MAR 19950010: CROWSNEST

Received date: Aug 04, 1995

Public release date: Aug 05, 1996

ALBERTA MINERALS AGREEMENT
6889030001
ASSESSMENT WORK REPORT

Submitted by
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a registered Alberta partnership
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Prepared for 393466 Alberta Limited

June 1995

1993
CROWSNEST VOLCANICS STUDY

A field program was initiated on the Crowsnest Pass properties; Alberta Mineral Agreement #6889030001 in the summer of 1993. This work was a continuation of a sampling program first performed on the said properties in the spring of 1989.

The purpose of this work was two-fold, one program concentrated on obtaining additional samples which would be tested for gold by fire assay, while the other gathered sediment samples suitable for processing for the recovery of diamond indicator minerals.

INTRODUCTION

The Crowsnest Volcanics Formation lies in the Crowsnest Pass on the western edge of the town of Coleman Alberta, approximately 250 Km by road south of Calgary and about 1025 Km east of Vancouver British Columbia.

Excellent access to the site is provided by the Crowsnest Highway (#3) which cuts through the Crowsnest Volcanics just west of the town of Coleman Alberta. Rail access is provided the southern main line of the Canadian Pacific Railways which also bisects the Corwsnest Volcanics Formation at Coleman. While coal mining and forestry have been the main industries of the area over the last century, in recent years tourism has become of greater importance to the region.

REGIONAL GEOLOGY

The property lies in the Front Ranges of the Canadian Cordillera, between the High Rock and Flathead Ranges of the Rocky Mountains on the west and the Livingstone and Blairmore Ranges on the east.

The Crowsnest Volcanics Formation are Early Cretaceous in age, and occur in the sedimentary seccession between the predominately sandy, non-marine Blairmore Group below and the marine shales of the Blackstone Formation above. (see Figure 1)

The Crowsnest Volcanics are alkaline volcanic in nature and consist of breccias, ash falls, welded tuffs and agglomerates which reach a thickness of approximately 400 m along highway 3 on the western edge of the town of Coleman Alberta

The rocks of the Crowsnest Volcanics are thickest at Iron Ridge in the vicinity of Coleman and to the north toward Ma Butte where thicknesses of 450 m have been recorded. (Adair 1986)

GEOCHEMICAL SAMPLING PROGRAM

A geochemical sampling program conducted during 1989 indicated that some of the sulphides contained in the Crowsnest Formation carried elevated gold values.

While most sulphide samples cantained either no gold (less than 1 ppb or values close to 3 ppb *(the average crustal value for volcanic rocks Mason 1952)*

Several of the samples from Iron Ridge did contain higher gold values, with one sample showing as much as .074 oz. per ton.

While this was of geochemical interest, none of the areas sampled yielded any results which indicated economic grades.

While this was disappointing in light of the work and effort expended in 1989, it was decided that another geochemical sampling program would be undertaken in1993, which might reveal other sulphide bearing zones in the volcanics which might yield economic grades.

SAMPLE HANDLING METHODS

The samples collected for the gold program were tested using standard fire assay techniques. Our in house assay method has a lower cutoff of .025 oz/per/ton. While commercial labs have lower levels of detection values lower than .025 oz/per/ton are not economic and are of little interest to our program.

All assays were standard fire assays with the exception of several sulphide rich samples which are so noted in the following table.

For the sulphide rich samples we used the following flux:

Ore	5.84 grams
Feldspar	23.33 grams
Sodium carbonate	3.4 grams
Red lead	69.62 grams
Borax glass	13.6 grams
Red iron oxide	7 grams
Flour	2.55 grams

Flux for standard ore:

Ore	29.14 grams
Sodium carbonate	30.31 grams
Silica	3.15 grams
Borax glass	7.42 grams
Calcium oxide	6.58 grams
Red iron oxide	12.73 grams
Flour	4.17 grams

