CCH RESOURCES LIMITED

ASSESSMENT REPORT

GEOLOGICAL AND GEOCHEMICAL SURVEYS

SNARK CLAIMS 1 TO 252
TEE CLAIMS 1 TO 8

115-P-15

63°46'N 136°43'W

MAYO AREA
YUKON TERRITORY

BRIAN PAUL
MARCH 27, 1981

This report has been examined by the Geological Evaluation Unit and is recommended to the Commissioner to be considered as representation work in the amount of

$ 57,397.90

Resident Geologist or
Resident Mining Engineer

Considered as representation work under Section 53 (4) Yukon Quartz Mining Act.

B. R. BAXTER
Supervising Mining Recorder

Commissioner of Yukon Territory

INDIAN and NORTHERN AFFAIRS

TRANSMITTAL FORM

M R File No _____
S M.R File No _____
Date Fwd. 6/4/81

FROM: Mining Recorder at ..... Mayo .....

TO Supervising Mining Recorder at Whitehorse, Y.T.

Office Of The Supervising Mining Recorder
APR 10 1981
WHITEHORSE
Yukon Territory

FOR ACTION ARE:

☐ NEW APPL'N for PLACER LEASE to PROSPECT: Name:

☐ RENEWAL APPL'N PLACER LEASE to PROSPECT: Name: Lease No. .....

☐ AFFIDAVIT of EXPENDITURE on PLACER LEASE. Name Lease No. .....

☐ ASSIGNMENT of PLACER LEASE No. .....
From: To:

☐ GROUPING APPL'N UNDER SEC. 52(2) PLACER MINING ACT.
Owner

☐ DIAMOND DRILL LOGS
Claims: Claim sheet no.

☑ QUARTZ ASSESSMENT REPORT
Claims: SNARK 1-25R Claim sheet no. 115-P-15
Type of report: TEE 1-8
GEO GEOCHEM.
Cls. work performed on:
Submitted by:
CCH MINERALS LTD.
$ Req. for ren. application
$57397.90

Signature

REPLY ACTION Date Ret.

090794

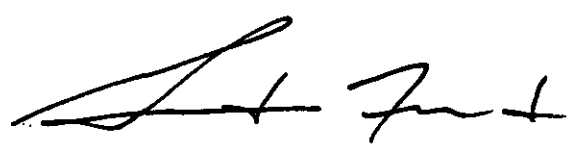
Signature

Note: Re Claim Ownership

At the time the majority of work described in this report was carried out, the Snark and Tee claims were owned by CCH Resources Ltd., a subsidiary of Campbell Chibougamau Mines Ltd., on behalf of the Cortin Joint Venture.

Since then, Campbell Chibougamau Mines Ltd. changed its name to Campbell Resources Inc., and a major corporate re-organization initiated. Legal requirements have resulted in a number of changes in claim ownership.

Presently the claims are being transferred from Campbell Resources Inc. to CCH Minerals Ltd. CCH Minerals Ltd. is a federally chartered company registered to do business in the Yukon, and in time will become the Campbell Group's dominant operating exploration subsidiary in western Canada.



Gordon Ford
Exploration Manager-West
CAMPBELL RESOURCES INC.
CCH MINERALS LTD.

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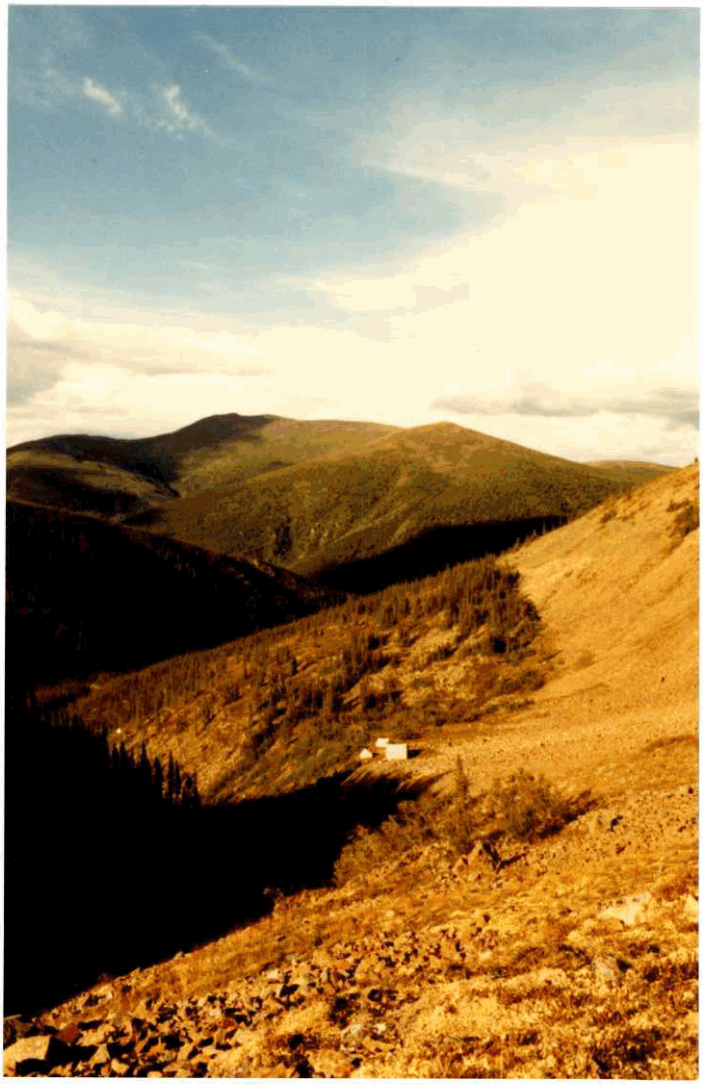


Lovich Creek, looking Northeast,
August, 1980

Introduction

The Snark and Tee claim groups straddle the Boulder Creek drainage area as well as the headwaters of May Creek. Both claim groups are owned in their entirety by CCH Resources Limited of Toronto, Ontario.

The work outlined in this report was conducted intermittently from May 26th through September 26th, 1980. Geological surveys of 1:2000 and 1:10000 scale were completed over large portions of the Snark Group and over 3300 soils collected for tin, lead, zinc, silver and gold analyses. A single 40-metre trench was sunk to bedrock on the west side of May Creek.

An amount totalling $57,200.00 has been claimed for assessment purposes.

Exploration History

The area presently overlain by the Snark and Tee Groups has been the focus of much exploration activity during the past sixty years.

As early as 1922, Niddery and Ortell had staked a lead/silver showing on the east side of May Creek on which an adit was reportedly driven. This occurrence was restaked in 1931 and again in 1962 as the Ted Group, by Zulco Exploration Limited. By this time the copper and zinc potential of the area had also been recognized and an extensive program of bulldozer trenching was carried out from 1963 to 1965. The May and Hope claims were tied onto the above group by J. Strebchuck in 1963 and restaked as the Ore Group in 1967. They were eventually optioned by Coin Canyon Mines Limited and Silver Springs Mines Limited, who, in 1970, carried out geochemical surveys as well as additional trenching. The Ted Group was optioned to Quintana Minerals Limited, who conducted geological, geochemical and magnetometer surveys in 1971 and 1972. These claims were restaked as the Bonnie Group in 1975 by J. Anderson, and the Tee Group by A. Triggs in 1976.

Tin, in the form of cassiterite was reported in panned samples from Boulder Creek by Aho (1949), and was identified, perhaps incorrectly, as an accessory in calc-silicate rocks during work on the aforementioned Ted Group (Archer et al, 1972). Cassiterite was also reported as a constituent of quartz veins in the vicinity of May Creek by D. Templeman-Kluit (pers. comm., 1979).

During 1977, very high tin and tungsten values were confirmed in panned concentrate samples collected along Boulder Creek by CCH Resources Limited. The Snark Group was staked for the company in December of the same year and, subsequently extended. The Tee Group was optioned from A. Triggs of Whitehorse in 1978 and is now owned in its entirety by CCH Minerals Limited.

Only a limited amount of work was carried out by the company in 1978, but reconnaissance scale geochemical surveys did outline several areas of potential interest.

During 1979, expanded geochemical and geological surveys in the vicinity of May Creek outlined an area of anomalous silver in soils on the west side of the creek, as well as a broadly anomalous zone of tin, zinc and copper on the slopes east of the creek. Despite nearly three weeks of detailed mapping and prospecting, no economic tin minerals were identified.

Cominco Limited, also in 1979, were active on the "A" claims northeast of the Snark Group, which they had earlier optioned from G. Dickson. Their target was believed to have been tourmaliniferous breccia veins and their exploration work culminated in a five-hole drill program; low to moderate tin values were reported over drill intersections of unspecified width.

Geological and geochemical surveys were carried out by CCH Resources Limited during 1980, with two objectives. Follow-up programs were carried out on the existing tin and silver anomalies in the vicinity of May Creek, and a large area in the eastern half of the claim group was examined for the first time.

Summary

The area is largely underlain by psammitic rocks of the Yukon Group which have been successively intruded by granite and granodioritic stocks, andesite and quartz-feldspar porphyry dykes. A major antiformal axis is present in the northeastern portion of the property and a weakly developed radial fracture set surrounds the two granitic intrusions. Skarn of varying composition, as well as quartz-muscovite-tourmaline greisen are present within the boundaries of the claim group. Tin, in the form of cassiterite occurs in accessory amounts with sphalerite in actinolite skarns east of May Creek. Narrow shear zones (breccia veins) are developed in a variety of orientations, and are the loci for lead-zinc-silver mineralization.

