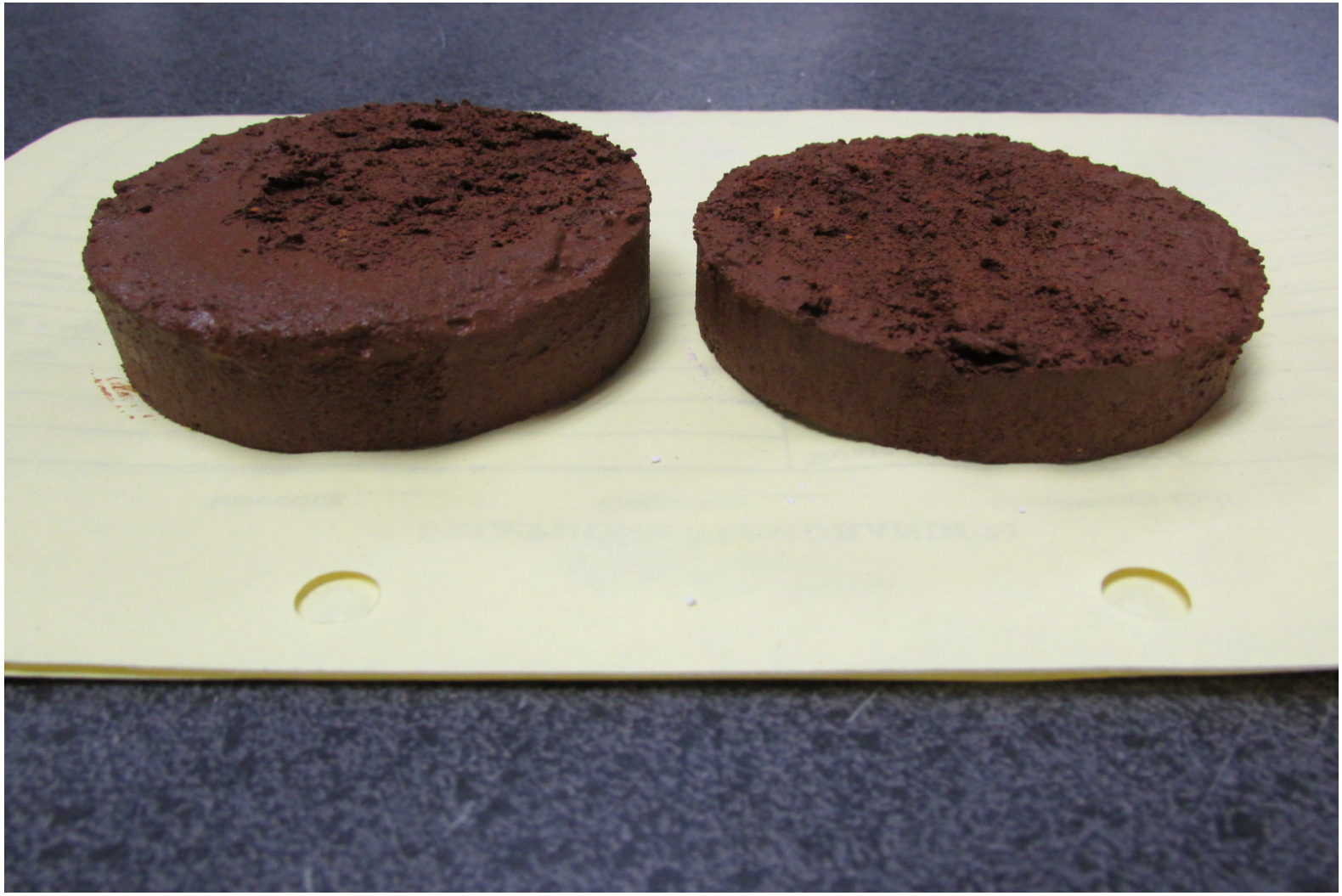
Shear Stress	Lateral Strain	Normal Displacement
kPa	%	mm
5	0.1	0.0002
22	0.2	0.0002
98	0.3	0.0002
166	0.4	0.0002
220	0.5	0.0004
286	0.6	0.0007
345	0.7	0.0009
402	0.8	0.0013
458	0.9	0.0016
502	1.0	0.0019
733	1.5	0.0023
909	2.0	0.0014
1,033	2.5	-0.0014
1,112	2.9	-0.0030
1,168	3.5	-0.0066
1,193	4.0	-0.0086
1,199	4.5	-0.0104
1,203	4.9	-0.0111
1,209	5.4	-0.0116
1,212	5.9	-0.0117
1,212	6.4	-0.0118
1,204	6.9	-0.0118
1,191	7.5	-0.0110
1,186	8.0	-0.0104
1,197	8.5	-0.0082
1,208	8.9	-0.0054
1,221	9.4	-0.0034
1,230	9.9	-0.0021

Golder Associates Inc.

Title:
ASTM D3080
CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT
SHEAR DATA

Job Short Title: ATAC/Pit Slope Study/BC

Sample:	Technician:	Reviewed:	Date:	Job Number:	Figure:
A03-3 @ 23 - 28 ft.	PRH	CCS	12/23/2013	1302357.2	4



Golder Associates Inc.	**Title:** ASTM D3080 CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT SPECIMEN PHOTOGRAPH - 500.0 kPa				
Job Short Title: ATAC/Pit Slope Study/BC					
Sample: A03-3 @ 23 - 28 ft.	**Technician:** PRH	**Reviewed:** CCS	**Date:** 12/23/2013	**Job Number:** 1302357.2	**Figure:** 5

Golder Associates Inc.	Title: ASTM D3080 CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT SPECIMEN PHOTOGRAPH - 1,000.0 kPa				
Job Short Title: ATAC/Pit Slope Study/BC					
Sample: A03-3 @ 23 - 28 ft.	Technician: PRH	Reviewed: CCS	Date: 12/23/2013	Job Number: 1302357.2	Figure: 6

Golder Associates Inc.	**Title:** ASTM D3080 CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT SPECIMEN PHOTOGRAPH - 1,500.0 kPa				
Job Short Title: ATAC/Pit Slope Study/BC					
Sample: A03-3 @ 23 - 28 ft.	**Technician:** PRH	**Reviewed:** CCS	**Date:** 12/23/2013	**Job Number:** 1302357.2	**Figure:** 7

December-13 **1302357.200**

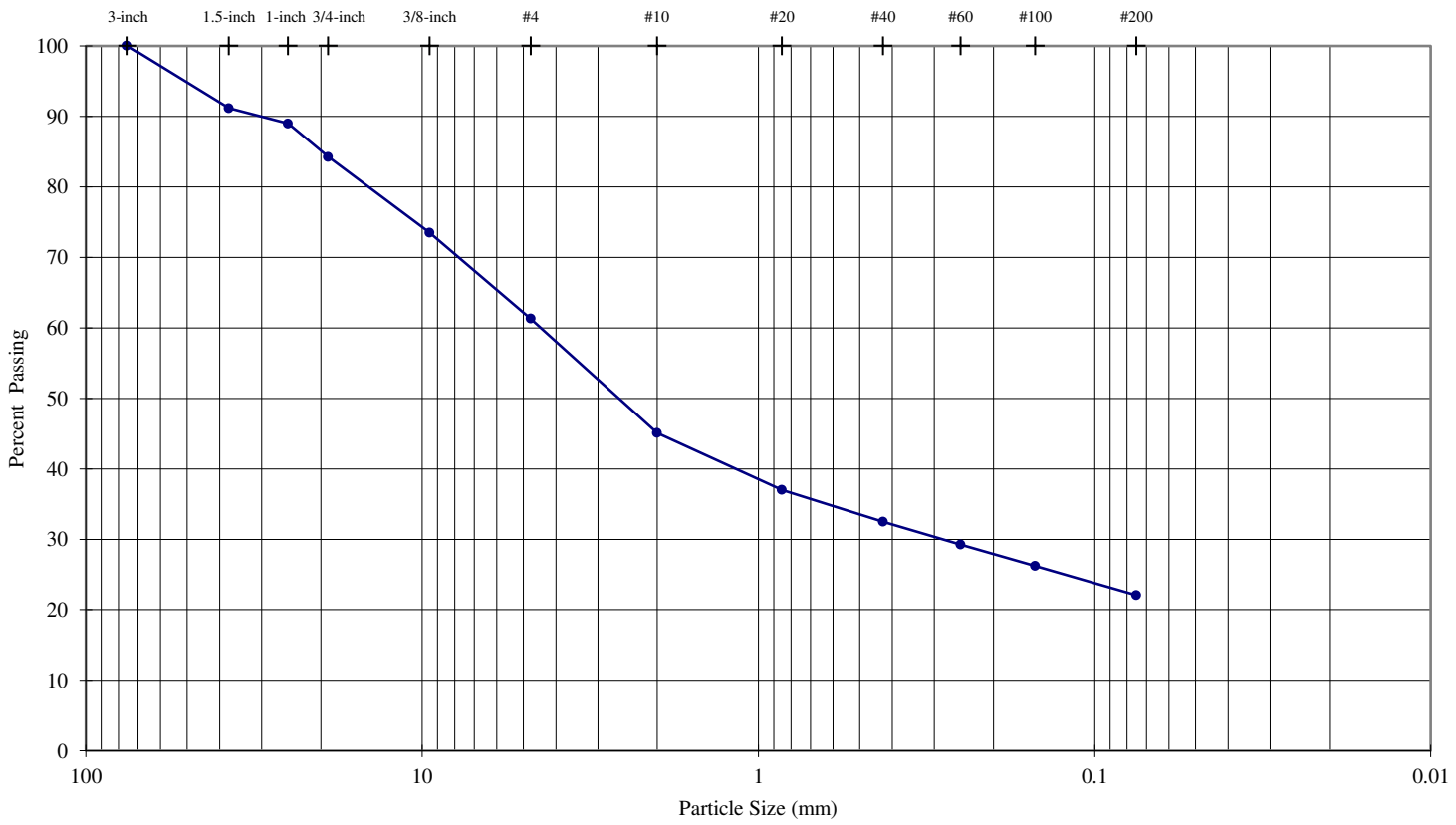
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **ATAC/Pit Slope Study/BC**

SAMPLE ID: **A01-2** DEPTH (ft): **13-18**

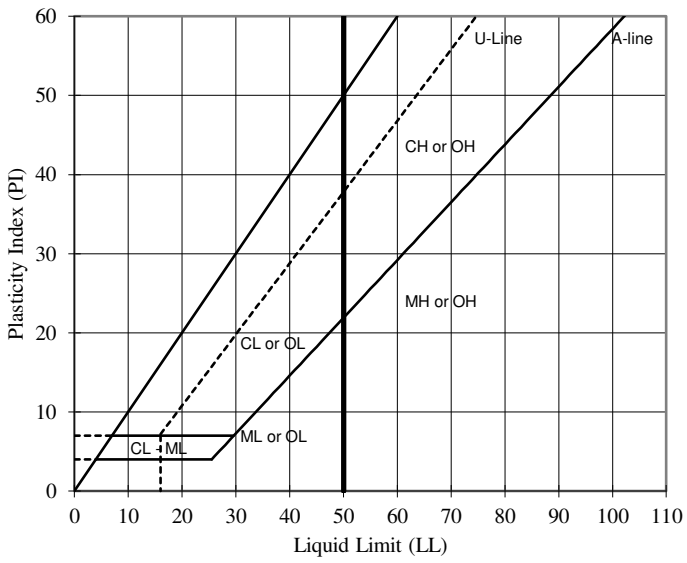
TYPE: **Bag**



Sieve Analysis (Initial Separation on No. 4 Sieve)

Sieve	Particle Size (mm)	% Passing
3-inch	75.0	**100.0**
1.5-inch	37.5	**91.2**
1-inch	25.0	**89.0**
3/4-inch	19.0	**84.2**
3/8-inch	9.5	**73.5**
#4	4.8	**61.3**
#10	2.00	**45.1**
#20	0.85	**37.0**
#40	0.43	**32.5**
#60	0.25	**29.2**
#100	0.15	**26.2**
#200	0.075	**22.0**

