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GEOPHYSICAL-GEOCHEMICAL

REPORT TO

DAWOOD MINES LTD.

NORTH VANCOUVER, B. C.

ON THE

DOTE MINERAL CLAIMS

NEAR MERRITT, B. C.

BY

SHERWIN F. KELLY, P. ENG.

GEOLOGIST AND GEOPHYSICIST

MERRITT, B. C.

JULY 15, 1970

Geophysical-Geochemical
Report to
Dawood Mines Ltd.

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INTRODUCTION

Geophysical and geochemical surveys were carried out on 16 mineral claims of the DOTE group, in the old Aspen Grove copper camp, British Columbia, in the spring of 1970. The techniques employed were soil sampling (samples analyzed for copper), a magnetometer survey and an electromagnetic survey employing a Ronka M-16 VLF unit. The work was carried out under the direction of George Cressy, Jr. and Jack Dawson, both of Merritt. These men have been known to me for several years and I recognise them as competent, conscientious and reliable operators.

The secretary of Dawood Mines, Jack Dawson, requested me to analyze the results, give my interpretations and recommendations and prepare the geophysical-geochemical report. The work performed was to satisfy the assessment requirements on the claims DOTE #1 to #9 and #11 to #37. This report is to support the submission of the surveys for assessment work.

The base maps were drawn by Jack Dawson. I then prepared the contour maps of the magnetic and soil survey results.

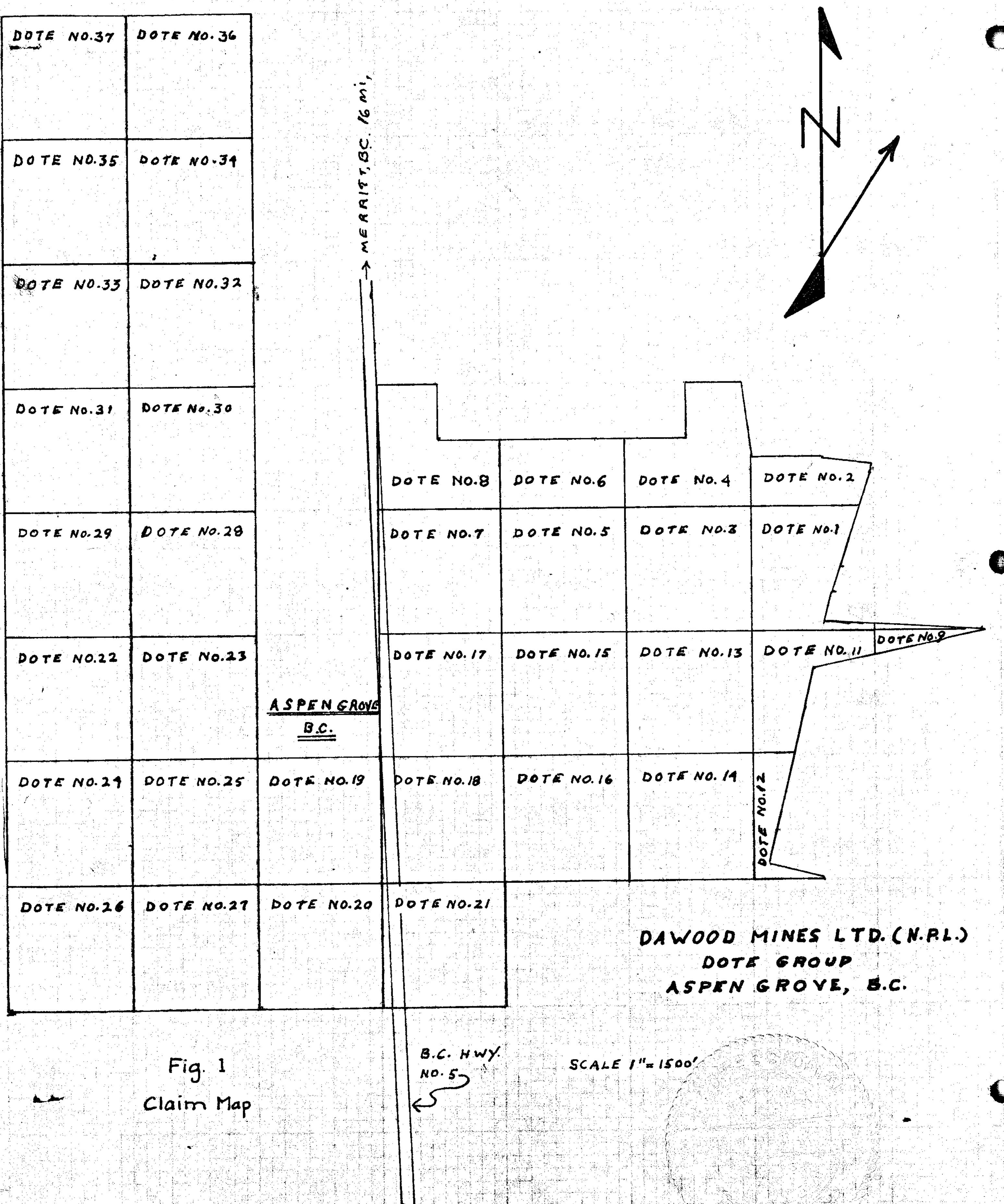

Fig. 1
Claim Map

CLAIMS

There are 36 claims in the DOTE group, which straddles the Merritt-Princeton Highway (Highway #5) at Aspen Grove. See Fig 1. The claims DOTE #1 to #33 (there is no DOTE #10) were staked in May, 1966, by Jack Dawson as agent for Dawood Mines Ltd., then of Kelowna. DOTE #34 to #37 he staked in the same capacity, in May, 1968. The data are as follows:

NAME OF CLAIM	RECORD NO.	VALID TO
DOTE #1 to #8	30213/20	May 13, 1970
DOTE #9	30223	May 16, 1970
DOTE #11 to #18	30225/32	May 16, 1970
DOTE #19 to #33	30579/93	May 30, 1970
DOTE #34 to #37	36904/7	May 27, 1970

All the above claims were grouped into one group on June 26, 1968, by Notice to Group #1215.

These data are on file in the office of the Mining Recorder in Merritt.

The validity dates on the DOTE claims will be extended one year, subject to the filing and acceptance of this report.

LOCATION AND ACCESS

The DOTE group of 36 mineral claims is located in the Nicola Mining Division, on the interior plateau, at an elevation of around 3500 to 4000 ft. The group straddles Highway No. 5 (Merritt-Princeton Highway) at the small settlement of Aspen Grove, some 16 miles southeast of Merritt. The co-ordinates for Aspen Grove, located about the middle of the group, are approximately:- longitude 120° 37½' West, latitude 49° 56½' North.