During 1980, a small area west of May Creek was mapped at 1:2000 scale, and a trench subsequently sunk to bedrock on anomalous lead-silver values in soil. A much larger area covering the entire property east and south of the Tee Group was mapped at 1:10000 scale. Work was directed at covering large gaps existing from the 1978 and 1979 programs, with the result that the property has been covered almost in its entirety by geological mapping. A limited amount of follow-up was completed on pre-existing tin anomalies east of May Creek, and cassiterite was identified as a constituent of skarn in this area.

The present discussion is limited mainly to ground covered during 1980 and shown on the enclosed geological maps 703-9 to 703-11. Work done in the vicinity of the Tee claims during 1979 has been described in an earlier report submitted March 21, 1980.

Bedded Rocks

The property is largely underlain by psammitic rocks of the Proterozoic Yukon Group. The most common lithologies are buff to rusty weathering gritty quartzite, quartz schist, quartz chlorite schist, quartz mica schist and phyllite. An argillaceous and fissile marker horizon containing accessory amounts of sulphide has been tentatively outlined in the area of Lovich and Zappa Creek.

Thin "grit" horizons are found interlayered with quartz schist in a number of localities, being particularly abundant in the area west of May Creek where they are exposed in a trench complex. Now mica schists, they are characterized by thin(1-1½mm) laminae which contain abundant ovoid blue quartz eyes(to 3X5mm), as well as a number of rotten, rusty feldspathic fragments to 3X5mm in size. Similar rocks are common on the EPD Group to the south. They appear to be of tuffaceous origin and their presence, along with thin stratabound massive sulphide horizons, suggests that a significant volcanogenic component is present within this sedimentary sequence.

Intrusive Rocks

A number of intrusive bodies were examined during the 1980 program, including two large granitic stocks centered on Boulder and Sunshine Creek, a large north trending body of biotite granodiorite west of Boulder Creek, a single thin andesitic sill north of the Boulder Stock, and also a late suite of quartz-feldspar porphyry dykes.

All of these rocks have been assigned to Unit 14 (Bostock,1964), which is an undifferentiated, 100 million year old(Cretaceous) suite of intrusive igneous rocks.

"Granite" (14A)

Granitic rocks occurring in the vicinity of Boulder and Sunshine Creek are only moderately well exposed. These rocks tend to outcrop in low-lying ground along the stream courses, and are surrounded by ridges of metasedimentary "cap" rock similar to topography described from the Circle Hot Springs area of Alaska(Robertson,1980).

The Boulder Stock, as presently mapped, covers an area of approximately twenty square kilometres. The contact remains open to the southeast: similar granitic rocks occur on the south side of the McQuesten River within the EPD Group, suggesting a continuation of the intrusive body across the valley floor. Should this extension exist, the total area then underlain by the Boulder Stock would be in excess of thirty square kilometres. The Sunshine Stock, on the other hand, occupies an area of only seven square kilometres in low-lying ground along the creek. The north-eastern portion of this body was not examined during the present survey, nor was the contact closed to the southeast along the creek. It should be noted that the Sunshine Stock falls entirely outside the boundaries of the Snark and Tee Groups.

The Boulder Stock is a coarse-grained, megacrystic, quartz monzonite. Although late pegmatitic veins containing graphic quartz-tourmaline intergrowths, and fine to medium-grained quartz monzonite dykes are found on occasion near the periphery of the intrusion, it consists essentially of a single phase. The large(to 2X3 cm), white K-feldspar phenocrysts commonly exhibit "ragged" edges and terminations, indicating some degree of intergrowth with, or possibly resorption by, groundmass material. Biotite is present in amounts approaching 5%, and tourmaline is an occasional accessory. Modal analyses of two specimens of this intrusive are presented in Table #1: although technically quartz

TABLE #1

SNARK AND TEE GROUPS

Intrusive Rocks, Selected Petrographic Data

SAMPLE NUMBER	Qtz %	Kspar %	Plag %	Mafics %	Kspar/Σ Feld X 100%	DESCRIPTION
79-CR-62	20.2	21.0	39.4	19.4	35%	Biotite-clinopyroxene granodiorite. Clinopyroxene intergrown with hornblende, biotite much altered to Fe chlorite. Accessory allanite, zircon and apatite.
79-CR-63	31.3	40.4	24.3	4.0	62%	Fine-grained, two-mica granite. Tourmaline and fluorite common as accessory minerals. Also zircon.
79-CR-63C	35.4	35.1	24.0	5.5	59%	Medium-grained, two-mica granite. Late sericite, tourmaline and fluorite.* Zircon and apatite as accessories

- 1000 point modal analyses -

* An almost identical granite on the EPD Group cut by late fractures containing tourmaline and fluorite was found to contain 0.62%F on analysis.

monzonites, they are close to being granitic in composition, and the term "two mica granite" is used on Map 703-9.

Where examined, the Sunshine Stock consists largely of a coarse-grained megacrystic phase identical to the one described above. A fine-grained aplitic phase containing only rare quartz and K-feldspar phenocrysts is present in abundance along Sunshine Creek, beyond the limits of the enclosed geological map. Greisen-style alteration is common along the periphery of this intrusive body. Although discreet greisen veinlets carrying accessory sulphide were observed cutting the quartz monzonite, most of the alteration appears to be massive and restricted to a narrow zone along the intrusive contact. Contact metamorphic schists with abundant coarse muscovite are found up to 35 metres away from the contact.

It is quite probable that both stocks belong to the same batholithic mass and are connected at depth. While the Boulder Stock is essentially uniphase and little altered, the Sunshine Stock is apparently multiphase, moderately altered towards its periphery, and cut by late porphyry dykes. The Sunshine Stock appears as if it may be slightly "higher level" than its larger twin to the southwest.

Any attempt to try and explain metal zonation around the two stocks is fraught with hazards, as it is difficult to assess any contribution from the large body of granodiorite west of Boulder Creek. The following general points can be made:

- lead, silver and minor copper occur in breccia veins near the periphery of the Boulder Stock
- copper, and minor lead occur in breccia veins or fractures near the periphery of the Sunshine Stock

- tin, zinc, boron and copper in skarn, and lead/ silver in breccia veins occur removed from the Boulder Stock, but adjacent to the granodiorite body
- tin, arsenic and boron occur in breccia veins removed from the Sunshine Stock

A reverse zonation, if anything, seems to have developed with "high temperature" minerals being deposited away from their presumed parental intrusives, and "low temperature" base metal veins being formed immediately adjacent to the intrusive contacts. Tungsten has been observed only along the margins of the granodiorite body and the proximity of tin, zinc, copper and boron mineralization to the contacts of this same body warrant its re-examination as source intrusive.

"Granodiorite" (14b)

The Molar granodiorite outcropping west of Boulder Creek was not examined in much detail during 1980, having been worked on in the previous year: a few samples were collected for petrographic studies and the eastern limit of the body delineated. A modal analysis of a representative specimen from this intrusive is included in Table #1. Once again, we are dealing with a quartz monzonite, but one which is very close to granodiorite in composition, hence the term granodiorite, which is used on the enclosed geological map. The northwestern extension of this intrusive body may be a separate dyke as originally mapped by Bostock(1964) - comparison of hand specimens from the extension and main mass of granodiorite(presently under way) should resolve this ambiguity. Comments regarding the relationship of this intrusive body to mineralization will be found in the preceding section.

Andesite (14c)

A small andesitic sill approximately one metre in width was found within quartz schists north of the Boulder Creek Stock. It consists of rounded to subhedral feldspar phenocrysts(to 3mm) and clotty green chlorite to 4mm in size, within a fine-grained dark grey groundmass. Biotite is a minor accessory. This rock is thought to be distinct from the "greenstone" dykes and sills commonly found within the Yukon Group metasediments.

Quartz-Feldspar Porphyry (14d)

Quartz-feldspar porphyry dykes occur north of the Boulder Stock and also in an area between the Boulder and Sunshine Stocks. In drill core remaining from Cominco Limited's 1979 program, these dykes can be seen cutting medium-grained quartz monzonite of Unit 14A, and, for this reason are considered the youngest intrusive bodies in the area. A typical example contains euhedral, Carlsbad-twinned K-feldspar phenocrysts to 5X15mm in size, and euhedral, often composite, dark grey quartz phenocrysts to 6mm in diameter, both within a fine-grained grey quartzo-feldspathic groundmass. Biotite(to 2mm) and occasionally tourmaline(to 4mm), occur as small phenocrysts within the groundmass. Mafic inclusions to 2 cm in diameter are common.

The dykes are, however, quite variable in appearance and probably in composition as well. The "pale" phase described above seems most abundant, but "dark" porphyries are also quite common. Strongly zoned plagioclase feldspar is present as a phenocryst phase within the dark porphyries, as are K-feldspar and quartz. Euhedral allanite and zircon are present as accessory minerals. Mafic inclusions are again quite common, and are almost always surrounded by narrow white reaction rims. Granitic or quartz monzonitic inclusions are

somewhat rarer. Large rounded fragments of dark porphyry occur as inclusions within the paler phase(Plate #1), and, coupled with the presence of quartz monzonitic inclusions in the dark phase, suggest the following intrusive sequence: quartz monzonite → "dark" porphyry → "pale" porphyry.

A single aphanitic quartz eye porphyry intrudes quartz schist on a ridge in between the Molar granodiorite and Boulder Stock. Although somewhat different in appearance and composition from the aforementioned porphyries, it has been placed in this subdivision as well.