GEOCHEMICAL RESULTS

Sample number	Au values OZ/PER/TON	
CNGP 001	NIL	
CNGP 002	NIL	
CNGP 003	NIL	
CNGP 004	.051	(Sulphide rich sample Iron Ridge)
CNGP 005	.033	(Sulphide rich sample Iron Ridge)
CNGP 006	.040	(Sulphide rich sample Iron Ridge)
CNGP 007		*(lost in processing)*
CNGP 008	.025	(Sulphide rich sample Iron Ridge)
CNGP 009	NIL	
CNGP 010	NIL	
CNGP 011	NIL	
CNGP 012	<.025	bead produced too small to weigh
CNGP 013	NIL	
CNGP 014	.057	(Sulphide rich sample Iron Ridge)
CNGP 015	NIL	
CNGP 016	NIL	
CNGP 017	.071	(Sulphide rich sample Iron Ridge)
CNGP 018	NIL	
CNGP 019	NIL	
CNGP 020	NIL	
CNGP 021	NIL	
CNGP 022	NIL	
CNGP 023	NIL	
CNGP 024	NIL	
CNGP 025	NIL	
CNGP 026	NIL	

GEOCHEMICAL RESULTS

Sample number	Au values OZ/PER/TON
MB 001	NIL
MB 002	NIL
MB 003	NIL
MB 004	NIL
MB 005	NIL
MB 006	NIL
MB 007	NIL
MB 008	NIL
MB 009	NIL
WM 001	NIL
WM 002	NIL
WM 003	NIL
WM 004	NIL
WM 005	NIL
WM 006	NIL
WM 007	NIL
WM 008	NIL
WM 009	NIL
WM 010	NIL
WM 011	NIL
WM 012	NIL
WM 013	NIL
WM 014	NIL
WM 015	NIL
WM 016	*(Lost in field)*
WM 017	NIL
WM 018	NIL
WM 019	NIL
WM 020	NIL
WM 021	NIL

GEOCHEMICAL RESULTS

Sample number	Au values OZ/PER/TON
SCF 001	NIL
SCF 002	> .025
SCF 003	> .025
SCF 004	> .025
SCF 005	> .025
SCF 006	NIL
SCF 007	NIL
SCF 008	NIL
SCF 009	NIL
Due to numbering error	*SCF 010 was never collected*
SCF 011	> .025
SCF 012	> .025
SCF 013	NIL
SCF 014	NIL

GEOCHEMICAL RESULTS

Sample number	Au values OZ/PER/TON
WR 001	NIL
WR 002	NIL
WR 003	NIL
WR 004	NIL
WR 005	NIL
WR 006	NIL
WR 007	NIL
WR 008	NIL
WR 009	NIL
WR 010	NIL
WR 011	NIL

DIAMOND SAMPLING PROGRAM

INTRODUCTION

The Crowsnest property was thought a possible prospect for diamond indicator minerals given that two small gem quality diamonds were found in sediments recovered from Etzikom Coulee, about 80 miles to the southeast of the Crowsnest Pass.

Etzikom Coulee lies on the northern edge of the Sweetgrass Arch a large igneous complex which extends north from southern Montana in the U.S.A. This complex is known to contain lamporites and several unconfirmed reports indicate that diamonds have been found near the Missouri Breaks which lies close to the Saskachewan border.

About 25 miles to the west of the Crowsnest Volcanics, kimberlites, diamond indicator minerals, and possibly diamonds have been found in the Cross Diatrime in southern British Columbia.

While it is unclear what connection if any the Crowsnest Volcanics have with these geological events, given the fact that the Sweetgrass Arch to the east and the Cross Diatrime to the west both seem to contain either diamonds or at very least diamond indicator minerals, and are aproximately the same age as the Crowsnest Volcanics it seemed logical to undertake a diamond sampling program in the summer of 1993.

As all Diamond Exploration programs are by necessity quite complicated, the purpose of this final report is to summarize the complex process by which the large volume of bulk field samples are reduced by a factor of almost 99 % to a small heavy mineral component suitable for examination, and subsequent Micro-probe analysis.

It is from these analyses that the final reccomondation concerning any future exploration work is based.

SAMPLE HANDLING

The samples as received from the field were an average weight of aproximately 20 Kg., and consisted of a mixture of sand, clay and slit which has been screened to aproximately18 mesh.

These sediment samples were labeled DSS 001 to DSS 015. (DSS = Diamond sedment samples)

The rock samples as recovered from the field (DE 001 through DE 015) were first crushed in a jaw crusher then reduced to a fine powder by the use of a rubber drum ball mill with ceramic balls.. It was felt that this attrition milling would better presserve the diamond crystals (should any be found.)

Crushed rock samples after attrition milling were handled in a similar manner to the sediment samples collected .

The sediment samples as received from the field are quite contaminated with clays, fine silt, and organics. The presence of these materials make processing with heavy liquids impossible so it is necessary that the samples first be soaked in a 4% solution of sodium metahexaphosphate for aproximately 18 hours.