From Tulameen Sheet 92H/NE

To Merritt—14 miles

2 mi.

1 inch = 2 miles

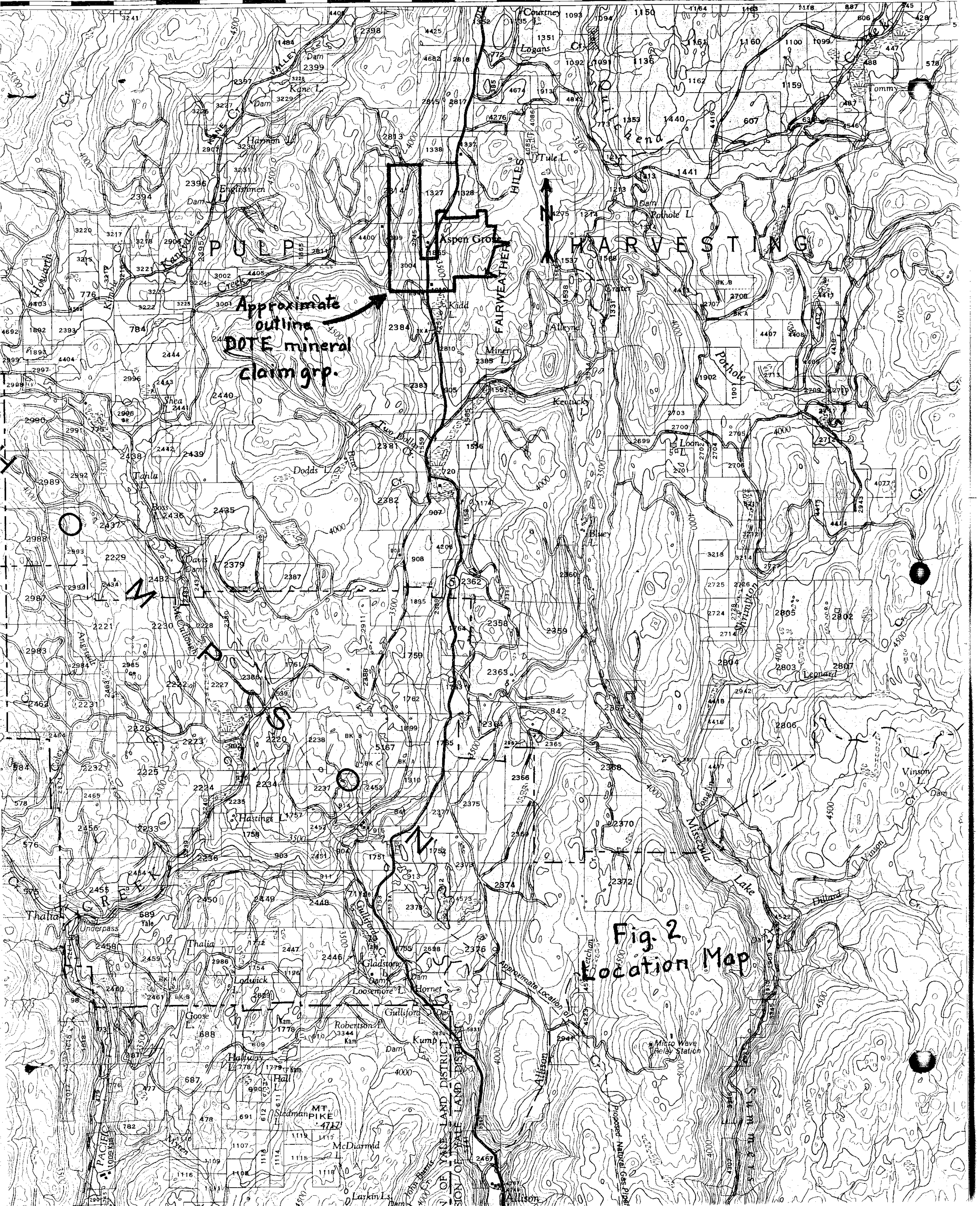

Fig. 2 Location Map

The area is shown near the middle of the northerly portion of the Tulameen topographic sheet, 92 H/NE, at the scale of 1 inch to 2 miles. See Fig. 2.

Access is via Highway #5 from Princeton or Merritt. Numerous ranching and logging roads turn off from this highway, including some near Aspen Grove, which give easy access to the area of these claims.

GEOLOGICAL SETTING

The bedrock of the claim area, and for many miles to the north and south, consists of the Nicola Series of volcanics and sediments, of Triassic age. The series is predominantly of volcanic origin, comprising flows from rhyolitic to basaltic in composition, with interbedded tuffs. There are some sedimentary beds in the series, usually conglomerates, shales and limestones. Prevailing strikes are northerly to northeasterly. A short distance north of the DOTE group, on the Porcupine claims of Amalgamated Resources Ltd., the volcanics are moderately thin bedded, usually a few feet thick, and dip southeasterly at about 30°.

The Nicola beds were intruded in Jurassic time by batholiths as well as by plugs of lesser dimensions, varying in composition from gabbro to granite. Diorites, quartz diorites and granodiorites predominate, however. Many of these are mineral-bearing, usually carrying copper and sometimes molybdenum. They are believed to be the source rocks of mineral deposits frequently found in Nicola host rocks, as at Copper Mountain and at the Craigmont mine. In the Highland Valley type of occurrence, the huge Guichon Batholith is both source rock and host rock for the great copper ore bodies being developed in that Valley.

In the Aspen Grove area, there are several Jurassic intrusives not far from the DOTE claims. The southwestern end of the Pennask batholith lies some six or seven miles to the northeast. Five or six miles to the southwest, the Allison Lake intrusive lies along the highway. The geological map accompanying Memoir 243, "Geology and Mineral Deposits of the Princeton Map-Area, British Columbia" by H. M. A. Rice, Department of Mines and Resources, Ottawa, 1947, shows these bodies as well as several smaller plugs of granite or granodiorite, intruding the Nicola beds near the claim group.

The Nicola rocks are favorable host rocks for the reception of mineralising solutions. Of the numerous Jurassic intrusives which have penetrated them, some were source rocks of mineralising solutions. The band of Nicola series, stretching from the U. S. border to Kamloops Lake, therefore presents a favorable hunting ground for copper deposits.

