

1869

GEOPHYSICAL REPORT  
GRAVITY SURVEY GIANT 1 and BEA 23 CLAIMS  
HOPE, B.C.

for

Kelco Exploration Ltd.  
Vancouver, B.C.

by

Geo Cal Limited  
West Vancouver, B.C.

Dec. 9 to Dec. 18, 1968

C.B. Salmear, M.Sc.  
Geophysicist.

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Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT

NO. **1869** MAP .....

GEOPHYSICAL REPORT  
GRAVITY SURVEY GIANT 1 and BEA 23 CLAIMS  
HOPE, B.C.

Introduction:

This survey covers an area adjoining the Giant Mascot group and is situated on American Creek some 3 miles north of the town of Hope, B.C. The geographical coordinates of this area are  $49^{\circ} 25'$  north latitude and  $121^{\circ} 27'$  west longitude.

Access to the property can be made from No. 1 Highway north of Hope on a gravel road, which follows American Creek. Due to the steepness of the road and snow conditions a 4-wheel drive vehicle was used in this survey. The distance from the Highway to the survey area is approximately 1 mile.

This survey was performed to improve the geological knowledge near a large Spontaneous Polarization anomaly and to check out the presence of vertical magnetic anomalies, which might denote basic intrusives, such as diorite. It was hoped that enough resolution would be given by a gravity survey to show definite locations for prospective diamond drilling on both acid and basic intrusives, which might carry economic amounts of copper and nickel ore such as is found at Giant Mascot Mines.

Work Summary:

This survey was under the supervision of the author, who also performed the instrument work for the horizontal and vertical control. The operation of the gravity meter was performed by Mr. T. Rolston, who is an experienced operator. The author has had 12 years' experience

supervising gravity surveys for Petroleum and Mining companies and is also experienced in the interpretation of these surveys.

The line cutting took 5 days and was done immediately before the instrument work. This was done with a crew of 3 men, who lived at the Cariboo Motel on the highway and took their meals at the Lake of the Woods dining room.

The actual survey party consisted of an instrument man, rodman and gravity operator, who spent 10 days at the property. Two days were spent doing office work, since the weather was too wet to use the instruments properly. The survey work was accomplished during the time period of December 9 to the 18, 1968. During this period the crew stayed at the same place as the line cutting crew.

#### Instrumentation:

The gravity station values were read with a Worden Gravity Meter No. XP2, which was manufactured by the Houston Technical Laboratories, Houston, Texas. This instrument is compensated for normal temperature changes, but was further corrected by keeping a daily diurnal chart of the operation. This was used to correct the values for the daily diurnal variation of this meter, which is unique for the operation of this meter.

The elevation control was made using a theodolite of Swiss manufacture as furnished by Riley's of Vancouver. This instrument was used with a stadia rod to determine horizontal and vertical distances, for the survey control. Elevations were computed to the nearest 1/10th of a foot.

### Survey Procedures and Calculations:

The dial constant was determined for this meter in April and one dial division on the meter equals 0.1 gravity units. The author is well acquainted with this meter for the past 12 years and will vouch for its stability, since it has been periodically checked during this period and has not been misused at any time. The last dial constant check, which was made personally by the author was 0.1202 Mg./Div.

A base station for reading repeats for the diurnal was established at Z-0 on the control line. As a further check on the operation of the meter sub-control stations were set out at Z-12, Z-8, Z-4, X-15, X-10, X-5, A-1, A-6, A-10, A-13, A-16, Y-13 and B-13. Repeat readings were made at all stations which showed discrepancies from the normals.

On control lines Z and X, which cross a deep depression, a plot was made to determine the average density of the formations. This gave a profile correction for a density of 2.5 c.g.s. units and a Bouguer factor correction of 0.622. A correction was also made in the calculations for the Latitude change, which was approximately 0.3 G.U. per 100 feet distance north and south. The other principle correction was for Terrain which was 0.14 G.U. per 100 feet east and west. Since these corrections are very small they have little effect on the final residual gravity readings.