Description	Percentage
Coarse Gravel	**15.78**
Fine Gravel	**22.95**
Coarse Sand	**16.21**
Medium Sand	**12.59**
Fine Sand	**10.43**
Silt or Clay Fines	**22.04**



USCS Description (ASTM D 2487):

Silty sand with gravel, dark brown, moist

LL	PL	PI
NP	**NP**	**NP**

As-Received Moisture Content (%): **--**

USCS Group Symbol: SM

Notes: 0g of particles up to 75.0mm maximum size were removed from particle size analysis sample prior to testing
Particle size analysis sample was not mechanically dispersed; hydrometer test was not performed
Sample prepared for Atterberg Limits testing by the dry method
Material retained on No. 40 sieve removed from Atterberg Limits sample by sieving
Plastic Limit test performed by hand rolling. Method A Liquid Limit test performed using mechanical device

TECH	LR
DATE	12/12/2013
REVIEW	MB

December-13 **1302357.200**

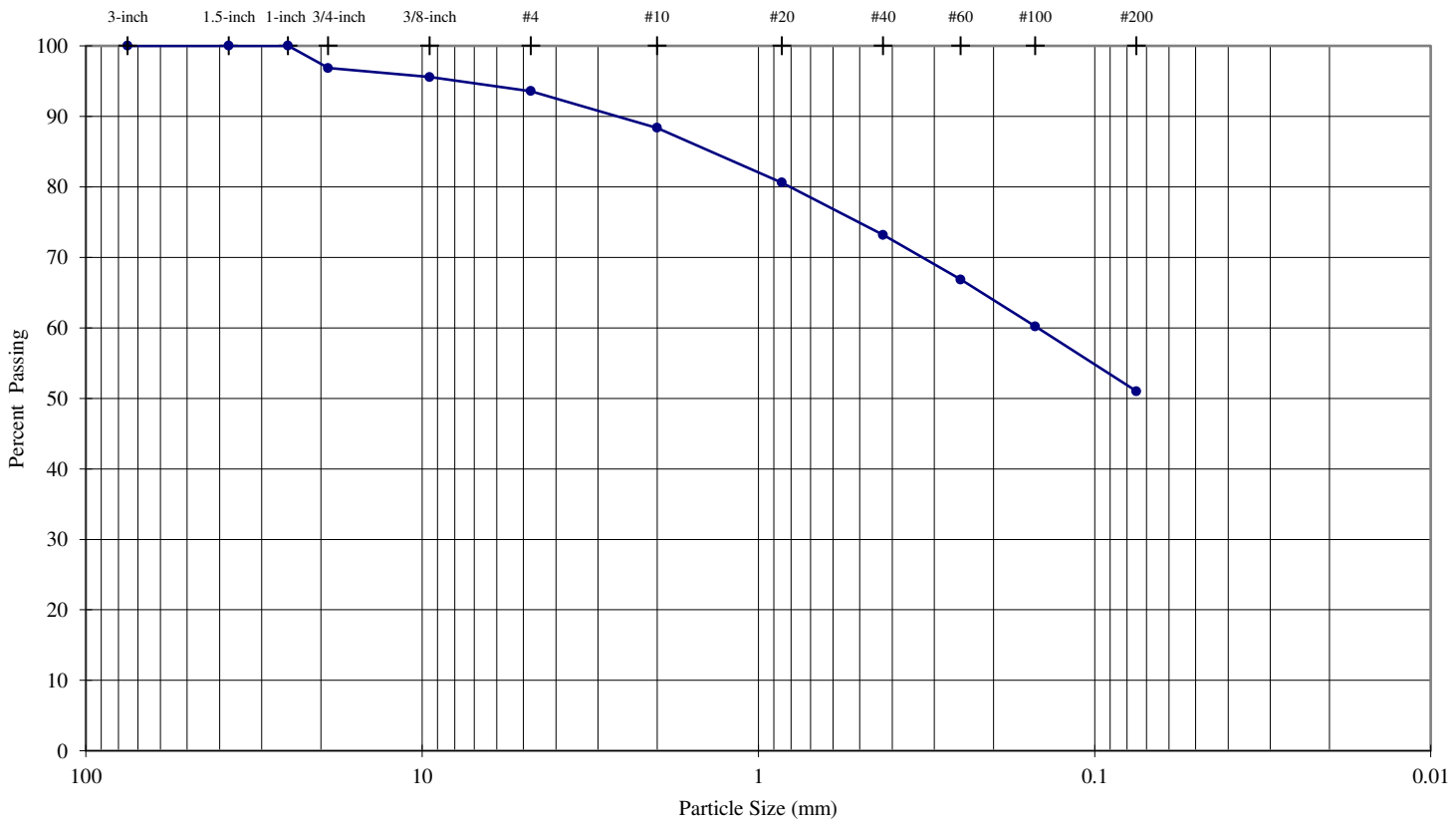
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **ATAC/Pit Slope Study/BC**

SAMPLE ID: **A01-4** DEPTH (ft): **23-28**

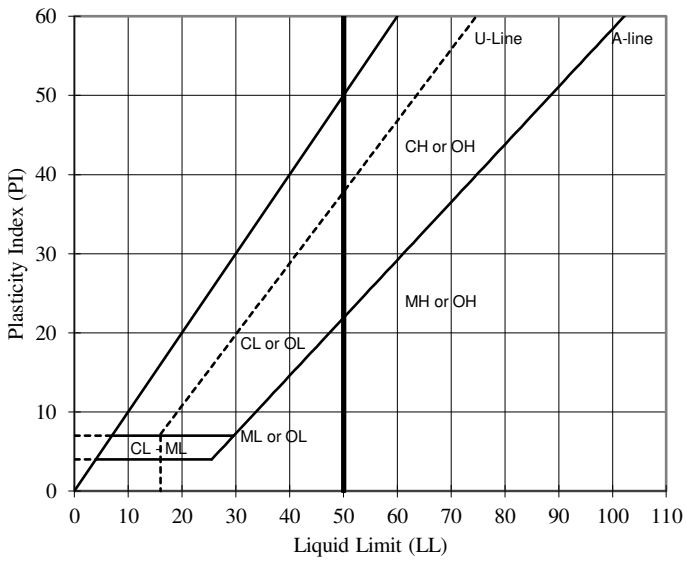
TYPE: **Bag**



Sieve Analysis (Initial Separation on No. 4 Sieve)

Sieve	Particle Size (mm)	% Passing
3-inch	75.0	**100.0**
1.5-inch	37.5	**100.0**
1-inch	25.0	**100.0**
3/4-inch	19.0	**96.8**
3/8-inch	9.5	**95.6**
#4	4.8	**93.6**
#10	2.00	**88.4**
#20	0.85	**80.6**
#40	0.43	**73.2**
#60	0.25	**66.8**
#100	0.15	**60.2**
#200	0.075	**51.0**

Description	Percentage
Coarse Gravel	**3.17**
Fine Gravel	**3.26**
Coarse Sand	**5.21**
Medium Sand	**15.19**
Fine Sand	**22.21**
Silt or Clay Fines	**50.97**



USCS Description (ASTM D 2487):

Sandy silt, dark reddish brown, moist

LL	PL	PI
NP	**NP**	**NP**

As-Received Moisture Content (%): **--**

USCS Group Symbol: ML

Notes: 0g of particles up to 25.0mm maximum size were removed from particle size analysis sample prior to testing
Particle size analysis sample was not mechanically dispersed; hydrometer test was not performed
Sample prepared for Atterberg Limits testing by the dry method
Material retained on No. 40 sieve removed from Atterberg Limits sample by sieving
Plastic Limit test performed by hand rolling. Method A Liquid Limit test performed using mechanical device

TECH	LR
DATE	12/12/2013
REVIEW	MB

December-13 **1302357.200**

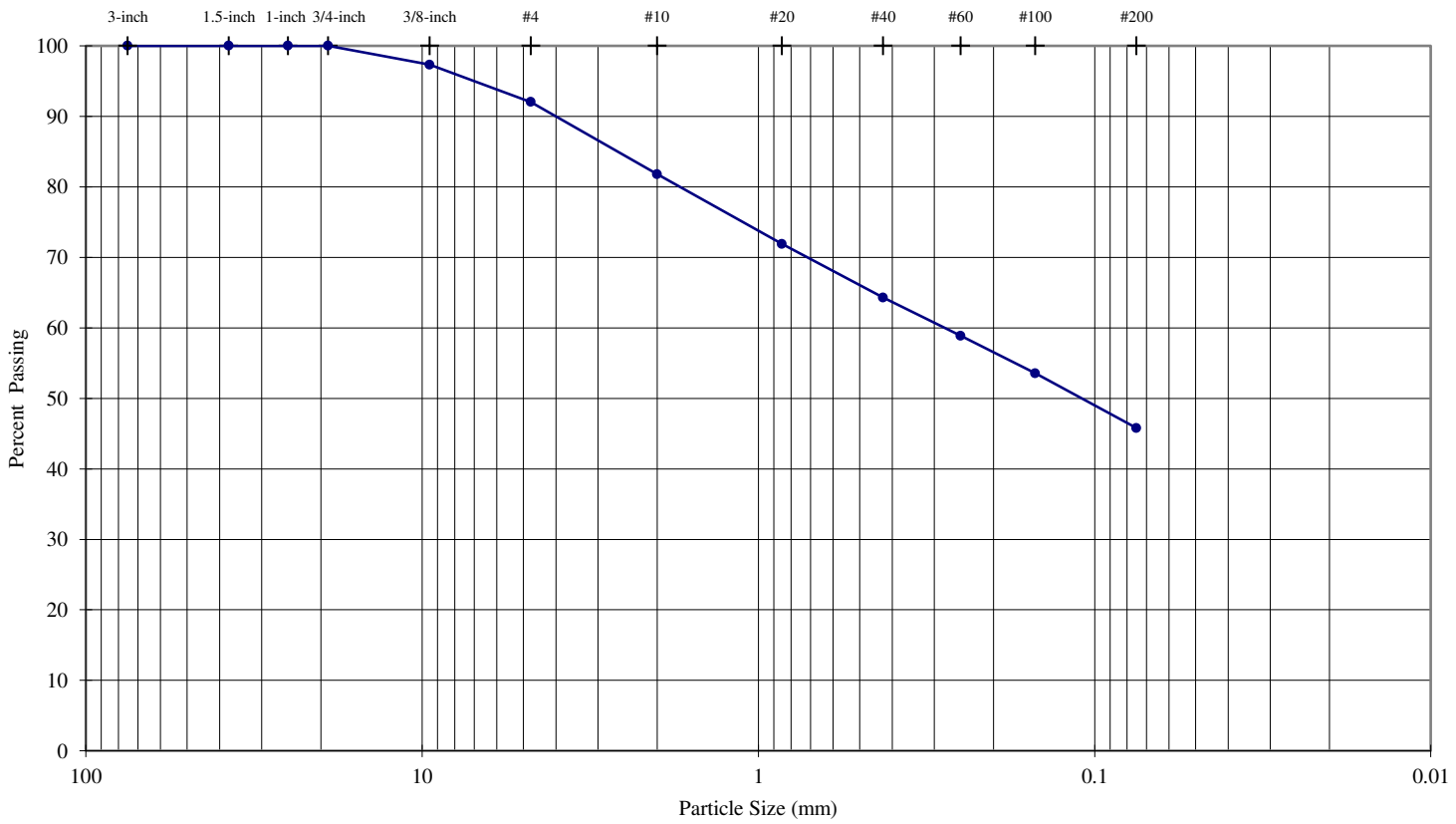
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **ATAC/Pit Slope Study/BC**