Brecciated Rocks

These rocks are discussed in more detail in the section on structure. The breccias are inevitably mineralized and can be subdivided into the following types:

1) tourmaliniferous breccia veins containing accessory topaz and cassiterite
2) tourmaline and arsenopyrite bearing breccia veins which contain a significant amount of silver
3) brecciated quartz veins containing argentiferous galena, sphalerite and chalcopyrite, as well as many secondary lead, copper and manganese minerals

The largest of these linear breccias is fifteen metres in width and can be traced over a strike length of 250 metres; the remaining veins tend to be much smaller.

Plate #1. Dark phase of K-feldspar/quartz-eye porphyry included within a pale phase of similar composition.

Structure

The planar feature within the Yukon Group metasediments is generally schistosity (locally foliation), but bedding is recognizable where individual horizons of calcareous sediment or skarn are present within the sequence. Where observed, bedding directions are indistinguishable from schistosity.

A major antiformal axis, the McQuesten Antiform, has been outlined in the northeastern part of the claim group in an area between the Boulder and Sunshine stocks. North of the antiform, the metasedimentary sequence dips at gentle to moderate angles (15 to 40^{o}) to the northwest, while south of the structure the dips are of similar magnitude to the southeast. The structure cannot be traced beyond the Boulder Stock to the southwest, as this is an area of much intrusive interference. Here, the schistosities within the metasedimentary rocks are much more variable, commonly showing some degree of parallelism with the intrusive contacts. That the granitic stocks are in some way related to the antiformal axis, seems obvious: whether they are the cause of the structure, or have been intruded along a pre-existing axis is unknown. Minor folding is common in the vicinity of the axis, as indicated in Plate #2.

The Yukon Group metasediments are typically well-jointed, in a variety of orientations. Breccia veining is fairly common: four individual veins have been located, three peripheral to the Boulder Stock and one adjacent to the Sunshine Stock, but many more are thought to exist. The breccia veins average one to two metres in width and can seldom be traced over more than ten or twenty metres along strike. They are inevitably mineralized with galena, secondary manganese and copper minerals and cerrusite.

Plate #2. Minor folding within Yukon Group metasediments adjacent to the McQuesten Antiform.

The general orientation of these breccia veins is perpendicular to the intrusive contacts and they appear to form part of a radial fracture set surrounding the two large granitic stocks.

Two breccia veins have been examined, which are some distance away from the intrusive contacts. The first of these, a one-metre wide vein containing abundant tourmaline and arsenopyrite, occurs near the headwaters of Zappa Creek. The second is located on the "A" claims northeast of the Snark Group and beyond the limits of the enclosed geological map. A tourmaliniferous breccia vein examined and subsequently drilled by Cominco Limited in 1979, it is approximately 15 metres in width, trends northeast/southwest, and can be traced over a strike length of more than 250 metres. Both of these breccia veins are thought to be hydraulic fractures related to intrusive bodies at depth.

Alteration

The psammitic rocks of the Yukon Group have almost certainly been subjected to low grade regional metamorphism, but a lack of diagnostic minerals precludes any estimate of metamorphic grade. No contact aureole is recognizable along the periphery of the Boulder Stock, but many areas along the Sunshine Stock contact are greisenized. Contact schists containing coarse muscovite are present up to 35 metres beyond the intrusive contacts, and andalusite has been tentatively identified in schists adjacent to the contact in an area west of Sunshine Creek.

As in the vicinity of May Creek, most of the significant alteration is metasomatic in origin. Skarn, of variable composition, occurs as discreet horizons within quartz schists west of Boulder Creek, and is particularly abundant in an area near the centre of the Zappa Creek grid. Almandine/diopside, grossular/diopside/epidote, almandine/diopside/calcite/axinite, and quartz/calcite/chlorite/epidote varieties have all been identified. The most substantial of these skarn horizons outcrops east of the Ore showing, where it is approximately four metres in width.

Tourmaline is a common accessory mineral, occurring in significant amounts in many of the brecciated rocks, as well as in late fractures or pegmatitic veinlets near the peripheries of the granite stocks. Its equivalent in the calc-silicate rocks is, of course, axinite. Boron metasomatism is not nearly as well-developed in the eastern portions of the claim group, as it is in the area around May Creek, but is present nevertheless. Topaz has been tentatively identified as an accessory in tourmaline-bearing breccia veins on the "A" claims.

Quartz-muscovite-tourmaline greisen is developed along the periphery of the Sunshine Stock and was observed in one locality along the northeastern margin of the Boulder Stock. This alteration appears more or less massive in the vicinity of the contact, and the presence of coarse muscovite in schists adjacent to the contact has been mentioned previously. Discreet greisen veinlets carrying accessory sulphide were seen cutting medium grained quartz monzonite of the Sunshine Stock in Cominco Limited's drill core.

Mineralization

Breccia veins and brecciated quartz veins containing significant amounts of argentiferous galena, sphalerite and chalcopyrite are present in a number of localities peripheral to the Boulder Stock, and were the focus of much of the early work on the Ore and Tee claims. Grab samples collected from several of these veins during 1979 assayed up to 3.4% Pb, 7.9% Zn and 77 oz/ton Ag - two additional grabs were submitted during 1980 and the resulting values are shown in Table #2. High lead and silver values were encountered in soils west of May Creek during the 1979 program, and a trench was sunk to bedrock on the anomalous area during 1980(Plate #3). Although no mineralization was encountered, further work is planned in this area during 1981. Bulldozer trenches on the ridge above the anomaly contain fractured limonitic quartzite, with only accessory sulphide.

Two areas of high tin in soils(1979) on the slopes east of May Creek were re-examined during the current program, and cassiterite was ultimately discovered within the southern-most of these areas. It occurs as small, one to two millimetre black crystals coating fracture surfaces and lining cavities, and also as slightly larger crystals within actinolite skarn (identified by XRD). Grab samples of the skarn containing visible black sphalerite contain from 0.23 to 0.41% Sn and

TABLE #2

Snark and Tee Groups

Grab samples, selected assay data

SAMPLE NUMBER	Sn%	Pb%	Zn%	Ag oz/t	DESCRIPTION
SK-80-1	-	3.60	2.50	7.74	brecciated quartz vein in shear
SK-80-11	0.26	-	-	-	actinolite skarn
SK-80-12	0.23	-	-	-	actinolite skarn
SK-80-19	0.24	-	-	-	actinolite skarn
SK-80-21	0.41	-	-	-	actinolite skarn
SK-80-26	-	-	-	6.35	breccia vein with abundant arsenopyrite
SK-80-48b	-	17.80	-	4.63	brecciated quartz vein
SC-80-08	0.31	-	-	-	tourmaliniferous breccia vein
SC-80-09	0.19	-	-	-	tourmaliniferous breccia vein

Plate #3. May Creek trench. Flagging at one metre intervals.

0.5 to 1.5% Zn(zinc was not assayed). Mineralization of this type may be quite erratic, as similar skarny rocks with accessory sphalerite, collected outside the area of anomalous soils, contain only insignificant amounts of tin. The importance of geochemical surveys to the location of "in situ" tin mineralization is self-evident. Petrographic studies directed towards a fuller understanding of the skarn mineralization are presently under way.

Tourmaliniferous breccia veins containing abundant arsenopyrite and scorodite, and significant amounts of silver (6 oz/ton) occur near the headwaters of Zappa Creek. Grab samples from the large breccia vein on the "A" claims ran as high as 0.31% Sn and cassiterite was identified in small fractures adjacent to this vein.

Although some work is planned on the lead-silver anomaly west of May Creek during 1981, the main thrust of our work will be directed towards tin-zinc mineralization on the opposite side of the creek. A better understanding of the nature and possible extent of this skarn mineralization will enable us to choose areas worthy of detailed follow-up, including diamond drilling, in 1982.

Geochemistry

Methods

Residual soils with a well developed and easily recognizable B horizon are widespread on the Snark Group, making sampling relatively straightforward. Alluvial contamination may be present along several of the larger stream courses, but these areas were largely avoided during the present survey. Samples collected immediately east of May Creek were inevitably of the scree fine variety, due to a thick blanket of boulder rubble covering the hillside in this area.

Minus 80 mesh fractions were analyzed for tin, lead, zinc, silver and gold by Bondar-Clegg and Company Limited in Whitehorse.

Tin analyses were done using ammonium iodide fusion and atomic absorption spectrometry after the method of Stanton and MacDonald (1961), and Smith (1967).

Lead, zinc and silver were analyzed by atomic absorption spectrometry following standard perchloric acid extraction.

Gold analyses were done using a combined fire assay/atomic absorption technique.

For the sake of completeness and as a check on our 1978 results, stream sediment samples were collected where the individual grid lines crossed a stream course. Heavy mineral studies were not attempted.

Results

Tin, zinc and silver were analyzed in soils on two separate 100 metre X 50 metre grids covering a large portion of the Snark Group north of the Boulder Creek stock. All of this work was completed in July and August of 1980. Included with the report are maps 703-3 and 6 (tin), 703-4 and 7 (zinc) and 703-5 and 8 (silver), all at 1:5000 scale, showing contoured results for the various elements. Both sets of geochemical maps, for Lovich and Zappa Creek, are indexed on Map 703-9.

Anomalous (greater than 50 ppm), but generally discontinuous values in tin occur in the central portion of the Zappa Creek grid, as well as on the vegetated slopes in the southern third of the grid. Within the Lovich Creek grid there are only a few mildly anomalous (greater than 20 ppm) tin values located on the upper reaches of the creek, most of which tie into pre-existing anomalies from the 1979 program. Values in excess of ten ppm tin are considered significant and maps contoured to this low level (viz. Zappa Creek, 703-6) seem to hang together quite nicely. Of note are the reasonably high tin values in stream sediments from Lovich and Zappa Creek, reaching 71 and 48 ppm, respectively.

