

ARIS SUMMARY SHEET

District Geologist, Smithers

Off Confidential: 89.04.12

ASSESSMENT REPORT 17448

MINING DIVISION: Omineca

PROPERTY: Silver Hill  
LOCATION: LAT 54 31 55 LONG 127 11 12  
UTM 09 6044005 617340  
NTS 093L11E

CLAIM(S): Silver Hill  
OPERATOR(S): Atna Res.  
AUTHOR(S): Harivel, C.  
REPORT YEAR: 1988, 28 Pages

COMMODITIES

SEARCHED FOR: Silver, Gold, Copper

GEOLOGICAL

SUMMARY: The property is underlain by red tuffaceous volcanics of the Lower Jurassic Hazelton Group. Three kilometres southwest, a large granodiorite stock of Upper Cretaceous age intrudes the volcanics. Lower Cretaceous sandstone rests unconformably on the volcanics. Major north-northeast trending faults cut across the claims. Early work reported the presence of electrum in an adit developed along a shear-hosted vein structure.

WORK

DONE: Geological, Geochemical  
SOIL 374 sample(s) ;AU  
MINFILE: 093L 043

LOG NO: 0609 RD.

LOCATION:

FILE NO:

**ASSESSMENT REPORT**

**THE GEOLOGY AND GEOCHEMISTRY  
OF  
SILVER HILL PROPERTY**

**FILMED**

**CLAIMS: SILVER HILL, RECORD NO. 8212**

**SMITHERS MAP SHEET  
93 L/11**

**LATITUDE 54 32 N  
LONGITUDE 127 11 W**

**GEOLOGICAL BRANCH  
OMINECA MINING DIVISION  
ASSESSMENT REPORT**

**17,448**

**WRITTEN BY: COLIN HARIVEL**

**FEBRUARY 1988**

## TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION: . . . . .	1
LOCATION AND ACCESS: . . . . .	1
PHYSIOGRAPHY: . . . . .	1
PROPERTY HISTORY: . . . . .	1
CLAIMS INFORMATION: . . . . .	1
ECONOMIC ASSESSMENT: . . . . .	3
REGIONAL GEOLOGY: . . . . .	3
PROPERTY GEOLOGY: . . . . .	4
MINERALIZATION AND ALTERATION: . . . . .	6
ROCK GEOCHEMISTRY: . . . . .	6
SOIL GEOCHEMISTRY: . . . . .	6
CONCLUSIONS AND RECOMMENDATIONS: . . . . .	9
STATEMENT OF COSTS: . . . . .	11
AUTHOR'S STATEMENT: . . . . .	12
APPENDIX: Assay Certificates	

## LIST OF ILLUSTRATIONS

FIGURE 1: Claims Location . . . . .	2
FIGURE 2: General Geologic Setting . . . . .	5
FIGURE 3: Grid Location . . . . .	7
FIGURE 4: Soil and Rock Geochemistry . . . . .	8
FIGURE 5: Sketch: Colorado Adit . . . . .	10

**INTRODUCTION:**

The claim was staked in late winter of 1987 as a result of library research. In July 1987 an assessment of the ground and geologic setting was made by Colin Harivel and Mary Lou Mallot. A camp was flown into the property on July 1 and in the course of the 5 day stay on the property, preliminary geologic mapping and soil sampling on wide-spaced lines was completed.

This report summarises some previous work done on the property and describes the work done in 1987.

**LOCATION AND ACCESS:**

The property is located about 45 km southwest of Smithers. The last few kilometers are along four-wheel drive road which, in early summer, may be difficult to negotiate in places. The route from Smithers is through the village of Telkwa, along Coalmine Road to Goathorn Creek turnoff and then along the road to Cabin Creek.

**PHYSIOGRAPHY:**

The property lies in the extreme north of the Telkwa Range within the Hazelton Mountains of the Bulkley Ranges. The property is sub-alpine and elevations range from 5100' (1555m) to 5700' (1737m) above sea level. The gentle upland surface which occupies the centre of the property is largely grass-covered. All drainage from the property is into tributaries of the Telkwa River which flows into the Bulkley River.

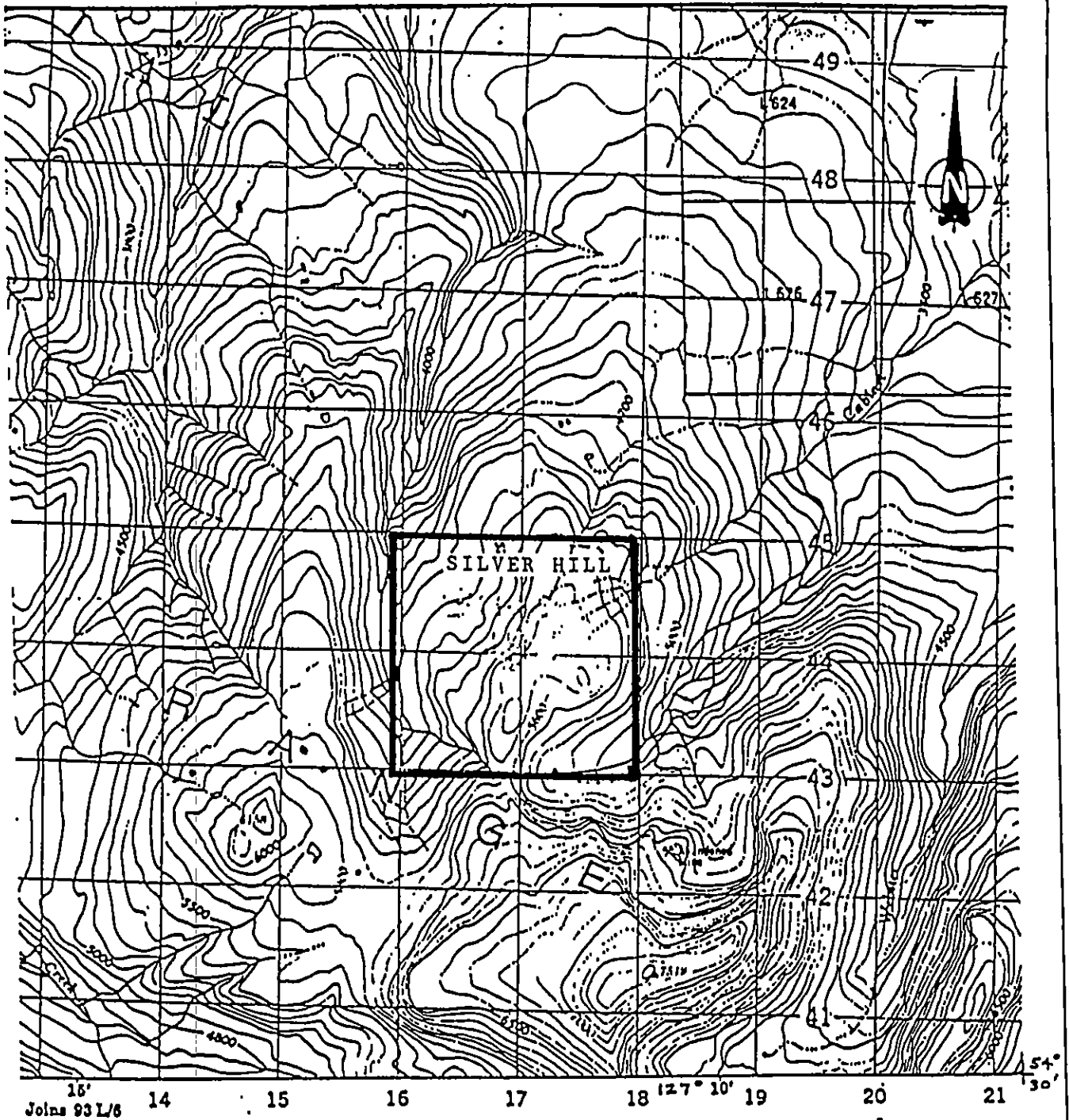
**PROPERTY HISTORY:**

The property was first discovered in 1909, with several tunnels and a shaft having apparently been developed, but no work of any significance has been done since 1915. The older workings have been buried by creep of the mobile felsenmeer cover. The location of the Colorado Adit is indicated by the conspicuous dump, but the portal has caved.

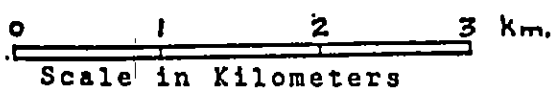
**CLAIMS INFORMATION:**

The property consists of the SILVER HILL mineral claim of 16 units (Figure 1). The record number is 8212 and the expiry date is March 13, 1989. The claim is owned by Atna Resources Ltd.

