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**1990 EXPLORATION REPORT  
ON THE  
PARADISE CLAIM GROUP**

(Dawn, Paradise 2, Shastex 1, Fleece, Shasta 7 Claims)

**OMINECA MINING DIVISION**

NTS: 94E/2W, 7W  
LATITUDE: 57°14'N  
LONGITUDE: 126°56'W

**OWNER: CREST RESOURCES LTD.**  
11th Floor  
808 West Hastings Street  
Vancouver, BC V6C 2X6

**OPERATOR: HOMESTAKE MINING (CANADA) LIMITED**  
#1000-700 West Pender Street  
Vancouver, BC V6C 1G8

BY:  
M.D. McPherson  
H. Oiyé

November 30, 1990

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**20,821**

**GEOLOGICAL BRANCH  
ASSESSMENT REPORT**

## SUMMARY

The Paradise property is a gold-silver prospect located in the Toodoggone River area of north-central B.C. The property consists of 65 units in five claims; Dawn, Paradise 2, Shastex 1, Shasta 7 and Fleece, which form the Paradise Group. The first three claims are under option to Homestake Mining (Canada) Ltd. from Crest Resources Ltd., while the latter two claims are owned by International Shasta Resources Ltd. (72%) and Homestake Mining (Canada) Ltd. (28%). Homestake has acted as operator for the past three years. The property can be accessed via fixed-wing aircraft from Smithers, B.C., 275km to the south, or by the Omineca and Cheni Mine roads from Fort St. James, 600km to the south.

Previous exploration on the Dawn, Shastex 1 and Paradise 2 claims consists of geological mapping and geochemical sampling by Newmont Exploration Ltd. in 1984, and Crest Resources Ltd. in 1986, and a more detailed program of mapping, soil sampling, trenching and diamond drilling by Esso Minerals Canada Ltd. in 1988. The Shasta 7 and Fleece claims are at the advanced exploration stage, with extensive mapping, sampling, trenching, diamond drilling and underground mapping programs conducted by Newmont Exploration Ltd., Esso Minerals Canada Ltd. and Homestake Mining (Canada) Ltd., since 1983.

The 1990 exploration program consisted of one diamond drill hole (DDH 90-10; 198.6m) which tested the Saunders Fault Zone on the Shasta 7 claim, and underground mapping of the JM Zone on the Fleece claim. The program was designed to i) determine the nature of mineralization potentially hosted by the Saunders Fault Zone; and ii) examine the nature and controls on mineralization within the JM Zone as a guide to further exploration.

The drill hole successfully intersected the Saunders Fault Zone, but was lost before reaching the structure's footwall. The highest values returned were 0.64g/t Au and 2.4g/t Ag from 117.0 to 118.0m.

The JM Zone on the Shasta property was investigated by detailed underground

mapping (1:100 scale) in an area presently being developed for stoping. The JM zone trends 320 degrees and dips steeply to the northeast, and is hosted within a feldspar-quartz crystal lapilli tuff. The ore zone is characterized by potassium feldspar-quartz flooding associated with a strong to intensely developed quartz-carbonate stockwork and breccia, that pinches and swells along strike. Observed mineralization includes pyrite, chalcopyrite, bornite, sphalerite, electrum and acanthite. Underground mapping has indicated that "visual" grade control, based solely on the intensity of veining and alteration is not effective due to the inconsistent distribution of precious metals within the mineralized zones. The inconsistent distribution of precious metals also means that diamond drill core which intersects an ore zone will not necessarily yield ore-grade assays. It will however, almost always yield some significant values.

Additional surface work and diamond drilling, is necessary to delineate the Saunders Zone and determine it's precious metal-bearing potential. Surface VLF-R geophysical surveying is recommended to follow the structure along strike, followed by diamond drilling. Future drill programs should attempt to intersect the zone down dip and along strike from DDH 90-10. Attention should be given to developing a practical drill hole spacing, to take into consideration the possible "pinch and swell" nature of the mineralization and the inconsistencies in grade distribution throughout the zone.

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## 1.0 INTRODUCTION

### 1.1 Location and Access

The Paradise property is located in the Toadoggone River area of north-central B.C., approximately 275km north of Smithers, B.C. (Fig.1.1). The property can be accessed by fixed-wing aircraft from Smithers to the Sturdee River airstrip, then 9km northeast by helicopter. Summer road access exists from the Sturdee airstrip to within 3km of the property. Alternatively, the property is accessible from Fort St. James, B.C. via the Omineca Mine Road to Moose Valley and from there to the Sturdee airstrip via the Cheni Mine Road. Access to this route is subject to approval by Cheni Gold Mine.

### 1.2 Claim Status

The Paradise property consists of 65 units in five claims, which form the Paradise Group (grouping date October 30, 1990). The Dawn, Paradise 2, and Shastex 1 claims are owned by Crest Resources Ltd. and are under option to Homestake Mining (Canada) Ltd., while the Fleece and Shasta 7 claims are owned by International Shasta Resources Ltd. (72%) and Homestake Mining (Canada) Ltd. (28%). Claim configuration is shown in Figure 1.2 and claim data are summarized in Table 1.0 below. All of the claims are located within the Omineca Mining Division.

**TABLE 1.0 CLAIM STATUS**

<u>Claim Name</u>	<u>Units</u>	<u>Record No.</u>	<u>Expiry Date</u>	<u>Owner</u>
Dawn	9	5795	Sept. 15, 1993	Crest
Paradise 2	20	6994	April 25, 1993	Crest
Shastex 1	20	6997	April 25, 1993	Crest
Shasta 7	12	11119	Sept. 20, 1998	ISR/HMCL
Fleece	4	Mng.Lse. #49	Sept. 21, 1998	ISR/HMCL

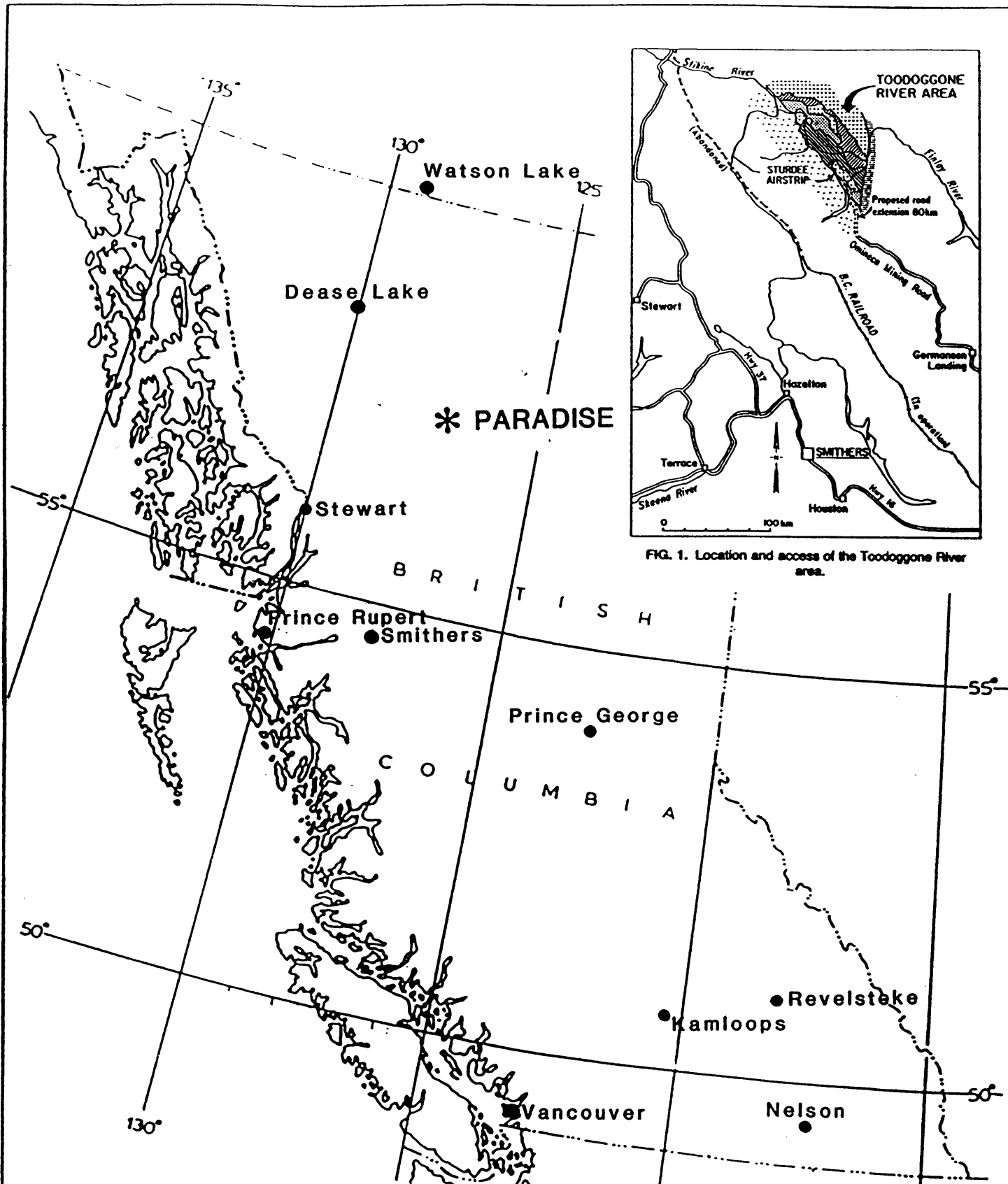
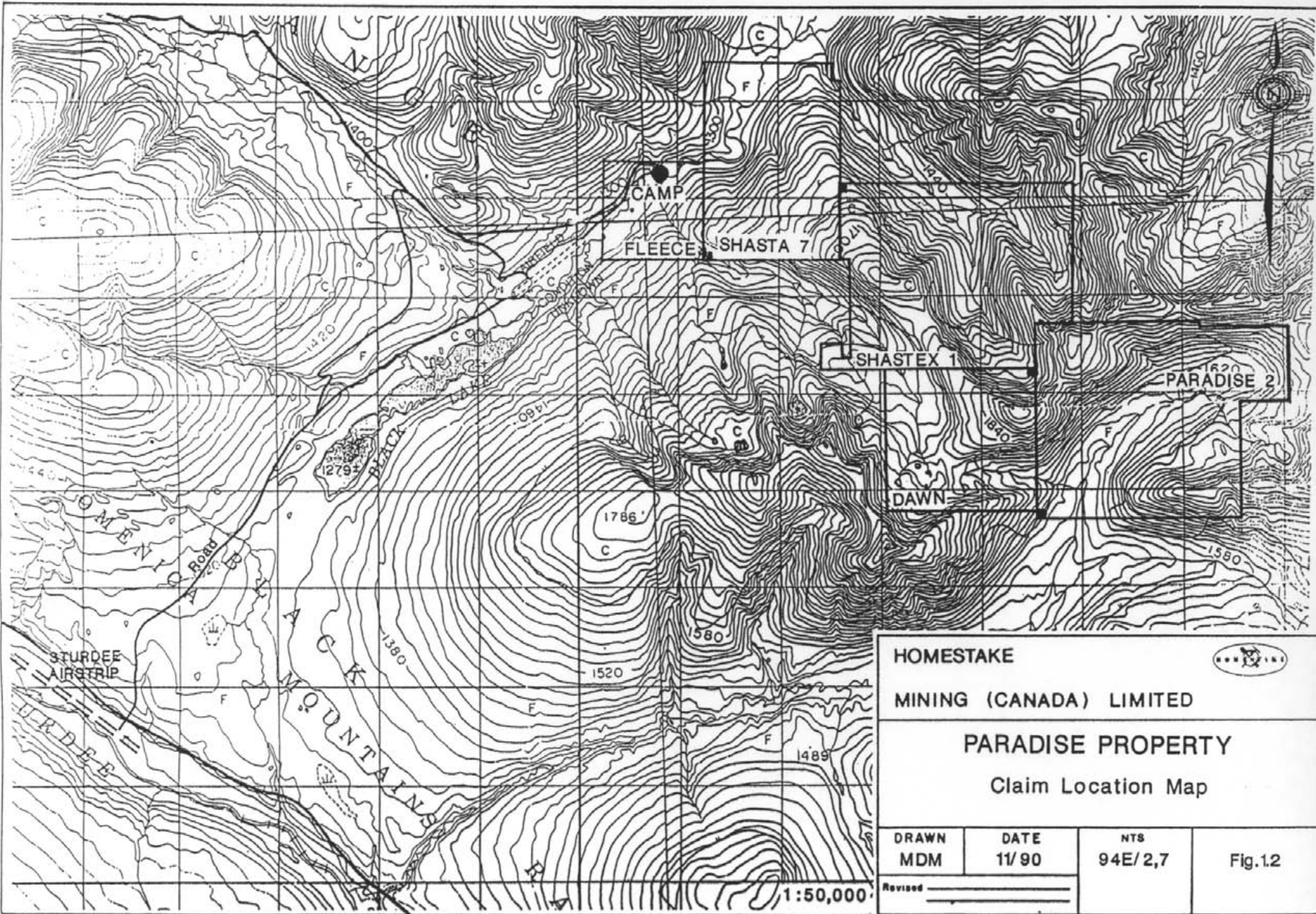


