

MAP NO.: ASSESSMENT REPORT X  
115 I 3 PROSPECTUS  
CONFIDENTIAL X  
OPEN FILE

DOCUMENT NO: 092122  
MINING DISTRICT: WHITEHORSE  
TYPE OF WORK: BULLDOZER TRENCHING,  
DRILLING

REPORT FILED UNDER: Archer, Cathro and Associates (1981) Ltd.

DATE PERFORMED: May 28 - September 23, 1987 DATE FILED: March 28, 1988

LOCATION: LAT.: 62°05'N AREA: Mt. Nansen  
LONG.: 137°08'W VALUE \$: 30,400.00

CLAIM NAME & NO.: Leases 2094-2100, 2173-8, 2491-2507; DOME 1-86(73537-87; 81842-50) HIW 1-17 INCL. FR. (YA24813-20, 35-43); JEFF 1-5, 7(77798-802, 4); JOANNE 1-6(74283-8); LAURA 9(93454); DD 1-48(YA59596-643); EEK 1-18(YA87210-227); ICT 1-36(YA86699-734); ONE 1F(YA92921); ONT 1-51(YA87167-209, YA92655-62); TBR 1-8(YA86690-7); J-BILL 1-32(YA78049-80); BULL 1-28(YA84120-7, 86288-307); RAT 9-24(YA81436-51)

WORK DONE BY: M.J. Walls, W.D. Eaton

WORK DONE FOR: B.Y.G. Natural Resources Inc., Chevron Canada Resources Ltd.

DATE TO GOOD STANDING:

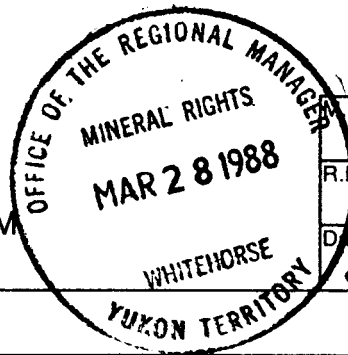
REMARKS: #40 MT. NANSEN

Work in 1987 included environmental and metallurgical studies, 4.6 km of bulldozer and excavator trenching and 17 HQ holes totalling 1048.5 m. Comparison of drill and trench results suggests supergene enrichment in at least the BROWN-MCDADE, FLEX and WEBBER zones. The HUESTIS 12 vein was traced 350 m along strike with consistent grades.



Indian and Northern  
Affairs Canada

Affaires indiennes  
et du Nord Canada



R. file no.  
R.M.R. file no.  
Date forwarded: 26 Mar 88

TRANSMITTAL FORM

From Mining Recorder at: *Whitehorse*  
To Regional Manager, Mineral Rights at Whitehorse, Y.T.

For action are:

<input type="checkbox"/> NEW APPLICATION FOR PLACER LEASE TO PROSPECT	Name	
<input type="checkbox"/> RENEWAL APPLICATION PLACER LEASE TO PROSPECT	Name	Lease no.
<input type="checkbox"/> AFFIDAVIT OF EXPENDITURE ON PLACER LEASE	Name	Lease no.
<input type="checkbox"/> SECURITY DEPOSIT		
<input type="checkbox"/> FINANCIAL ABILITY		
<input type="checkbox"/> ASSIGNMENT OF PLACER LEASE NO.	From	To
<input type="checkbox"/> GROUPING APPLICATION UNDER SEC. 52(2) PLACER MINING ACT.	Owner	
<input type="checkbox"/> DIAMOND DRILL LOGS	Claims	Claim sheet no.
<input type="checkbox"/> QUARTZ ASSESSMENT REPORT	Claims <i>See Attached</i>	Claim sheet no. <i>115-I-6</i>
	Type of report <i>Bulldozing &amp; Trenching</i>	Submitted by <i>Archer Cathno &amp; Assoc.</i>
	Cls. work performed on <i>See Report</i>	\$ req. for ren. application <i>125.30,4</i>

*[Signature]*  
Signature

092122

Date returned  
*7 April, 1988*

REPLY ACTION

*Approved for amount required*

092122

*[Signature]*  
Signature

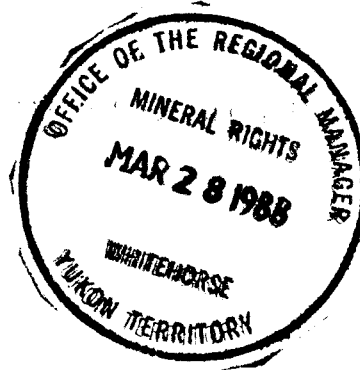
# ARCHER, CATHRO

& ASSOCIATES (1981) LIMITED

CONSULTING GEOLOGICAL ENGINEERS

1016-510 WEST HASTINGS STREET  
VANCOUVER, B. C. V6B 1L8

(604) 688-2568



NANSEN PROJECT

FINAL REPORT

DECEMBER, 1987

M.J. Walls, B.Sc.

W.D. Eaton, B.A., B.Sc.

**092122**

This report has been examined by  
the Geological Evaluation Unit  
under Section 53 (4) Yukon Quartz  
Mining Act and is allowed as  
representation work in the amount  
of \$ 30 400.00.

*for*   
**Regional Manager, Exploration and  
Geological Services for Commissioner  
of Yukon Territory.**

MT NANSEN            Gold, silver, lead  
B.Y.G. Natural        zinc vein  
Resources Inc.        115 I 3 (40)  
Chevron Canada        62 05'N, 137 08'W  
Resources Ltd         1988

References: Morin et al. 1977, p.  
167-8; INAC (1987, p. 337; 1988, p.  
266-7.

Claims: DOME 1-86; HIW 1-17 INCL.  
FR., JEFF 1-7; JOANNE 1-6; LAURA 9;  
DD 1-48; ECK 1-18; ICT 1-36; ONE 1F;  
ONT 1-51; TBR 1-8; J. BILL 1-32; BULL  
1-28; RAT 9-24

Source: Summary by T. Bremner of  
assessment report 092122 by M.J.  
Walls and W.D. Eaton (Archer, Cathro  
& Associates (1981) Ltd.

#### Current Work and Results:

Work in 1987 included environmental  
and metallurgical studies, bulldozer  
and excavator trenching and 17 HQ  
diamond drill holes totalling 1048.5  
m. Twelve of the holes tested the  
FLEX zone, three were drilled in the  
WEBBER zone near the FLEX zone  
junction, one tested the northern  
extension of the HUESTIS vein and one  
tested the BROWN-MCDADE zone. More  
than 4.6 km of trenches were divided  
between the DICKSON, ORLOFF KING,  
SPUD, HUESTIS, FLEX and WEBBER zones  
and outlying geochemical anomalies.  
Comparison of trench and drill  
results showed that most veins  
produced wider, higher-grade  
intersections at surface than at  
depth, which is probably the result  
of supergene enrichment.

The BROWN-MCDADE drillhole tested  
the main footwall fault plus several  
vertical to reverse-dipping hanging  
wall splits. Four intervals graded  
better than 1.4 g/t Au, the best  
being 3.2 g/t Au and 42.2 g/t Ag  
across a true width of 6.0 m at the  
level of the footwall fault and 2.3  
g/t Au and 19.5 g/t Ag across a true  
width of 1.2 m in one of the hanging  
wall splits. The core was completely

oxidized to a vertical depth of 40 m  
and partially oxidized to a depth of  
80 m.

Trenching in the HUESTIS zone  
exposed a series of narrow  
subparallel anastomosing quartz  
veins, each surrounded by a  
bleached, clay-altered halo 1 to 5 m  
wide. The most consistent vein  
known as the HUESTIS No. 12 was  
traced for 350 m along strike and  
consists of a 6 to 23 cm wide  
limonite and scorodite-stained  
quartz vein containing pyrite,  
arsenopyrite, galena and  
sulphosalts surrounded by a zone of  
quartz stringers 0.1 to 1 m wide.  
Selected samples assayed up to 180.7  
g/t Au and 3385.3 g/t Ag. The  
HUESTIS No. 13 is a highly  
fractured, bleached, clay-altered  
and silicified zone which averaged  
5.4 g/t Au and 33.3 g/t Ag across  
its entire width of 19 m. The  
HUESTIS veins terminate at their  
northwest end against a northwest-  
trending cross-fault.

Northwest of the fault one  
drillhole intersected two weakly-  
mineralized veins 23 m apart. These  
veins form the HUESTIS NORTH zone  
and are believed to be a  
continuation of the HUESTIS zone  
displaced by 90 m of right-lateral  
offset. The best intersection from  
the easternmost vein graded 2.0 g/t  
Au and 46.3 g/t Ag over 2.1 m.

Some high-grade drill  
intersections were encountered in  
the central part of the FLEX zone,  
with values up to 21.0 g/t Au and  
280.1 g/t Ag, but there was little  
correlation between drill sections  
25-50 m apart, and the widths and  
grades were generally much lower  
than those obtained in overlying  
trenches.

Trenches and drillholes at the  
north end of the WEBBER zone all cut  
mineralized veins. DDH 87-39  
intersected a zone in the hanging  
wall of the main vein which assayed  
12.2 g/t Au and 2450.3 g/t Ag over  
2.1 m. A trench above the Webber

upper portal cut weak mineralization only.

The DICKSON zone which lies between the FLEX and BROWN-MCDADE zones was exposed in six trenches over a strike length of 1000 m.

Well mineralized veins were exposed in five of the trenches. Two veins 40 m apart in trench GD87-10 near the centre of the zone returned assays up to 17.6 g/t Au and 79.9 g/t Ag across 3.0 m and 4.2 g/t Au and 43.5 g/t Ag over 4.0 m respectively. At least four separate veins are interpreted and the zone is open in all directions.

The ORLOFF KING zone lies immediately north of the Webber Creek Fault. It consists of numerous shears and occasional quartz veins up to 30 cm wide surrounded by a halo of bleached and fractured pyroclastic rocks. The zone strikes northwest and is traceable for a distance of at least 250 m. It appears to dip at a moderate angle to the southwest, parallel to the slope of the hillside. Assays from four trenches that reached bedrock averaged 1.7 g/t Au and 63.4 g/t Ag across 11.5 m.

The SPUD zone 100 m west of the ORLOFF KING zone was exposed in two trenches 50 m apart. It consists of a 30 cm wide quartz-sulphide vein cutting pyroclastic rocks and returned up to 6.6 g/t Au and 60.0 g/t Ag over 2.0 m.

A single trench across the anomalous stockwork zone on the adjoining RUSK property exposed brecciated and weakly clay-altered siliceous tuff. The highest assay from a 2.5 m band of fractured limonitic siliceous tuff was 0.65 g/t Au and 38.3 g/t Ag.

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SUMMARY AND RECOMMENDATIONS

The Mt. Nansen area has seen exploration for placer gold, gold-silver veins, and porphyry copper mineralization at various times since 1912. The placer and porphyry occurrences have proven to be too low grade to be of major interest but the veins are well mineralized and exhibit good lateral and vertical continuity. There are three major vein systems, the Brown-McDade which was discovered in 1943 and the Huestis and Webber which were located shortly afterward. The veins were explored by a number of companies in the mid-1940's, late 1950's and early 1960's using surface trenching, diamond drilling and underground development. By 1965, modest reserves were proven and a 200 ton/day mill was constructed. During the periods September, 1968 to April, 1969 and December, 1975 to May, 1976, 26,196 tons grading about 0.3 oz/ton Au and 6 oz/ton Ag were mined from underground on the Huestis and Webber veins. The mill used flotation without a cyanide circuit and both operations were suspended because of unsatisfactory gold recoveries from the refractory and partially oxidized sulphide mineralization. Total proven and probable reserves left when operations ceased are tabulated below.

	<u>Proven</u>			<u>Probable</u>			<u>Proven &amp; Probable</u>		
	<u>Tons</u>	<u>oz/ton</u>		<u>Tons</u>	<u>oz/ton</u>		<u>Tons</u>	<u>oz/ton</u>	
		<u>Au</u>	<u>Ag</u>		<u>Au</u>	<u>Ag</u>		<u>Au</u>	<u>Ag</u>
Huestis	40,963	0.48	8.91	44,765	0.42	8.28	85,728	0.45	9.11
Webber	30,961	0.33	20.73	27,563	0.35	17.67	58,524	0.34	19.29
Brown-McDade	<u>20,143</u>	<u>0.45</u>	<u>6.24</u>	<u>20,143</u>	<u>0.45</u>	<u>6.24</u>	<u>40,286</u>	<u>0.45</u>	<u>6.24</u>
	92,067	0.42	12.30	92,471	0.41	11.12	184,538	0.41	11.71

From 1977 to 1984 the property was inactive due to a complicated land position caused by multiple owners and creditors' liens. In April 1984, B.Y.G. Natural Resources Inc. began consolidation of the property and on June 12, 1985, optioned it to Chevron Canada Resources Limited. In anticipation of the agreement, Chevron staked protection claims in late April and May, 1985 and after the field season optioned claims adjoining the property from prospector G. Dickson, bringing the total land holdings to 30 mineral leases and 333 claims covering a 75 sq km area.

The 1985 exploration program searched for open pittable oxidized ores amenable to cyanide extraction and included geological mapping; multi-element soil geochemistry (6300 samples); VLF-EM surveys (48 km); linecutting and baseline surveys; aerial photography; excavator and bulldozer trenching (7582 m of bedrock exposed); rotary percussion drilling (1283.5 m in 17 holes); diamond drilling (949.9 m in 13 holes); retimbering of the Brown-McDade adit; limited underground sampling; metallurgical tests; environmental and geotechnical studies; and, destruction of dangerous chemicals abandoned when the mill ceased operation in 1976.

The work was principally directed toward the Brown-McDade Zone where it outlined a series of subparallel quartz veins and related porphyry dykes and breccias within a 450 m long area that tapers from 150 m in width at the south end to 7 m at the north end. The highest grade and widest mineralization (up to 0.247 oz/ton Au with 2.10 oz/ton Ag over a true width of 32 m) occurs along the footwall contact where a northwest-trending, moderate to steep southwest-dipping fault separates relatively fresh granodiorite in the footwall from strongly clay altered granodiorite, feldspar porphyry and veins in the hanging

wall. Metallurgical tests indicate that oxidized mineralization from the Brown-McDade Zone responds extremely well to cyanidization but sulphide ores are relatively refractory.

Trenching and drilling at the Webber Zone confirmed previous work which indicated that gold and silver values were restricted to narrow but high grade veins. The best assays were 0.111 oz/ton Au with 1.37 oz/ton Ag over 7.0 m from trench samples and 0.292 oz/ton Au with 24.20 oz/ton Ag over 1.1 m from drill core. Although cyanide amenability tests were generally favourable, recoveries were slightly lower and reagent consumptions higher than those obtained from the Brown-McDade ores.

Grid soil geochemistry outlined numerous northwest-trending clusters of moderately to strongly anomalous gold, silver, lead and/or arsenic values. A few of the anomalies were from known mineralization but most identified untested targets.

Test EM-16 surveys showed that the clay altered rocks in the hanging wall of the Brown-McDade Zone are conductive and traced the conductors approximately 1000 m north and 200 m south of the main area of interest.

In 1986, exploration was directed toward expanding reserves of open pitable, oxidized ore, and shifted from the Brown-McDade and Webber Zones to their strike extensions and untested soil geochemical targets. Work on the Mt. Nansen core property consisted of geological mapping, EM-16 and test proton magnetic and horizontal-loop surveys, bulldozer stripping, excavator trenching (12,933 m) and diamond drilling (576.4 m in 11 holes). Most of the effort was directed toward the northern projection of the Brown-McDade Zone and a recently discovered vein system (which has been named the Flex Zone) located southeast of

the Webber Zone. Exploration was also done on the claims optioned from Dickson, including geological mapping, soil geochemistry, EM-16 surveys and minor bulldozer trenching.

The 1986 results were generally encouraging, except along the northern projection of the Brown-McDade Zone where work showed that the veins are narrow, weakly mineralized and relatively unoxidized. At the Flex Zone, trenching yielded up to 0.146 oz/ton Au and 1.98 oz/ton Ag across 11 m and drilling up to 0.129 oz/ton Au and 7.13 oz/ton Ag over 7.6 m. The mineralization occurs in a northwest-striking, moderately west-dipping, anastomosing vein system that was traced intermittently along a 1100 m strike length. Unfortunately the mineralization is erratically distributed and drill holes beneath some of the best trenches did not return significant values. The junctions between the Flex and the adjacent Huestis and Webber Zones produced particularly interesting trench results with the highest grade intersection (0.495 oz/ton Au and 4.01 oz/ton Ag over 5.3 m) coming from the Flex Zone near its junction with the Huestis and the widest intersection (0.117 oz/ton Au with 3.97 oz/ton Ag over 19 m) from the Webber Zone near its junction with the Flex. Exploration elsewhere on the property discovered four new vein zones (Dickson, Orloff King, Spud and Goulter) with bulk tonnage potential; outlined a multi-element soil geochemical anomaly on the claims optioned from G. Dickson; and showed that magnetic surveys are of little value because of low contrast between units while VLF surveys are unable to detect some types of veins and cannot distinguish between mineralized and unmineralized portions of structures that are conductive.

Exploration in 1987 continued to focus on open pit potential for oxidized ores but also included preliminary evaluation of the potential for small scale, open pit, high grade mining of predominantly sulphide ore from the Huestis Zone. Work consisted of claim surveys, continued environmental and metallurgical studies, 4606.5 m of bulldozer and excavator trenching, and 1048.5 m of diamond drilling on the core property, plus 750 m of bulldozer and excavator trenching on the claims optioned from Dickson. Most of the Mt. Nansen trenching was done on the Huestis, Dickson, Orloff King and Spud Zones, while the drilling included twelve holes in the Flex Zone, three in the Webber, one in the Brown-McDade and one in the Huestis North (formerly called the Upper Flex).

The Brown McDade Zone drill hole tested the main footwall fault plus a series of hanging wall splits. It showed that the splits are vertical to reverse dipping and that mineralization and alteration along the footwall fault are stronger than in previous deep holes, suggesting that the intersections between the split and the footwall fault are important controls on mineralization. Samples from the footwall fault averaged 0.094 oz/ton Au and 1.23 oz/ton Ag over a true width of 6.0 m, which compares well with results obtained from holes drilled updip on that section. However, intersections on the splits were narrow and low grade compared with those in overlying trenches, which may be evidence of near surface supergene enrichment of gold.

Trenching and drilling in the Flex Zone confirmed the erratic distribution of mineralization and showed that most veins produced wider, higher grade intersections at surface than they do at depth, again suggesting supergene enrichment. Bulk tonnage potential in this zone appears to be limited but underground potential is comparable to the Webber and Huestis Zones, based on

the density of high grade intersections. Work in the vicinity of the junction between the Flex and Huestis Zones identified a large cross fault with approximately 90 m of dextral offset which results in the juxtaposition of the two zones. Metallurgical tests on 1986 drill core from the Flex Zone showed the oxidized and partially oxidized mineralization responds well to cyanidization.

The Webber Zone work was directed toward the north end of the zone (near its junction with the Flex Zone) where 1985 and 1986 trenching returned broad intersections (up to 0.117 oz/ton Au and 3.97 oz/ton Ag over 19 m) from a series of bifucated veins. Assays from 1987 drill holes and trenches yielded generally low values. The best assay (0.356 oz/ton Au and 71.47 oz/ton Ag over 2.1 m) was returned from a drill hole directly downdip from the 19 m intersection.

Trenching at the Huestis Zone showed that most of the mineralization is relatively unoxidized and confined to narrow veins, except for an exposure in the most southerly trench which averaged 0.158 oz/ton Au and 0.97 oz/ton Ag over 19 m. This intersection came from a highly fractured, intensely bleached and clay altered quartz flooded zone that pinches out to the north but is open to the south.

Sampling of high grade material from one of the narrower veins yielded consistently higher values (up to 5.272 oz/ton Au and 98.74 oz/ton Ag) over 6 to 23 cm widths for a 350 m strike length, suggesting that it could support a small open pit mine that produced hand sorted high grade ore.

Work on the Huestis North Zone traced the Huestis veins intermittently over a 450 m strike length on the north side of the cross fault. Although the

1987 exploration did not produce any significant results, it was extremely wide spaced and 1986 drill trenches and drill holes in the zone did yield some high assays.

The Dickson Zone, located midway between the Brown-McDade and Flex Zones, is exposed in six trenches spread over a 1000 m strike length and consists of at least four anastomosing veins. The best assay (0.513 oz/ton Au and 2.33 oz/ton Ag over 3.0 m) came from a trench near the centre of the zone. Exploration potential for bulk tonnage or underground targets exists within the zone, along strike in both directions and parallel to it, particularly to the northeast in the vicinity of an untested soil geochemical anomaly.

Work at the Orloff King and Spud Zones, which may be faulted extensions of the Flex and Webber Zones, included nine trenches that were completed and four that were stripped and left to thaw. The Orloff King Zone was intersected in four trenches over a 250 m strike length and returned a weighted average grade for the intersections of 0.050 oz/ton Au and 1.85 oz/ton Ag across 11.5 m. Mineralization consists predominantly of limonite stained fractures and shears within a broad zone that dips subparallel to the slope of the hill. The Spud Zone lies 100 m to the west and was only cut in two trenches 50 m apart. The best assay was 0.192 oz/ton Au and 1.75 oz/ton Ag over 2 m.

Exploration of outlying geochemical targets on the Mt. Nansen core property and the claims optioned from Dickson exposed several well altered zones but did not produce significant assays.

The next stage of exploration and development at the Mt. Nansen property should concentrate on close spaced diamond drilling and bulldozer stripping in the Brown-McDade Zone to establish the tonnage and grade of oxidized ore that

could be effectively mined by open pit methods. In anticipation of favourable results and a positive production decision, all necessary applications should be made to the appropriate governmental agencies. Drilling and trenching should also continue on the other zones to determine if any could contribute additional open pit ore to a mining operation. The four areas with the most immediate potential appear to be the central part of the Flex Zone, the Orloff King Zone, the new vein at the south end of the Huestis Zone and the Dickson Zone. Consideration should also be given to the best method for mining relatively high grade, cyanide amenable, oxidized ore in the Webber Zone.

Open pit mining of oxidized ores is likely to be a relatively small scale, short-lived operation and the long-term potential of the property lies in underground mining of higher grade sulphide ore. In this regard, metallurgical studies should continue to determine the most effective means for treating these ores while drilling and underground development should be done to establish reserves, as funds are available.

Respectfully submitted,

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED



M.J. Walls, B.Sc.



W.D. Eaton, B.A., B.Sc.

## INTRODUCTION

In mid-June 1985, Chevron Canada Resources Limited optioned the Mt. Nansen property from B.Y.G. Natural Resources Inc. Since that time, exploration has been managed by Archer, Cathro & Associates (1981) Limited and directed toward evaluating potential for open pittable, oxidized gold-silver ores suitable for cyanide extraction.

In 1985, work focused on the previously discovered Brown-McDade and Webber Zones and included claim staking, geological mapping, property-wide multi-element soil geochemistry, VFL-EM test surveys, linecutting, baseline surveys, aerial photography, 7582 m of excavator and/or bulldozer trenching, 1283.5 m of rotary percussion drilling in 17 holes, 949.9 m of diamond drilling in 13 holes, sampling of old dumps and tailing ponds, retimbering of the Brown-McDade adit portal, limited underground sampling, and metallurgical, geotechnical and environmental studies.

The property was enlarged in March, 1986 when 76 claims (Rusk Group) adjoining the west side of the Mt. Nansen claim group were optioned from prospector G. Dickson. In 1986, the exploration focus shifted from the Webber and Brown-McDade Zones to their strike extensions and previously untested geochemistry targets. Most of the work was done on the northerly projection of the Brown-McDade Zone, a complex vein system southeast of the Webber Zone (which has been named the Flex Zone) and four discoveries in the central part of the property (Dickson, Orloff King, Spud and Goulter Zones). Work included claim surveys, geological mapping, VLF-EM surveys, test proton magnetic and horizontal-loop surveys, bulldozer stripping, 12,933 m of excavator trenching and 576.4 m of diamond drilling on the Mt. Nansen claim group plus baseline surveys, soil geochemistry and 600 m of bulldozer trenching on the Rusk Group.

The 1987 field program consisted of additional claim surveys, continued environmental and metallurgical studies, bulldozer and excavator trenching on several zones and geochemical targets, and diamond drilling. In addition, bulldozer and excavator trenching was done on the Rusk Group which is described in a separate report included as Appendix I in the pocket. Exploration was conducted under the authors' supervision between May 28 and September 23 from a tent frame camp located near the Brown-McDade portal. The Authors' Statements of Qualifications appears in Appendix II.

LOCATION, ACCESS AND CLAIM DATA

The Mt. Nansen property is located in west-central Yukon on NTS mapsheet 115I/3 at latitude 62°05'N and longitude 137°08'W. A 60 km gravel road connecting it to Carmacks, the closest community, is maintained by the territorial government from April to October. Whitehorse, the main supply centre and territorial capital, is 175 km further south by paved highway, as shown on Figure 1 on the following page. A gravel airstrip suitable for all types of bush aircraft is situated on the property but requires grading before it can be used.

Land holdings include 30 mineral leases, 143 claims more than three years old (Mt. Nansen and DD Groups), 114 claims staked in spring 1985 (Chevron Group) and 76 claims optioned from G. Dickson in March 1986 (Rusk Group). All are registered with the Whitehorse Mining Recorder, with the leases and Mt. Nansen, DD and Rusk Groups held in the name of Chevron Canada Resources Limited and the Chevron Group in the name of Archer, Cathro & Associates (1981) Limited on behalf of Chevron. Table 1, following, summarizes the claim data, while Figure 2, following the table, illustrates the approximate claim boundaries.

Claim surveys conducted in 1987 were able to establish the location of several key claims at the north end of the Mt. Nansen property. However, legal surveys will be required to confirm the locations as most of the claim posts were untagged, one set was incorrectly tagged by earlier workers, and several posts were missing. Replacement posts and tags were placed in some areas and notification of this work has been forwarded to the mining recorder for his approval. Based on the presumed claim locations and interpretation of the B.Y.G. and Chevron option agreement, the Mt. Nansen area of interest has been determined relative to the nearby Tawa claims that are held under option by Chevron from Consolidated BRX Mining and Petroleum Corporation, as shown on Figure 2.

TABLE 1: CLAIM STATUS AS OF DECEMBER 1, 1987

<u>Claim Name</u>	<u>Lease Number</u>	<u>Expiry Date</u>
<u>Mineral Leases</u>		
Old Timer	2094	October 23, 1993
Tub	2095	October 23, 1993
Big Thing	2096	October 23, 1993
Rex	2097	October 23, 1993
Buster	2098	October 23, 1993
Glouser	2099	October 23, 1993
Buck	2100	October 23, 1993
Leroi	2173	March 18, 1995
Amalee	2174	March 18, 1995
Hope	2175	March 18, 1995
Duke	2176	March 18, 1995
Queen	2177	March 18, 1995
Senorita	2178	March 18, 1995
Rose	2491	October 9, 1998
Golden Eagle	2492	October 9, 1998
War Eagle	2493	October 9, 1998
Shamrock	2494	October 9, 1998
Nansen	2495	October 9, 1998
Spot	2496	October 9, 1998
Clarence	2497	October 9, 1998
Arlep	2498	October 9, 1998
Phyllis	2499	October 9, 1998
Lucky Thing	2500	October 9, 1998
Bluebell	2501	October 9, 1998
Rub	2502	October 9, 1998
Pub	2503	October 9, 1998
Sundog	2504	October 9, 1998
Cub	2505	October 9, 1998
Jam	2506	October 9, 1998
Pam	2507	October 9, 1998

Number of Leases - 30

TABLE 1: CLAIM STATUS (Cont'd)

<u>Claim Name</u>	<u>Grant Number</u>	<u>Expiry Date</u>
<u>Mt. Nansen Group</u>		
Dome 1-7	73537-73543	February 6, 1990
Dome 8-18	73694-73704	February 6, 1991
Dome 19	73705	February 6, 1990
Dome 20-22	73706-73708	February 6, 1991
Dome 25-28	77746-77749	February 6, 1990
Dome 33-43	77754-77764	February 6, 1990
Dome 47-66	77768-77787	February 6, 1990
Dome 78-84	81842-81848	February 6, 1993
Dome 86	81850	February 6, 1993
HIW 1-8F	YA24813-YA24820	February 6, 1991
HIW 9	YA23835	February 6, 1993
HIW 10-11F	YA23836-YA23837	February 6, 1993
HIW 12-17	YA23838-YA23843	February 6, 1993
Jeff 1-5	77798-77802	February 6, 1990
Jeff 7	77804	February 6, 1990
Joanne 1-6	74283-74288	February 6, 1991
Laura 9	93454	February 6, 1990
Number of Claims - <u>95</u>		
<u>DD Group</u>		
DD 1-48	YA59596-YA59643	February 6, 1990
Number of Claims - <u>48</u>		
<u>Chevron Group</u>		
EEK 1-18	YA87210-YA87227	February 6, 1991
ICT 1-36	YA86699-YA86734	February 6, 1991
ONE-1F	YA92921	February 6, 1991
ONT 1-43	YA87167-YA87209	February 6, 1991
ONT 44-51	YA92655-YA92662	February 6, 1991
TBR 1-8	YA86690-YA86697	February 6, 1991
Number of Claims - <u>114</u>		
<u>Dickson Group</u>		
J-Bill 1-32	YA78049-YA78080	February 28, 1992
Bull 1-8	YA81420-YA81427	February 28, 1991
9-28	YA86288-YA86307	February 28, 1990
Rat 9-24	YA81436-YA81451	February 28, 1991
Number of Claims - <u>76</u>		

Figure 1

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

# LOCATION MAP

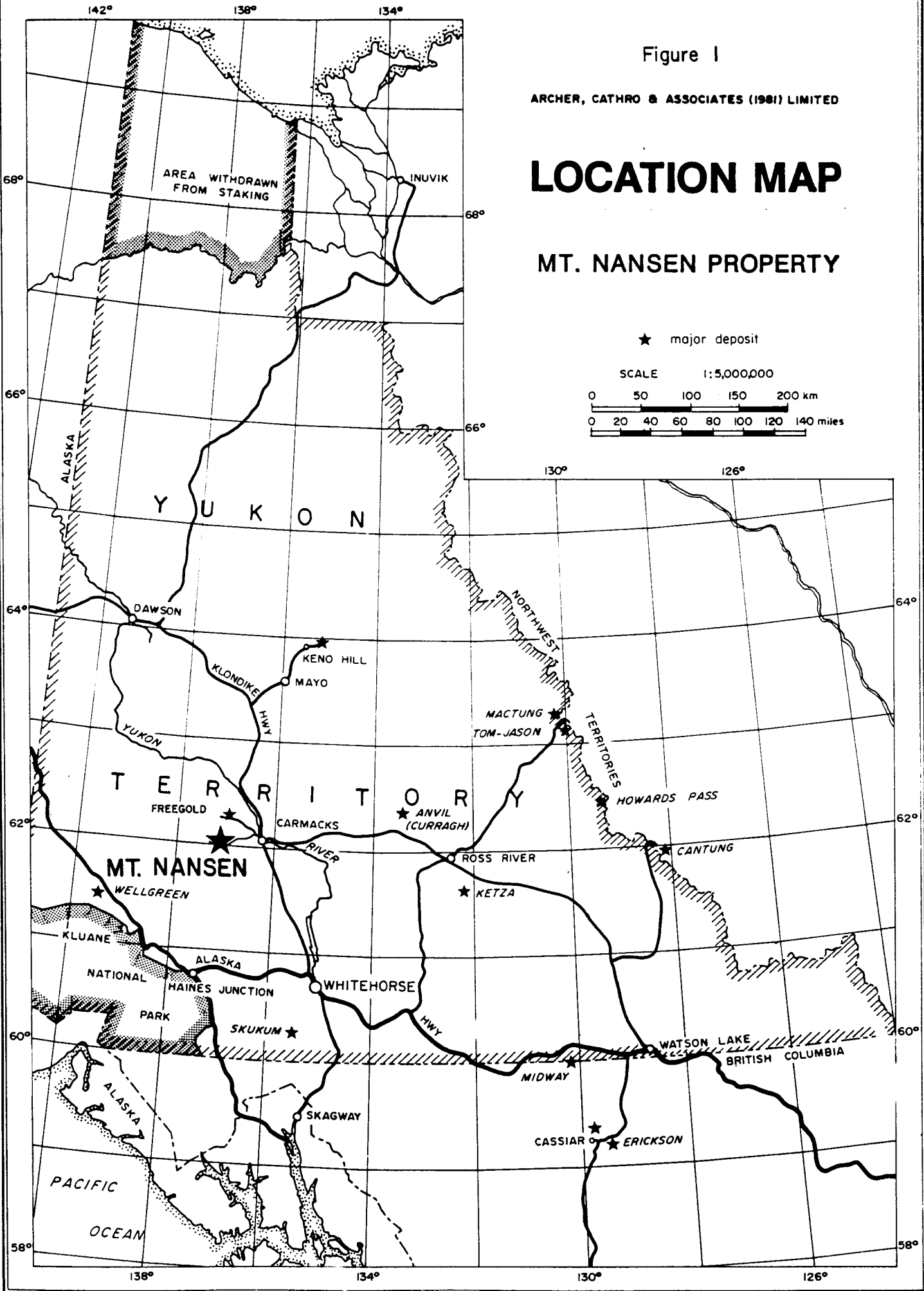
## MT. NANSEN PROPERTY

★ major deposit

SCALE 1:5,000,000

0 50 100 150 200 km

0 20 40 60 80 100 120 140 miles



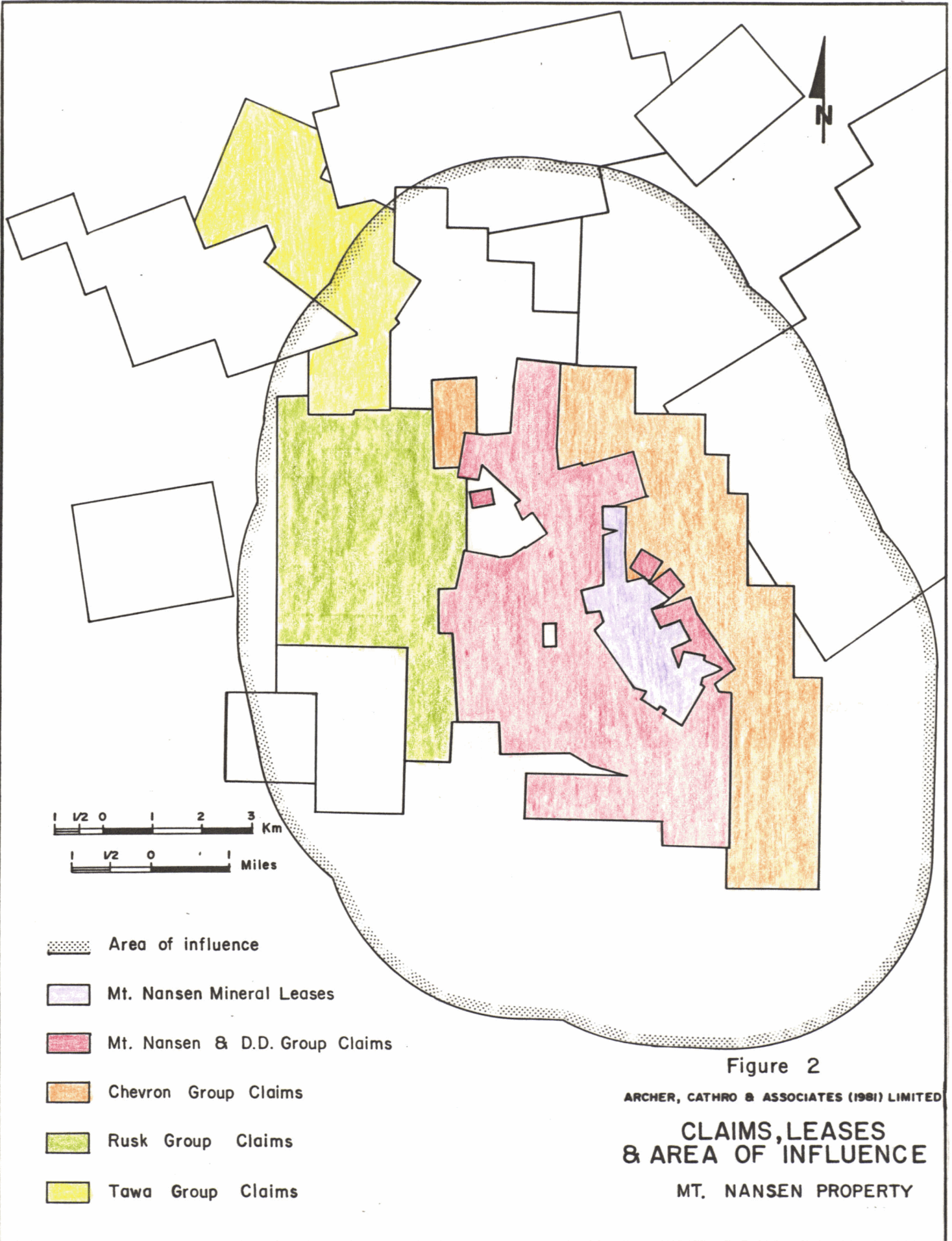


Figure 2

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

**CLAIMS, LEASES  
& AREA OF INFLUENCE**

MT. NANSEN PROPERTY

PERSONNEL, CONTRACTORS AND PROGRAM CHRONOLOGY

The Nansen Project crew was supervised by D. Eaton and consisted of project geologist M. Walls, a cook and one to four fieldmen, depending upon the level of activity. Appendix III contains a list of personnel who worked on the property.