Early prospectors working in this area, discovered copper mineralization from Lake Missezula north to Nicola Mtn., in the beginning of this century. As a result, the area around Aspen Grove became a center of activity and was known as the Aspen Grove Camp. The early prospectors were looking for shipping ore, which they did not find. The Aspen Grove region is nevertheless dotted with old trenches, pits, adits, and shafts which reveal copper mineralisation assaying up to three or four percent copper. The mineralisation thus uncovered, yields useful information which can help to guide the interpretation of geophysical data. Such information concerns both the type of mineralisation and the structural or formational controls of mineral deposition.

The sulphide minerals usually occur in disseminated form in the beds of the Nicola volcanics. The dissemination may be dust-fine particles to moderate-sized blebs and crystals. These are found in both tuffs and flows. In some cases, the mineral particles are so fine as to be almost invisible to the naked eye. Copper sulphide predominates and pyrite, where it occurs, is usually sparse; pyrrhotite is almost non-existent. Magnetite does not seem to have accompanied the mineralisation, but is found as a primary constituent in some of the flows (such as in basalt). To a depth of around 100 feet, secondary bornite and chalcocite frequently are developed. Below about 100 feet, although the depth will vary from place to place, the predominant sulphide is the primary copper sulphide, chalcopyrite.

The absence of magnetite as an accompaniment of mineralisation, means that magnetic surveys will yield little or no useful information on the occurrence of copper sulphides. Such surveys may, however, yield useful data on the occurrences, trends, and dislocations of volcanic flows with distinctive magnetic reactions.

Since the sulphide mineralisation is largely disseminated, spontaneous polarization and the usual electromagnetic methods are not likely to produce distinctive anomalies. The induced polarization and the V.L.F. (very low frequency) methods are probably better adapted to the type of occurrences found in the Aspen Grove area.

The structural and formational controls of mineral deposition still present moot questions. There is evidence favouring the hypothesis that mineralising solutions have been introduced along faults cutting the bedding of the Nicola series. There is also a good deal of evidence that mineralisation has favoured particular beds of the Nicola series and hence may be bedding-controlled. Possibly, mineralising solutions following fault zones and shears have selectively permeated certain beds. In any case, it becomes important to trace the trends of the underlying Nicola beds and to locate areas of faulting, shearing, dislocation. Thus it is in this field of enquiry that magnetic methods may be helpful.

GRID LAYOUT

A grid was laid out to cover the claims on the east side of Highway #5, namely DOTE #1 to #18, not including #9 (there is no DOTE #10). A north-south base line was run approximately along the location line between DOTE #4 and #6 on the north to between #14 and #16 on the south. This line was 4800 feet long. East-west grid lines were turned off at 400 foot intervals, beginning with line 0+00 on the north and ending with 48+00 on the south. These lines are of varying lengths, but usually run about 2500 feet west of the base line and 2000 feet east of it. Grid lines and base lines were picketed at 100 foot intervals, the stakes being numbered east and west from the base lines. See Figs. 3 and 4.

The surveys conducted on this grid were magnetic, V.L.F. and soil sampling. Soil samples were taken and observations were made with the magnetometer and the V.L.F. instrument, at 100 foot intervals along the grid lines. Soil samples were also taken at 100 foot intervals along the base line. The resultant observations were entered on appropriate plan maps, as described below.

MAGNETIC SURVEY

Magnetic observations were made on the vertical component of the earth's magnetic field, using a Fluxgate Magnetometer. The instrument employed was a Sharpe MF-1 Fluxgate Magnetometer, serial #811377. It is a hand-held instrument and needs only coarse leveling and is independent of orientation. Scales available are, for full scale deflection, 1,000, 3,000, 10,000, 30,000, 100,000 gammas. The sensitivity at the 1,000 gamma range is 20 gammas per scale division, making it possible to estimate to about 5 gammas. The temperature stability is 1 gamma per degree fahrenheit.

As a base and control point, the station at 2100 W on line 40+00 S was chosen. It was arbitrarily given a value of 1,000 gammas and all readings were referred to that as datum. Control points were also established at stations 2100 W, line 24+00 S and at 2100 W, line 12+00 S. The survey was carried out in loops, taking the readings at 100 ft. intervals along all grid lines, returning to a control station three times per day in order to correct for diurnal variations. At some locations where details were desired on anomalous zones, the reading interval was reduced to 50 ft.

The recorded values, corrected for diurnal variation, were entered on a plan map of the grid area and the values contoured thereon. See Fig. 3. The claim lines are also shown on this map.

GEOCHEMICAL SURVEY

Soil samples were taken at 100 foot intervals along the cross lines of the grid as well as along the base line. Holes were dug, with mattock and shovel to the "B" horizon, or to the "C" horizon wherever the "B" was lacking. Soil samples were then taken with a wooden spoon and placed in Kraft sample bags, duly identified, and shipped to Bondar-Clegg and Company in North Vancouver for determining copper values. This company uses hot nitric acid for extraction of the metal, whose quantities are then determined by the atomic absorbtion process.

The values returned by Bondar-Clegg and Company were entered on a plan map of the survey grid and the values were then contoured. See Fig. 4. The claim lines are also shown on this map.

ELECTROMAGNETIC SURVEY

The technique known as the VLF-E.M. method, was used on the same grid, covering a part of the DOTE mineral claim group. The method relies on measurements of the broadcasting field emanating from one of the U. S. Navy stations set up to communicate with naval vessels, especially submarines. The station to which the field instrument was tuned on this survey, was the one at Jim Creek, near Seattle, Washington, broadcasting with 300 Kilowatts power on a frequency of 18.6 kHz. The stations mentioned utilize vertical antennae, with the result that the electromagnetic fields emanating therefrom, are horizontal.

When the field radiating from such an antenna encounters a conductive formation, it generates a secondary field therein. This secondary field distorts the primary one, and is not in phase with it. The resultant distortions and phase relationships are deduced from observations made on the vertical and horizontal components of the resultant electromagnetic field. The instrument employed to measure these parameters, was a Ronka EM-16, manufactured by Geonics Ltd., of Toronto, serial number 78.

Readings are taken of the real (in-phase) and quadrature (out-of-phase) portions of the vertical component of the secondary field. They are plotted as profiles on the plan of the grid lines, each profile being laid out along the grid line on which the readings were taken. See Fig. 5. A sharp cross-over of the real component, from above to below the line, usually indicates a steeply dipping, sheet type conductor. It reads in the direction in which the instrument was facing, in this case west, so the lines should be read from right to left (east to west). A high ratio of in-phase to quadrature component, indicates a good conductor of large size.