FIG. 1. Location and access of the Toodoggone River area.

HOMESTAKE MINING (CANADA) LIMITED			
<b>PARADISE PROPERTY BRITISH COLUMBIA LOCATION MAP</b>			
DRAWN	DATE	FILE CODE	Fig.1.1
	Nov./88		
Revised		N. T. S.	
		94E/2W,7W	



HOMESTAKE



MINING (CANADA) LIMITED

PARADISE PROPERTY

Claim Location Map

DRAWN  
MDM

DATE  
11/90

NTS  
94E/2,7

Fig.1.2

Revised

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### 1.3 Physiography

The property lies within the Samuel Black Range of the Omineca Mountains, near the eastern boundary of the Intermontane Belt. The claims are mainly at or above treeline, with elevations ranging from 1250 to 1950m. The terrain is moderately rugged, with broad till-filled valleys terminating in steep north-northwest facing cirques, and separated by narrow, steep-sided north-northwest trending ridges.

The geology is best exposed along ridge tops and in cirques. Creek gullies show intermittent exposure where gradients are high. Most slopes and ridges are covered by felsenmeer except on the Shastex 1 claim where grassy slopes are dominant. The Fleece and Shasta 7 claims are covered by a 15 to 30 year-old burn, and forest regrowth is minimal. Overburden depths range from 0 to 3m at higher elevations, and up to 10m in the valleys. Exploration is hindered by snow-cover until early July.

### 1.4 Exploration History

The Paradise 2 and Shastex 1 claims were staked in April 1985, for D. Stecyk of Vancouver, B.C. The claims were purchased by Alexim Resources Corp. in May 1985, and then by William Hudson of Vancouver in July 1985. The Dawn claim was originally staked as the Itch claim by Serem, but was allowed to lapse in 1983. The ground was restaked in September 1983 by Newmont Exploration Ltd., and sold to William Hudson of Vancouver in February 1986. All three claims were purchased by Crest Resources Ltd. in August 1986.

In August 1984, Newmont Exploration Ltd. carried out a detailed exploration program on the Dawn claim, consisting of geologic mapping, and soil and rock chip sampling (Visagie, 1984). Crest Resources Ltd. conducted a small program of mapping and sampling in August 1986, concentrating on the Shastex 1 and Dawn claims (Richards, 1986). Esso Minerals Canada Ltd. optioned the Dawn, Paradise 2, and Shastex 1 claims from Crest Resources Ltd.

in March 1988, and completed a program of soil sampling, geologic mapping, backhoe trenching and diamond drilling in the summer of 1988 (McPherson, 1988).

In the spring of 1989, Homestake Mining (Canada) Ltd. acquired Esso Mineral's interest in the property. No new exploration was initiated, but a reclamation program was carried out on the Shastex 1 and Dawn claims. All trenches on the Shastex 1 claim were backfilled, and the trenches and two 1988 drill sites were reseeded.

Both the Shasta 7 and Fleece claims have undergone extensive exploration as part of the Shasta property. Since 1983, geological mapping, geochemical sampling, geophysical surveying, trenching, diamond drilling and underground mapping have been conducted by Newmont Exploration Ltd., Esso Minerals Canada Ltd. and Homestake Mining (Canada) Ltd.

### 1.5 Present Work

The 1990 exploration program consisted of one diamond drill hole (DDH 90-10; 198.6m) on the Shasta 7 claim and underground mapping on the Fleece claim (Fig.3.1). Underground mapping was carried out by H. Oiyé. The program was designed to

- i) determine the nature of mineralization potentially hosted by the Saunders Fault Zone; and
- ii) examine the nature and controls on mineralization within the JM Zone as a guide to further exploration. The program commenced on July 4, 1990 and was completed on October 26, 1990.

## 2.0 GEOLOGY

### 2.1 Regional Setting

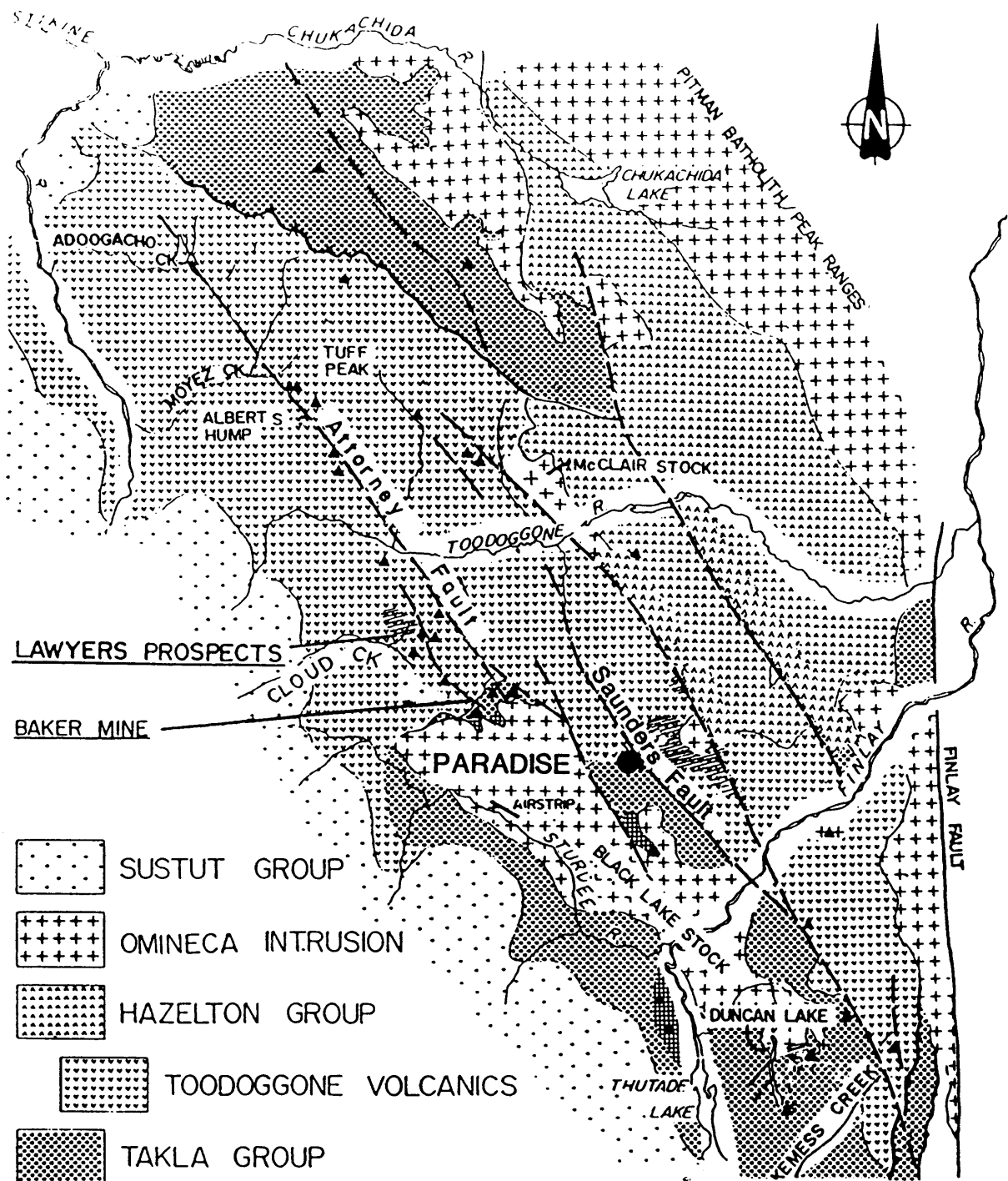
The Toodoggone River area lies within the Stikine Terrane on the Eastern margin of the Intermontane Belt, in the Cassiar-Omineca Mountains (Fig.2.1). The oldest rocks in the area are the Permian Asitka Group limestones, which are in thrust contact with Upper Triassic Stuhini Group volcanics. Stuhini Group rocks are dominantly alkaline to sub-alkaline, submarine, mafic flows and derived sediments. Unconformably overlying the Stuhini Group are Lower to Middle Jurassic Hazelton Group rocks representing a probable island-arc sequence of volcanics and associated sediments. The Jurassic Toodoggone volcanic rocks (Carter, 1972; Gabrielse et al, 1976) represent a distinct quartz-bearing facies of the Hazelton Group and comprise dominantly calc-alkaline, intermediate to felsic subaerial volcanic rocks and associated sediments (Schroeter, 1982; Panteleyev, 1982; Diakow et al, 1985). The youngest rocks in the area are chert-pebble conglomerates and sandstones of the Tertiary to Cretaceous Sustut Group, which unconformably overlies the Toodoggone volcanics. Lower Jurassic to Upper Triassic Omineca plutonic rocks, consisting of granodiorite and quartz monzonite, intrude the Stuhini and Toodoggone volcanics.