Prior to the program's commencement, bids were obtained for the heavy equipment work and contracts were subsequently signed with two Whitehorse-based firms, IbeX Contracting Limited and E. Caron Diamond Drilling Ltd., to do the trenching and drilling, respectively.

Environmental and metallurgical studies were supervised by Chevron and were contract to Norecol Environmental Consultants Ltd. of Vancouver, B.C. and Lakefield Research of Lakefield, Ontario, respectively. A report summarizing the results of Norecol's 1986 work appears in Appendix IV and the 1987 report is not expected until early 1988. Lakefield's report, which describes cyanidization tests performed in spring, 1987 on samples collected in 1986, is included in Appendix V.

The following is a chronological summary of the work and important events.

early May	Drill mobilized to the property.
May 25-27	Mt. Nansen crew arrived in Whitehorse and organized the camp and field gear.
May 28	Camp supplies and crew mobilized to property and camp reestablished.
May 29-31	Bulldozer arrived, first drill sites leveled, access roads built and new core storage area constructed.
May 31-June 1	Drillers arrived on property and prepared for drilling.
June 2-27	Diamond drilling performed using bulldozer for moves and support.

June 4-10           Vegetation stripped from proposed trenches.

June 6-July 5       Drill sites, trenches and claims surveyed.

June 13-Sept. 17   Excavator and operator arrived. Trenching performed intermittently throughout period with occasional use by other groups working on nearby prospects when not required at Mt. Nansen.

June 17             T. Donaldson and investor toured property.

June 22             T. Donaldson and two B.Y.G. directors and four investors toured property.

June 28             Diamond drill moved off the property.

June 29-July 5      Bulldozer deepened proposed trenches.

July 4               Norecol technician visited property and collected water samples.

July 15             Jim Morin and two geologists from the Department of Indian and Northern Affairs toured property.

August 2-8          Bulldozer trenching performed on the Rusk Group.

August 5-21         Additional trenches and claims surveyed.

August 19           J. Mancuso, E. Dodson and C. Dyson of Chevron toured property.

August 28           Norecol technical visited property and collected water samples.

September 1         T. Donaldson, A. Thompson and four investors toured property.

September 5-13     Bulldozer trenched on the Rusk Group.

September 13-16    Excavator attempted to cut severely frozen ground at Rusk Group.

September 17       Excavator left property.

September 19       T. Donaldson, A. Thompson and Northern Miner reporter toured property.

September 19-20    Camp partially dismantled and winterized.

September 21       Camp gear and crew demobilized to Whitehorse.

September 22-23    Camp gear put into storage and field data shipped to Vancouver.

### ACTIVITY BY OTHERS

During the 1987 field season, the Mt. Nansen area saw a moderate level of placer miner activity and a slightly increased level of lode exploration over the previous year.

The placer work was performed by individuals. Profitable placers were operated on Back Creek, Nansen Creek and an unnamed tributary of the Klaza River, while most other streams draining the Mt. Nansen property received either stripping or test pitting.

Lode exploration was conducted on several properties, the locations of which are shown on Figure C-1 in the pocket.

Tawa (Chevron Canada Resources Ltd. under option from Consolidated BRX Mining and Petroleum Corporation) - Work included claim surveys, staking of 16 additional claims, construction of a 1700 m long access road, excavator trenching which exposed 1939 m of bedrock, and 6385 m of prestripping on proposed 1988 trench sites. Exploration was directed toward a series of northwest-trending, gold- and silver-bearing veins, shear zones and porphyry dykes.

Vic (Chesbar Resources Inc. and States Exploration farming-in on Kerr Addison Mines Limited's option from G. Dickson) - A test EM-16 survey, minor excavator and bulldozer trenching and approximately 1220 m of diamond drilling were done to test narrow quartz veins that contain erratic but high grade gold values. Results were rumoured to be negative.

Goulter (Aurchem Ltd. under option from the Goulter family and G. Dickson)- This program consisted of minor soil geochemistry, staking of fractional claims and about 1525 m of diamond drilling. Exploration found precious metals in broad shear zones containing localized calcite ± quartz ± sulphide lenses. No assays were reported but additional drilling is planned for 1988.

Minor reconnaissance exploration was conducted on the DK (Chesbar and States under an option from Kerr Addison), the Robert (G. Dickson) and the Dows (E. Curley) properties.

### HISTORY

The Mt. Nansen area is the fourth oldest precious metal camp in the Yukon Territory. Placer gold was discovered in several creeks draining the area during the early 1900's but none of the discoveries was rich or large enough to sustain a long term operation. Figure P-1 in the pocket shows the location of placer workings, lode occurrences, roads and buildings.

The first lode deposit was found in 1943 by prospectors Brown and McDade. Sampling of surface trenches on their showing, plus subsequent drilling, returned sufficiently high values in gold and silver to induce Leitch Gold Mines Ltd. to form Brown-McDade Mines Ltd. and explore the zone underground with extensive drifting and drilling from a crosscut adit in 1946. At the same time, Conwest Explorations Ltd. explored the Webber Creek area, three kilometres to the west, and the Huestis Syndicate trenched the Huestis Zone about one and one-half kilometres west of the Brown-McDade. Underground results at Brown-McDade did not meet expectations and when the project was abandoned in 1947, all activity ceased in the area.

In 1958, interest was revived and in 1962 the Mt. Nansen Exploration Syndicate (Newmont, Noranda, Rio Tinto, Kerr Addison, Conwest and Faraday) optioned the properties. This group explored the Webber and Huestis Zones by geochemical surveys and bulldozer trenching and drilled one hole into the Webber Zone. In 1963, Mt. Nansen Mines Ltd. was formed by the syndicate and the Webber Zone was further tested by bulldozer trenching and three drill holes. Peso Silver Mines Limited acquired control of Mt. Nansen Mines Ltd. in 1964 and explored the Brown-McDade, Webber and Huestis Zones by underground development and diamond drilling between 1964 and 1967.

A production decision was made in 1967 and construction of a 200 ton/day mill was started. During the period September, 1968 to April, 1969, 18,000 tons of ore was mined and milled from the Huestis Zone with recovery of only 2,482 oz Au, 76,534 oz Ag and 108,621 lb Pb. The major problems were refractory sulphide ores and the lack of a cyanide circuit to treat oxidized ores. The mine was reopened in 1975 and 8,196 tons was obtained from the Huestis Zone during the first five months of 1976. Of this, 6,429 tons grading about 0.3 oz/ton Au, 7.0 oz/ton Ag, 1.0% Pb and 1.0% Zn was milled. Results were again unfavourable and the operation was discontinued. Since that time, the property has been relatively inactive and was transferred through several owners until it was acquired by B.Y.G. Natural Resources Inc. in April, 1984.

A porphyry copper occurrence lies approximately 6 km north of the precious metal veins and is partially covered by the Mt. Nansen property. This occurrence was discovered in 1969 and explored in 1970 by soil geochemistry and airborne geophysics. The claims covering the target were optioned to Area Exploration Company, a subsidiary of Cyprus Exploration Corporation, during the period 1971 to 1975 and were explored by soil geochemistry, ground geophysical surveys and percussion and diamond drilling. This target has been inactive since 1975.

After the 1976 shutdown, the mill was left unguarded and was subsequently scavenged and vandalized. This, plus sale of some components and lack of maintenance, has left the mill and campsite in severe disrepair.

### GEOMORPHOLOGY

The Mt. Nansen property lies on the eastern margin of the Dawson Range which forms the backbone of a deeply dissected peneplane known as the Yukon Plateau. This region is unique in Canadian geography as it lies northwest of the maximum advance of the Wisconsin ice sheet and, thus, escaped Pleistocene continental glaciation, as shown on Figure 3 on the following page. The result is a deeply weathered terrain characterized by broad, rounded ridge tops flanked by gentle slopes.

The major streams in the Mt. Nansen area are Nansen and Victoria Creeks which occupy wide, flat bottomed valleys that flank the property and flow south into the Nisling River, part of the Yukon River watershed. Tributary creeks have steeper gradients and form V-shaped dendritic drainages. Local elevations range from 1030 m in the larger valleys to 1500 m on ridge tops.

Soil development is generally poor, typically consisting of 5 to 10 cm of organics overlying 0 to 5 cm of white volcanic ash, 10 to 100 cm of buff to red-brown soil and 100 to 200 cm of decomposed bedrock mixed with soil. On ridge tops, the soil is residual but on hillsides it is often mixed by solifluction. The volcanic ash was derived from an eruption in the Wrangell Mountains, 200 km southeast of Mt. Nansen, about 1230 years ago. Extensive deposits of relatively homogeneous glacial outwash sand blankets the floors of the larger valleys. Outcrop is rare and is normally restricted to resistant weathering units exposed on ridge tops. Drilling on various parts of the property indicates that total oxidation extends from 1 m to greater than 75 m in depth depending upon bedrock permeability.

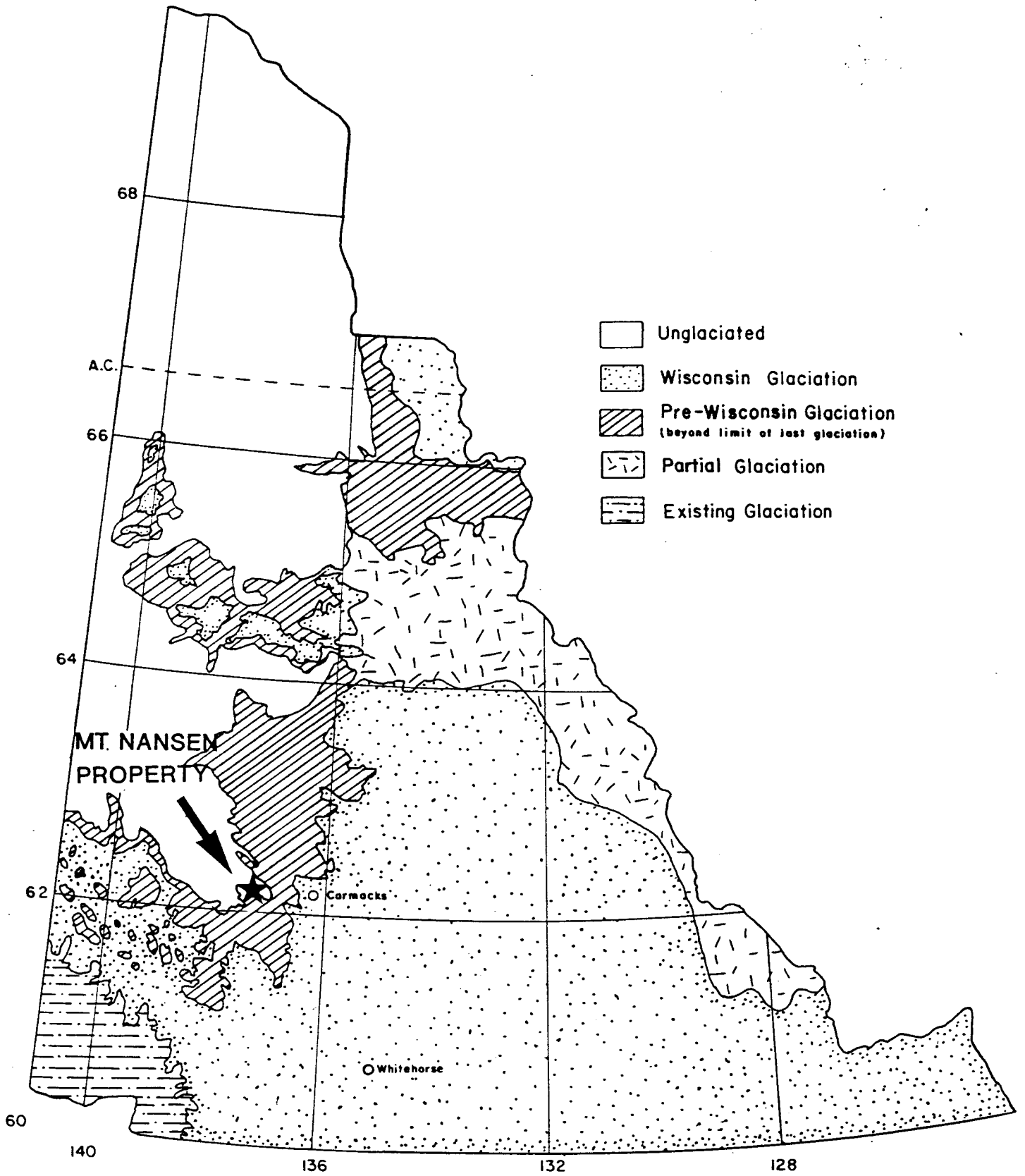


FIGURE 3: GLACIATION, DAWSON RANGE Y.T.

Permafrost is widespread, with north-facing slopes remaining frozen throughout the year and south-facing slopes thawing to a depth of 1 to 2 m by late summer. Once the insulating organic layer is removed, permafrost rapidly melts and does not reform. Vegetation consists of spruce up to 30 cm in diameter along the main streams, giving way to moss, stunted black spruce and aspen on lower slopes, moss and buckbrush on upper slopes, and lichen on ridge tops.

## GEOLOGY

### REGIONAL SETTING

The Mt. Nansen property is located within the Yukon Crystalline Terrane (Tempelman-Kluit, 1984) which consists of Upper Paleozoic or older schists, gneisses, amphibolites and marbles; foliated Upper Triassic and unfoliated Jurassic diorite, granodiorite and syenite batholiths; and, unfoliated Mid- to Late Cretaceous, mafic to felsic volcanics, pyroclastic, subvolcanic and plutonic rocks. The Upper Paleozoic and Triassic rocks belong to an island arc that was accreted to North America during Mid-Jurassic time, while the younger igneous rocks are related to the Coast Plutonic Complex (Tempelman-Kluit, 1979).

The structural history of the area is complex and not well understood. The major structural feature is the Big Creek Fault which marks the boundary between the island arc assemblage and adjacent para-cratonic rocks belonging to the Yukon Cataclastic Terrane. This northwest-trending structure is anomalous as it appears to be a linear, steeply-dipping fault in some areas and a sinuous west-dipping thrust elsewhere. A series of northeast-trending cross faults offset the Big Creek Fault but the absence of reliable marker units and the fact that some igneous activity postdates early fault movement makes the magnitude of the offsets and exact relative motion difficult to determine. The overall impression obtained from studying the geology is that the area underwent compression and metamorphism in Jurassic times and then entered a post-orogenic extensional regime characterized by block faulting and mafic to intermediate volcanism.

## PROPERTY GEOLOGY

### General

During 1986, the property was systematically mapped using the 1985 low level airphotos for control. Regional scale and detailed mapping by earlier workers (notably Tempelman-Kluit, 1984 and Dickinson, 1972) was re-interpreted and the resulting compilations are shown on Figures C-1 (1:20,000 scale of the Mt. Nansen Camp) and P-2 (1:10,000 scale of the Mt. Nansen core property).

### Lithology

The oldest rocks in the Mt. Nansen area belong to the Upper Paleozoic or older metamorphic assemblage that underlies most of the southern part of the property. This unit is the dominant wallrock at the Webber, Flex, Huestis, and Dickson Zones and occurs at the southeast end of the Brown-McDade Zone. The most common rocks are light coloured quartz-feldspar-chlorite gneiss that grade locally to quartzite. Chlorite content is normally low and where present in higher than normal amounts is concentrated in narrow bands that impart a striped appearance. Porphyroblasts of pink feldspar up to 1 cm in diameter are occasionally seen. Other rocks in the metamorphic assemblage include: augen gneiss, which is common in the southern part of the property and occurs in trenches near the north end of the Webber Zone and in the Dickson Zone; black to dark green amphibolite which is widely distributed and consists of equal amounts of plagioclase and actinolite; and, quartz-chlorite schist with minor quartz-graphite horizons, which has only been observed in trenches at the southeast end of the Brown-McDade Zone. The augen gneiss and amphibolite are resistant weathering and are often abundant in talus. However, trenching has shown that the talus is normally derived from a few horizons that are only a

few metres wide. Foliation within the metamorphic rocks generally strikes northeast and dips moderately to steeply to the northwest.

Most of the northern and eastern parts of the Mt. Nansen property are underlain by coarse-grained granodiorite that grades locally to quartz diorite or quartz monzonite. Although the most recent GSC maps assign these rocks a Mid-Cretaceous age, weak foliation observed in them suggests that they may belong at least in part to the Late Triassic Klotassin granodiorites. The granodiorites are medium to coarse grained and commonly exhibit pink feldspar phenocrysts up to 2 cm long and up to 25% stubby hornblende crystals. Pegmatite and aplite dykes comprised of quartz, plagioclase and orthoclase, with minor biotite and hornblende, cut the granodiorites at high angles. The granodiorite normally exhibits a greenish tinge caused by weak pervasive saussuritization and chloritization but adjacent to vein faults alteration is often much more intense, as discussed later in the Alteration section. Contacts between the granodiorite and metamorphic rocks are rarely observed but in one trench at the southeast end of the Brown-McDade Zone, the gneisses have been partially assimilated and granitized. The Goulter Zone, which is an extension of the vein system being explored by Aurchem, occurs along the contact between the granodiorite and finer-grained diorites.

Jurassic and Cretaceous hornblende syenites are common along the northern edge of the Mt. Nansen Camp and are the wallrocks for veins occurring on Kerr Addison's Vic claims. The older syenites are coarse grained and often porphyritic while the younger ones are generally fine grained and are thought to be subvolcanic equivalents of the Mount Nansen Group andesites. Porphyritic syenite float is found in a few areas on the Mt. Nansen property but no outcrops are known.

The youngest rocks in the Mt. Nansen Camp are volcanic flows, pyroclastics, feeder dykes and plugs belonging to the Mid-Cretaceous Mount Nansen Group. Two suites are present, one is predominantly andesitic and the other dacitic to rhyolitic.

The andesitic rocks are widespread and include porphyritic flows and breccias plus related feeders. The unit is massive and resistant weathering, often forming caps on ridge tops. When fresh, the rock has a dark green colour and consists of 1 to 2 mm white feldspar phenocrysts in a medium-grained groundmass. The volcanic breccias (agglomerates?) consist predominantly of rounded volcanic fragments up to 10 cm across with rare gneiss and granodiorite cobbles. Faults often form contacts between volcanics and other units and the largest concentration of volcanics (north of Webber Creek) appears to have been preserved in a downdropped block bounded on the south and east by large faults. The Orloff King and Spud Zones occur within this block.

Drilling and trenching at various parts of the property has intersected a number of fine-grained intrusions that appear to be feeders to the andesitic volcanics. These dykes range from 0.5 to 10 m in width and average about 2 m. They are dark green and grade from aphanitic to porphyritic. The groundmass is normally a microcrystalline mixture of quartz and feldspar while the phenocrysts are andesine plagioclase with lesser amphibole and pyroxene. Magnetite is more abundant in this unit than any other rock type on the property.

Dacitic to rhyolitic volcanics are limited to a few small centres in the northern and western parts of the camp; but related porphyritic intrusions are widespread. Although this unit is not volumetrically abundant, it is highly

significant as it is closely associated with porphyry copper mineralization and some precious metal veins. The rocks are typically buff to tan coloured and consist of 1 to 3 mm quartz and feldspar phenocrysts in an aphanitic to fine-grained felsic groundmass. Biotite is the only mafic mineral present, occasionally forming up to 5% of the rocks as euhedral flakes. Minor finely disseminated pyrite is ubiquitous. The unit ranges from recessive to resistant weathering depending on its degree of alteration. Most porphyry intrusions form narrow dykes but there are three large and several small plugs on the property. In general, the dykes are feldspar porphyries while the plugs are quartz-feldspar porphyries.

The largest plug is approximately 3.5 m long by 1.5 km wide with its long axis trending northwesterly along the north side of Discovery Creek. This plug was explored as a porphyry copper deposit and exhibits classic hypogene porphyry alteration centred on two quartz-tourmaline breccia zones, the largest of which is 300 m in diameter (Dickinson, 1972). The second plug is approximately 500 m in diameter and forms a prominent dome between the headwaters of Pony and Webber Creeks while the third is a 150 m diameter body exposed in trenches on the Rusk Group.

Dykes belonging to this unit cut all other rock types on the property and range in width from 10 cm to 12 m, averaging about 1 to 2 m. Most are oriented either northwesterly or northeasterly. In general, the northwest-trending dykes exhibit brecciation with montmorillonite or kaolinite alteration while the others are unbrecciated and relatively fresh. At the Brown-McDade Zone most porphyry dykes are aligned northwest, parallel to the main fault zone and are intimately associated with the precious metal-bearing veins. It is

common for dykes to grade into vein faults along strike and/or downdip. Breccia fragments within the dykes are usually well rounded and consist principally of porphyry with occasional pieces of wallrock. Flow banding is sometimes seen and chilled margins are common. In many instances breccia zones up to 25 m wide are developed in wallrocks surrounding dykes that are less than 2 m across. The wallrock breccia fragments are typically angular and contacts with enclosing fractured wallrocks are gradational.

#### Alteration

Table 2 on the following page lists five hypogene alteration facies seen in the trenches and drill core. Each facies is defined by an index mineral or mineral assemblage. Contacts between facies are usually transitional and supergene overprinting tends to elevate hypogene alteration to a higher facies near surface. Intensity and depth of supergene alteration depends upon fracture density and rock type.

Propylitic alteration is the weakest facies and is defined by slight saussuritization of plagioclase, chloritization of hornblende and the presence of minor epidote. Fine pyrite often wholly or partially replaces mafic minerals and interstitial calcite is locally abundant.

Argillic (clay) alteration has been subdivided into montmorillonite and kaolinite facies. Montmorillonite facies is lower grade and is characterized by soft, greenish feldspars and mafic minerals that are altered to a medium or dark green mixture of chlorite, montmorillonite and calcite. Rocks belonging to kaolinite facies exhibit a uniform strongly bleached appearance due to total destruction of mafic minerals. Kaolinite is the principal clay mineral and calcite is absent. In the supergene zone, rocks exhibiting montmorillonite



facies hypogene alteration normally prograde to kaolinite facies. Argillic alteration, usually montmorillonite facies, is common in feldspar porphyry dykes and in halos surrounding vein zones. In steeply-dipping vein zones such as Huestis and Webber, alteration is relatively symmetric about the veins, but in moderately dipping zones such as Brown-McDade and Flex, it is best developed in the hanging wall.

Phyllic alteration occurs when the original rock-forming minerals are totally altered to an extremely fine-grained mixture of quartz and sericite. The result is a light grey, aphanitic matrix surrounding residual quartz grains that are slightly enlarged by silica overgrowths. Where this alteration is pervasive, the rock mimics quartz porphyry dykes and where it is mottled, it takes on a pseudobrecciated appearance. Phyllic alteration is the dominant facies within a 7 to 30 m wide breccia zone developed immediately in the hanging wall of the Footwall Fault at the Brown-McDade Zone, and commonly forms 0.1 to 2 m wide halos that flank the veins at the Webber Zone.

Silicic facies is the most intense alteration and occurs when the rocks are almost wholly replaced by quartz. This alteration is rare and is usually found directly adjacent to mineralized quartz veins. Contacts with the surrounding phyllic facies rocks are often gradational and irregular.

### MINERALIZATION

Two types of mineralization have been recognized in the Mt. Nansen Camp: 1) precious metal vein zones; and, 2) disseminated and stockwork porphyry copper mineralization. Earlier workers (Campbell, 1965; Sawyer & Dickinson, 1976; Ranspot, 1983) have described the mineralization in some detail. The following summary incorporates results of the 1985, 1986 and 1987 work and briefly describes the characteristics of each type of mineralization. Details on specific zones that have been explored during the Chevron option are given in the 1985 and 1986 Final Reports. The locations of the main mineral occurrences are shown on Figures C-1 (1:20,000) and P-2 (1:10,000) in the pocket.

Precious metal vein zones occur throughout the camp and are found in all rock types. The mineralization is highly variable in grade and width but the host structures show considerable lateral and vertical continuity. Ore and gangue mineralogy differs from one vein zone to another but is usually relatively consistent within a single structure. Once the character of a particular vein zone is established, the grade of a specific exposure can usually be estimated by determining the width of the vein and the approximate proportion of ore to gangue minerals. The strikes of individual veins commonly range between 130 and 180 but the average strike of the zones is about 150°. Dips range from about 30°SW to 75°NE but most are between 55 and 80°SW. The widest, highest grade ore shoots are normally found where a vein splits or takes a bend, thus creating greater open space. Steeply-dipping, northeast-trending cross faults commonly cut the veins usually resulting in a few metres of dextral offset. The largest offset is thought to be along the Webber Creek Fault, which appears to offset the veins about 1.2 km. The relative importance

of strike and dip slip movement has not yet been established but both appear to have occurred. While a wide variety of veins are present, most fall into one of two end member categories: 1) narrow, relatively simple vein systems (Webber, Huestis, Spud, Dickson, Vic); and, 2) complex vein and breccia zones (Brown-McDade, Orloff King, Rusk, Goulter, Tawa). The Flex Zone shares some characteristics of both groups.

Narrow precious metal veins occur along anastomosing, steeply-dipping, northwest-trending faults and are best developed within the metamorphic rocks although they occur in all major rock types within the camp. They range from a few centimetres to 5 m in width and consist of quartz- and sulphide-rich cores that are surrounded by narrow, intense phyllic and kaolinitic facies alteration envelopes. Wallrocks within 5 m of the veins are often bleached and exhibit weak montmorillonite alteration. Higher grade precious metal values (greater than 0.1 oz/ton Au and 10 oz/ton Ag) are confined to the quartz-, sericite- and kaolinite-rich zones and values drop off rapidly to less than 0.02 oz/ton Au and/or 0.5 oz/ton Ag in the surrounding wallrocks. Depth of weathering is variable with total oxidation (aside from occasional sulphides encapsulated in quartz) ranging from greater than 30 m in the Webber Zone to less than 15 m in the Huestis Zone. The weathering appears to be deepest on south-facing and shallowest on north-facing slopes. Primary sulphides include, in approximate order of abundance: pyrite, arsenopyrite, galena, sphalerite, chalcopyrite, sulfosalts and stibnite. No detailed work has been done to establish mineralogy in weathered ores. Neither native gold nor silver has been observed megascopically in primary or weathered ores. Silver to gold ratios are normally in the range of 20 to 30:1.

Complex precious metal zones share many characteristics with the narrow precious metal veins but also exhibit some features that suggest an affinity with the porphyry copper mineralization. Mineralization and alteration in these zones is more widely distributed than occurs in the narrow vein zones, and there is a spatial, and probably genetic, link with feldspar porphyry dykes. These zones are up to 150 m wide and consist of a series of subparallel faults separated by fractured and altered wallrocks. The mineralization is best developed where the faults cut igneous rocks. The highest assays (0.1 to 1.0 oz/ton Au) are obtained from quartz + sulphide ± calcite veins that occur with sericite and kaolinite in the fault zones. The wallrocks typically exhibit montmorillonite to kaolinite alteration and grade between 0.01 and 0.05 oz/ton Au. Kaolinite altered, frequently brecciated feldspar porphyry dykes often intrude along or subparallel to the faults and it is common for a mineralized vein to grade into a breccia zone and then into a porphyry dyke either along strike or downdip. The dykes normally range from 10 cm to 5 m wide and grade between 0.01 and 0.1 oz/ton Au. Ore mineralogy and metal ratios in the complex precious metal zones are variable probably reflecting different depths of erosion into the hydrothermal system. For example, the Goulter Zone, which is thought to be high level, contains a wide range of ore minerals including realgar in a mixed calcite, quartz and barite gangue while the presumably deeper Brown-McDade Zone contains predominantly pyrite and arsenopyrite with quartz. Silver to gold ratios for complex precious metal zones appear to be lowest where the host rocks are granodiorite (8:1 in the Brown-McDade Main Zone) and highest where they are volcanics (greater than 20:1 in the Orloff King and Rusk Zones). Oxidation in these zones is usually slightly deeper than

might be expected from a narrow vein in a comparable geomorphological setting due to the increased permeability in the highly fractured wallrock. At the Brown-McDade Zone, depth of total oxidation ranges from 15 m to greater than 75 m.

The porphyry copper zone is probably related to the same hydrothermal cell as the veins, but represents a deeper and hotter part of the system. The mineralization is weak (average grade of less than 0.1% Cu) but extensive, covering an area approximately 3,000 by 1,500 m. The zone exhibits classic porphyritic alteration zonation, with localized silicic and potassic cores surrounded by advanced argillic and phyllic halos giving way to weak argillic and propylitic margins. Primary mineralization consists of pyrite and chalcopyrite, which are usually oxidized to limonite within 30 m of surface. Precious metal sampling has not been conducted systematically throughout the zone but preliminary indications are that the values are low, averaging less than 0.005 oz/ton Au and 0.1 oz/ton Ag.

## 1987 TRENCHING AND DRILLING

### GENERAL

The location of all 1985, 1986 and 1987 trenches and drill holes are illustrated on Figure P-1 (1:10,000 scale), while work done on specific targets is shown in greater detail on Figures V-1 (1:5,000 scale covering all of the main zones), BMX-1 (1:2,000 scale of the Brown-McDade Zone), HFW-1 (1:2,000 scale of the Huestis, Flex and Webber Zones), and DKS-1 (1:2,000 scale of the Dickson, Orloff King and Spud Zones), all of which are in the pocket.

The trenching program was performed in several phases over the course of the summer using, at various times, a ripper-equipped Caterpillar D7G bulldozer and/or a Caterpillar 225 excavator. The excavator was used to complete trenches in previously stripped areas while the bulldozer stripped vegetation and soil from proposed trenches. A total of 4606.5 m of bedrock was exposed, of which 671 m is in the Dickson Zone, 572 m in the Orloff King and Spud Zones, 2084 m in the Huestis Zone and the remaining 1279.5 m divided among the Webber Zone, Flex Zone and outlying geochemical anomalies.

The diamond drill program totalled 1048.5 m in 17 holes, with twelve holes in the Flex Zone, three in the Webber Zone near its junction with the Flex, one on the northern extension of the Huestis Zone (now called the Huestis North) and one testing the Brown-McDade Zone and subsidiary hanging wall structures. All holes were drilled with an unitized and wireline-equipped Longyear 38 drill, using HQ equipment except for the bottom 74 m of the Brown-McDade hole (DDH87-37) where NQ was used. Waterlines were all less than 1500 m long and, aside from minor amounts of mud which was used in all holes, no drilling products were consumed.

### SAMPLING AND ANALYTICAL TECHNIQUES

Trench samples were collected wherever mineralization or strongly altered rocks were observed. All were taken from continuous channels dug along ribs approximately 20 cm above the trench floor with typical intervals ranging from 1 to 3 m in the most promising areas and 5 to 10 m elsewhere. About 5 kg was taken regardless of interval length and care was exercised to ensure the sample was collected uniformly across the interval.

Diamond drill core was logged and mineralized, brecciated, or altered intervals were split and one-half of the core was submitted for assay. The remaining core is stored on the property.

All trench and drill samples were sent to Chemex Labs Ltd. in North Vancouver, B.C. where they were dried and prepared for assay by primary and secondary jaw crushing, tertiary cone crushing and ring pulverizing to -100 mesh. A one assay ton split was then fire assayed for gold and silver using a gravimetric finish. All coarse rejects are stored at Chemex for one year in case they are required for further analysis or metallurgical testing.

### RESULTS

Trench results for the Huestis, Huestis North, Flex and Webber Zones are shown on Figure HFW-1 and summarized in Table 3 on the following page, while those for the Dickson, Orloff King and Spud Zones appear on Figure DKS-1 and in Table 4, which follows Table 3. All significant drill intersections are listed on Table 5, following Table 4, and shown on the appropriate cross sections as referred in the following text. Drill logs are in Appendix VI.

Work in the Brown-McDade Zone was limited to surveying of proposed holes and a single 171.6 m diamond drill hole (DDH87-37) located on the 200S section

TABLE 3  
1987 HUESTIS, HUESTIS NORTH, FLEX AND WEBBER ZONES  
TRENCH RESULTS, MT. NANSEN PROPERTY

<u>Trench</u>	<u>Zone</u>	<u>From (m)</u>	<u>To (m)</u>	<u>Width (m)</u>	<u>oz/ton Au</u>	<u>oz/ton Ag</u>
H087-2	Huestis	28.0	29.0	1.0	0.352	4.20
		79.7	81.0	1.3	0.152	1.45
H087-3 including	Huestis	47.0	51.5	4.5	0.106	0.94
		50.5	51.5	1.0	0.244	2.74
		79.5	82.5	3.0	0.043	0.51
H087-4  including	Huestis	65.0	67.0	2.0	0.063	2.71
		89.6	95.5	5.9	0.335	7.29
		92.0	93.0	1.0	1.665	36.70
		101.5	103.5	2.0	0.182	6.56
H087-5 including	Huestis	80.0	88.0	8.0	0.136	2.86
		80.0	81.5	1.5	0.403	8.90
H087-6  including	Huestis	2.5	6.0	3.5	0.044	0.05
		100.0	107.0	7.0	0.091	0.24
		130.0	136.0	6.0	0.263	5.90
		132.5	134.0	1.5	0.676	17.20
		148.5	150.0	1.5	0.059	0.58
H087-7 including	Huestis	127.5	132.0	4.5	0.350	2.05
		127.5	129.5	2.0	0.737	0.58
H087-8	Huestis	128.5	129.5	1.0	0.855	44.33
		135.0	136.5	1.5	0.595	0.33
H087-9	Huestis	172.0	176.0	4.0	0.048	0.03
		193.0	196.0	3.0	0.069	0.80
H087-10	Huestis	31.5	33.5	2.0	0.048	0.69
		99.0	100.0	1.0	0.061	4.55
		147.5	149.5	2.0	0.050	0.64
		177.0	184.0	7.0	0.243	2.66
H087-11	Huestis	89.7	92.3	2.6	0.042	0.40
		148.5	152.0	3.5	0.098	4.37
		203.5	205.0	1.5	0.085	0.68
H087-12 including	Huestis	61.5	80.5	19.0	0.158	0.97
		65.0	74.0	9.0	0.266	1.50
		135.0	138.0	3.0	0.053	0.78
H87-9X	Flex	4.0	9.5	5.5	0.499	3.22
H87-10  including	Huestis	21.0	23.5	2.5	0.052	1.98
		43.0	46.0	3.0	0.049	3.21
		84.0	94.0	10.0	0.064	2.15
		87.5	89.5	2.0	0.196	4.72

TABLE 3 (Cont'd)

<u>Trench</u>	<u>Zone</u>	<u>From (m)</u>	<u>To (m)</u>	<u>Width (m)</u>	<u>oz/ton Au</u>	<u>oz/ton Ag</u>
H87-11	Flex	---	---	---	---	---
H87-12 including	Huestis	14.0 18.0	15.0 20.0	1.0 2.0	0.402 0.068	33.00 0.07
W87-50	Webber	19.0	20.0	1.0	0.109	1.60
W87-51	Webber	---	---	---	---	---
W87-52	Huestis North	---	---	---	---	---

TABLE 4  
1987 DICKSON, ORLOFF KING AND SPUD ZONES  
TRENCH RESULTS, MT. NANSEN PROPERTY

<u>Trench</u>	<u>Zone</u>	<u>From (m)</u>	<u>To (m)</u>	<u>Width (m)</u>	<u>oz/ton Au</u>	<u>oz/ton Ag</u>
GD87-3X	Dickson	179.0 189.0	180.0 190.0	1.0 1.0	0.056 0.140	0.09 4.53
GD87-6	Dickson	---	---	---	---	---
GD87-7	Dickson	16.5	18.0	1.5	0.070	0.48
GD87-8	Dickson	11.0 28.5	12.5 32.0	1.5 3.5	0.079 0.043	1.03 0.48
GD87-9	Dickson	53.5	55.0	1.5	0.054	0.48
GD87-10	Dickson	15.0 58.0 59.5	19.0 61.0 61.0	4.0 3.0 1.5	0.122 0.513 0.791	1.27 2.33 4.20
86-3X including	Orloff King	25.0 34.0	42.0 35.0	16.0 1.0	0.040 0.201	2.07 20.10
W86-36X	Spud	3.0	5.0	2.0	0.192	1.75
87-8	Orloff King	---	---	---	---	---
87-9	Orloff King	31.5	44.0	12.5	0.048	3.24
87-10	Orloff King	---	---	---	---	---
87-12 including	Spud	36.0 37.0	38.5 38.5	2.5 1.5	0.084 0.120	0.13 0.19
87-13	Orloff King	---	---	---	---	---
87-14	Orloff King	---	---	---	---	---
87-15	Orloff King	---	---	---	---	---
87-16	Orloff King	---	---	---	---	---
87-18	Orloff King	6.0	9.0	3.0	0.065	0.71
87-19	Orloff King	---	---	---	---	---

TABLE 5  
SIGNIFICANT 1987 DRILL INTERSECTIONS  
FOR BROWN-MCDADE, FLEX, HUESTIS NORTH AND WEBBER ZONES,  
MT. NANSEN PROPERTY

<u>Drill Hole</u>	<u>Zone</u>	<u>From (m)</u>	<u>To (m)</u>	<u>Width (m)</u>	<u>oz/ton Au</u>	<u>oz/ton Ag</u>
87-37	Brown-McDade	26.0	30.5	1.4	0.067	1.21
		47.0	62.0	4.6*	0.066	0.57
		187.0	195.0	2.4*	0.042	0.71
		470.5	482.0	3.5*	0.037	0.65
		504.0	525.0	6.4*	0.094	1.23
87-38	Webber	18.6	24.0	5.4	0.035	1.72
		41.8	42.7	0.9	0.126	3.85
87-39	Webber	28.0	30.1	2.1	0.356	71.47
87-40	Webber	---	---	---	---	---
87-41	Flex	39.3	41.9	2.6	0.159	20.08
		43.7	44.5	0.8	0.067	19.91
87-42	Flex	2.1	3.3	1.2	0.062	0.66
		14.9	16.4	1.5	0.038	0.64
87-43	Flex	28.4	29.9	1.5	0.037	0.67
87-44	Flex	4.0	5.8	1.8	0.215	41.40
		10.7	12.8	2.1	0.058	1.28
87-45	Flex	12.5	14.0	1.5	0.090	0.51
87-46	Flex	26.8	27.7	0.9	0.118	2.80
87-47	Flex	20.8	23.8	3.0	0.047	0.44
87-48 including	Flex	17.1	23.5	6.4	0.204	2.88
		21.7	23.5	1.8	0.613	8.17
87-49	Flex	17.1	19.1	2.0	0.033	0.36
87-50	Huestis North	37.5	39.0	1.5	0.048	0.17
		45.4	47.5	2.1	0.084	1.36
87-51	Flex-Huestis	---	---	---	---	---
87-52	Flex-Huestis	28.3	30.1	1.8	0.040	2.69
87-53 including	Flex	15.4	17.1	1.7	0.042	0.70
		37.3	41.3	4.0	0.117	1.83
		37.3	38.2	0.9	0.402	7.34

\* True Width

line, as shown on on Figure BM-10 in the pocket. The mineralized intervals intersected in the hole include two steep- to reverse-dipping hanging wall splits near the top of the hole and the main footwall fault at the bottom. Four intervals returned assays greater than 0.04 oz/ton Au, with the best being 0.094 oz/ton Au and 1.23 oz/ton Ag across a true width of 6.0 m from the footwall fault and 0.066 oz/ton Au and 0.57 oz/ton Ag across a true width of 1.2 m from one of the hanging wall splits. Alteration and mineralization along the footwall fault is stronger in this hole than seen in two previous deep holes drilled in this zone (DDH85-2A and 85-12B), suggesting that the zone may have a southerly plunge controlled by the intersections between the footwall fault and the hanging wall splits. The width and grade of the intersections from the hanging wall splits are significantly less than those in the trench directly above the hole (as was the case in most holes in the Brown-McDade Zone). The core is totally oxidized to 40 m vertically below surface, while partial oxidation extends to 80 m.