SAMPLE ID: **A02-5** DEPTH (ft): **28-33**

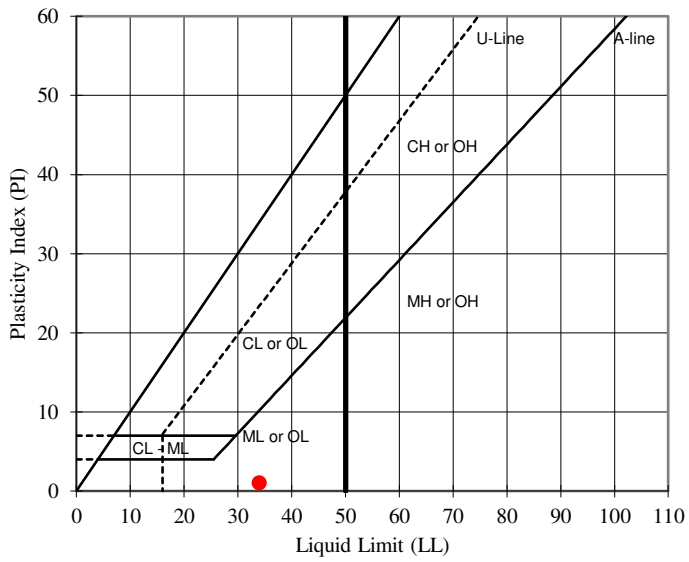
TYPE: **Bag**



Sieve	Particle Size (mm)	% Passing
3-inch	75.0	**100.0**
1.5-inch	37.5	**100.0**
1-inch	25.0	**100.0**
3/4-inch	19.0	**100.0**
3/8-inch	9.5	**97.3**
#4	4.8	**92.0**
#10	2.00	**81.8**
#20	0.85	**71.9**
#40	0.43	**64.3**
#60	0.25	**58.8**
#100	0.15	**53.6**
#200	0.075	**45.8**

Sieve Analysis (Initial Separation on No. 4 Sieve)

Description	Percentage
Coarse Gravel	**0.00**
Fine Gravel	**7.98**
Coarse Sand	**10.25**
Medium Sand	**17.50**
Fine Sand	**18.49**
Silt or Clay Fines	**45.77**



USCS Description (ASTM D 2487):

Silty sand, dark reddish brown, moist

LL	PL	PI
34	**33**	**1**

As-Received Moisture Content (%): **--**

USCS Group Symbol: **SM**

Notes: 0g of particles up to 19.0mm maximum size were removed from particle size analysis sample prior to testing
Particle size analysis sample was not mechanically dispersed; hydrometer test was not performed
Sample prepared for Atterberg Limits testing by the dry method
Material retained on No. 40 sieve removed from Atterberg Limits sample by sieving
Plastic Limit test performed by hand rolling. Method A Liquid Limit test performed using mechanical device

TECH	LR
DATE	12/12/2013
REVIEW	MB

December-13 **1302357.200**

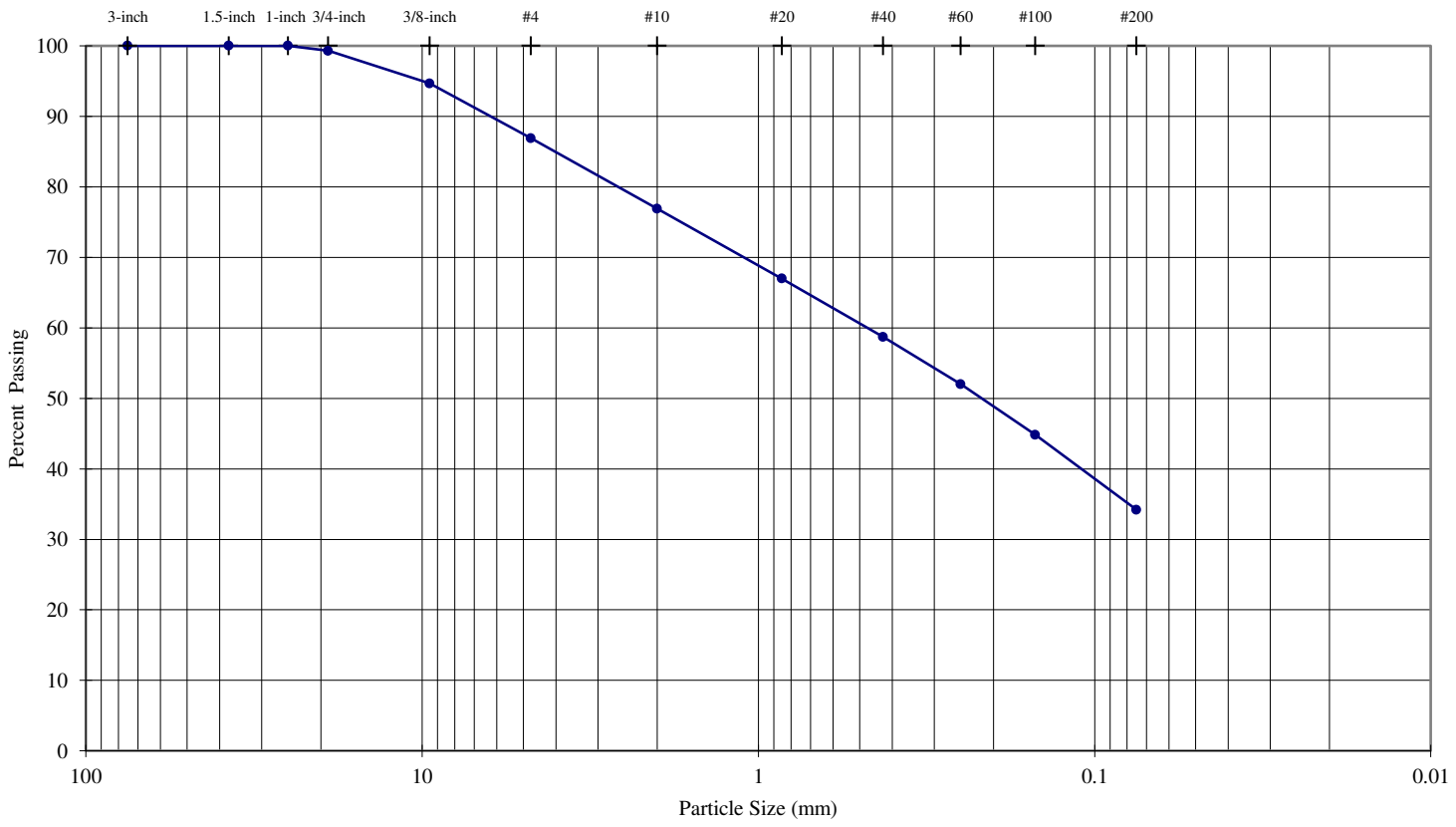
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **ATAC/Pit Slope Study/BC**

SAMPLE ID: **A03-3** DEPTH (ft): **23-28**

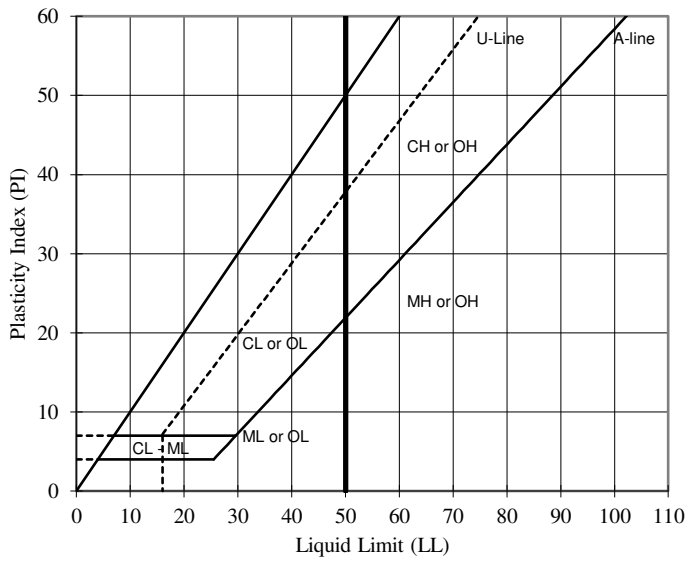
TYPE: **Bag**



Sieve Analysis (Initial Separation on No. 4 Sieve)

Sieve	Particle Size (mm)	% Passing
3-inch	75.0	**100.0**
1.5-inch	37.5	**100.0**
1-inch	25.0	**100.0**
3/4-inch	19.0	**99.3**
3/8-inch	9.5	**94.7**
#4	4.8	**86.9**
#10	2.00	**76.9**
#20	0.85	**67.0**
#40	0.43	**58.7**
#60	0.25	**52.0**
#100	0.15	**44.8**
#200	0.075	**34.2**

Description	Percentage
Coarse Gravel	**0.72**
Fine Gravel	**12.39**
Coarse Sand	**10.00**
Medium Sand	**18.20**
Fine Sand	**24.50**
Silt or Clay Fines	**34.19**



USCS Description (ASTM D 2487):

Silty sand, dark reddish brown, moist

LL	PL	PI
NP	**NP**	**NP**

As-Received Moisture Content (%): **--**

USCS Group Symbol: SM

Notes: 0g of particles up to 25.0mm maximum size were removed from particle size analysis sample prior to testing
Particle size analysis sample was not mechanically dispersed; hydrometer test was not performed
Sample prepared for Atterberg Limits testing by the dry method
Material retained on No. 40 sieve removed from Atterberg Limits sample by sieving
Plastic Limit test performed by hand rolling. Method A Liquid Limit test performed using mechanical device

TECH	PRH
DATE	12/13/2013
REVIEW	MB

December-13 **1301357.2**

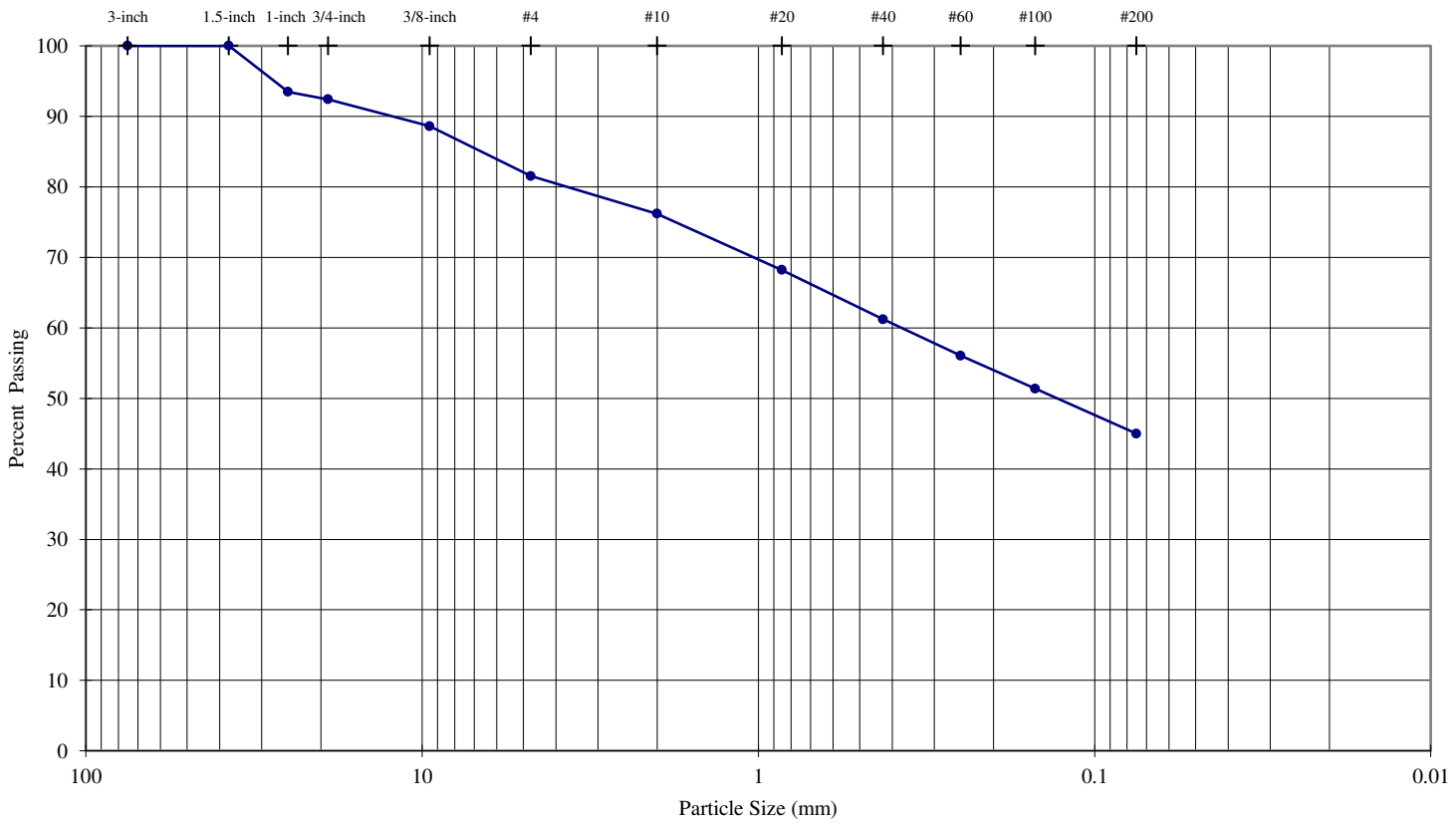
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **ATAC/Pit Slope Study/BC**