The elevation correction (Free air and Bouguer) is always positive for stations above the datum level. In this survey, the datum level was the grade elevation of Highway No. 1, opposite the survey

area. Terrain corrections in all cases are added.

The Residual Surface as determined by an overlay made by inspection of the Bouguer values, shows a northwest to southeast trend. There is a gradient of deep gravity origin, which centers at a corrected gravity value of 575.0 gravity units. This overlay was used as a datum surface to determine the residual gravity values used in figure 4.

For the principle anomalies found on figure 4 profiles have been plotted to find the  $\frac{1}{2}$  maximum separations. These are recorded in red numbers for the anomalies at F-16, B-13, C-17, C-8 and B-35. These values are in feet and represent the approximate depth below the surface of the center of gravity of the anomalous mass involved.

General Geology:

The author was benefited in the interpretation of this survey by a geological report made on the property. This may be sum-

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A Report on the Geology of the BEA claims, of Kelso Explorations Ltd, near Hope by Mr. Ian F. Morton, Geologist

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marized in respect to the specific area involved in this survey. Also a ground Self Potential Survey made by Mr. D. A. McDonald was consulted as was an airborne and Ground Magnetic Survey by Geo-X Surveys Ltd. Of special importance concerning these surveys is the fault lineament labeled J on the airborne magnetic map and the self potential anomaly labeled J on the Self Potential map. Some residual aspects of the ground vertical magnetic survey also point up the presence of basic

intrusives in the northeast part of the area.

As suggested in the geological report by Mr. Ian F. Morton, the self potential anomaly B is probably related to a dacite intrusive and that finely disseminated pyrite is an accessory mineral as well as finely disseminated pyrrhotite. Also the stream valley divides the volcanics on the east from the biotite schists on the west (see northeast sector of figure 2.) The fault gradient (see figure 3) parallels this feature, but is not directly related to it structurally. The southwest side of this fault gradient is predominately a Quartz diorite intrusive.

The following densities are quoted as a reference in order to relate the lithology of the survey area with the residual gravity values given on the Residual Gravity Map. (figure 4)

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Handbook of Physical Constants by Francis Birch, Geological Society of America

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<u>Rock</u>	<u>Mean Density (c.g.s. units)</u>
Quartz Diorite	2.806
Dacite	2.505
Dunite	3.289
Andesite	2.474
Biotite schist	3.15*

\* estimated

#### Geophysical Interpretation:

Since the average density on the control lines Z and X is 2.5 c.g.s. units, the southwest side of the fault gradient, which is predominantly quartz diorite, appears to have a higher gravity value on the Bouguer Gravity Map. (see figure 3) The andesite volcanics have

on the other hand, the appearance of being of lowest value. This is most reasonable since the quartz diorite has a greater density than 2.5, and the volcanics have a lower value. However, when the deep gradient correction has been made we see that the Residual Gravity Map has quite a different aspect. (see figure 4)

The zero line on the Residual Gravity Map weaves back and forth because the summation of the lithology between the quartz diorite and the higher gravity biotite schists varies in a north and south direction. The region in the west part of the map marked pendant is predominantly biotite schist, while the part marked embayment east of this area is predominantly quartz diorite rather than biotite schist. The diorite has a lower density than the quartz diorite so it shows up as an extreme negative anomaly. The schists on the other hand, since it has a far greater density than the volcanics, is an extremely positive anomaly.

The difference in the apparent depths to the centers of gravity of either the basic or the acid intrusives depends principally on 3 parameters. These are density contrast, depth of penetration and vertical size of the body. It would seem that all of these intrusives have probably reached the surface so the main variation is due either to the size of the body or the density contrast. The bodies in the most northerly position from the foregoing discussion would seem to have the greater density contrast.

All of the intrusive anomalies except the one near B-35 seem to have a near vertical attitude. The B-35 intrusive seems to dip shallowly due east. The body near F-16 would seem to be the largest of the anomalies mentioned.



Conclusion:

Anomalies B-35, C-8 and C-17 are probable granite pipes with a fairly good vertical extent. Since these are varying parameters, as already mentioned, it is not possible to surmise whether they contain extensive economic mineralization.