In preparation for future detailed drilling, section lines were cut along the length of the Brown-McDade Main Zone at 33 m intervals from Section 1+66N to 3+66S. The proposed collars are marked with 1 m high wooden lath and are spaced along the section lines so that their projected intersections on the footwall fault would be at 20 m intervals vertically below surface, assuming the holes were drilled with a 50° dip.

Exploration in the Huestis Zone included 14 trenches and 1 diamond drill hole. Thirteen of the trenches were excavated along the floors of a series of old (pre-1966) bulldozer trenches located northwest of the mill, directly over the Huestis underground workings. The drill hole and other trench are located

about 270 m to the northwest along extension of the Huestis Zone (referred to as the Upper Flex Zone in previous reports and now called the Huestis North Zone).

Work in the Huestis Zone exposed a series of subparallel, anastomosing veins, most composed of a narrow quartz core with a 1 to 5 m wide bleached and clay altered halo. The best mineralized and most consistent vein (called the Huestis No. 12 Vein on old underground maps) was traced for a 350 m strike length and consists of 6 to 23 cm of limonite and scorodite stained, white to grey quartz containing pyrite, arsenopyrite, galena and sulphosalts surrounded by 10 to 100 cm wide bands exhibiting quartz stringers. One set of samples was taken in the normal manner to test the entire width of the vein while a second set was taken specifically from the quartz- and sulphide-rich core. As expected, the selected samples returned consistently high assays (up to 5.272 oz/ton Au and 98.74 oz/ton Ag) and contained a high percentage of the gold in the veins, as shown on Table 6 on the following page. Other veins in the Huestis Zone exhibit weaker mineralization and returned lower values, except for one (Huestis No. 13 Vein underground) exposed in Trench H087-12 which is the most southerly of the trenches, lying just beyond the end of the underground workings. This vein consists of a highly fractured, intensely bleached and clay altered, quartz flooded zone that averaged 0.158 oz/ton Au and 0.97 oz/ton Ag across its entire 19 m width. It appears to pinch out rapidly to the north but is untested to the south.

Veins comprising the Huestis Zone generally weaken toward the southeast but may link up with the Mill Zone and terminate to the northwest against an east-northwest trending cross fault that juxtaposes them with Flex Zone veins.

TABLE 6  
HUESTIS ZONE HIGH GRADE TRENCH SAMPLING

<u>Trench</u>	<u>High Grade Sampling</u>			<u>Routine Trench Sampling</u>			<u>% High Grade of Total Width</u>	<u>% Au in High Grade of Au in Total Width</u>
	<u>Width (m)</u>	<u>Au oz/ton</u>	<u>Ag oz/ton</u>	<u>Width (m)</u>	<u>Au oz/ton</u>	<u>Ag oz/ton</u>		
H86-1	0.229	2.360	35.84	1.0	0.528	11.40	22.9	102.3
H87-10	0.064	4.136	98.74	2.0	0.196	4.72	3.2	135.0
H87-12	0.076	3.378	86.12	1.0	0.402	0.33	7.6	63.9
H087-2	0.038	3.394	23.37	1.0	0.352	4.20	3.8	36.6
H087-3	0.102	2.254	38.75	1.0	0.244	2.74	10.2	94.2
H087-4	0.076	2.744	47.30	1.0	1.665	36.70	7.6	12.5
H087-5	0.051	1.974	51.45	1.5	0.403	8.90	3.4	25.0
H087-6	0.064	3.886	62.23	1.5	0.676	17.20	4.3	36.8
H087-7	0.076	5.272	29.25	2.0	0.737	0.58	3.8	54.4
H087-8	0.102	1.736	61.70	1.0	0.855	44.33	10.2	20.7

The cross fault appears to have about 90 m of dextral offset, and on the northwest side the veins have been traced intermittently in trenches and drill holes for another 450 m as the Huestis North Zone. Only one trench (W87-52) tested this zone in 1987 and it was located on the south side of the Dome near the boundary of the Hub 1 claim (G. Cochrane). Two veins were exposed but both are weakly mineralized and returned low assays. The only other work on the zone was diamond drill hole DDH87-50 which tested below 1986 trench W86-27 and hole DDH86-36. It intersected downdip extensions of two veins about 23 m apart. The westerly vein is weakly mineralized and returned low values, while the easterly one contains two moderately mineralized intervals, the best of which graded 0.059 oz/ton Au and 1.35 oz/ton Ag over 2.1 m, as shown on Figure HN-1.

Most work in the Flex Zone (10 of 12 drill holes) was directed toward a 280 by 140 m area in the central part of the zone where encouraging but highly erratic assays were obtained in 1986 from trenches and drill holes. The 1987 holes were located to fill in section lines spaced 50 to 25 m apart with holes cutting the mineralized structures downdip at about 30 m intervals. The work produced some high grade intersections (up to 0.613 oz/ton Au and 8.17 oz/ton Ag over 1.8 m) but all were relatively narrow and there is little continuity between sections, as shown on Figures FX-2 to 8 in the pocket. In most instances, the grade and width of the intervals in drill holes is much lower than those in the overlying trenches.

Other work in the Flex Zone includes two trenches (H87-9X and H87-11) and two drill holes (DDH87-51 and 87-52) which tested the southeast end of the zone in the vicinity of the cross fault that juxtaposes it with the Huestis Zone. Neither of the trenches exposed significant new mineralization but H87-9X, which

cuts the cross fault at an oblique angle, showed that the cross fault contains scattered blocks and fragments of vein material torn from the veins that it cuts and confirmed a high grade assay obtained from a vein in 1986 trench H86-9 (0.495 oz/ton Au and 4.01 oz/ton Ag over 5.3 m). The drill holes were aligned parallel to trench H87-9X and were intended to intersect the downdip extension of the high grade vein. Unfortunately the cross fault has much shallower dip than suspected (about 50°NW) and both holes passed through it before reaching the vein, as shown on Figure FX-9 in the pocket.

Work in the Webber Zone consisted of two trenches and three diamond drill holes, all of which are located at the north end of the zone near its intersection with the Flex Zone. Trenching done in this area during 1985 and 1986 showed that the zone is made up of a strong hanging wall vein with several close-spaced footwall splits. Samples taken across the vein returned up to 0.180 oz/ton Au and 6.70 oz/ton Ag over 11.0 m (trench W86-42) suggesting some bulk tonnage potential. The 1987 drilling was designed to test this potential with one hole (DDH87-39) passing directly beneath trench W86-42 and the other two located about 60 m on either side of it. Although all three holes intersected mineralized structures (see Figures W-9 to 11 in the pocket) the only significant assay obtained from any of the holes came from a well mineralized vein in DDH87-39 (0.356 oz/ton Au and 71.47 oz/ton Ag over 2.1 m), which appears to be the main hanging wall structure. Trench 87-50, which was cut northeast of the drill holes, returned 0.109 oz/ton Au and 1.60 oz/ton Ag over 1 m from a footwall split, while Trench 87-51, located directly above the Webber upper portal, exposed only a weakly mineralized structure.

The Dickson Zone lies approximately halfway between the Flex and Brown-McDade Zones and was explored with six trenches. All but one of the trenches exposed at least one well mineralized vein with the best assays coming from trench GD87-10 which returned 0.513 oz/ton Au and 2.33 oz/ton Ag over 3.0 m and 0.122 oz/ton Au and 1.27 oz/ton Ag over 4.0 m from two veins 40 m apart. The trenches are relatively short and spread over a 1000 m strike length; thus, it is difficult to reliably project the veins from one trench to the next. Based on attitudes measured in the trenches, the zone appears to be an anastomosing system comprised of at least four veins. The zone is open in all directions and soil geochemical response is actually stronger in an untested area 200 m northeast of the zone than directly over it.

Exploration of the Orloff King and Spud Zones, located immediately north of the Webber Creek Fault, included thirteen trenches of which ten started in 1987 and two started in 1986 were wholly or partially completed. The Orloff King Zone has been traced for a 250 m strike length and consists of numerous, up to 30 cm wide shears and rare quartz veins within a broader halo of highly fractured and bleached pyroclastic rocks. The zone appears to trend northwesterly and dip moderately (45 to 60°) to the southwest subparallel to the slope of the hill. Assays from the four trenches that reached bedrock in the zone averaged 0.050 oz/ton Au and 1.85 oz/ton Ag across 11.5 m. The silver to gold ratios in this zone are the highest of any zone discovered to date on the property. The Spud Zone lies 100 m west of the Orloff King Zone and was exposed in two trenches 50 m apart. It consist of a 30 cm wide, sulphide-bearing quartz vein cutting pyroclastic rocks and returned up to 0.192 oz/ton Au and 1.75 oz/ton Ag over 2 m.

Four trenches totalling 861 m were cut on overlying soil geochemical anomalies scattered around the headwaters of Back Creek. Although several strongly altered zones were exposed, no significant assays were obtained.

### CONCLUSIONS

The 1987 exploration program has provided a more detailed understanding of the distribution, character and controls of mineralization in several zones on the Mt. Nansen property and has outlined a number of targets that deserve additional exploration.

Among the most significant developments were:

1. evidence that the intersections between steep- to reverse-dipping hanging wall splits and the main footwall fault are important controls on mineralization in the Brown-McDade Zones;
2. recognition of an east-northeast trending cross fault that has offset the Huestis and Flex Zones so that the two systems are locally juxtaposed;
3. confirmation of the erratic distribution of mineralization in the Flex Zone;
4. further documentation that near surface, supergene enrichment of gold has occurred in parts of the Brown-McDade, Flex and Webber Zones; and,
5. indications that at least one vein in the Huestis Zone is suitable for small scale, open pit, high grade mining.

Future exploration should focus on drilling to reliably determine the grade and tonnage of the Brown-McDade Zone plus additional trenching and drilling to establish the potential of the other zones. The most promising trenching targets appear to be the south end of the Huestis Zone, the southern offset of the Flex Zone, the central part of the Dickson Zone and adjacent soil geochemical anomalies, the Huestis North Zone and the Goulter Zone. Drilling should be done at the Orloff King Zone to test the depth of oxidation and confirm the grades and widths indicated in trenches to determine whether or

or not it is a valid bulk tonnage target. A few deep holes should also be drilled beneath the Huestis, Webber and Flex Zones to prove that the mineralization is open to depth and that there is potential for much larger underground reserves.

Assuming that precious metal prices maintain their present levels and that fill in drilling at Brown-McDade Zone confirms previous results, there appears to be sufficient oxidized ore to justify a small open pit mining operation employing heap leach cyanide extraction. While this development is underway, the other zones should be thoroughly evaluated to determine which could contribute additional cyanide amenable, open pit ore and research should begin on metallurgical techniques that would provide suitable recoveries from sulphide-rich ores mined either by underground or open pit methods.

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APPENDIX I  
REPORT ON BULLDOZER AND EXCAVATOR TRENCHING  
RUSK GROUP

092122

# ARCHER, CATHRO

& ASSOCIATES (1981) LIMITED

CONSULTING GEOLOGICAL ENGINEERS

1016-510 WEST HASTINGS STREET  
VANCOUVER, B. C. V6B 1L8

(604) 688-2568

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Report On

BULLDOZER AND EXCAVATOR TRENCHING

RUSK GROUP

(J-Bill 1-32, Bull 1-28 and Rat 9-24 Claims)

NTS 115I/3

Latitude 62°05'N; Longitude 137°15'W

W.D. Eaton, B.A., B.Sc.

January, 1988

Work done between August 2 and September 17, 1987

092122

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3	Geology, Mineralization & Gold Geochemistry .....	In Pocket

## APPENDICES

Appendix I	Statement of Qualifications
Appendix II	List of Personnel

## INTRODUCTION

In mid-June 1985, Chevron Canada Resources Limited optioned the Mt. Nansen property from B.Y.G. Natural Resources Inc. and began a comprehensive exploration program aimed at evaluating potential for open pittable, oxidized gold-silver ores amenable to cyanide extraction. Results were generally favourable and in March, 1986 seventy-six claims (called the Rusk Group) adjoining the west side of the Mt. Nansen property were optioned from G. Dickson. Exploration later that year consisted of geological mapping, baseline and claim surveys, grid soil geochemistry, EM-16 surveys, and minor bulldozer trenching, as described in a report by the author dated December 1, 1986. The work identified three areas with coincident, moderately to strongly anomalous gold, silver and lead soil geochemical response. One anomaly is located immediately downhill from a prominent airphoto linear, another is associated with a stockwork zone on the edge of a small porphyry plug containing weak copper and molybdenum mineralization, and the third coincides with a known gold- and silver-bearing vein system.

The 1987 work was performed between August 2 and September 17 under the author's supervision and consisted of a single trench cut across the anomalous stockwork zone and airphoto linear. The Author's Statement of Qualifications appears in Appendix I, while a list of personnel who worked on the property is in Appendix II.

CLAIM DATA, LOCATION AND ACCESS

The Rusk Group consists of 76 claims registered in the name of Chevron Canada Resources Limited with the Whitehorse Mining Recorder as follows:

<u>Claim Name</u>	<u>Grant Numbers</u>	<u>Expiry Date</u>
J-Bill 1-32	YA78049-YA78080	February 28, 1992
Bull 1-8	YA81420-YA81427	February 28, 1991
9-28	YA86288-YA86307	February 28, 1990
Rat 9-24	YA81436-YA81451	February 28, 1991

The claims are located in west central Yukon on NTS map sheet 115I/3 at latitude 62°05'N and longitude 137°15'W, as shown on Figure 1 on the following page. Figure 2, which follows Figure 1, is a claim sketch showing the position of individual claims.

Direct access to the centre of the property is provided by a 5 km long, four-wheel drive trail that connects with the 60 km long Nansen Road which extends from the Mt. Nansen property to Carmacks, the closest community. The Nansen Road has a gravel surface and is maintained by the Yukon Territorial Government from April to October.

Figure 1

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

# LOCATION MAP

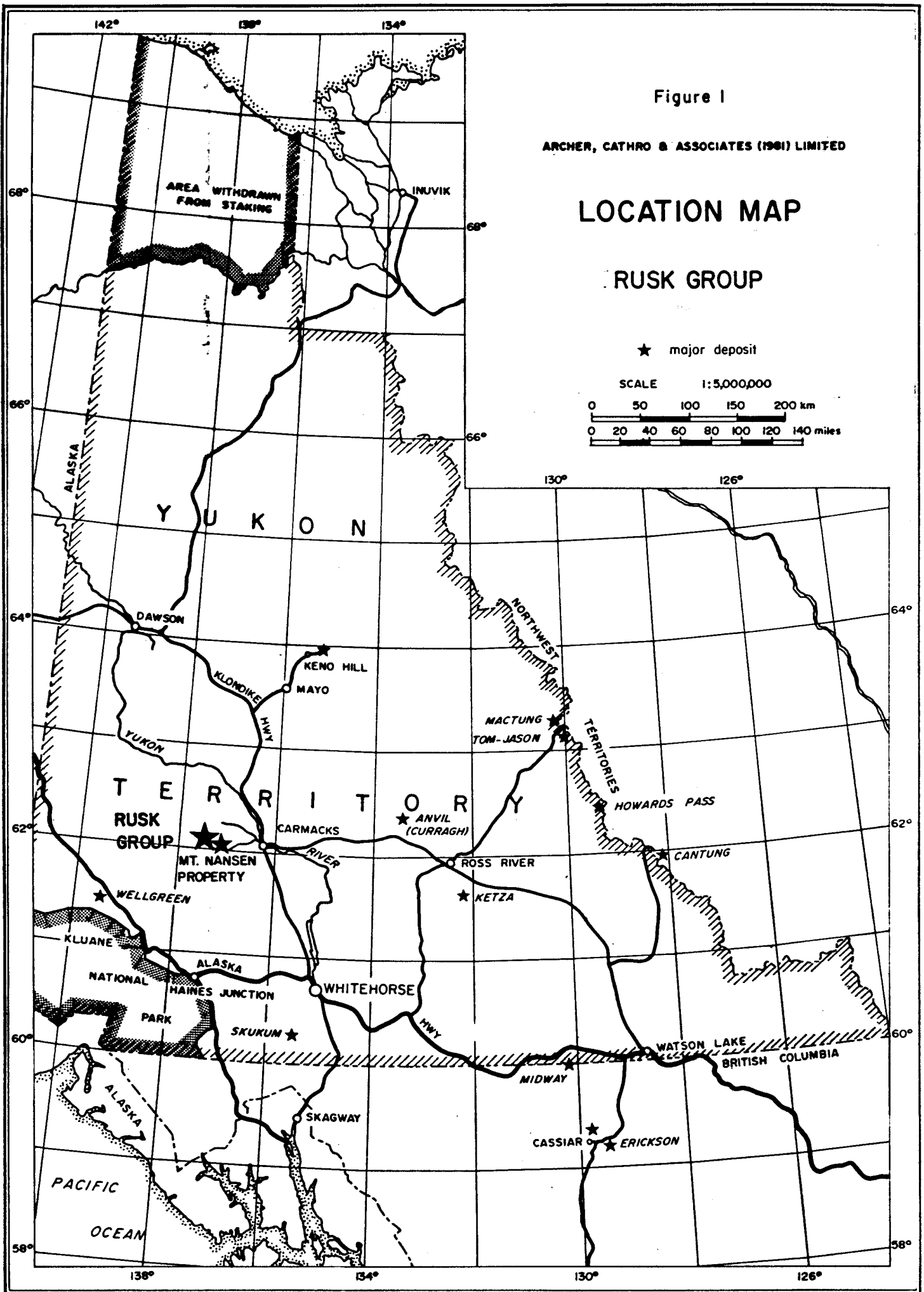
## RUSK GROUP

★ major deposit

SCALE 1:5,000,000

0 50 100 150 200 km

0 20 40 60 80 100 120 140 miles



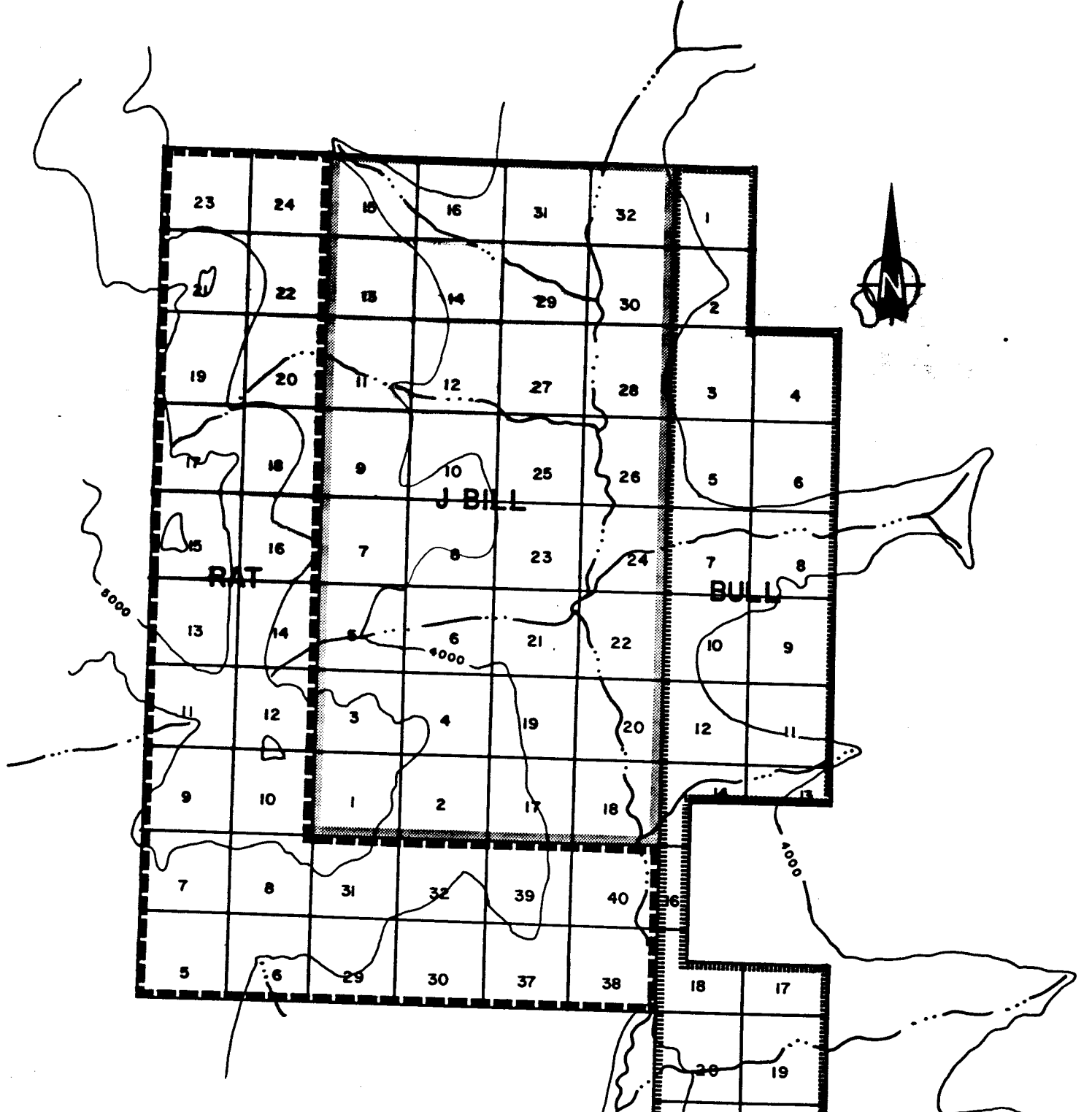


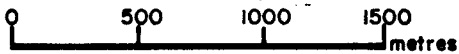
Figure 2

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

CLAIM LOCATION MAP

RUSK GROUP

SCALE 1:30,000



### HISTORY

The Mt. Nansen area, of which the Rusk Group is part, is the fourth oldest precious metal camp in Yukon Territory. Placer gold was discovered in several creeks draining the area in the early 1900's but none of the discoveries (including workings on Rusk Creek which bisects the Rusk Group) was rich or large enough to sustain a long term operation.

The first lode discoveries in the area were made in the early 1940's and Dickson reports having located old claim posts dating from this era. The earliest recorded claims on what is now the Rusk Group were the Bit 1-6 staked in November, 1965 by Mt. Nansen Mines Limited on the north bank of Rusk Creek. No assessment reports were filed for the Bit claims but the fact that they were a considerable distance from the main Mt. Nansen Mines claim block suggests a discovery of mineralization initiated staking.

In 1970, R. Saager and F. Bianconi, geologists for Mt. Nansen Mines, conducted a stream sediment survey in the Mt. Nansen area. They reported that samples taken on Rusk Creek were anomalous in molybdenum, lead, zinc, silver and antimony and suggested a vein source for the metals.

In 1971, Area Exploration Ltd. (a subsidiary of Anvil Mining Corp.) optioned the northern two-thirds of Mt. Nansen Mines' property and explored it for porphyry copper-molybdenum until 1973. In conjunction with that program, Area Exploration fringe staked the Bit claims with its Rusk claims and conducted geological mapping, geochemical surveys and 183 m of diamond drilling in one hole to test a circular copper and molybdenum soil anomaly located near the headwaters of Rusk Creek.

When the Bit and Rusk claims lapsed, Dickson restaked the occurrence as the LD claims in September, 1976, as the Swiss claims in May, 1979 and as the J-Bill claims in August, 1983. The Rat and Bull claims were added to the claim group in February, 1984.

Dickson has prospected in the Mt. Nansen area at various times since the late 1940's. In the mid-1970's while prospecting near the mouth of Rusk Creek, he discovered a piece of vuggy, siliceous porphyry float that assayed 0.2 oz/ton Au even though it contained no visible sulphides. Subsequent prospecting in an area 1.5 km south of Rusk Creek located an old hand trench or bear pit which exposed part of a small porphyry plug. A fragment of quartz float taken from this pit contained minor galena and assayed about 2 oz/ton Au.

In the summer of 1976 Dickson found mineralized porphyry float in a small saddle along an east-northeast trending ridge on the north flank of Rusk Creek. This material contained arsenopyrite, pyrite and sphalerite and assayed 50.8 oz/ton Ag and 0.09 oz/ton Au. A quantitative spectrographic analysis showed 2 to 3% Pb, 2 to 3% Zn, 0.1 to 0.3% Cu, 0.3% Sb and 1% As. Dickson subsequently performed bulldozer trenching in this area and located the source of this mineralized float. M.P. Phillips of Archer, Cathro visited the occurrence in October, 1984 on behalf of Chevron. Similar property examinations were made about the same time by Kerr Addison Mines Limited and Hudson's Bay Mining & Smelting Limited.

### GEOMORPHOLOGY

The property is located on the eastern margin of the Dawson Range which forms the backbone of a dissected peneplane known as the Yukon Plateau. This region is unique in Canadian geography as it lies northwest of the maximum advance of the Wisconsin ice sheet and, thus, escaped Pleistocene continental glaciation.

The claims straddle Nansen Creek, a south-flowing tributary of the Nisling River, and cover a wide, flat bottomed valley with gentle rounded hills on its east flank and a steeper, rocky ridge on its west flank. Dickson's main trenching area lies on the west side of the creek in a saddle on a low spur that projects out into the valley away from the north-trending rocky ridge. Tributary creeks flow easterly or westerly into Nansen Creek and exhibit V-shaped dendritic drainages. Local elevations range from 1150 m on the valley floor to 1690 m along the crest of the western ridge.

Soil profiles are highly variable with talus slopes and poorly developed C horizon material predominating at higher elevations giving way to 5 to 10 cm of organics overlying 0 to 5 cm of white volcanic ash, 10 to 100 cm of buff to brown soil and 100 to 200 cm of decomposed bedrock mixed with soil on the lower slopes. The floors of Nansen Creek and several of its tributaries are blanketed by thick deposits of relatively homogeneous glacial outwash sand, the upper edge of which roughly coincides with the 1200 m contour. The volcanic ash, which is younger than the sand, was derived from an eruption in the Wrangell Mountains 200 km southeast of the property about 1230 years ago. Outcrop is rare and restricted to ridge tops and a few actively eroding creek cuts. Drilling on the adjacent Mt. Nansen property has shown that the zone of

total oxidation extends from 1 m to greater than 75 m in depth, depending upon bedrock permeability.

Permafrost is widespread with north-facing slopes remaining frozen throughout the year and south-facing slopes thawing to a depth of 1 to 2 m by late summer. Once the insulating organic layer is removed, permafrost rapidly melts and does not reform. Vegetation consists of spruce up to 30 cm in diameter along the Nansen Creek valley giving way to stunted black spruce and aspen on lower slopes, moss and buckbrush on upper slopes and lichen on ridge tops.

## GEOLOGY

### REGIONAL SETTING

The Rusk Group is located within the Yukon Crystalline Terrane which consists of Upper Paleozoic or older schists, gneisses, amphibolites and marbles; foliated Upper Triassic and unfoliated Jurassic diorite, granodiorite and syenite batholiths; and, Mid- to Late Cretaceous, mafic to felsic volcanics, pyroclastic, subvolcanic and plutonic rocks. The Upper Paleozoic and Triassic rocks belong to an island arc that was accreted to North America during Mid-Jurassic time, while the younger igneous rocks are related to the Coast Plutonic Complex.

The major fault trends in the Dawson Range are northwesterly and northeasterly with the northeasterly structures usually producing small, left lateral offsets in the northwesterly structures. The northwesterly faults are generally extensional structures and control the distribution of most precious metal mineralization in the Mt. Nansen area.

### PROPERTY GEOLOGY

#### General

During 1986 the property was remapped using 1985 Nansen Project low level airphotos for control in the eastern and central parts of the property and a 1972 orthophoto map prepared by Area Exploration in the western part. Regional scale and detailed mapping done by earlier workers was reinterpreted and the resulting compilation is shown on Figure 3 in the pocket.

### Lithology

The oldest rocks on the property are Paleozoic or older, quartz-feldspar-chlorite gneisses exposed in old bulldozer trenches on the ridge east of Nansen Creek. The metamorphic rocks are completely surrounded by volcanic flows and agglomerates, some of which contain occasional metamorphic cobbles, suggesting that exposed gneisses are the top of a pre-volcanic topographic high.

Mount Nansen Group volcanic rocks cover approximately 80% of the property. They include flows, agglomerates and pyroclastic rocks and range from basaltic to rhyolitic in composition with andesites and dacites being most abundant. The predominant units in the main area of interest near Rusk Creek are well jointed, medium grey, aphanitic dacites; buff, banded and locally porphyritic, mafic-deficient, tuffaceous rhyolites; and, porphyritic andesites containing subhedral, 1 to 2 mm plagioclase phenocrysts in a greenish-grey microcrystalline matrix.

The volcanics are cut by three types of intrusive rocks:

1. medium-grained, grey-green quartz diorite which underlies the northeast corner of the property where it forms the border phase of a 1 to 2 km wide and 15 km long, northwest-trending granodiorite stock;
2. silicified quartz-feldspar porphyry which forms a small plug and series of dykes that intrude dacite flows in the main area of interest; and,
3. biotite-feldspar porphyry which occurs as scattered float mixed with dacite talus near the headwaters of Rusk Creek.

### Structure

Two principal lineament directions (NE and NNW) are present on the Rusk Group. The most prominent features are two subparallel, northeast-trending, steeply dipping faults called the Rusk Creek and East Fork Creek Faults. They are about 1500 m apart in the main area of interest and appear to converge toward the east. The Rusk Creek Fault, the more southerly of the two, juxtaposes tuffaceous rhyolites against dacites (which normally underlie the rhyolites) suggesting that the south side of the fault is down-dropped. Poor exposure and lack of marker units make it difficult to determine offsets on the East Fork Creek Fault.

The north-northwest trending lineaments are more subtle and do not appear to have produced significant offsets. Structures within this trend host most of the precious metal mineralization on the adjacent Mt. Nansen property and three faults with this trend are exposed in Dickson's trenches on the north side of Rusk Creek. The most prominent north-northwest trending feature on the property is a recessive weathering airphoto linear that can be traced for about 1000 m along talus slopes on the south side of Rusk Creek.

### MINERALIZATION

Two principal types of mineralization were recognized on the property prior to 1987:

1. a weak porphyry-type copper-molybdenum system developed near the headwaters of Rusk Creek; and,
2. scattered precious metal veins and stockwork zones.

During the current trenching program, mineralization was also discovered in brecciated tuff horizons, as described in the Trenching section. The location of mineral occurrences is shown on Figure 3.

The porphyry mineralization is found in talus within an area 1000 m in diameter and consists of minor molybdenite with traces of chalcopyrite, hematite and pyrrhotite. The sulphides occur as fine disseminations or coat hairline fractures where they are associated with sugary quartz and secondary biotite. The host rocks are dacites and biotite-feldspar porphyry on the eastern contact of the silicified quartz-feldspar porphyry plug. Pyrite with minor chalcopyrite occurs in the quartz-feldspar porphyry. Area Exploration tested the porphyry mineralization with a 183.9 m diamond drill hole in 1972 but results were disappointing. The best values were 0.008% Mo and 0.03% Cu over different 3 m intervals. A swarm of narrow (up to 1 cm wide) sphalerite-, galena- and pyrite-bearing quartz veins was intersected near the bottom of the hole and assays from intervals containing them returned values up to 0.01 oz/ton Au with 0.16 oz/ton Ag over 3 m.

Precious metal mineralization is best exposed in Dickson's trenches on the north side of Rusk Creek where it is associated with three northwest- to north-northwest trending vein faults and related breccias that cut highly

fractured feldspar porphyry and dacite flows. The feldspar porphyry typically exhibits strong argillic alteration but the volcanics are relatively fresh. The highest values (up to 0.054 oz/ton Au with 0.42 oz/ton Ag over 6 m) are associated with either the veins or the brecciated feldspar porphyry. Rocks in the trenches are well oxidized, aside from minor galena and pyrite in the more massive volcanics.

Prospecting in 1986 located two other poorly exposed precious metal occurrences. The first lies along the northwest-trending airphoto linear on the south side of Rusk Creek and consists of a specimen of brecciated and weakly limonite-stained rhyolite which assayed a surprisingly high 0.074 oz/ton Au and 0.42 oz/ton Ag. This structure is recessive weathering and material from it is mostly obscured by rock from more resistant units. The other occurrence is located along the main ridge top 1100 m northwest of Dickson's trenching area. This mineralization was exposed in a small, recent slump and included several fist-sized pieces of strongly brecciated volcanic float cemented by yellow-brown to pale green limonite boxwork. A specimen of this material assayed 0.022 oz/ton Au with greater than 3.0 oz/ton Ag. There was no evidence of old workings at either site.

### TRENCHING

All of the 1987 work was done in a single 700 m long trench that contours around the head of Rusk Creek and tests the largest and most intense soil geochemical anomalies on the property. The trenching was done with a ripper-equipped Caterpillar D7-G bulldozer and Caterpillar 225 excavator, both owned by Ibex Contracting Limited of Whitehorse.

The area of interest is characterized by steep (20 to 30°) slopes consisting primarily of ice cemented talus. Thus, progress was generally slow and constant attention was required to ensure that the equipment did not slide down the slope. At one point the bulldozer and operator skidded out of control for 150 m down a lightly vegetated frozen slope but fortunately there was no significant damage or injuries.

Bedrock was rarely exposed in the trench because of the thick talus layer and pervasive frost, however the talus was carefully mapped and prospected. Aside from minor disseminated pyrite and a single specimen containing about 1% galena, no mineralization was observed. Brecciation and weak clay alteration are widespread particularly within siliceous tuff horizons. The highest assay (0.019 oz/ton Au and 1.12 oz/ton Ag) was obtained from a sample across a 2.5 m thick, strongly limonitic and intensely fractured, silicified tuff horizon.

CONCLUSION AND RECOMMENDATIONS

Surface exploration on the Rusk Group has outlined three areas of anomalous soil geochemical response and located several precious metal occurrences; however, the steep slopes and pervasive frost make bulldozer and excavator trenching very costly. The veins exposed in Dickson's trenches on the north side of Rusk Creek are too narrow and low grade to be of direct economic interest and the character, distribution and abundance of mineralized float elsewhere on the property suggests that most is derived from similar subeconomic veins. Sampling and mapping of talus in the trench cut through the best soil geochemical anomalies returned generally negative results but did show that there is a slight concentration of metals in some brecciated and altered tuffaceous horizons. A stratabound source such as this would be an attractive exploration target except that the horizons are narrow and low grade.