SAMPLE ID: **A04-3** DEPTH (ft): **18-23**

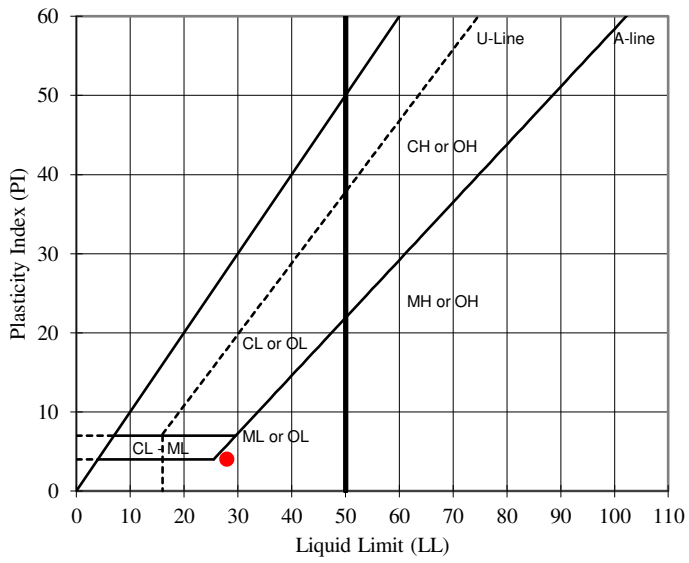
TYPE: **Bag**



Sieve	Particle Size (mm)	% Passing
3-inch	75.0	**100.0**
1.5-inch	37.5	**100.0**
1-inch	25.0	**93.5**
3/4-inch	19.0	**92.4**
3/8-inch	9.5	**88.6**
#4	4.8	**81.5**
#10	2.00	**76.2**
#20	0.85	**68.2**
#40	0.43	**61.2**
#60	0.25	**56.0**
#100	0.15	**51.4**
#200	0.075	**45.0**

Sieve Analysis (Initial Separation on No. 4 Sieve)

Description	Percentage
Coarse Gravel	**7.60**
Fine Gravel	**10.88**
Coarse Sand	**5.34**
Medium Sand	**14.97**
Fine Sand	**16.25**
Silt or Clay Fines	**44.96**



USCS Description (ASTM D 2487):

Silty sand with gravel, dark reddish brown, moist

LL	PL	PI
28	**24**	**4**

As-Received Moisture Content (%): **--**

USCS Group Symbol: **SM**

Notes: 0g of particles up to 37.5mm maximum size were removed from particle size analysis sample prior to testing
Particle size analysis sample was not mechanically dispersed; hydrometer test was not performed
Sample prepared for Atterberg Limits testing by the dry method
Material retained on No. 40 sieve removed from Atterberg Limits sample by sieving
Plastic Limit test performed by hand rolling. Method A Liquid Limit test performed using mechanical device

TECH	LR
DATE	12/12/2013
REVIEW	MB

December-13 **1302357.200**

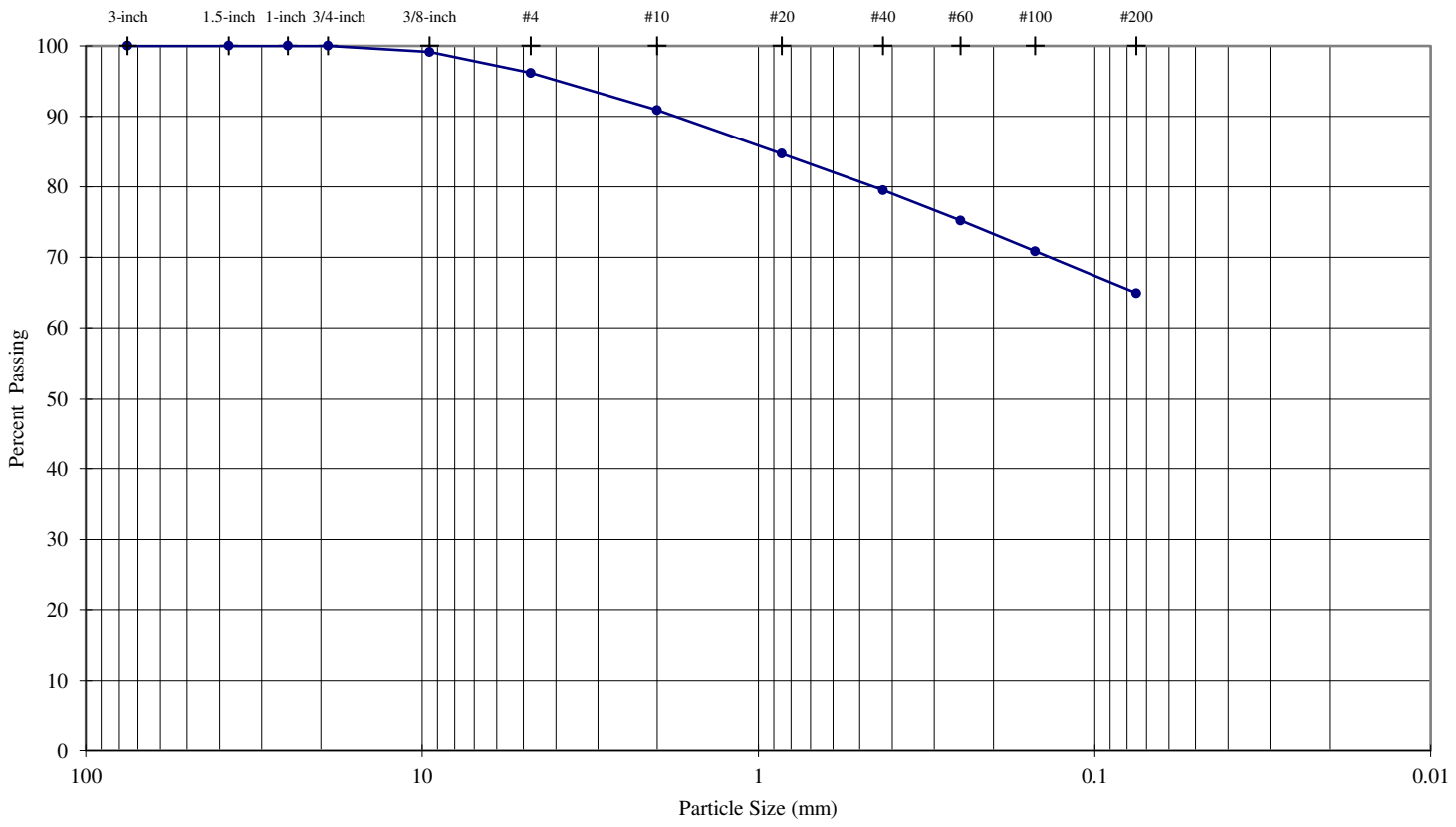
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **ATAC/Pit Slope Study/BC**

SAMPLE ID: **A04-5** DEPTH (ft): **28-33**

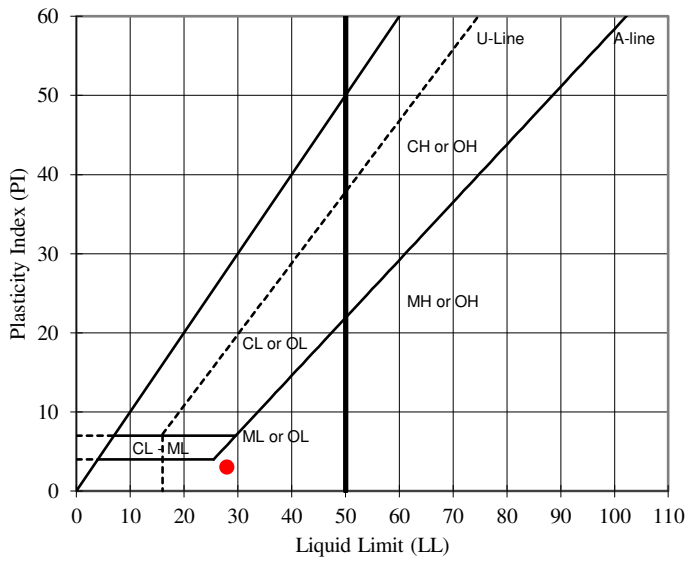
TYPE: **Bag**



Sieve	Particle Size (mm)	% Passing
3-inch	75.0	**100.0**
1.5-inch	37.5	**100.0**
1-inch	25.0	**100.0**
3/4-inch	19.0	**100.0**
3/8-inch	9.5	**99.1**
#4	4.8	**96.1**
#10	2.00	**90.9**
#20	0.85	**84.7**
#40	0.43	**79.5**
#60	0.25	**75.2**
#100	0.15	**70.8**
#200	0.075	**64.9**

Sieve Analysis (Initial Separation on No. 4 Sieve)

Description	Percentage
Coarse Gravel	**0.00**
Fine Gravel	**3.86**
Coarse Sand	**5.28**
Medium Sand	**11.39**
Fine Sand	**14.60**
Silt or Clay Fines	**64.87**



USCS Description (ASTM D 2487):