Anomalies F-16 and B-11 are probable dacite dykes. These have some pyrite and pyrrhotite mineralization as mentioned above.

Recommendation:

Anomalies C-8 and B-11 are the most accessible for preliminary drilling as tests. The next tests could still fairly easily be made on anomalies F-16 and C-17. The most difficult set-up is on anomaly B-35. Holes should be drilled to a depth of at least 200 feet at each of these locations.

Respectfully submitted,

GEO CAL LIMITED

*C. B. Selmer*  
C. B. Selmer, Geophysicist

## CERTIFICATE OF QUALIFICATIONS

The author is a graduate of McGill University in Mining Geology with a M.Sc. degree, with graduate studies at the University of Toronto in Geophysics. He has also been qualified in both engineering geology and geophysics as a professional engineer.

The author has had over 20 years' experience in the fields of Geology and Geophysics. During this time he was a gravity supervisor for Texaco Exploration Company for 5 years and did gravity work for International Nickel Company as Chief Geophysicist and for Spartan Air Services as Chief Engineer in their Exploration Department.

The author has been a member of the Association of Professional Engineers of Ontario, Alberta and British Columbia for the past 15 years. He has been active in exploration in this province for the past 4 years.

His knowledge of the property outlined in this report has been gained from geophysical surveys performed personally on this property. Reference has also been made to government reports and pertinent text books.

The author has no financial interest in this property, other than the present survey. Any remuneration received has been for expenses incurred during the survey.

*C. B. Selmes*  
C. B. Selmes, M. Sc.



THE ASSOCIATION OF  
**PROFESSIONAL ENGINEERS**

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April 28, 1969

Calbert B. Selmser, Esq.,  
2658 Nelson,  
West Vancouver, B.C.

Dear Mr. Selmser:

This is to advise you that your suspension from practice terminated as of the 4th day of April 1969.

Council has instructed me to advise you that upon receipt by this office of a fee in the amount of \$30.00 you can be reinstated as a member with the right to practice professional engineering in this province.