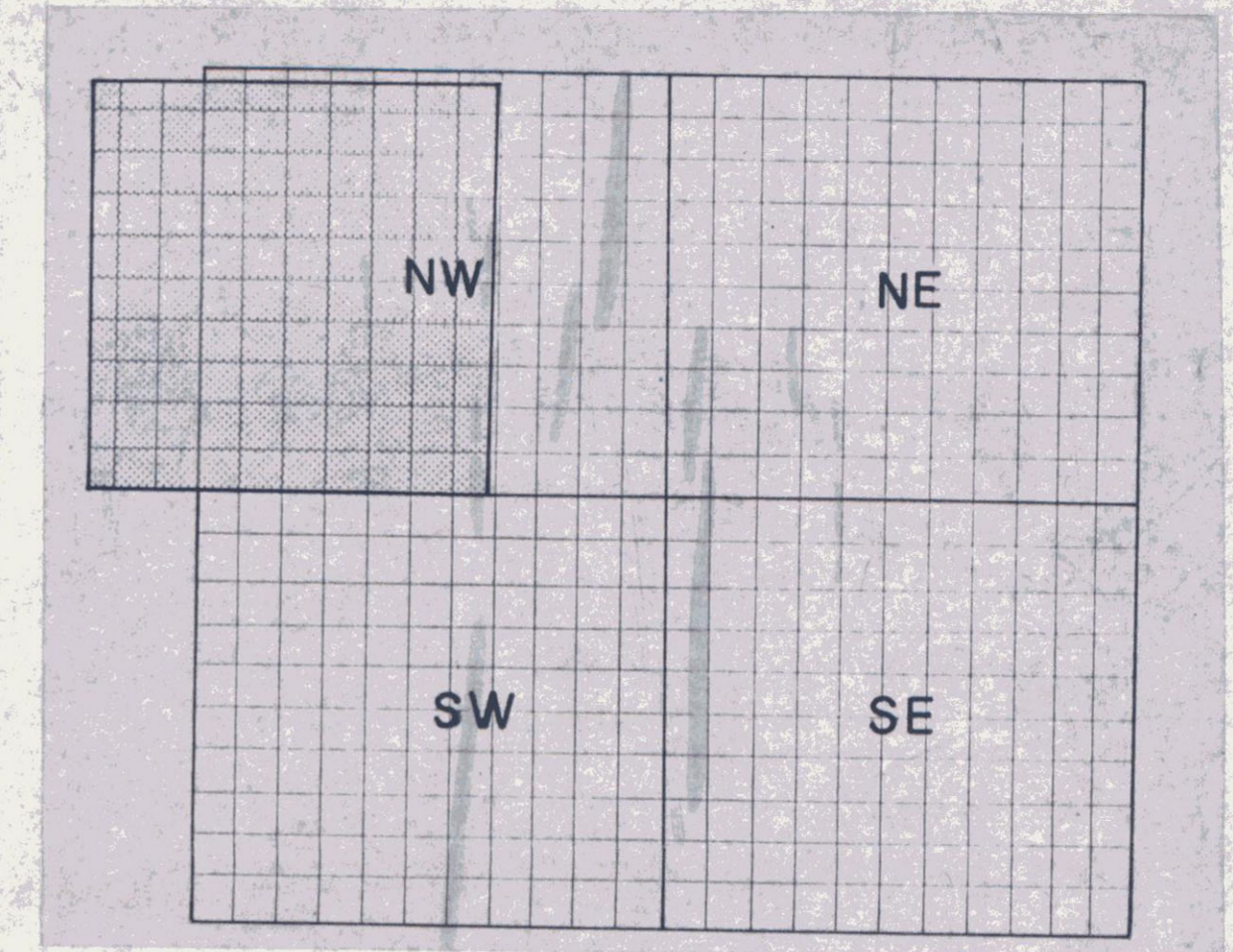
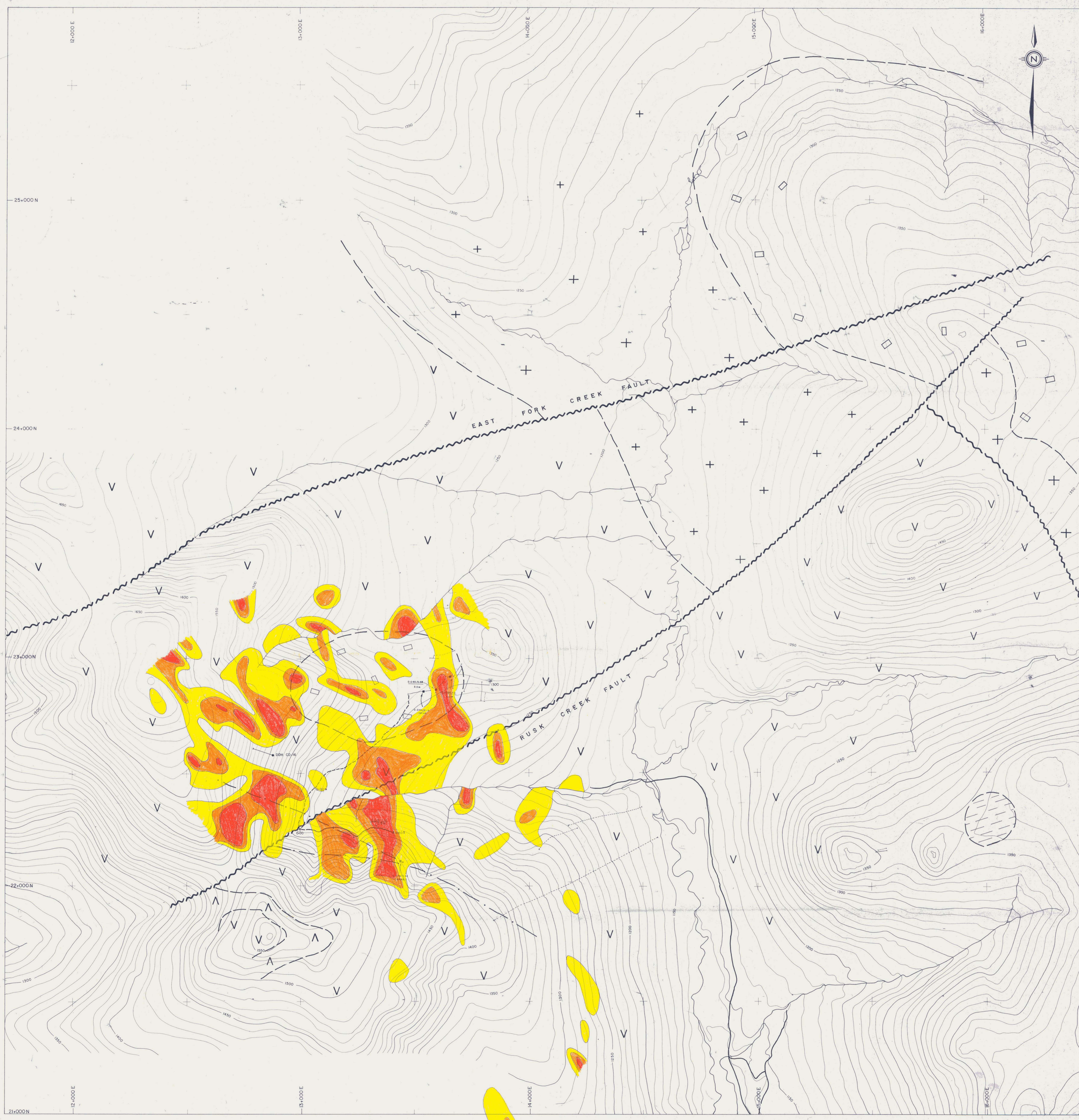
Considering the results, it appears that the Rusk Group has little potential for hosting either a bulk tonnage deposit or high grade mineralization. This, coupled with the relatively high exploration costs and escalating option payments, makes the property a risky venture. Therefore, it is recommended that the option be allowed to lapse.

Respectfully submitted,

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

/mc

W.D. Eaton, B.A., B.Sc.



- LEGEND**
- Mid-Cretaceous**
- Quartz feldspar porphyry
  - Rhyolitic tuffs and flows
  - Andesitic flows, tuffs and agglomerates
  - Granodiorite and diorite
- Paleozoic or older**
- Gneiss and schist with lesser amphibolite, quartzite and marble

- Topographic linear feature
  - Fault
  - Geological contact
  - Rock sample site
  - Trench (bedrock)
  - Trench (not to bedrock)
  - Road
  - Area Exploration diamond drill hole (1972)
- Gold Geochemistry**
- ≤ 25    > 50 ppb
  - ≤ 50    > 100 ppb
  - ≤ 100 ppb

092122

**Chevron Canada Resources Limited**  
Minerals Staff

**GEOLOGY, MINERALIZATION AND GOLD GEOCHEMISTRY**  
**DICKSON GROUP**

FIGURE No.	3	PROJECT No.	NANSEN
DATE	DEC/86	REVISIONS	SCALE 1:5000
NTS No.			FILE No.
COMPILED BY ARCHER, CATIRO & ASSOCIATES (1981) LIMITED			

APPENDIX I  
AUTHOR'S STATEMENT OF QUALIFICATIONS

## STATEMENT OF QUALIFICATIONS

I, W. Douglas Eaton, geologist, with business addresses in Whitehorse, Yukon Territory and Vancouver, British Columbia, and residential address in Burnaby, British Columbia, do hereby declare:

1. I graduated from the University of British Columbia in 1980 with a B.Sc.
2. From 1971 to the present, I have been actively engaged in mineral exploration in British Columbia and Yukon Territory and on June 1, 1981, became a partner in Archer, Cathro & Associates (1981) Limited.
3. I have personally participated in or supervised the field work reported herein and have interpreted all data resulting from this work.

---

W. Douglas Eaton, B.A., B.Sc.

**APPENDIX II**

**PERSONNEL**

NAMEPOSITIONDATES ON PROPERTY

M. Walls

Geologist

September 10, 16, 17

T. Becker

Fieldman

August 2

J. Corrigan

Fieldman

August 2

R. Hancox

Fieldman

September 17

APPENDIX II  
AUTHORS' STATEMENTS OF QUALIFICATIONS

STATEMENT OF QUALIFICATIONS

I, W. Douglas Eaton, geologist, with business addresses in Whitehorse, Yukon Territory and Vancouver, British Columbia, and residential address in Burnaby, British Columbia, do hereby declare:

1. I graduated from the University of British Columbia in 1980 with a B.Sc.
  
2. From 1971 to the present, I have been actively engaged in mineral exploration in British Columbia and Yukon Territory and on June 1, 1981, became a partner in Archer, Cathro & Associates (1981) Limited.
  
3. I have personally participated in or supervised the field work reported herein and have interpreted all data resulting from this work.

---

W. Douglas Eaton, B.A., B.Sc.

STATEMENT OF QUALIFICATIONS

I, Michael J. Walls, geologist, with business addresses in Whitehorse, Yukon Territory and Vancouver, British Columbia, and residential address in Vancouver, British Columbia, hereby certify that:

1. I graduated from the University of British Columbia in 1985 with a B.Sc. majoring in Geological Sciences.
2. From 1985 to present, I have been actively engaged as a geologist in mineral exploration in Yukon Territory and am presently employed with Archer, Cathro & Associates (1981) Limited.
3. I have personally participated in or supervised the field work reported herein and have interpreted all data resulting from this work.



---

Michael J. Walls, B.Sc.

APPENDIX III  
LIST OF PERSONNEL

<u>NAME</u>	<u>POSITION</u>	<u>DATES ON PROPERTY</u>
M. Walls	Geologist	May 28-June 29; July 1, 2, 4-16, 18-26; August 10-16, 19-31; September 1-20
T. Becker	Fieldman	May 28-June 7; June 10-25, 27, 29; July 1-5, 26-30; August 1-3, 10, 16, 17, 19-28
J. Corrigan	Fieldman	May 28-June 17; July 13, 20-28, 30,; August 1-3, 7-15
D. Parry	Fieldman	May 28
J. MacRory	Surveyor	May 28-June 25, 28, 30; July 1, 5; August 6-21
B. McTaggart	Surveyor	June 6-25, 28; July 1, 4, 5; August 6-21
G. Cockell	Fieldman	May 28-June 8; June 10-30; July 1-4
M. Phillips	Geologist	June 2-26; July 1-7
L. Vano	Fieldman	June 10-17; July 12
S. Price	Cook	July 1-22; August 6-13, 16-31; September 1-8
L. Robinson	Cook	May 28-June 30
D. Turner	Fieldman	July 20-23
R. Hancox	Fieldman	August 2, 16-31; September 1-15, 17-21
J. Sebben	Fieldman	August 28-31; September 1-3
R. Streich	Fieldman	September 19-21

APPENDIX IV  
ENVIRONMENTAL UPDATE FOR THE MT. NANSEN PROJECT  
NORECOL ENVIRONMENTAL CONSULTANTS LTD.

# DRAFT

## ENVIRONMENTAL UPDATE FOR THE MOUNT NANSEN PROJECT

Prepared for:

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1900 - 1055 West Hastings Street  
Vancouver, B. C.  
V6E 2E9

Prepared by:

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March, 1987

File: 58-3E

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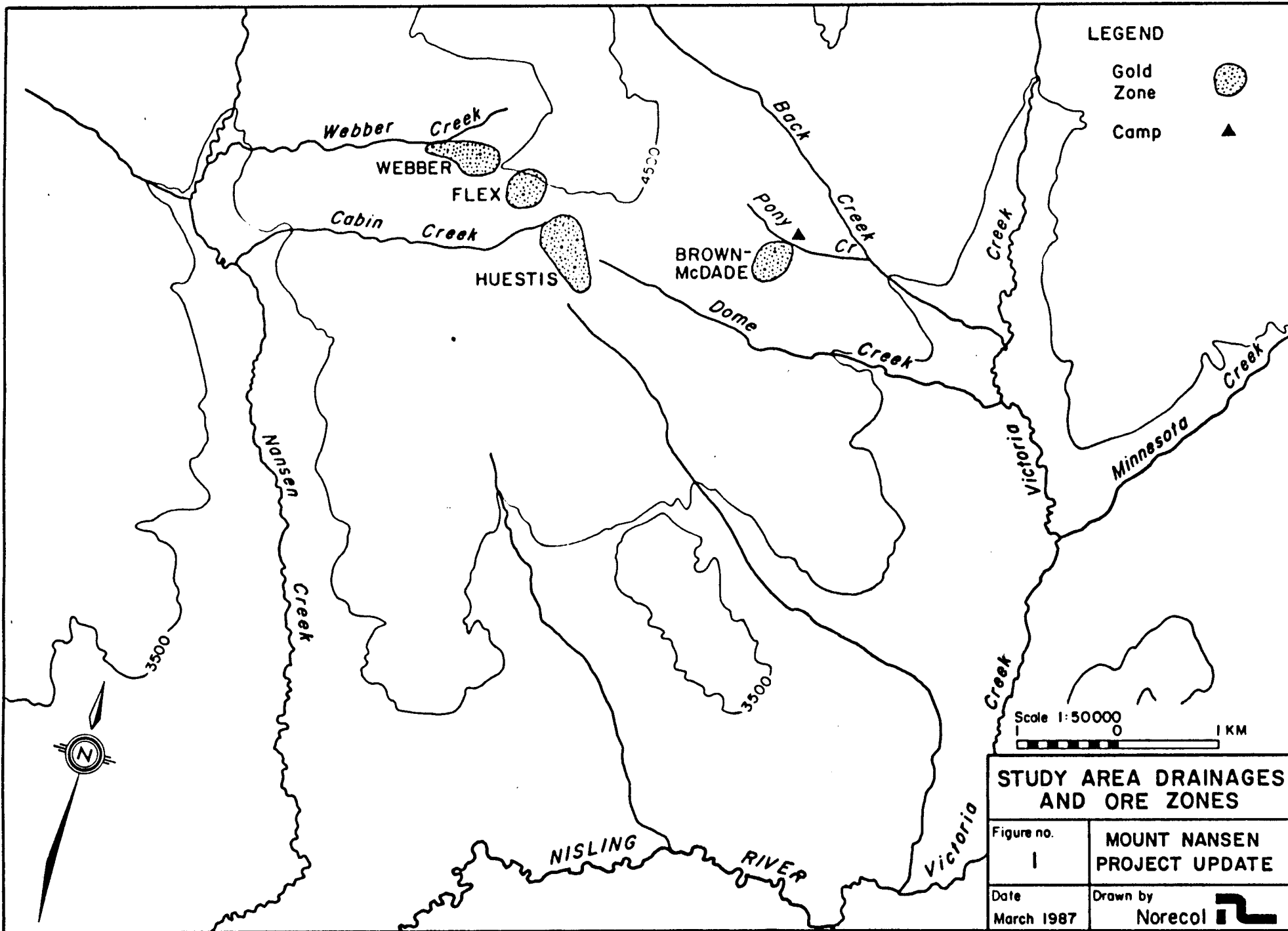
## 1.0 INTRODUCTION

### 1.1 Background

The three principle vein systems occurring in the Mount Nansen Project area are the Huestis, Webber and Brown - McDade zones (Figure 1). The first exploration in the area occurred in 1946 on the Brown - McDade Zone, and since then the Huestis and Webber veins have been developed by underground workings. A 70 ton per day mill operated in 1968 and 1969 and again in 1976, but has remained closed since 1976. Tailings associated with mill operation are found in three separate structures located on Dome Creek. The property is currently owned by BYG and is optioned to Chevron.

The exploration program is continuing in attempts to prove-up additional reserves of gold and silver ores. The program discovered a new zone, the Flex Zone, during 1986 (George Cross News Letter, 1987). In 1986, there were 81 trenches dug to bedrock, 24 in the Brown - McDade Zone, 25 in the Flex, Webber and Heustis zones and the remaining trenches in other zones.

The preliminary plans indicate mining by open pit and underground methods with a mill preparing the ore on-site. Gold extraction would be accomplished by conventional milling and flotation separation techniques, which would require a tailings pond. Heap leaching with cyanide is being considered as an alternative method of gold extraction.



## 1.2 Objectives

The objective of this report is to compile, assess and present the environmental information collected to-date; particularly since 1985. In addition, other pertinent environmental information which has been obtained from government agencies is included.

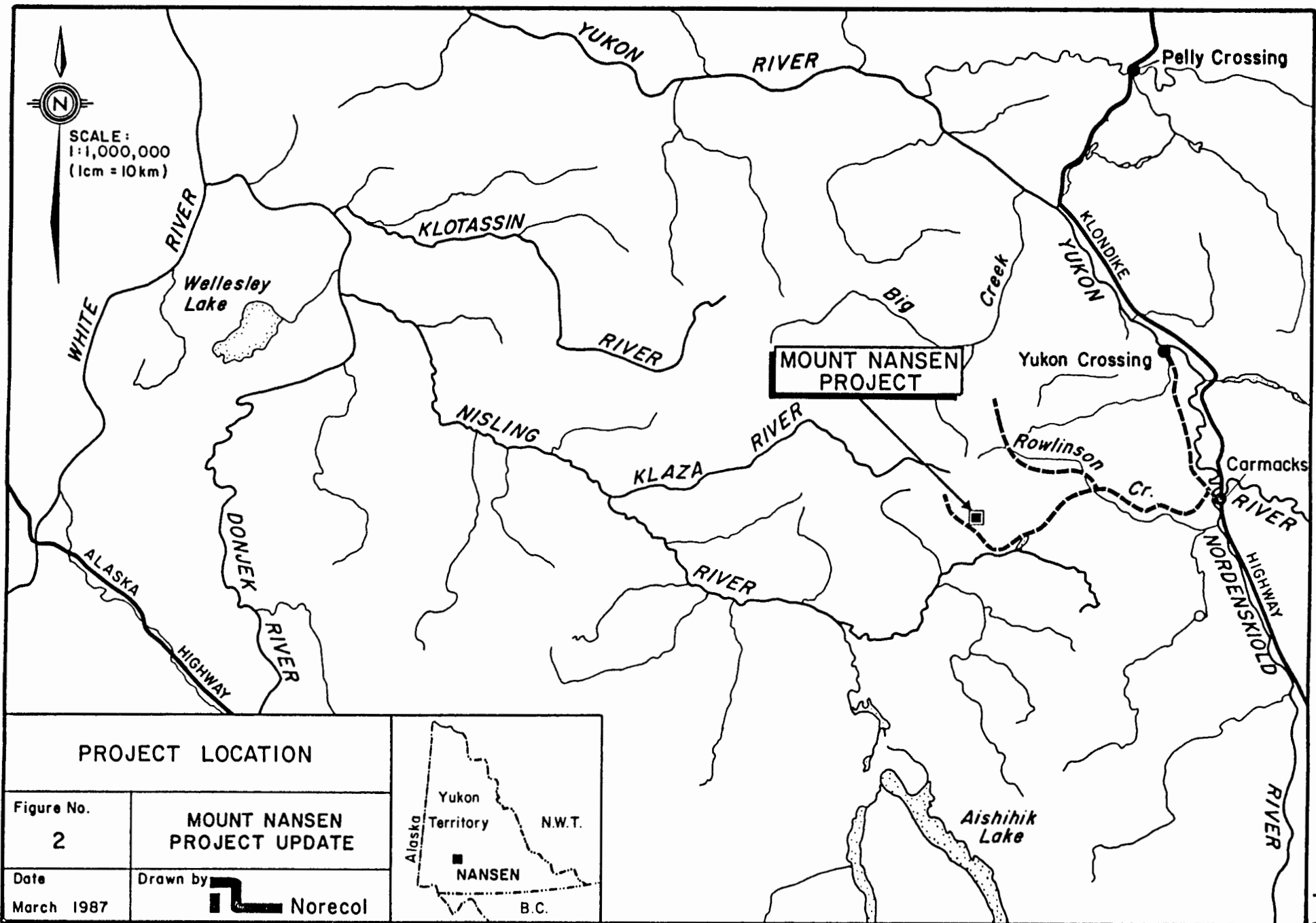
## 1.3 Project Location

Chevron Canada Resources Limited is investigating the potential of the Mount Nansen gold property in the Yukon Territory (Figure 2). The project area is located approximately 190 km northwest of Whitehorse at 62°03'N and 137°07'W. The property is accessed by a gravel road from Carmacks, located 45 km to the east.

## 1.4 Environmental Setting

The Mount Nansen claims are located in the Dawson Range at elevations ranging between 945 m and 1525 m. The area is drained by the Nisling River, which empties into the Yukon River via the Donjek and White Rivers (Figure 2). Drainage from the property flows into two moderate sized tributaries of the Nisling River, Nansen Creek to the west and Victoria Creek to the east (Figure 1).

The area lies in the Dawson Range Ecoregion and is vegetated by black and white spruce, aspen, balsam, poplar and paper birch. The principle understory is willow, shrub birch, labrador tea, moss and lichens (Oswald and Senyk, 1977).



PROJECT LOCATION

Figure No.  
2

MOUNT NANSEN  
PROJECT UPDATE

Date  
March 1987

Drawn by  Norecol



The geology of the deposit is composed of vein structures cutting much older metamorphic rocks in three principle vein systems (Davidge, 1984). Ore minerals are arsenopyrite, pyrite, galena, sphalerite and minor sulphides. Ore bearing structures occur as sulphides associated with discontinuous quartz lenses and stringers in fractured, altered zones up to several feet wide (Environmental Protection Service (EPS), 1979).

Some environmental information has been collected in recent years related to the earlier mining activity in the area. The Environmental Protection Service (1979) examined water chemistry and biological conditions in the Victoria Creek watershed in 1976 and 1977. EPS found that the creek receiving mine decant water had reduced bottom fauna, but there was little impact on the bottom fauna and fish populations in Victoria Creek. During 1982, EPS conducted leaching experiments on tailings from the Mount Nansen mine to determine oxidation potential (Davidge, 1984). It was found that the tailings remained alkaline, did not oxidize appreciably, and leaching bacteria were prevented from becoming established due to acid consuming properties of the tailings.

Preliminary geotechnical and permafrost information was gathered in the project area by Klohn Leonoff Consulting Engineers (1985) in September, 1985. In general, the ridge tops and steeper hillsides have either no tree cover and bedrock outcropping or there is a cover of 1 to 3 metres of weathered rock over intact bedrock. Extensive deposits of grey-brown sand

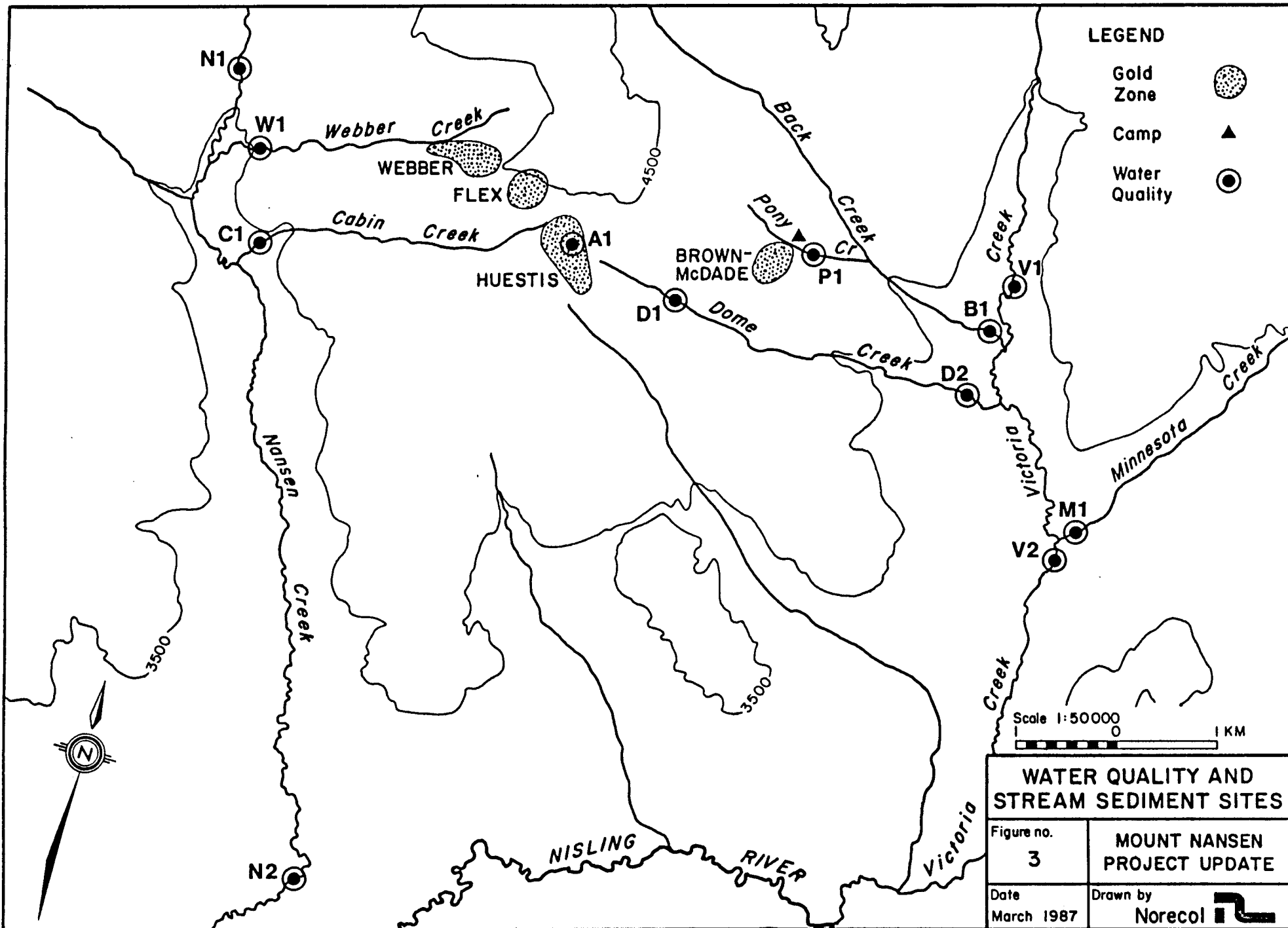
occur in the valley bottoms and in the benchland near Dome Creek. Permafrost is evident at shallow depths (about 0.4 m) where the rock has an organic or moss cover, but where cover has been removed the permafrost layer occurs at greater depths (about 5.0 m). The permafrost layer in this region is 30 to 60 metres thick. Mean annual temperature at the site is approximately  $-3^{\circ}\text{C}$ .

## 2.0 RESULTS AND ASSESSMENT OF 1985/86 PROGRAM



### 2.1 Water Quality


Water quality sampling was conducted in the Mount Nansen Project area on October 11, 1985 and March 4, June 9 and September 4, 1986. Water quality sites are shown in Figure 3 and are described as follows:

- A1 - Lower Huestis Adit.
- N1 - Nansen Creek, 1.0 km upstream of Webber Creek.
- N2 - Nansen Creek, 1.2 km from mouth.
- W1 - Webber Creek, 0.6 km from mouth (drains Webber Zone).
- C1 - Cabin Creek, 0.3 km from mouth (drains Huestis Zone).
- V1 - Victoria Creek, 0.8 km upstream of Back Creek.
- V2 - Victoria Creek, approximately 5 km from mouth.
- M1 - Minnesota Creek, 0.1 km from mouth.
- B1 - Back Creek, 0.2 km from mouth.
- P1 - Pony Creek, tributary to Back Creek, 0.6 km from mouth (drains Brown-McDade Zone).
- D1 - Dome Creek, 3.5 km from mouth (drains Huestis Zone and old mill and tailings area).
- D2 - Dome Creek, 0.4 km from mouth.




**LEGEND**

- Gold Zone 
- Camp 
- Water Quality 

Scale 1:50000  
 1 KM

**WATER QUALITY AND  
 STREAM SEDIMENT SITES**

Figure no. <b>3</b>	<b>MOUNT NANSEN PROJECT UPDATE</b>
Date March 1987	Drawn by Norecol 

Analytical results from the four sampling periods are shown in Tables 1, 2, 3 and 4. On March 4, 1986 water was collected only from Webber Creek (W1) due to ice conditions and lack of water at the other sites; most sites were covered with 1-2 m of ice which was continuous to the creek bottom. Sampling was attempted at all sites except Victoria Creek (V1), Back Creek (B1) and Dome Creek (D2) which were observed from the air and judged to be similar to the other sites which had no flow. Webber Creek (W1) was sampled when groundwater recharge softened the ice.

Recent water quality data has also been collected in the Mount Nansen Project area by Indian and Northern Affairs Canada (INAC). This information is presented in Appendix I. On August 27, 1986 conductivity and temperature were measured at selected sites (Table 1, Appendix I) and water from Pony Creek (P1) was collected and analyzed (Table 2, Appendix I). A comparison of the analyses for Pony Creek (P1) collected August 27 by INAC (Table 2, Appendix I) and September 4 by Norecol (Table 4) show considerable differences in certain parameters. The reasons for these differences are not known, but may be related to the fact that the INAC sampling location was about 100 m downstream of the Norecol site and there was about a week between the two samplings. This emphasizes the need to adhere to a designated sample site. It is apparent that water quality characteristics can change over short distances with such locally enriched mineralogy as is found in the Mount Nansen Project area.

TABLE 1  
ANALYTICAL RESULTS FOR WATER SAMPLES FROM MOUNT NANSEN PROJECT

Sampling Date: October 11, 1985

ANALYTICAL PARAMETER	SITE A1	SITE B1	SITE C1	SITE D1	SITE D2	SITE M1	SITE N1	SITE N2	SITE P1	SITE V1	SITE V2	SITE W1
Temperature (°C)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
pH	7.3	7.3	7.2	7.3	7.0	6.9	7.5	7.8	7.5	7.7	7.5	7.1
Alkalinity (mgCaCO <sub>3</sub> /L)	192	67	28	236	58	22	50	55	89	69	61	43
Turbidity (NTU)	6	48	4.5	30	3.7	2.5	5.5	5.5	5.2	0.8	9	5.8
Conductance (µmhos/cm)	660	150	67	1200	350	51	126	136	264	140	125	150
Total Solids (mg/L)	782	248	112	1435	370	96	144	144	269	120	154	170
Suspended Solids (mg/L)	1	57	<1	14	<1	<1	7	4	1	2	16	<1
EDTA-Hardness (mgCaCO <sub>3</sub> /L)	535	94	39	963	212	24	72	77	162	83	69	83
Sulfate (mg/L)	334	31	15	694	156	<1	29	25	82	11	17	44
Ammonia (mgN/L)	0.063	0.053	0.011	0.342	0.010	0.006	0.006	<0.005	0.081	<0.005	<0.005	0.005
Nitrate (mgN/L)	0.092	0.021	0.013	0.117	0.015	0.030	0.035	0.023	0.037	0.044	0.037	0.011
Nitrite (mgN/L)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Total Phosphorus (mgP/L)	0.026	0.113	0.008	0.077	0.017	0.006	0.014	0.014	0.017	0.008	0.024	0.008
Total Cyanide (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
<b>TOTAL METALS: (mg/L)</b>												
Ag	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As	0.062	0.024	0.004	0.072	0.019	<0.001	0.002	0.002	0.016	<0.001	0.004	0.005
Ba	0.023	0.12	0.041	0.072	0.046	0.048	0.056	0.042	0.050	0.067	0.071	0.033
Cd	0.0070	0.0004	<0.0002	0.0021	<0.0002	<0.0002	<0.0002	<0.0002	0.0089	<0.0002	<0.0002	<0.0002
Cu	0.0022	0.0063	0.0019	0.0031	0.0014	0.0028	0.0083	0.0077	0.19	0.0015	0.0028	0.0011
Fe	0.85	4.14	0.78	8.8	1.04	0.83	0.64	0.54	1.42	0.12	0.77	1.18
Hg (µg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pb	<0.001	0.0035	<0.001	0.0017	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zn	1.19	0.0093	0.0009	0.65	0.013	0.0015	0.0030	0.0022	0.95	0.0010	0.0026	0.0010
<b>DISSOLVED METALS: (mg/L)</b>												
Ag	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As	0.005	0.006	0.003	0.007	0.012	<0.001	<0.001	0.001	0.012	<0.001	0.001	0.004
Ba	0.020	0.12	0.040	0.058	0.044	0.046	0.041	0.040	0.050	0.059	0.069	0.030
Cd	0.0054	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0071	<0.0002	<0.0002	<0.0002
Cu	0.0012	0.0046	0.0019	0.0025	0.0013	0.0026	0.0075	0.0075	0.11	0.0015	0.0025	0.0010
Fe	0.036	0.51	0.48	0.033	0.56	0.46	0.22	0.14	0.81	0.10	0.09	0.52
Pb	<0.001	<0.001	<0.001	<0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zn	1.10	0.0042	0.0010	0.39	*-	*-	*-	*-	0.77	0.0010	0.0022	*-

\*Samples stored and analysed at a later date. All dissolved values were equal to or less than totals indicated.