(The washed samples are then carefully dried at aproximately 120 degrees centigrade untill dry.

This process usually is acomplisehed in about 8 hours.

The dried material is rescreened to 18 mesh and all larger material is set aside for futher work.

The samples are next exposed to a magnetic field to remove the mineral magnetite, this mineral makes up about 90% of all the heavy minerals in the sample and is of no use in diamond exploration.

The sample is then dried, screened and with the magnetite removed is finally ready for heavy liquid seperation.

HEAVY LIQUID SEPERATION

A heavy liquid TBE (ethylene tetrabromoethane) is used to seperate the heavy mineral component of the sample from the lighter material (mostly quartz, and feldspars).

The heavy mineral grains are recovered and washed in acetone to remove the TBE, (which is highly toxic). The light grains of quartz, feldspar, and other light minerals are washed of TBE and then discarded.

HAND PICKING OF SEPERATES

It was decided after careful thought and consideration, due to the size of the heavy mineral samples, it would be most productive if they were all picked by hand rather than resorting to the mechanical separation which takes place using a Frantz Isodynamic Magnetic Separator.

While the recovery rates of the Frantz are usually excellent, it is quite possible that certain critical indicator minerals may be lost in the waste material produced by magnetic seperation.

Hand picking, while much more time consuming, than using a Frantz Separator, is much safer for small samples, as there is no chance that critical mineral grains may be lost. It was for these reasons that the extra time and attention was spent processing each sample by hand.

Crushed Rock Samples	Diamond Indicators
DE 001	nil
DE 002	nil
DE 003	nil
DE 004	nil
DE 005	nil
DE 006	nil
DE 007	nil
DE 008	nil
DE 009	nil
DE 010	nil
DE 011	nil
DE 012	nil
DE 013	nil
DE 014	nil
DE 015	nil

Diamond Sediment Samples	Diamond Indicators
DSS 001	nil
DSS 002	nil
DSS 003	nil
DSS 004	nil
DSS 005	nil
DSS 006	nil
DSS 007	nil
DSS 008	nil
DSS 009	nil
DSS 010	nil
DSS 011	nil
DSS 012	nil
DSS 013	nil
DSS 014	nil
DSS 015	nil

RESULTS

Examination of both the crushed rock powders and the stream sediments revealed little of interest other than small amounts of magnetite which was missed during the magnetic seperation and several garnets which seemed to be sanadines.

While several grains of interest were selected and submitted for Electron Microprobe analysis, nothing of significance was found.

No diamond indicator minerals were found in either sediment samples or crushed rock powders from the Crowsnest Volcanics.

POLISHING

The picked grains were mounted in 154 petroepoxy and polished at the University of Alberta Thin Section Lab.

MICROPROBE

The samples were probed utilizing the Energy Dispersive System (EDS) and Wavelength Dispersive System (WDS) at the University of Alberta electron microprobe lab. Minerals are identified by their characteristic x-ray spectra and the relative amounts of trace and accessory minerals quantified.

Energy Dispersive System (EDS) and Its Limitations

EDS is a very cost effective method for the examination of a large number of mineral grains, it is best used for a primary reconnaissance as it does not give a definitive analysis of all mineral grains. Those grains that are determined by EDS, to be of interest, are then examined by WDS.

The EDS system is based on the characteristic x-ray energy released when an accelerated electron removes an inner shell electron of the target atom and an outer shell electron drops back to a lower energy level. The emitted electrons pass through a berylium window and are detected by a silicon based detector. The computer of the Micro probe compiles this data to produce a spectrum of the energies produced.

While EDS is most cost effective for reconnosance of a large number of indivual grains, it does have its limitations. Elements with an atomic weight lower than Na cannot be analysised and some emitted X-ray energies overlap and may mask other emissions, or give misleading reading.

Nothing of significance was found.

FUTURE DIAMOND EXPLORATION

Given the complexity of this geological unit and the fact that a diamond bearing pipe is located toward the west of the volcanics, we plan in future field seasons to concentrate our efforts in a more detailed study of the various volcanic outcrops.

While results to date are disapointing, we intend to continue our feild work hoping to locate possible diamond bearing units of the Crowsnest Volcanics. to either prove or disprove our theory that the Crowsnest may habour kimberlite bodies with in the formation.