Yours very truly,

*W. Hall*  
for W. Hall, P. Eng.  
Registrar

WH/ch

Department of  
Mines and Petroleum Resources

NO. **1869** Map **1**

# BRITISH COLUMBIA

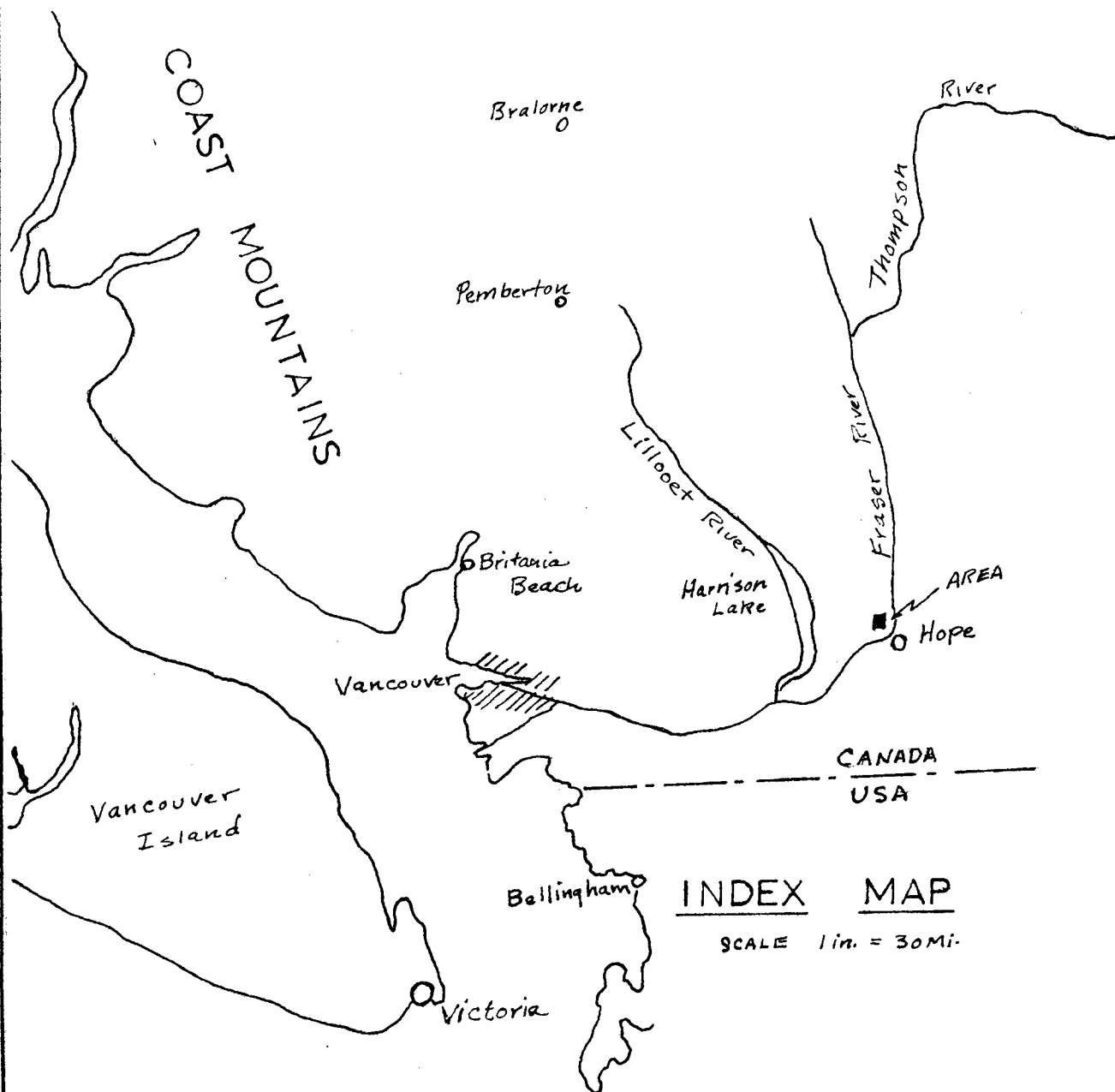
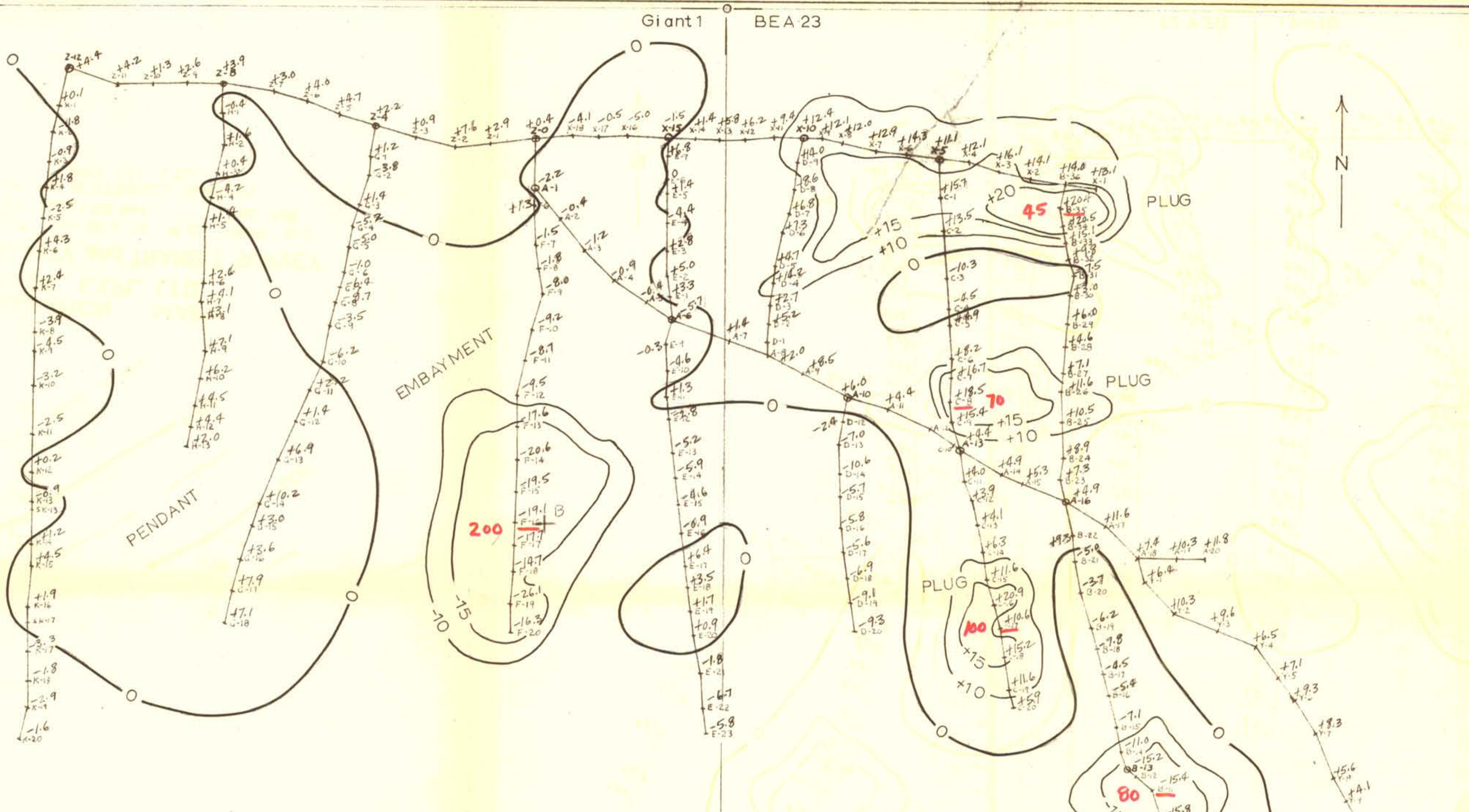