TABLE 2

## ANALYTICAL RESULTS FOR WATER SAMPLES FROM MOUNT NANSEN PROJECT

Sampling Date: March 4, 1986

ANALYTICAL PARAMETER	SITE W1
Temperature (°C)	0.0
pH	6.8
Alkalinity (mgCaCO <sub>3</sub> /L)	80
Turbidity (NTU)	0.65
Conductance (µmhos/cm)	183
Total Solids (mg/L)	181
Suspended Solids (mg/L)	<1
EDTA-Hardness (mgCaCO <sub>3</sub> /L)	123
Sulfate (mg/L)	50
Ammonia (mgN/L)	0.039
Nitrate (mgN/L)	0.007
Nitrite (mgN/L)	<0.002
Total Phosphorus (mgP/L)	<0.003
Total Cyanide (mg/L)	<0.001
<u>TOTAL METALS: (mg/L)</u>	
Ag	<0.0005
As	<0.001
Ba	0.057
Cd	<0.0002
Cu	0.0006
Fe	0.09
Hg (µg/L)	<0.05
Pb	<0.001
Zn	0.0046
<u>DISSOLVED METALS: (mg/L)</u>	
Ag	<0.0005
As	<0.001
Ba	0.055
Cd	<0.0002
Cu	0.0006
Fe	0.037
Pb	<0.001
Zn	0.0010

(0318d)

TABLE 3

## ANALYTICAL RESULTS FOR WATER SAMPLES FROM MOUNT NANSEN PROJECT

Sampling Date: June 9, 1986

ANALYTICAL PARAMETER	SITE A1	SITE B1	SITE C1	SITE D1	SITE O2	SITE M1	SITE N1	SITE N2	SITE P1	SITE V1	SITE V2	SITE W1
Temperature (°C)	1.0	5.0	5.0	3.0	4.0	3.0	5.0	7.0	4.0	3.5	3.0	3.0
pH	7.4	7.3	7.6	7.5	7.3	7.3	7.6	7.7	7.5	7.7	7.8	7.4
Alkalinity (mgCaCO <sub>3</sub> /L)	172	26	21	128	40	19	24	28	30	44	41	37
Turbidity (NTU)	3.6	150	1.2	6.2	0.5	1.0	29	23	3.0	2.0	11	0.8
Conductance (µmhos/cm)	805	105	69	940	410	42	74	82	103	87	88	115
Total Solids (mg/L)	825	1563	175	1044	424	116	242	198	169	150	171	152
Suspended Solids (mg/L)	3	1418	5	6	<1	<1	108	50	5	14	42	1
EDTA-Hardness (mgCaCO <sub>3</sub> /L)	547	35	29	641	234	20	36	41	55	49	48	59
Sulfate (mg/L)	368	19	11	496	187	<1	14	14	23	7	9	22
Ammonia (mgN/L)	0.026	0.043	<0.005	0.230	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrate (mgN/L)	0.336	0.096	0.027	0.223	0.010	0.058	0.064	0.030	0.054	0.070	0.078	0.022
Nitrite (mgN/L)	0.005	<0.002	<0.002	0.009	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Total Phosphorus (mgP/L)	<0.003	2.18	<0.003	<0.003	<0.003	<0.003	0.176	0.076	<0.003	<0.003	0.040	<0.003
Total Cyanide (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
<b>TOTAL METALS: (mg/L)</b>												
Ag	0.0002	0.0028	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	<0.0002
As	0.049	0.168	<0.001	0.021	0.012	<0.001	0.006	0.004	0.015	<0.001	0.005	0.001
Ba	0.017	0.18	0.031	0.027	0.038	0.038	0.053	0.038	0.031	0.032	0.034	0.030
Cd	0.0061	0.0025	<0.0002	0.0050	<0.0002	<0.0002	0.0004	0.0003	0.0017	<0.0002	<0.0002	<0.0002
Cu	0.0064	0.08	0.0019	0.0042	0.0018	0.0025	0.019	0.015	0.034	0.0025	0.0038	0.0021
Fe	0.64	45.5	0.37	1.04	0.24	0.81	2.73	1.96	0.81	0.33	1.12	0.24
Hg (µg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pb	0.0013	0.08	<0.001	0.0019	<0.001	<0.001	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001
Zn	1.36	0.27	0.0019	2.47	0.04	0.0040	0.018	0.012	0.14	0.0018	0.0018	0.0015
<b>DISSOLVED METALS: (mg/L)</b>												
Ag	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
As	0.005	0.037	<0.001	0.018	0.009	<0.001	0.003	0.002	0.011	<0.001	0.002	<0.001
Ba	0.016	0.095	0.023	0.026	0.038	0.036	0.025	0.019	0.029	0.028	0.030	0.026
Cd	0.0058	0.0006	<0.0002	0.0041	<0.0002	<0.0002	<0.0002	<0.0002	0.0015	<0.0002	<0.0002	<0.0002
Cu	0.0061	0.0057	0.0017	0.0027	0.0018	0.0024	0.0068	0.0073	0.031	0.0020	0.0023	0.0015
Fe	0.45	6.85	0.34	0.37	0.16	0.74	0.79	0.71	0.67	0.09	0.35	0.16
Pb	<0.001	0.0025	<0.001	0.0017	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zn	1.34	0.014	0.0011	2.37	0.04	0.0037	0.0041	0.0040	0.13	0.0015	0.0018	0.0015

(0318d)

TABLE 4

## ANALYTICAL RESULTS FOR WATER SAMPLES FROM MOUNT NANSEN PROJECT

Sampling Date: September 4, 1986

ANALYTICAL PARAMETER	SITE A1	SITE B1	SITE C1	SITE D1	SITE D2	SITE M1	SITE N1	SITE N2	SITE P1	SITE V1	SITE V2	SITE W1
Temperature (°C)	2.0	8.0	7.0	6.5	7.5	6.0	10.0	8.0	8.0	9.0	8.5	8.5
Dissolved Oxygen (mg/L)	-	11.2	10.9	7.4	8.3	10.7	8.4	10.9	-	9.7	9.7	9.4
pH:												
Field	6.8	7.7	7.7	7.5	7.5	7.1	7.8	8.2	7.7	7.8	7.8	7.7
Laboratory	7.7	7.8	7.6	7.6	7.6	7.3	7.7	8.0	7.8	8.0	8.0	7.6
Alkalinity (mgCaCO <sub>3</sub> /L)	208	47	24	85	46	18	39	43	31	60	52	49
Turbidity (NTU)	10	110	2.5	6.8	1.5	3.5	6.9	4.3	16	4.2	40	46
Conductance (µmhos/cm)	900	135	65	330	230	39	110	106	89	115	115	156
Total Solids (mg/L)	850	1167	179	362	219	115	134	117	128	101	567	485
Suspended Solids (mg/L)	9	965	2	32	3	9	15	6	23	8	322	363
EDTA-Hardness (mgCaCO <sub>3</sub> /L)	601	69	32	194	118	22	54	56	46	62	61	80
Sulfate (mg/L)	420	40	10	126	130	<1	21	18	18	9	16	38
Ammonia (mgN/L)	0.078	0.119	0.008	0.104	0.014	0.005	0.009	0.009	0.065	0.008	0.020	0.024
Nitrate (mgN/L)	0.220	0.057	0.010	0.066	0.006	0.005	0.020	<0.005	0.048	0.019	0.022	0.006
Nitrite (mgN/L)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Total Phosphorus (mgP/L)	0.059	0.693	0.091	0.054	0.059	0.043	0.038	0.041	0.084	0.024	0.223	0.374
Total Cyanide (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
<b>TOTAL METALS: (mg/L)</b>												
Ag	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
As	0.050	0.056	0.004	0.010	0.026	0.001	0.002	0.002	0.011	<0.001	0.024	0.021
Ba	0.011	0.15	0.021	0.031	0.018	0.038	0.026	0.020	0.051	0.044	0.10	0.09
Cd	0.0051	0.0026	<0.0002	0.0005	0.0003	0.0002	0.0003	0.0002	0.0004	<0.0002	0.0010	0.0006
Cu	0.0023	0.027	0.0022	0.0021	0.0025	0.0034	0.0083	0.0058	0.0027	0.0027	0.013	0.010
Fe	0.62	17.7	0.80	1.95	1.37	0.94	1.01	0.57	1.70	0.43	4.74	6.16
Hg (µg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pb	<0.001	<0.018	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.004
Zn	1.33	-	-	-	-	-	-	-	-	-	-	-
<b>DISSOLVED METALS: (mg/L)</b>												
Ag	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
As	0.013	0.006	0.003	0.005	0.008	<0.001	<0.001	0.002	0.006	<0.001	0.001	0.001
Ba	0.011	0.036	0.014	0.025	0.013	0.025	0.021	0.016	0.040	0.038	0.023	0.033
Cd	0.0051	0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	0.0002	0.0003
Cu	0.0008	0.0065	0.0022	0.0014	0.0025	-	0.0054	0.0046	-	0.0026	0.0066	0.0027
Fe	0.23	0.47	0.51	0.93	0.39	0.41	0.46	0.26	0.77	0.18	0.24	0.26
Pb	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zn	1.31	-	-	-	-	-	-	-	-	-	-	-

G. Whitley (Administrator, Pollution Control, Water Resources Division, INAC) accompanied Norecol during the September 4, 1986 sampling. INAC will be sampling water from study area streams in 1987/88, but the sampling program will depend largely on the activity planned for the area.

Analytical results of the water samples collected by Norecol indicate the water in the Mount Nansen Project area is generally soft and slightly alkaline. However, water from the lower Huestis adit (A1) is hard, very alkaline, highly conductive, and high in total solids. Dome Creek receives water from the lower Huestis adit, and as a result exhibits similar hard, alkaline conditions. In fact, the upstream site on Dome Creek (D1) had higher conductivity, hardness and total solids than Site A1 during the October 11, 1985 (Table 1) and June 9, 1986 (Table 3) samplings, indicating additional dissolution of minerals.

Elevated levels for suspended solids occur in certain streams in the area, usually reflecting upstream placer mining activity. This is particularly prevalent during periods of peak runoff. Levels for suspended solids were extremely high in Back Creek (B1) in June, 1986 (1 418 mg/l) and September, 1986 (965 mg/l) due to the close proximity of this site to placer mining activity. Elevated levels for suspended solids were also found at Site N1 (108 mg/l) in June, 1986, and at site V2 (322 mg/l) and W1 (363 mg/l) in September, 1986. The highest values occurred on June 9, 1986 during spring runoff, with the exception of B1 and N1 other values were at or below 50 mg/l.

Levels of nutrients were found to be highly variable in study area streams. Upper Dome Creek (D1) had elevated ammonia (0.104 - 0.342 mg N/l) and nitrates (0.117 - 0.223 mg N/l) on two occasions, Back Creek (B1) had elevated ammonia (0.119 mg N/l) on one occasion, and the lower Huestis adit (A1) had elevated nitrates (0.220 - 0.336 mg N/l) on two occasions. Sites A1, B1, D1 and F1 also showed slightly elevated levels of ammonia (0.026 - 0.081 mg N/l) and nitrate (0.021 - 0.096 mg N/l) on other occasions. Other nutrients such as nitrite had concentrations generally below detection limits. Although total ammonia itself is not considered a highly toxic substance, the un-ionized form of ammonia hydroxide is considered highly toxic. The concentration of un-ionized ammonia is highly dependent on pH and temperature. Acceptable concentrations are extremely low, with levels of 0.003 to 0.025 mg/l causing sublethal effects in trout and levels of 0.2 mg/l or more being acutely toxic. The safe level of nitrate for rainbow trout recommended by Westin (1974) is 6 mg/l, which is much higher than any values from the Mount Nansen Project area.

Background total phosphorus (TP) concentrations in undisturbed environments (e.g. site M1, V1) appear to range between <0.003 and 0.008 mg P/l. The highest TP concentrations (0.113 - 2.18 mg P/l) were measured in Back Creek (B1), the maximum level being recorded on June 9, 1986. The elevated TP levels in Back Creek are probably associated with sediments from placer mining. The effect of the TP loading to Victoria Creek from the Back Creek drainage was evident during the late summer at the lower Victoria Creek sampling location. Webber

Creek also showed elevated TP levels (0.374 mg P/l) on September 4, 1986, probably contributing to the increase in TP between stations N1 (upstream) and N2 (downstream) on Nansen Creek. The higher TP concentration on June 9, 1986 at site N1 than at N2 on Nansen Creek suggest that there is an important upstream TP source entering the creek. The higher overall TP concentrations in late summer (September 4, 1986) rather than in late spring (June 9, 1986) probably reflected the reduced streamflows with continued placer mining.

Pony Creek was used for drinking water during the 1985/86 exploration program, and Minnesota Creek may be used in the future as a water supply. Therefore, the water quality results for Pony Creek (P1) and Minnesota Creek (M1) are compared to recommended drinking water standards (Appendix II). Since the recommended metal levels in Appendix II are based on total concentrations the total metal values presented in Tables 1, 3 and 4 are used as the source for comparison. These results indicate that Pony Creek had a slightly elevated level of cadmium on October 11, 1985. Both Pony Creek and Minnesota Creek had elevated iron levels on all three occasions. These values ranged from 0.81 to 1.70 mg/l for Pony Creek, and from 0.81 to 0.94 mg/l for Minnesota Creek. The recommended level of 0.3 mg/l for iron is established for aesthetic reasons (staining) and is not a health consideration.

In order to assess the potential water quality effects on aquatic biota in the Mount Nansen area the water quality results at all sites are compared to guidelines

recommended for protection of aquatic life (Appendix II). As with the drinking water standards, these guidelines are based on total metal concentrations, therefore, the total metal values appearing in Tables 1 to 4 were used for comparison.

Table 5 shows the range of values that exceeded the recommended guidelines at each site. Pony Creek (P1), which drains the Brown-McDade Zone, had the highest value of cadmium (0.0089 mg/l) and copper (0.19 mg/l) of all sites, and was very high in zinc (0.95 mg/l). Back Creek (B1) had the highest values of total phosphorus (2.18 mg P/l), arsenic (0.168 mg/l) and iron (45.5 mg/l) of all sites. In fact, the level of phosphorus was 87 times the permissible level and iron was 152 times the permissible level. The elevated levels of contaminants in Back Creek are related to the severe disturbance of the stream by placer mining operations both upstream and in the immediate vicinity of the water sampling site. Back Creek also receives water from Pony Creek which has high levels of certain heavy metals.

The other area of concern is the Dome Creek drainage, which drains the Huestis Zone. The sample from the lower Huestis adit (A1) was very high in cadmium (0.0070 mg/l) and zinc (1.36 mg/l), whereas the nearest downstream site on Dome Creek (D1) had the highest zinc value (2.47 mg/l) of all sites and was very high in ammonia (0.342 mg N/l) and iron (9.9 mg/l). Other areas found to be high in iron were lower Victoria Creek (4.7 mg/l) and lower Webber Creek (6.16 mg/l). It should be noted that upper Victoria Creek (V1) had

TABLE 5  
 RANGE OF VALUES FOR WATER QUALITY CHARACTERISTICS EXCEEDING GUIDELINES  
 FOR THE PROTECTION OF AQUATIC ORGANISMS IN THE MOUNT NANSEN AREA

SITE	AMMONIA (mgN/l)	TOTAL P (mgP/l)	TOTAL As (mg/l)	TOTAL Cd (mg/l)	TOTAL Cu (mg/l)	TOTAL IRON (mg/l)	TOTAL ZINC (mg/l)
A1	0.026 - 0.078	0.026 - 0.059	0.050 - 0.062	0.0051 - 0.0070	0.0064	0.62 - 0.85	1.19 - 1.36
B1	0.043 - 0.119	0.113 - 2.18	0.056 - 0.168	0.0004 - 0.0026	0.0063 - 0.08	4.14 - 45.5	0.27
C1		0.091				0.37 - 0.80	
D1	0.104 - 0.342	0.054 - 0.077	0.072	0.0005 - 0.0050		1.04 - 8.8	0.65 - 2.47
D2		0.059		0.0003		1.04 - 1.37	0.04
M1		0.043		0.0002		0.81 - 0.94	
N1		0.038 - 0.176		0.0003 - 0.0004	0.0083 - 0.019	0.64 - 2.73	
N2		0.041 - 0.076		0.0002 - 0.0003	0.0058 - 0.015	0.54 - 1.96	
P1	0.065 - 0.081	0.084		0.0004 - 0.0089	0.034 - 0.19	0.81 - 1.70	0.14 - 0.95
V1						0.12 - 0.43	
V2		0.040 - 0.223		0.0010	0.013	0.77 - 4.74	
W1	0.024 - 0.039	0.374		0.0006	0.010	1.18 - 6.16	

RECOMMENDED LEVELS FOR PROTECTION OF AQUATIC LIFE:

Ammonia	< 0.02 mg/l
Total Phosphorus	< 0.025 mg P/l
Total Arsenic	< 0.05 mg/l
Total Cadmium	< 0.0002 mg/l
Total Copper	< 0.005 mg/l
Total Iron	< 0.3 mg/l
Total Zinc	< 0.03 mg/l

iron levels as high as 0.43 mg/l, which may approximate maximum background levels in the area.

The previous discussion identified areas of environmental concern from a water quality perspective, but it should be noted that the effect of aquatic contaminants on aquatic biota is extremely variable. The effects are dependent on numerous water quality characteristics such as pH, temperature, alkalinity, conductivity, suspended solids, chelating qualities and the form of the contaminant (ionic is more biologically available).

## 2.2 Stream Sediment

Stream sediments were collected at water quality sites in the Mount Nansen area on September 4, 1986. The analytical results of these samples are shown in Table 6.

The Pony Creek (P1) sediment samples contained the highest levels of metals relative to the other sites. With the exception of iron, mercury and silver, the Pony Creek sediment metals concentrations were all at least 10 times greater than those at the other sites; lead and arsenic reached levels of over 100 times those of the other sites. The high metal levels at Site P1 are attributed to the Brown-McDade adit and material from eroding banks near the adit. Sediment metals concentrations are higher in the Victoria Creek drainage than in the Nansen Creek drainage. The area of highest metal enrichment is likely from the Brown-McDade zone and the Back Creek placer mining area.

TABLE 6  
 TOTAL METAL CONCENTRATIONS  
 IN SEDIMENT SAMPLES FROM MOUNT NANSEN PROJECT

SAMPLE	TOTAL METALS: (ug/g DRY WEIGHT)							
	Cu	Zn	Pb	Cd	As	Fe	Ag	Hg
B1	11.5	59.4	14.9	<1.25	22.1	19223	<1.25	<0.05
C1	5.46	39.0	<2.5	<1.24	10.7	33009	<1.24	<0.05
D1	5.46	43.4	3.47	<1.24	12.2	9927	<1.24	<0.05
D2	5.93	47.4	8.90	<1.23	25.2	12112	<1.23	<0.05
N1	26.0	51.5	18.1	<1.22	21.1	14216	<1.22	<0.05
N2	14.9	41.6	9.13	<1.20	13.0	10333	<1.20	<0.05
F1	456	702	1268	11.8	2093	49994	8.13	0.122
V1	13.6	42.2	6.33	<1.17	9.60	13138	<1.17	<0.05
V2	21.1	91.9	21.8	<1.22	50.4	18384	<1.22	<0.05
W1	5.59	28.7	3.89	<1.21	14.2	17015	<1.21	<0.05

### 2.3 Acid Generation

Eight rock samples were collected on October 11, 1985 to conduct Acid-Base accounting tests. This test is a preliminary evaluation of potential of these materials to generate acid. The source of this rock, type of material, and assay analysis results are shown in Table 7. Results indicate that ore and tailings from the Huestis Zone (Site 1, 2 and 8) have considerable acid generation potential. The marginal ore from the Brown-McDade Zone (hanging wall) has a low acid generation potential. The remaining samples exhibited acid consuming properties. Further examination of acid generation potential of rock types will be required as development proceeds.

Previous studies on acid generation potential of mine tailings showed that the tailings from the abandoned Mount Nansen Mine had the ability to consume acid, had little or no oxidation potential, and remained alkaline (Davidge, 1984). These tests were carried out using different procedures compared to those used for the present analyses. The tailing material has been shown to have potential for reprocessing and may require some further analysis for acid generation potential, although no acid generation is apparent from the tailings deposits.

### 2.4 Fisheries

Fisheries information for the area is extremely limited. Arctic grayling (Thymallus arcticus) have been captured in Victoria Creek (Environmental

TABLE 7  
ACID NEUTRALIZATION POTENTIALS  
OF ORE, WASTE ROCK AND TAILINGS FROM MOUNT NANSEN PROJECT

SAMPLE NUMBER	SOURCE	MATERIAL	PERCENT SULFUR	ACID AND BASE TONS CaCO <sub>3</sub> EQUIVALENT/1000 TONS		
				ACID GENERATION POTENTIAL	ACID CONSUMING POTENTIAL (CaCO <sub>3</sub> equivalent)	NET ACID GENERATION POTENTIAL (Acid-Base)
1	Huestis Zone (upper audit)	Ore	7.56	236.9	38.10	198.80
2	Huestis Zone	Ore	16.90	529.4	3.50	525.90
3	Webber Zone	Wall Rock	0.11	3.3	8.68	-5.38
4	Webber Zone	Wall Rock (with pyrite)	0.84	25.8	57.60	-31.80
5	Brown-McDade Zone	Marginal Ore	0.38	11.8	20.70	-8.90
6	Brown-McDade Zone	Wall Rock	0.09	2.6	19.80	-17.20
7	Brown-McDade Zone (hanging wall)	Marginal Ore	0.46	14.3	6.20	8.10
8	Huestis Zone (lower audit)	Tailings	4.53	141.8	30.20	111.60

Protection Service, 1979). This may be the only species occurring in Nansen and Victoria creeks, but both streams have moderate fish habitat capability and could support other fish species.

The Nisling River appears to be a moderate capability stream, but little is known of the fisheries resources in the vicinity of the Mount Nansen Project area. Radio tagging studies have been conducted by Fisheries and Oceans which have tracked chum and chinook salmon 30 km and 80 km, respectively, up the Nisling River from its confluence with the Donjek River (Etherton, pers. comm.). It is unlikely that chum salmon would migrate upstream as far as the project area, but chinook salmon could reach the area providing there are no fish barriers.

Nansen and Victoria creeks have no sport fishing potential, but the Nisling River may support some angling.

## 2.5 Wildlife

The property generally has low to moderate capability for wildlife. Moose occur throughout the area in low numbers in summer and fall, favouring the valley bottoms and riparian edges of streams. Caribou occur in the general area and occasionally move through the property. A bull caribou was observed on an open ridge between Victoria and Back creeks on June 9, 1986 and occasional sightings are made by exploration crews on and near the property.

In terms of wildlife populations during the winter periods, it appears that a few moose utilize the lower elevations, in particular the floodplain and lower slopes along Victoria Creek, for at least part of the winter. Several sightings were made in March, 1986 (Appendix III); one moose near the confluence of Back and Victoria creeks and a cow moose and yearling further downstream in the wide Victoria Creek valley south of the airstrip. Scattered moose tracks were also observed along the floodplain of Victoria Creek. The low snow depth and availability of browse, primarily willows, offer winter range for low densities of moose. The only other ungulate that could occur on the property in winter would be caribou which may occasionally move through the area.

Other large mammals which may occur in low numbers include black bear and wolf. The area appears to have generally low productivity for furbearers. Very little signs of furbearers were observed during field visits, including helicopter flights, and reconnaissance during March, 1986.

A general note of interest is that the Yukon Game Branch has transplanted bison to the Nisling River area, approximately 10 - 15 km downstream (south) of the Mount Nansen property. Large pens were constructed for the bison and hay was moved in to provide winter feed. The bison were brought in by road from Carmacks in the late winter of 1986.

### 3.0 POTENTIAL ENVIRONMENTAL ISSUES

Potential environmental issues related to the development of the Mount Nansen Project were discussed in detail by Norecol (1985). The items identified in this report remain as the most probable areas of concern. They are summarized as follows:

- o There is minimal environmental concern with the existing road since no upgrading is necessary.
- o The potential for acid generation is indicated by Norecol data and will require further examination. Materials handling and reclamation will likely be the key to mitigation if acid generation is determined to be probable.
- o The location of mine site facilities should be examined from an engineering and environmental perspective. Most important will be the location of leaching pads and/or tailings ponds. If cyanide is used the excess effluent should be recycled to the mill; cyanide destruction may be required for effluent discharge.
- o Appropriate water management plans must be developed for the project to protect surface water quality. Quality and quantity of ground and surface water will be used in project planning and engineering design.
- o Fisheries is not expected to be a significant concern unless the area is accessible to salmon.

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APPENDIX I

WATER QUALITY DATA  
COLLECTED IN THE MOUNT NANSEN PROJECT AREA  
BY INDIAN AND NORTHERN AFFAIRS CANADA  
(Pages 1-3)

MEMORANDUM

NOTE DE SERVICE

FILE

SECURITY - CLASSIFICATION - DE SÉCURITÉ
OUR FILE/NOTRE RÉFÉRENCE  Mt. Nansen
YOUR FILE/VOTRE RÉFÉRENCE
DATE  9 January 1987

FROM / DE

Gerry Whitley  
Administrator, Pollution Control

SUBJECT / OBJET

Mt. Nansen Area

On 27 August 1985 I visited the Archer Cathro camp at Mt. Nansen. At Mt. Nansen there is extensive exploration for gold-bearing materials. Investigators are investigating the oxidized upper zones of the sulphide mineral deposits of the area. There is good potential for finding mineral deposits suitable for mining and gold recovery using heap leaching technology.

In 1976 the Mt. Nansen mine was operated under an authorization issued pursuant to the Northern Inland Waters Act. Review of the archived file revealed two samples which had been collected upstream of the tailings pond on Dome Creek. One sample dated 23 April 1976 is of the adit water and the other of the unnamed creek above the mill. The sample of the water from the adit definitely shows the effects of dissolving minerals, with a higher conductance, hardness and metals than the adjacent stream.

The conductivity and temperature of the streams was taken and is reported in Table 1. A sample of Pony Creek water was sent to the EPS laboratory in Vancouver and the results are reported in Table 2.

TABLE I

Results of field measurements of water quality  
in the Mt. Nansen area on 27 August 1986

<u>Name</u>	<u>Conductivity</u> <u>us/cm</u>	<u>Temperature</u> <u>°C</u>
Victoria Creek above Back Creek (V1)	100	8
Nansen Creek upstream of Webber Creek (N1)	100	12
Webber Creek (W1)	120	10
Back Creek (B1)	130	13
Pony Creek above Camp	70	8.5
Pony Creek below Camp (P1)	210	8.5
Mt. Nansen Adit	625	3.5
Outfall of first tailing pond	1,200	12.5
"    second tailing pond	1,200	13
"    recycle pond	900	11
Dome Creek at road crossing (D2)	220	9

TABLE 2

Results of Laboratory analysis of sample of Pony Creek (P1)  
below the Archer Cathro camp. 27 August 1986

Alkalinity	26.0 mg/L	Hardness Ca + Mg	136 mg/L
Chloride	0.6 mg/L	Hardness total	183 mg/L
Conductivity	315 umho/cm	pH	6.8
Cyanide	0.044 mg/L	Turbidity	38 FTU

Extractable metals (ICP Scan)	mg/L	Total metals (ICP)	mg/L
Al	2.78	3.03	
As	0.37	0.38	
B	0.001	0.001	
Ba	0.057	0.06	
Be	0.001	0.001	
Ca	37.3	38.4	
Cd	0.065	0.065	
Co	0.066	0.07	
Cr	0.007	0.007	
Cu	1.26	1.29	
Fe	11.6	12.4	
Mg	10.3	10.7	
Mn	3.67	3.76	
Mo	0.065	0.079	
Na	3.5	3.5	
Ni	0.02	0.02	
P	0.06	0.07	
Pb	0.03	0.04	
Sb	.05	0.05	
Se	0.23	0.23	
Si	7.9	8	
Sm	0.02	0.02	
Sr	0.211	0.216	
Ti	0.004	0.035	
V	0.007	0.01	
Zn	2.98	3.07	
Nitrogen/Ammonia	0.04		
Nitrogen/nitrate	0.005		
Nitrogen/nitrate + nitrate	0.087		
Total phosphorus	0.16		
Residue/filterable	41		
Residue/non- filterable	46		
Sulphate	110		

APPENDIX II

WATER QUALITY GUIDELINES  
(Pages 1-2)

GUIDELINES FOR CANADIAN DRINKING  
WATER QUALITY (1978) - SUMMARY OF RECOMMENDED LIMITS

Parameter	Maximum Acceptable Concentration*	Objective Concentration*	Basis**	Page
Aldrin + Dieldrin	0.0007	$\leq 5 \times 10^{-6}$	H	50
Antimony	—	$\leq 0.0002$	H	41
Arsenic	0.05	$\leq 0.005$	H	41
Asbestos	—	—	—	41
Barium	1.0	$\leq 0.1$	H	42
Boron	5.0	$\leq 0.01$	H	42
Cadmium	0.005	$\leq 0.001$	H	42
Carbaryl	0.07	$\leq 5 \times 10^{-4}$	H	50
Chlordane (Total)	0.007	$\leq 5 \times 10^{-8}$	H	50
Chloride	250	<250	A	54
Chromium	0.05	$\leq 0.0002$	H	43
Colour (TCU)	15	<15	A	21
Copper	1.0	<1.0	A	54
Cyanide	0.2	$\leq 0.002$	H	43
DDT (Total)	0.03	$\leq 5 \times 10^{-8}$	H	50
Diazinon	0.014	$\leq 1 \times 10^{-6}$	H	50
Dieldrin + Aldrin	0.0007	$\leq 5 \times 10^{-8}$	H	50
Endrin	0.0002	$\leq 5 \times 10^{-8}$	H	50
Fluoride	1.5	1.0***	H & A	36
Hardness	—	—	—	57
Heptachlor + Heptachlor Epoxide	0.003	$\leq 5 \times 10^{-8}$	H	50
Iron	0.3	<0.05	A	54
Lead	0.05	$\leq 0.001$	H	43
Lindane	0.004	$\leq 1 \times 10^{-7}$	H	50
Manganese	0.05	<0.01	A	55
Mercury	0.001	$\leq 0.0002$	H	44
Methoxychlor	0.1	$\leq 5 \times 10^{-8}$	H	50
Methyl Parathion	0.007	$\leq 1 \times 10^{-6}$	H	50
Nitrate (as N)	10.0	$\leq 0.001$	H	44
Nitrotriacetic Acid (NTA)	0.05	$\leq 0.0002$	H	49
Nitrite (as N)	1.0	$\leq 0.001$	H	45
Odour	—	Inoffensive	A	22
Parathion	0.035	$\leq 1 \times 10^{-6}$	H	50
Pesticides (Total)****	0.1	—	H	49
pH	6.5 - 8.5	—	A	22
Phenols	0.002	<0.002	A	55
Selenium	0.01	$\leq 0.002$	H	45
Silver	0.05	$\leq 0.005$	H	46
Sodium	—	—	—	46
Sulphate	500	<150	H & A	46
Sulphide (as H <sub>2</sub> S)	0.05	<0.05	A	55
Taste	—	Inoffensive	A	22
Temperature (°C)	15	<15	A	23
Total Dissolved Solids	500	—	A	57
Total Organic Carbon	—	—	—	58
Toxaphene	0.005	$\leq 5 \times 10^{-6}$	A	50
Trihalomethanes	0.35	$\leq 0.0005$	H	52
Turbidity (NTU)	5	<1	H & A	23
Uranium	0.02	$\leq 0.001$	H	47
Zinc	5.0	<5.0	A	56
2, 4-D	0.1	$\leq 0.001$	H	50
2, 4, 5-TP	0.01	$\leq 0.001$	H	50

\* Unless indicated otherwise, the maximum acceptable and objective concentrations are specified in mg/L.

\*\* Maximum acceptable and objective concentrations have been established on the basis of either aesthetic (A) or health (H) considerations.

\*\*\* In areas where the annual mean maximum temperature is below 10°C, the objective is 1.2 mg/L.

\*\*\*\* The "total pesticides" limit applies to water in which more than one of the pesticides listed in this Table is present, in which case, the sum of their concentrations should not exceed 0.1 mg/L.

## GUIDELINES FOR THE PROTECTION OF FRESHWATER AQUATIC LIFE

(WATER QUALITY SOURCE BOOK)

PARAMETER		LEVEL		REFERENCE
ALDRIN + HEOD (DIELDRIN)	LE	0.001	µg/L	INTERNATIONAL JOINT COMMISSION, 1977
ALKALINITY, as CaCO <sub>3</sub>	GT	20	mg/L	US. ENVIRONMENTAL PROTECTION AGENCY, 440/9-76-023
ALUMINIUM, as Al	LE	0.100	mg/L	GREAT LAKES WATER QUALITY BOARD, 1976
AMMONIA, UN-IONIZED, as NH <sub>3</sub>	LE	0.02	mg/L	US. ENVIRONMENTAL PROTECTION AGENCY, 440/9-76-023
ARSENIC, as As	LE	0.05	mg/L	ENVIRONMENT CANADA, 1979
BERYLLIUM, as Be	LE	0.011	mg/L	US. ENVIRONMENTAL PROTECTION AGENCY, 440/9-76-023
γ-BHC, (LINDANE)	LE	0.01	µg/L	US. ENVIRONMENTAL PROTECTION AGENCY, 440/9-76-023
CADMIUM, as Cd	LE	0.2	µg/L	ENVIRONMENT CANADA, 1979
CHLORDANE, TOTAL	LE	0.01	µg/L	US. ENVIRONMENTAL PROTECTION AGENCY, 440/9-76-023
CHROMIUM, as Cr	LE	0.04	mg/L	ENVIRONMENT CANADA, 1979
COPPER, as Cu	LE	0.005	mg/L	GREAT LAKES WATER QUALITY BOARD, 1976
CYANIDE, as CN	LE	0.005	mg/L	US. ENVIRONMENTAL PROTECTION AGENCY, 440/9-76-023
DDT, TOTAL	LE	0.001	µg/L	US. ENVIRONMENTAL PROTECTION AGENCY, 440/9-76-023
DIAZINON	LE	0.08	µg/L	GREAT LAKES WATER QUALITY BOARD, 1976
α- ENDOSULFAN	LE	0.003	µg/L	US. ENVIRONMENTAL PROTECTION AGENCY, 440/9-76-023
β- ENDOSULFAN	LE	0.003	µg/L	US. ENVIRONMENTAL PROTECTION AGENCY, 440/9-76-023
ENDRIN	LE	0.002	µg/L	INTERNATIONAL JOINT COMMISSION, 1977
GUTHION	LE	0.005	µg/L	GREAT LAKES WATER QUALITY BOARD, 1976
HEPTACHLOR	LE	0.001	µg/L	US. ENVIRONMENTAL PROTECTION AGENCY, 440/9-76-023
IRON, as Fe	LE	0.300	mg/L	GREAT LAKES WATER QUALITY BOARD, 1976
LEAD, as Pb	LE	0.03	mg/L	ENVIRONMENTAL STUDIES BOARD, 1973, EPA.R3.73.033
MALATHION	LE	0.1	µg/L	US. ENVIRONMENTAL PROTECTION AGENCY, 440/9-76-023
MERCURY, TOTAL, as Hg	LE	0.1	µg/L	ENVIRONMENT CANADA, 1979
p,p'- METHOXYCHLOR	LE	0.03	µg/L	US. ENVIRONMENTAL PROTECTION AGENCY, 440/9-76-023
MIREX	LE	0.001	µg/L	US. ENVIRONMENTAL PROTECTION AGENCY, 440/9-76-023
NICKEL, as Ni	LE	0.025	mg/L	GREAT LAKES WATER QUALITY BOARD, 1976
OXYGEN, DISSOLVED, as O <sub>2</sub>	GE	4.0	mg/L	ENVIRONMENT CANADA, IWD, TECH. BULL. 87, 1972
PARATHION	LE	0.008	µg/L	GREAT LAKES WATER QUALITY BOARD, 1976
pH	GE	6.5		INTERNATIONAL JOINT COMMISSION, 1977
	LE	9.0		
PHENOLIC SUBSTANCES, as PHENOL	LE	0.001	mg/L	US. ENVIRONMENTAL PROTECTION AGENCY, 440/9-76-023
PHOSPHATE, TOTAL, as P	LT	0.025	mg/L	US. ENVIRONMENTAL PROTECTION AGENCY, 440/9-76-023
POLYCHLORINATED BIPHENYLS	LE	0.001	µg/L	US. ENVIRONMENTAL PROTECTION AGENCY, 440/9-76-023
SUSPENDED SOLIDS	LE	25	mg/L	ENVIRONMENTAL STUDIES BOARD, 1973, EPA.R3.73.033
SULPHIDE, as H <sub>2</sub> S	LE	0.002	mg/L	US. ENVIRONMENTAL PROTECTION AGENCY, 440/9-76-023
SURFACTANTS, as MBAS	LE	0.5	mg/L	LITTLE, 1977
CAMPHECHLOR (TOXAPHENE)	LE	0.005	µg/L	US. ENVIRONMENTAL PROTECTION AGENCY, 440/9-76-023
ZINC, as Zn	LE	0.030	mg/L	GREAT LAKES WATER QUALITY BOARD, 1976

APPENDIX III

WILDLIFE AERIAL SURVEY REPORT  
MOUNT NANSEN PROJECT  
March 4, 1986

Time of Survey: During water sampling conducted between 0900 and 1500 hours.

Helicopter: Bell 206B Jet Ranger, Trans North Air, Carmacks

Observers: C. Schmidt (Norecol) left front  
Mike Phillips (Archer Cathro) left rear  
Bill (Archer Cathro) right rear

Weather: Cloud: 100%  
Wind: light, strong on ridges  
Temperature: -15°C  
Visibility: excellent

Area Surveyed: Mount Nansen Property, along major creeks - Victoria, Back, Dome, Webber, Nansen; immediate exploration area.

Observations: Moose: 3  
Tracks - occasional moose along Victoria Creek flood plain.

APPENDIX V  
THE RECOVERY OF GOLD AND SILVER  
LAKEFIELD RESEARCH

An Investigation of  
THE RECOVERY OF GOLD AND SILVER  
from samples  
submitted by  
CHEVRON CANADA RESOURCES LIMITED  
Progress Report No. 1

Project No. LR 3286

NOTE:

This report refers to the samples as received.

The practice of this Company in issuing reports of this nature is to require the recipient not to publish the report or any part thereof without the written consent of Lakefield Research.

LAKEFIELD RESEARCH  
A Division of Falconbridge Limited  
Lakefield, Ontario  
March 20, 1987

## INTRODUCTION

This report contains the results of testwork conducted on nine project samples as requested by Mr. C.V. Dyson, Senior Geologist, Chevron Canada Resources Limited. The purpose of the testwork was to investigate the recovery of gold and silver by direct cyanidation.

LAKEFIELD RESEARCH

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Robert S. Salter

General Manager



Irene Jackman

Project Metallurgist

Experimental Work By: C. Caza

## SUMMARY

### 1. Head Analyses

A representative fraction from each sample was removed for assaying.

<u>Sample Number</u>	<u>Assays g/t</u>	
	<u>Gold (Au)</u>	<u>Silver (Ag)</u>
F86-1	8.78	318
F86-2	3.82	214
F86-3	1.86	38.0
F86-4	17.1	227
F86-5	2.04	30.5
F86-6	7.73	74.0
F86-7	9.44	303
F86-8	5.56	142
F86-9	2.79	106

### 2. Cyanidation Testwork

Tests were conducted on each of the nine samples to investigate the recovery of gold and silver by direct cyanidation. The samples were ground to approximately 100 % minus 200 mesh and leached in agitated vessels with air sparging. The cyanide concentration was maintained at 1 g/L NaCN and the pH at 11 with lime throughout the 24 hour retention time. The results are summarized in Table 1.

**TABLE NO. 1 - Cyanidation Results**

Test No.	Sample No.	Reag. Cons. kg/t		% Extraction		Residue g/t		Head Assays, g/t			
		NaCN	CaO	Au	Ag	Au	Ag	Calc		Direct	
								Au	Ag	Au	Ag
1	F86-1	2.73	3.02	71.3	69.9	2.54	99.4	8.86	331	8.78	318
2	F86-2	3.42	2.00	61.0	64.3	1.86	95.4	4.80	267	3.82	214
3	F86-3	2.01	1.55	68.6	50.6	1.00	20.0	3.19	40.5	1.86	38.0
4	F86-4	2.82	1.76	90.9	71.4	1.85	71.7	20.4	251	17.1	227
5	F86-5	1.72	2.73	92.9	72.6	0.17	9.8	2.37	35.8	2.04	30.5
6	F86-6	2.75	1.84	94.7	47.0	0.43	40.9	8.10	77.2	7.73	74.0
7	F86-7	2.78	3.40	44.9	78.4	5.25	69.6	9.53	322	9.44	303
8	F86-8	3.19	3.38	52.5	60.1	2.86	56.3	6.02	141	5.56	142
9	F86-9	1.83	4.64	85.0	93.3	0.51	9.1	3.41	135	2.79	106

Summary - Continued

2. Cyanidation Testwork - Cont'd

The recoveries of gold and silver ranged from 45 % to 95 % and 47 % to 93 % respectively. There was some variation between the calculated and direct gold head assays. The reasons for this were not investigated but may be due to the presence of free gold.