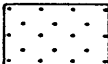
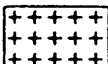




Structure of the Toodoggone area is dominated by normal faults of Lower Jurassic to Tertiary age which have north-northwesterly to north-northeasterly trends (Fig. 2.2). Some of the older faults are thought to have acted as conduits for mineralizing hydrothermal solutions (Schroeter, 1982).

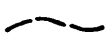


### 2.2 Property Geology

#### 2.2.1 Stratigraphy

The Paradise property is underlain predominantly by Upper Triassic Stuhini Group volcanic rocks and Lower to Middle Jurassic Toodoggone volcanics and derived sediments, both of which are intruded by Lower to Middle Jurassic syenitic to granodioritic dykes.



-  SUSTUT GROUP
-  OMINECA INTRUSION
-  HAZELTON GROUP
-  TOODOGGONE VOLCANICS
-  TAKLA GROUP
-  ASITKA GROUP

-  FAULT
-  GOSSAN
-  MINERAL OCCURRENCE

<b>HOMESTAKE MINING (CANADA) LIMITED</b>		
<b>PARADISE PROPERTY BRITISH COLUMBIA</b>		
<b>REGIONAL GEOLOGY</b>		
DRAWN	DATE	FILE CODE
	Nov./88	
Revised		N.T.S. 94E/2W,7W

5 0 10 20km.

REVISIONS		
By	Date	Approv. By

From Vulimiri et al, 1986

Fig.2.1



238,000 tonnes  
8.57 g/t AuEq.

272,000 tonnes  
12.00 g/t AuEq.

AL \*

METS \*

1.45 million tonnes  
9.94 g/t AuEq.

82,000 tonnes mined  
31.20 g/t AuEq.  
54,000 tonnes  
22.63 g/t AuEq.

CHENI \*

BAKER \*

1.15 million tonnes  
5.24 g/t AuEq.

PARADISE \*

\* SHASTA

\* SAUNDERS FAULT

\* MOSEHORN FAULT

Toodoggone River

JOCK FAULT

Finley River

FINLAY FAULT



HOMESTAKE MINING (CANADA) LIMITED

# PARADISE PROPERTY

Mineral Deposits and Regional Faults  
of the Toodoggone District

DRAWN MDM	DATE 11/ 90	NTS 94E/2,3	Fig.2.2
Revised			

The oldest rocks in the property area are pyroxene+/-feldspar bearing basalt flows and derived fragmental rocks of the Upper Triassic Stuhini Group. These rocks are exposed over the southern half of the claim group, strike east-northeast and dip gently to the northwest. Alteration of these rocks consists of patchy, moderate to strong quartz-sericite-pyrite which may be associated with moderate to strong quartz-carbonate stockworks and silica flooding.

Unconformably overlying the Stuhini Group are a series of pyroclastic and epivolcaniclastic rocks termed the "basal series", that are typical of Hazelton Group rocks. This unit consists of dark green lapilli tuffs and interbedded green and purple volcanic sediments (Marsden and Moore, 1990). Bedding within the basal series dips gently to the northwest.

Basal series rocks are conformably (?) overlain by a succession of feldspar-quartz-biotite-hornblende crystal-rich pyroclastic and epiclastic rocks of the Toadoggonne volcanics (Diakow et al, 1985), which have been informally termed the pyroclastic series (PYCS) and the epivolcaniclastic series (EVCS) based on differences in composition and depositional environments (Holbek and McPherson, 1990). These units are exposed predominantly on the Shasta 7 and Fleece claims, and dip gently to the north, consistent with regional attitudes. Mineralization is hosted predominantly by the feldspar-quartz crystal lapilli tuffs of the pyroclastic series, however several small isolated veins and alteration zones have been encountered within the EVCS unit as well. Alteration of the PYCS is dominantly pervasive quartz-K-feldspar flooding in association with quartz-carbonate stockworking and/or brecciation. Mineralization, when observed, includes native gold and silver, electrum, argentite, and chalcopyrite.

Overlying the epivolcaniclastic series is another thick sequence of mixed pyroclastic rocks and epiclastic rocks termed the Saunders Member (Marsden and Moore, 1990), which is exposed to the north of the property, and east of the Saunders Fault. These are the youngest rocks in the immediate vicinity of the Paradise property, and are not known to host significant mineralization.

### 2.2.2 Structure

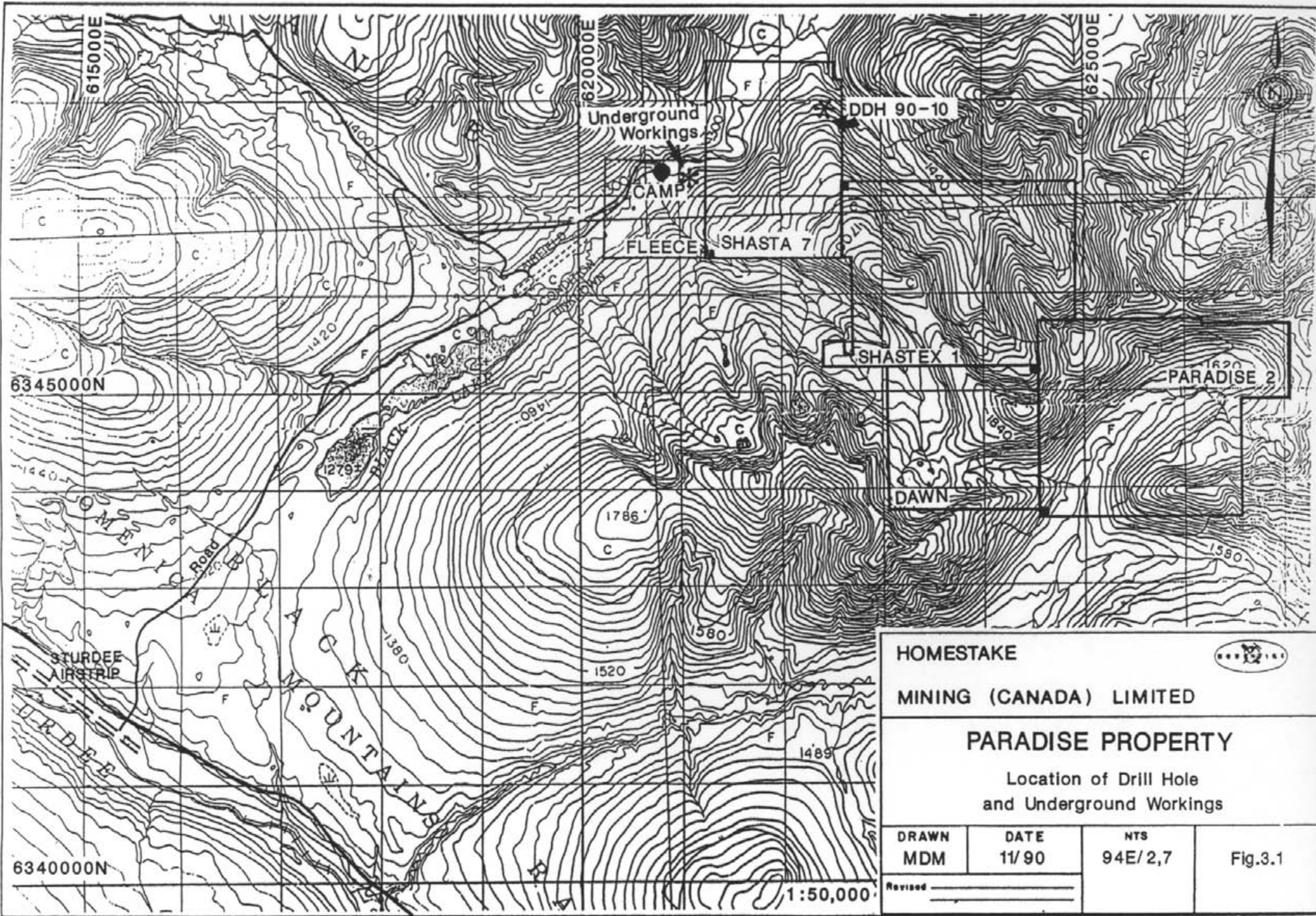
Structure on the Paradise property is dominated by north to northwest trending normal or dextral block faulting. The rock units are gently tilted and lack any evidence of ductile deformation, although regionally, the Toodooggone volcanic rocks are reported to display broad open folds (Panteleyev, 1982). Tilting and rotation of the fault blocks is noted at both property and regional scales. An understanding of faulting and fracturing on the property is important because structural breaks controlled the initial emplacement, and the subsequent displacement, of mineralization (Holbek and McPherson, 1990).

The most obvious structural feature in the area is the Saunders Fault zone, which strikes 150 degrees across the property. It is interpreted as a right-lateral fault with approximately 5km of displacement, consisting of numerous steeply dipping fault strands within a wide zone of altered and highly fractured rock (Marsden and Moore, 1990). Several subsidiary faults, striking 160 to 190 degrees, splay off of the Saunders Fault and exhibit east-side down displacement. The displacement decreases from north to south suggesting that the faults initiated adjacent to the Saunders Fault and propagated southward. Evidence of mineralization within the Saunders Fault, deduced from VLF-resistivity surveying and soil geochemistry, suggested potential for a large mineralized system.

