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KENNECOTT CANADA EXPLORATION INC.

BLACKWATER-DAVIDSON PROJECT DAVE CLAIM

1997 GEOPHYSICAL AND PHYSICAL ASSESSMENT REPORT

NTS 93 F / 2W

AUTHORS:

D.B. FLEMING, A.G. COLE

CLAIMS:

DAVE (16 UNITS)

WORK PERIOD:

JUNE 23-AUGUST 2, 1997

COMMODITY:

Au, Ag, Zn, Cu, Mo

LOCATION:

Area

Nechako Plateau, Central British Columbia

Coordinates

UTM Zone 10

5891500 N

NAD 83

374500 E

Latitude

53 09' N

Longitude

124 53' E

Mining Division

Omineca

OWNER:

J.C. VERHIEL

J.K. BLACKWELL

OPERATOR:

KENNECOTT CANADA EXPLORATION INC.

GEOLOGIGAI SURVEY BRANCH ASSERBNEGON WARCOUVEROFFICE

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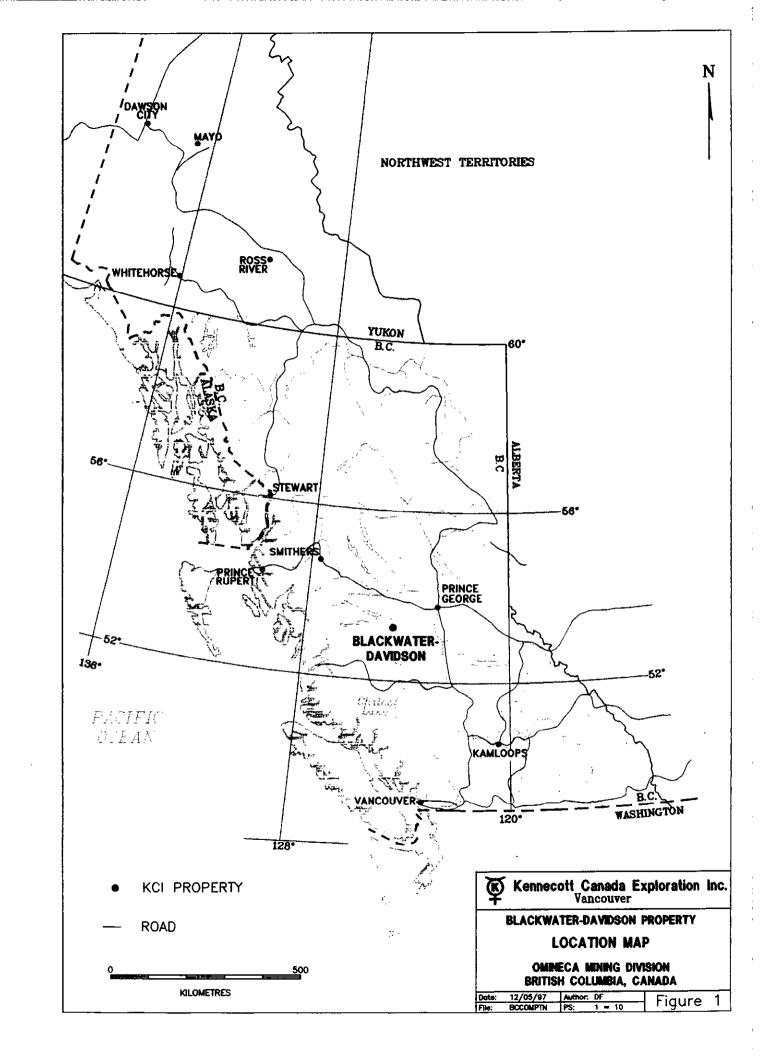
SUMMARY

This report documents the results of the 1997 field program conducted on the Dave claim (16 units) by Kennecott Canada Exploration Inc. (KCEI). Field work consisted of a limited pole-dipole induced polarization survey, linecutting and GPS surveying. The Dave claim is internal to a larger block of 437 units collectively referred to as the Blackwater-Davidson property, currently under option from Granges Inc.. Blackwater-Davidson has been explored intermittently since discovery in 1973. The property is located 120 kilometres south-southwest of Vanderhoof in central British Columbia. The objective of the program was the discovery of an unroofed porphyry system believed related to significant Au-Ag-Zn mineralization explored to date.