Silver values are low to non-existent throughout most of the two grid areas.

Mildly anomalous zinc values occur in association with gossaned scree slopes on the upper reaches of Lovich Creek, but these values are only vaguely coincident with moderately high tin soils in this area. In the central portion of the Zappa Creek grid, zinc values in excess of 300 ppm do appear to coincide with an area of reasonably enhanced tin in soils.

The tin/zinc association is reminiscent of the area east of May Creek, where sphalerite, chalcopyrite and cassiterite are found in accessory amounts within actinolite skarn. Although rocks of similar appearance are present in the central portions of the Zappa Creek grid, no tin or zinc minerals were discovered during the 1980 surveys. Detailed prospection of this area is planned in 1981.

During late May, several areas of high tin in soils (1979) on the slopes east of May Creek were re-tested. Samples were collected on a 20 metre X 50 metre grid and analyzed for tin only. Pre-existing anomalies were confirmed and soil/scree fine samples yielded results as high as 2400 ppm tin. Cassiterite was ultimately discovered on the southern-most of these grids, in the form of vug fillings and also as an accessory with sphalerite in actinolite skarn. The location of both detailed grids is indicated on Map 703-10 - contoured results are still awaiting drafting and are not included with this report.

A detailed 20 metre X 50 metre followup was also undertaken in an area of high silver in soils on the west side of May Creek (see Map 703-11). The pre-existing anomaly was again confirmed, with individual samples running as high as 141 ppm silver and 2200 ppm lead. A single 40-metre trench was subsequently sunk to bedrock on this anomaly, but mineralization was not encountered.

Recommendations for Future Work

The Snark and Tee Groups, together comprise a large area of about 50 square kilometers. Because of its size, this area has proved difficult to evaluate. Work has been directed in the past, and should be directed in the future, towards isolating areas of specific interest which will warrant a concentrated exploration effort.

Our main area of interest remains the ground immediately east of May Creek, centred on the Tee claims. Twenty-eight individual tin anomalies (greater than 50 ppm), with associated high zinc and copper exist on the slopes east of the creek, only two of which were checked on the ground in 1980. Detailed prospection of each of the remaining anomalies is recommended in 1981. Mapping would be desirable, but is thought to be unfeasible, due to the "jumbled" nature of the scree cover on these slopes. Trenching remains a remote possibility.

Somewhat less enticing are the tin and zinc anomalies in the vicinity of Zappa Creek, for which a similar program of prospection is recommended. Mapping is entirely possible within this area, and detailed geochemical surveys will probably be of some help. Limited reconnaissance geochemistry is suggested to close small gaps in our existing coverage.

On the west side of May Creek, a combination of geochemistry and trenching failed to locate the source of anomalous lead and silver in soils. VLF E-M and double dipole E-M surveys are recommended in this area in 1981. Should these surveys be successful in picking up a zone of sulphide mineralization, trenching is again recommended prior to diamond drilling.

The Snark and Tee Groups remain one of our priority areas within the Mayo district, and there is no reason why the properties should not be fully evaluated by the end of 1981. Based on excellent existing multi-element geochemistry, favorable geology and a number of "in situ" cassiterite occurrences, it is anticipated that several diamond drill targets will be outlined during the coming year.

STATEMENT OF QUALIFICATIONS

Work on the SNARK and TEE Groups during 1980 was carried out under the direction of A. Woodsend of Vancouver, British Columbia.

Mr. Woodsend is Field Manager-North for CCH RESOURCES LIMITED. He holds a B.Sc.(Hons.) degree in geology from Southhampton University, England and has practiced his profession continuously for a period of ten years, in a variety of countries and geological environments.

The majority of geological work during this period was conducted by the author, Brian Paul, a geologist with Billiton Canada Limited, Toronto, Ontario and presently seconded to the Cortin Joint Venture. R. Robertson of CCH Resources Limited spent several days on the property, in a consulting capacity.

Capable assistance was provided in the field by T. Boyd, J. Branch, J. Dunn, M. Kerlan, T. McKinlay, A. Lee and P. Plishka.

STATEMENT OF EXPENDITURES

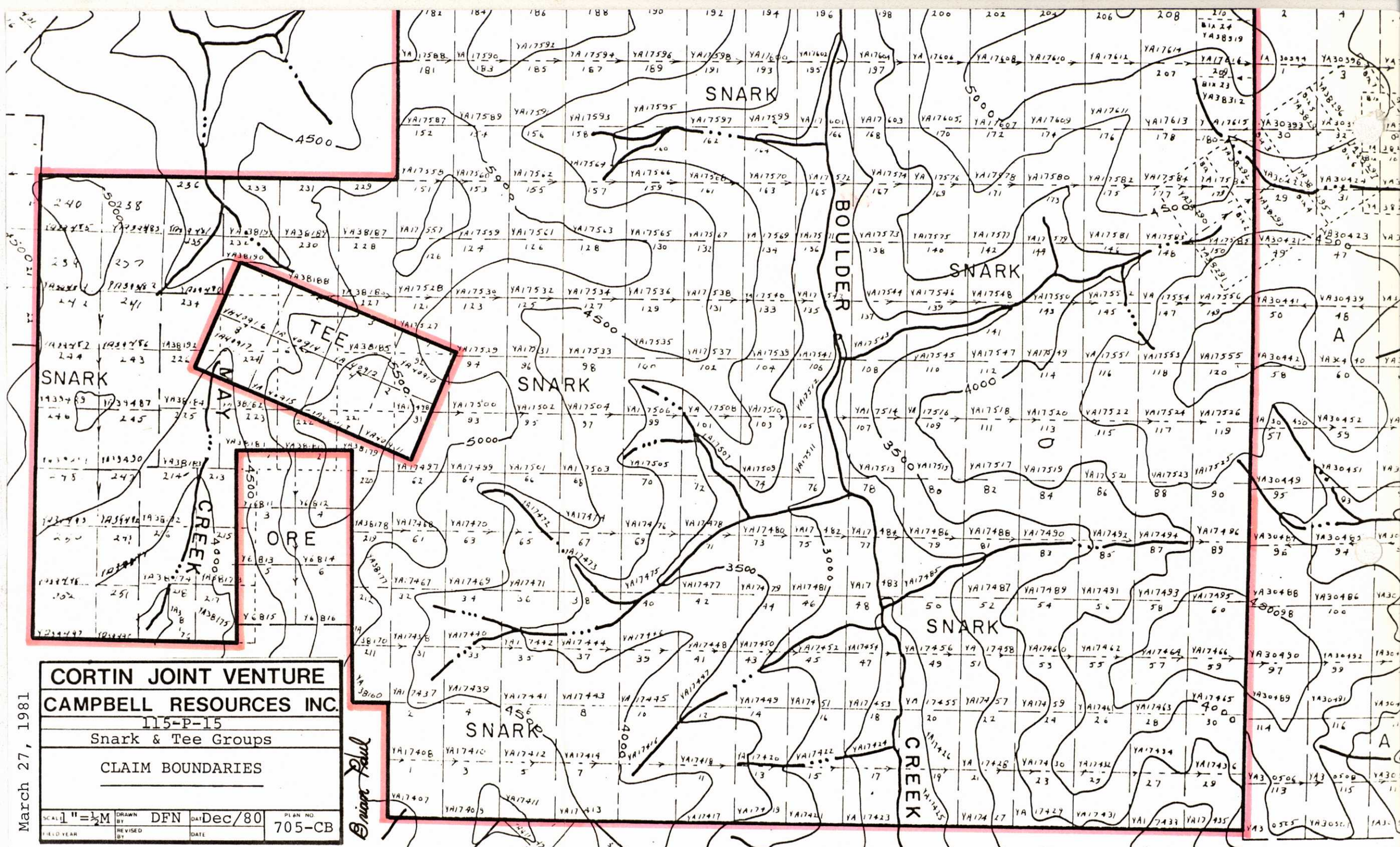
3122 Soils analyzed for Sn/Zn/Ag @$6.15	$19,200.30
90 Soils analyzed for Ag only @$2.90	261.00
85 Soils analyzed for Sn only @$3.75	318.75
26 Soils analyzed for Ag/Pb/Au @$7.15	185.90
33 Rock samples analyzed for Ag/Pb/Au @$8.65	285.45
7 Sn assays @$9.00	63.00
4 Ag assays @$7.00	28.00
2 Pb and 1 Zn assay @$5.50	16.50
40 Geologist days @$100.00/day	4,000.00
150 Assistant days @$75.00/day	11,250.00
2 Geologist days @$155.00/day	310.00
1 Supervisory day @$175.00/day	175.00
12 Helicopter hours @$440.00/hour (casual rate)	5,280.00
18 Helicopter hours @$340.00/hour (contract rate)	6,120.00
Contract trenching, May Creek	5,420.00
Drafting & Interpretation	2,000.00
Food and supplies: 207 man days @$12.00/day	2,484.00
	$57,397.90

Work was carried out intermittently between May 26th and September 26th, 1980.

Brian Paul

Vancouver, B.C.
27 March, 1981

Brian Paul
Geologist - Cortin J.V.



CORTIN JOINT VENTURE

CAMPBELL RESOURCES INC.