93 L/11 E



Joins 93 L/6



<b>ATNA RESOURCES LTD.</b>		
SILVER HILL MINERAL CLAIM		
PROJECT:		
Claims' Location		
FIGURE 1		
SCALE	DRAWN	DATE

**ECONOMIC ASSESSMENT:**

The property is a volcanic-hosted, structurally controlled, precious metals target. Early work has demonstrated economic potential based on the reported presence of electrum in an adit developed along a shear-hosted vein structure. Recent geo-chemical soils analyses have demonstrated significant extensions and additions to the earlier known mineralized structures.

**REGIONAL GEOLOGY:**

The region is situated along the west-central part of the Stikine Terrane. Stratified and plutonic rocks range in age from Upper Paleozoic to Early Tertiary, with rocks of Jurassic age and younger being dominant.

Four major tectono-stratigraphic elements dominate the region:

The Lower and Middle Jurassic Hazelton Group comprises a marine and non-marine arc assemblage that is the preponderant rock assemblage in the area of interest. These strata are mainly non-marine rhyolitic to andesitic flows, pyroclastics and hypabyssal intrusives comprised of interfingering assemblages of flows, ignimbrites, lahars, air fall tuffs and breccias, volcanoclastic sediments and high level intrusive units. Consanguineous with the volcanics are diorite to granite plugs and stocks of the Topley Intrusions.

The interval between Upper Jurassic and Early Upper Cretaceous time is occupied by two sedimentary assemblages that appear to have little bearing on mineralization in this area.

To the immediate north of the area of interest, Upper Jurassic to mid-Lower Cretaceous Bowser Lake Group comprise a northwardly thickening wedge of deltaic-foredeep deposits. The source of the sediments was the Hazelton Group to the south and the depositional basin is known as the Bowser Basin. The locus of the strand lines across the southern limit of the Bowser Basin defines a structure known as the Skeena Arch, one of the most intensely mineralized belts in the Canadian Cordillera.

Between the mid-Lower Cretaceous and early Upper Cretaceous, the Skeena Group sediments were deposited across the entire region. This unit represents a continental margin clastic wedge, whose sediments were derived from the east, off the Omineca Terrane.

The late Upper Cretaceous to Eocene time is represented by a suite of continental transtensional arc volcanics that were deposited in an array of down-drop volcanic basins within the Stikine Terrane from latitude 55°30'N southward. These volcanics (the Kasalka and Ootsa Lake Groups) and their coeval intrusives

(Bulkley, Babine, Nanika) are associated with the development of basin and range geomorphology that typifies this segment of the Stikine Terrane.

Post-Eocene time was one of uplift, erosion and local deposition of basalt. It served to expose mineralization.

Early and Middle Jurassic age arc-related mineralization is widespread and precious-metals based. Included within this epoch is the Toodoggone gold silver camp, and the major deposits of Silbak-Premier, Big Missouri and Granduc along the east flank of the Coast Range. Mineralization in the Smithers-Whitesail area likely of this epoch includes the Dome Mountain deposits and those of the Topley-Richfield area.

Late Cretaceous - Early Tertiary aged mineralization in the Skeena Arch is presently the most varied, widespread and significant of the two epochs. All the copper, molybdenum, tungsten and gold-bearing porphyries belong to this stage. Precious metals properties include Equity Silver, New Nadina, Silver Standard, Cronin and a host of smaller properties. Most of these deposits are related to the evolution of down-drop basins and calderas associated with volcanism, related plutonism and the development of a basin-and-range geomorphology. These deposits range from low temperature epithermal to high temperature mesothermal types.

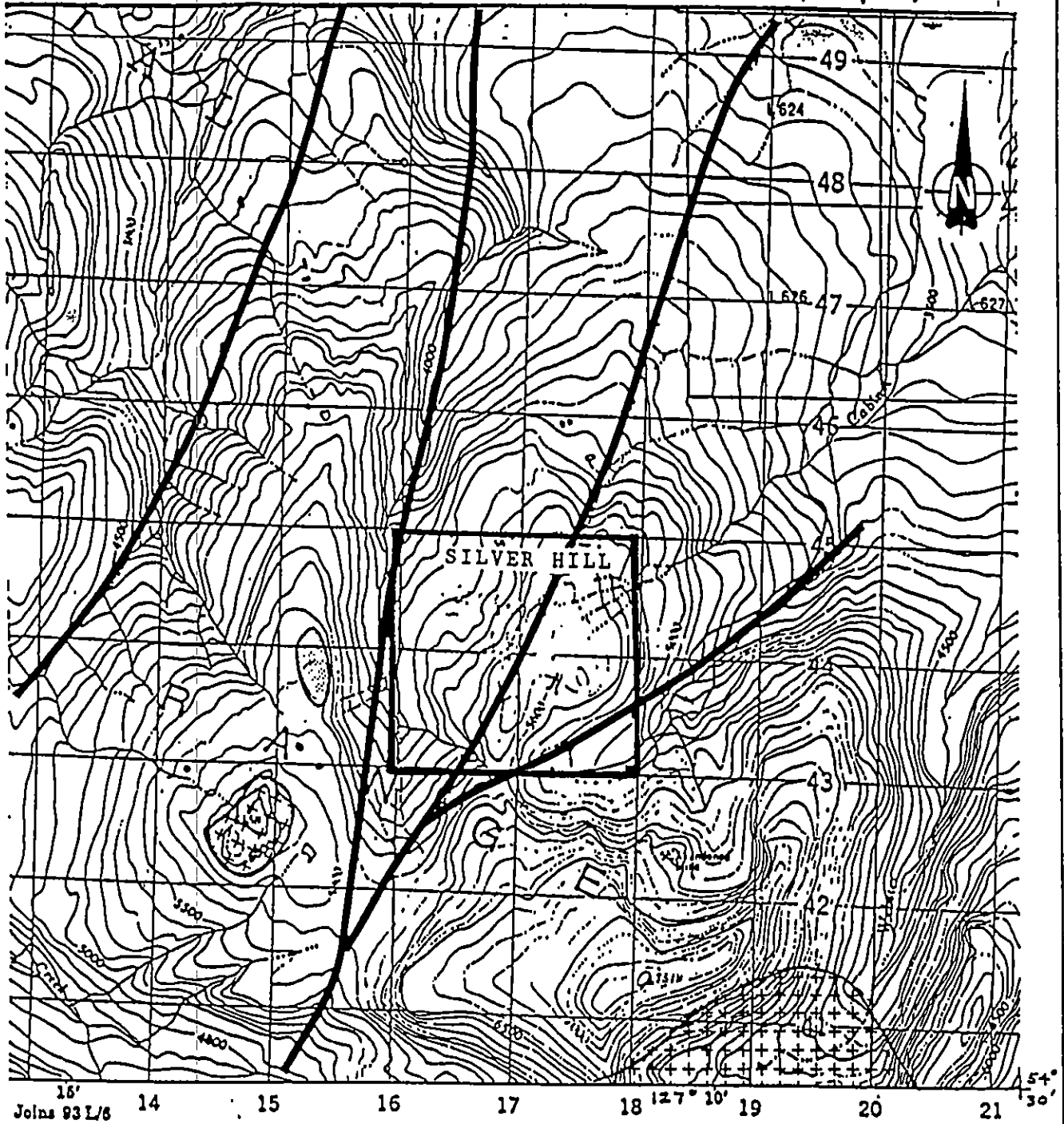
#### PROPERTY GEOLOGY:

The claims are underlain by red tuffaceous volcanics of the Lower Jurassic Hazelton Group (Figure 2). Three kilometers to the southwest, a large granodiorite stock of Upper Cretaceous age intrudes the volcanics and forms the core of the Telkwa Mountains. A small satellitic stock or sill is exposed one kilometer to the southwest. A small outlier of Lower Cretaceous sandstone rests unconformably on Hazelton volcanics 800m to the west, across a prominent, fault-controlled, north-trending creek. Hazelton strata west of this creek comprise red tuffs and shallow marine, fossiliferous tuffaceous sediments of the Smithers formation.

Major north to northwest-trending faults transect the claims and the immediate adjacent strata. The west boundary fault near the claim separates stratigraphically younger Jurassic strata to the west from older strata on the claim area. To the south of the claim, a northwest trending fault separates strata on the claims from still older Hazelton assemblages. The claims are located astride the junction of major fault structures.

Strata on the claims comprise poorly exposed fine-grained maroon tuff, tuffaceous mudstone, fine-grained grey green tuff and

93 L/11 E



Upper Cretaceous Intrusions



Cretaceous Sandstone

Jurassic Volcanics



Faults



ATNA RESOURCES LTD.

