MineQuest Report #152
Ref. No. RM3802

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REMOTE SENSING ANALYSIS
CHURN CREEK CLAIMS

Churn Creek Area
Clinton Mining Division

N.T.S. 92O/7, O/8

for

Chevron Canada

by

K.V. Campbell

of

MineQuest Exploration Associates Ltd.

Vancouver, B.C.

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1.0 INTRODUCTION

This brief report describes the results of a remote sensing analysis on the CHURN CREEK claims, Clinton Mining Division, British Columbia. The objective of the work was to identify lineaments using digitally enhanced Thematic Mapper data.

Thematic Mapper (Landsat 5) computer tapes were used in this study. Particulars of the imagery are given in Table I.

TABLE I

Description of Data

Tape ID	Image Date	Scene
TM1543	September 22, 1985	Track 48 Figure 24 Bands 1,2,3,4,5,7

Spectral wavebands included on the tape were:

TM-1	0.45 - 0.52	visible blue
TM-2	0.52 - 0.60	visible green
TM-3	0.63 - 0.69	visible red
TM-4	0.76 - 0.90	infrared
TM-5	1.55 - 1.75	infrared
TM-7	2.08 - 2.35	infrared

Figure 1 shows the relation of the Thematic Mapper (TM) bands in relation to other satellite scanners. The TM spectral sampling area (i.e. pixel dimension) is 30 x 30 m.

Supporting data consisted of 1:50,000 topographic maps (N.T.S. 92O/7, O/8).

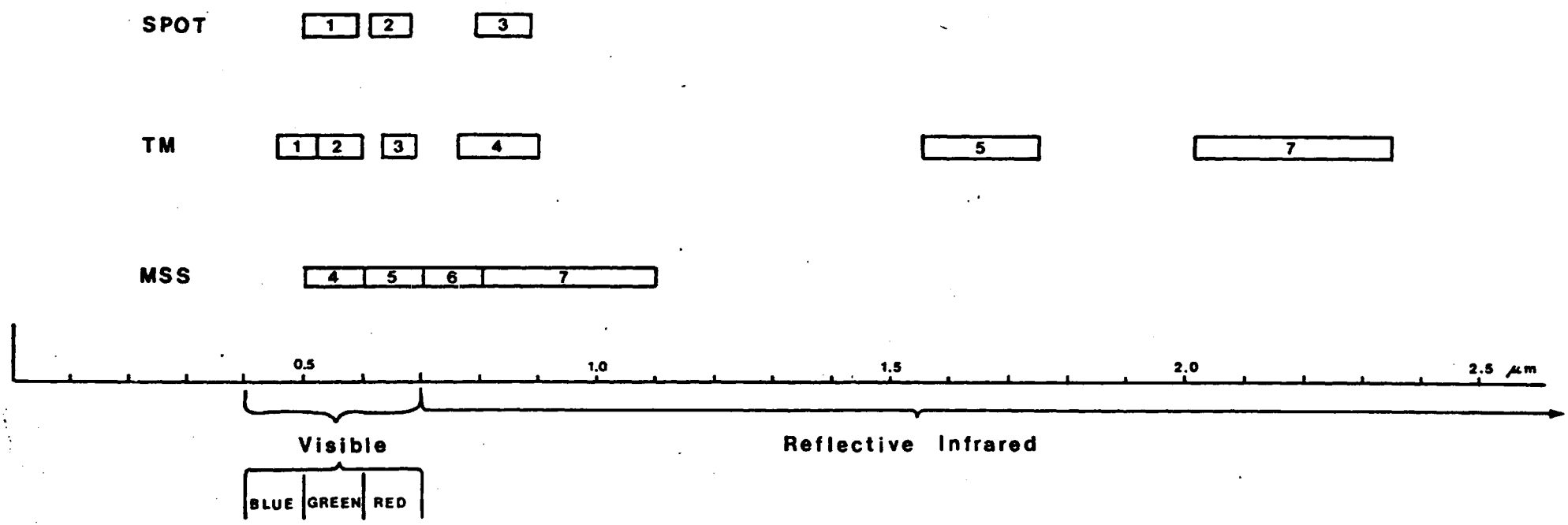


FIGURE I
Remote sensing satellite scanner bands

2.0 METHOD

TM computer compatible tapes (CCT) are acquired from the Canadian Centre for Remote Sensing, Prince Albert, Saskatchewan. The imagery contained on each tape covers an area about 90 kilometres square. A portion of the imagery, 1024 x 1024 pixels or 30.72 kilometres square, is transferred to a hard disk on the Vax 780 main frame computer at the B.C. Research Council facility. The software program used in the analysis is EASI-PACE produced by Perception Computing Inc.