## **3.0 DIAMOND DRILLING PROGRAM**

### 3.1 Introduction

The diamond drill program was conducted from July 4 to July 7, 1990. A single BQ-thinwall hole was drilled, using a JKS 300 diamond drill contracted from Van Alphen Diamond Drilling of Smithers, B.C. (see Table 3.0). Drill moves were accomplished with a John Deere 750 tractor supplied by the drilling contractor. The location of the drill hole collar was surveyed by A.A. de Bruynes of Smithers, B.C.



HOMESTAKE



MINING (CANADA) LIMITED

**PARADISE PROPERTY**

Location of Drill Hole  
and Underground Workings

DRAWN  
MDM

DATE  
11/90

NTS  
94E/2,7

Fig.3.1

Revised \_\_\_\_\_

1:50,000



Drill core was logged using the GEOLOG format of Lynx Geosystems Inc. of Vancouver, B.C. The core is stored in racks at the Shasta camp (UTM coordinates N6347270, E620850). The drill log can be found in appendix I.

The core was manually split, and shipped to Min-En Laboratories in Smithers, B.C. for gold and silver assaying. Analytical data is located in appendix II.

**TABLE 3.0 DIAMOND DRILL HOLE SPECIFICATIONS**

<u>Drill Hole</u>	<u>Azimuth</u>	<u>Dip</u>	<u>Length(m)</u>	<u>Northing</u>	<u>Easting</u>	<u>Elevation</u>
90-10	060	-45	198.6	7604.14	2281.80	1487.13m

### 3.2 Discussion and Results

The purpose of drill hole 90-10 was to test the Saunders Fault Zone, a strong northwest trending, steep easterly dipping regional structure with up to 5km of right-lateral displacement (Marsden, pers. comm. 1989; Fig.2.2). The fault zone is manifested within the property as a broad zone of argillic alteration with numerous sub-parallel fault splays. Potential for mineralization was initially detected by VLF-resistivity geophysical surveying during the early part of the 1989 field season. This was followed up by backhoe trenching later in 1989, and further geophysical surveying and soil sampling in 1990. The geophysical survey identified two parallel resistivity anomalies approximately 100m apart, trending approximately 140 degrees over a strike length of 400 to 700m.

The hole encountered relatively fresh feldspar-quartz crystal tuffs before intersecting a 10m clay gouge zone at 151m, marking the top of the fault zone (Figs.3.1 and 3.2). An increase in alteration to strong stringer and/or pervasive clay+chlorite occurred approximately 12m "up-hole" from the upper fault contact. The hole continued in extremely shattered, clay

altered crystal tuffs to the end of the hole. Disseminated pyrite was ubiquitous throughout the fault zone at 3 to 5% by volume, but no other mineralization was noted. The highest values returned were 0.64g/t Au, 2.4 g/t Ag from 117.0 to 118.0m. The drill hole was lost within the fault zone because of poor ground conditions, and the footwall of the fault was not intersected. Core recovery was very poor, ranging from 10 to 75%, and averaging 40% across the fault zone. Significant information and possibly mineralized material may have been lost, and therefore the zone cannot be considered fully drill tested.

## **4.0 UNDERGROUND MAPPING PROGRAM**

### **4.1 Introduction**

Geological mapping of the lower JM Zone was carried out between 10-12 and 22-26 of October 1990. Access to the lower JM Zone is through the Creek Portal. Underground development from this portal branches out in two directions, south for 57 metres intersecting the Creek Zone, and east for 63 metres intersecting the Lower JM Zone. The south heading has been damned and is being used as a sump. Consequently no mapping has been done along this heading. The east heading terminates in a 55 metre by 4 to 9 metre by 5 metre drift within what is termed the "D" block. This block is currently being developed as a stope.

Mapping of the backs, and where possible, walls and faces, was completed at a scale of 1:100. The areal extent of mapping was controlled by the availability and pressure of the water used in washing the walls and back. A total of 152 metres of development were mapped (Fig.4.1.1).

### **4.2 Geology and Mineralization**

The JM Zone lies within a feldspar-quartz crystal lapilli tuff of the pyroclastic series of volcanics. This is a heterolithic unit, containing subangular to subrounded fragments of

feldspar-quartz crystal tuff (12-15%) and minor amounts of green to red siltstone (2-5%). Fragments range from 0.5 to 15cm in size, and occur within a fine-grained tuffaceous matrix.

The Lower JM ore Zone is characterized by a strong to intense quartz-carbonate stockwork and breccia, and associated potassium feldspar-quartz flooding. Where distinguishable, lapilli fragments in the ore zone have also been altered by the potassium feldspar-quartz flooding. In contrast, lapilli fragments are unaltered in areas of weak to moderate potassium feldspar alteration, outside the ore zone.

Ore zone boundaries are defined by two subparallel carbonate veins. These veins vary in width from 2 centimetres to 1.5 metres. They parallel the regional NW-SE structural trend, striking 320° to 330° and dipping 68° to 80° to the east. The northernmost carbonate vein is pale pink and weakly banded. It is believed to be the strike extension of the carbonate vein intersected in the "B" and "C" stopes of the Upper JM Zone. Similarly, the stockwork of "D" block is the continuation of the stockwork/breccia zone of the upper stopes. Alteration and brecciation in the "D" block ore zone is much more intense than in the "B" and "C" stopes.

Observed mineralization includes pyrite, chalcopyrite, bornite, sphalerite, electrum and acanthite. The highest gold and silver values were returned from areas of intense quartz-carbonate brecciation and stockworking. Detailed geology maps of the Lower JM Zone are included as figures 4.2.1 and 4.2.2.

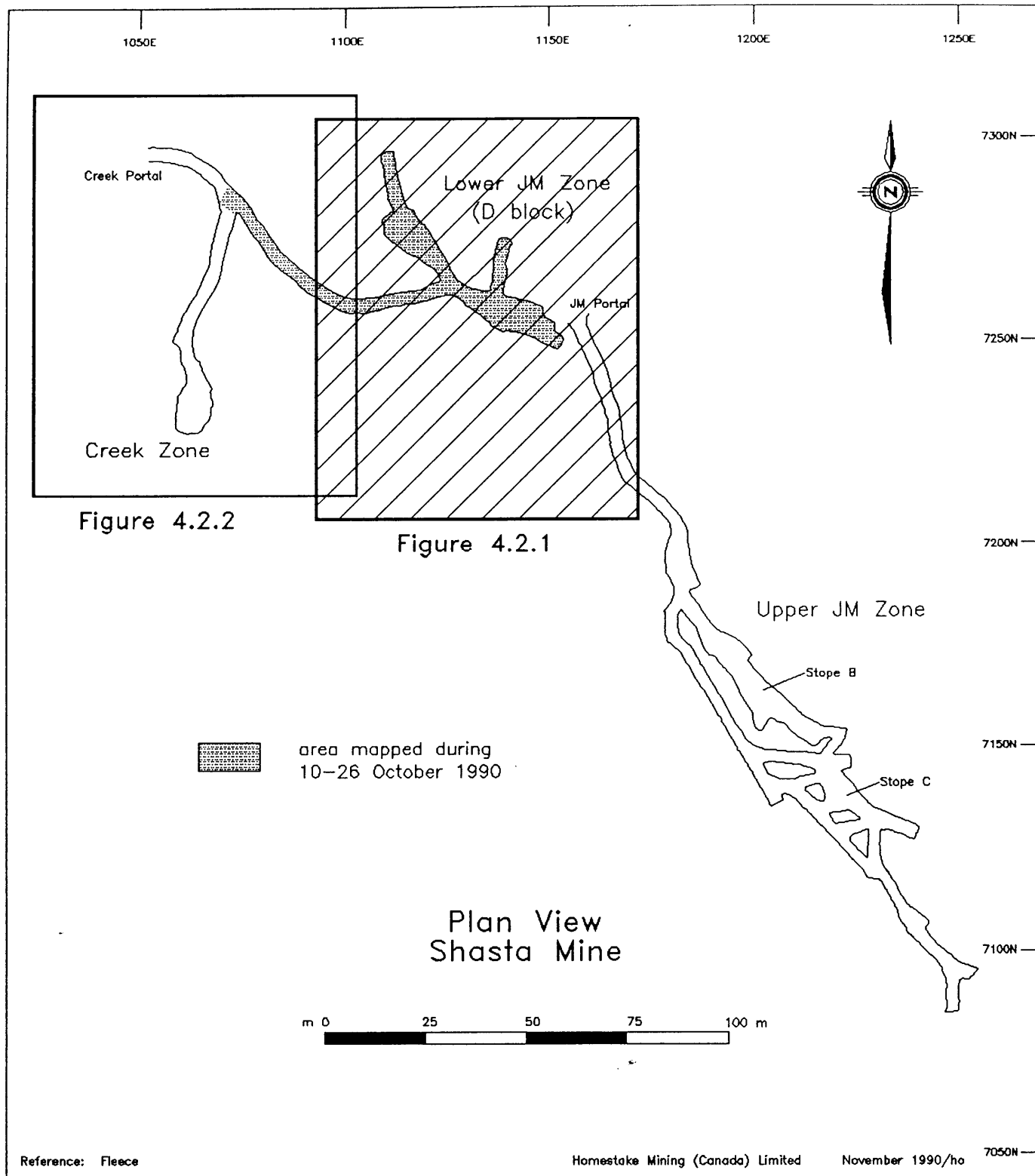


Figure 4.1.1

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

The purpose of the 1990 exploration program was i) to determine the nature of mineralization potentially hosted by the Saunders Fault Zone; and ii) examine the nature and controls on mineralization within the JM Zone (Fleece claim), as a guide to further exploration.

The Lower JM Zone is characterized by a strong to intense quartz-carbonate stockwork and breccia, associated with potassium feldspar-quartz flooding of the host heterolithic lapilli crystal tuffs. Lapilli fragments are typically altered within the ore zone. The zone is bounded by two subparallel carbonate veins up to 1.5m in width, that parallel the JM structural trend, striking 320 degrees and dipping steeply to the east. Alteration and brecciation in the lower zone is much more intense than that further south, and average gold and silver values are correspondingly higher.

Alteration within the Saunders Zone is distinctly different from the JM Zone. Drill core from the Saunders Zone is intensely shattered and clay altered. Disseminated pyrite occurs within the clay altered material and small bits of core appear to be silicified, but there is no evidence of potassium feldspar or carbonate alteration.