SAMPLE PREPARATION

On February 17, 1987, nine samples were received at Lakefield Research and given our Reference Number 8727268. Each sample was crushed to minus 10 mesh. A head sample was riffled out and a 2 kg test charge was prepared.

DETAILS OF TESTS

TEST NO. 1

Purpose: To investigate the extraction of gold and silver from sample F86-1.

Procedure: The sample was pulped with water in a 8 liter pail. NaCN and lime were added and the cyanidation was carried out with mechanical agitation in one 24 hour stage with air introduced. The pulp was filtered and the residue washed three times with water.

Feed: 2000 g minus 10 mesh F86-1 sample.

Solution Volume: 4061 mL Pulp Density 33 % solids

Solution Composition: 1.0 gpL NaCN

pH: 11.0 with Ca(OH)<sub>2</sub>

Grind: 60 min/2 kg in the lab ball mill at 65 % solids.

Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
	NaCN	Ca(OH) <sub>2</sub>	NaCN	CaO	NaCN	CaO	NaCN	CaO	
0-2	4.27	8.00	4.06	6.08	0.20	0.93	3.86	5.15	11.2-11.6
2-4	4.06	0	3.86	0	3.45	0.69	0.61	0.24	11.6-11.6
4-6.5	0.64	0	0.61	0	3.96	0.57	0.10	0.12	11.6-11.5
6.5-24	0.11	0	0.10	0	3.35	0.24	0.71	0.33	11.5-10.9
Total	9.08	8.00	8.63	6.08	3.35	0.24	5.28	5.84	-

Reagent Consumption (kg/t of cyanide feed) NaCN : 2.73  
CaO : 3.02

Metallurgical Results

Product	Amount	Assays mg/L, g/t		% Distribution	
		Au	Ag	Au	Ag
24 h Preg + Wash Sol'n	8000 mL	1.53	56.0	71.3	69.9
24 h Cyanide Residue	1936.7 g	2.54	99.4	28.7	30.1
Head (Calc.)	1936.7 g	8.86	330.7	100.0	100.0

TEST NO. 2

Purpose: As for Test 1, but on sample F86-2.  
 Procedure: As for Test 1.  
 Feed: 2000 g minus 10 mesh F86-2 sample.  
 Solution Volume: 4060 mL Pulp Density 33 % solids  
 Solution Composition: 1.0 gpL NaCN  
 pH Range: 11 with Ca(OH)<sub>2</sub>  
 Grind: 60 min/2 kg in the lab ball mill at 65 % solids.  
 Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
	NaCN	Ca(OH) <sub>2</sub>	NaCN	CaO	NaCN	CaO	NaCN	CaO	
0-2	4.27	4.00	4.06	3.04	0.20	0.16	3.86	2.88	11.2-10.7
2-4	4.06	1.00	3.86	0.76	3.05	0.37	1.01	0.55	11.3-11.1
4-6.5	1.06	0	1.01	0	3.76	0.24	0.30	0.13	11.1-11.0
6.5-24	0.32	0	0.30	0	2.94	0.12	1.12	0.12	11.0-10.5
Total	9.71	5.00	9.23	3.80	2.94	0.12	6.29	3.68	-

Reagent Consumption (kg/t of cyanide feed) NaCN : 3.42  
 CaO : 2.00

Metallurgical Results

Product	Amount	Assays mg/L, g/t		% Distribution	
		Au	Ag	Au	Ag
24 h Preg + Wash Sol'n	8000 mL	0.67	39.5	61.0	64.3
24 h Cyanide Residue	1838.0 g	1.86	95.4	39.0	35.7
Head (Calc.)	1838.0 g	4.80	267.3	100.0	100.0

**TEST NO. 3**

Purpose: To investigate the gold and silver extraction from sample F86-3.

Procedure: As for Test 1.

Feed: 2000 g minus 10 mesh F86-3 sample.

Solution Volume: 4060 mL Pulp Density 33 % solids

Solution Composition: 1.0 gpL NaCN

pH Range: 11 with Ca(OH)<sub>2</sub>

Grind: 60 min/2 kg in the lab ball mill at 65 % solids.

Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
	NaCN	Ca(OH) <sub>2</sub>	NaCN	CaO	NaCN	CaO	NaCN	CaO	
0-2	4.27	3.00	4.06	2.28	1.83	0.16	2.23	2.12	11.3-11.0
2-4	2.35	0	2.23	0	3.86	0.16	0.20	0	11.0-10.9
4-6.5	0.21	1.00	0.20	0.76	3.45	0.24	0.61	0.68	11.4-11.4
6.5-24	0.64	0	0.61	0	3.15	0	0.91	0.24	11.4-10.7
Total	7.47	4.00	7.10	3.04	3.15	0	3.95	3.04	-

Reagent Consumption (kg/t of cyanide feed) NaCN : 2.01  
CaO : 1.55

Metallurgical Results

Product	Amount	Assays mg/L, g/t		% Distribution	
		Au	Ag	Au	Ag
24 h Preg + Wash Sol'n	8140 mL	0.53	4.95	68.6	50.6
24 h Cyanide Residue	1965.9 g	1.00	20.0	31.4	49.4
Head (Calc.)	1965.9 g	3.19	40.5	100.0	100.0



TEST NO. 5

Purpose: To investigate the gold and silver extraction from sample F86-5.

Procedure: As for Test 1.

Feed: 2000 g minus 10 mesh F86-5 sample.

Solution Volume: 4060 mL Pulp Density 33 % solids

Solution Composition: 1.0 gpL NaCN

pH Range: 11 with Ca(OH)<sub>2</sub>

Grind: 60 min/2 kg in the lab ball mill at 65 % solids.

Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH
	Actual NaCN	Ca(OH) <sub>2</sub>	Equivalent NaCN	CaO	Grams		Grams		
					NaCN	CaO	NaCN	CaO	
0-2	4.27	6.00	4.06	4.56	2.64	0.24	1.42	4.32	11.2-11.0
2-4	1.49	0	1.42	0	3.65	0.16	0.41	0.08	11.0-10.9
4-6.5	0.43	1.00	0.41	0.76	3.65	0.24	0.41	0.68	11.3-11.1
6.5-24	0.43	0	0.41	0	3.05	0.16	1.01	0.08	11.1-10.6
Total	6.62	7.00	6.30	5.32	3.05	0.16	3.25	5.16	-

Reagent Consumption (kg/t of cyanide feed) NaCN : 1.72  
CaO : 2.73

Metallurgical Results

Product	Amount	Assays mg/L, g/t		% Distribution	
		Au	Ag	Au	Ag
24 h Preg + Wash Sol'n	8010 mL	0.52	6.14	92.9	72.6
24 h Cyanide Residue	1891.5 g	0.17	9.8	7.1	27.4
Head (Calc.)	1891.5 g	2.37	35.8	100.0	100.0

TEST NO. 6

Purpose: To investigate the gold and silver extraction from sample F86-6.

Procedure: As for Test 1.

Feed: 2000 g minus 10 mesh F86-6 sample.

Solution Volume: 4060 mL Pulp Density 33 % solids

Solution Composition: 1.0 gpL NaCN

pH Range: 11 with Ca(OH)<sub>2</sub>

Grind: 60 min/2 kg in the lab ball mill at 65 % solids.

Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
	NaCN	Ca(OH) <sub>2</sub>	NaCN	CaO	NaCN	CaO	NaCN	CaO	
0-2	4.27	4.00	4.06	3.04	0.81	0.41	3.25	2.63	11.2-11.2
2-4	3.42	0	3.25	0	3.35	0.24	0.71	0.17	11.2-11.0
4-6.5	0.75	0	0.71	0	3.86	0.24	0.20	0	11.0-10.9
6.5-24	0.21	1.00	0.20	0.76	2.94	0.28	1.12	0.72	11.3-10.4
Total	8.65	5.00	8.22	3.80	2.94	0.28	5.28	3.52	-

Reagent Consumption (kg/t of cyanide feed) NaCN : 2.75  
CaO : 1.84

Metallurgical Results

Product	Amount	Assays mg/L, g/t		% Distribution	
		Au	Ag	Au	Ag
24 h Preg + Wash Sol'n	8000 mL	1.84	8.70	94.7	47.0
24 h Cyanide Residue	1917.7 g	0.43	40.9	5.3	53.0
Head (Calc.)	1917.7 g	8.10	77.2	100.0	100.0

TEST NO. 7

Purpose: To investigate the gold and silver extraction from sample F86-7.

Procedure: As for Test 1.

Feed: 2000 g minus 10 mesh F86-7 sample.

Solution Volume: 4060 mL Pulp Density 33 % solids

Solution Composition: 1.0 gpL NaCN

pH Range: 11 with Ca(OH)<sub>2</sub>

Grind: 60 min/2 kg in the lab ball mill at 65 % solids.

Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
	NaCN	Ca(OH) <sub>2</sub>	NaCN	CaO	NaCN	CaO	NaCN	CaO	
0-2	4.27	6.00	4.06	4.56	0.20	0.18	3.86	4.38	11.5-10.7
2-4	4.06	3.00	3.86	2.28	3.76	0.99	0.30	1.47	11.8-11.6
4-6	0.32	0	0.30	0	4.06	0.63	0	0.36	11.6-11.5
6-24	0	0	0	0	2.84	0.16	1.22	0.47	11.5-11.0
Total	8.65	9.00	8.22	6.84	2.84	0.16	5.38	6.68	-

Reagent Consumption (kg/t of cyanide feed) NaCN : 2.78  
CaO : 3.40

Metallurgical Results

Product	Amount	Assays mg/L, g/t		% Distribution	
		Au	Ag	Au	Ag
24 h Preg + Wash Sol'n	8000 mL	1.05	62.0	44.9	78.4
24 h Cyanide Residue	1963.6 g	5.25	69.6	55.1	21.6
Head (Calc.)	1963.6 g	9.53	322.2	100.0	100.0

TEST NO. 8

Purpose: To investigate the gold and silver extraction from sample F86-8.

Procedure: As for Test 1.

Feed: 2000 g minus 10 mesh F86-8 sample.

Solution Volume: 4060 mL Pulp Density 33 % solids

Solution Composition: 1.0 gpL NaCN

pH Range: 11 with Ca(OH)<sub>2</sub>

Grind: 60 min/2 kg in the lab ball mill at 65 % solids.

Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
	NaCN	Ca(OH) <sub>2</sub>	NaCN	CaO	NaCN	CaO	NaCN	CaO	
0-2	4.27	6.00	4.06	4.56	0.20	0.18	3.86	4.38	11.2-10.5
2-4	4.06	3.00	3.86	2.28	2.23	0.47	1.83	1.99	11.8-11.4
4-6	1.93	0	1.83	0	4.06	0.35	0	0.12	11.4-11.3
6-24	0	0	0	0	3.45	0.16	0.61	0.19	11.3-10.8
Total	10.26	9.00	9.75	6.84	3.45	0.16	6.30	6.68	-

Reagent Consumption (kg/t of cyanide feed) NaCN : 3.19  
CaO : 3.38

Metallurgical Results

Product	Amount	Assays mg/L, g/t		% Distribution	
		Au	Ag	Au	Ag
24 h Preg + Wash Sol'n	8000 mL	0.78	20.9	52.5	60.1
24 h Cyanide Residue	1975.8 g	2.86	56.3	47.5	39.9
Head (Calc.)	1975.8 g	6.02	140.9	100.0	100.0

TEST NO. 9

Purpose: To investigate the gold and silver extraction from sample F86-9.

Procedure: As for Test 1.

Feed: 2000 g minus 10 mesh F86-9 sample.

Solution Volume: 4060 mL Pulp Density 33 % solids

Solution Composition: 1.0 gpL NaCN

pH Range: 11 with Ca(OH)<sub>2</sub>

Grind: 60 min/2 kg in the lab ball mill at 65 % solids.

Reagent Balance:

Time Hours	Added, grams				Residual		Consumed		pH
	Actual NaCN	Ca(OH) <sub>2</sub>	Equivalent NaCN	CaO	Grams NaCN	CaO	Grams NaCN	CaO	
0-2	4.27	8.00	4.06	6.08	2.03	0	2.03	6.08	11.1-10.4
2-4	2.14	3.00	2.03	2.28	3.76	0.10	0.30	2.18	11.7-11.1
4-6	0.32	0	0.30	0	3.86	0.10	0.20	0	11.1-11.0
6-24	0.21	1.00	0.20	0.76	3.05	0.16	1.01	0.70	11.3-10.8
Total	6.94	12.00	6.59	9.12	3.05	0.16	3.54	8.96	-

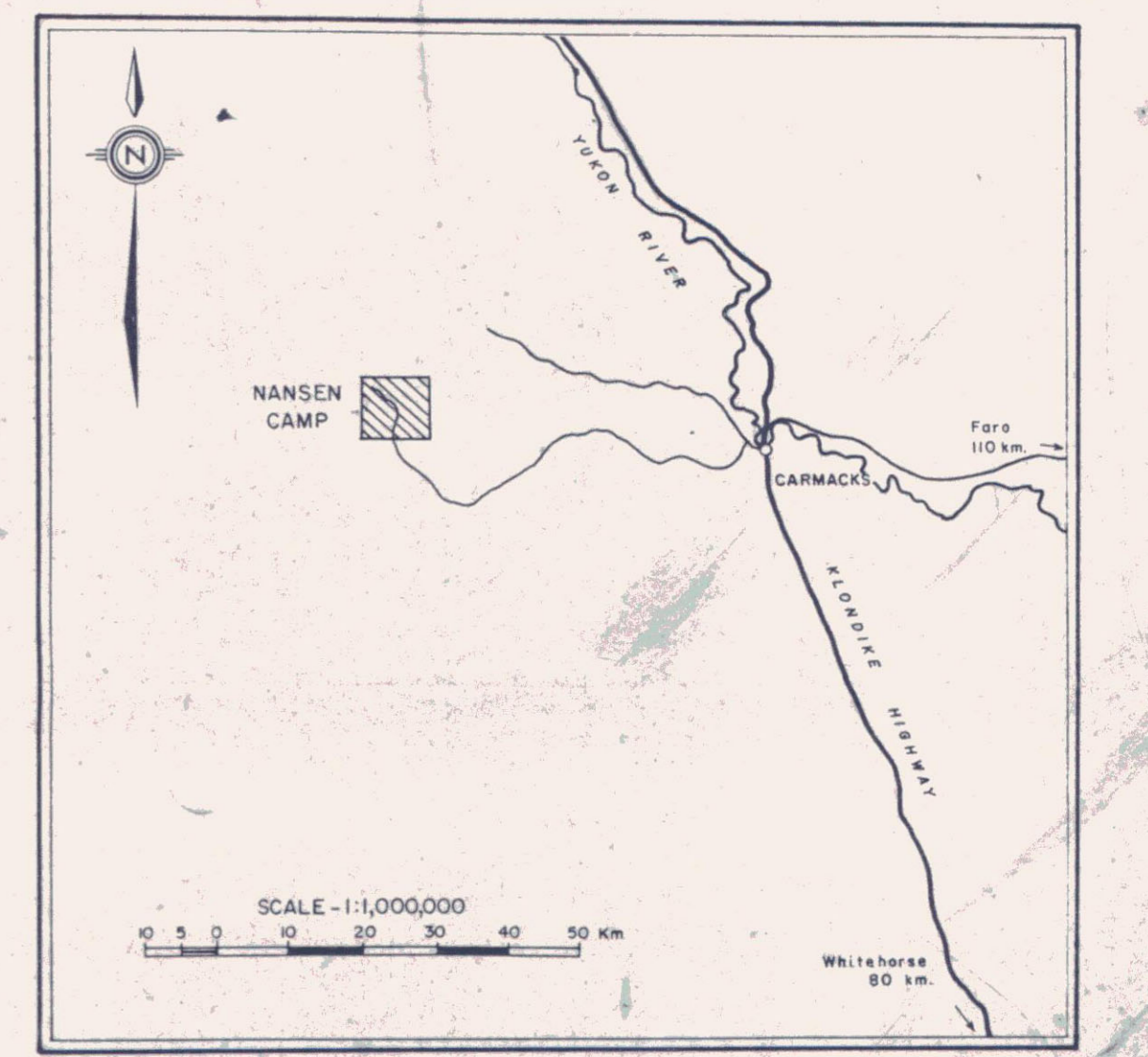
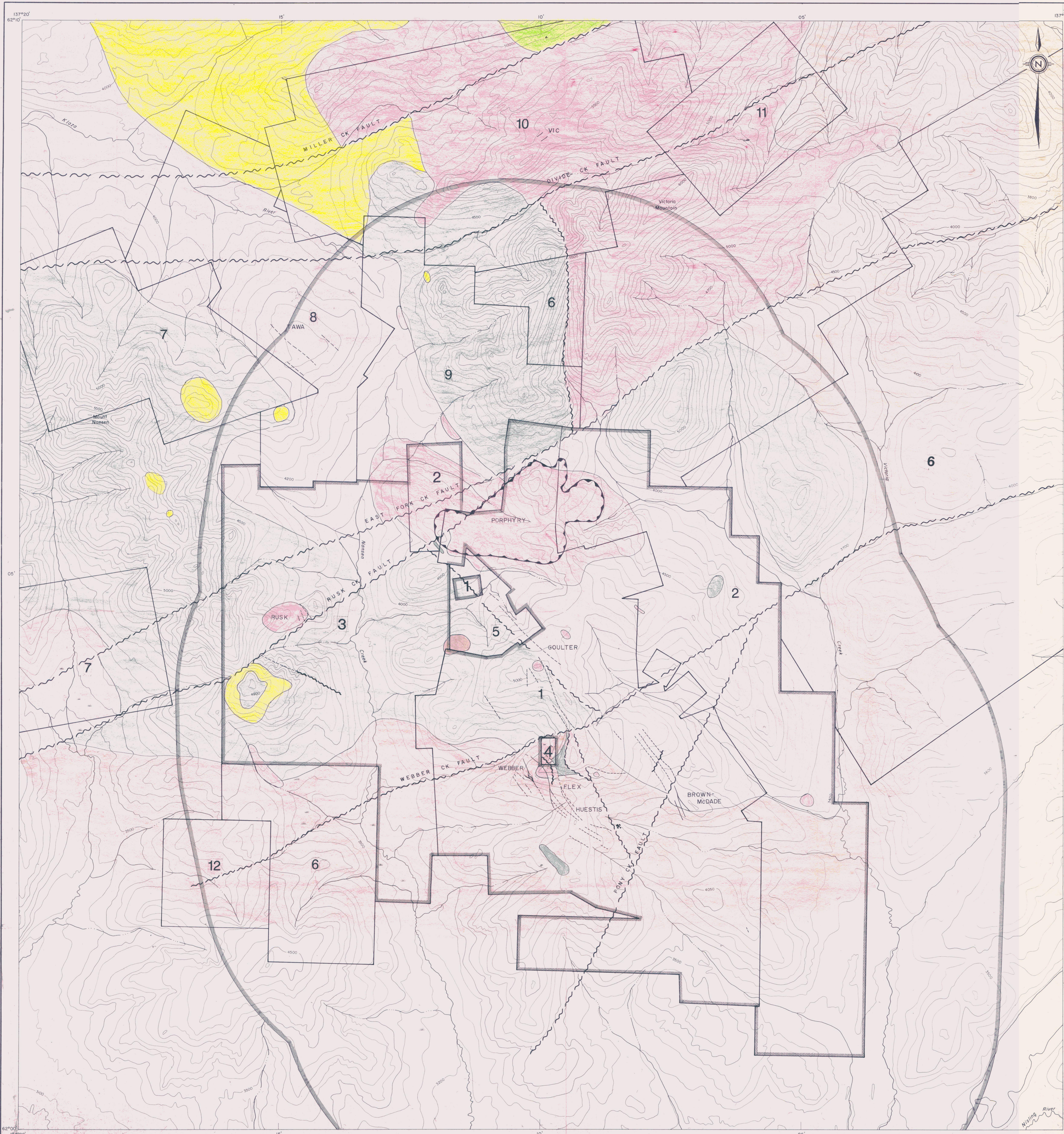
Reagent Consumption (kg/t of cyanide feed) NaCN: 1.83  
CaO: 4.64

Metallurgical Results

Product	Amount	Assays mg/L, g/t		% Distribution	
		Au	Ag	Au	Ag
24 h Preg + Wash Sol'n	8000 mL	0.70	30.4	85.0	93.3
24 h Cyanide Residue	1932.1 g	0.51	9.1	15.0	6.7
Head (Calc.)	1932.1 g	3.41	135.0	100.0	100.0

LAKEFIELD RESEARCH  
Lakefield, Ontario  
March 20, 1987 / sem

APPENDIX VI  
1987 DRILL LOGS



- LAND HOLDINGS**
- 1 B.Y.G. Nat Res Inc (opt to Chevron Canada Res L)
  - 2 Chevron Canada Res L
  - 3 G. Dickson (opt to Chevron Can Res L)
  - 4 G. Cochrane
  - 5 F. Goulter & G. Dickson (opt to Aurchem L)
  - 6 G. Dickson
  - 7 Kerr Addison ML (opt to Chesbar Res & States Exp)
  - 8 Cons B.R.X. Mg & Pet Corp (opt to Chevron Canada Res L)
  - 9 G. Dickson
  - 10 G. Dickson (opt to Kerr Addison ML, Chesbar Res & States Exp)
  - 11 Noranda ML
  - 12 E. Curley

**LEGEND**

**LATE CRETACEOUS**

- Basaltic flows

**MID CRETACEOUS**

- Quartz feldspar porphyry
- Rhyolitic tuffs and flows
- Andesitic flows, tuffs and agglomerates
- Granodiorite and diorite

**CRETACEOUS - JURASSIC**

- Syenite

**PALEOZOIC or OLDER**

- Gneiss and schist with lesser amphibolite, quartzite and marble

Geological contact  
Fault  
Vein fault (known, assumed)  
Limit of advanced argillic alteration in porphyry zone  
Mt Nansen project claim boundary  
Mill buildings  
Mt. Nansen area of influence

**Chevron Canada Resources Limited**  
Minerals Staff

**GEOLOGY, MINERALIZATION & LAND HOLDINGS**  
MT. NANSEN CAMP **092122**

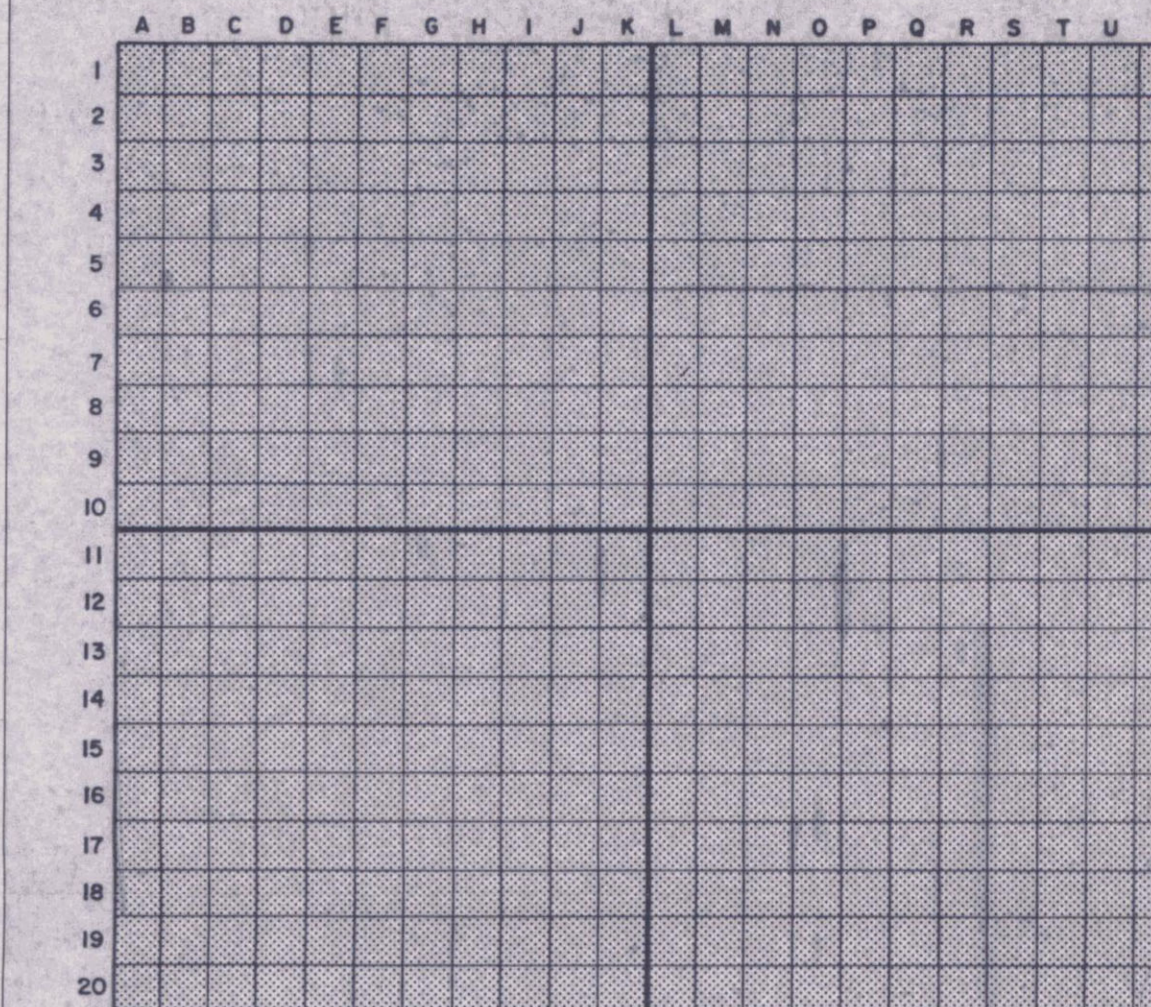
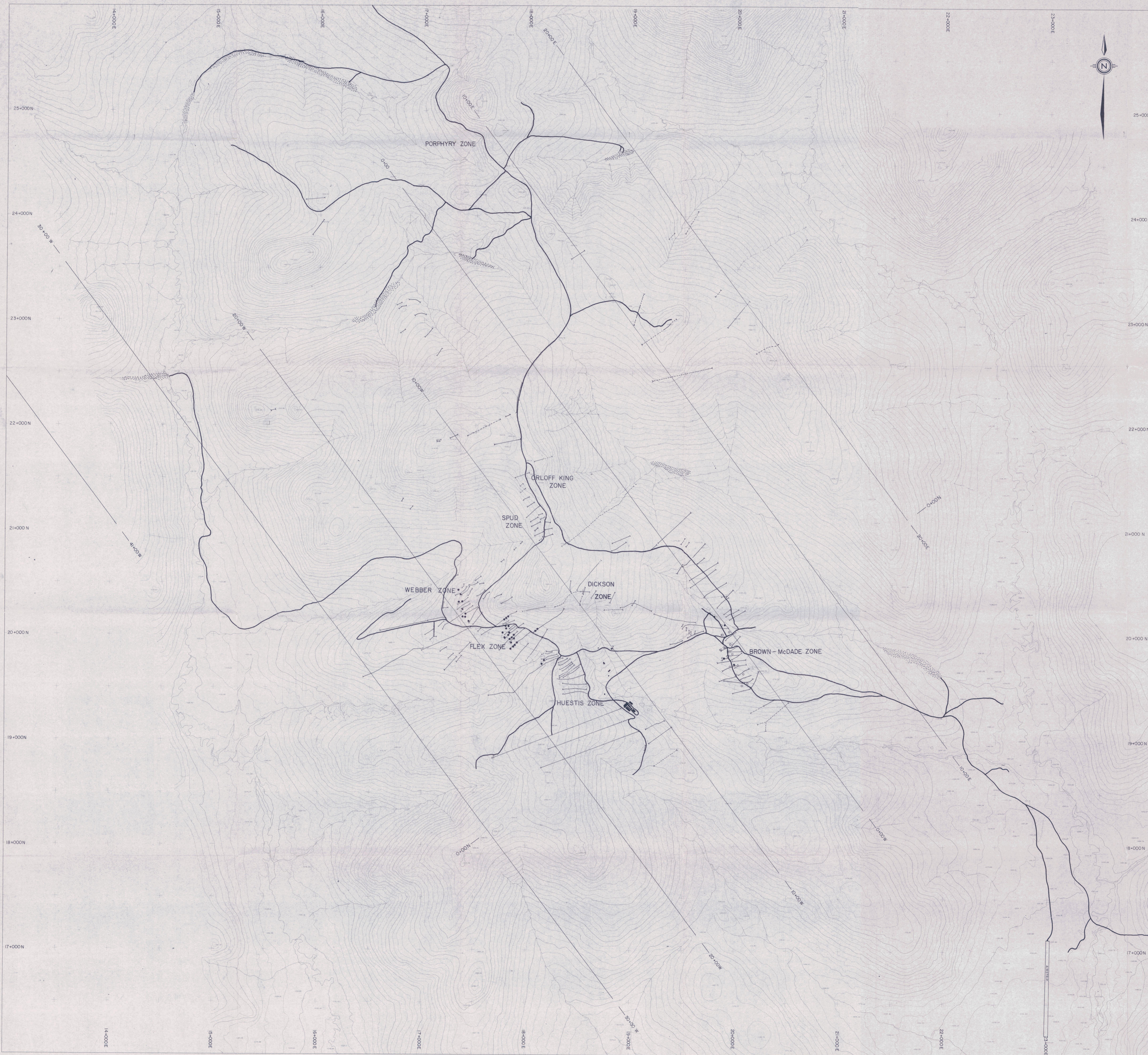
FIGURE No. C-1	PROJECT No. NANSEN
DATE DEC / 86	REVISIONS DEC / 87
NTS No. 115 1-3	SCALE 1:20,000
FILE No.	FILE No.

COMPILED BY TARDER, CATRO & ASSOCIATES (1981) LIMITED

SCALE - 1:20,000  
0 500 1000 1500 2000 metres  
0 1 2 3 4 5 miles

389

To accompany report dated December 87



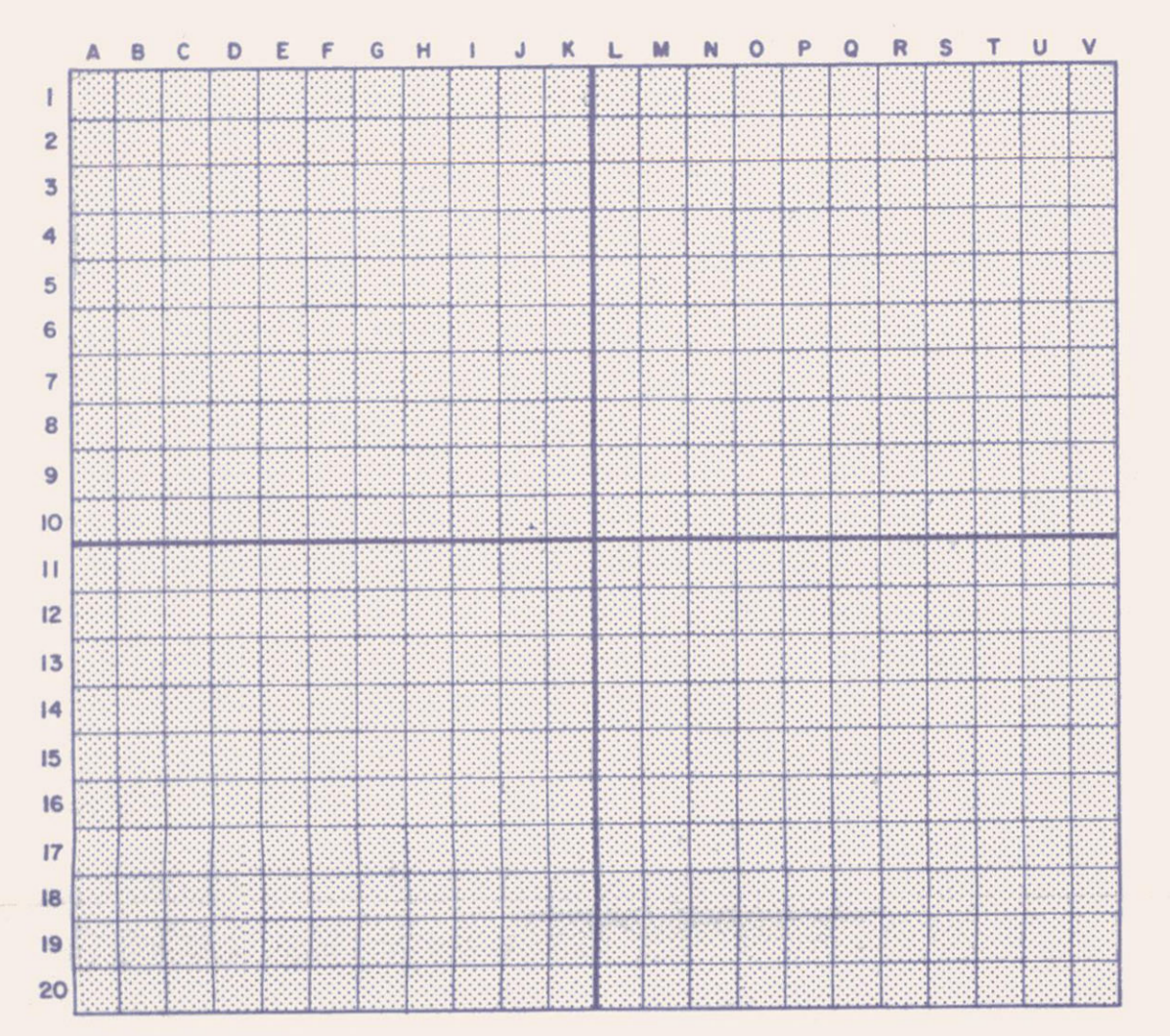
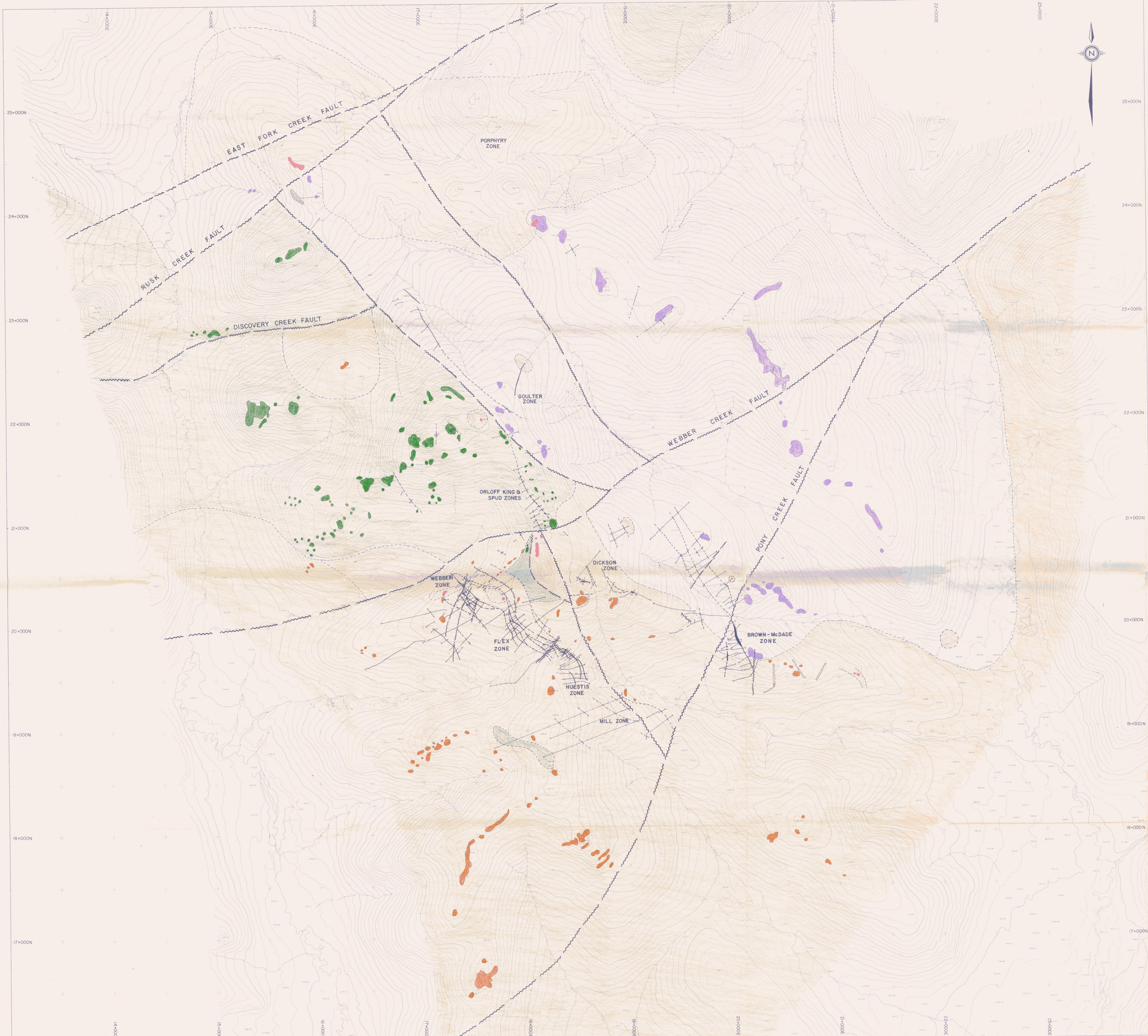
- Road
- - - Stripped areas
- - - Bulldozer / excavator trenches
- o Percussion drill holes
- Diamond drill holes
- Buildings
- ▨ Placer workings

002122

**Chevron Canada Resources Limited**  
Minerals Staff

**WORKINGS**  
MT. NANSEN PROPERTY

FIGURE No. P - 1	PROJECT NANSEN
DATE DEC/86	REVISIONS
NTS No.	SCALE 1:10000
COMPILED BY ARCHER, CATHRO & ASSOCIATES (1981) LIMITED	FILE No.