The method of digital analysis is outlined below:

1. Histograms of raw spectral data are produced.

2. The spectral data are 'stretched' from their raw distribution (determined in Step 1) over the available brightness sensitivity range, 0-255. The nature of the stretch is proprietary.

3. Ratios of the six bands of raw data are then produced and stretched according to the configuration of their histograms. Ratios produced were $^{1}/_{2}$, $^{1}/_{7}$, $^{2}/_{3}$, $^{3}/_{4}$, $^{4}/_{5}$ and $^{5}/_{7}$.

4. Each waveband and ratio is then viewed independantly and a judgement made as to the quality of contrast and ability of the enhancement to identify geological stuctures.

5. Based on the above, a number of colour composites are made using combinations of various bands and band ratios. Any three bands or band ratios can be composited and projected onto the computer monitor (512 x 512 pixel display). Any one channel (band or band ratio) can be projected with blue, green or red light, the operator determining which colour combination is most suitable for lineament definition.

6. Each composite is photographed with 35mm colour positive film (Ektachrome 200). Eight x ten inch enlargements are then made, with a nominal scale of 1:75,000.

7. Lineament analysis is performed on overlays directly on the enlarged photographs. The overlays are then enlarged to a scale of 1:50,000 with a photocopy machine. For this work lineaments were transferred by overlaying a 1:50,000 topographic map and getting the best fit. The surface features making up a lineament may be geomorphic (caused by relief) or tonal (caused by contrast in colour or brightness). Surface features may be landforms, linear boundaries between different types of terrain, or breaks within a uniform terrain. Tonal lineaments are caused by differences in vegetation, moisture content, and soil or rock composition.

3.0 RESULTS

Figure 2 is the lineament analysis of the project area, compiled from all composited images. A three-fold classification is used; well defined, moderately well defined and weakly defined. This has no relation to the relative geological significance or ranking of the lineaments.

Figure 3 is the same lineament base as Figure 2, but with particular lineaments highlighted by the author as being worthy of ground verification and prospecting. Silt anomalies identified in earlier work (1983) and fossil hot springs are also shown. The following observations are made:

1. The majority of lineaments fall into three sets: northeast, north-northeast and northwest.

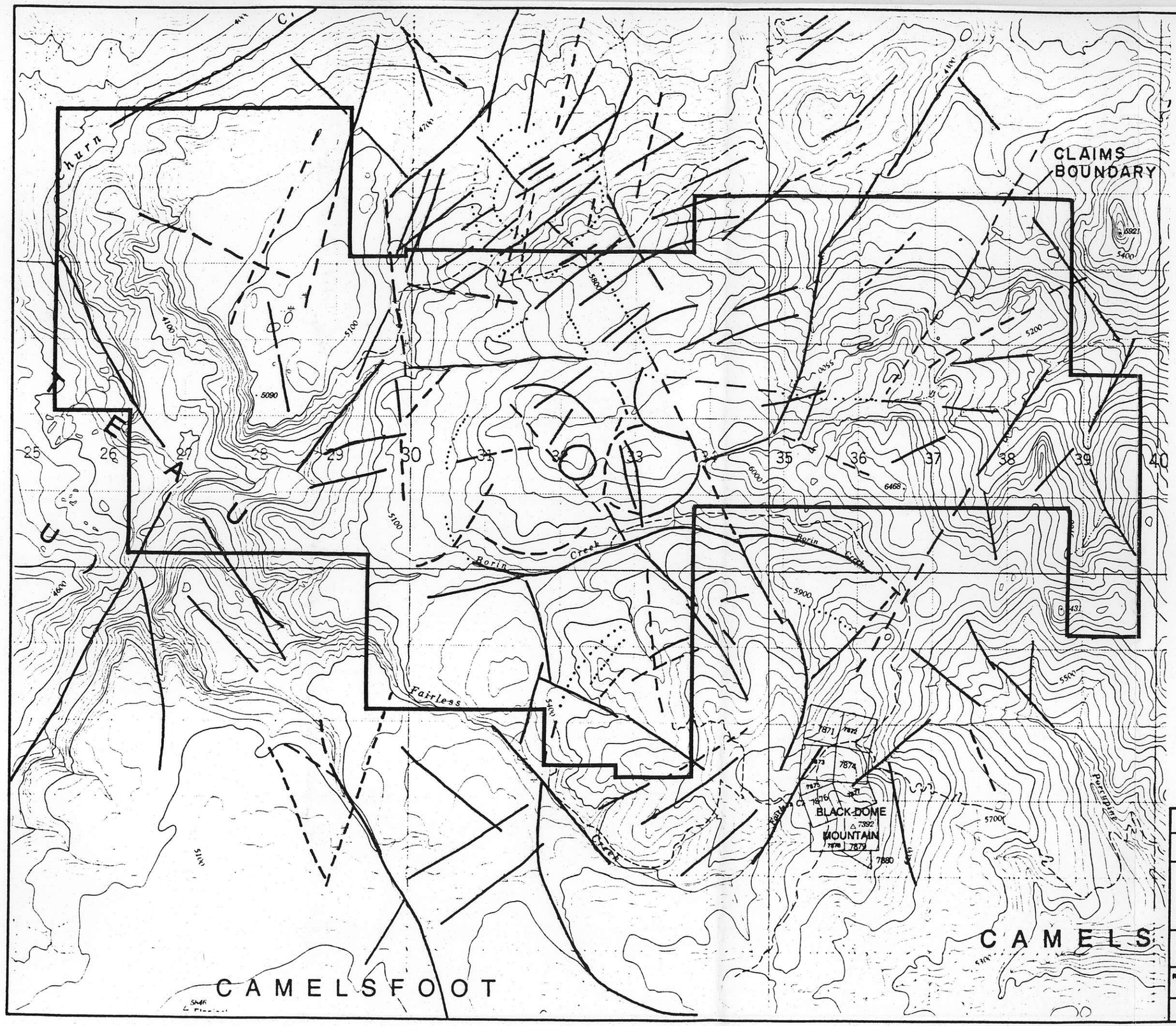
2. There are four arcuate features:

    a) centered in Black Dome Mountain area, diameter 5-6 kilometres, well defined by drainage and weakly defined by tonal contrasts.

    b) and (c) centered one kilometre north of Borin Creek, diameter of (b) 1 $^{1}/_{2}$ - 2 kilometres, diameter of (c) $^{3}/_{4}$ kilometre, well defined to weakly defined by tonal contrasts.

    d) centered five kilometres north of Borin Creek, diameter 1 $^{1}/_{2}$ - 2 kilometres,weakly defined by tonal contrasts.

It is considered noteworthy that these features are aligned on a north-northwest trend extending from the Black Dome area. The possibility that these curvilineaments represent ring structures caused by doming or collapse should be examined. Of particular exploration interest are the longer lineaments that cross or project into the circular features.



LINEAMENT DEFINITION

——— well defined

– – – – moderately well defined

..... weakly defined

SCALE 1:50,000

500 m 0 1 1 km

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CHURN CREEK CLAIMS

LINEAMENT ANALYSIS

PLAN No.	DRAWN	DATE	FIGURE
Revised		MAR. '87	2
		N.T.S. 92O/7,8	

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CLAIMS BOUNDARY

Churn Creek

Borin Creek

Fairless Creek

Pressure Creek

BLACK DOME MOUNTAIN

CAMELSFOOT

CAMELS

PROSPECTIVE LINEAMENTS

ARCUATE FEATURES

HM ANOMALIES (1986)

HOT SPRINGS (fossil)

SCALE 1:50,000

500 m 0 1 1 km

CHEVRON CANADA RESOURCES LIMITED

CHURN CREEK CLAIMS

LINEAMENT INTERPRETATION

PLAN No.	DRAWN	DATE	FIGURE
		MAR.'87	3
Revised		N.T.S. 920/7,8	

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4.0 RECOMMENDATIONS

Prior to field verification the lineaments in Figures 2 and 3 should be identified or approximated as closely as possible on 1:15,000 or 1:20,000 air photos. This is most cheaply done by sketch transferring directly from the colour enlargements to the photos.

Geomorphic lineaments are relatively easy to transfer accurately. Tonal lineaments are more difficult to transfer as they can be invisible to the human eye (or panchromatic film). Hand-held colour infrared photography from fixed or rotary wing aircraft can bridge this problem.

Once the lineaments have been located on the photos they should be examined in the field and quantified as to definition and apparent geological significance. Geochemical soil sampling both along and across lineaments, especially where they intersect the arcuate lineaments is an established reconnaissance technique that has been used successfully elsewhere.

K.V. Campbell