GOLD EXPLORATION CONCLUSIONS

While results of the 1993 geochemcial sampling program have been disappointing, we are now certain that only the sulphides contained in the volcanics have a definite positive co-relation to gold values. Samples barren of sulphides without exception yielded no gold values.

While nothing discovered to date on the Crowsnest property could be construded as economic, we believe that we will keep the property for another term with the aim of further exploration trying to locate massive sulphide deposits within the Crowsnest Volcanics .

CONCLUSION

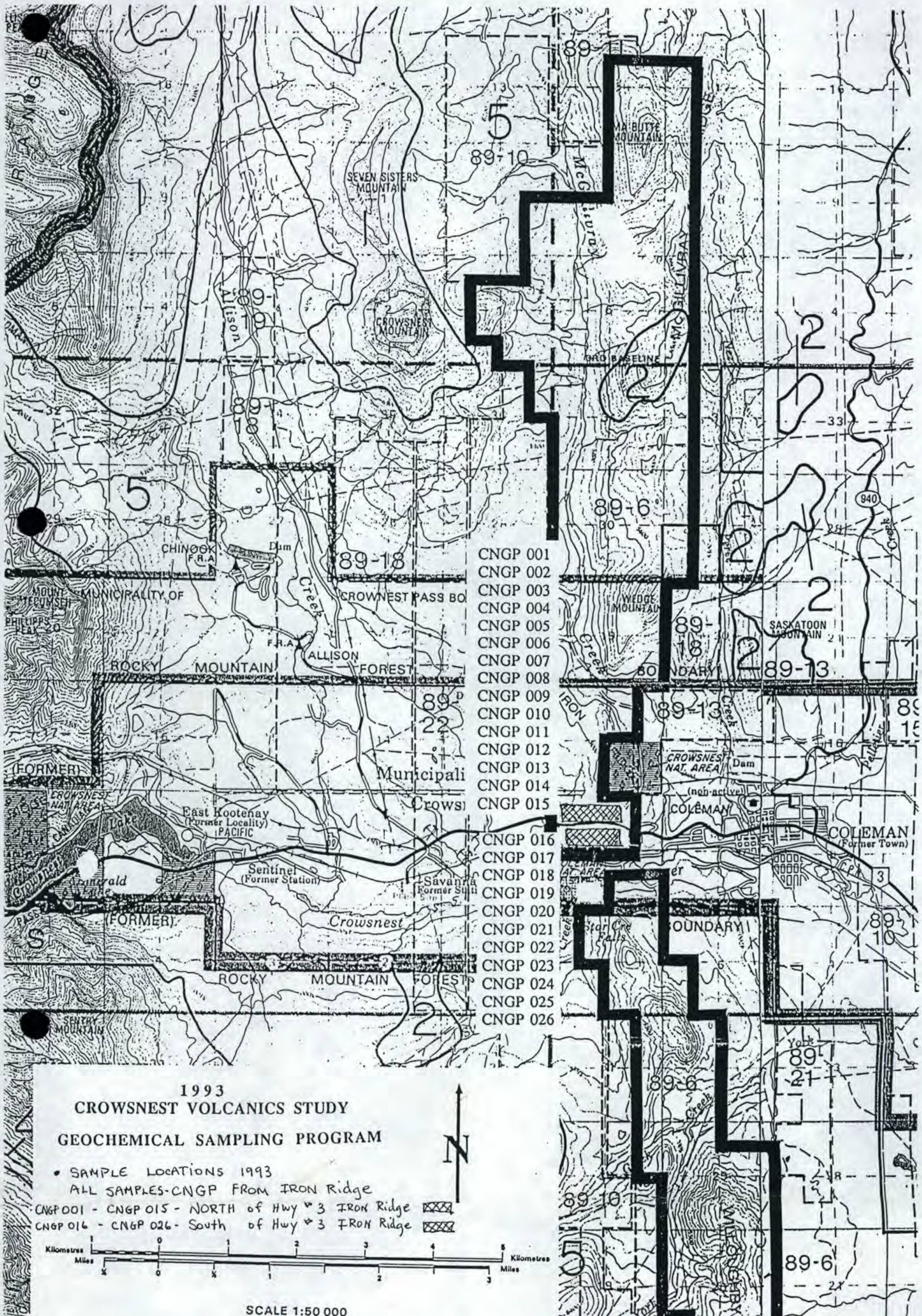
Another line of investigation that we intent to pursue in the next field season are possible Carlin Type associations found in carbonate formations in the immediate vicinity of the volcanics.