The VLF method is a sensitive one, which presents both advantages and disadvantages. It will respond not only to sulphide mineralization, but also to conductive faults, contacts, shear zones, etc. Thus, it provides a useful tool for mapping such geological structures. On the other hand, it may sometimes be difficult to distinguish anomalies caused by such features from those arising from sulphide deposits. Consequently, it is advisable to correlate results from the VLF method with those from other techniques, such as geochemical and magnetic surveys. Further checks by other electrical methods may also be desirable.

DISCUSSION OF RESULTS

Magnetic

The contours of the magnetic intensities recorded on this group of claims, reveal an interesting contrast between the east and the west portions of the grid area. See Fig. 3. The base line more or less marks the boundary between the two contrasting areas. West of this line, the magnetic relief is generally slight and the values are low. The contoured area is marked by numerous zones of low values, outlined by depression contours. There are only a few peaks of magnetic intensity, rarely attaining a maximum value of 1500 gammas. In general, each is confined to a single grid line, at least in the upper values.

These phenomena of low values, and only weak, scattered peaks, indicate an underlying bedrock of generally low magnetic susceptibility and lacking in marked contrasts. Under these circumstances of low magnetic relief, the bedrock is probably not one of strongly basic constitution, i.e. not one high in iron-magnesium minerals. It could consist of acidic (high in silica) flows or intrusives, or of sedimentary beds. The general trend of the contours implies a northerly strike for underlying flows or beds.

East of the base line, the magnetic pattern is characterized by numerous peaks with values as high as 3000 gammas. Depression contours are less numerous than in the western portion and in general do not indicate values quite as low. Furthermore, they are more constricted and tend to a narrow, elongate shape, whereas in the western portion many of the depression contours are broad and diffuse in outline.

The high value contours are also narrow and elongated with a striking, north-south trend. There is an indication of a curvature in this trend, with a general tendency to swing from a north-south orientation in the south-eastern portion of the grid area to a slightly west of north trend in the north-central portion. This could indicate a slight bend in the underlying beds, but needs careful checking in the field as there is also a possibility that this apparent change in direction could be due to topography.

The topography of the western portion of the survey area is reported to be flatter than in the eastern portion. A north-south ridge structure spreads eastward from the area of the base line. Under such circumstances, the positions of the underlying beds or flows at bedrock surface, will be affected by the bedrock topography. If, as seems probable, the dips are to the east, then the bedrock surface expression of a given bed will lie further to the west at a high elevation than at a lower one. Thus, it will take careful correlation in the field between the topography and magnetic contours to discover whether the contours reflect only the topography or, on the other hand, if they are indicative of slight folding or of dislocation by faulting. This information will be useful in tracing either specific beds carrying mineralization, or beds lying in some definite relationship to mineralized beds.

Elongate magnetic lows between narrow bands of highs, may indicate relatively acidic flows or tuffs, or possibly even sedimentary beds, intercalated in a series of flows of predominantly basaltic or near-basaltic character. Prominent lows interrupting a given band of highs, may signify a discontinuity caused by faulting. It could also be the result of the alteration of some of the magnetite in the flow, due to the action of circulating hydrothermal solutions.

There may be other causes capable of producing these effects, but the above are of most immediate interest as possibilities.

Soil Analyses

An interesting feature of the contours outlining copper soil anomalies, is that they seem to avoid the magnetic highs. For example, the central portion of the area east of the base line, where magnetic peaks abound, is notably deficient in soil anomalies. See Fig. 4.

In general, there is little contrast between the soil anomalies in the western and eastern portion of the survey grid. In both areas there are long anomalies and short anomalies, as well as weak ones and strong ones. There are occasional, isolated anomalies, confined to one station and which show high intensities. Noticeable examples occur on line 36+00 S where an anomaly of 900 ppm lies 500 ft. west of the base line and another of 410 ppm lies 1600 ft. east of the base line. High values such as these, severely restricted in area, lead to the suspicion that they correspond to an isolated pocket of mineralized material, such as a boulder, buried in the overburden. With this in mind, they should nevertheless be investigated.

Of greater interest are the anomalies which extend across several grid lines, such as those on claims Dote #7, on Dote #1, #2, #3, and #4, and on Dote #16 and #13. These areas are characterized by elongated anomalies with fairly high peak values.

The background value for copper in this area, is about 25 ppm and the first contoured value is 3 times background, or 75 ppm. Contours of 100, 200, 300, etc. ppm are drawn more heavily and correspond to values of 4, 8, 12, etc., times background. Anomalies of three times background and higher, are considered to be of definite interest.

There is no consistent correlation between soil anomalies and magnetic anomalies, except as previously mentioned that the soil anomalies seem to avoid the magnetic highs. Otherwise, some of them coincide with magnetic lows, some lie on the flanks of magnetic highs and some lie at the ends of magnetic highs or in saddles between magnetic highs.

The avoidance of magnetic highs by the copper soil anomalies, implies that the more basic flows, such as basaltic types, presented unfavorable host rocks for copper deposition. The tendency to follow lows, or low saddles between highs, indicates at least two possible controls of copper deposition. The elongate lows between ridges of highs, may correspond to less basic, more acidic flows or tuffs, which presented favorable conditions for copper deposition. The saddles which interrupt a given band of magnetic highs, may be due to transverse faults or shears; when occupied by copper soil anomalies, they imply a favorable environment for copper deposition in the shear zone. Also, such interruptions by magnetic lows of a band of highs, could be due to alteration of magnetite by the hydrothermal solutions from which the copper minerals are precipitated. The alteration of the magnetite, (to hematite, for example) would destroy the magnetic effect of the formation at that locality.

There are several alignments of interesting soil anomalies, with a generally east-of-north trend. One of the most persistent starts in the south-west corner of the grid area, on claim Doto #18. Scattered, weak to moderate soil anomalies occur on nearly every grid line, in a band extending to the north boundary of the grid area, 400 ft. west of the base line, on line 0+00. A long individual anomaly in this band, extends from 1100 feet west of the base line on line 20+00 S, to 800 ft. west of the base line on line 12+00S. It corresponds to a magnetic low and is separated by a magnetic high from what might be its continuation, at 1400 feet west of the base line on line 28+00 S.

Just west of the above described, long anomaly, a moderately strong soil anomaly at 800 ft. west of the base line, on line 4+00 S, shows a parallel orientation and points toward a very strong high on line 12+00 S, 1300 ft. west of the base line. This latter copper anomaly, however, has an independant north-south orientation. Other anomalies in this survey-area, also show the same orientation, as will be discussed later in this chapter.

A second band of soil anomaly highs, with a similar east-of-north trend, lies some 600 ft. east of the first one described. In this one, the anomalies are generally stronger but more scattered. It starts on line 40+00 S, 900 ft. west of the base line and extends north-easterly to the vicinity of the intersection of the base line and line 4+00 S. The anomalies roughly correspond with magnetic lows, except that at the last mentioned point, near the north end of the base line, the anomaly lies on the flank of a magnetic high.