115-P-15

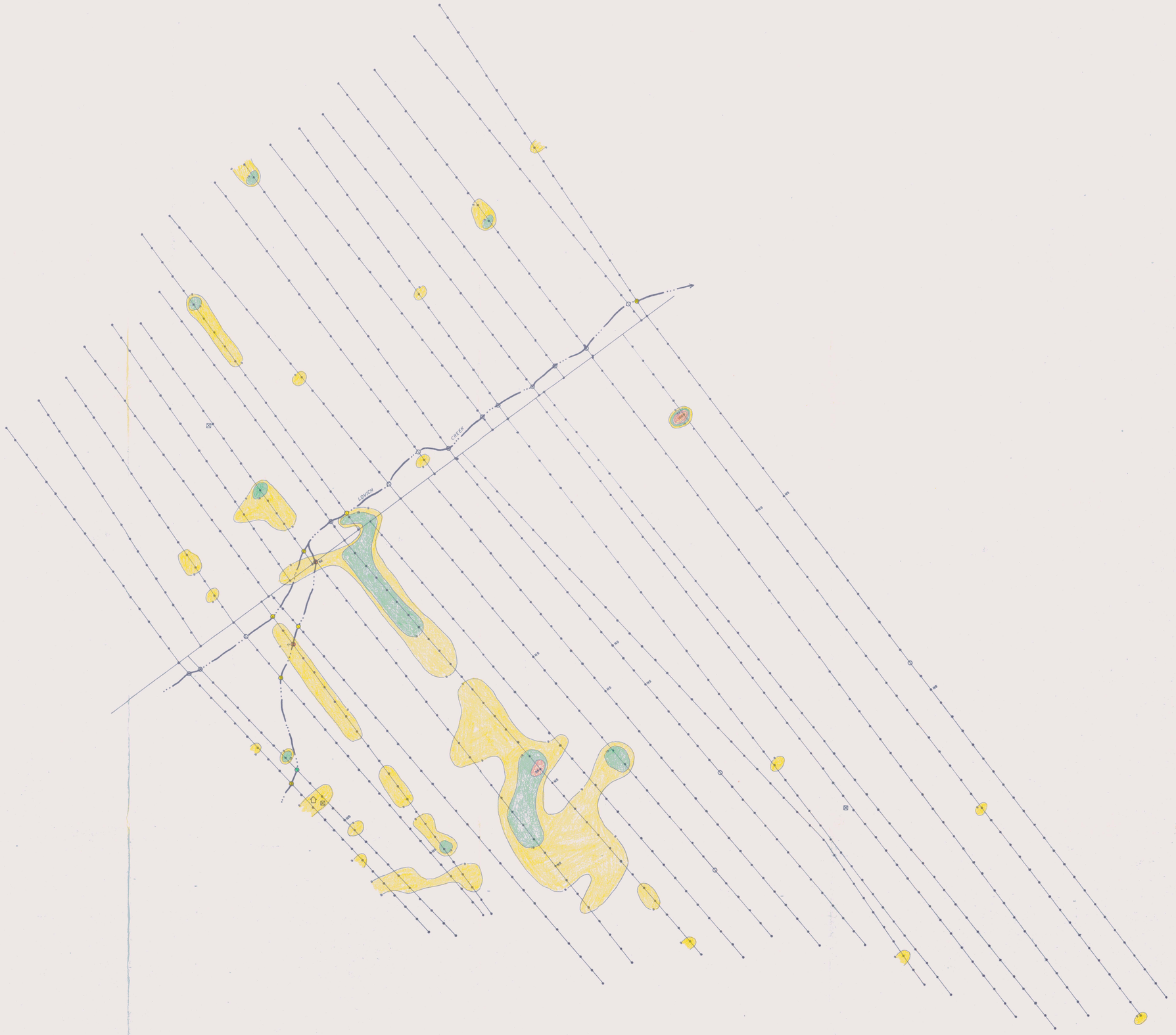
Snark & Tee Groups

CLAIM BOUNDARIES

SCALE	DRAWN BY	DATE	PLAN NO.
1" = ½M	DFN	Dec/80	705-CB
FIELD YEAR	REVISED BY	DATE	

March 27, 1981

Brian Paul



LEGEND

VALUES:

Sn

- > 99. ppm
- > 49. ppm
- > 19. ppm
- > 9. ppm

NS. NO SAMPLE TAKEN

SOIL SAMPLES

STREAM SEDIMENT SAMPLES

SNARK CLAIM POSTS.

CAMP

CORTIN JOINT VENTURE

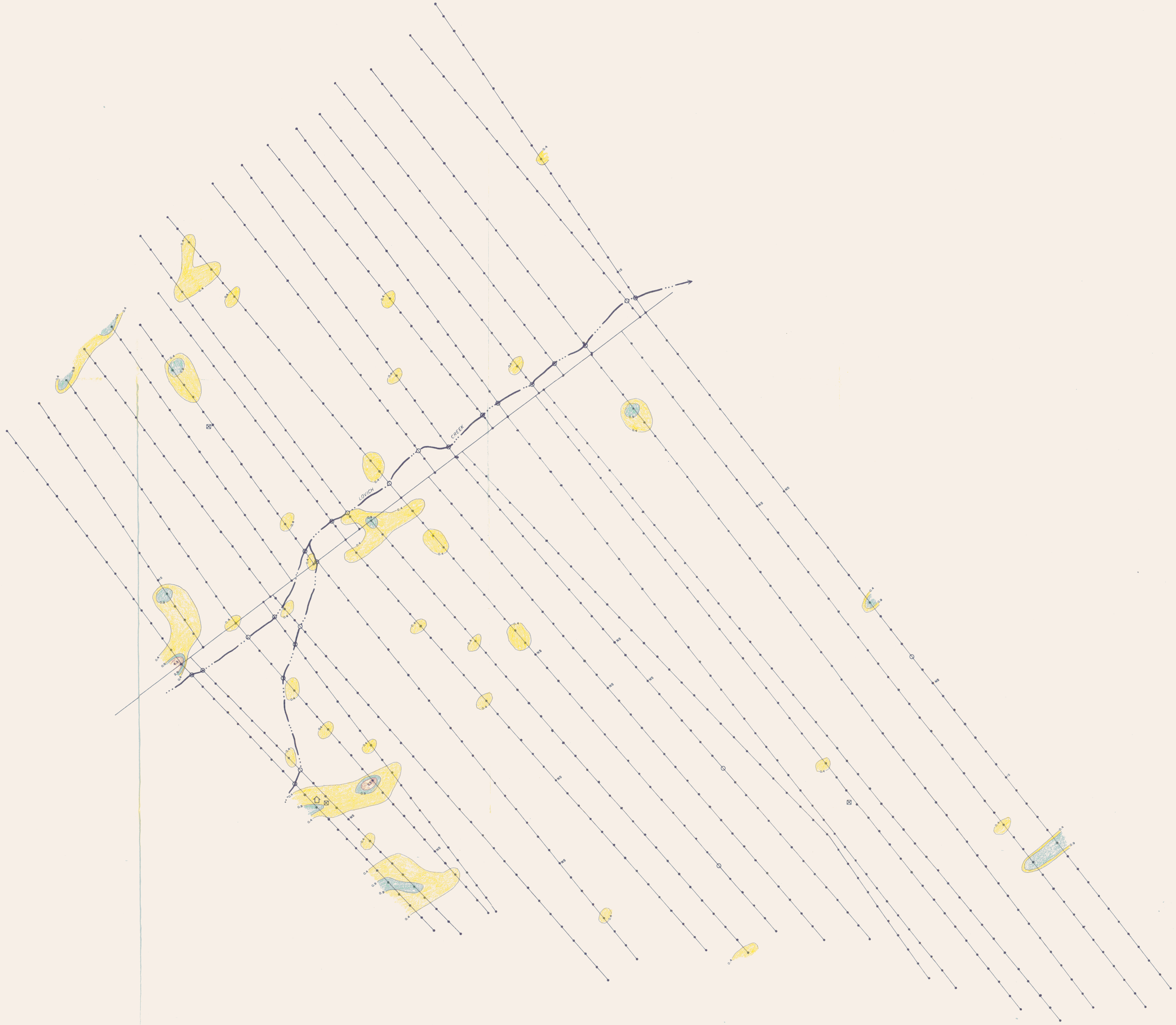
CAMPBELL RESOURCES INC

115-P-15

SNARK GROUP

DETAILED SOIL GRID LOVICH CR. Sn

SCALE 1:5000	DRAWN By DFN	DATE JAN. 30, 1981	PLAN NO. 703-3
FIELD YEAR 1980	REVISED By	DATE	



LEGEND

VALUES:

Ag

> 2.9 ppm

> 0.9 ppm

> 0.4 ppm

is INSUFFICIENT SAMPLE

ns NO SAMPLE TAKEN

SOIL SAMPLES

STREAM SEDIMENT SAMPLES

SNARK CLAIM POSTS

CAMP

CORTIN JOINT VENTURE

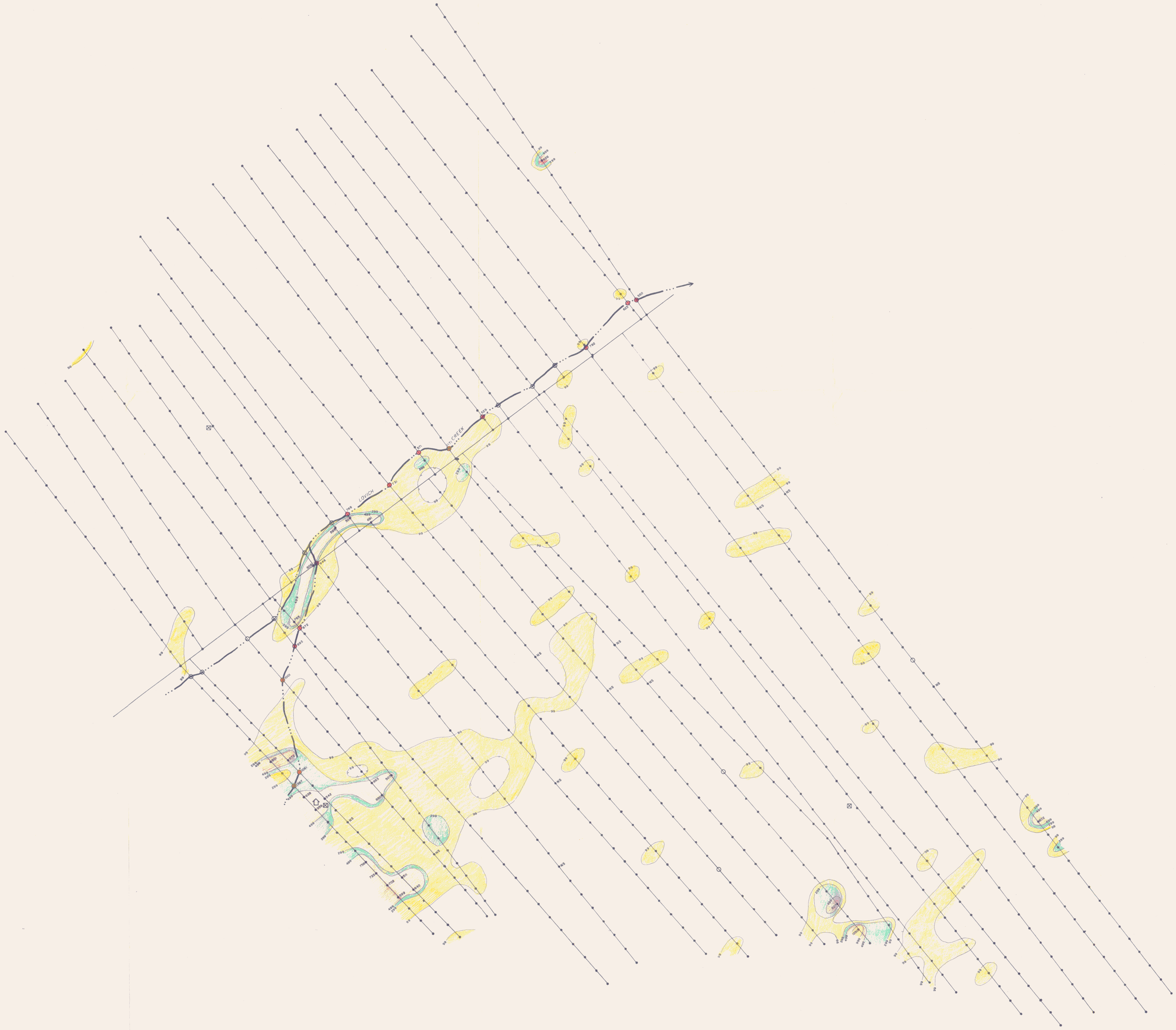
CAMPBELL RESOURCES INC.

115-P-15

SNARK GROUP

DETAILED SOIL GRID LOVICH CR. Ag

SCALE 1:5000	DRAWN BY D.F.N	DATE JAN. 30, 1981	PLAN NO. 703-4
FIELD YEAR 1980	REVISED BY	DATE	



LEGEND

VALUES:

Zn

- >999 ppm
- >499 ppm
- >299 ppm
- > 99 ppm

ns NO SAMPLE TAKEN

SOIL SAMPLES

STREAM SEDIMENT SAMPLES

SNARK CLAIM POSTS

CAMP

CORTIN JOINT VENTURE

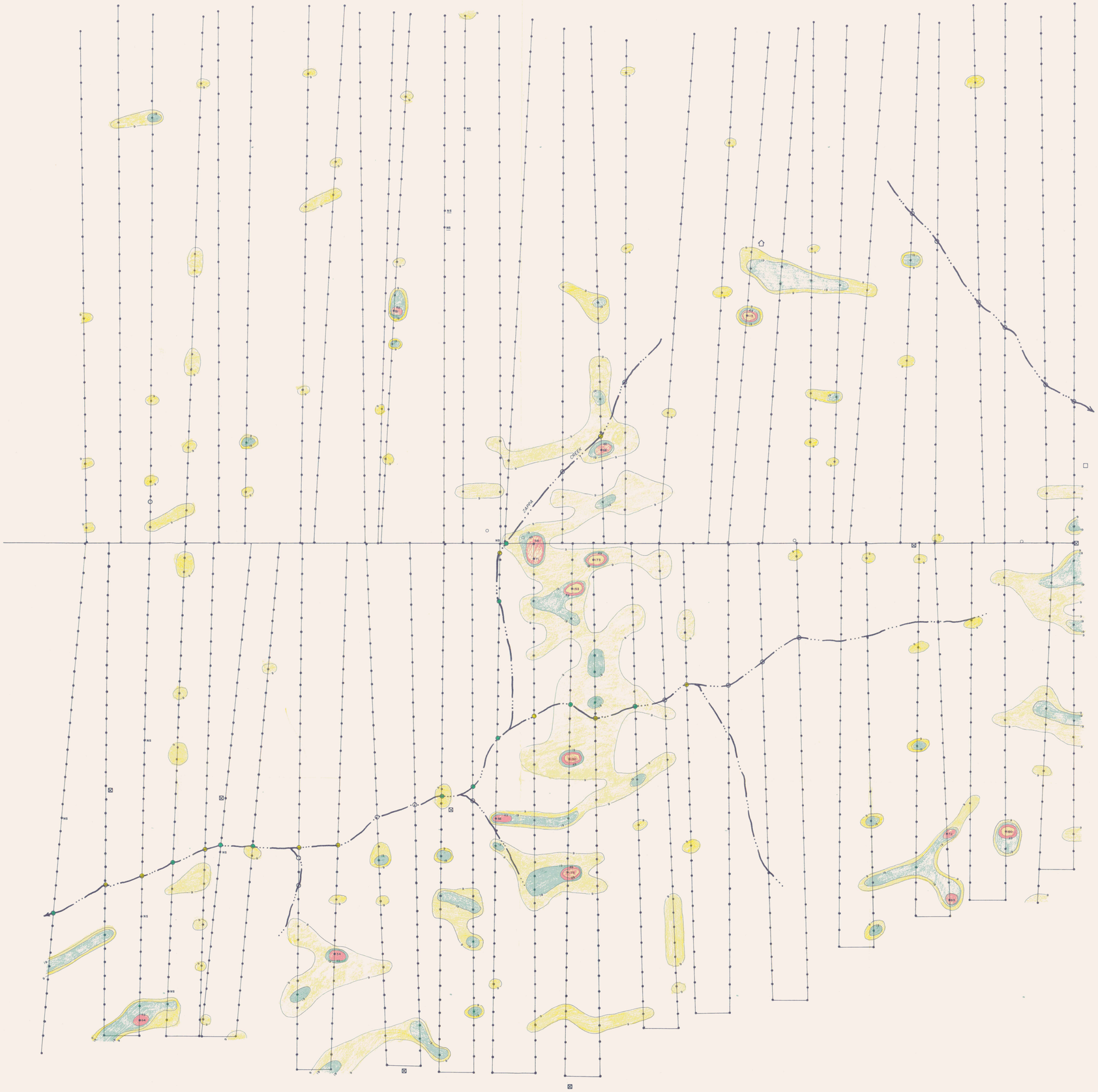
CAMPBELL RESOURCES INC.

115-P-15

SNARK GROUP

DETAILED SOIL GRID LOVICH CR. Zn

SCALE 1:5000	DRAWN BY DFN	DATE FEB. 2, 1981	PLAN NO. 703-5
FIELD YEAR 1980	REVISED BY	DATE	



LEGEND

VALUES:

Sn

CORTIN JOINT VENTURE
CAMPBELL RESOURCES INC.