The only significant drill core assays from the Saunders Zone were 0.64 g/t Au and 2.4 g/t Ag over 1.0m. Although these values are anomalous, they are significantly less in size and tenor than is common in areas proximal to mineralized zones elsewhere on the property.

Underground mapping within the JM Zone has revealed that geological information must be used in conjunction with assay data in order to correctly interpret mineralization and grade distribution. "Visual" grade control, based solely on the intensity of veining and alteration, has not proved to be effective due to the inconsistent distribution of precious metals within the ore bodies. The zones have also been noted to "pinch and swell" underground, and therefore a "blank" drill hole may not be representative of the zone overall.

Therefore a practical drill hole spacing will have to be developed, to take the grade inconsistencies into consideration, for any future exploration on the Saunders Zone.

Additional surface work and diamond drilling is necessary to fully test the precious metal-bearing potential of the Saunders Fault Zone. The structure has a regional strike length of at least 20km (Marsden and Moore, 1990). Previous VLF-R surveying (Holbek and McPherson, 1990) has proved to be successful in locating the altered areas within the zone, but only about 400 to 700m of the total strike length has been tested by this method. Additional VLF-R surveying would be useful in locating potentially mineralized areas along the strike extension of the Saunders Zone.

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Richards, T.A., (1986): Geology and Mineralization - Dawn, Shastex 1 and Paradise 2 Mineral Claims; an in-house report prepared for Crest Resources Ltd.

Schroeter, T.G., (1982): Toodoggone River, B.C.; B.C.M.E.M.P.R. Geological Fieldwork 1981, Paper 1982-1, pp. 122-133.

Visagie, D.A., and Hanel, T., (1984): Geological and Geochemical Report on the Dawn Claim; Newmont Exploration of Canada Ltd.; Assessment Report #13273.



**7.0 STATEMENT OF COSTS**1) Salaries and Wages:

- Geologist (M. McPherson) July 5, 6		
	2 days @ \$180/day	\$ 360
- Geologist (H. Oiyee) Oct. 10-12, 22-26		
	8 days @ \$180/day	\$ 1,440
- Core Splitter (M. Willson) July 5, 6		
	2 days @ \$110/day	\$ 220
- Mapping Assistant (G. Miller) Oct. 10-12, 22-26		
	8 days @ \$130/day	\$ 1,040

2) Logistics:

- Food and Accomodation:		
- 17 man-days @ \$50/day (drilling program)		\$ 850
- 10 man-days @ \$35/day (underground program)		\$ 350
- Airfare:		
- Vancouver - Smithers roundtrip; Oct. 10-12		
- 1 @ \$520		\$ 520
- Vancouver - Smithers roundtrip; Oct. 22-26		
- 2 @ \$550		\$ 1,100
- Smithers - Sturdee Valley roundtrip		
- 3 @ \$302		\$ 906

3) Drilling Costs:

- DDH 90-10; 198.6m @ \$54/m	\$10,724
- materials + 15% overhead	\$ 8,698
- tractor time; 10 hours @ \$90/hour	\$ 900

4) Analysis:

- 77 split core samples @ \$16.50/sample	\$ 1,271
- freight; 300 lbs @ \$1/lb	\$ 300

5) Report Writing:

- Labour; 3 days @ \$180/day	\$ 540
- Drafting and Reproduction	\$ 300

	=====
TOTAL	\$29,519

## 8.0 STATEMENT OF QUALIFICATIONS

I, Margaret D. McPherson, DO HEREBY CERTIFY THAT:

1. I am a geologist presently employed by Homestake Mineral Development Company, located at #1000-700 West Pender Street, Vancouver, B.C., V6C 1G8.
2. I graduated from the University of British Columbia in 1987, with a Bachelor of Science degree in Geology.
3. I have been employed in the mineral exploration industry since 1985.
4. The work described in this report was done with my participation.
5. I do not own interest, shares, or securities of Homestake Mining (Canada) Ltd., International Shasta Resources Ltd., or Crest Resources Ltd.



Margaret McPherson, BSc

Vancouver, B.C.

January 10, 1991

## STATEMENT OF QUALIFICATIONS

I, Heather Oiye, hereby certify that:

- 1) I am a graduate of the Univeristy of Toronto (BSc, Honours Geology, 1979)
- 2) I have practised within the geological profession since 1979.
- 3) The opinions, conclusions and recommendations contained herein are based on fieldwork conducted by me from 10-26 October 1990, on the Fleece claim.
- 4) I do not own direct, indirect, or contingent interests or shares, or securities of Homestake Mining (Canada) Limited, International Shasta Ltd. or Sable Resources Ltd., or associated companies.



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Heather Oiye, BSc

Vancouver, B.C.  
November 1990

**APPENDIX I:**

**DRILL LOG - DDH 90-10**

# HOMESTAKE MINERAL DEVELOPMENT COMPANY

## PARADISE PROPERTY

### DRILL HOLE LOG

PROJECT ID : SHASTA

HOLE / TRAVERSE ID : DDH90_10	COLLAR AZIMUTH : 60.00
CORE HOLE SIZE : BQ	COLLAR DIP : -45.00
DATE STARTED : 90/ 7/ 4	COLLAR ELEVATION : 1490.20
DATE COMPLETED : 90/ 7/ 7	COLLAR NORTHING : 7604.24
GEOLOGGED BY : MDM	COLLAR EASTING : 2269.09
PLOT DATE : 90/OCT/27	COLLAR OFFSET :
PROJECT LEADER : P. HOLBEK	COLLAR STATION :
LOCATION : TODDGGONE	TOTAL LENGTH : 198.6

NTS: 94E MINING DIV.: OMINECA  
 PURPOSE: TEST SAUNDERS FAULT ZONE  
 COMMENTS: HOLE LOST IN SAUNDERS FAULT ZONE  
 KEY INTERSECTIONS:

SURVEY DATA  
 DEPTH DIP AZIMUTH

DRILL HOLE SUMMARY  
 FROM TO LITHOLOGY AUEQ G/T

#### SUMMARY REMARKS

Hole tested Saunders fault zone. Hole was collared ~170m NE of 90-08 to scissor with that hole and identify source of VLF-R high. Hole intersected A0-A1 FQXT from top of hole to 146m. Goes through 2m of ash tuff and then 40m of extremely rubbly, pyritic, clay altered FS porphyry of FQXT? Poor ground conditions caused rods to stick and hole was abandoned with 500' stuck rods.

#### LEGEND

ECON. MINERAL:  
 AG = NATIVE SILVER AR = ARGENTITE  
 AU = GOLD EL = ELECTRUM SP = SPHALERITE  
 BS = UNIDENTIFIED GREY/BLACK SULPHIDES

STRUCTURE ID:  
 CV = CALCITE VEIN QV = QUARTZ VEIN  
 BC = BRECCIA CONTACT BD = BEDDING  
 FO = FOLIATION/WELDING

FROM	TO	LITHOLOGY	AUEQ G/T
0.00	8.50	Drill casing	
8.80	21.20	Feldspar-quartz crystal tuff	
21.20	139.00	Feldspar-quartz crystal tuff	
139.00	146.70	Feldspar-quartz	
151.50	161.70	Fault gouge	
161.70	198.60	Fault zone	

0 10 20 30 40 50

0 10 20 30 40 50









STRUCTURE

ALTERATION

ASSAYS

STRUCTURE ID	ANGLE TO CORE	STRUCTURE ID	ANGLE TO CORE	% QUARTZ	% CALCITE	% K-SPAR	% CLAY	% EPIDOTE	% CHLDRITE	ALT. FACIES	ALT. FACIES	% STOCKWORK	EC. MINERAL	EC. MINERAL
CV 30		CV 45		0.3	0.3	2.5	0.3	2.5	2.5	1				GM

FROM	TO	SAMPLE NUMBER	LENGTH M/10	SILVER g/t	GOLD g/t
43.60	44.60	7	100		42.0
44.60	45.60	8	100		
45.60	46.60	9	100		
46.60	48.10	10	150		
48.10	49.10	11	100		
49.10	50.20	12	110		
50.20	51.20	13	100		
					52.0
55.00	56.00	14	100		
56.00	57.00	15	100		
57.00	58.00	16	100		
61.50	62.50	17	100		62.0
62.50	63.50	18	100		
63.50	64.50	19	100		
					72.0
83.00	84.00	20	100		82.0





DRILL HOLE: DDH90\_10  
PAGE 8

METERS	RECOVERY		FROM	TO	LITHOLOGY	MINOR LITH.	COLOUR	TEXTURE 1	TEXTURE 2	REMARKS
	RQD									
126.0	600	980	21.20	139.00	Feldspar-quartz crystal tuff		Green and orange	Porphyritic	Sheared	Similar interval, but with occasional rubbly 10cm fault zones and increase in epidote alteration. 2x2cm CAVN's at 332m carry grey matter--hematite? EP alteration is variable downhole. Local very weak QCSV's with EP selvages and in veins, i.e. at 55.8-56.8m. 9cm EP-QZ BXVN at 99.0m is unmineralized.
136.0	500	1000	139.00	146.70	Feldspar-quartz crystal tuff		Medium Grey	Porphyritic	Stringer zone	Increase in pervasive chlorite-clay alteration, as 'net-like' stringers. Rock loses competent look. Tiny pink-white carbonate stringers common. Lower in looks fragmental base of dome??
146.0	950	1000	146.70	149.00	Ash tuff (unspecified)	Breccia (general)	Dark Grey	Bedded	Fine grained	Interbedded dark grey ash tuff argillite, and green siltstone. Base of FOXT? 10cm CYGG at UC.
	400	950	149.00	151.50	Breccia (general)		Green and orange	Brecciated	Irregular	Fault breccia? Pinked and silicified FOXT fragments in chloritic/clay altered matrix. CY gauge to 5cm. Pervasive clay alteration overprint. Very ugly rock.
156.0	00	300	151.50	161.70	Fault gouge		Medium Grey	Gouge	Sheared	Clay gouge/nud. Poor recovery and RQD. Any core is very rubbly and broken. Saunders fault? Host is unidentifiable, but looks FS-phynic and may have been silicified. Could have been FOXT.
166.0	00	800	161.70	198.60	Fault zone		Medium Grey	Sheared	Gouge	Saunders fault? As above but less siliceous. Rubbly, shattered core. Rock is clay altered and pyritic, still see faint FX. May have been silicified at one time. No veining. Dense white clay fracture coating could be alunite(?). Increase in recovery with right shift drills! (179.5-198.6m)







**APPENDIX II:**

**ANALYTICAL DATA**





**MIN  
• EN  
LABORATORIES**  
(DIVISION OF ASSAYERS CORP.)

SPECIALISTS IN MINERAL ENVIRONMENTS  
CHEMISTS • ASSAYERS • ANALYSTS • GEOCHEMISTS

VANCOUVER OFFICE:  
705 WEST 15TH STREET  
NORTH VANCOUVER, B.C. CANADA V7M 1T2  
TELEPHONE (604) 980-5814 OR (604) 988-4524  
FAX (604) 980-9621

THUNDER BAY LAB.:  
TELEPHONE (807) 622-8958  
FAX (807) 623-5931

SMITHERS LAB.:  
TELEPHONE/FAX (604) 847-3004

Assay Certificate

OS-0183-RA5

Company: HOMESTAKE MINING CANADA  
Project: 3171  
Attn: PETER HOLBEK

Date: JUL-30-90

- Copy 1. HOMESTAKE MINING CANADA, VANCOUVER, B.C.  
2. HOMESTAKE MINING CANADA, SMITHERS, B.C.  
3. HOMESTAKE MINING CANADA, C/O MIN-EN LABS

We hereby certify the following Assay of 26 CORE samples  
submitted JUL-20-90 by MARGARET MCPHERSON.