A strong high with no continuation to the north or south, as already noted lies on line 36+00 S, 500 ft. west of the base line. It occurs between a high of the trend just described and a high on the next parallel one to the east. Jack Dawson stated that a large block of fresh diorite appeared in the roots of an uprooted tree in the locality of this high. No mineralisation was evident. The manner of occurrence of this high and the description of the appearance of the presumed bedrock, tend to reinforce the suspicion that the reading here is due to an erratic pocket of mineralisation, possibly a boulder, in the overburden.

The next trend of highs is discontinuous and is more prominent in the south portion of the grid. It starts with the anomaly between 300 ft. and 800 ft. west of the base line on line 48+00 S, and extends north-easterly to the intersection of the base line and line 32+00 S. The prolongation of that trend would then lead through a crowded nest of magnetic highs, devoid of soil copper anomalies. If the trend is projected however, it encounters a strong anomaly 900 ft. east of the base line on line 16+00 S; a moderate one 1400 ft. east of the base line on line 8+00 S and another 1600 ft. east of the base line on line 4+00 S. These latter anomalies, however, lie in an assemblage of soil anomalies of north-south orientation. Their correlation with the north-easterly trending band is therefore questionable.

East of the base line, there are several soil anomaly highs, rather widely scattered and not too prominent, most of which exhibit the prevalent north-easterly trend. In the north-east corner of the survey grid, however, there are several soil anomalies which have a north-south strike. The magnetic contours in the same area show a similar strike. For the magnetic highs, this is not so anomalous a direction as it is for the soil copper highs. The evidence may indicate a swing in this vicinity, to a more northerly strike of the underlying beds. The area is also reported to be one of ridges and troughs with a north-south direction, and at least some of the anomalies coincide with north-south gulleys. Careful evaluation of these anomalies is essential, because they may represent a trapping and accumulation of copper ions by the clay soil which tends to form in low areas of poor drainage. Under these conditions, very strong copper anomalies could develop which are totally unrelated to the immediately subjacent bedrock. The copper thus might have drained from mineralized material higher up on the hillside.

Before undertaking intensive investigation of any soil anomalies, they should be carefully compared with the topography in order to determine whether or not a situation such as described above, could be responsible for the anomalous highs. If so, it is highly probable that the strong anomalies will be of considerably less interest than the weaker ones.

The trend of the soil anomalies is generally east of north, which is not entirely in accordance with the trend of the magnetic highs, which generally run north-south. The latter orientation is more definite in the east-central portion of the survey area, where there are no strong soil anomalies, than in the western portion. In the latter area there are some magnetic highs and lows trending east of north, with which soil anomalies showing the same trend, are associated. Consequently, there may be a slight change in strike of the beds in the eastern area, compared to the western portion.

It is surprising that there are almost no anomalous soil readings in the vicinity of the shafts, near the eastern end of line 4+00 S. There are a couple of weak anomalies trending east of north, just south of these shafts. Information in the area indicates that the soil is shallow, which may mean fairly quick drainage and no thick blanket of soil in which copper could accumulate. Mineralization is evident in the shafts, and a sample taken by George Cressy, Jr. and Jack Lawson from sheared wall rock in the west shaft, assayed 0.89% copper. A fragment from the dump assayed 1.35% copper. Another fragment from the dump of the eastern shaft, assayed 0.19% copper. Azurite, malachite, and chalcocite are reported evident in the dump and in the walls of the shafts. Further investigation should be carried out in this vicinity to check the prior determinations. If they are found valid, an effort should be made to discover the reason for the lack of soil anomalies here. If it is found that good copper mineralization exists here and it fails to give soil anomalies, the validity of soil surveys in this area would be called in question. For this an evident explanation will need to be found which could be applied to other, similar circumstances.

Possibly the lack of soil anomalies near the shaft is due, as previously mentioned, to rapid drainage and that the drainage has accumulated the copper ions in low ground to the west, forming the strong anomaly which extends north and south, close to the nearby claim posts.

VLF Survey

The profiles recorded in the VLF survey are shown on Fig. 5. The "cross-overs" that are thought to be of interest, have been indicated by extra heavy cross lines drawn through the cross-over. The usual indication of an underlying, steeply dipping sheet of conductive material (sulphide mineralization) is given by the in-phase profile line (solid line) descending and crossing, or closely approaching the line representing the quadrature (out-of-phase) component, which is shown as a dashed line.

The cross-overs that have been emphasized, are those which are closely associated with soil anomaly highs, or which are obviously on strike with such a high. In both the western and eastern portions of the area, they correspond very well with the soil anomalies and reinforce the supposition of an east-of-north strike.

Worthy of note is the fact that there are some cross-overs in the vicinity of the shafts. Some of the cross-overs appear where there are no nearby soil anomalies, as on the east end of line 0+00. One, near the east end of line 8+00 S, is associated with a weak soil copper high, and others lie on the prolongation of its trend, to the north and south. Lack of soil anomalies around the shaft and the relatively poor response of the VLF measurements in this area, leads to some suspicion about the strength of the mineralization here. The VLF profiles and especially the soil anomalies, indicate that the area west of the base line may well be more promising than that east of it.

SUMMARY AND CONCLUSIONS

An excellent program of geophysical and geochemical investigations by a variety of techniques, has been conducted on the DOTE group of mineral claims. These claims at Aspen Grove, near Merritt, B. C., belong to Dawood Mines Ltd. The techniques employed were geochemical soil analyses for copper, plus magnetic and the VLF electromagnetic methods. These procedures should be extended over the balance of the holdings in this group.

Copper-bearing beds in the Nicola volcanics, or mineralized shear zones at flat angles to the strike of the Nicola beds, are indicated by the bands of soil anomalies trending east-of-north. "Cross-overs" in the VLF readings correspond, in many cases, with anomalous soil areas and also confirm the east-of-north trends. The soil anomalies generally avoid magnetic highs and are found in lows, or on the ends or flanks of highs. The magnetically strong formations, probably near-basaltic in composition, therefore seem to be unfavorable host rocks for copper deposition. Such deposition has presumably favored more acidic beds, and zones where magnetite in the basic formations may have been destroyed by the mineralizing, hydrothermal solutions.