SILVERHILL MINERAL CLAIM  
PROJECT

GENERAL GEOLOGIC SETTING

FIGURE 2

SCALE

DRAWN

DATE



coarse-grained lapilli tuff. Exposures are generally poor as the tuffs weather to a pervasive mantle of fine red felsenmeer and soil. Bedding, where visible, appears to strike north to northeast, dipping 25 to 50 degrees westerly.

#### MINERALIZATION AND ALTERATION:

The claims were staked because high silver values in association with electrum have been reported from the Colorado Adit. The property was first discovered in 1909 but no work of any significance has been done on the property since 1915.

The 1987 work, centred on the caved Colorado Adit, consisted of reconnaissance geologic mapping, soil sampling and basic prospecting.

Two, poor exposures of mineralization were noted. A small area of proximal float containing galena and tetrahedrite in a quartz-carbonate rock assayed 49 oz/ton Ag, with low Au. A one meter chip at the adit location gave 4 oz/ton Ag and a grab returned >100 ppm Ag.

#### ROCK GEOCHEMISTRY:

Rock chip samples collected in the course of mapping were analyzed by ICP techniques for 28 elements and by FA & AAS for gold. Analyses were conducted by Vangeochem Labs, Vancouver, and the results are included in Appendix 1. Twenty three samples were analyzed.

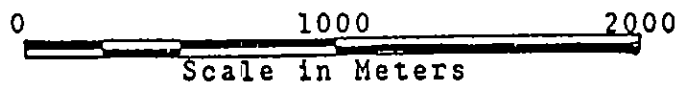
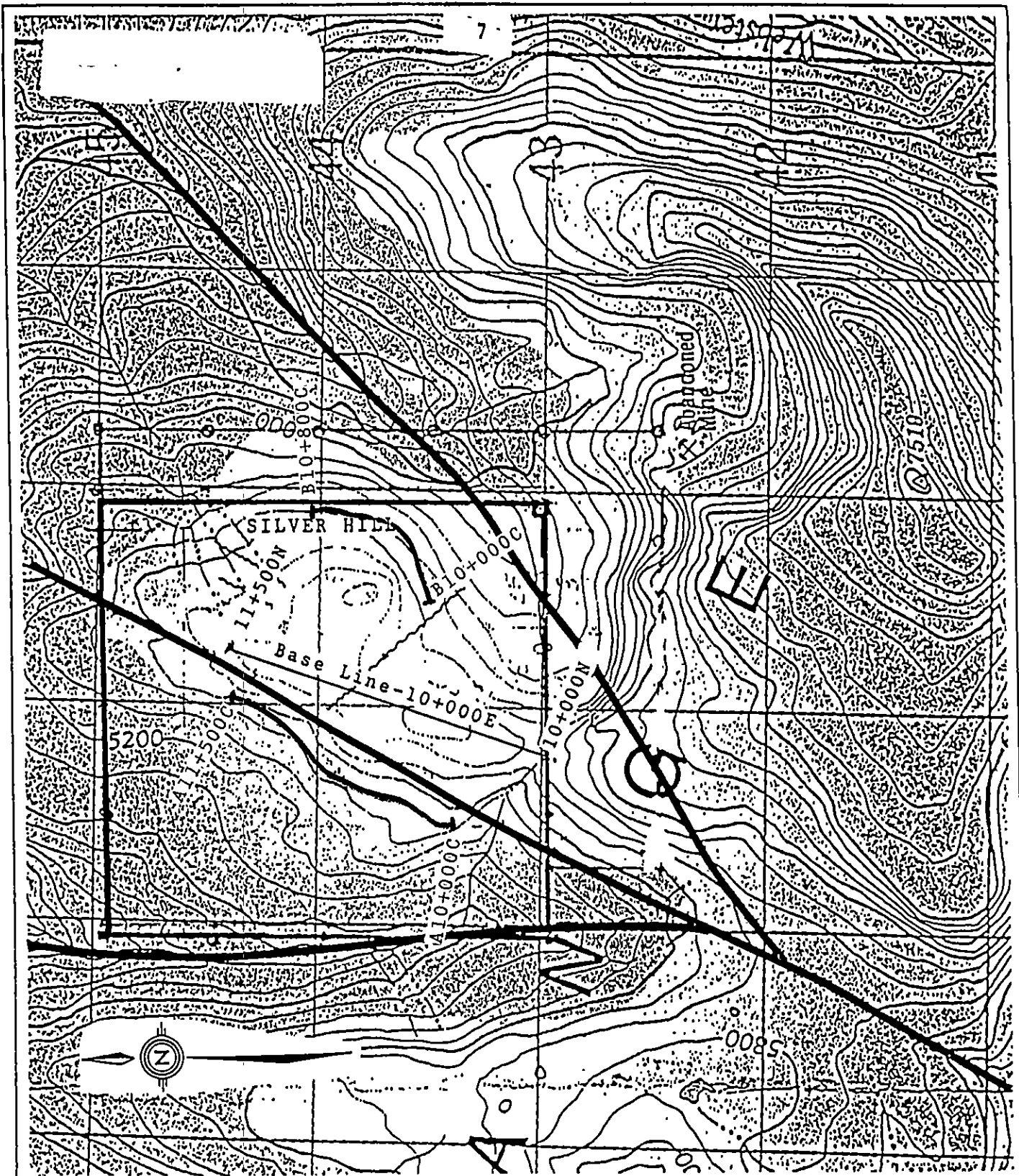
Samples ML 10A, 10B and 11-15 were mineralized. Samples ML 1-9 and 16-22 were character and rock type samples.

The sample locations are plotted on Figure 4, and values in Au and Ag are also plotted on this map. ML 13 ran 165 ppb Au and >100 ppm Ag.

#### SOIL GEOCHEMISTRY:

A soil survey, on 100m lines with samples 25m apart, was completed over the central part of the property (Figure 3). Soils were taken from a depth of 5-15cm and from the B horizon wherever possible. Soils were placed in kraft paper bags and shipped to the Vancouver laboratory.

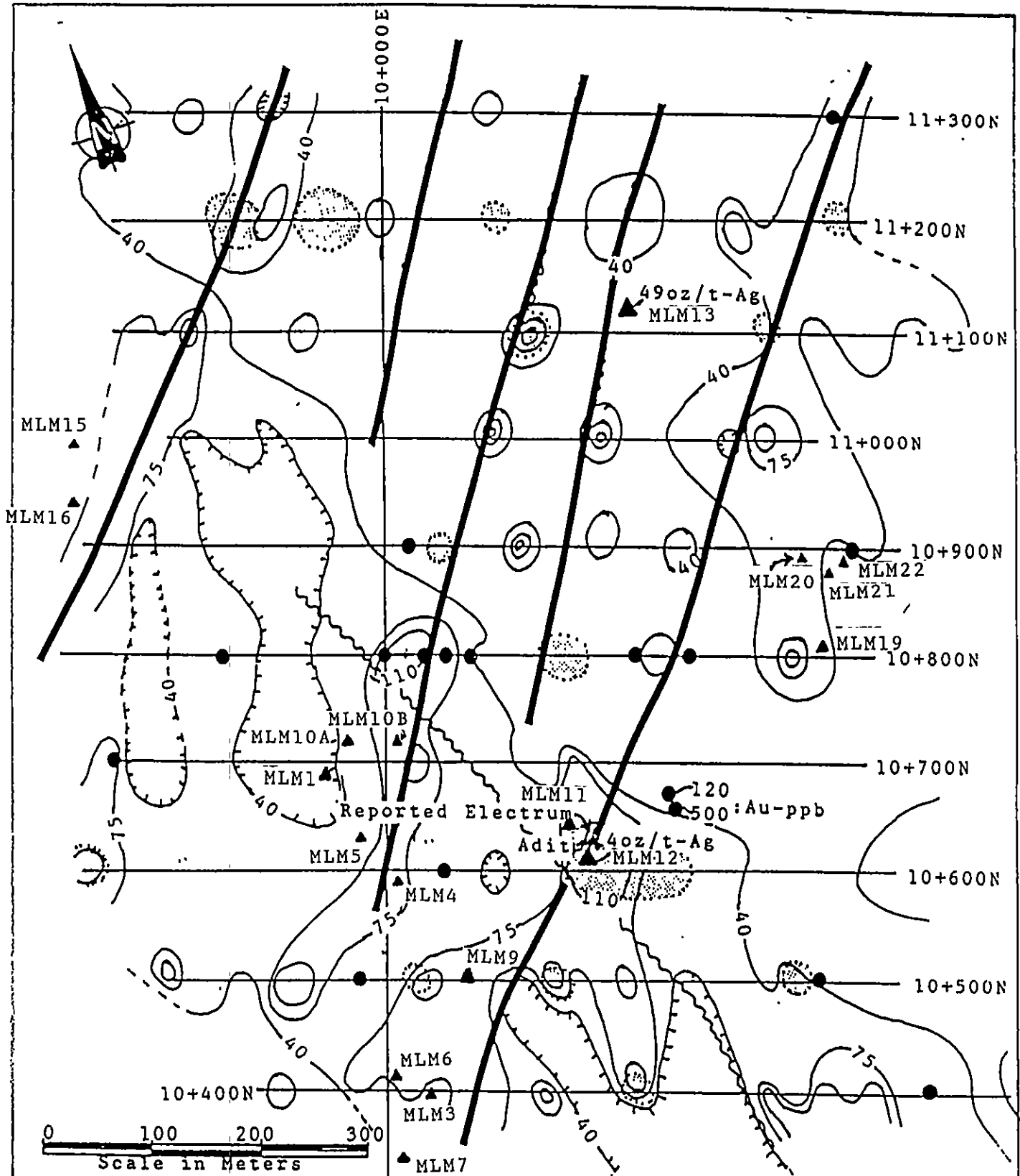
Copper in soil, when results are contoured, outlines two distinctive, overlapping trends (see Figure 4). A northerly trend divides the grid area into two panels; to the east, soils