Fig. 1





RESIDUAL GRAVITY MAP  
KELSO EXPL. LTD.

GRAVITY and TRANSIT SURVEY

GIANT 1 and BEA 23 M.C. HOPE B.C.

Scale: 1 inch = 100 feet Dec. 1968

Survey by: GEOTRONICS SURVEYS  
: GEO CAL LTD.

LEGEND

- Data in gravity units.
- Positive anomaly (ultra basic)
- Negative anomaly (acid intrusive)

To accompany a geophysical report by  
C.B. Selmsler, geophysicist on Giant 1 and  
BEA 23 M.C. on American Creek, New  
Westminster M.D. December 28, 1968.

C. B. Selmsler

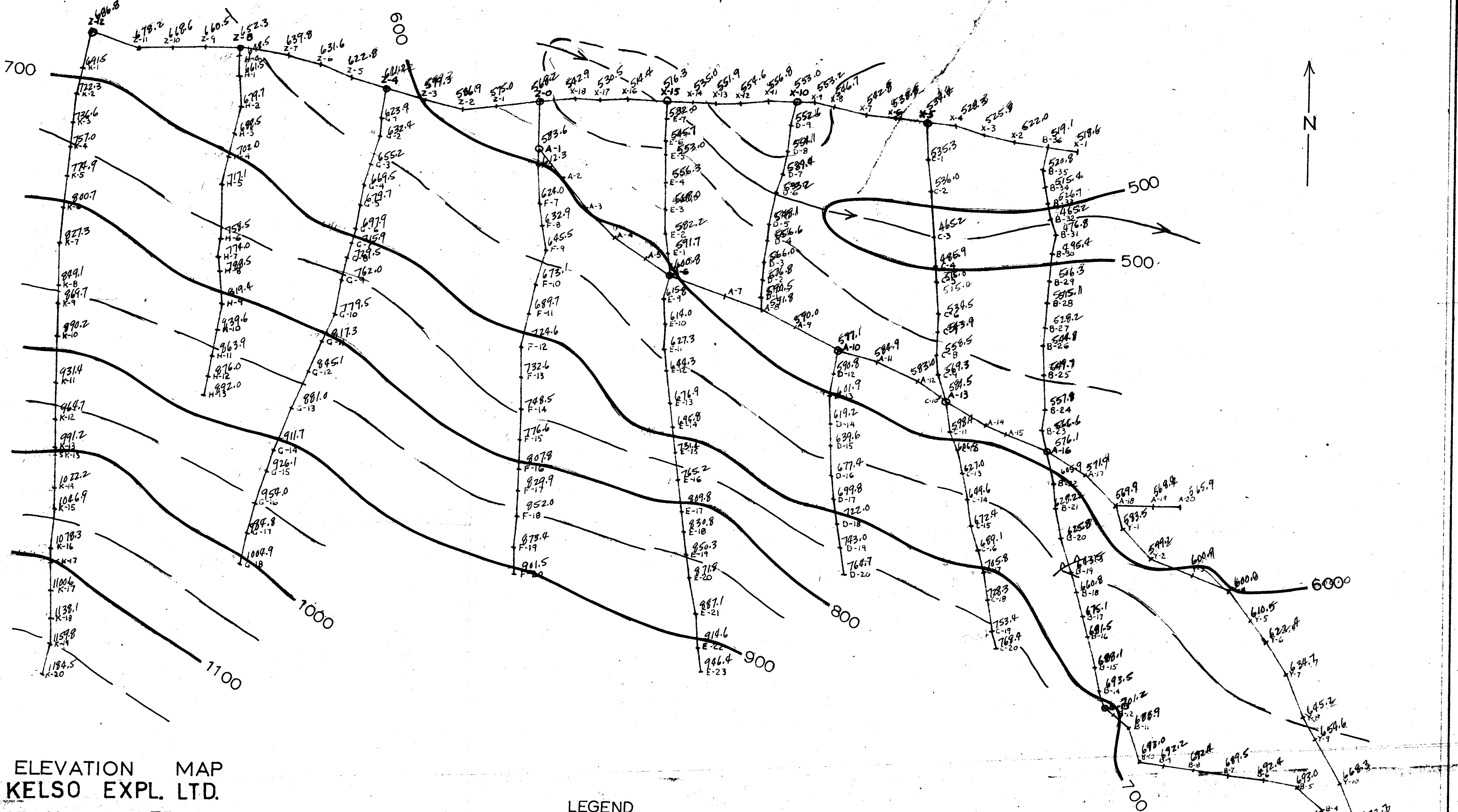
Giant 1 | BEA 23

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Fig. 4





ELEVATION MAP  
 KELSO EXPL. LTD.  
 GRAVITY and TRANSIT SURVEY

GIANT 1 and BEA 23 M.C. HOPE B.C.  
 Scale: 1 inch = 100 feet Dec. 1968  
 Survey by: GEOTRONICS SURVEYS  
 : GEO CAL LTD.

Department of  
 Mines and Petroleum Resources  
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LEGEND