Sandy silt, dark reddish brown, moist

LL	PL	PI
28	**25**	**3**

As-Received Moisture Content (%): **--**

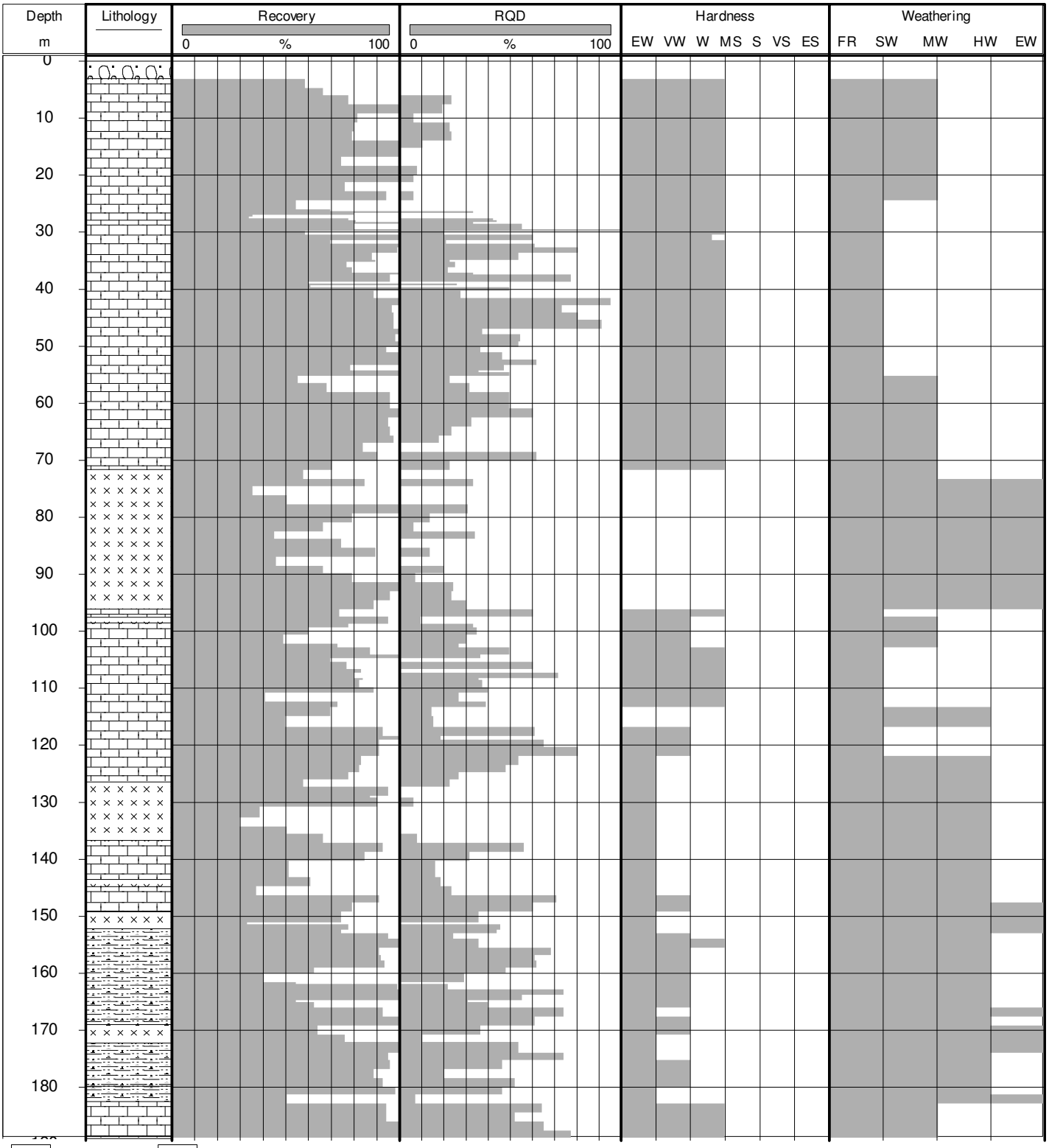
USCS Group Symbol: ML

Notes: 0g of particles up to 19.0mm maximum size were removed from particle size analysis sample prior to testing
Particle size analysis sample was not mechanically dispersed; hydrometer test was not performed
Sample prepared for Atterberg Limits testing by the dry method
Material retained on No. 40 sieve removed from Atterberg Limits sample by sieving
Plastic Limit test performed by hand rolling. Method A Liquid Limit test performed using mechanical device

TECH	LR
DATE	12/12/2013
REVIEW	MB

APPENDIX C
DOWNHOLE PLOTS OF GEOTECHNICAL DATA

RAU-09-041



Overburden

Oxide

Volcaniclastic

Limestone

HARDNESS

ES	Extremely Strong
VS	Very Strong
S	Strong
MS	Moderately Strong
W	Weak
VW	Very Weak
EW	Extremely Weak

Weathering

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

PROJECT

ATAC RESOURCES LTD.
TIGER ZONE, RAU PROPERTY
YUKON TERRITORY, CANADA

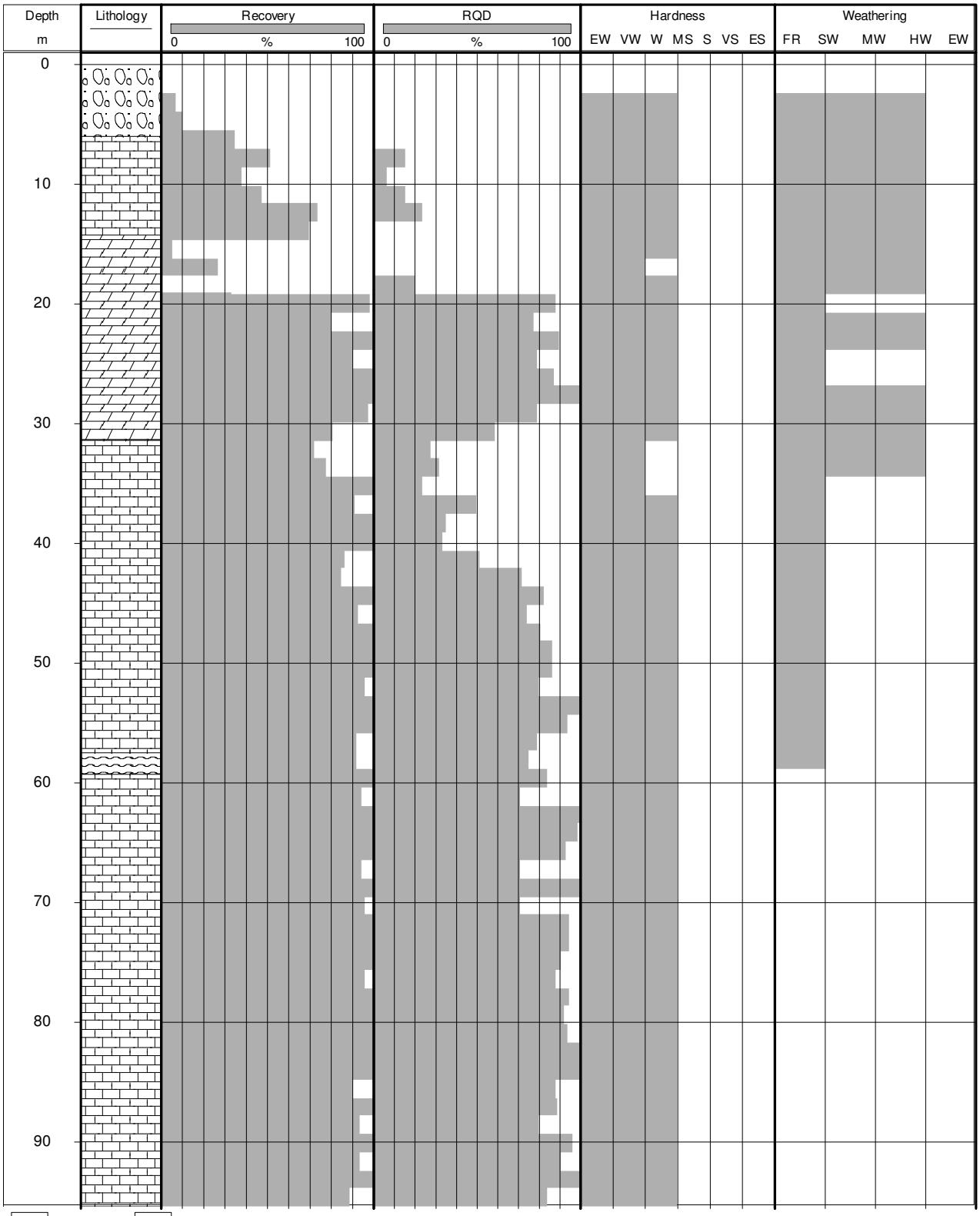
TITLE

Downhole plot of Recovery, RQD, Hardness, and Weathering for RAU-09-041

Golder Associates

PROJECT No.		1302357	FILE No.	
DESIGN	GTL	11/12/2013	SCALE	NOT TO SCALE
CADD	BJE	11/12/2013	FIGURE	C-1
-	-	-		
-	-	-		

RAU-09-055



Overburden
Marble
Dolomite
Limestone

HARDNESS

ES	Extremely Strong
VS	Very Strong
S	Strong
MS	Moderately Strong
W	Weak
VW	Very Weak
EW	Extremely Weak

Weathering

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

PROJECT

ATAC Resources Ltd.

ATAC RESOURCES LTD.
TIGER ZONE, RAU PROPERTY
YUKON TERRITORY, CANADA

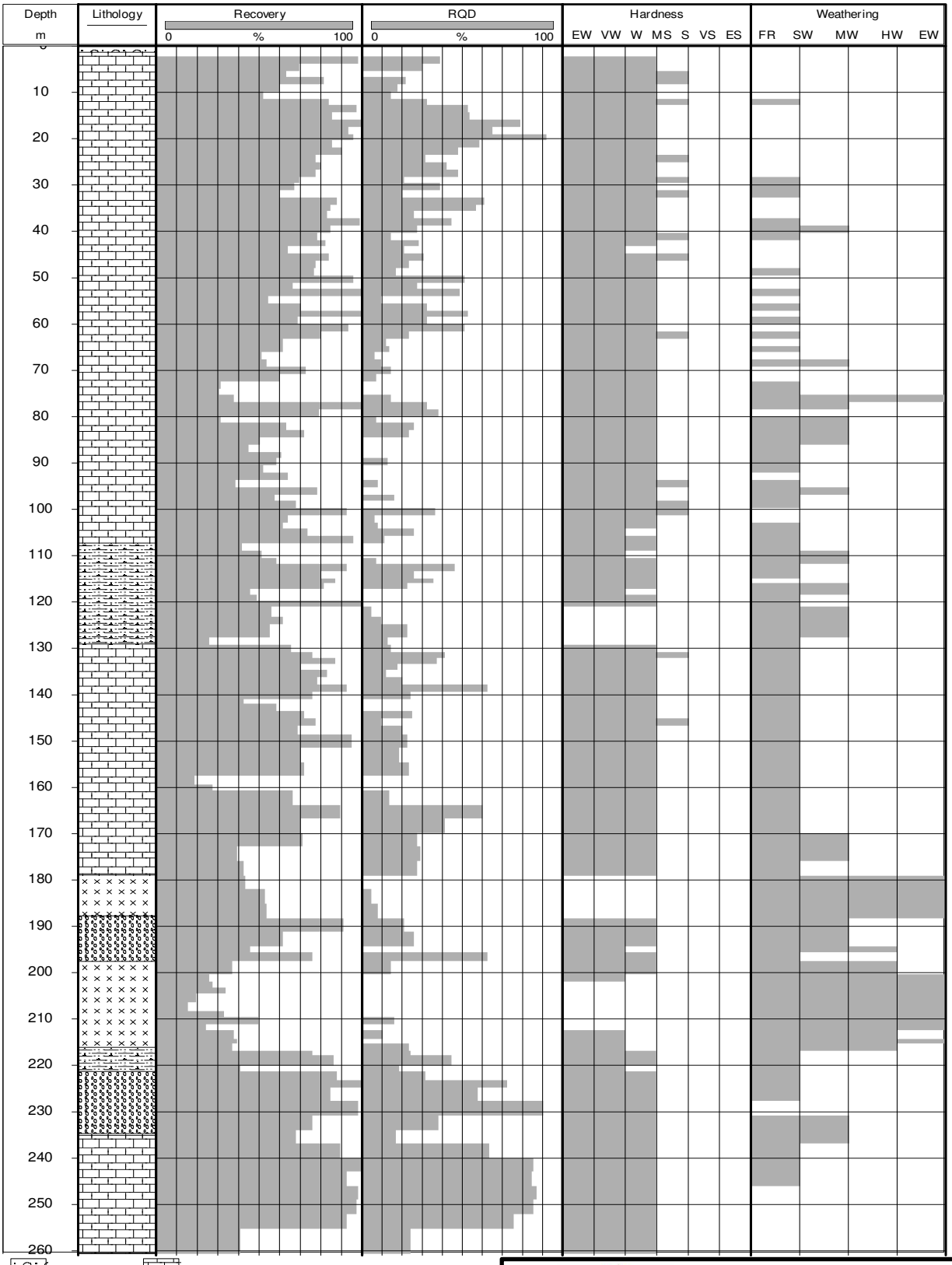
TITLE

Downhole plot of Recovery, RQD, Hardness, and Weathering for RAU-09-055

Golder Associates

PROJECT No.		1302357	FILE No.	
DESIGN	GTL	11/12/2013	SCALE	NOT TO SCALE
CADD	BJE	11/12/2013	FIGURE	C-2
-	-	-		
-	-	-		

RAU-10-072



Overburden
Gravel
Volcaniclastic
Limestone
Shale
Oxide

HARDNESS

ES	Extremely Strong
VS	Very Strong
S	Strong
MS	Moderately Strong
W	Weak
VW	Very Weak
EW	Extremely Weak

Weathering

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

PROJECT

ATAC Resources Ltd.