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SILVER HILL MINERAL CLAIM PROJECT:		
GRID LOCATION		
FIGURE 3		
SCALE	DRAWN	DATE

▲ MLM14

8



0 100 200 300  
Scale in Meters

- 40— Copper Soil Contour-in ppm
- 75— Copper Soil Contour-in ppm
- 110— Copper Soil Contour-in ppm
- Gold in Soils:  $\geq 30$ ppb
- Silver in Soils:  $\geq 0.9$ ppm
- Fault Zones
- ▲ Rock Sample

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SILVER HILL MINERAL CLAIM

PROJECT:

SOIL AND ROCK GEOCHEMISTRY,

FIGURE 4

SCALE

DRAWN

DATE

are generally less than 40 ppm and to the west, greater than 40 ppm. This pattern reflects underlying bedrock. Second-order trends define a set of northeast elongate anomalies that are coincident with northeast trending fault structures. The mapped direction of the Colorado Adit (see Figure 5) also follows this trend, and the 49 oz/ton Ag assay-showing also lies on a northeast trending structure. Copper values in excess of 75 ppm and 110 ppm (values range to 817 ppm) outline these anomalies. A soil sample at the adit gave >100 ppm Ag, 7240 ppm Cu, 249 ppm Sb, 214 ppm As and 49 ppb Cd.

Silver in soils includes values to 6.3 ppm, exclusive of the dump sample. Sample sites where silver was greater than 0.8 ppm are also plotted on Figure 4. Gold values are generally low, with values greater than 30 ppm somewhat aligned with copper and silver. Two soil samples taken off the grid gave results of 120 and 500 ppb Au. The anomalous geochemical trends remain open to the north and south.

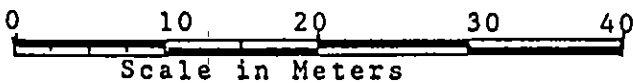
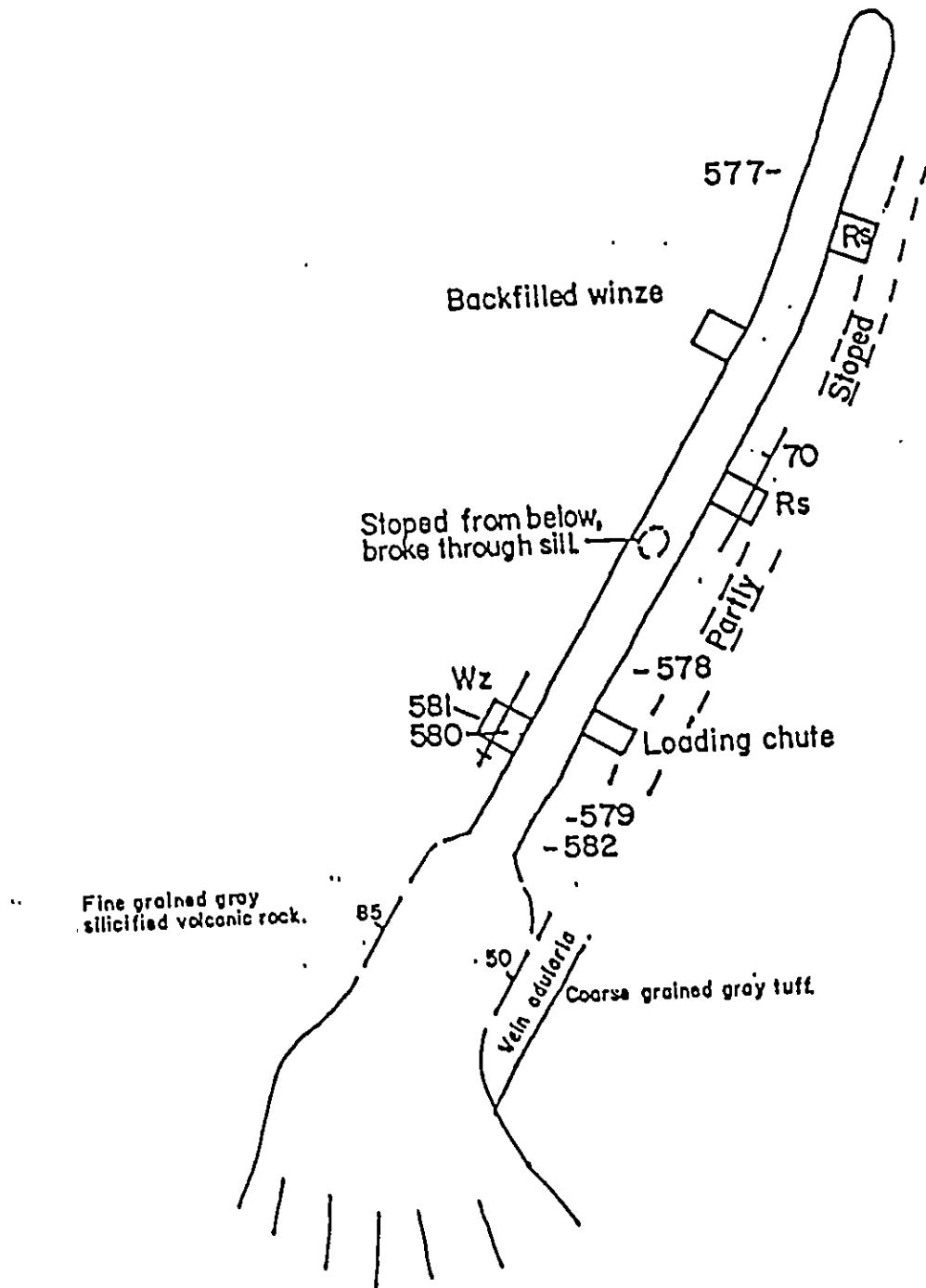
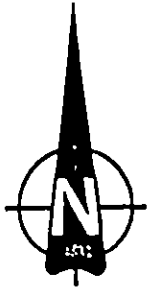
#### CONCLUSIONS AND RECOMMENDATIONS:

The claim area contains at least four major north-trending structures that are geochemically anomalous in copper and silver and are associated with known exposures or proximal float with high silver values. Electrum has been reported from the claims (B.C. Dept. of Mines Assessment Report #10918). An assay taken in 1912 reports: Cu 18%, Ag 400 oz/ton, and Au 0.12 oz/t.

The soil survey indicates a high correlation between fault structures and Cu and Ag anomalies. Completion of a tighter spaced soil grid is expected to better define this correlation.

In addition, VLF-EM surveys will assist in the definition of the faulting on the property.

At the conclusion of the soil and VLF-EM surveys, soil anomalies clearly coincident with structure should be trenched.