The eastern half of the grid is crowded with prominent alignments of magnetic highs, generally with a north-south trend. Where such highs are most numerous, in the east-central area, soil anomalies are well-nigh absent. The north-south magnetic trends indicate a possible change in strike, or dislocation, of the bed-rock formations with respect to the western half of the grid. In the western portion, the magnetic map shows a weaker and more diffuse pattern, but with some confirmation of the east-of-north trend evident in the soil anomaly and VLF readings.

The soil anomalies and confirmatory magnetic and VLF results, imply that the western portion of the grid is more promising than the eastern part, for persistent bands of copper mineralization.

Soil anomalies are surprisingly scarce near the shafts in the northeast corner of the grid area. Bedrock mineralization is nevertheless revealed by those workings. Further investigation of this area is suggested, to develop an explanation for this phenomenon.

The geophysical and geochemical exploration on these claims has produced excellent indications of copper mineralization. Further development by bulldozing and diamond drilling is desirable, especially on the more consistent indications. Particular attention should be paid to those locations where VLF cross-overs coincide with soil anomalies of some length, which are associated with magnetic lows.

Respectfully submitted,

Sherwin F. Kelly, P. Eng.,
Geologist and Geophysicist

Adelphi Hotel
Merritt, B. C.
July 15, 1970

STATEMENT OF WORK PERFORMED

The following sets forth the number of persons employed on the geophysical and geochemical surveys herein described, their names, the work they performed and the time devoted thereto, and the period within which the work was done.

J. R. Dawson..April 24 to May 27, 1970

1 month plus three days. Supervising and participating in the cutting and chaining of grid lines, establishing control stations and the taking of geochemical soil samples. Also magnetometer operator for the magnetic survey.

George F. Cressy, Jr....................................May 4 to May 23, 1970

Twenty days. VLF operator for geophysical survey. Assisted in geochemical soil sampling survey and supervised cutting and chaining of some grid lines.

D. Dawson...May 4 to May 23, 1970

Twenty days. Assistant on line-cutting for the grid and in geochemical soil sampling survey.

R. Dawson...May 4 to May 23, 1970

Twenty days. Assistant on cutting and chaining lines and in geochemical soil sampling survey.

Sherwin F. Kelly, P. Eng...................................June and July, 1970

Preparation of report under a contract agreement.

Sherwin F. Kelly

Sherwin F. Kelly, P. Eng.,
Geologist and Geophysicist

Adelphi Hotel
Merritt, B. C.
July 15, 1970

CERTIFICATE OF QUALIFICATIONS

I, Sherwin F. Kelly, P. Eng., residing at the Adelphi Hotel in Merritt, B. C., certify that:-

(1) I am a registered Professional Engineer in the Province of British Columbia.

(2) I received the degree of B. Sc. in Mining Engineering from the University of Kansas in 1917.

(3) I pursued graduate work in geology and mineralogy at the Sorbonne, Ecole des Mines and Museum d'Histoire Naturelle in Paris and at the University of Kansas and the University of Toronto. I also taught those two subjects at the two latter universities. I received my training in geophysics from Prof. Conrad Schlumberger of the Ecole des Mines, in Paris.

(4) I have practised as a geologist and geophysicist in Europe, North Africa, United States, Canada, Mexico, Central America, South America and the Caribbean, since 1920. Since 1936, my work has been principally as a consultant.

(5) This report on the geophysical and geochemical surveys on part of the DOTE claim group, is based on the field data presented to me in transcribed form, by Jack Dawson and George Cressy Jr. They had taken the geophysical observations and supervised the collecting of the geochemical samples. I have also relied on my personal knowledge of, and experience in that general area, extending over the last ten years. References used include Memoir 249, of the Geological Survey of Canada, "Geology and Mineral Deposits of the Nicola Map Area, British Columbia," by W. E. Cockfield, 1948; "Geology and Mineral Deposits of the Princeton Map Area," Memoir 243 of the Geological Survey of Canada, by H. M. A. Rice, 1947; "Five Years of Surveying with the VLF-E.M. Method" by Norman R. Paterson and Vaino Ronka, presented at the 1969 Annual International Meeting of the Society of Exploration Geophysicists.

(6) I have no interest in the claims herein reported on, or in any securities referring to them, nor have I been promised any.

(7) I give my permission to publish this report in a prospectus, or other literature dealing with the property herein reviewed.

Respectfully submitted,

Sherwin F. Kelly

Sherwin F. Kelly, P. Eng.,
Geologist and Geophysicist

Adelphi Hotel
Merritt, B. C.
July 15, 1970

Statement Covering Expenditures Incurred for Geophysical-Geochemical Surveys on DOTE Mineral Claim Group.

J. R. Dawson, April 24 to May 27, 1970.		
1 month @ $750 per month......................$	750.00	
George F. Cressy, Jr., May 4 to May 23, 1970.		
Twenty days @ $30 per day..................$	600.00	
D. Dawson, May 4 to May 23, 1970.		
Twenty days @ $20 per day..................$	400.00	
R. Dawson, May 4 to May 23, 1970.		
Twenty days @ $20 per day..................$	400.00	
Sherwin F. Kelly, P. Eng.		
Contract price for report..................$	400.00	
Total, salaries and wages......................$	2,550.00	$ 2,550.00
Rental of 4x4 Jeep for 20 days.................$	176.00	
Rental of Sharpe Magnetometer, 10 days..........$	50.00	
Rental of Ronka E.M.-16, 10 days................$	50.00	
Rental of equipment............................$	276.00	$ 276.00
Cost of soil analyses..........................$	706.80	$ 706.80
<u>Miscellaneous</u>		
Freight on samples..........................$	8.00	
Cost of supplies for grid picketing..........$	62.05	
$	70.05	$ 70.05
Total expenditures..		$ 3,602.85

I hereby certify that the above is a true statement of the expenses incurred for the geophysical and geochemical surveys on part of the DOTE mineral claim group, conducted in April and May of 1970.