ATAC RESOURCES LTD.
TIGER ZONE, RAU PROPERTY
YUKON TERRITORY, CANADA

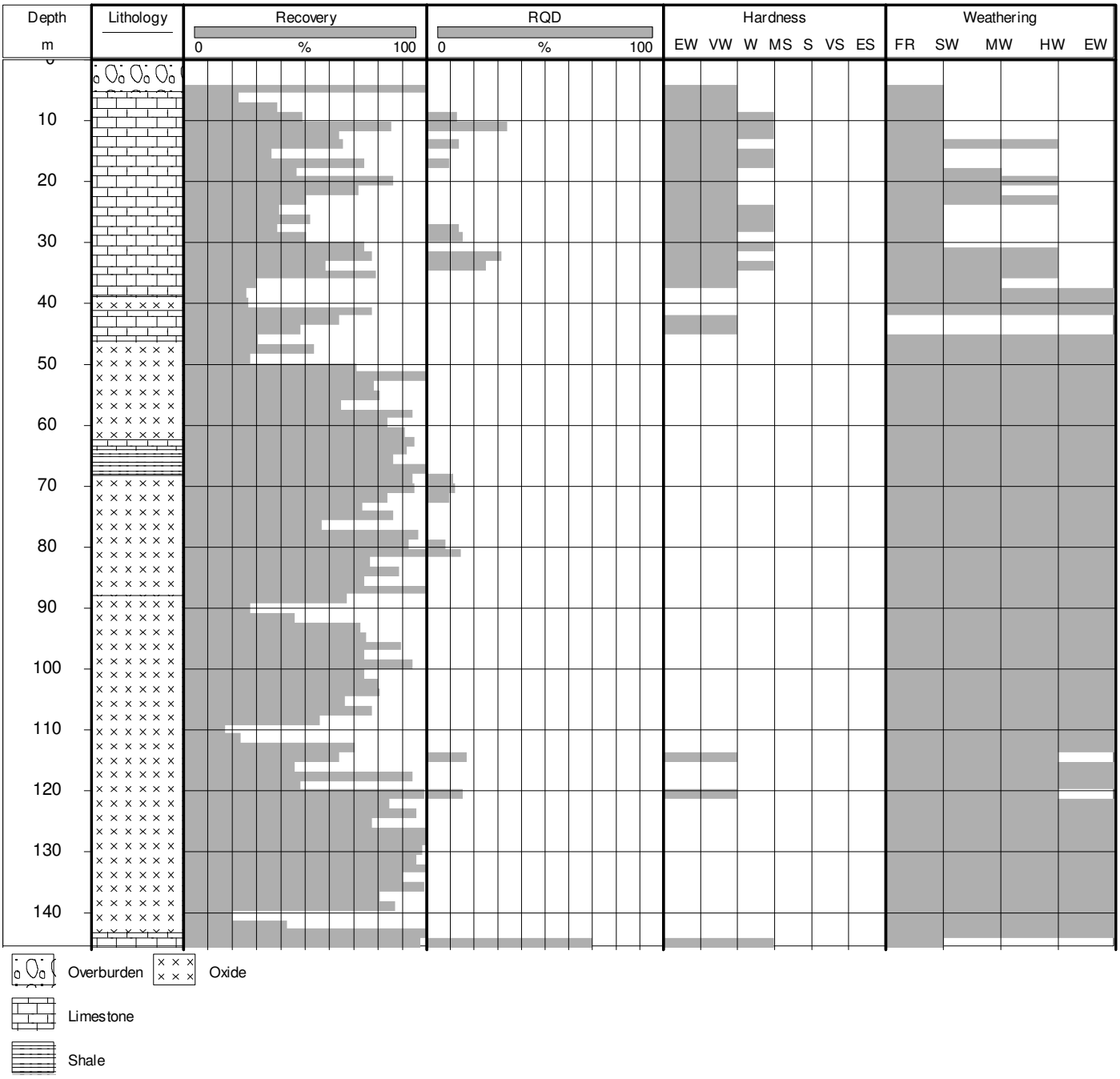
TITLE

Downhole plot of Recovery, RQD, Hardness, and Weathering for RAU-10-072

Golder Associates

PROJECT No.		1302357	FILE No.	
DESIGN	GTL	11/12/2013	SCALE	NOT TO SCALE
CADD	BJE	11/12/2013	FIGURE	C-3
-	-	-		
-	-	-		

RAU-10-102



HARDNESS

ES	Extremely Strong
VS	Very Strong
S	Strong
MS	Moderately Strong
W	Weak
VW	Very Weak
EW	Extremely Weak

Weathering

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

PROJECT

ATAC RESOURCES LTD.
TIGER ZONE, RAU PROPERTY
YUKON TERRITORY, CANADA

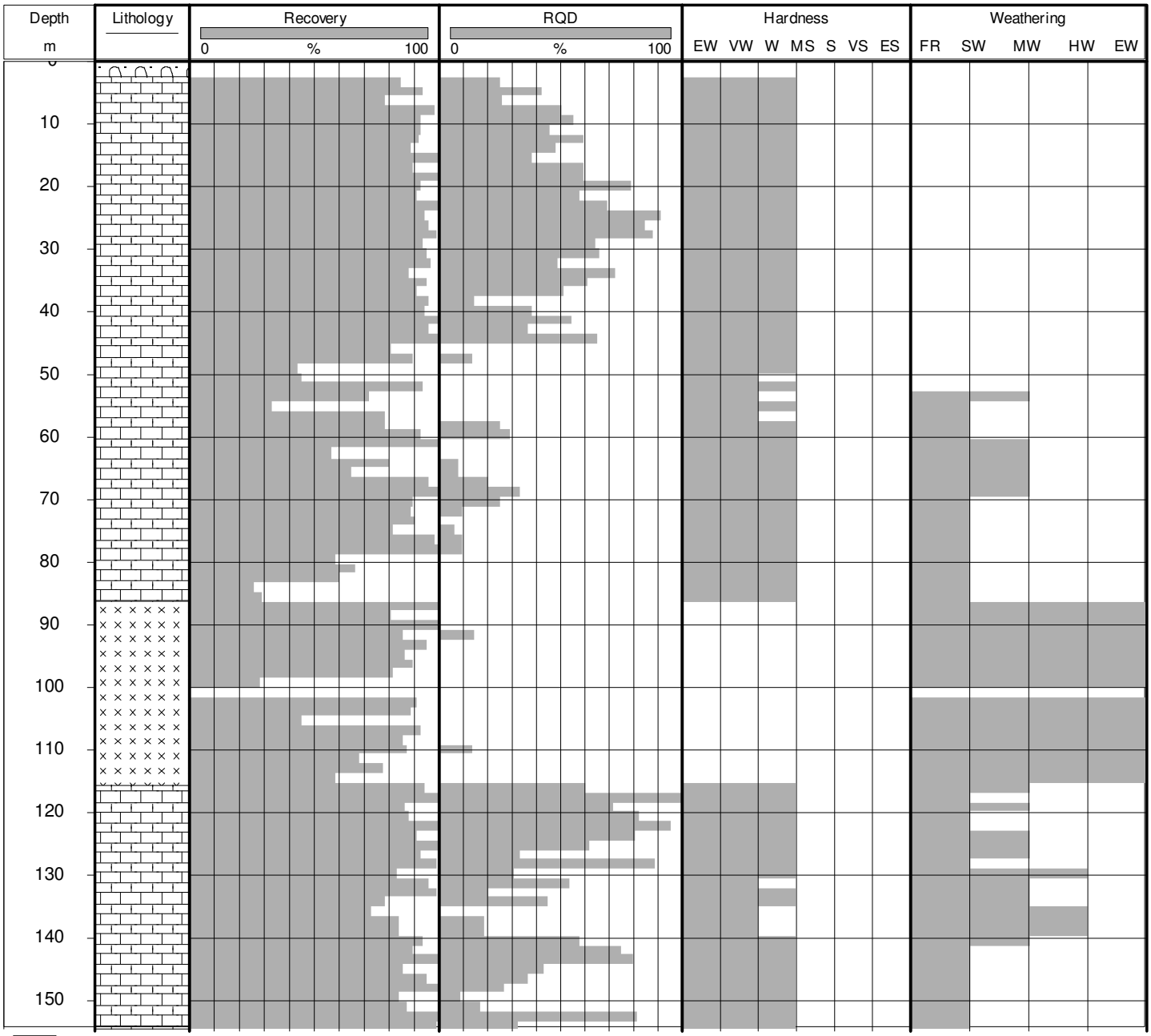
TITLE

Downhole plot of Recovery, RQD, Hardness, and Weathering for RAU-10-102

Golder Associates

PROJECT No.		1302357	FILE No.	
DESIGN	GTL	11/12/2013	SCALE	NOT TO SCALE
CADD	BJE	11/12/2013	FIGURE	C-4
-	-	-		
-	-	-		

RAU-10-108



HARDNESS

ES	Extremely Strong
VS	Very Strong
S	Strong
MS	Moderately Strong
W	Weak
VW	Very Weak
EW	Extremely Weak