ATNA RESOURCES LTD.		
SILVER HILL MINERAL CLAIM PROJECT:		
Sketch: Colorado Adit FIGURE 5 after W. Thomson		
SCALE	DRAWN	DATE

## STATEMENT OF COSTS

## PERSONNEL

Mary Lou Mallot, Geologist;	June 24, July 1-5 (field)	
	6 days @ \$200/day	\$1200
	July 8-10 (office)	
	3 days @ \$200/day	\$600
Colin Harivel, Geologist;	June 24, July 5 (field)	
	2 days @ \$350/day	\$700
Myron Kozak, Field Assistant;	June 24, July 1-5 (field)	
	6 days @ \$150/day	\$900
Stephan Soby, Field Assistant;	June 24, July 1-5 (field)	
	6 days @ \$150/day	\$900

## TRANSPORTATION

Trucks	3 days @ \$55/day	\$165
Helicopter	3.5 hours @ \$550/hour	\$1925

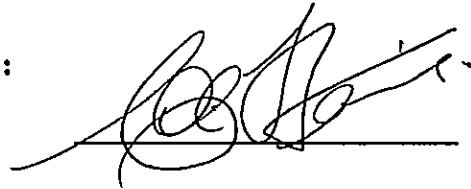
CAMP AND SUPPLIES	9 man days @ \$75/man/day	\$675
MOTELS		\$150
GEOCHEMISTRY		\$4849
OFFICE		\$500
REPORT, INCLUDING DRAFTING		<u>\$1500</u>
TOTAL		<u>\$14964</u>

**AUTHOR'S STATEMENT**

I, Colin Harivel, do hereby state the following;

1. I am a mineral exploration geologist with business address P.O. Box 233, Smithers, B.C. Postal Code V0J2N0.
2. I graduated from the University of British Columbia in 1972 with a B.Sc. in geology and I have since then practised my profession in Australia, Canada and the United States of America.
3. I am a Fellow of the Geological Association of Canada.
4. I have explored for ore deposits of the type that may be contained in the Silver Hill Property, the subject property in this report.
5. I visited the property on July 5, 1987. This report is based on a literature review and on observations made by me and by associates who were present on that date.

Signed:

A handwritten signature in black ink, appearing to read 'Colin Harivel', written over a horizontal line.

COLIN HARIVEL, B.Sc., F.G.A.C.

APPENDIX

Assay Certificates





# VANGEOCHEM LAB LIMITED

MAIN OFFICE  
1521 PEMBERTON AVE  
NORTH VANCOUVER, B.C. V7P 2S3  
(604) 986-5211 TELEX 04-352578

BRANCH OFFICE  
1630 PANDORA ST  
VANCOUVER, B.C. V5L 1L6  
(604) 251-6658

REPORT NUMBER: 870587 GA

JOB NUMBER: B70587

ATMA RESOURCES

PAGE 1 OF 9

SAMPLE #	Au ppb
A-10+000 C	15
A-10+050 C	10
A-10+100 C	20
A-10+150 C	15
A-10+200 C	nd
A-10+250 C	nd
A-10+300 C	nd
A-10+350 C	nd
A-10+400 C	nd
A-10+450 C	5
A-10+500 C	10
A-10+550 C	10
A-10+600 C	nd
A-10+700 C	nd
A-10+750 C	nd
A-10+800 C	10
A-10+850 C	10
A-10+900 C	15
A-10+950 C	20
A-11+000 C	20
A-11+050 C	nd
A-11+100 C	10
A-11+150 C	nd
A-11+200 C	nd
A-11+250 C	nd
A-11+300 C	nd
A-11+350 C	nd
A-11+400 C	nd
A-11+450 C	nd
A-11+500 C	15
B-10+000 C	nd
B-10+050 C	5
B-10+100 C	5
B-10+150 C	5
B-10+200 C	nd
B-10+250 C	nd
B-10+300 C	5
B-10+350 C	5
B-10+400 C	nd

DETECTION LIMIT

5

nd = none detected

-- = not analysed

is = insufficient sample



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REPORT NUMBER: B70687 BA

JOB NUMBER: B70687

ATMA RESOURCES

PAGE 2 OF 9

SAMPLE #	Au
	ppb
B-10+450 C	15
B-10+500 C	5
B-10+550 C	20
B-10+600 C	20
B-10+650 C	20
B-10+700 C	5
B-10+750 C	nd
B-10+800 C	nd
10+400N 9+875E	nd
10+400N 9+900E	nd
10+400N 9+925E	nd
10+400N 9+950E	nd
10+400N 9+975E	25
10+400N 10+000E	20
10+400N 10+025E	20
10+400N 10+050E	10
10+400N 10+075E	15
10+400N 10+100E	10
10+400N 10+125E	20
10+400N 10+150E	nd
10+400N 10+175E	10
10+400N 10+200E	nd
10+400N 10+225E	nd
10+400N 10+250E	nd
10+400N 10+275E	5
10+400N 10+300E	5
10+400N 10+325E	5
10+400N 10+350E	5
10+400N 10+375E	10
10+400N 10+400E	10
10+400N 10+425E	10
10+400N 10+450E	15
10+400N 10+475E	20
10+400N 10+500E	10
10+400N 10+525E	40
10+400N 10+550E	20
10+400N 10+575E	15
10+500N 9+800E	20
10+500N 9+825E	10

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5

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(604) 251-5656

REPORT NUMBER: 8706B7 GA

JOB NUMBER: 8706B7

ATMA RESOURCES

PAGE 3 OF 9

SAMPLE #	Au
	ppb
10+500N 9+850E	nd
10+500N 9+875E	10
10+500N 9+900E	15
10+500N 9+925E	10
10+500N 9+950E	10
10+500N 9+975E	30
10+500N 10+000E	10
10+500N 10+025E	20
10+500N 10+050E	20
10+500N 10+075E	25
10+500N 10+100E	nd
10+500N 10+125E	10
10+500N 10+150E	10
10+500N 10+175E	nd
10+500N 10+200E	nd
10+500N 10+225E	10
10+500N 10+250E	15
10+500N 10+275E	30
10+500N 10+300E	20
10+500N 10+325E	10
10+500N 10+350E	nd
10+500N 10+375E	nd
10+500N 10+400E	30
10+500N 10+425E	5
10+500N 10+450E	10
10+500N 10+475E	10
10+500N 10+500E	5
10+500N 10+525E	25
10+500N 10+550E	nd
10+600N 9+725E	20
10+600N 9+750E	15
10+600N 9+775E	15
10+600N 9+800E	10
10+600N 9+825E	15
10+600N 9+850E	5
10+600N 9+875E	20
10+600N 9+900E	15
10+600N 9+925E	5
10+600N 9+950E	20

DETECTION LIMIT

5

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REPORT NUMBER: 870687 BA

JOB NUMBER: 870687

ATNA RESOURCES

PAGE 4 OF 9

SAMPLE #	Au ppb
10+600N 10+000E	10
10+600N 10+025E	25
10+600N 10+050E	30
10+600N 10+075E	5
10+600N 10+100E	5
10+600N 10+125E	nd
10+600N 10+150E	5
10+600N 10+175E	5
10+600N 10+200E	25
10+600N 10+225E	5
10+600N 10+250E	10
10+600N 10+275E	5
10+600N 10+300E	5
10+600N 10+325E	nd
10+600N 10+350E	nd
10+600N 10+375E	10
10+600N 10+400E	10
10+600N 10+425E	nd
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10+600N 10+475E	nd
10+600N 10+500E	10
10+600N 10+525E	nd
10+700N 9+750E	30
10+700N 9+775E	10
10+700N 9+800E	15
10+700N 9+825E	5
10+700N 9+850E	15
10+700N 9+875E	10
10+700N 9+900E	5
10+700N 9+925E	nd
10+700N 9+950E	nd
10+700N 9+975E	nd
10+700N 10+000E	5
10+700N 10+025E	nd
10+700N 10+050E	nd
10+700N 10+075E	5
10+700N 10+100E	10
10+700N 10+125E	10
10+700N 10+150E	20

DETECTION LIMIT

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-- = not analysed

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(604) 251-5856

REPORT NUMBER: 870687 6A

JOB NUMBER: 870687

ATNA RESOURCES

PAGE 5 OF 9

SAMPLE #	Au ppb
10+700N 10+175E	10
10+700N 10+200E	5
10+700N 10+225E	nd
10+700N 10+250E	10
10+700N 10+275E	10
10+700N 10+300E	10
10+700N 10+325E	10
10+700N 10+350E	10
10+700N 10+375E	5
10+700N 10+400E	5
10+700N 10+425E	nd
10+700N 10+450E	nd
10+800N 9+700E	nd
10+800N 9+725E	5
10+800N 9+825E	15
10+800N 9+850E	30
10+800N 9+875E	10
10+800N 9+900E	5
10+800N 9+925E	10
10+800N 9+950E	5
10+800N 9+975E	10
10+800N 10+000E	30
10+800N 10+025E	30
10+800N 10+050E	30
10+800N 10+075E	30
10+800N 10+100E	15
10+800N 10+125E	20
10+800N 10+150E	5
10+800N 10+175E	15
10+800N 10+200E	nd
10+800N 10+225E	35
10+800N 10+250E	5
10+800N 10+275E	30
10+800N 10+300E	20
10+800N 10+325E	5
10+800N 10+350E	nd
10+800N 10+375E	10
10+800N 10+400E	30
10+800N 10+450E	5