- MID-CRETACEOUS**
- Quartz feldspar porphyry
  - Andesitic flows tuffs and agglomerates
  - Granodiorite and diorite
- PALEOZOIC or OLDER**
- Gneiss and schist with lesser amphibolite quartzite and marble
- Legend for symbols:
- Geological contact
  - Vein fault
  - Fault
  - Outcrop
  - Excavator trench

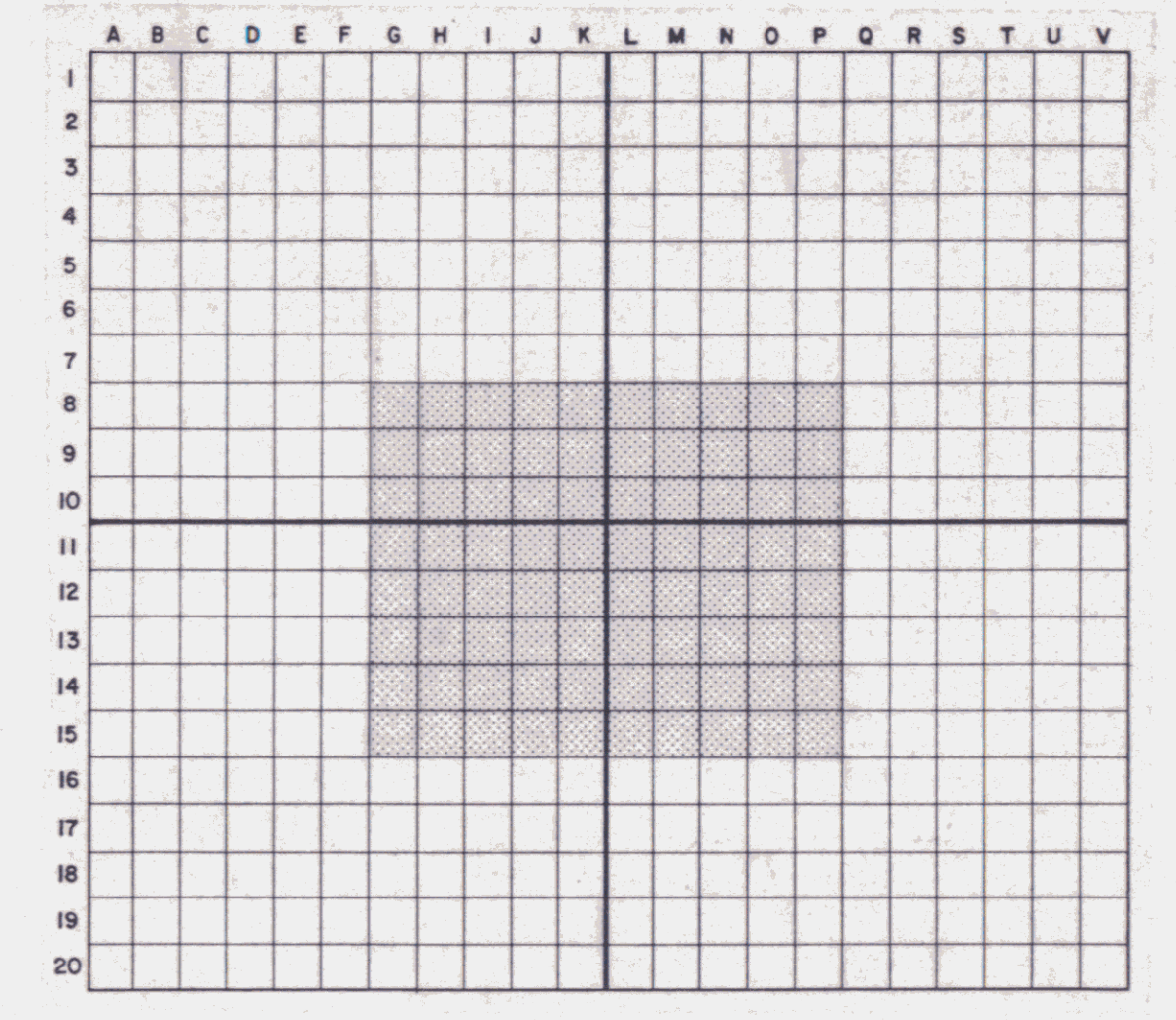
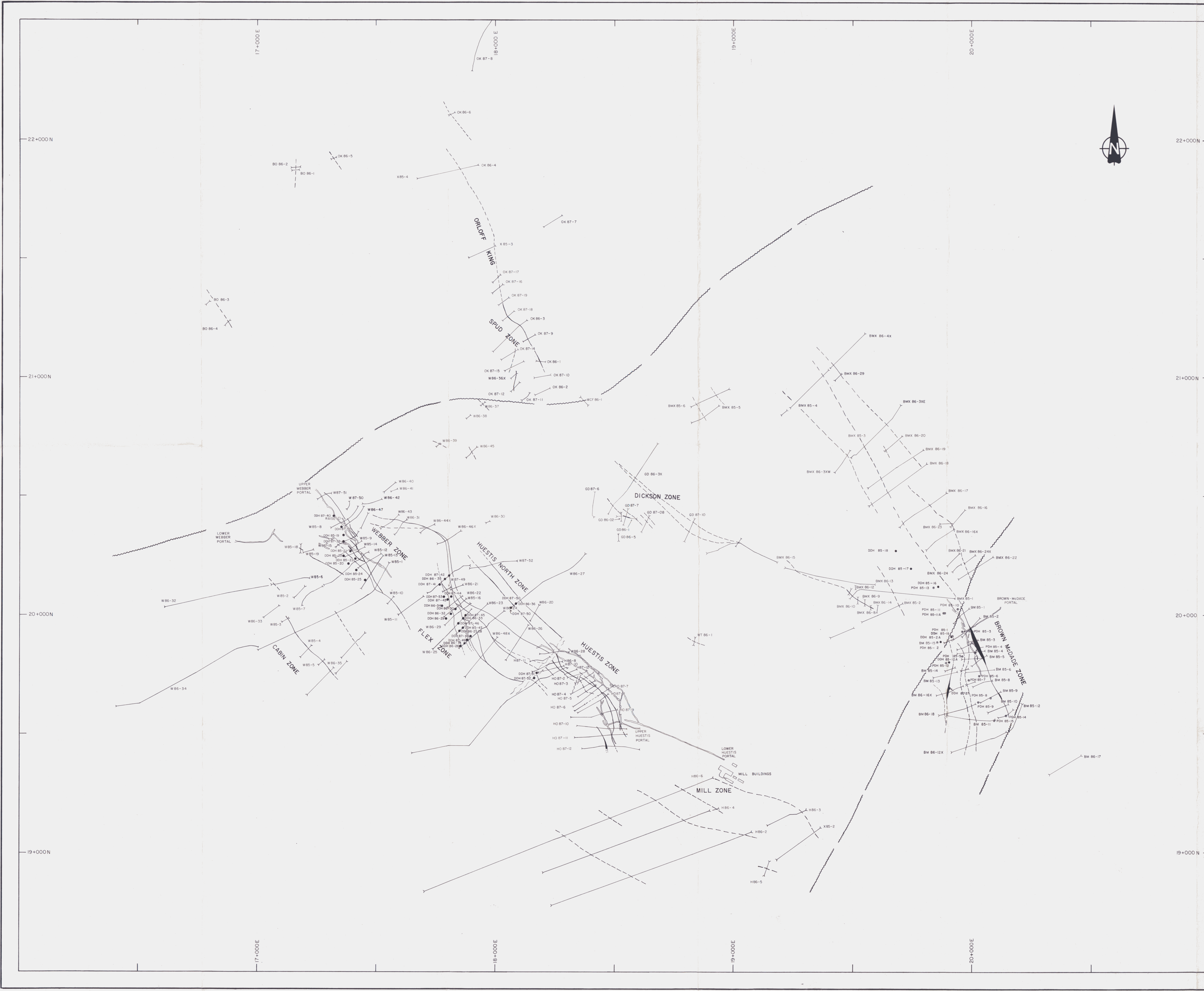
**Chevron** Chevron Canada Resources Limited  
Minerals Staff

**GEOLOGY AND MINERALOGY**  
MT. NANSEN PROPERTY  
**092122**

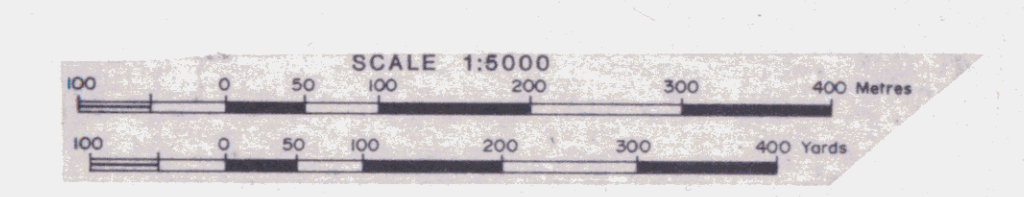
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DATE DEC/86	REVISIONS DEC/87
NTS No. 115 1-3	SCALE 1:10,000
FILE No.	

COMPILED BY ARCHER, CATIRO & ASSOCIATES (1981) LIMITED

391



- Bulldozer and/or excavator trench
- Diamond drill hole
- Percussion drill hole
- Vein fault
- Crossfault



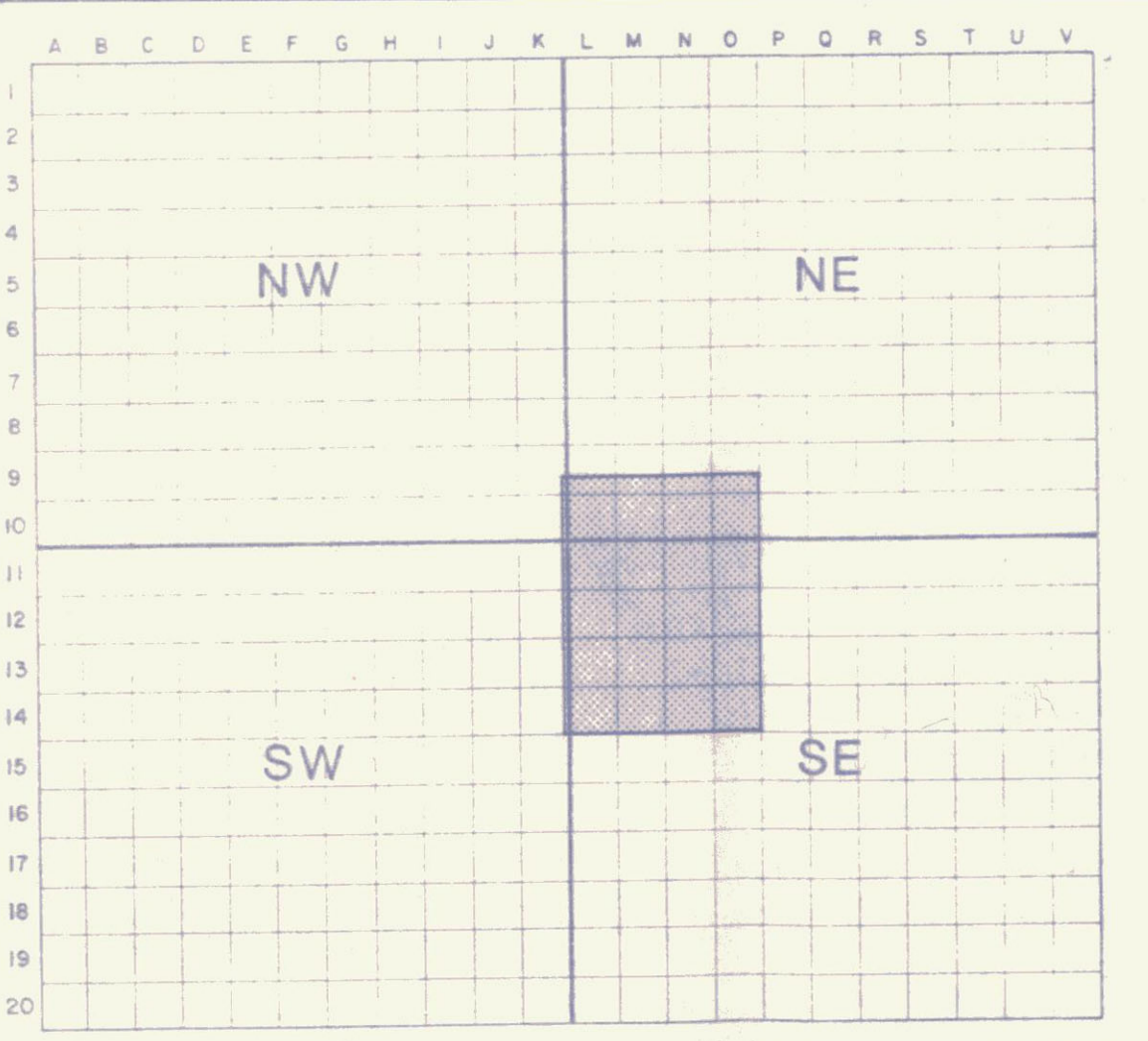
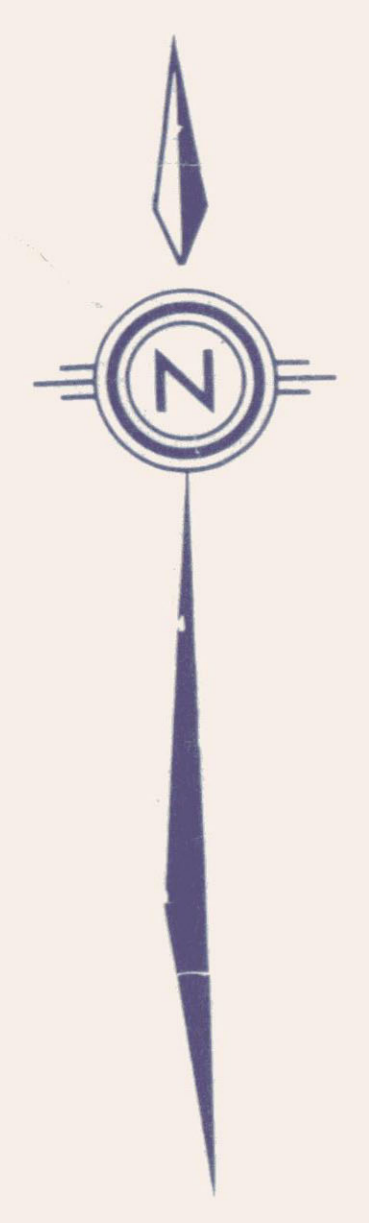
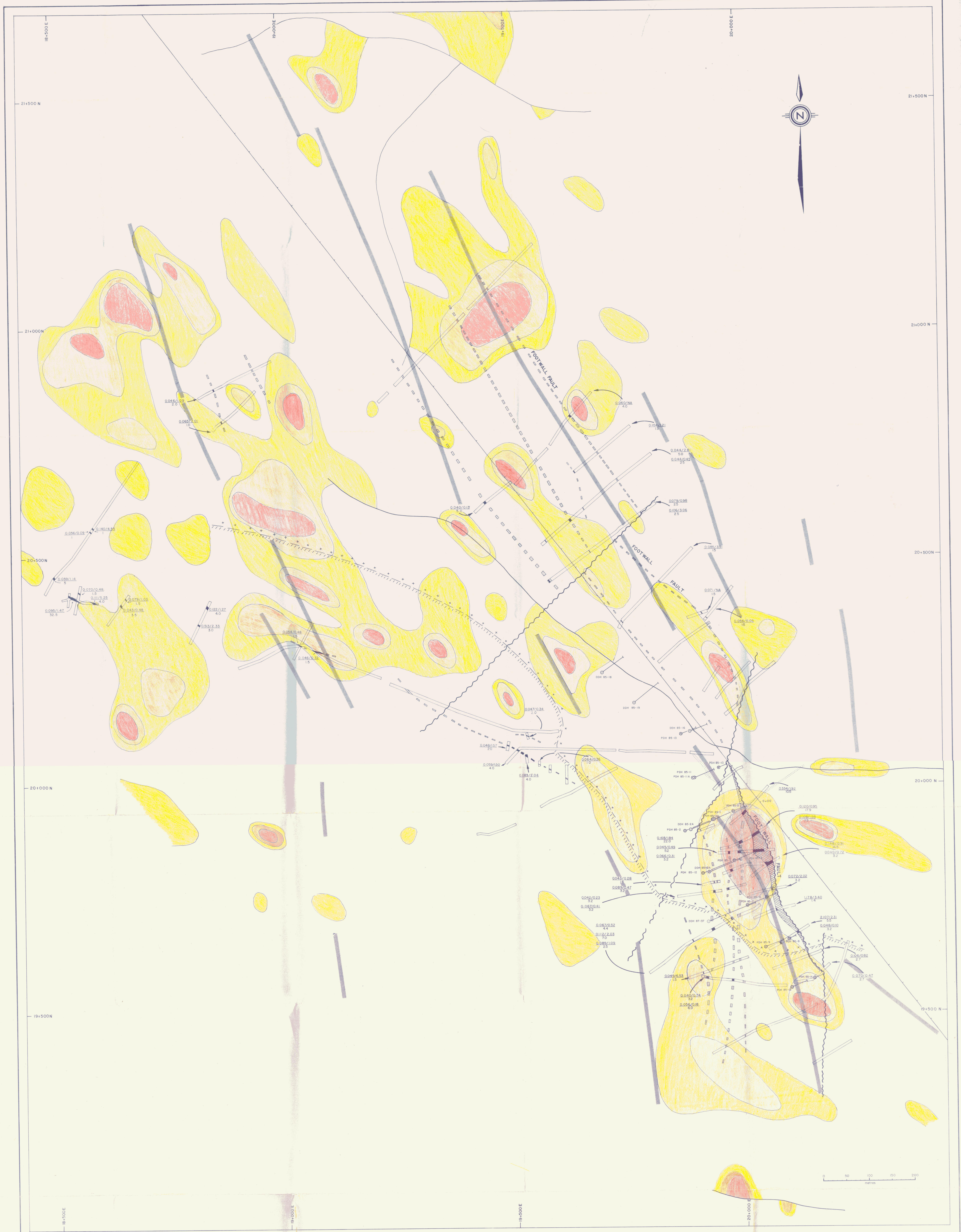
092122

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Minerals Staff

**TRENCH & DRILL HOLE  
LOCATION MAP**  
MT. NANSEN PROPERTY

FIGURE No. V-1	PROJECT NANSEN
DATE: DEC /86	REVISIONS DEC/87
NTS No. 115 I-3	SCALE 1:5000
COMPILED BY ARCHER, CATIRO & ASSOCIATES (1983) LIMITED	

393



- Granodiorite
- Metamorphic rocks
- Faults
- Vein faults
- Mineralized interval with  $\frac{Au}{Ag/Cu}$  width (metres)

- Excavator trench
- Percussion drill hole
- Diamond drill hole
- Underground workings
- Baseline

- Axis of EM-16 conductor
- $\geq 25 \leq 50$  ppb Au
  - $\geq 50 \leq 100$  ppb Au
  - $\geq 100$  ppb Au

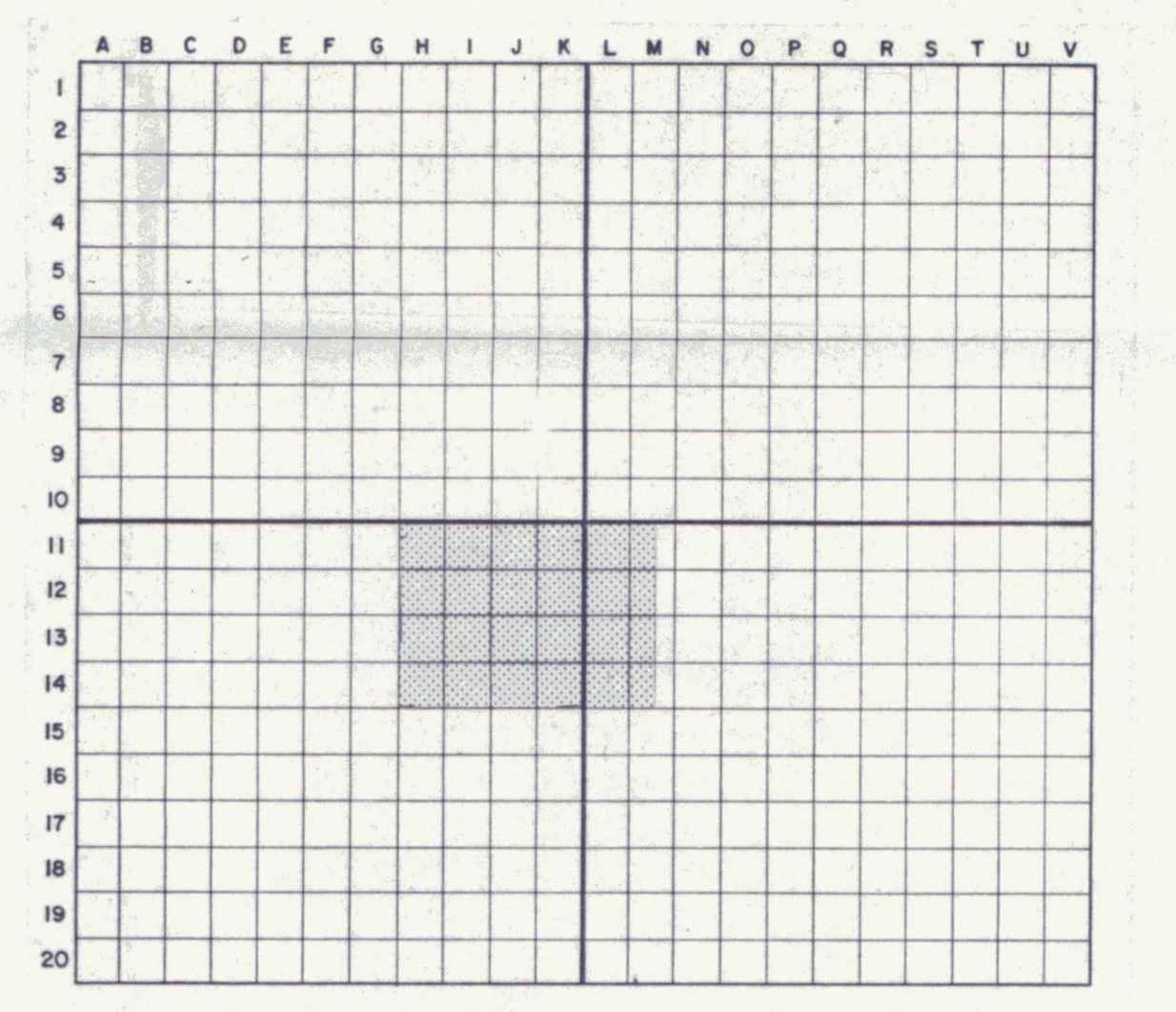
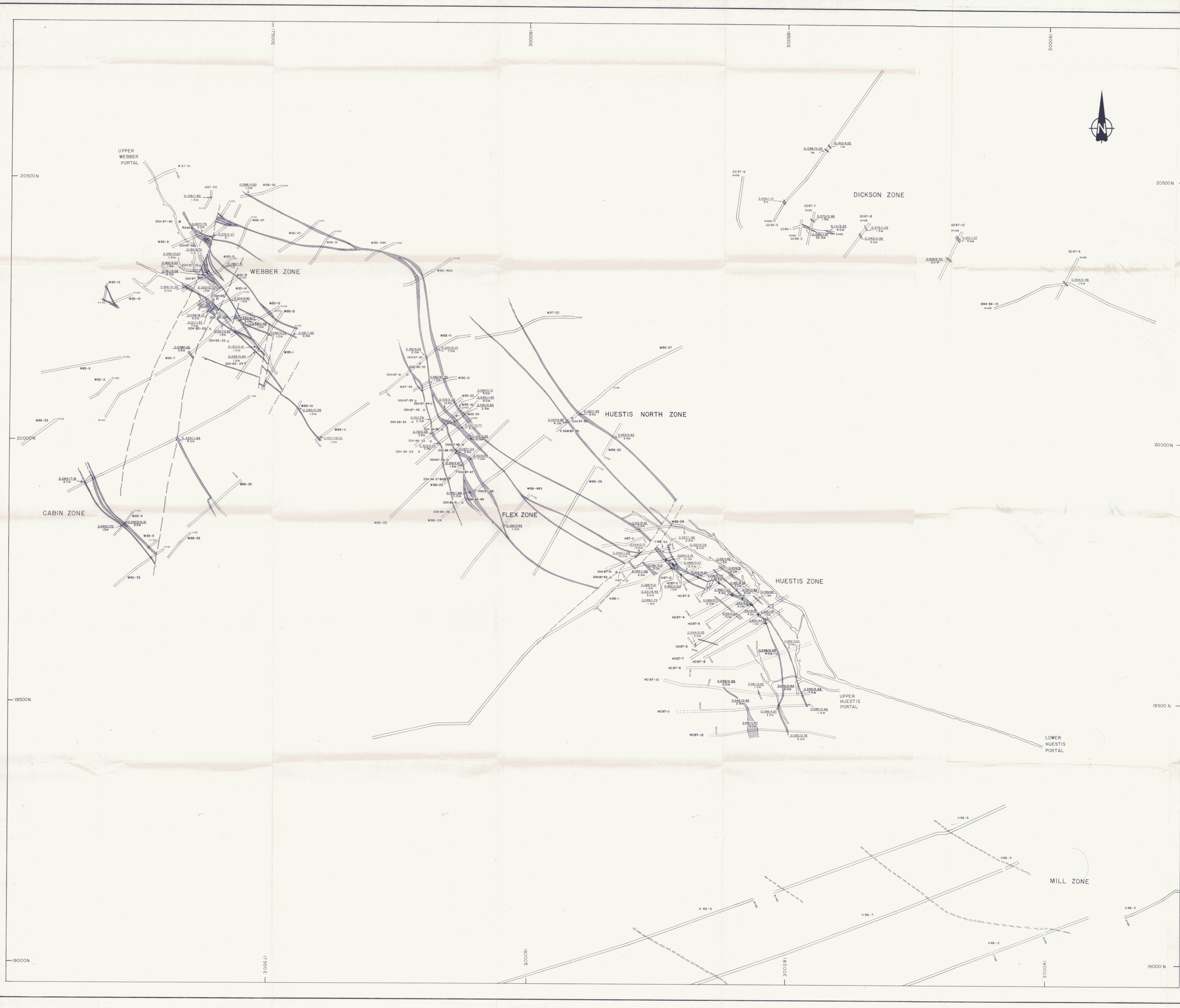
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**GEOLOGICAL, GEOCHEMICAL  
AND GEOPHYSICAL COMPILATION  
BROWN MACDADE ZONE  
MT. NANSEN PROPERTY**

FIGURE No. BMX-1		PROJECT No. NANSEN	
DATE DEC/86	REVISIONS	DEC/87	SCALE 1:2000
WKS No. 115 3/3			FILE No.
COMPILED BY: ARCHER, CATRO & ASSOCIATES (1981) LIMITED			

392



- Underground workings
  - Excavator trench with survey point
  - Diamond drill hole
  - Vein trace, known and inferred
  - Mineralized interval with gold value  $\geq 0.040$  oz/ton
  - Unmineralized crosscut
- 0.103 / 2.30 oz/ton Au / oz/ton Au  
4.0 m width in meters
- \* Location of high grade sample referred to in text

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<b>GEOLOGY AND ASSAYS</b> <b>HUESTIS, FLEX &amp; WEBBER ZONES</b> MT. NANSEN PROPERTY			
FIGURE No.	HFW-1	PROJECT	NANSEN
DATE	DEC/87	REVISIONS	SCALE 1:2000
NTS No.	115-1-3		FILE No.
COMPILED BY	ARCHER, CATHRO & ASSOCIATES (1981) LIMITED		



ELEVATION (m)

1250

1200

1150

1100

1050

200W

100W

BM00

PDH 85-7

PDH 85-6

0.44 / 1.03  
0.7m

0.066 / 0.57  
1.2 m

0.042 / 0.71  
1.8m

0.045 / 0.19  
2.5m

0.101 / 1.03  
8.6m

0.103 / 0.81  
7.3m

0.037 / 0.65  
3.3 m

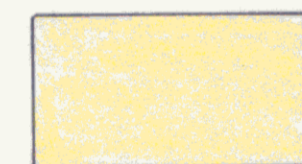
0.094 / 1.23  
6.0 m



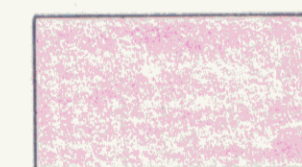
HIGHLY ALTERED AND BRECCIATED  
FELDSPAR PORPHYRY-GRANODIORITE  
CONTAINING VEIN ZONES



FELDSPAR PORPHYRY DYKES  
IN PART BRECCIATED AND ALTERED



CLAY ALTERED GRANODIORITE



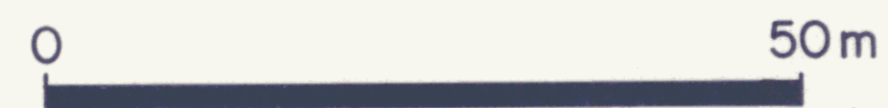
UNALTERED GRANODIORITE



MINERALIZED WIDTH, >0.04 oz/ton Au

0.103 / 0.81  
7.3m

oz/ton Au / oz/ton Ag  
true width in metres



092122

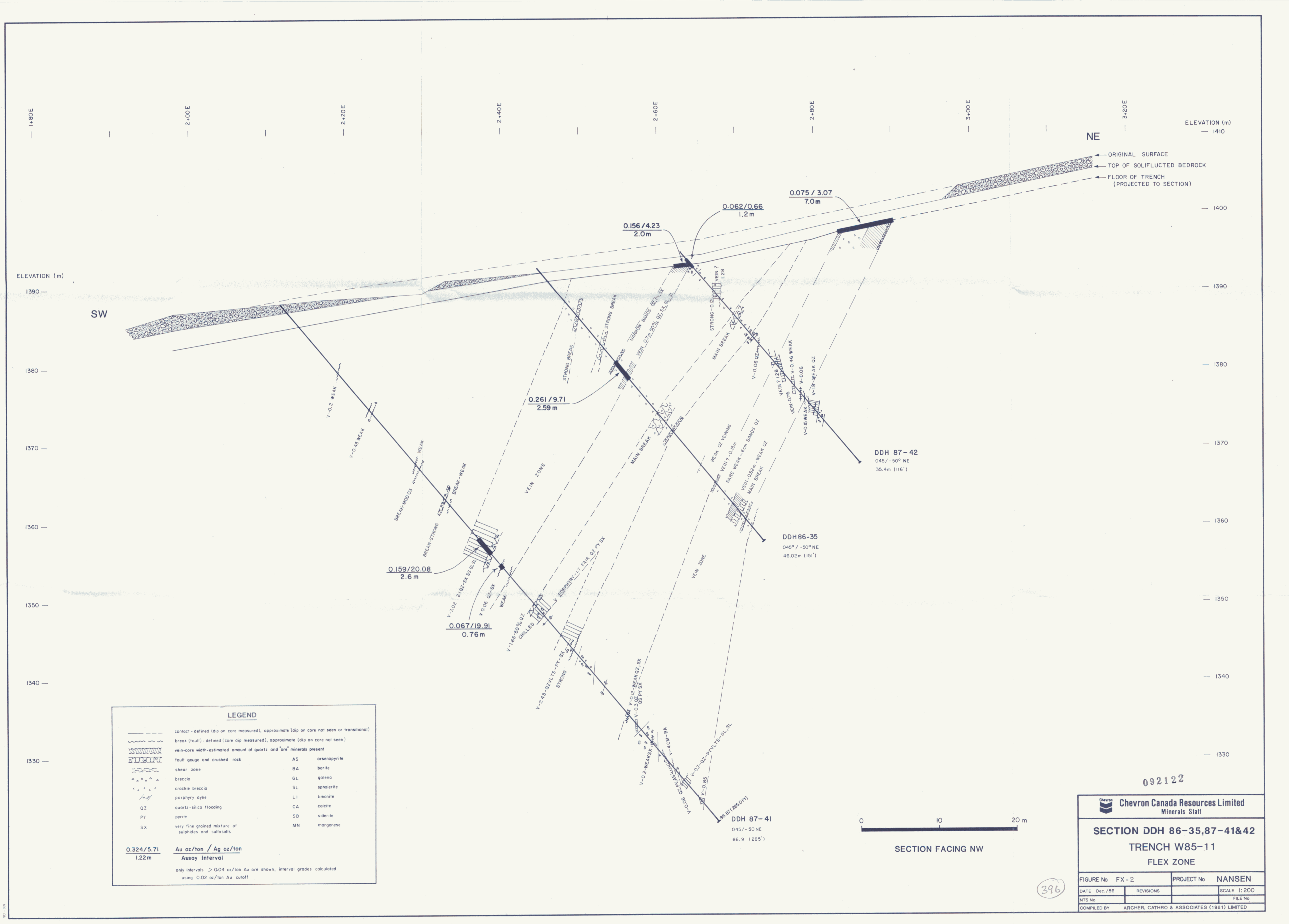
Chevron Canada Resources Limited  
Minerals Staff

**BROWN-McDADE**  
**200S**  
MT. NANSEN PROPERTY

FIGURE No	BM-10	PROJECT No	
DATE	DEC 85	REVISIONS	DEC / 87
NTS No.	115 1-3	SCALE	1:500
COMPILED BY		ARCHER, CATHRO & ASSOCIATES (1981) LIMITED	

398

To accompany report dated December, 87



**LEGEND**

	contact - defined (dip on core measured), approximate (dip on core not seen or transitional)		
	break (fault) - defined (core dip measured), approximate (dip on core not seen)		
	vein-core width-estimated amount of quartz and 'ore' minerals present		
	fault gouge and crushed rock	AS	arsenopyrite
	shear zone	BA	barite
	breccia	GL	galena
	crackle breccia	SL	sphalerite
	porphyry dyke	LI	limonite
	quartz-silica flooding	CA	calcite
	pyrite	SD	siderite
	very fine grained mixture of sulphides and sulfosalts	MN	manganese

<u>0.324/5.71</u>	<b>Au oz/ton / Ag oz/ton</b>
1.22m	<b>Assay Interval</b>

only intervals > 0.04 oz/ton Au are shown; interval grades calculated using 0.02 oz/ton Au cutoff

092122

<b>Chevron Canada Resources Limited</b> Minerals Staff			
<b>SECTION DDH 86-35,87-41&amp;42</b>			
<b>TRENCH W85-11</b>			
<b>FLEX ZONE</b>			
FIGURE No. FX-2	PROJECT No. NANSEN		
DATE Dec./86	REVISIONS	SCALE 1:200	
NTS No.		FILE No.	
COMPILED BY ARCHER, CATHRO & ASSOCIATES (1981) LIMITED			

396

ELEVATION (m)

ELEVATION (m)

1400 —

— 1400

1390 —

— 1390

1380 —

— 1380

1370 —

— 1370

1360 —

— 1360

1350 —

— 1350

1340 —

— 1340

1330 —

— 1330

1320 —

— 1320

LEGEND

- contact - defined (dip on core measured), approximate (dip on core not seen or transitional)
- ~~~~~ break (fault) - defined (core dip measured), approximate (dip on core not seen)
- ||||| vein-core width-estimated amount of quartz and ore minerals present
- ||||| fault gouge and crushed rock
- ~~~~~ shear zone
- ▲▲▲ breccia
- ▲▲▲ crackle breccia
- /// porphyry dyke
- QZ quartz-silica flooding
- PY pyrite
- SX very fine grained mixture of sulphides and sulfosalts
- AS arsenopyrite
- BA barite
- GL galena
- SL sphalerite
- LI limonite
- CA calcite
- SD siderite
- MN manganese

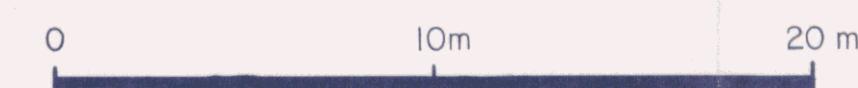
0.324/5.71 Au oz/ton / Ag oz/ton  
1.22m Assay interval

only intervals > 0.04 oz/ton Au are shown; interval grades calculated using 0.02 oz/ton Au cutoff

0.042/0.70  
1.7m

0.117/1.83  
4.0m

DDH 87-53  
045/-50°  
73.76 m (242')



SECTION FACING NW

092122

Chevron Canada Resources Limited  
Minerals Staff

SECTION DDH 87-53

FLEX ZONE

FIGURE No. FX-3	PROJECT NANSEN
DATE DEC/87	REVISIONS
NTS No.	FILE No.
COMPILED BY ARCHER, CATHRO & ASSOCIATES (1981) LIMITED	

397

ELEVATION (m)

1380

1370

1360

1350

1340

1330

1320

NE

SW

ROAD

ROAD

CLAY ALTERED

VEIN-0.24m QZ-PY-SX

WEAK BREAK 0.15m

0.099 / 4.86  
3.65m

CLAY ALTERED  
VEIN-0.24m QZ-PY-SX  
VEIN-0.35-0.74m QZ-PY-SX, GL, SL  
VEIN-0.73m PAIR QZ-SL

VEIN-0.05m QZ  
0.24m QZ-PY-SX, GL  
0.05m QZ-PY-SX, GL, SL

VEIN-0.12m QZ-SD VEINLETS  
VEIN-0.04m QZ-SD VEINLETS

VEIN-0.04m QZ-SD VEINLETS  
VEIN-0.04m QZ-SD VEINLETS

VEIN-0.04m QZ-SD VEINLETS  
VEIN-0.04m QZ-SD VEINLETS

VEIN-0.04m QZ-SD VEINLETS  
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VEIN-0.04m QZ-SD VEINLETS  
VEIN-0.04m QZ-SD VEINLETS