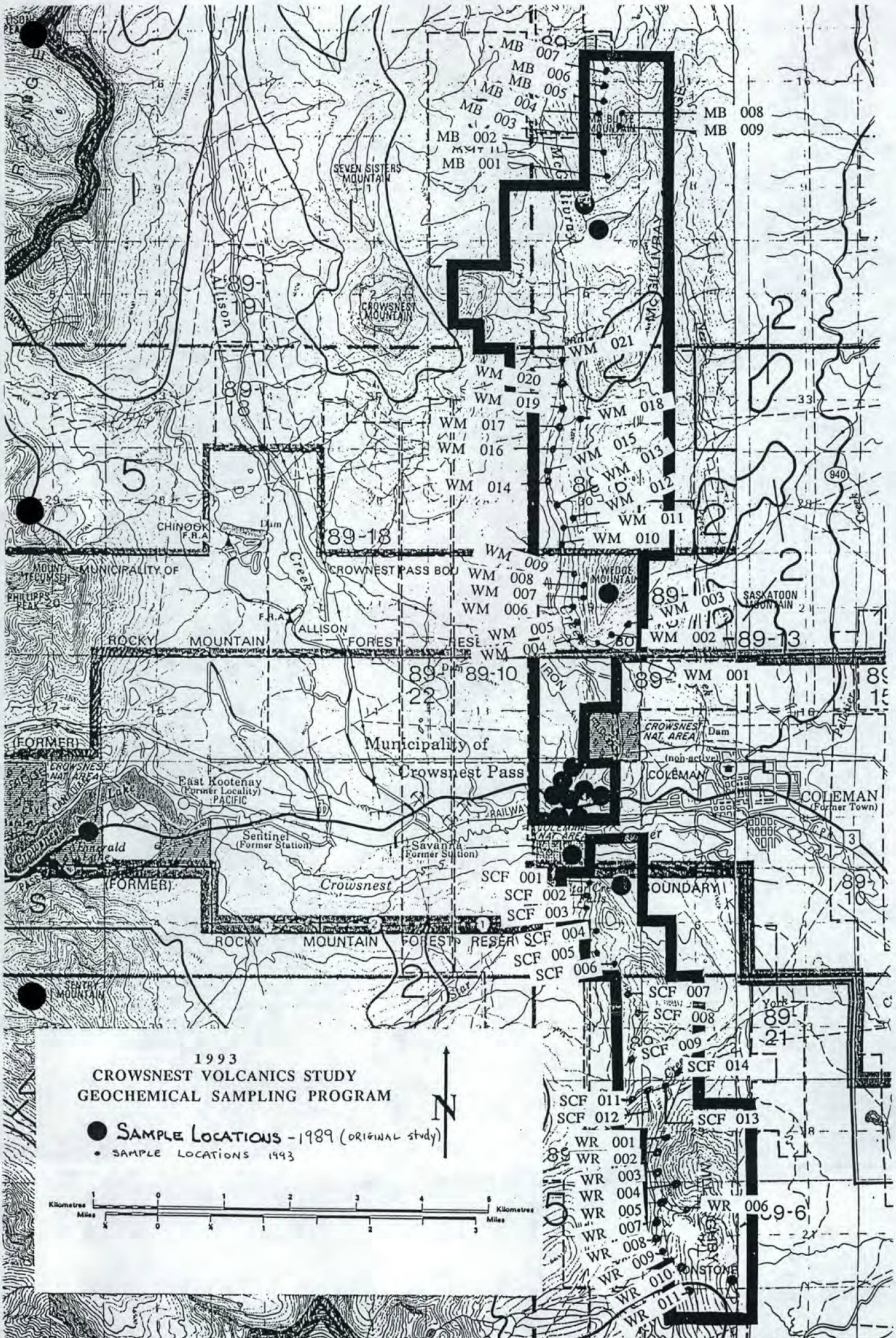
Several random samples of carbonates were taken in close proximity to contacts between the volcanics and the carbonates. While this work is very perliminary and doesnot make up part of this report, analysis of some of these samples by Neutron Activation do show promising gold values.

Unsubstantiated reports have also come to our attention that massive sulphides have been found in the area While we are not aware of any offical reports being filed on the matter, given our preliminary finds concerning Neutron Activation of the carbonates and the possibility of massive sulphides being found in the area of the volcanics, it is our intention to attempt another field season in the hope that these promising indciations may be proven correct.