Weathering

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

PROJECT

ATAC RESOURCES LTD.
TIGER ZONE, RAU PROPERTY
YUKON TERRITORY, CANADA

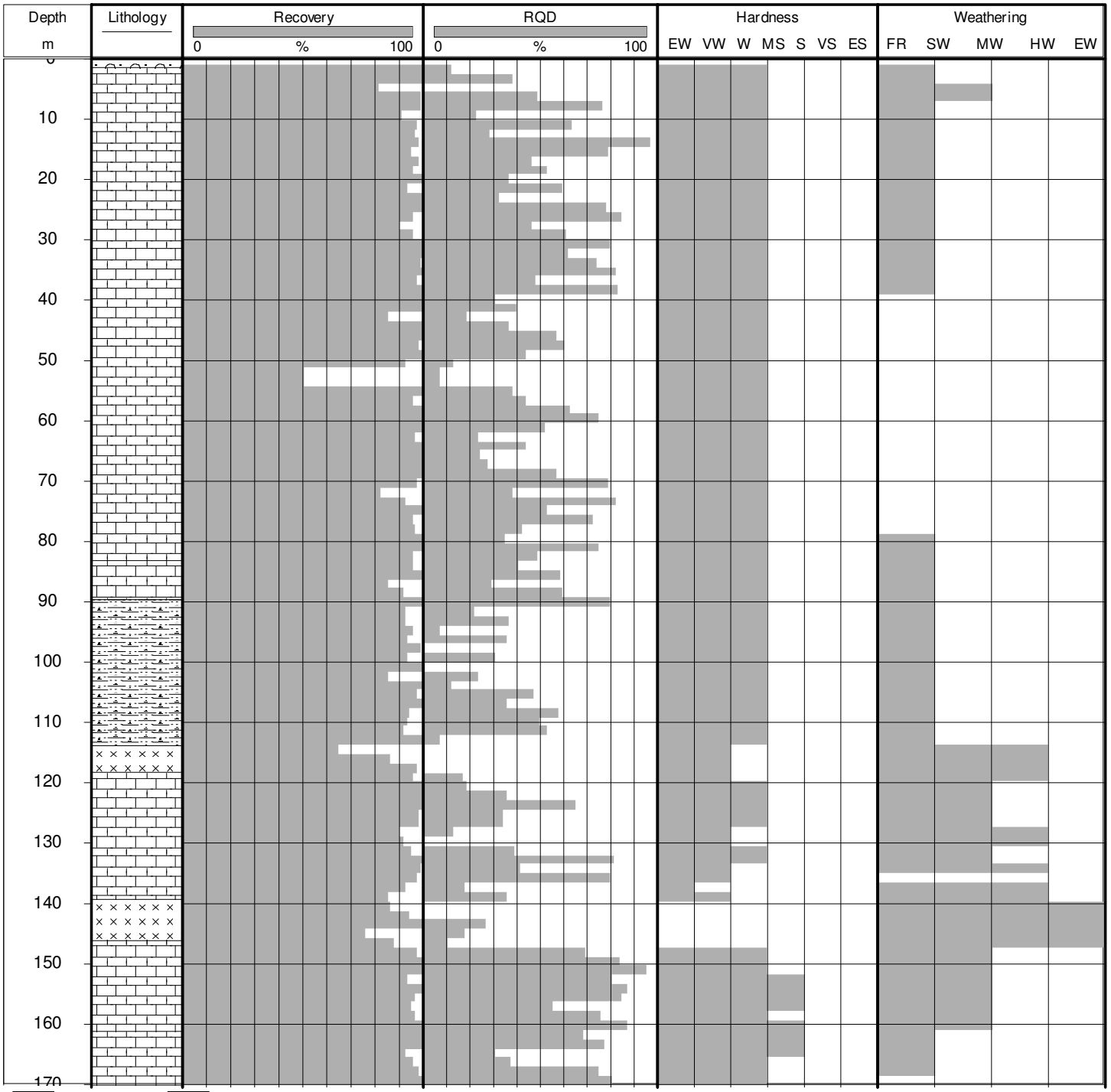
TITLE

Downhole plot of Recovery, RQD, Hardness, and Weathering for RAU-10-108

Golder Associates

PROJECT No.		1302357	FILE No.	
DESIGN	GTL	11/12/2013	SCALE	NOT TO SCALE
CADD	BJE	11/12/2013	FIGURE	C-5
-	-	-		
-	-	-		

RAU-10-113



HARDNESS

ES	Extremely Strong
VS	Very Strong
S	Strong
MS	Moderately Strong
W	Weak
VW	Very Weak
EW	Extremely Weak

Weathering

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

PROJECT

ATAC Resources Ltd.

ATAC RESOURCES LTD.
TIGER ZONE, RAU PROPERTY
YUKON TERRITORY, CANADA

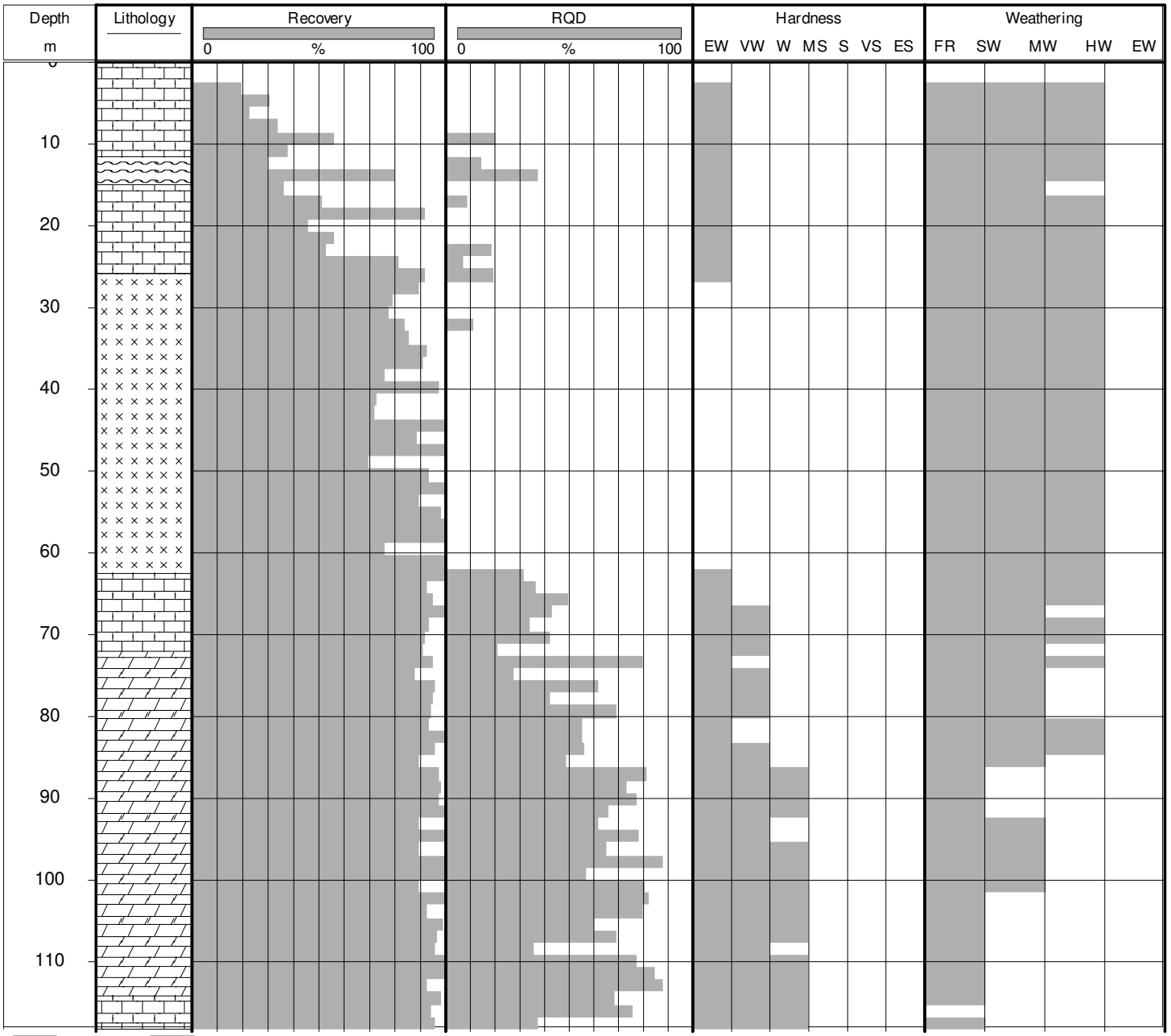
TITLE

Downhole plot of Recovery, RQD, Hardness, and Weathering for RAU-10-113

Golder Associates

PROJECT No.		1302357	FILE No.	
DESIGN	GTL	11/12/2013	SCALE	NOT TO SCALE
CADD	BJE	11/12/2013	FIGURE	C-6
-	-	-		
-	-	-		

RAU-10-132



HARDNESS

ES	Extremely Strong
VS	Very Strong
S	Strong
MS	Moderately Strong
W	Weak
VW	Very Weak
EW	Extremely Weak

Weathering

FR	Fresh
SW	Slightly Weathered
MW	Moderately Weathered
HW	Highly Weathered
EW	Extremely Weathered

PROJECT

ATAC RESOURCES LTD.
TIGER ZONE, RAU PROPERTY
YUKON TERRITORY, CANADA

TITLE

Downhole plot of Recovery, RQD, Hardness, and Weathering for RAU-10-132

Golder Associates

PROJECT No.		1302357	FILE No.	
DESIGN	GTL	11/12/2013	SCALE	NOT TO SCALE
CADD	BJE	11/12/2013	FIGURE	C-7
-	-	-		
-	-	-		

APPENDIX D
DISTRIBUTION OF RQD, HARDNESS AND WEATHERING IN COREHOLES

RQD Classification

RQD (percent)	Rock Quality Classification	Approximate Discontinuity Spacing (mm)[1]
0-25	Very Poor	< 70
25-50	Poor	70 to 100
50-75	Fair	100 to 150
75-90	Good	150 to 300
90-100	Excellent	> 300

Notes: 1. Bieniawski (1989).

Hardness Categories

Category	ATAC Code	Description
0	EW	Extremely Weak
1	VW	Very Weak
2	W	Weak
3	MS	Medium Strong
4	S	Strong
5	VS	Very Strong
6	ES	Extremely

Weathering Categories

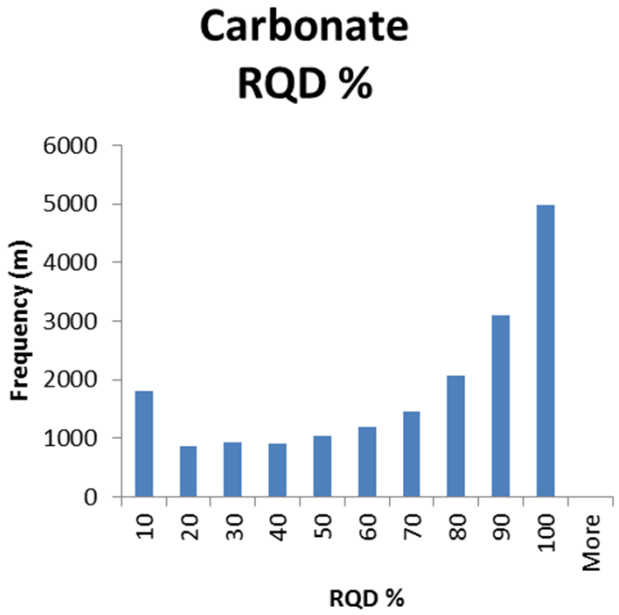
Category	ATAC Code	Description
1	FR	Fresh
2	SW	Slightly weathered
3	MW	Moderately weathered
4	HW	Highly weathered
5	EW	Extremely weathered

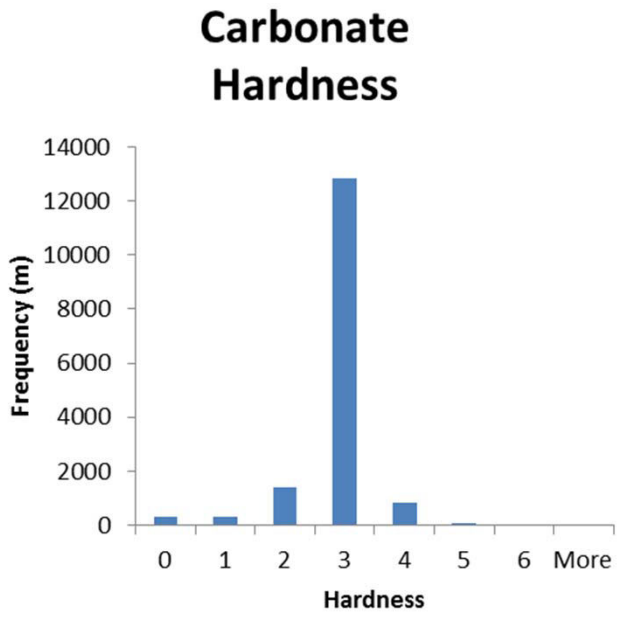
ATAC RESOURCES LTD.
TIGER ZONE,
RAU PROPERTY
YT, CANADA

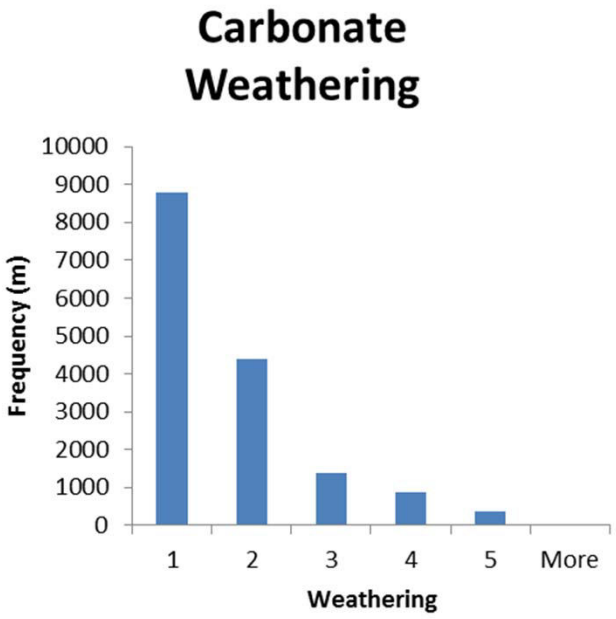
Drawn	Date	Project Number
GL	01/27/14	1302357