Regionally, Blackwater-Davidson is situated within a 50 kilometre wide horst of basement rocks dominated by Jurassic Hazelton Group volcanic and sedimentary rocks of island-arc affinity, referred to as the Nechako Uplift. Outliers of Cretaceous and Tertiary continental volcanic and sedimentary rocks are preserved in local down-drop blocks. The property is proximal to the southeastern margin of the upper Jurassic to lower Cretaceous Capoose batholith. Upper Cretaceous and Eocene plutons are spatially related to known mineralization within the uplift.

The Dave claim is underlain by a complex package of felsic to mafic flows, pyroclastics and heterolithic breccias of presumed Lower to Middle Jurassic age. A north-trending structure with a minimum 250 metres of west-side down displacement juxtaposes Eocene crystal-lithic tuffs and andesite flows at the western claim boundary. Feldspar porphyritic intermediate dikes are known from drill core. Exploration in the period 1973 to 1992 partly defined a glacial till covered, disseminated and fracture controlled zone of gold and silver bearing Fe-Zn-Pb-As-Sb-Cu sulphides and sulphosalts (Pem zone) in a one square kilometre area immediately north of the Dave claim. Preliminary work on the Dave claim in 1994 drill tested IP chargeability targets, resulting in intersections of magmatic-hydrothermal breccia and strong, pervasive biotite-pyrrhotite alteration with weak attendant vein and fracture controlled Fe-Cu-As-Mo sulphides.

An induced polarization survey utilizing wide spaced dipoles was conducted in 1997 to detect sulphide mineralization at depth. A pole-dipole array with a dipole spacing of 100 meters measured to n = 6 allowed a depth penetration exceeding 200 metres. The results of two north-south lines which traversed the eastern and western limits of the claim block, suggested highly chargeable (total chargeability > 30 msec) material (indicative of sulphide mineralization) existed at depth (>150m). Chargeability amplitudes were similar to those recorded historically over the shallow PEM mineralisation.



INTRODUCTION

Location and Access

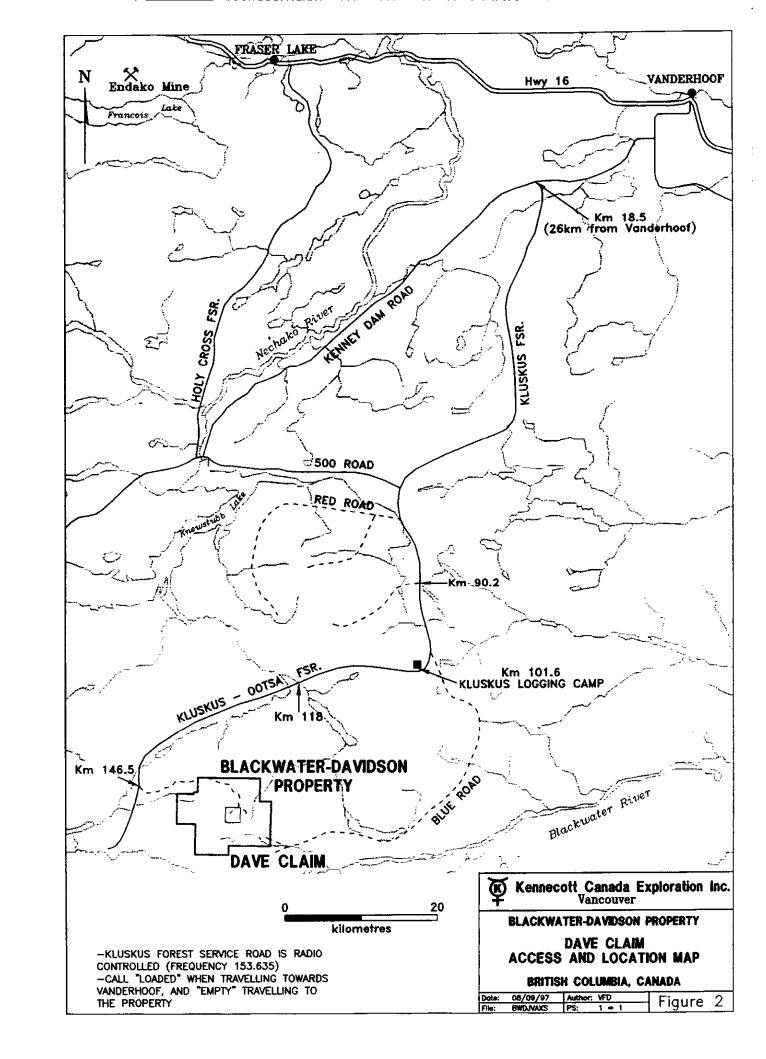
The Blackwater-Davidson property, of which the Dave claim occupies an internal block, is located approximately 120 kilometres south-southeast of Vanderhoof in the Omineca Mining Division of central British Columbia (Figure 1). The property is roughly 10 by 12 kilometres in area, centered on Mt. Davidson (elevation 1861 metres), at the southern limit of the Fawnie Range in the Nechako Plateau physiographic region. Access to the exploration camp on the property is gained by driving south and west from Vanderhoof on the Kluskus-Main logging road to kilometre 146.5 (Figure 2), then 17 kilometres east on the Mt. Davidson "mining" access road. FM radio communication is required for travel on the Kluskus-Main by monitoring Slocan-Plateau frequency 153.635. A four-wheel drive vehicle is not necessary but recommended from the Kluskus to the exploration camp. Beyond the camp, road conditions are poor and comprise a network of drill trails via which ATV access can be gained to the Dave claim.