VEIN-0.04m QZ-SD VEINLETS  
VEIN-0.04m QZ-SD VEINLETS

VEIN-0.45m

MOD. BREAK

VEIN-0.33m QZ-PY-SX

VEIN-0.04m QZ-SD VEINLETS

VEIN-0.04m QZ-SD VEINLETS

VEIN-0.04m QZ-SD VEINLETS

VEIN-0.04m QZ-SD VEINLETS

VEIN-0.04m QZ-SD VEINLETS

VEIN-0.04m QZ-SD VEINLETS

VEIN-0.04m QZ-SD VEINLETS

VEIN-0.04m QZ-SD VEINLETS

VEIN-0.04m QZ-SD VEINLETS

VEIN-0.04m QZ-SD VEINLETS

VEIN-0.04m QZ-SD VEINLETS

VEIN-0.04m QZ-SD VEINLETS

VEIN-0.04m QZ-SD VEINLETS

VEIN-0.04m QZ-SD VEINLETS

DDH 87-43  
045°/-50°E  
46.9m (154')

DDH 87-44  
045°/-50° NE  
53.6m (176.0')

0.093 / 1.20  
5.48m

DDH 86-34  
045°/-50°NE  
71.93m (236')

**LEGEND**

contact - defined (dip on core measured), approximate (dip on core not seen or transitional)  
 break (fault) - defined (core dip measured), approximate (dip on core not seen)  
 vein-core width-estimated amount of quartz and "ore" minerals present  
 fault gouge and crushed rock  
 shear zone  
 breccia  
 crackle breccia  
 porphyry dyke  
 quartz-silica flooding  
 pyrite  
 very fine grained mixture of sulphides and sulfosalts

AS	arsenopyrite
BA	barite
GL	galena
SL	sphalerite
LI	limonite
CA	calcite
SD	siderite
MN	manganese

0.324 / 5.71  
1.22m

**Au oz/ton / Ag oz/ton Assay interval**

only intervals > 0.04 oz/ton Au are shown; interval grades calculated using 0.02 oz/ton Au cutoff



SECTION FACING NW

092122

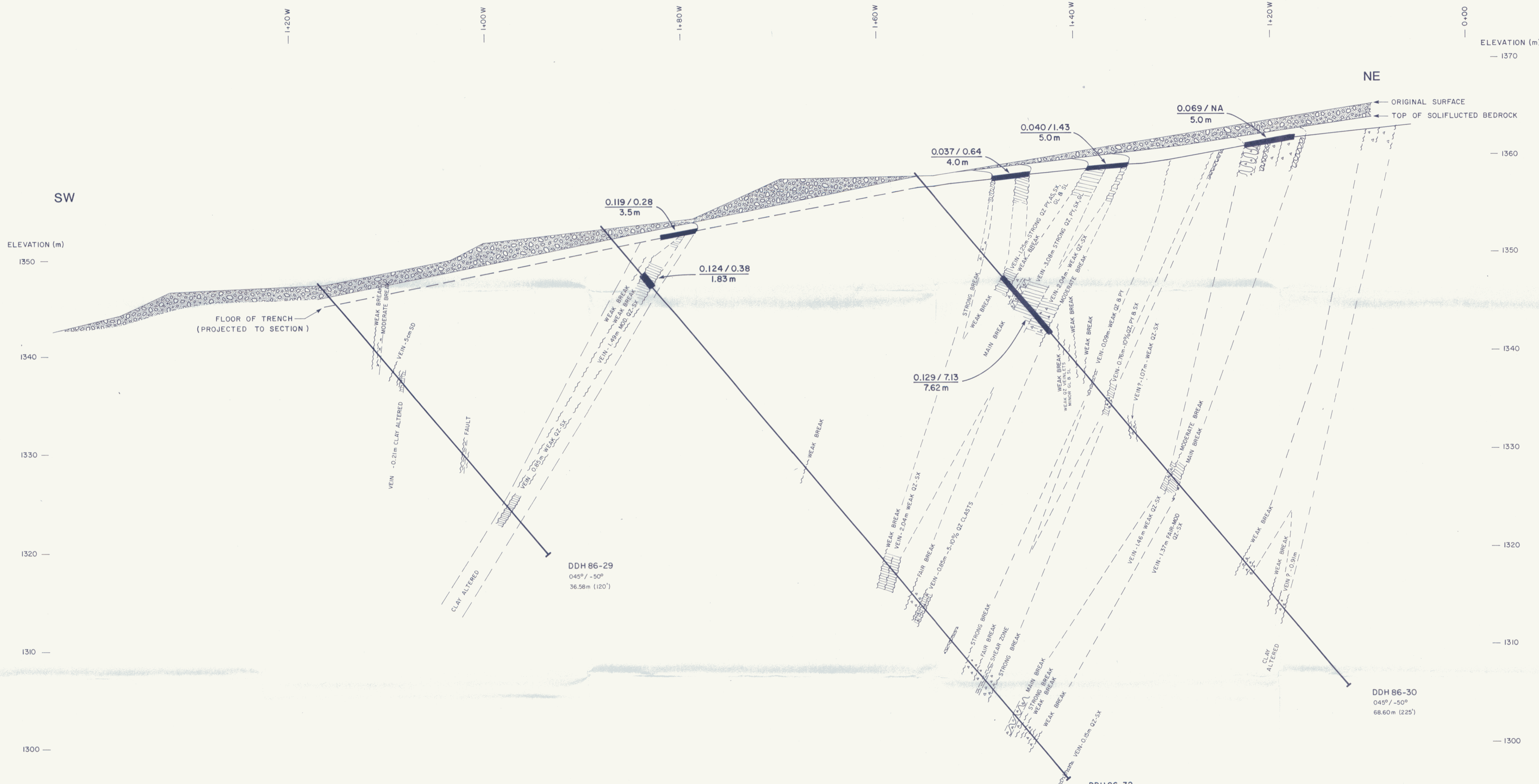
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Minerals Staff

SECTION DDH86-34,87-43&44

FLEX ZONE

FIGURE No	FX - 4	PROJECT No	NANSEN
DATE	Dec./86	REVISIONS	SCALE 1:200
NTS No.			FILE No.
COMPILED BY	ARCHER, CATHRO & ASSOCIATES (1981) LIMITED		

399



**LEGEND**

--- contact - defined (dip on core measured), approximate (dip on core not seen or transitional)

~ break (fault) - defined (core dip measured), approximate (dip on core not seen)

--- vein-core width-estimated amount of quartz and "ore" minerals present

--- fault gouge and crushed rock

--- shear zone

--- breccia

--- crackle breccia

--- porphyry dyke

QZ quartz-silica flooding

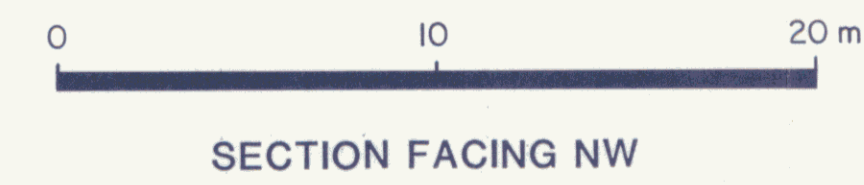
PY pyrite

SX very fine grained mixture of sulphides and sulfosalts

AS	arsenopyrite
BA	barite
GL	galena
SL	sphalerite
LI	limonite
CA	calcite
SD	siderite
MN	manganese

0.324/5.71 Au oz/ton / Ag oz/ton  
1.22m Assay Interval

only intervals > 0.04 oz/ton Au are shown; interval grades calculated using 0.02 oz/ton Au cutoff



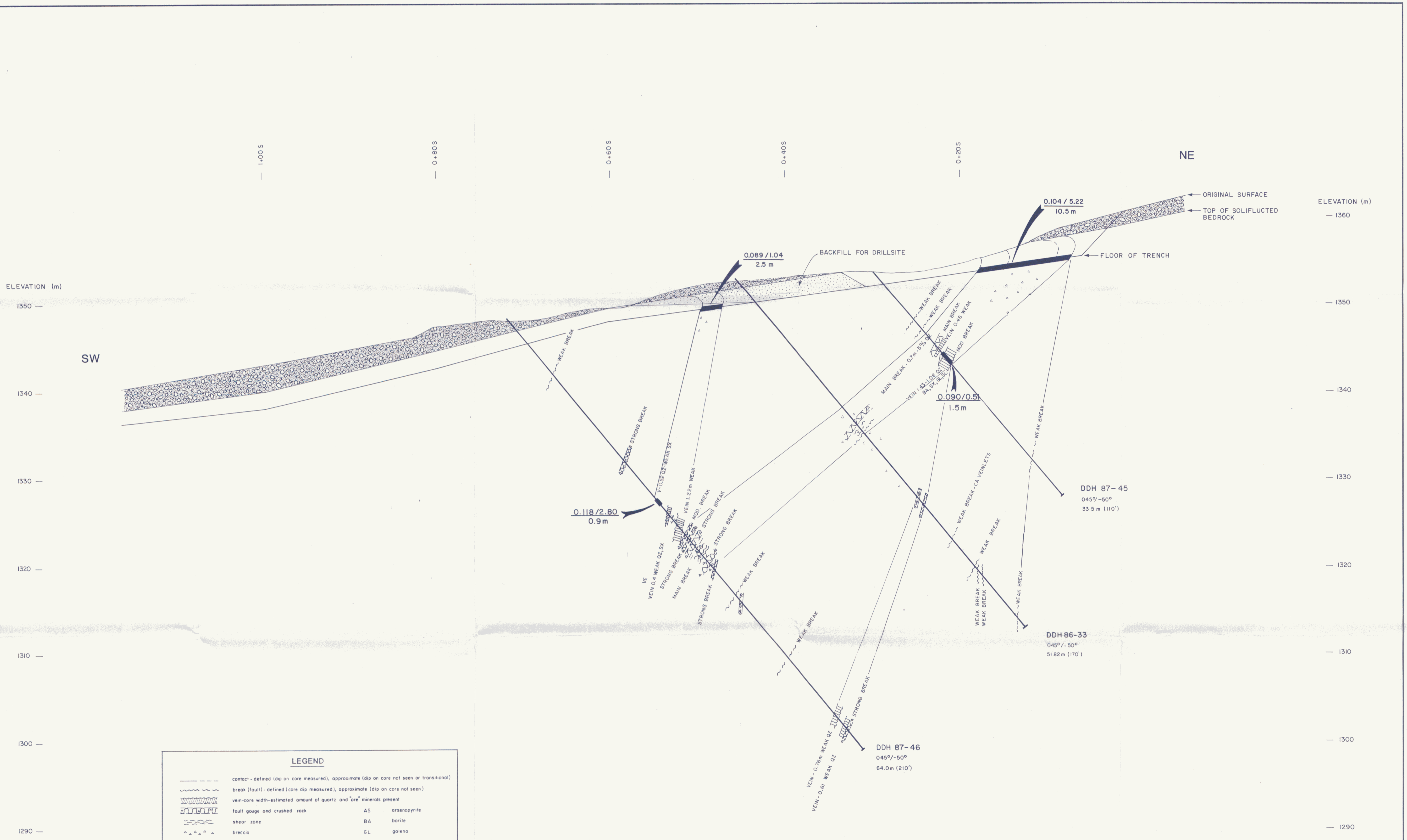
092122

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Minerals Staff

**SECTION DDH86-29, 30 & 32**  
**TRENCH W86-16X**  
**FLEX ZONE**

FIGURE No. FX-5	PROJECT No. NANSEN	
DATE Dec./86	REVISIONS	SCALE 1:200
NTS No.		FILE No.
COMPILED BY ARCHER, CATHRO & ASSOCIATES (1981) LIMITED		

400



ELEVATION (m)  
 1350 —  
 1340 —  
 1330 —  
 1320 —  
 1310 —  
 1300 —  
 1290 —

ELEVATION (m)  
 1360 —  
 1350 —  
 1340 —  
 1330 —  
 1320 —  
 1310 —  
 1300 —  
 1290 —

**LEGEND**

-----	contact - defined (dip on core measured), approximate (dip on core not seen or transitional)	AS	arsenopyrite
~~~~~	break (fault) - defined (core dip measured), approximate (dip on core not seen)	BA	barite
	vein-core width-estimated amount of quartz and "ore" minerals present	GL	galena
	fault gouge and crushed rock	SL	sphalerite
~~~~~	shear zone	LI	limonite
▲▲▲	breccia	CA	calcite
▲▲▲	crackle breccia	SD	siderite
	porphyry dyke	MN	manganese
QZ	quartz-silica flooding		
PY	pyrite		
SX	very fine grained mixture of sulphides and sulfosalts		

**0.324/5.71** Au oz/ton / Ag oz/ton  
 1.22m Assay Interval

only intervals > 0.04 oz/ton Au are shown; interval grades calculated using 0.02 oz/ton Au cutoff



SECTION FACING NW

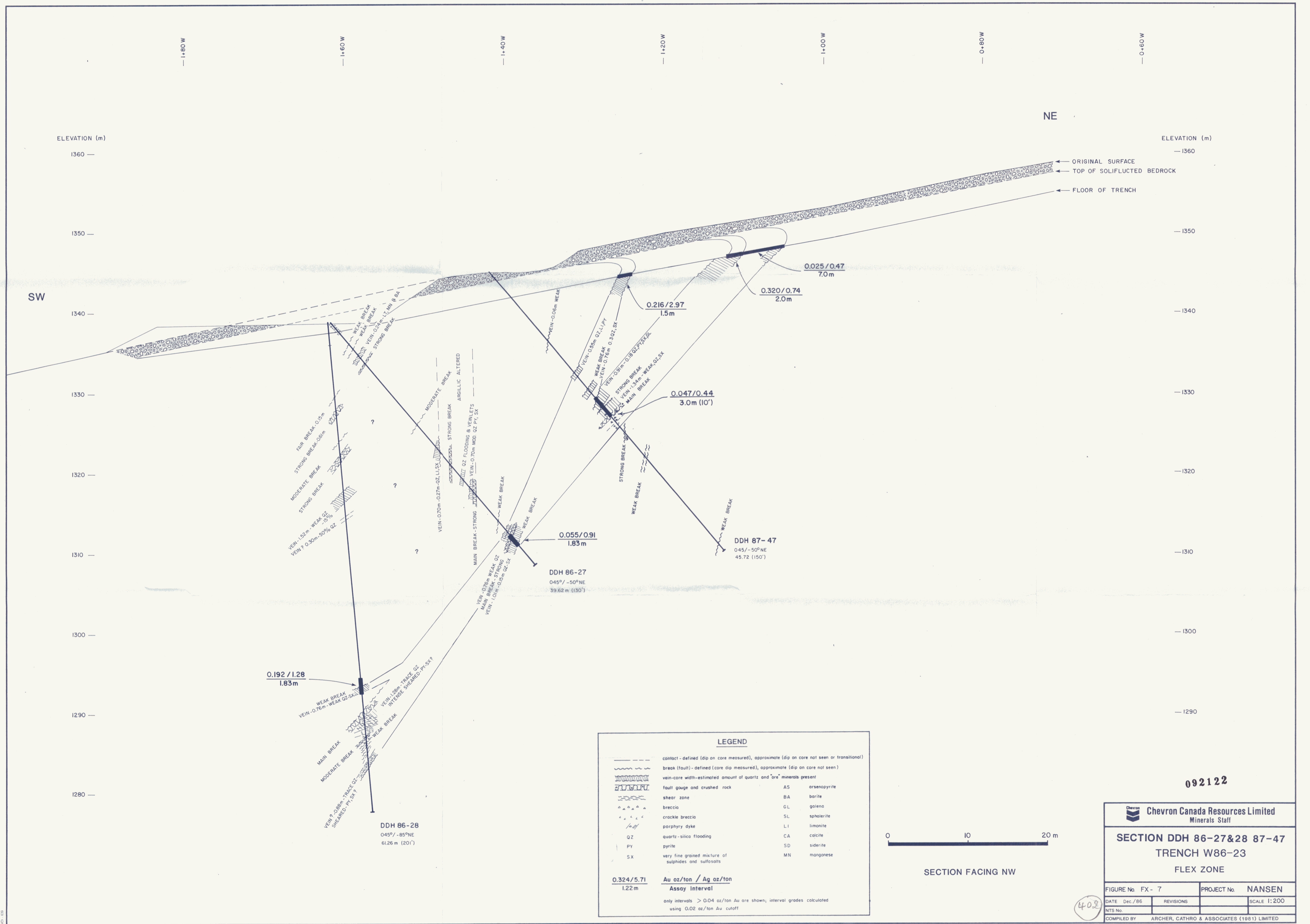
092122

**Chevron Canada Resources Limited**  
 Minerals Staff

**SECTION DDH 86-33 87-45&46**  
**TRENCH W86-25**  
**FLEX ZONE**

FIGURE No. FX - 6	PROJECT No. NANSEN
DATE Dec./86	REVISIONS
NTS No.	FILE No.
COMPILED BY ARCHER, CATHRO & ASSOCIATES (1981) LIMITED	

401



**LEGEND**

	contact - defined (dip on core measured), approximate (dip on core not seen or transitional)
	break (fault) - defined (core dip measured), approximate (dip on core not seen)
	vein-core width - estimated amount of quartz and "ore" minerals present
	fault gauge and crushed rock
	shear zone
	breccia
	crackle breccia
	porphyry dyke
	quartz-silica flooding
	pyrite
	very fine grained mixture of sulphides and sulfosalts

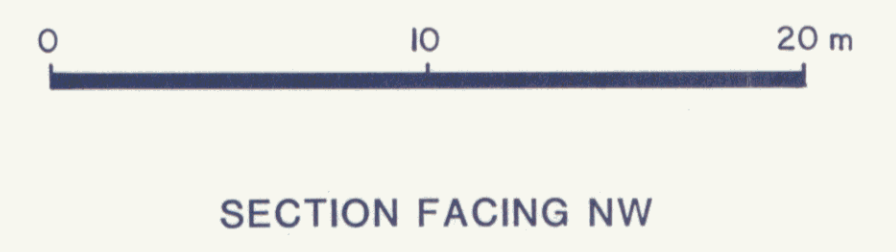
  

	AS	arsenopyrite
	BA	barite
	GL	galena
	SL	sphalerite
	LI	limonite
	CA	calcite
	SD	siderite
	MN	manganese

<b>0.324 / 5.71</b>	<b>Au oz/ton / Ag oz/ton</b>
<b>1.22 m</b>	<b>Assay Interval</b>

only intervals > 0.04 oz/ton Au are shown; interval grades calculated using 0.02 oz/ton Au cutoff



**092122**

**Chevron Canada Resources Limited**  
Minerals Staff

**SECTION DDH 86-27&28 87-47**  
**TRENCH W86-23**  
**FLEX ZONE**

FIGURE No. FX - 7		PROJECT No. NANSEN	
DATE Dec / 86	REVISIONS	SCALE 1:200	
NTS No.			
COMPILED BY ARCHER, CATHRO & ASSOCIATES (1981) LIMITED			

402



Elevation (m)

1350  
1340  
1330  
1320  
1310  
1300



Wide fault zone, subparallel to cross section containing numerous 'chaotic blocks' of vein material.

0.40/2.69  
1.8 m

DDH 87-52  
045/-60°  
56.7 (186')

DDH 87-51  
045/-50°  
76.2 m (250')

**LEGEND**

-----	contact - defined (dip on core measured), approximate (dip on core not seen or transitional)		
~~~~~	break (fault) - defined (core dip measured), approximate (dip on core not seen)		
	vein-core width-estimated amount of quartz and 'ore' minerals present		
	fault gouge and crushed rock	AS	arsenopyrite
~~~~~	shear zone	BA	barite
▲▲▲▲	breccia	GL	galena
▲▲▲▲	crackle breccia	SL	sphalerite
///	porphyry dyke	LI	limonite
QZ	quartz-silica flooding	CA	calcite
PY	pyrite	SD	siderite
SX	very fine grained mixture of sulphides and sulfosalts	MN	manganese

0.324/5.71 Au oz/ton / Ag oz/ton  
1.22m Assay Interval

only intervals > 0.04 oz/ton Au are shown; interval grades calculated using 0.02 oz/ton Au cutoff



092122

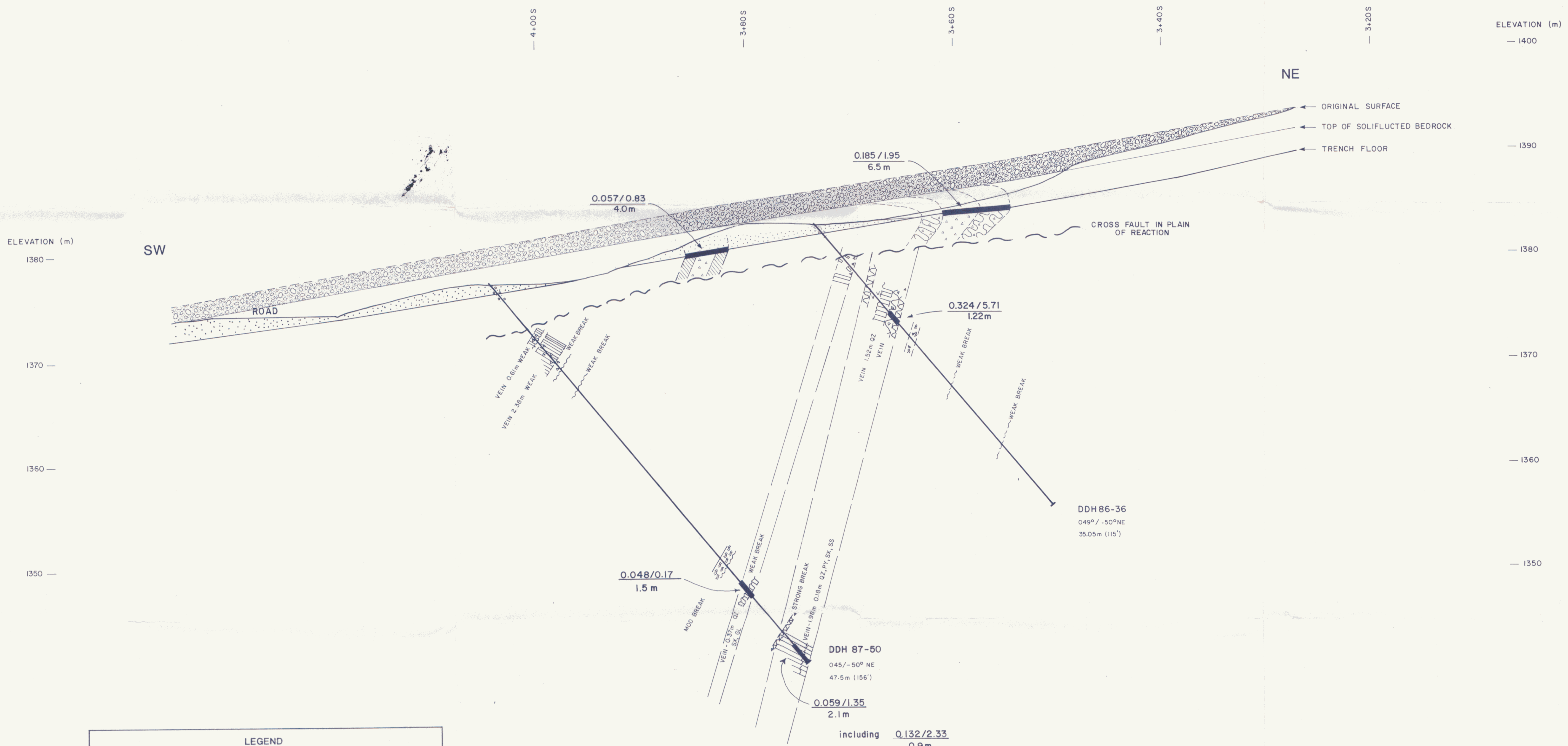
**Chevron Canada Resources Limited**  
Minerals Staff

**SECTION DDH 87-51&52**

FLEX HUESTIS JUNCTION

FIGURE No.	FX-9	PROJECT	NANSEN
DATE	DEC/87	REVISIONS	
NTS No.		SCALE	1:200
COMPILED BY		ARCHER, CATHRO & ASSOCIATES (1981) LIMITED	

404



**LEGEND**

-----	contact - defined (dip on core measured), approximate (dip on core not seen or transitional)		
~~~~~	break (fault) - defined (core dip measured), approximate (dip on core not seen)		
	vein-core width-estimated amount of quartz and "ore" minerals present		
	fault gouge and crushed rock	AS	arsenopyrite
~~~~~	shear zone	BA	barite
	breccia	GL	galena
	crackle breccia	SL	sphalerite
	porphyry dyke	LI	limonite
	quartz-silica flooding	CA	calcite
	pyrite	SD	siderite
	very fine grained mixture of sulphides and sulfosalts	MN	manganese

**0.324/5.71** Au oz/ton / Ag oz/ton  
1.22m Assay Interval

only intervals > 0.04 oz/ton Au are shown; interval grades calculated using 0.02 oz/ton Au cutoff



SECTION FACING NW

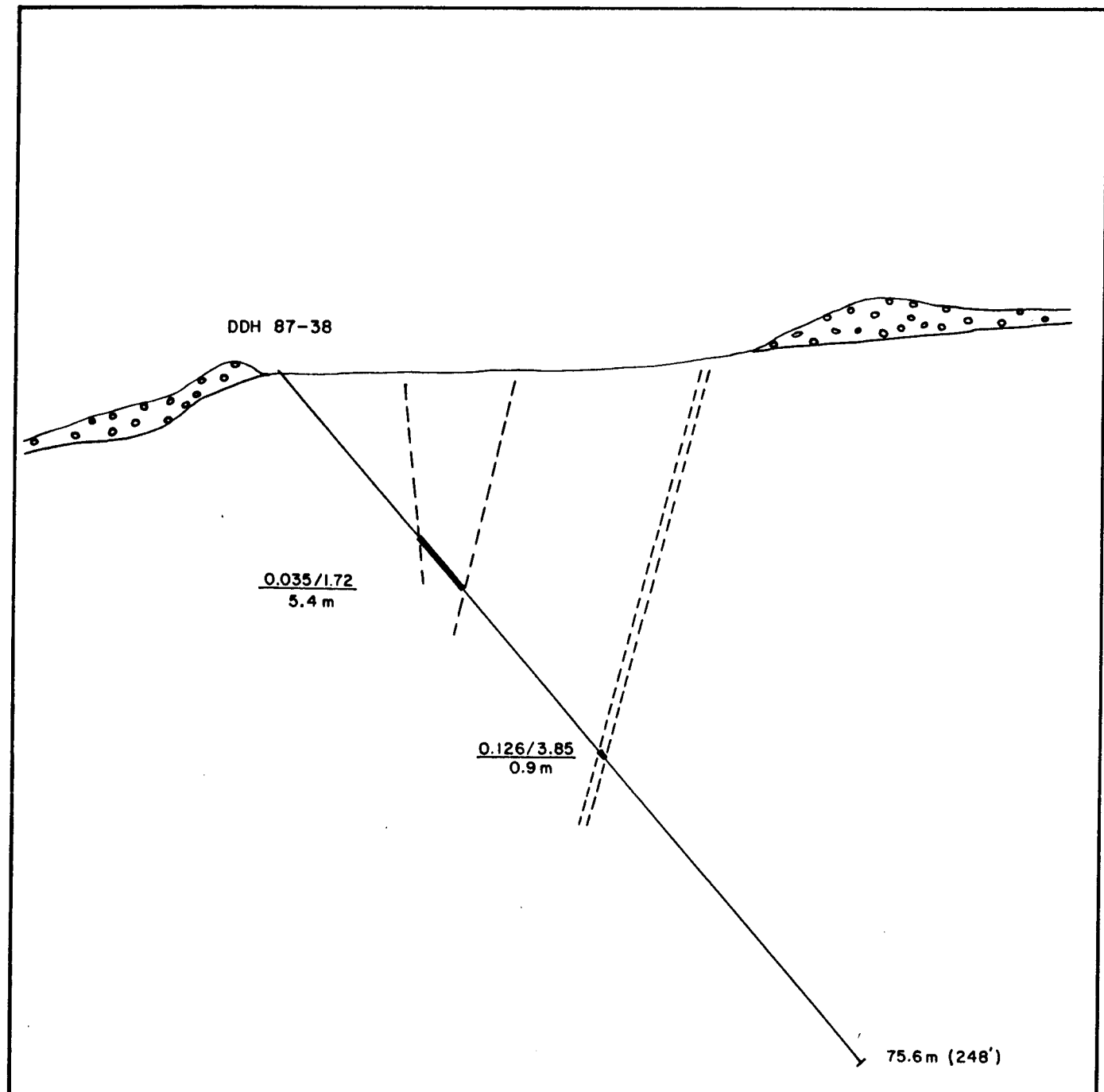
092122

**Chevron Canada Resources Limited**  
Minerals Staff

**SECTION DDH 86-36 87-50**  
**TRENCH W86-27**  
HUESTIS NORTH ZONE

FIGURE No. HN-1	PROJECT No. NANSEN
DATE Dec./86	REVISIONS
NTS No.	SCALE 1:200
COMPILED BY ARCHER, CATHRO & ASSOCIATES (1981) LIMITED	

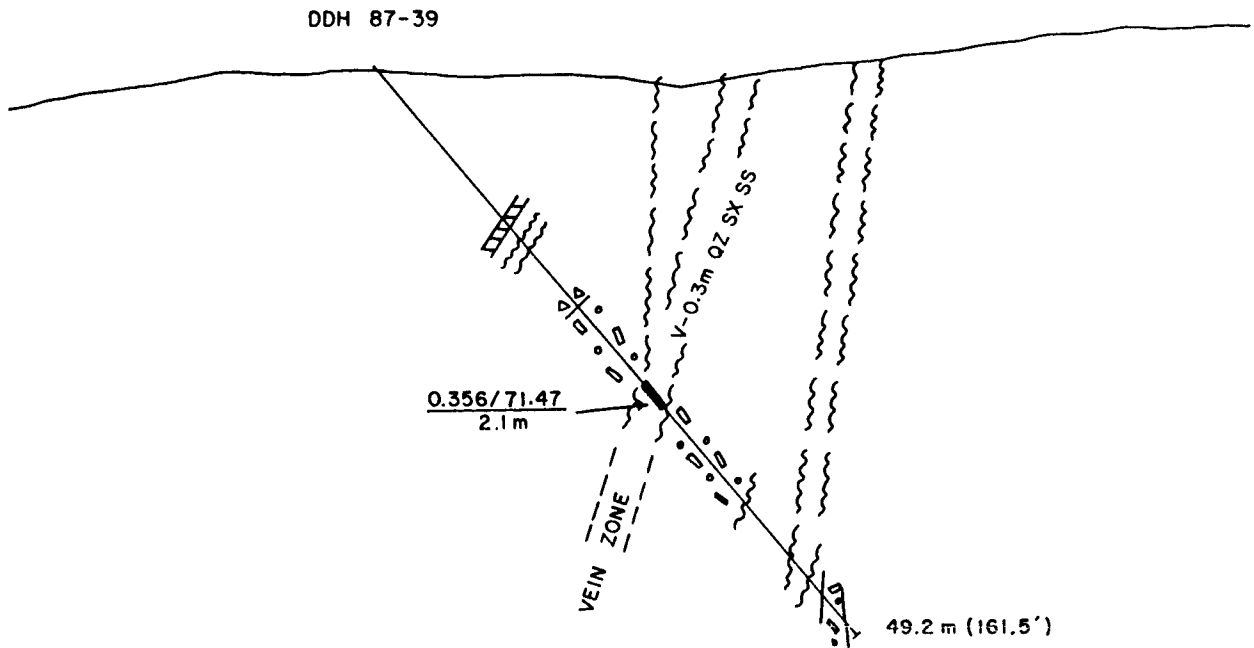
405



**LEGEND**

- geological contact
- ~~~~~ fault
- △△△△ breccia
- ⚡/ porphyry
- ▬ mineralized interval  
0.040 oz/ton Au
- QZ quartz-silica flooding
- SS sulfosalts
- SX very fine grained mixture of  
sulphides and sulfosalts
- 0.035/1.72  
5.4m Au oz/ton / Ag oz/ton  
Assay interval

Figure W-9  
 ARCHER, CATMO & ASSOCIATES (1981) LIMITED  
**SECTION**  
**DDH 87 - 38**  
**WEBBER ZONE**  
**NANSEN PROJECT 092122**  
 SCALE 1:500  
 0 20m



**LEGEND**

- geological contact
- ~~~~~ fault
- △△△△ breccia
- ▨ porphyry
- ▬ mineralized interval  
0.040 oz/ton Au
- QZ quartz-silica flooding
- SS sulfosalts
- SX very fine grained mixture of  
sulphides and sulfosalts
- $\frac{0.035}{5.4m} / 172$  Au oz/ton / Ag oz/ton  
Assay Interval

Figure W-10

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

**SECTION**

**DDH 87 - 39**

**WEBBER ZONE**

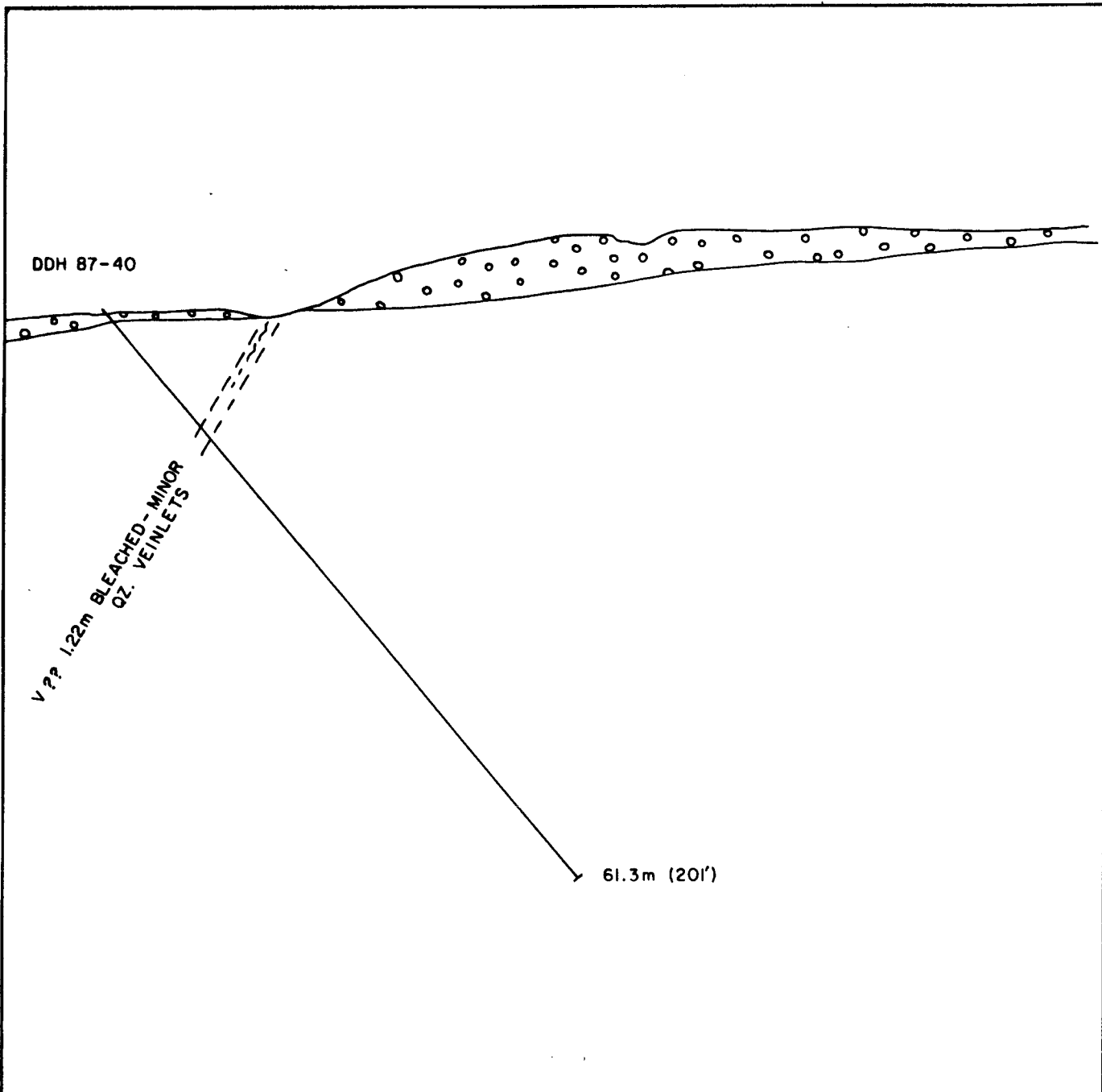
**NANSEN PROJECT**

SCALE 1:500



**092122**

Sheet 1



**LEGEND**

- geological contact
- ~~~~~ fault
- ▲▲▲▲ breccia
- porphyry
- mineralized interval  
0.040 oz/ton Au
- QZ quartz-silice flooding
- SS sulfosalts
- SX very fine grained mixture of  
sulphides and sulfosalts
- 0.035/172 Au oz/ton / Ag oz/ton  
5.4m Assay interval

Figure W-11

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

**SECTION**

**DDH 87 - 40**

**092122 WEBBER ZONE**

**NANSEN PROJECT**

SCALE 1:500



092122  
Sheet K