July 15, 1970
Date

J. R. Dawson
J. R. Dawson, Secretary Treasurer and Director of Dawood Mines Ltd. (N.P.L.)

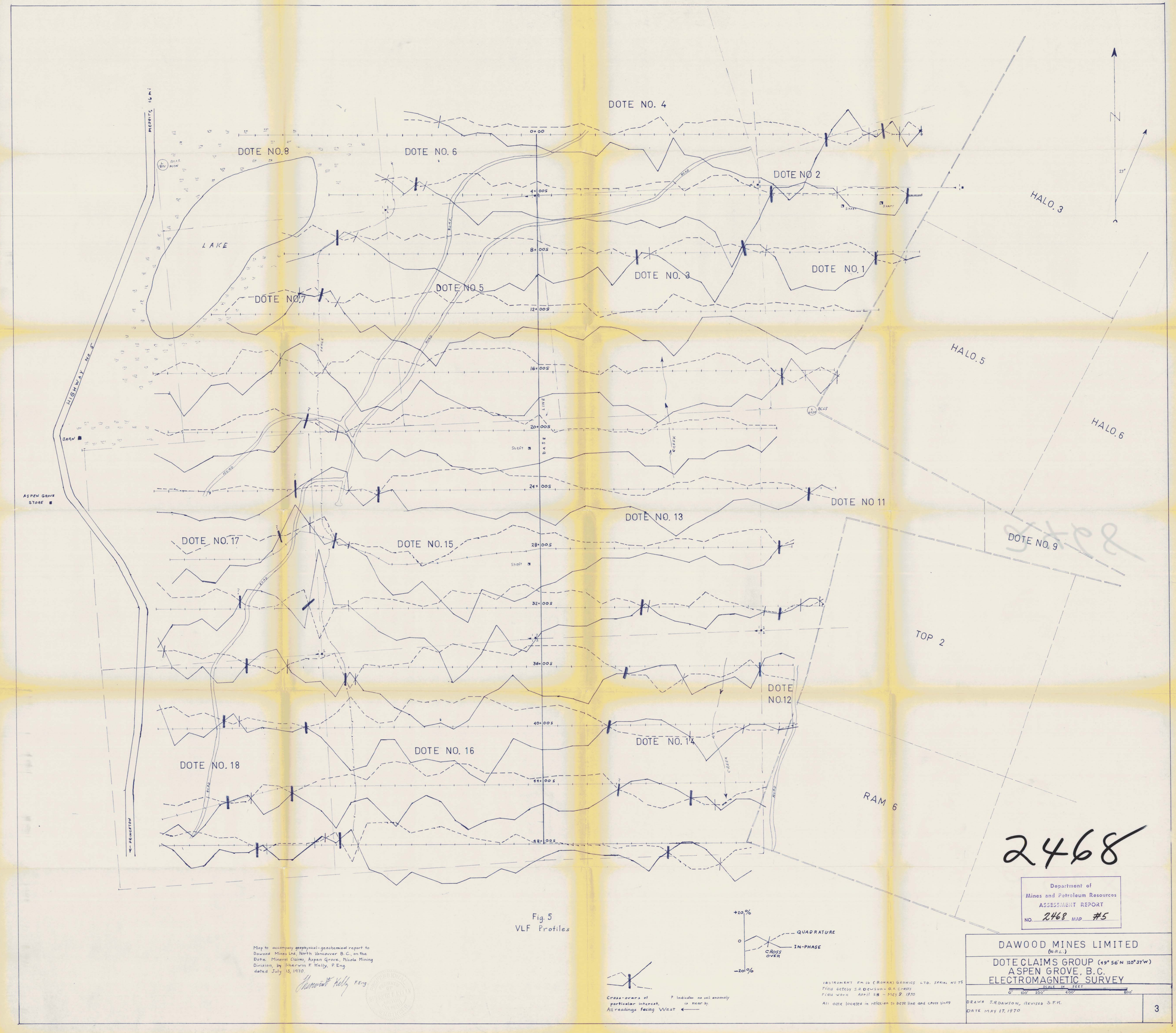

Fig. 5
VLF Profiles

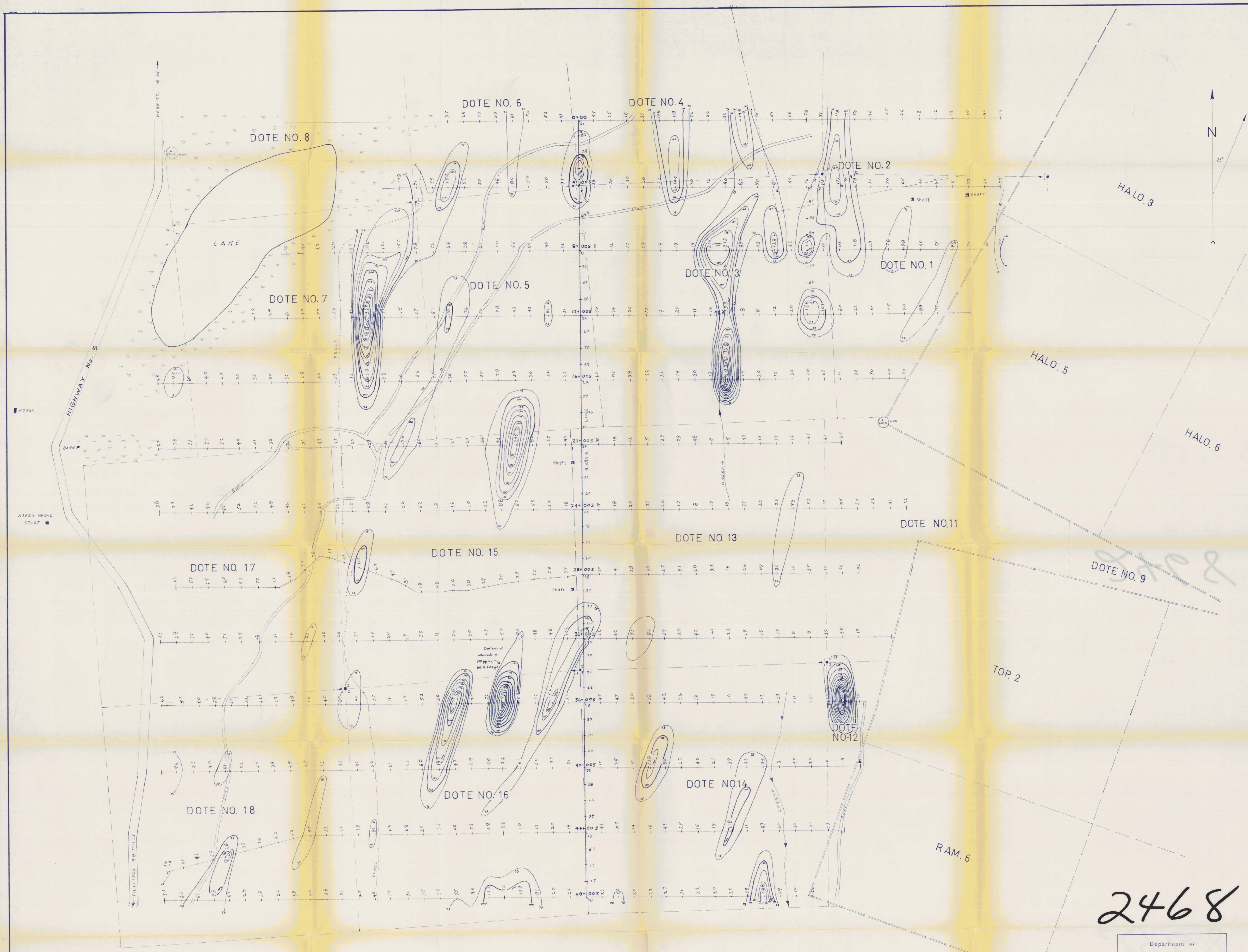

Fig. 4
Soil Anomaly
Contours

Map to accompany geophysical–geochemical report to Dawood Mines Ltd., North Vancouver, B.C., on the Dote Mineral Claims, Aspen Grove, Nicola Mining Division, by Sherwin F. Kelly, P. Eng.,
dated July 15, 1970

Sherwin F. Kelly, P. Eng.