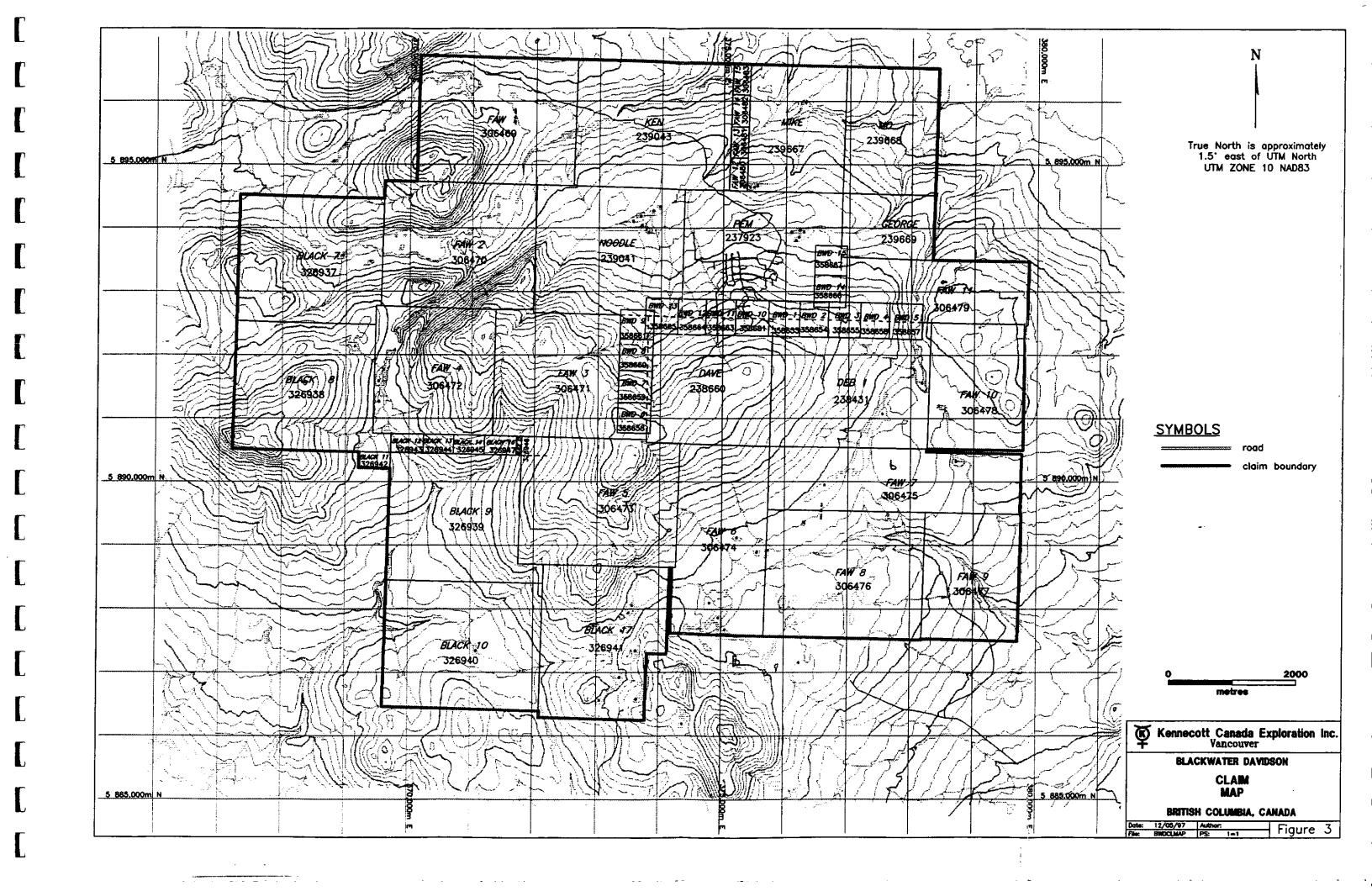
Claims

The Dave claim is a 16 unit, four-post claim staked July 27, 1983 with a current expiry date of August 3, 2005. It is central to the 437 unit Blackwater-Davidson property which is comprised of 26 four-post claims and 25 two-post claims (Figure 3). The Dave claim is subject to a September 7, 1994 option agreement between Granges Inc. and Dave claim owners J. C. Verhiel and J. K. Blackwell. The entire Blackwater-Davidson claim block was subsequently optioned from Granges by KCEI on June 19, 1996. GPS surveying of claim posts (2-5 metre horizontal accuracy) in the course of 1997 field work has determined the location of the Dave LCP and adjacent Pem, Deb No 1 and Faw 3 claims. Internal fractions to the Blackwater-Davidson property identified along the north and west Dave claim boundaries were staked by KCEI August 23-25, 1997.

Exploration History

Exploration activity at Blackwater-Davidson was prompted by the results of a 1973 Granges regional stream sediment survey which identified anomalous Zn-Ag from a drainage on the northeast flank of Mt. Davidson. The lack of outcrop and thickness of glacial till cover prompted a variety of geophysical surveys in the period 1977 to 1984. Diamond drilling and reverse circulation drilling intermittently from 1985 to 1992 partly defined a zone of pervasive hydrothermal alteration and disseminated Ag-Au-Zn mineralization in the Pem Zone, immediately north of the Dave claim. The first IP survey in 1992 characterized the zone as both chargeable and resistive. Immediately





following the initial option agreement on the Dave claim in September of 1994, IP surveying and subsequent drilling of chargeability targets led to the identification of magmatic-hydrothermal breccias and pervasive biotite-pyrrhotite alteration in drill hole Dav 94-40. KCEI geological mapping in 1996 further identified pervasive induration and weak hydrothermal alteration in outcrop.