DETECTION LIMIT

5

nd = none detected

-- = not analysed

is = insufficient sample



# VANGEOCHEM LAB LIMITED

MAIN OFFICE  
1521 PEMBERTON AVE  
NORTH VANCOUVER, B.C. V7P 2S3  
(604) 980-5211 TELEX 04-352578

BRANCH OFFICE  
1830 PANDORA ST  
VANCOUVER, B.C. V5L 1L6  
(604) 251-5656

REPORT NUMBER: 870687 6A

JOB NUMBER: 870687

ATMA REBOURCES

PAGE 6 OF 9

SAMPLE #	Au ppb
10+900N 9+725E	nd
10+900N 9+750E	15
10+900N 9+775E	10
10+900N 9+800E	10
10+900N 9+850E	10
10+900N 9+875E	5
10+900N 9+900E	10
10+900N 9+925E	25
10+900N 9+950E	nd
10+900N 9+975E	20
10+900N 10+000E	10
10+900N 10+025E	30
10+900N 10+050E	5
10+900N 10+075E	10
10+900N 10+100E	10
10+900N 10+125E	10
10+900N 10+150E	20
10+900N 10+175E	10
10+900N 10+200E	20
10+900N 10+225E	5
10+900N 10+250E	10
10+900N 10+275E	10
10+900N 10+300E	5
10+900N 10+325E	5
10+900N 10+350E	15
10+900N 10+375E	5
10+900N 10+400E	25
10+900N 10+425E	30
10+900N 10+450E	20
10+900N 10+475E	10
11+000N 9+800E	5
11+000N 9+825E	15
11+000N 9+850E	10
11+000N 9+875E	5
11+000N 9+900E	5
11+000N 9+925E	20
11+000N 9+950E	15
11+000N 9+975E	10
11+000N 10+000E	20

DETECTION LIMIT

5

nd = none detected

-- = not analysed

is = insufficient sample



# VANGEOCHEM LAB LIMITED

MAIN OFFICE  
1521 PEMBERTON AVE  
NORTH VANCOUVER, B C V7P 2S3  
(604) 885-5211 TELEX. 04-352578

BRANCH OFFICE  
1630 PANDORA ST  
VANCOUVER, B C V6L 1L6  
(604) 251-5656

REPORT NUMBER: 870687 6A

JOB NUMBER: 870687

ATMA RESOURCES

PAGE 7 OF 9

SAMPLE #	Au
	ppb
11+000N 10+025E	5
11+000N 10+050E	nd
11+000N 10+075E	10
11+000N 10+100E	10
11+000N 10+125E	10
11+000N 10+150E	nd
11+000N 10+175E	20
11+000N 10+200E	5
11+000N 10+225E	20
11+000N 10+250E	10
11+000N 10+275E	nd
11+000N 10+300E	10
11+000N 10+325E	10
11+000N 10+350E	5
11+000N 10+375E	15
11+000N 10+400E	10
11+100N 9+750E	5
11+100N 9+775E	15
11+100N 9+800E	5
11+100N 9+825E	10
11+100N 9+850E	nd
11+100N 9+875E	5
11+100N 9+900E	10
11+100N 9+925E	10
11+100N 9+950E	nd
11+100N 9+975E	10
11+100N 10+000E	10
11+100N 10+025E	10
11+100N 10+050E	5
11+100N 10+075E	10
11+100N 10+100E	nd
11+100N 10+125E	10
11+100N 10+150E	10
11+100N 10+175E	10
11+100N 10+200E	5
11+100N 10+250E	5
11+100N 10+275E	5
11+100N 10+300E	10
11+100N 10+325E	10

DETECTION LIMIT

5

nd = none detected

-- = not analysed

is = insufficient sample



## VANGEOCHEM LAB LIMITED

MAIN OFFICE  
1521 PEMBERTON AVE  
NORTH VANCOUVER, B.C. V7P 2S3  
(604) 980-5211 TELEX 04-352578

BRANCH OFFICE  
1630 PANDORA ST.  
VANCOUVER, B.C. V5L 1L6  
(604) 251-6658

REPORT NUMBER: 870687 GA

JOB NUMBER: 870687

ATNA RESOURCES

PAGE 8 OF 9

SAMPLE #	Au ppb
11+100N 10+350E	10
11+100N 10+375E	10
11+100N 10+400E	5
11+100N 10+425E	10
11+100N 10+450E	20
11+100N 10+475E	5
11+100N 10+500E	25
11+100N 10+525E	10
11+100N 10+550E	5
11+200N 9+750E	5
11+200N 9+775E	5
11+200N 9+800E	nd
11+200N 9+825E	nd
11+200N 9+850E	20
11+200N 9+875E	20
11+200N 9+900E	20
11+200N 9+925E	15
11+200N 9+950E	10
11+200N 9+975E	20
11+200N 10+000E	10
11+200N 10+025E	nd
11+200N 10+050E	5
11+200N 10+075E	10
11+200N 10+100E	5
11+200N 10+125E	5
11+200N 10+150E	5
11+200N 10+175E	5
11+200N 10+200E	5
11+200N 10+225E	5
11+200N 10+250E	10
11+200N 10+275E	10
11+200N 10+300E	5
11+200N 10+325E	20
11+200N 10+350E	5
11+200N 10+375E	5
11+200N 10+400E	25
11+200N 10+425E	15
11+200N 10+450E	15
11+300N 9+750E	15

DETECTION LIMIT

5

nd = none detected

-- = not analysed

is = insufficient sample





# VANGEOCHEM LAB LIMITED

MAIN OFFICE  
1521 PEMBERTON AVE  
NORTH VANCOUVER, B.C. V7P 2S3  
(604) 966-5211 TELEX 04-352576

BRANCH OFFICE  
1630 PANDORA ST  
VANCOUVER, B.C. V6L 1L6  
(604) 251-5656

REPORT NUMBER: 870687 GA

JOB NUMBER: 870687

ATNA RESOURCES

PAGE 9 OF 9

SAMPLE #	Au ppb
11+300N 9+775E	nd
11+300N 9+800E	nd
11+300N 9+825E	30
11+300N 9+850E	5
11+300N 9+875E	10
11+300N 9+900E	15
11+300N 9+925E	10
11+300N 9+950E	nd
11+300N 9+975E	nd
11+300N 10+000E	nd
11+300N 10+025E	nd
11+300N 10+050E	nd
11+300N 10+075E	nd
11+300N 10+100E	5
11+300N 10+125E	5
11+300N 10+150E	5
11+300N 10+175E	5
11+300N 10+200E	5
11+300N 10+225E	20
11+300N 10+250E	5
11+300N 10+275E	5
11+300N 10+300E	20
11+300N 10+350E	25
11+300N 10+375E	15
11+300N 10+400E	25
11+300N 10+425E	30
11+300N 10+450E	nd
11+300N 10+475E	nd
11+300N 10+500E	15
11+300N 10+525E	10
11+300N 10+550E	5

DETECTION LIMIT

5

nd = none detected

-- = not analysed

ls = insufficient sample

VANGEOCHEM LAB LIMITED

MAIN OFFICE: 1521 PEMBERTON AVE. N. VANCOUVER B.C. V7P 2S3 PH: (604) 986-5211 TELEX: 04-352578  
 BRANCH OFFICE: 1630 PANDORA ST. VANCOUVER B.C. V5L 1L6 PH: (604) 251-5656

ICAP GEOCHEMICAL ANALYSIS

A .5 GRAM SAMPLE IS DIGESTED WITH 5 ML OF 3:1:2 HCL TO HNO3 TO H2O AT 95 DEG. C FOR 90 MINUTES AND IS DILUTED TO 10 ML WITH WATER.  
 THIS LEACH IS PARTIAL FOR SM, MN, FE, CA, P, CR, MG, BA, PD, AL, NA, K, W, PT AND SR. AU AND PD DETECTION IS 3 PPM.  
 IS= INSUFFICIENT SAMPLE, ND= NOT DETECTED, -- NOT ANALYZED

COMPANY: ATNA RESOURCES  
 ATTENTION:  
 PROJECT: SMITHERS REGIONAL

REPORT#: PA  
 JOB#: 870704  
 INVOICE#: NA

DATE RECEIVED: 87/07/13  
 DATE COMPLETED: 87/07/25  
 COPY SENT TO:

ANALYST *W. P. P. P.*

PAGE 1 OF 1

SAMPLE NAME	AG PPM	AL %	AS PPM	AU PPM	BA PPM	BI PPM	CA %	CO PPM	CR PPM	CU PPM	FE %	K %	MG %	MN PPM	MO PPM	NA %	NI PPM	P %	PD PPM	PT PPM	SB PPM	SN PPM	SR PPM	U PPM	W PPM	ZN PPM		
87-MLN-1	.1	4.45	ND	ND	8	ND	3.07	.1	11	55	2.22	.01	1.40	754	2	.01	17	.02	10	ND	ND	ND	2	56	ND	ND	24	
87-MLN-3	.1	2.65	ND	ND	26	ND	6.55	.1	22	133	98	4.02	.01	2.87	1156	2	.17	41	.05	18	ND	ND	ND	158	ND	ND	80	
87-MLN-4	.1	5.57	ND	ND	10	ND	3.84	.1	14	69	309	2.77	.01	1.76	943	3	.01	22	.03	12	ND	ND	4	5	71	ND	ND	31
87-MLN-5	.1	3.16	ND	ND	57	ND	3.04	.1	32	108	63	6.19	.01	3.45	1225	2	.22	54	.07	9	ND	ND	ND	4	85	ND	ND	80
87-MLN-6	.1	1.27	ND	ND	44	ND	15.05	1.8	19	76	37	1.68	.01	3.00	1704	ND	.20	29	.01	41	ND	ND	ND	1	330	ND	ND	254
87-MLN-7	.1	3.40	10	ND	14	ND	1.43	.1	38	148	22	6.89	.01	4.45	2112	3	.25	76	.07	10	ND	ND	4	5	25	ND	ND	74
87-MLN-8	.1	4.50	ND	ND	62	ND	5.58	.1	32	187	53	6.02	.01	3.55	1264	3	.20	75	.07	7	ND	ND	ND	10	81	ND	ND	65
87-MLN-9	.1	4.09	8	ND	11	5	2.04	.1	37	198	712	6.23	.01	4.41	1943	3	.11	118	.04	15	ND	ND	3	ND	25	ND	ND	90
87-MLN-10A	.1	2.52	7	ND	49	ND	2.02	.1	33	61	42	5.39	.01	2.77	684	2	.16	52	.07	10	ND	ND	ND	ND	41	ND	ND	60
87-MLN-10B	.1	.68	ND	ND	25	ND	2.25	.1	15	43	38	2.27	.17	1.41	609	1	.07	17	.02	9	ND	ND	ND	ND	36	21	6	28
87-MLN-11	.1	.40	ND	ND	85	ND	1.62	.3	1	9	2	1.77	.07	.58	1392	ND	.07	ND	.03	12	ND	ND	13	ND	29	9	5	77
87-MLN-12	49.4	.32	5	ND	1157	ND	2.97	10.1	5	48	917	1.93	.01	.59	2720	ND	.12	9	.01	17	ND	ND	144	ND	36	ND	3	165
87-MLN-13 (FL)	>100	.14	938	ND	51	ND	11.05	73.1	21	89	39486	4.82	.01	3.44	4297	4	.48	15	.01	26	ND	ND	1163	ND	133	ND	ND	655
87-MLN-14	9.8	4.07	13	ND	274	ND	2.74	.4	17	70	323	4.33	.01	.83	1052	3	.12	8	.12	15	ND	ND	19	ND	71	ND	ND	84
87-MLN-15	2.4	1.33	6	ND	156	ND	6.05	.1	30	172	137	5.05	.01	2.77	2727	ND	.19	45	.04	9	ND	ND	5	ND	56	ND	ND	72
87-MLN-16	.1	1.67	5	ND	35	ND	4.79	.1	34	248	129	5.12	.01	2.54	1811	ND	.17	88	.04	3	ND	ND	ND	ND	89	ND	ND	58
87-MLN-17	.1	5.29	ND	ND	18	ND	9.41	.1	18	186	61	3.52	.01	1.66	666	3	.01	49	.04	5	ND	ND	ND	ND	47	ND	ND	33
87-MLN-19	.1	2.79	14	ND	56	ND	1.35	.1	27	81	35	4.55	.01	2.66	574	2	.10	72	.05	12	ND	ND	6	ND	168	ND	ND	50
87-MLN-20	.1	1.62	9	ND	37	ND	4.70	.1	32	235	160	4.80	.01	2.45	1758	1	.17	84	.04	5	ND	ND	ND	ND	86	ND	ND	55
87-MLN-21	.1	2.20	3	ND	62	ND	4.58	.1	33	73	53	5.05	.01	3.08	1011	ND	.17	77	.05	6	ND	ND	ND	ND	42	ND	ND	56
87-MLN-22	.1	2.57	ND	ND	20	ND	2.04	.1	34	191	96	4.95	.01	3.64	1505	2	.19	75	.04	7	ND	ND	ND	ND	36	ND	ND	72
DETECTION LIMIT	.1	.01	3	3	1	3	.01	.1	1	1	1	.01	.01	1	1	.01	1	.01	2	3	5	2	2	1	5	3	1	



# VANGEOCHEM LAB LIMITED

MAIN OFFICE  
1521 PEMBERTON AVE  
NORTH VANCOUVER, B.C. V7P 2S3  
(604) 980-6211 TELEX: 04-352576

BRANCH OFFICE  
1630 PANDORA ST.  
VANCOUVER, B.C. V6L 1L6  
(604) 251-5656

REPORT NUMBER: 870704 6A

JOB NUMBER: 870704

ATMA RESOURCES

PAGE 1 OF 1

SAMPLE #	Au
	ppb
87-MLM-1	nd
87-MLM-3	5
87-MLM-4	5
87-MLM-5	nd
87-MLM-6	nd
87-MLM-7	nd
87-MLM-8	25
87-MLM-9	nd
87-MLM-10 A	nd
87-MLM-10 B	nd
87-MLM-11	nd
87-MLM-12	5
87-MLM-13 (FLOAT)	165
87-MLM-14	35
87-MLM-15	40
87-MLM-16	15
87-MLM-17	nd
87-MLM-19	nd
87-MLM-20	nd
87-MLM-21	5
87-MLM-22	10

DETECTION LIMIT

5

nd = none detected

-- = not analysed

is = insufficient sample



# VANGEOCHEM LAB LIMITED

MAIN OFFICE  
1521 PEMBERTON AVE.  
NORTH VANCOUVER, B.C. V7P 2S3  
(604) 986-5211 TELEX: 04-352578

BRANCH OFFICE  
1630 PANDORA ST.  
VANCOUVER, B.C. V5L 1L6  
(604) 251-5656

REPORT NUMBER: 871404 AA

JOB NUMBER: 871404

ATNA RESOURCES

PAGE 1 OF 2

SAMPLE #	Ag oz/st
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SS - R1	18.05
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PS - 25	81.69
---------	-------

PS - 26R	18.13
----------	-------

87-MLM-13 (FL)	49.10
----------------	-------

A .5 GRAM SAMPLE IS DIGESTED WITH 5 ML OF 3:1:2 HCL TO HNO3 TO H2O2 / DEG. C FOR 90 MINUTES AND IS DILUTED TO 10 ML WITH WATER.  
 THIS LEAD IS PARTIAL FOR Sb, Bi, Fe, Ca, P, Cr, Ni, Ba, Pb, Al, Na, K, V, Pt AND Au. AU AND PD DETECTION IS 3 PPM.  
 IS= INSUFFICIENT SAMPLE, ND= NOT DETECTED, -- NOT ANALYZED

COMPANY: ATMA RESOURCES LTD.  
 ATTENTION:  
 PROJECT:

REPORT#: PA  
 JOB#: 870741  
 INVOICE#: NA

DATE RECEIVED: 87/07/16  
 DATE COMPLETED: 87/07/22  
 COPY SENT TO: SMITHERS B.C.