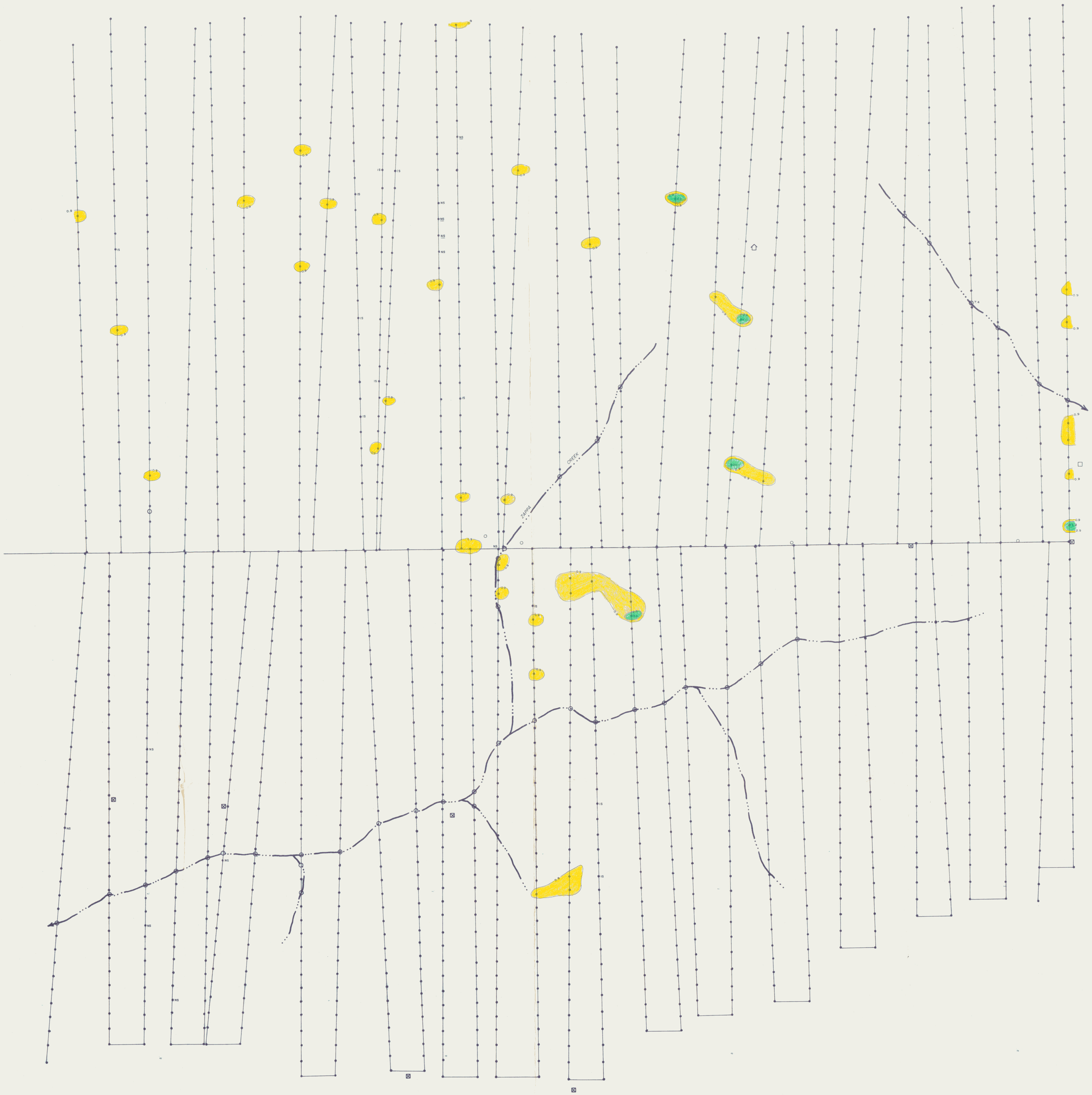
115 - P - 15

SNARK GROUP

DETAILED SOIL GRID
ZAPPA CR.

Sn

SCALE	DRAWN BY	DATE	PLAN NO.
1 : 5000	DFN	FEB. 9, 1981	703-6
	REVISED		



LEGEND

VALUES:

Ag
- > 2.9 ppm
- > 0.9 ppm

- SAMPLE NOT TAKEN, OMIT FROM NUMBERING SEQUENCE
- NS SAMPLE NOT TAKEN, INCLUDE IN NUMBERING SEQUENCE
- IS INSUFFICIENT SAMPLE
- SOIL SAMPLES (1980), SOIL SAMPLES (1978)
- STREAM SEDIMENT SAMPLES
- CLAIM POSTS: SNARK, OTHER
- CAMP

CORTIN JOINT VENTURE

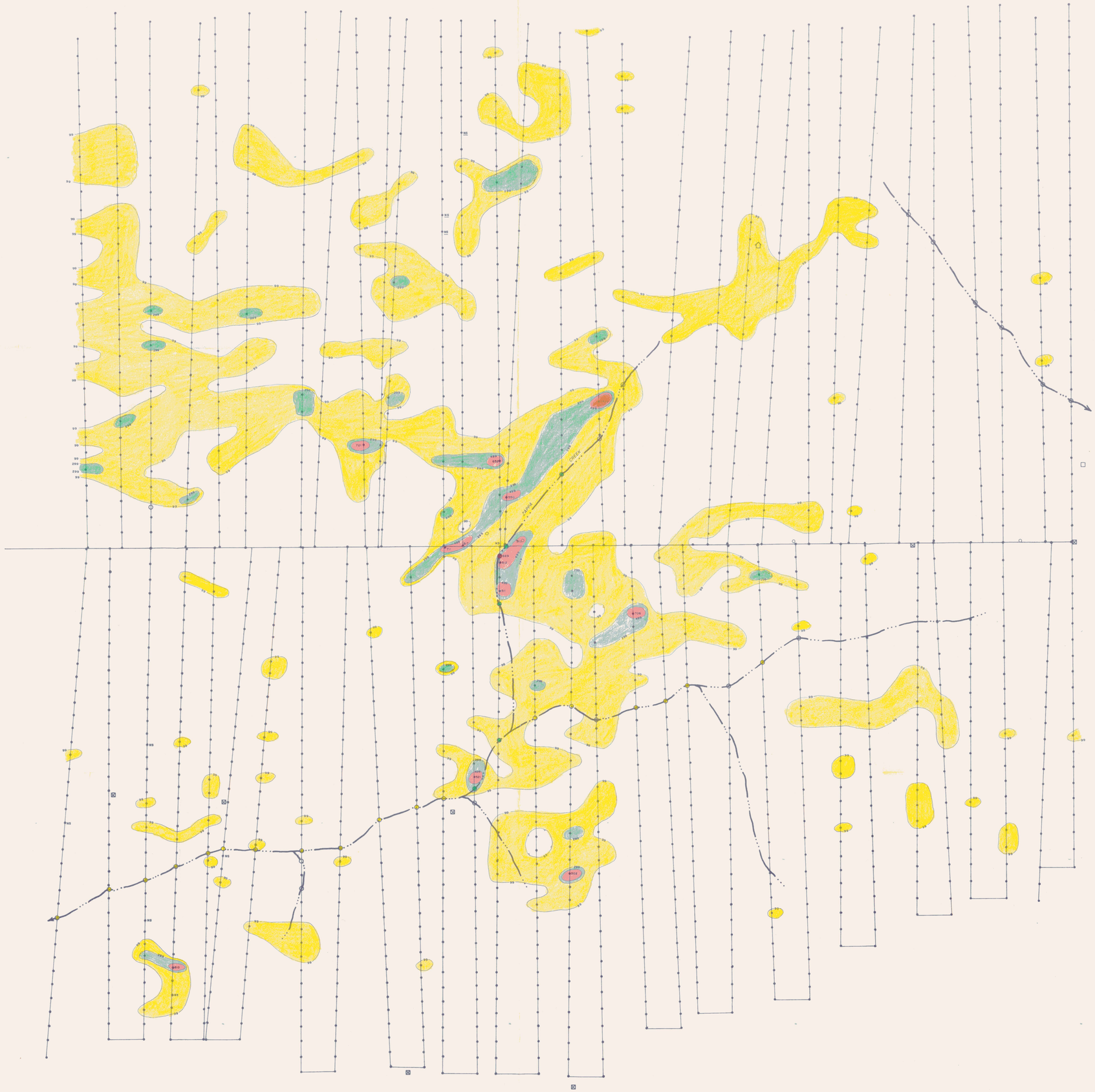
CAMPBELL RESOURCES INC.

115 - P - 15

SNARK GROUP

DETAILED SOIL GRID ZAPPA CR. Ag

SCALE 1 : 5000	DRAWN BY DFN	DATE FEB. 9, 1981	PLAN NO. 703-7
FIELD YEAR 1980	REVISED BY	DATE	



LEGEND

VALUES:

Zn

- >999 ppm
- >499 ppm
- >299 ppm
- >99 ppm

- IS INSUFFICIENT SAMPLE
- NS SAMPLE NOT TAKEN, OMIT FROM NUMBER SEQUENCE
- NS SAMPLE NOT TAKEN, INCLUDE IN NUMBER SEQUENCE
- SOIL SAMPLES (1978)
- SOIL SAMPLES (1980)
- STREAM SEDIMENT SAMPLES
- CLAIM POSTS: SNARK, OTHER
- CAMP

CORTIN JOINT VENTURE

CAMPBELL RESOURCES INC.

115 - P - 15

SNARK GROUP

DETAILED SOIL GRID Zn

ZAPPA CR.

SCALE 1:5000	DRAWN BY	DFN	DATE FEB. 11, 1981	PLAN NO.	703-8
FIELD YEAR 1980	REVISED BY		DATE		

LEGEND

GEOLOGY:

CRETACEOUS

- K-FELDSPAR/QTZ EYE "I"
  - FELSIC PHASE AND DARK PHASE, DARK OFTEN AS INCLUSIONS IN FELSIC AND VICE VERSA
  - MAFIC INCLUSIONS COMMON
  - SOME TEXTURAL AND COMPOSITIONAL VARIATION
  - CUTS CG MEGACRYSTIC GRANITE, 14 a
- ANDESITE
  - THIN SILL WITHIN YUKON SCHIST, ONE LOCALITY ONLY
  - NOT TO BE CONFUSED WITH "GREENSTONE"
- BIOTITE/FELDSPHYRIGENE GRANODIORITE
  - GENERALLY CG, PORPH QTZ AND K-FELDSPAR)
  - FINE TO MED GRAINED, SUB-PORPH IN PLACES
- TWO MICA GRANITE
  - GENERALLY CG, MEGACRYSTIC (K-FELDSPAR)
  - FINE TO MED GRAINED, SACCHAROIDAL PHASE SUNSHINE STOCK
  - FINE TO MED GRAINED, ALSO TOUR-BEARING PEG PHASE IN LATE VEINS NEAR PERIPHERY OF "BOULDER STOCK"
  - QTZ/MUSCOVITE/TOUR GREISEN DEVELOPED SPORADICALLY ALONG INTRUSIVE MARGINS