Sample Number	*AU g/tonne	AG g/tonne
---------------	----------------	---------------

9010 260 270 01	.01	1.6
9010 270 280 02	.01	2.0
9010 280 290 03	.05	1.6
9010 320 330 04	.01	1.7
9010 330 340 05	.03	2.3

9010 340 350 06	.01	1.8
9010 436 446 07	.01	1.7
9010 446 456 08	.02	1.8
9010 456 466 09	.01	1.4
9010 466 481 10	.01	1.6

9010 481 491 11	.01	0.9
9010 491 502 12	.03	1.7
9010 502 512 13	.01	1.4
9010 550 560 14	.01	1.0
9010 560 570 15	.01	1.9

9010 570 580 16	.01	1.6
-----------------	-----	-----

STD	.65	
BLK	.01	

\*AU - 1 ASSAY TON.

Certified by



**MIN-EN LABORATORIES**  
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FAX (604) 980-8621

THUNDER BAY LAB.:  
TELEPHONE (807) 622-8958  
FAX (807) 623-5931

SMITHERS LAB.:  
TELEPHONE/FAX (604) 847-3004

Assay Certificate

OS-0183-RA6

Company: HOMESTAKE MINING CANADA  
Project: 3171  
Attn: PETER HOLBEK

Date: JUL-30-90  
Copy 1. HOMESTAKE MINING CANADA, VANCOUVER, B.C.  
2. HOMESTAKE MINING CANADA, SMITHERS, B.C.  
3. HOMESTAKE MINING CANADA, C/O MIN-EN LABS

We hereby certify the following Assay of 26 CORE samples  
submitted JUL-20-90 by MARGARET MCPHERSON.

Sample Number	*AU g/tonne	AG g/tonne
9010 615 625 17	.01	1.8
9010 625 635 18	.01	1.5
9010 635 645 19	.01	1.7
9010 830 840 20	.01	1.4
9010 840 850 21	.01	1.3
9010 850 860 22	.01	1.8
9010 980 990 23	.01	0.8
9010 990 1000 24	.01	1.6
9010 1000 1010 25	.01	1.1
9010 1160 1170 26	.01	1.4
9010 1170 1180 27	.64	2.4
9010 1180 1190 28	.02	1.2
9010 1390 1405 29	.11	4.0
9010 1405 1420 30	.01	1.5
9010 1420 1435 31	.01	1.8
9010 1435 1450 32	.01	1.9
9010 1450 1467 33	.01	2.1
9010 1467 1475 34	.01	1.7
9010 1475 1490 35	.03	0.6
9010 1490 1500 36	.01	1.6
9010 1500 1515 37	.01	1.5
9010 1515 1539 38	.01	0.8
9010 1539 1564 39	.01	1.7
9010 1564 1603 40	.04	0.4
9010 1603 1612 41	.02	1.2
9010 1612 1634 42	.04	1.3
STD	.70	110.5
BLK	.01	0.1

\*AU - 1 ASSAY TON.

Certified by 



**MIN-EN LABORATORIES**  
(DIVISION OF ASSAYERS CORP.)

SPECIALISTS IN MINERAL ENVIRONMENTS  
CHEMISTS • ASSAYERS • ANALYSTS • GEOCHEMISTS

VANCOUVER OFFICE:  
705 WEST 15TH STREET  
NORTH VANCOUVER, B.C. CANADA V7M 1T2  
TELEPHONE (604) 980-5814 OR (604) 988-4524  
FAX (604) 980-9621

THUNDER BAY LAB.:  
TELEPHONE (807) 622-8958  
FAX (807) 623-5931

SMITHERS LAB.:  
TELEPHONE/FAX (604) 847-3004

Assay Certificate

OS-0183-RA7

Company: HOMESTAKE MINING CANADA  
Project: 3171  
Attn: PETER HOLBEK

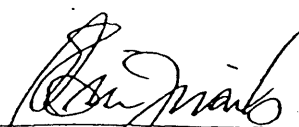
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2. HOMESTAKE MINING CANADA, SMITHERS, B.C.  
3. HOMESTAKE MINING CANADA, C/O MIN-EN LABS

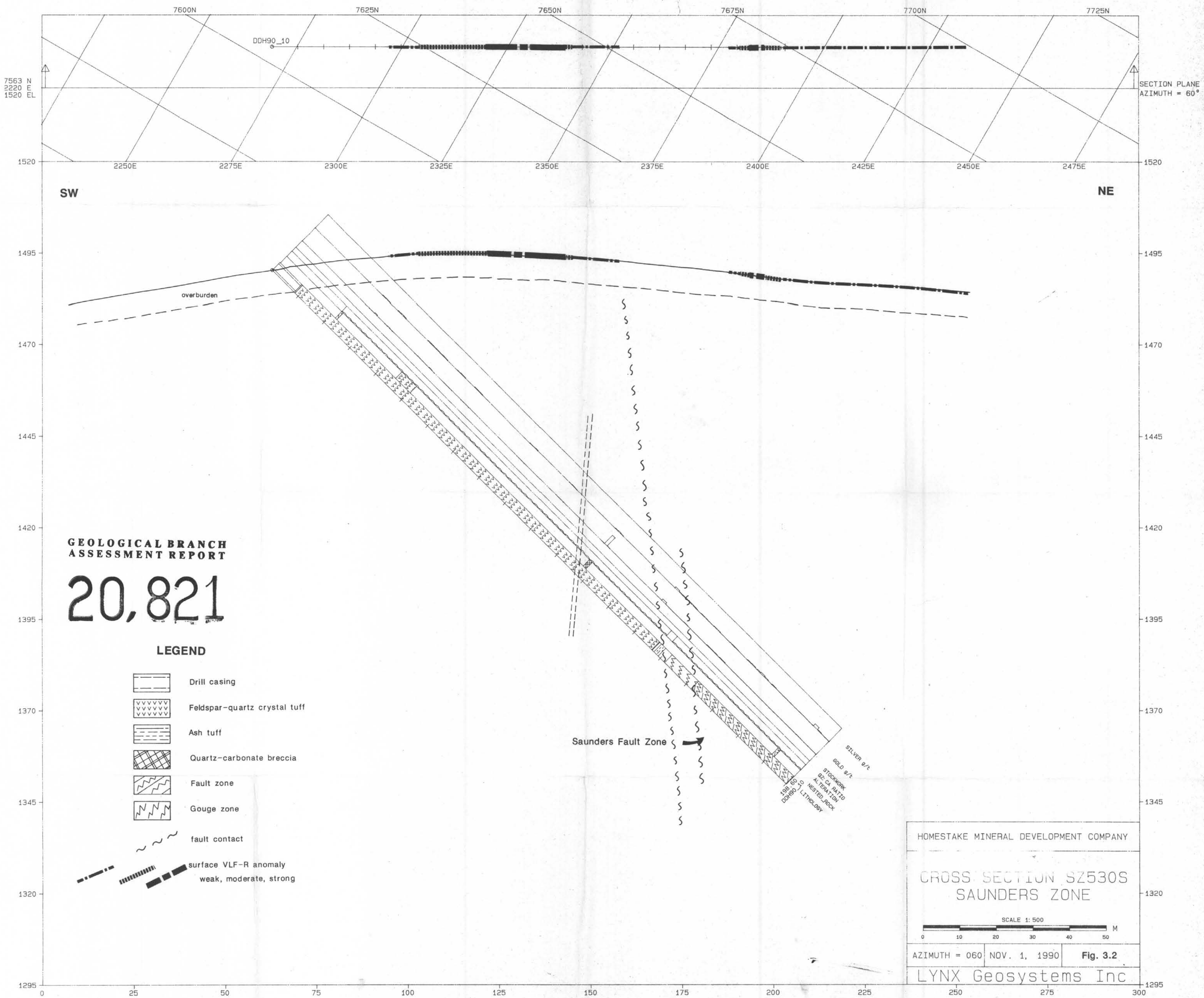
We hereby certify the following Assay of 26 CORE samples  
submitted JUL-20-90 by MARGARET MCPHERSON.