ANALYST *J. Reeves*

SAMPLE NAME	Ag	Al	As	Au	Ba	Bi	Ca	Co	Cu	Cr	Cd	Fe	K	Mg	Mn	Ni	Nb	Na	Ni	P	Pb	Pd	Pt	Sb	Se	Si	U	V	Zn
	PPM	%	PPM	PPM	PPM	PPM	%	PPM	PPM	PPM	PPM	%	%	%	PPM	PPM	PPM	%	PPM	%	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
CH-68	.2	.20	40	ND	36	ND	2.37	.1	4	176	74	2.33	.18	.06	604	ND	.07	24	.01	15	ND	ND	11	2	14	ND	ND	61	
CH-70	.1	.53	ND	ND	855	ND	3.83	2.1	41	71	32	6.37	.12	.56	4950	ND	.32	59	.06	22	ND	ND	5	4	219	ND	ND	431	
CH-71	.1	.58	ND	ND	458	ND	3.11	3.5	38	78	56	6.05	.13	.48	3397	ND	.36	62	.08	26	ND	ND	6	5	153	ND	ND	567	
CH-76	.1	2.84	23	ND	121	ND	.12	.1	12	30	23	4.83	.07	.64	96	3	.17	20	.10	15	ND	ND	ND	ND	5	7	ND	ND	162
CH-79	5.4	.88	19	ND	64	3	.68	3.2	12	24	444	4.54	.10	.28	353	16	.17	5	.07	42	3	ND	3	ND	3	ND	ND	199	
CH-80	28.2	.71	7	ND	60	ND	.01	.1	7	24	8624	4.51	.05	.32	559	54	.13	4	.01	181	ND	ND	ND	4	551	ND	ND	152	
CH-81	.4	.17	ND	ND	1014	ND	.30	.6	1	118	78	1.23	.10	.01	423	4	.02	2	.01	9	ND	ND	4	1	29	ND	ND	71	
CH-82	.1	2.77	ND	ND	254	ND	1.67	.1	33	61	84	4.84	.13	.28	1813	1	.08	88	.12	11	ND	ND	ND	19	73	ND	ND	74	
CH-83	.1	3.04	5	ND	139	ND	4.39	.1	34	58	78	4.54	.13	.34	1442	1	.07	86	.12	4	ND	ND	ND	5	96	ND	ND	58	
CH-84	.1	.13	ND	3	158	ND	21.33	.8	22	41	24	4.17	.01	1.06	2264	ND	.72	38	.01	55	ND	ND	ND	5	113	ND	ND	225	
CH-85	.1	2.06	ND	ND	159	ND	9.63	.1	27	41	69	3.95	.04	.56	1554	ND	.08	80	.07	15	ND	ND	ND	4	112	ND	ND	91	
CH-86	.1	3.59	ND	ND	1185	ND	1.86	.1	36	62	109	6.24	.11	2.25	6491	1	.20	94	.03	4	ND	ND	ND	7	293	ND	ND	84	
CH-87	.5	.38	125	ND	85	ND	.22	.1	3	26	61	2.33	.07	.02	75	5	.05	3	.01	36	ND	ND	5	2	28	ND	ND	21	
CH-89	.5	.60	9	ND	199	ND	.28	.8	6	114	1	2.37	.08	.35	500	5	.18	4	.04	10	ND	ND	3	ND	10	ND	ND	201	
CH-90	.1	1.37	9	ND	101	ND	.04	.1	7	25	394	7.23	.12	.26	294	2	.19	5	.08	18	10	ND	ND	5	114	ND	ND	74	
CH-91	.2	.88	ND	ND	2564	ND	.15	.1	2	27	225	5.20	.10	.28	243	2	.12	4	.02	6	ND	ND	4	2	81	ND	ND	44	
CH-92	.1	4.08	ND	ND	27	ND	2.58	.1	2	26	65	.85	.08	.24	165	1	.02	18	.01	6	ND	ND	ND	8	213	ND	ND	37	
CH-93	.1	3.60	ND	ND	39	ND	1.43	.1	5	11	164	1.58	.08	.24	420	2	.04	5	.03	6	ND	ND	ND	7	164	ND	ND	48	
CH-94	.6	1.10	18	ND	63	4	.68	.1	18	13	74	6.27	.08	.77	465	1	.14	4	.17	2	ND	ND	ND	ND	29	ND	ND	47	
CH-95	.1	3.52	28	ND	49	5	.85	.1	25	18	244	6.89	.08	1.23	570	1	.20	6	.17	2	ND	ND	ND	1	90	ND	ND	75	
CH-96	.5	.57	11	ND	20	ND	.56	.1	10	61	63	7.50	.11	.48	555	2	.17	3	.13	4	ND	ND	3	ND	36	ND	ND	52	
CH-97	.1	3.39	ND	ND	143	ND	2.02	.1	8	24	51	3.35	.13	.77	548	2	.01	3	.05	4	ND	ND	ND	7	341	ND	ND	68	
CH-98	.6	1.39	3	ND	29	ND	.69	.1	4	62	33	5.62	.13	.51	347	10	.15	4	.10	16	ND	ND	ND	ND	53	ND	ND	62	
CH-99	.3	.17	ND	ND	73	ND	.20	.1	1	37	3	.68	.10	.02	324	ND	.01	4	.02	ND	ND	ND	3	ND	11	1	3	22	
CH-100	.2	.25	ND	ND	52	ND	.13	.1	2	96	3	2.83	.12	.02	629	3	.03	2	.06	5	ND	ND	5	ND	5	2	ND	16	
CH-101	.4	.19	ND	ND	91	ND	.04	.1	1	25	19	1.16	.12	.01	264	ND	.01	1	.01	ND	ND	ND	4	ND	5	7	ND	15	
CH-102	.1	2.65	ND	ND	628	ND	.93	.1	14	46	84	2.75	.16	1.13	3745	2	.11	42	.25	20	ND	ND	ND	4	66	ND	ND	238	
CH-103	.1	2.49	ND	ND	259	ND	.34	.1	15	65	37	3.45	.11	1.51	1263	2	.13	50	.14	15	ND	ND	ND	2	38	ND	ND	177	
CH-104	12.1	1.12	ND	ND	2582	ND	.94	9.5	5	37	555	2.27	.12	.27	967	2	.54	4	.04	9076	ND	ND	5	ND	258	ND	ND	1382	
CH-105	.1	.46	ND	ND	164	ND	.02	.1	ND	16	4	2.06	.13	.17	76	1	.02	2	.01	54	ND	ND	3	1	5	6	ND	20	
CH-106	.4	.32	ND	ND	268	ND	.01	.1	ND	25	5	.91	.12	.02	37	27	.01	1	.01	106	ND	ND	3	ND	5	9	ND	21	
CH-107	.2	.40	ND	ND	324	ND	.1	.1	ND	10	1	1.41	.12	.12	51	ND	.01	1	.01	12	ND	ND	3	ND	8	7	ND	15	
CH-108	.1	3.09	3	ND	43	ND	1.20	.1	15	72	44	4.70	.08	1.25	1164	2	.13	9	.02	20	ND	ND	ND	35	ND	ND	93		
CH-109	.1	1.16	ND	ND	261	ND	1.12	.1	9	9	16	3.27	.17	.66	773	1	.18	3	.06	7	ND	ND	3	1	40	ND	ND	97	
CH-110	.6	.66	ND	ND	343	ND	1.45	.2	7	12	46	2.56	.17	.39	569	4	.06	7	.03	14	ND	ND	10	1	41	ND	ND	71	
CH-112	.1	.89	5	ND	146	ND	.08	.2	6	49	38	2.79	.11	.24	2419	1	.13	4	.06	42	ND	ND	ND	1	4	ND	ND	239	
CH-113	.1	.60	ND	ND	129	ND	.07	.1	4	57	33	2.33	.12	.16	1906	ND	.11	4	.05	49	ND	ND	4	ND	3	4	ND	232	
CH-114	.1	1.37	ND	ND	78	ND	.72	.1	10	39	15	3.65	.08	.63	1307	1	.14	8	.06	23	ND	ND	ND	8	ND	ND	ND	193	
CH-115	97.8	.22	1	ND	365	ND	.08	.4	1	40	2579	1.31	.18	.01	351	ND	.08	4	.02	36	ND	ND	4	ND	4	3	ND	148	



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REPORT NUMBER: B70741 GA

JOB NUMBER: B70741

ATMA RESOURCES

PAGE 1 OF 2

SAMPLE #	Au ppb
CH 48 (ROCK)	15
CH 70 (SOIL)	120
CH 71 (SOIL) <i>SILVER HILL</i>	500
CH 78 (SOIL)	nd
CH 79 (ROCK)	~ 11140
CH 80 (ROCK)	10
CH 81 (ROCK)	nd
CH 82 (SOIL)	50
CH 83 (SOIL)	nd
CH 84 (ROCK)	5
CH 85 (SOIL)	nd
CH 86 (SOIL)	nd
CH 87 (ROCK)	nd
CH 89 (ROCK)	5
CH 90 (SOIL)	10
CH 91 (ROCK)	nd
CH 92 (ROCK)	nd
CH 93 (SOIL)	80
CH 94 (ROCK)	60
CH 95 (SOIL)	140
CH 96 (ROCK)	nd
CH 97 (ROCK)	nd
CH 98 (ROCK)	nd
CH 99 (ROCK)	10
CH 100 (ROCK)	25
CH 101 (ROCK)	nd
CH 102 (SOIL)	nd
CH 103 (SOIL)	10
CH 104 (ROCK)	370
CH 105 (ROCK)	nd
CH 106 (ROCK)	5
CH 107 (ROCK)	15
CH 108 (ROCK)	15
CH 109 (ROCK)	10
CH 110 (ROCK)	nd
CH 111 (SOIL)	nd
CH 112 (SOIL)	45
CH 113 (SOIL)	5
CH 114 (SOIL)	nd

DETECTION LIMIT

5

nd = none detected

-- = not analysed

is = insufficient sample