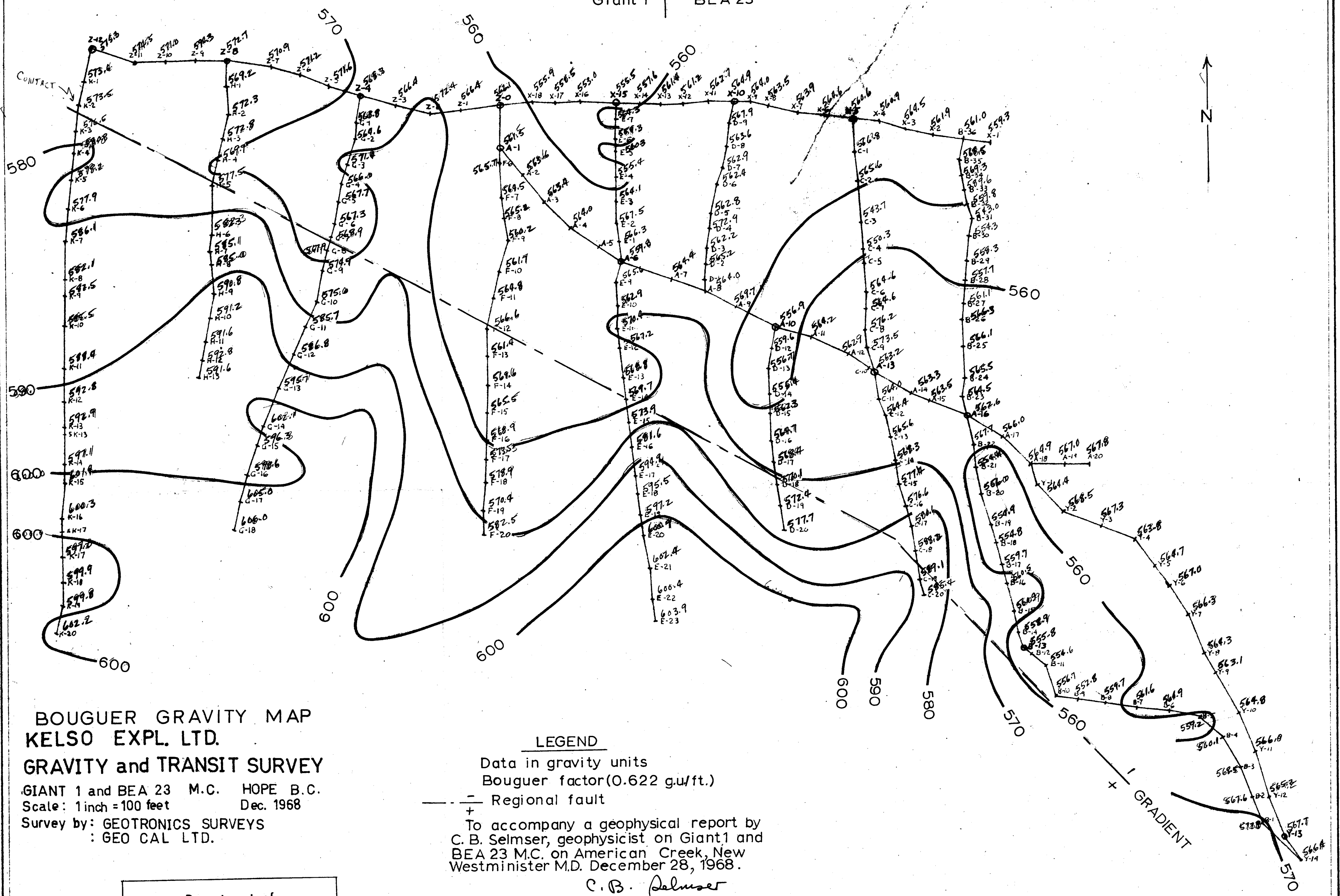
- Contour interval 50 ft.
- Datum at highway level.
- stream valley
- cliff

To accompany a geophysical report by  
 C. B. Selmser, geophysicist on Giant 1 and  
 BEA 23 M.C. on American Creek, New  
 Westminster M.D. December 28, 1968.

C. B. Selmser

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Fig. 2



BOUGUER GRAVITY MAP  
 KELSO EXPL. LTD.  
 GRAVITY and TRANSIT SURVEY  
 GIANT 1 and BEA 23 M.C. HOPE B.C.  
 Scale: 1 inch = 100 feet Dec. 1968  
 Survey by: GEOTRONICS SURVEYS  
 : GEO CAL LTD.

**LEGEND**  
 Data in gravity units  
 Bouguer factor (0.622 g.u./ft.)  
 - - - Regional fault  
 +  
 To accompany a geophysical report by  
 C. B. Selmser, geophysicist on Giant 1 and  
 BEA 23 M.C. on American Creek, New  
 Westminster M.D. December 28, 1968.

C. B. Selmser

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Fig. 3 1869