PRE-CAMBRIAN AND/OR CAMBRIAN — YUKON GROUP

- BUFF-, BROWN-, AND RUSTY-WEATHERING GRITTY QFELPH, QTZ SCHIST, QTZ CHLOR SCHIST, QTZ-MICA SCHIST AND PHYLLITE
- SKARN

SYMBOLS:

- FOLIATION, INCLINED
- SCHISTOSITY, INCLINED
- JOINTING, PROMINENT FRACTURE SETS
- TREND OF CONTACT
- ANTIFORMAL AXIS
- PLUNGE OF MINOR FOLD AXES
- HORIZONTAL MINOR FOLD AXES
- TRENCH
- AREA OF GOOD EXPOSURE - INCLUDES BOTH OUTCROP AND SCREE COVER
- OUTCROP BOUNDARY
- LIMIT OF MAPPING, 1980
- CAIRN
- CAMPSITE
- HELICOPTER PAD
- CLAIM POSTS: SNARK, OTHER
- SCATTERED BOULDERS, RUBBLE
- PARALLEL

ABBREVIATIONS:

O/C	OUTCROP
N/O	NO OUTCROP
CG	COARSE GRAINED
MED	MEDIUM
FF	PORPHYRY
PORPH	PORPHYRITIC
AX	AXINITE
BIO	BIOTITE
CHLOR	CHLORITE
Cu	SECONDARY COPPER MINERALIZATION
MN	MANGANESE
Pb	GALENA
PEG	PEGMATITE
QTZ	QUARTZ
QTZITE	QUARTZITE
QV	QUARTZ VEIN
TOUR	TOURMALINE
ARG	ARGILLACEOUS

N.B. - ADDITIONAL GEOLOGICAL COVERAGE ON MAPS TY-35 AND 703-10

CORTIN JOINT VENTURE
CAMPBELL RESOURCES INC.
115-P-15
SNARK GROUP

GEOLOGY

SCALE 1:10,000	DRAWN BY	DATE MAR 24, 1981	PLAN NO. 703-9
FIELD YEAR 1981	REVISED BY	DATE	

10646
SK-80-13
10715
SK-80-1
10650
10719
Sn
Sn
N
108 W
107 W
106 W
105 W
104 W
103 W
102 W
101 W
100 W
99 W
98 W
97 W
96 W
95 W
MICACEOUS Qtzite, GRITSTONE, TUFF
THIS SAMPLE LINE MISFLAGGED
N/O
10920
SK-80-9
SK-80-8
CALCAREOUS Qtzite AS FLOAT
Ag
10315
MAY CREEK
10240
SK-80-12
SK-80-14
SK-80-11
SK-80-10
17326
10972
SK-80-3,4
- BROKEN OUTCROP
- WEAKLY DEVELOPED FRACTURE SET (< 1-3 mm)
SK-80-5
(PROMINENT)
SK-80-6a,b,c
MINERALIZED FRACTURE SYSTEM (< 1-30 mm) Qtz-SULPHIDE
SK-80-7
SK-80-2
(MINOR BRECCIA, Qtz VEINING, RUSTY Qtzite)
CAT ROAD ALONG RIDGE CREST
CAT ROAD (POSITION APPROXIMATE)
GRITSTONE/TUFF

LEGEND

- YUKON SCHIST: MICACEOUS Qtzite, SCHIST, LIMESTONE (AS THIN HORIZONS), GRITSTONE/TUFF
- Ag >30 ppm (SOIL)
- OUTCROP
- SCREE/BOULDER RUBBLE LIMIT
- LIMIT FRACTURE MINERALIZATION
- FOLIATION/PARTING
- SCHISTOCITY
- JOINTING/FRACTURING
- PLUNGE MINOR FOLD AXES
- TRENCH
- BOUNDARY DETAILED SOIL GRID
- SOIL SAMPLE LOCATION (1979) NOT ALL SHOWN
- ROCK SAMPLE LOCATION (1980)
- CLAIM POST AND CLAIM LINE
- GULLY
- x SCATTERED BOULDERS

Qtz QUARTZ
Qtzite QUARTZITE
N/O NO OUTCROP

CORTIN JOINT VENTURE
CAMPBELL RESOURCES INC.

115-P-15

SNARK GROUP

GEOLOGY
MAY CR. – WEST SIDE

SCALE 1 : 2000	DRAWN BY DFN	DATE MAR 4, 1981	PLAN NO. 703-10
FIELD YEAR '79, '80	REVISED BY	DATE	

104 W

BASE LINE 330°/150° (?)

101 W

MAY CREEK

N

0.5 (28) 2.3 (64) 2.0 (26) 0.8 (33) 0.5 (19) 2.5 (100) 5.3 (160) 17.5 (220) 9.1 (135) 15.5 (175) 9.0 (175) 6.8 (365) 11.5 (265) 2.8 (140) 6.8 (78)

26014
EL. 1370

26000
EL. 1319

SCATTERED BOULDERS OF MICACEOUS QUARTZITE FOLIATION MILDLY CONTORTED. QUARTZ LENSING PARALLEL TO FOLIATION.

MICACEOUS QUARTZITE

O 10916 (POS'N APPR.)

2.5 (59) 0.8 (32) 0.9 (22) 3.6 (285) 1.0 (41) 2.7 (68) 35.3 (380) 21.7 (480) 8.5 (190) 8.7 (275) 15.5 (490) 10.0 (225) 3.7 (68) 5.2 (52) 5.0 (62)

26015

26029

ABUNDANT MINOR FOLDING FOLD AXES IN PLANE OF SCHISTOSITY

16

CHEVRON FOLDING FOLD AXES IN PLANE OF SCHISTOSITY

38

THIN TO MASSIVE BEDDED QUARTZITE AND SCHIST

APPROXIMATE SLOPE DIRECTION (?)

2.0 (28) 1.6 (27) 0.9 (32) 1.3 (41) 4.0 (140) 34.0 (320) 24.0 (475) 30.0 (600) 78.0 (2200) 16.0 (580) 6.1 (130) 5.1 (105) 4.5 (66) 1.9 (33) 2.5 (39)

26044

26030

O 10279

1.5 (32) 1.7 (38) 0.9 (29) 1.1 (35) 1.3 (27) 20.8 (340) 4.9 (78) 20.3 (395) 19.0 (140) 8.8 (230) 1.9 (65) 1.8 (37) 2.7 (59) 2.0 (33)

26059

26045

GULLY

MASSIVE QUARTZITE

33

24m

MINOR FOLDS: AXES PLUNGE WEST IN PLANE OF SCHISTOSITY

20

O 10942

26 SOILS: 12 GREATER THAN OR EQUAL TO 348 ppm LEAD 14 GREATER THAN OR EQUAL TO 10.2ppm SILVER ALL BETWEEN .5 AND 120ppb GOLD

33 BEDROCK SAMPLES: ALL LESS THAN OR EQUAL TO 111 ppm LEAD, 2.6 ppm SILVER AND 5 ppb GOLD

2.4 (85) 1.3 (39) 0.8 (30) 0.7 (27) 9.0 (42) 21.0 (160) 6.0 (65) 6.1 (55) 8.0 (130) 2.3 (53) 2.0 (34) 4.9 (58) 1.3 (27) 1.7 (87) 1.5 (36)

26060

26074

POSITIONS OF THESE OUTCROPS ARE APPROXIMATE TIED INTO 1979 SOIL GRID

GULLY

O 10920

CALCAREOUS QUARTZITE/ LIMESTONE PREDOMINATES

ABUNDANT FLOAT

CALCAREOUS QUARTZITE

1.5 (68) 2.0 (53) 10.0 (185) 2.2 (25) 3.9 (50) 4.8 (73) 9.0 (205) 2.7 (58) 1.1 (47) 1.1 (39) 10.4 (130) 1.8 (45) 6.0 (80) 5.3 (85) 1.8 (39)

26069
EL. 1433

QUARTZITE OF VARIABLE COMPOSITION

26075
EL. 1415

MICACEOUS QUARTZITE WITH CALCAREOUS INTERBEDS

25

MINOR SULPHIDE (PYRITE) COATING FRACTURES

O 10972

FROM 26079, APPROXIMATELY 140 m. UPHILL TO MIDDLE OF TRENCH COMPLEX

FRACTURING/SCHISTOSITY IN TRENCH COMPLEX

80 20

LEGEND

- SILVER : GREATER THAN 30 ppm
- SILVER : GREATER THAN 10 ppm
- LEAD : GREATER THAN 1500 ppm
- LEAD : GREATER THAN 300 ppm
- YUKON SCHIST : MICACEOUS QUARTZITE, SCHIST, LIMESTONE (THIN HORIZONS), GRITSTONE (TUFF)
- OUTLINE OF MAY CREEK TRENCH
- AXIAL PLUNGE, MINOR FOLDS
- FOLIATION, INCLINED
- SCHISTOSITY, INCLINED
- PROMINENT FRACTURES
- 1980 SOIL GRID : Ag (Pb) ppm
- O 1979 SAMPLE LOCATION
- AREA OF OUTCROP
- SCREE LIMIT
- STREAM, WITH DIRECTION OF FLOW
- GULLY MARGIN

N.B. CORRECTED FOR TOPOGRAPHY

CORTIN JOINT VENTURE
CAMPBELL RESOURCES INC.

115-P-15

SNARK GROUP

MAY CREEK DETAILED GRID

Ag
Pb

SCALE 1:500	DRAWN BY R.C.	DATE MAR. 16, 1981	PLAN NO. 703-11
FIELD YEAR 1980	REVISED BY	DATE	