Title

Figure D-1
Geotechnical Data Categories

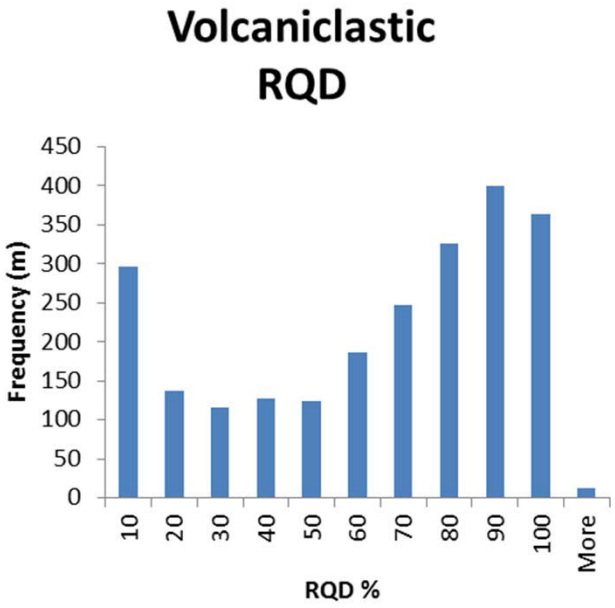


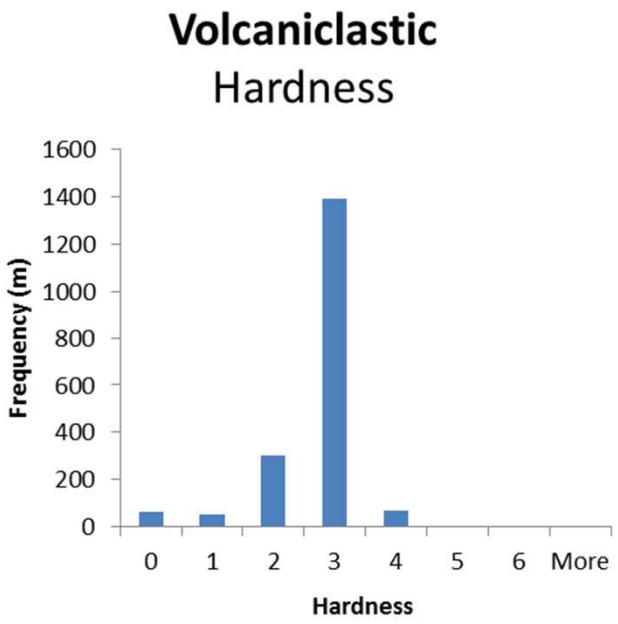


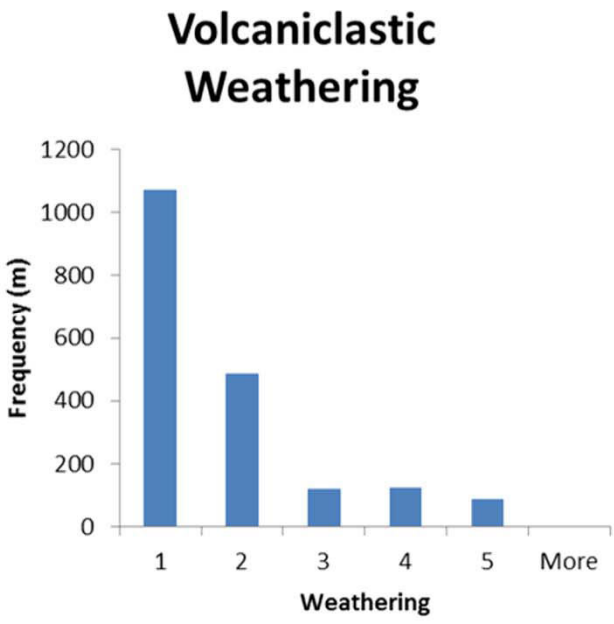


Notes: 1. See Figure D-1 for Explanation of Categories
2. Frequency = length drilled in meters

ATAC RESOURCES LTD. TIGER ZONE, RAU PROPERTY YT, CANADA	Drawn JB	Date 01/27/14	Project Number 1302357
	Title **Figure D-1** **Geotechnical Data for Carbonate Rocks**		

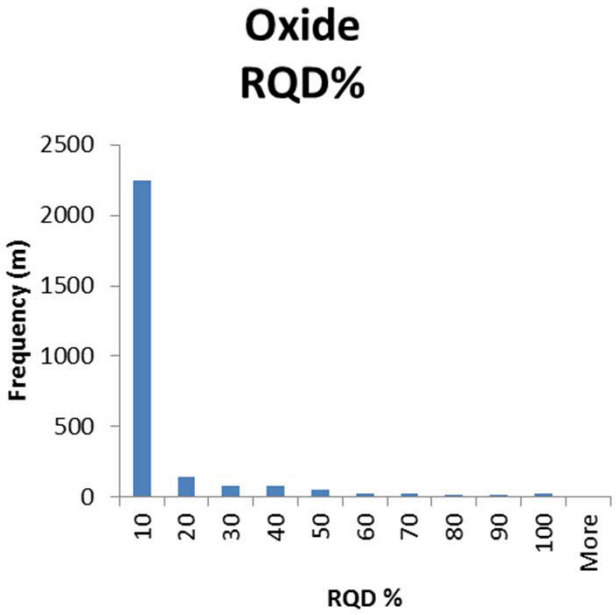


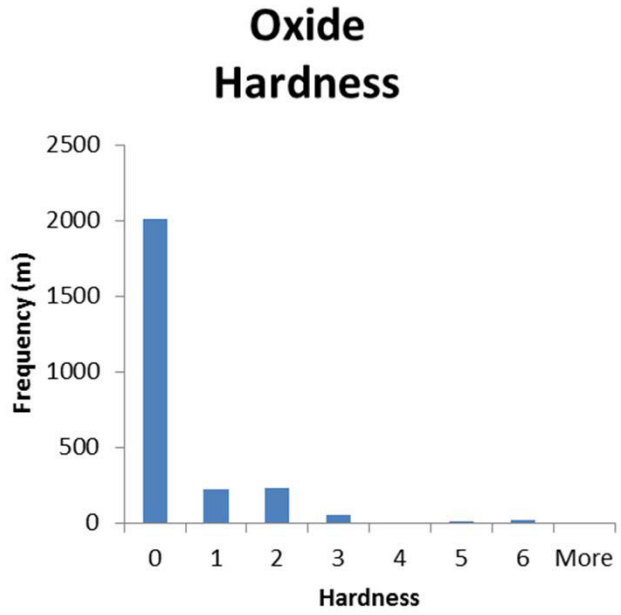


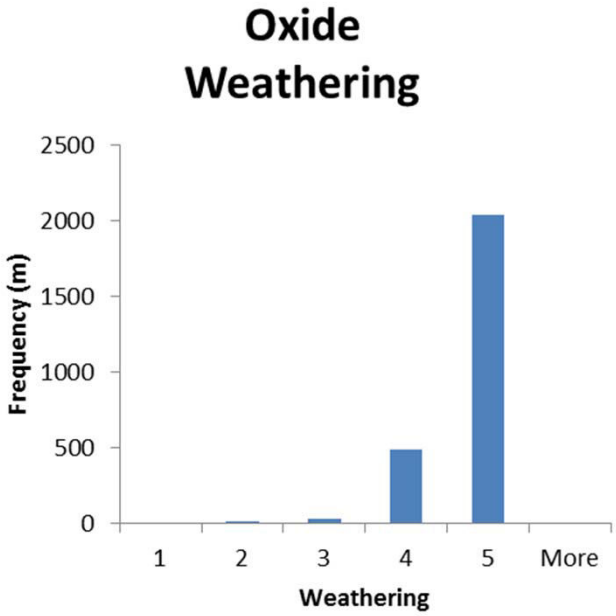


Notes: 1. See Figure D-1 for Explanation of Categories
2. Frequency = length drilled in meters

ATAC RESOURCES LTD. TIGER ZONE, RAU PROPERTY YT, CANADA	Drawn JB	Date 01/27/14	Project Number 1302357
	Title **Figure D-3** **Geotechnical Data for Volcaniclastic**		







Notes: 1. See Figure D-1 for Explanation of Categories
2. Frequency = length drilled in meters

ATAC RESOURCES LTD. TIGER ZONE, RAU PROPERTY YT, CANADA	Drawn JB	Date 01/27/14	Project Number 1302357
	Title **Figure D-4** **Geotechnical Data for Oxide**		

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South America	+ 56 2 2616 2000

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GolderAddress1
GolderAddress2
Tel: Phone Number
Fax: Fax Number

Golder Associates

Engineering Earth's Development, Preserving Earth's Integrity

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T.N.
0.67°
22°51'
Grid north
Magnetic north
Annual change decreasing 26.6'
*UTM grid angle corresponds to map sheet 106D01

*Letter corresponds to assessment grouping

106D06
106D07
106D08
106C05
106C06
106C07
106C08
106D03
106D02
106D01
106C04
106C03
106C02
106C01
UTM Zone 8
UTM Zone 9
PROPERTY BOUNDARY

PROPERTY BOUNDARY

7,125,000 mN
7,120,000 mN
7,115,000 mN
7,110,000 mN
510,000 mE
515,000 mE
520,000 mE
525,000 mE
530,000 mE

700
800
900
1,100
1,200
1,300
1,400
1,500

ATAC RESOURCES LTD.

FIGURE 2

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

CLAIM LOCATIONS - GROUPS I & J

TIGER PROJECT

0 1 2 3 4 5 km

UTM ZONE 8, NAD 83, 106D01, Contour line intervals 100 feet, Scale 1:55,000

FILE:P:\...TIGER\Figures\F_2_CLAIMS_I&J

DATE: AUGUST 2014

T.N.
0.67°
23°51'
Grid north
Magnetic north

Annual change decreasing 26.6'

*UTM grid angle corresponds to map sheet 106O01

*Letter corresponds to assessment grouping

UTM Zone 8
UTM Zone 9

106D06
106D07
106D08
106C05
106C06
106C07
106C08
106D03
106D02
106D01
106C04
106C03
106C02
106C01

N
K
L
J
I
H
G
F
E
D
C
B
A
M

PROPERTY BOUNDARY

7,150,000 mN
7,145,000 mN
7,140,000 mN
7,135,000 mN
7,130,000 mN
7,125,000 mN
7,120,000 mN
7,115,000 mN

480,000 mE
485,000 mE
490,000 mE
495,000 mE
500,000 mE
505,000 mE
510,000 mE
515,000 mE

PROPERTY BOUNDARY

ATAC RESOURCES LTD.

FIGURE 3

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

CLAIM LOCATIONS - GROUPS K, L &N

TIGER PROJECT

0 1 2 3 4 5 km

UTM ZONE 8, NAD 83, 106D07, Contour line intervals 100 feet, Scale 1:50,000

FILE:P:\...TIGER\Figures\F_3_CLAIMS_KLN

DATE: AUGUST 2014

T.N.

0.67°

22°51'

Grid north

Magnetic north

Annual change decreasing 26.6'

*UTM grid angle corresponds to map sheet 106D01

*Letter corresponds to assessment grouping

106D06 | 106D07 | 106D08 | 106C05 | 106C06 | 106C07 | 106C08

UTM Zone 8 | UTM Zone 9

PROPERTY BOUNDARY

106D03 | 106D02 | 106D01 | 106C04 | 106C03 | 106C02 | 106C01

N K L J I H G F E D C B A M

PROPERTY BOUNDARY

7,115,000 mN

7,110,000 mN

7,105,000 mN

7,100,000 mN

7,095,000 mN

495,000 mE | 490,000 mE | 495,000 mE | 500,000 mE | 505,000 mE | 510,000 mE | 515,000 mE

ATAC RESOURCES LTD.

FIGURE 4

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

CLAIM LOCATIONS - GROUPS I & J

TIGER PROJECT

0 1 2 3 4 5 km

UTM ZONE 8, NAD 83, 106D02, Contour line intervals 100 feet, Scale 1:50,000

FILE:P:\...TIGER\Figures\F_4_CLAIMS_M | DATE: AUGUST 2014