Sample Number	*AU g/tonne	AG g/tonne
9010 1634 1670 43	.01	0.4
9010 1670 1685 44	.01	1.5
9010 1685 1700 45	.01	2.0
9010 1700 1707 46	.01	0.4
9010 1708 1720 48	.01	2.2
9010 1720 1735 49	.01	3.7
9010 1735 1750 50	.01	2.0
9010 1750 1765 51	.01	0.2
9010 1765 1780 52	.01	1.6
9010 1780 1795 53	.01	0.5
9010 1795 1810 54	.01	0.3
9010 1810 1825 55	.01	0.6
9010 1825 1840 56	.01	0.2
9010 1840 1855 57	.01	0.2
9010 1855 1870 58	.01	0.5
9010 1870 1885 59	.01	0.9
9010 1885 1900 60	.01	0.9
9010 1900 1910 61	.01	0.3
9010 1910 1975 62	.02	0.2
9010 1925 1940 63	.01	8.0
9010 1940 1955 64	.01	1.8
9010 1955 1970 65	.01	0.2
9010 1970 1986 66	.01	0.2
9010 1707 1708 77	.01	0.5

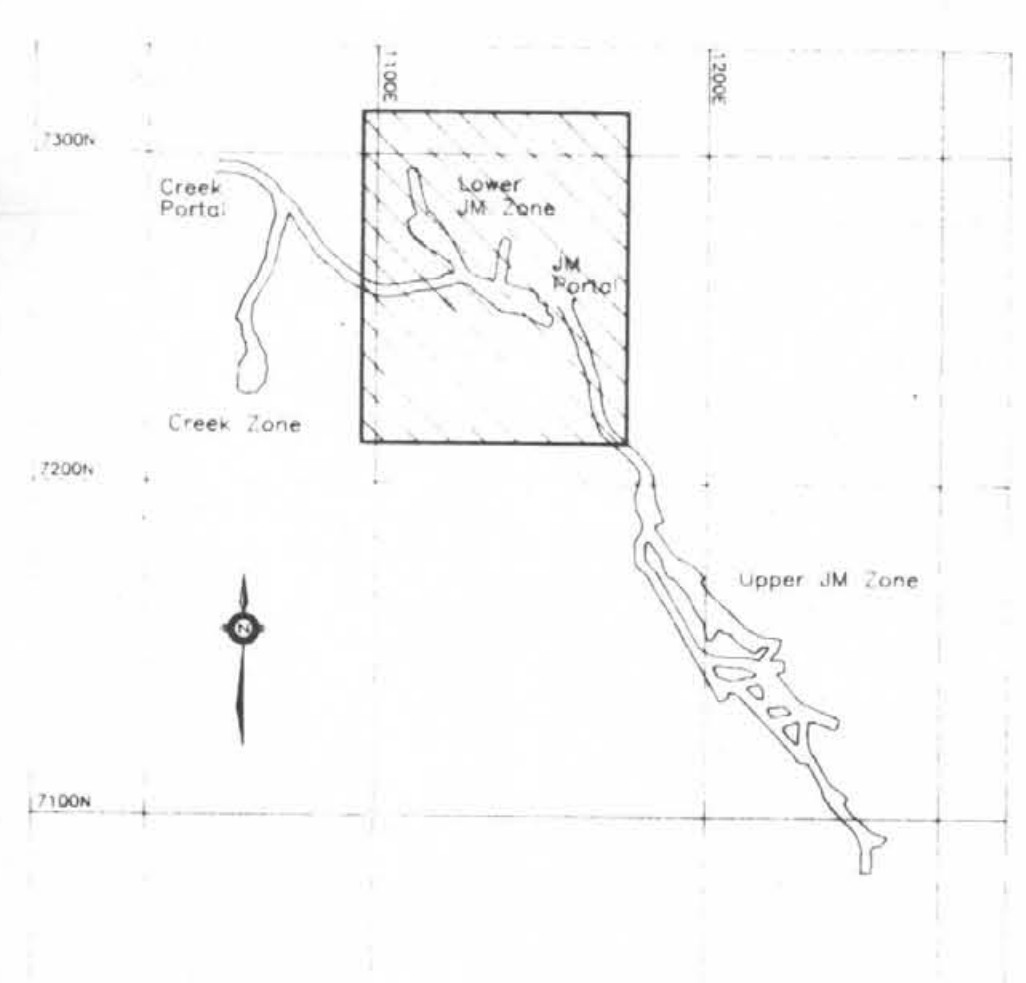
STD .66  
BLK .01

\*AU - 1 ASSAY TON.

Certified by 







Plan View Shasta Mine

**GEOLOGICAL BRANCH  
ASSESSMENT REPORT**  
**20,821**

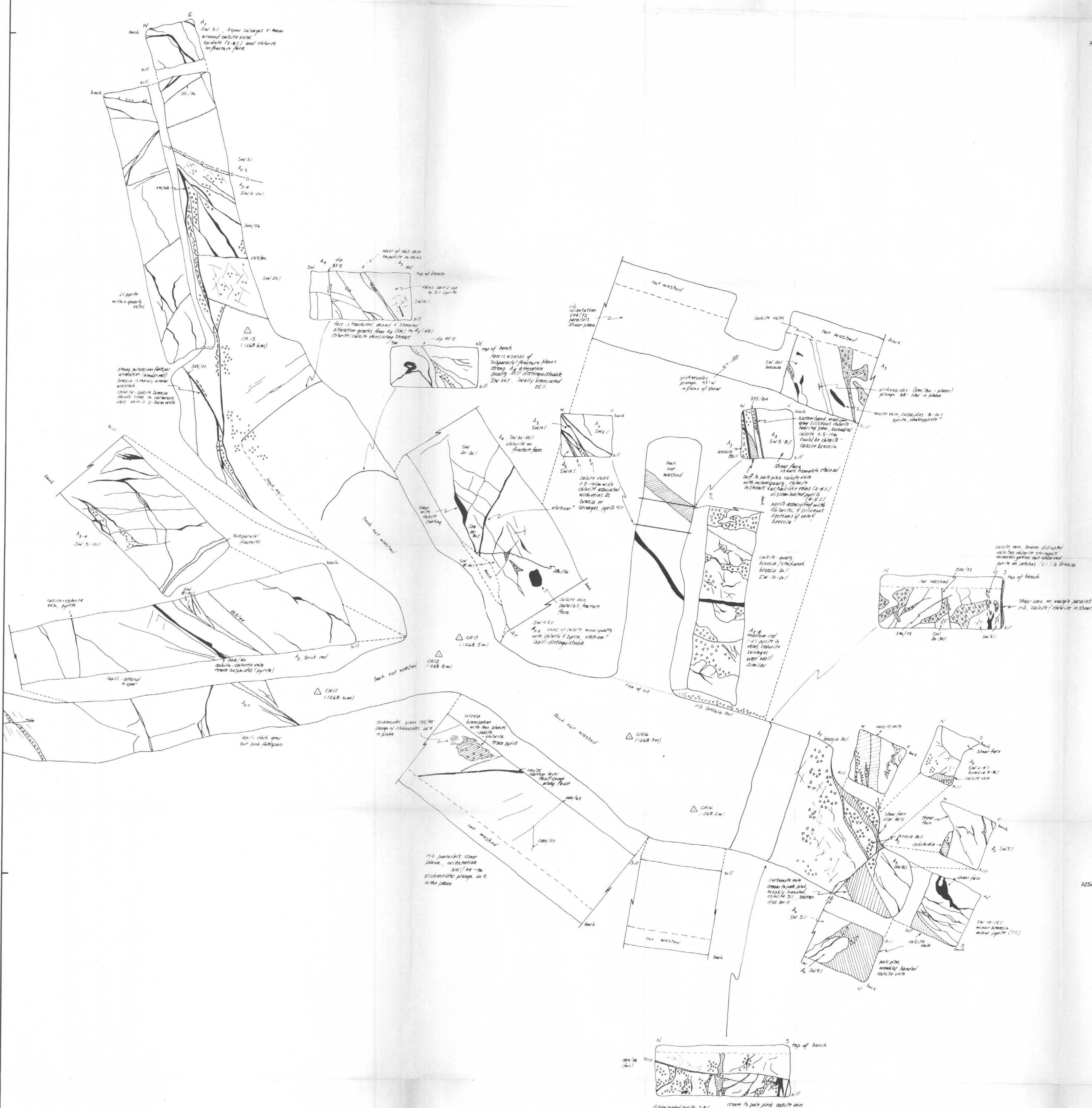
**LEGEND**

- wall outline
- back outline
- face map location (dotted line)
- tailings filling into underground
- vein inclined (calcite veins otherwise noted)
- fault/shear, inclined
- stockwork
- vein breccia quartz-calcite matrix
- calcite-calcite breccia
- alteration/stockwork contact
- survey station (back elevation)
- raise

note: all strikes and dips were recorded using right-hand rule

**ABBREVIATIONS**

- A<sub>1-5</sub> alteration facies; number indicates intensity from 1 (weak) to 5 (intense); see McMurdo et al., 1979 for abbreviated list of alteration facies
- cc calcite
- chf calcite
- k-spar potassium feldspar
- qz quartz
- sw stockwork
- >> much greater than



SW 5-122: minor breccia minor quartz (1%)

SW 5-123: minor breccia minor quartz (1%)

SW 5-124: minor breccia minor quartz (1%)

SW 5-125: minor breccia minor quartz (1%)

SW 5-126: minor breccia minor quartz (1%)

SW 5-127: minor breccia minor quartz (1%)

SW 5-128: minor breccia minor quartz (1%)

SW 5-129: minor breccia minor quartz (1%)

SW 5-130: minor breccia minor quartz (1%)

SW 5-131: minor breccia minor quartz (1%)

SW 5-132: minor breccia minor quartz (1%)

SW 5-133: minor breccia minor quartz (1%)

SW 5-134: minor breccia minor quartz (1%)

SW 5-135: minor breccia minor quartz (1%)

SW 5-136: minor breccia minor quartz (1%)

SW 5-137: minor breccia minor quartz (1%)

SW 5-138: minor breccia minor quartz (1%)

SW 5-139: minor breccia minor quartz (1%)

SW 5-140: minor breccia minor quartz (1%)

SW 5-141: minor breccia minor quartz (1%)

SW 5-142: minor breccia minor quartz (1%)

SW 5-143: minor breccia minor quartz (1%)

SW 5-144: minor breccia minor quartz (1%)

SW 5-145: minor breccia minor quartz (1%)

SW 5-146: minor breccia minor quartz (1%)

SW 5-147: minor breccia minor quartz (1%)

SW 5-148: minor breccia minor quartz (1%)

SW 5-149: minor breccia minor quartz (1%)

SW 5-150: minor breccia minor quartz (1%)

SW 5-151: minor breccia minor quartz (1%)

SW 5-152: minor breccia minor quartz (1%)

SW 5-153: minor breccia minor quartz (1%)

SW 5-154: minor breccia minor quartz (1%)

SW 5-155: minor breccia minor quartz (1%)

SW 5-156: minor breccia minor quartz (1%)

SW 5-157: minor breccia minor quartz (1%)

SW 5-158: minor breccia minor quartz (1%)

SW 5-159: minor breccia minor quartz (1%)

SW 5-160: minor breccia minor quartz (1%)

SW 5-161: minor breccia minor quartz (1%)

SW 5-162: minor breccia minor quartz (1%)

SW 5-163: minor breccia minor quartz (1%)

SW 5-164: minor breccia minor quartz (1%)

SW 5-165: minor breccia minor quartz (1%)