Copper background = 25 parts per million
Contour interval = 25 ppm., beginning at 75 ppm.

Copper by HOT HNO_3 ACID EXTRACTION
METALS DETERMINED BY ATOMIC ABSORPTION

Copper (in parts per million)

60 – 40 CU.
○ > 61 P.P.M.
○ 51-60 P.P.M.
○ 41-50 P.P.M.

Field data by J.R. DAWSON, G.F. CRESSY,
Field work April 24 - May 27, 1970
All data located in relation to base line and cross lines

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 2468 MAP #4

DAWOOD MINES LIMITED (N.P.L.)	
DOTE CLAIMS GROUP (49° 56' N. 120° 37' W) ASPENGROVE, B.C. GEOCHEMICAL SURVEY	
SCALE IN FEET 0' 100' 200' 400' 800'	
DRAWN BY J.R.D. REVISED	1
DATE MAY 30, 1970 Contoured - S.F.K.	

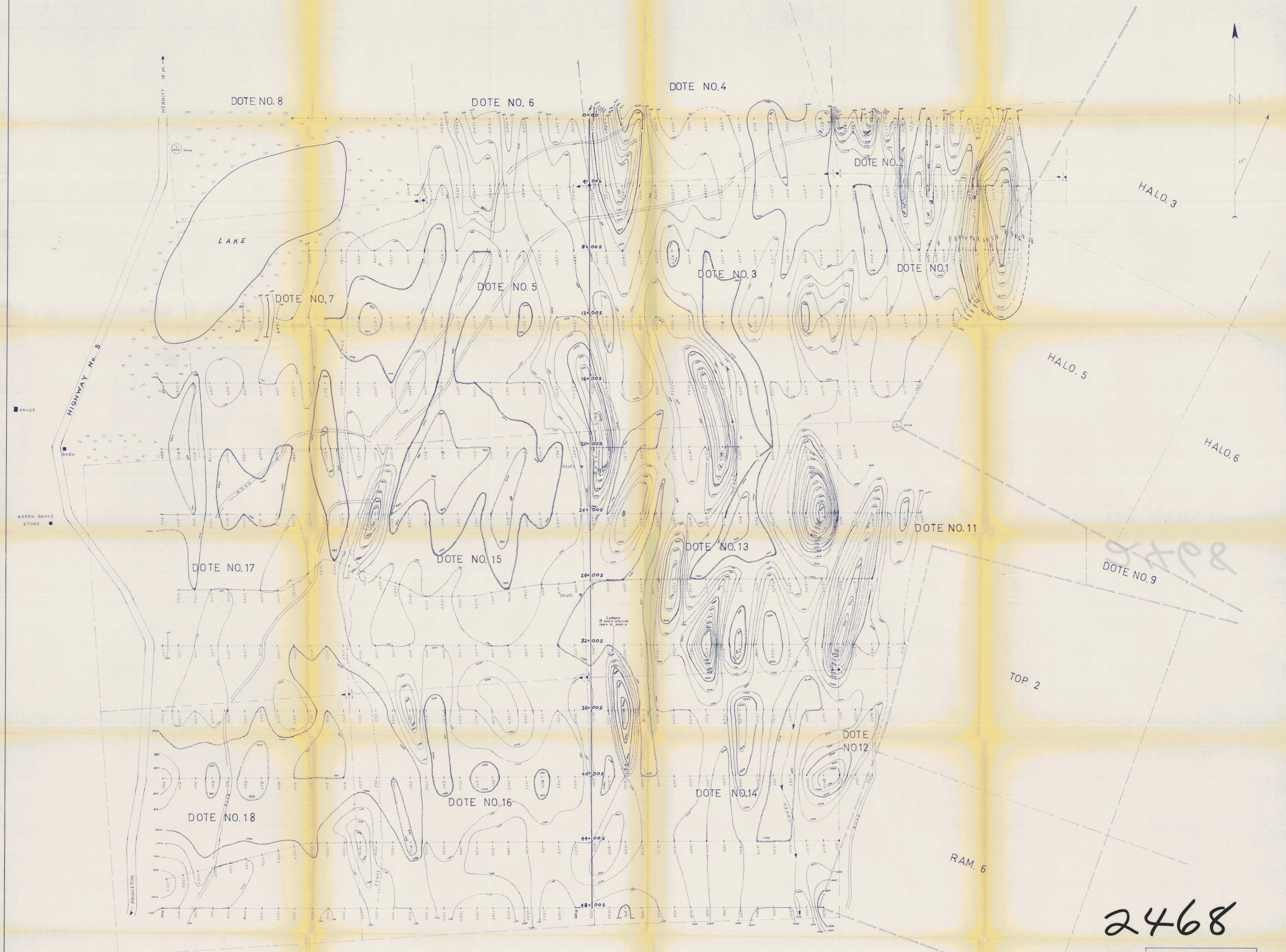

Fig 3
Magnetic Contours

Map to accompany geophysical-geochemical report to Dawood Mines Ltd., North Vancouver, B.C., on the Dote Mineral Claims, Aspen Grove, Nicola Min. Div., by Sherwin F. Kelly, P. Eng. dated July 15, 1970.

Sherwin F. Kelly, P. Eng.

gammas
1510
1565
Contour interval = 100 gammas

Instrument - MF-1 FLUXGATE MAGNETOMETER
Field data by: J.R. DAWSON, G.F. CRESSY,
Field Work April 28 - May 1970

2468

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 2468 MAP #3

DAWOOD MINES LIMITED (N.P.L.)

DOTE CLAIMS GROUP (49° 56'N 120° 37'W)
ASPENGROVE B.C.
MAGNETOMETER SURVEY

SCALE IN FEET
0' 100' 200' 400' 800'

DRAWN J.R.D. REVISED
DATE MAY 27, 1970 Contoured S.F.K.

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