EXPLORATION COSTS
1993 CROWSNEST STUDY

Days in field	21 days
Two men in field [redacted]	
Rate per man per day **$300.00**	
Labour costs	$16,200.00
Food and Lodging @ **$75.00** per man per day	$ 4050.00
Mileage	$ 4200.00
Equipment rental	$ 2000.00
Total Field costs	**$26,450.00**
Total Lab costs	**$ 9500.00**
Total costs	**$35950.00**


1993
CROWSNEST VOLCANICS STUDY
GEOCHEMICAL SAMPLING PROGRAM
• SAMPLE LOCATIONS 1993
ALL SAMPLES-CNGP FROM IRON Ridge
CNGP001 - CNGP 015 - NORTH of Hwy #3 IRON Ridge
CNGP 016 - CNGP 026 - South of Hwy #3 IRON Ridge
Kilometres
Miles
SCALE 1:50 000
N
CNGP 001
CNGP 002
CNGP 003
CNGP 004
CNGP 005
CNGP 006
CNGP 007
CNGP 008
CNGP 009
CNGP 010
CNGP 011
CNGP 012
CNGP 013
CNGP 014
CNGP 015
CNGP 016
CNGP 017
CNGP 018
CNGP 019
CNGP 020
CNGP 021
CNGP 022
CNGP 023
CNGP 024
CNGP 025
CNGP 026
SEVEN SISTERS MOUNTAIN
CROWSNEST MOUNTAIN
CHINOOK F.R.A.
Dam
Allison
Creek
ALLISON
MUNICIPALITY OF
CROWSNEST PASS BO
ROCKY MOUNTAIN FOREST
ROCKY MOUNTAIN FOREST
East Kootenay
(Former Locality)
PACIFIC
Sentinel
(Former Station)
Savanna
Crowsnest
(FORMER)
CROWSNEST NAT. AREA
WEDGE MOUNTAIN
SASKATOON MOUNTAIN
COLEMAN
COLEMAN
(Former Town)
BOUNDARY
IRONSTONE
McGillivray
SENTRY MOUNTAIN
940
3
89-10
89-19
89-18
89-18
89-6
89-13
89-22
89-21
89-6
89-10
89-10