SW 5-166: minor breccia minor quartz (1%)

SW 5-167: minor breccia minor quartz (1%)

SW 5-168: minor breccia minor quartz (1%)

SW 5-169: minor breccia minor quartz (1%)

SW 5-170: minor breccia minor quartz (1%)

SW 5-171: minor breccia minor quartz (1%)

SW 5-172: minor breccia minor quartz (1%)

SW 5-173: minor breccia minor quartz (1%)

SW 5-174: minor breccia minor quartz (1%)

SW 5-175: minor breccia minor quartz (1%)

SW 5-176: minor breccia minor quartz (1%)

SW 5-177: minor breccia minor quartz (1%)

SW 5-178: minor breccia minor quartz (1%)

SW 5-179: minor breccia minor quartz (1%)

SW 5-180: minor breccia minor quartz (1%)

SW 5-181: minor breccia minor quartz (1%)

SW 5-182: minor breccia minor quartz (1%)

SW 5-183: minor breccia minor quartz (1%)

SW 5-184: minor breccia minor quartz (1%)

SW 5-185: minor breccia minor quartz (1%)

SW 5-186: minor breccia minor quartz (1%)

SW 5-187: minor breccia minor quartz (1%)

SW 5-188: minor breccia minor quartz (1%)

SW 5-189: minor breccia minor quartz (1%)

SW 5-190: minor breccia minor quartz (1%)

SW 5-191: minor breccia minor quartz (1%)

SW 5-192: minor breccia minor quartz (1%)

SW 5-193: minor breccia minor quartz (1%)

SW 5-194: minor breccia minor quartz (1%)

SW 5-195: minor breccia minor quartz (1%)

SW 5-196: minor breccia minor quartz (1%)

SW 5-197: minor breccia minor quartz (1%)

SW 5-198: minor breccia minor quartz (1%)

SW 5-199: minor breccia minor quartz (1%)

SW 5-200: minor breccia minor quartz (1%)

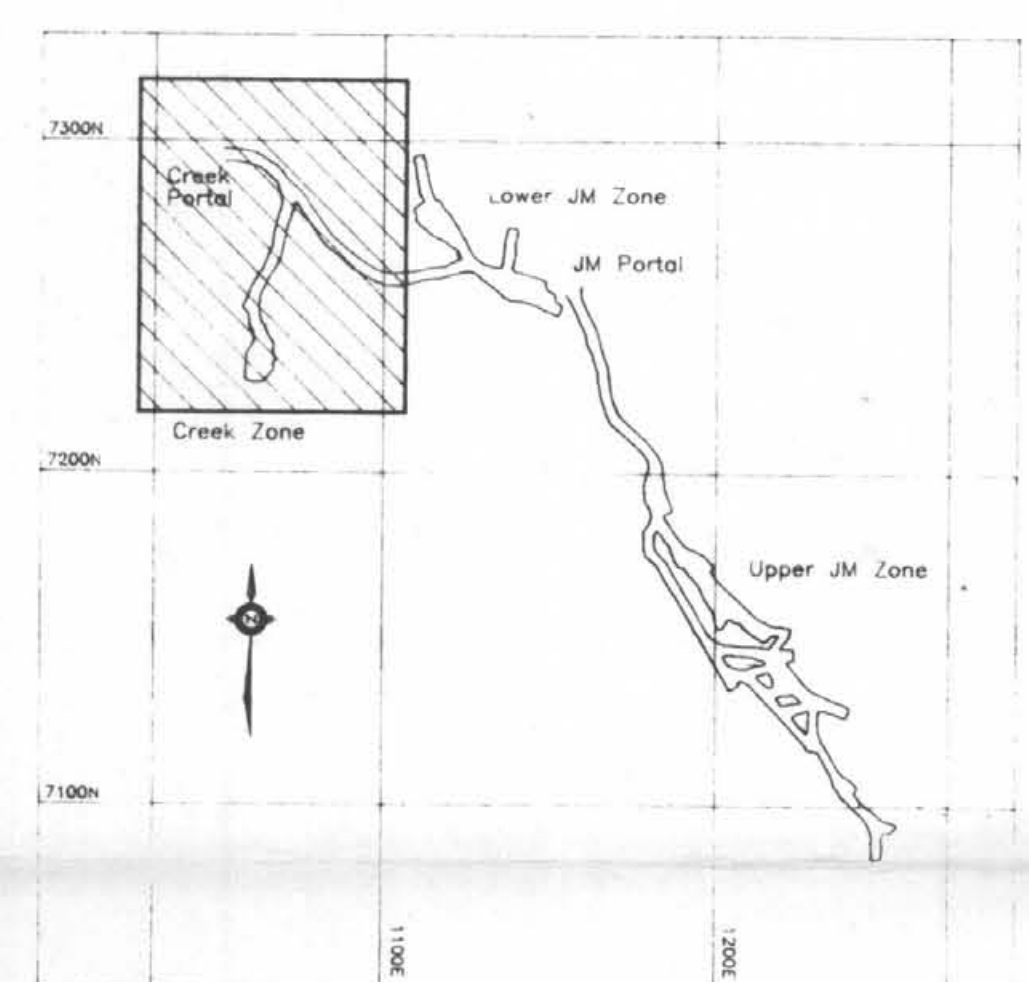
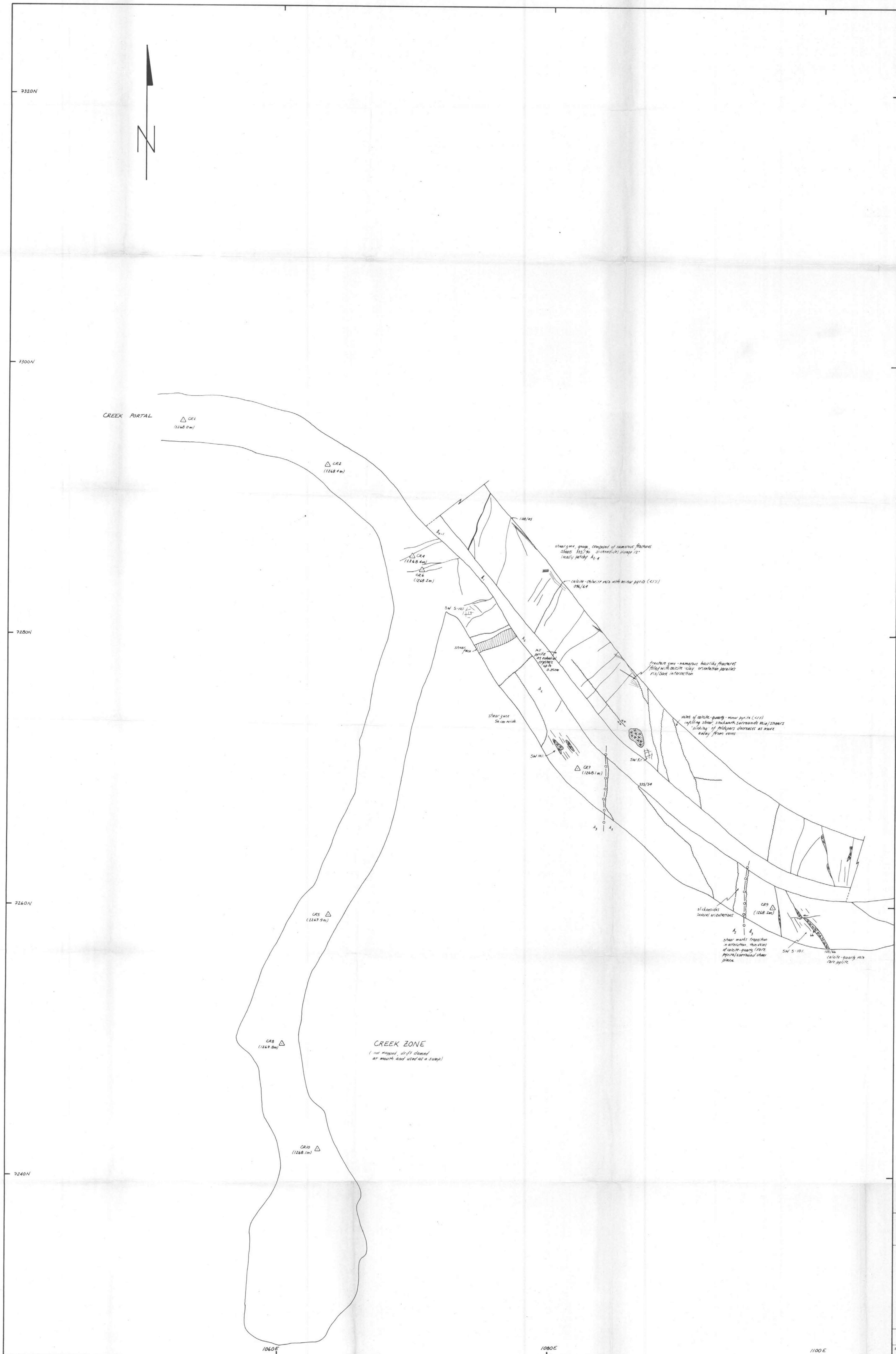
HOMESTAKE MINING (CANADA) LIMITED

SHASTA MINE

**GEOLOGY**  
(Lower JM Zone)

DRAWN	HO	DATE	November 1990	NTS	94E	Fig. 4.2.1
REVISED					2, 3, 6, 7	





Plan View Shasta Mine  
0 25 50 75 m

**GEOLOGICAL BRANCH  
ASSESSMENT REPORT**  
**20,821**

**LEGEND**

- wall outline
- back outline
- face map location (bold line)
- face map looking into underground development
- vein, inclined (calcite veins otherwise noted)
- fault/shear, inclined
- stockwork
- vein breccia, quartz-calcite matrix
- chertite-calcite breccia
- alteration/stockwork contact
- survey station (back elevation)
- rise

note: all strikes and dips were recorded using right-hand rule

**ABBREVIATIONS**

- A<sub>1-5</sub> alteration facies, number indicates intensity of zone (zone 1 is 50% calcite, 50% quartz, 50% chertite)
- cc calcite
- ch chertite
- A-quartz quartz-calcite matrix
- qb quartz
- sw stockwork
- >> much greater than

**HOMESTAKE  
MINING (CANADA) LIMITED**

**SHASTA MINE**

**Geology**  
(Creek Zone)

DRAWN HO	DATE November 1990	NTS 94E	Fig. 4.2.2
REVISED		2, 3, 6, 7	