1993
CROWSNEST VOLCANICS STUDY
GEOCHEMICAL SAMPLING PROGRAM
SAMPLE LOCATIONS - 1989 (ORIGINAL study)
SAMPLE LOCATIONS 1993
Kilometres
Miles
MB 001
MB 002
MB 003
MB 004
MB 005
MB 006
MB 007
MB 008
MB 009
WM 001
WM 002
WM 003
WM 004
WM 005
WM 006
WM 007
WM 008
WM 009
WM 010
WM 011
WM 012
WM 013
WM 014
WM 015
WM 016
WM 017
WM 018
WM 019
WM 020
WM 021
SCF 001
SCF 002
SCF 003
SCF 004
SCF 005
SCF 006
SCF 007
SCF 008
SCF 009
SCF 011
SCF 012
SCF 013
SCF 014
WR 001
WR 002
WR 003
WR 004
WR 005
WR 006
WR 007
WR 008
WR 009
WR 010
WR 011
SEVEN SISTERS MOUNTAIN
CROWSNEST MOUNTAIN
CHINOOK F.R.A.
MUNICIPALITY OF CROWNEST PASS
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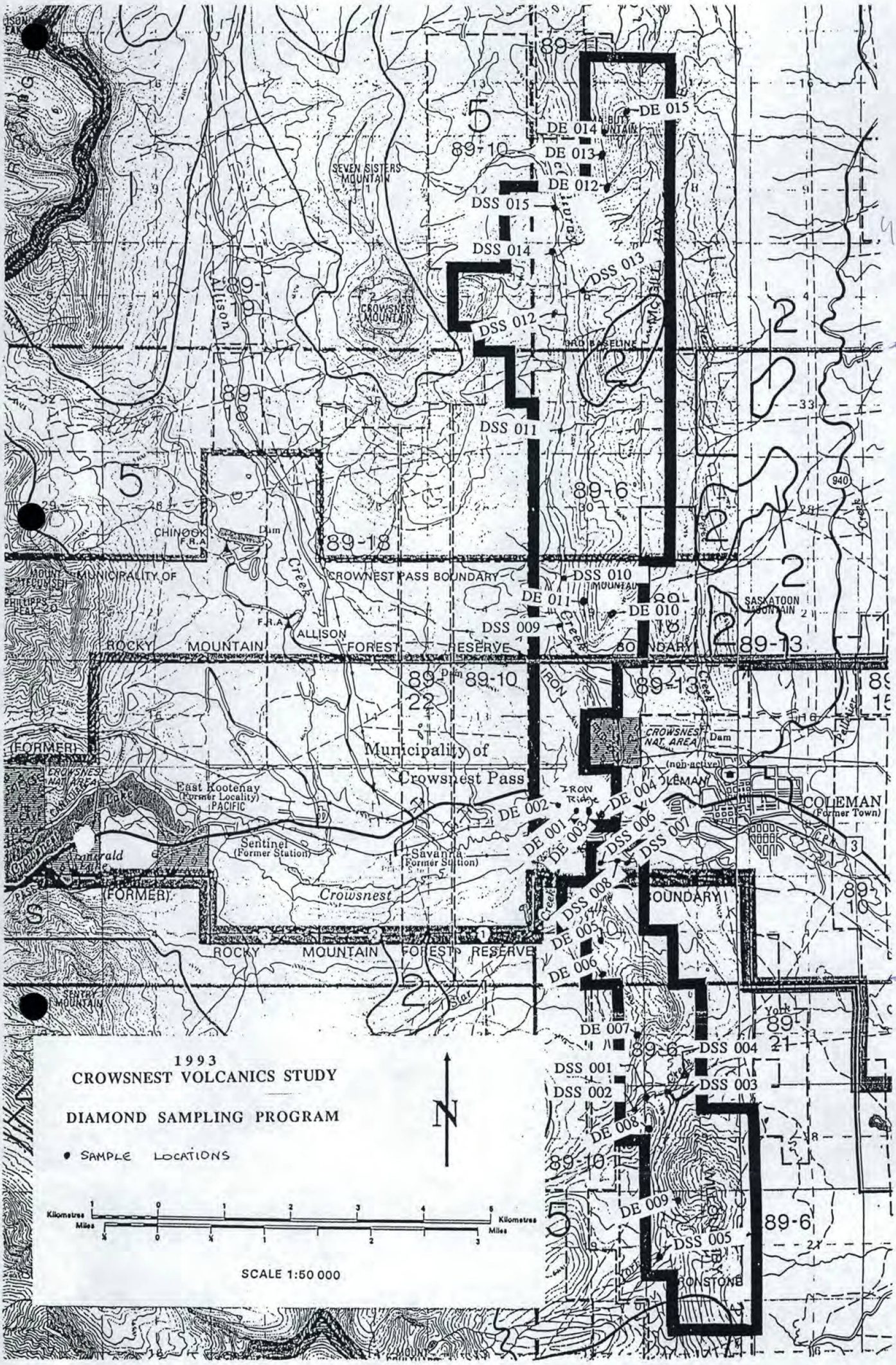
SASKATOON MOUNTAIN
WEDGE MOUNTAIN
SENTRY MOUNTAIN
89-10
89-13
89-18
89-21
89-22


DE 015
DE 014
DE 013
DE 012
DSS 015
DSS 014
DSS 013
DSS 012
DSS 011
DSS 010
DE 011
DE 010
DSS 009
DE 002
DE 001
DE 003
DE 004
DSS 006
DSS 007
DSS 008
DE 005
DE 006
DE 007
DSS 004
DSS 001
DSS 002
DSS 003
DE 008
DE 009
DSS 005
SEVEN SISTERS MOUNTAIN
CROWSNEST MOUNTAIN
CROWNEST PASS BOUNDARY
CHINOOK F.R.A.
ALLISON F.R.A.
ROCKY MOUNTAIN FOREST RESERVE
Municipality of Crowsnest Pass
East Kootenay (Former Locality) PACIFIC
Sentinel (Former Station)
Savanna (Former Station)
Crowsnest
IRON Ridge
CROWSNEST NAT. AREA
COLEMAN (Former Town)
SASKATOON MOUNTAIN
SENTRY MOUNTAIN
BONSTONE
1993
CROWSNEST VOLCANICS STUDY
DIAMOND SAMPLING PROGRAM
• SAMPLE LOCATIONS
N
Kilometres
Miles
SCALE 1:50 000