1997 Field Program

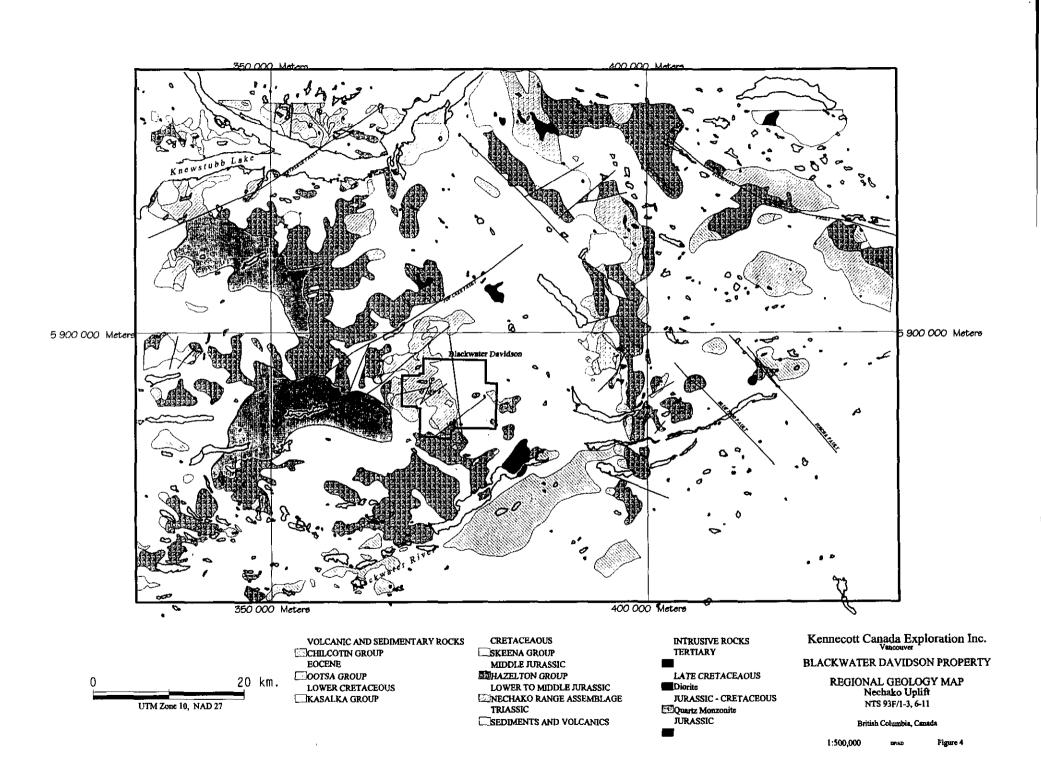
Field work conducted by KCEI on the Dave claim in 1997 is as follows:

- 4.0 kilometres of pole-dipole IP along two north-south lines. Survey parameters were a = 100 metres, n = 6.
 Surveying was contracted to Pacific Geophysical Ltd. in the period July 29th, 30th and August 1st, 2nd.
- 4.0 kilometres of linecutting along two north-south grid lines and one east-west tieline. Linecutting was
 contracted to Sabre Explorations and Durfeld Geological Management in the periods June 22-June 29 and July
 24-July 27 respectively.
- GPS surveying of claim posts and the east-west tieline on July 5 by Durfeld Geological Management.

REGIONAL GEOLOGY

The regional geology of the Nechako Plateau was first documented by H.W. Tipper (1963) of the Geological Survey of Canada and most recently by L.J. Diakow et. al (1993-1995) of the British Columbia Geological Survey. Geochronology of igneous rocks associated with mineralization in the Nechako Plateau is currently in progress under the UBC-MDRU magmatic hydrothermal project (R.M. Friedman).

The Blackwater-Davidson property is situated within a 50 kilometre wide basement horst referred to as the Nechako Uplift, exposing upper Triassic to Neogene lithologies (Figure 4). The uplift is bounded to the north by the northeast trending Natalkuz Fault and to the south by an unmapped structure along the Blackwater River. North and south of the uplift, Tertiary volcanic strata dominate bedrock geology suggesting significant post Eocene movement. The uplift itself is predominantly underlain by Jurassic island are volcanics and intravolcanic sediments of the Hazelton Group. Outliers of Eocene Ootsa Lake Group are situated within local down-drop blocks with the largest accumulation in the vicinity of Mt. Davidson. Blackwater-Davidson is proximal to the southeast margin of the Capoose batholith, recently dated at 148.1 Ma. Upper Cretaceous and Eocene age plutons are spatially related to known mineralization within the uplift.



PROPERTY GEOLOGY

Stratified rocks within the Blackwater-Davidson property boundary are divided into three regionally recognizable groups: The Jurassic Hazelton Group, the Eocene Ootsa Lake Group and the Miocene to Pliocene Chilcotin Group. In general terms, the western half of the property is underlain by an anomalously thick package of Eocene crystal lithic tuffs and subordinate intermediate tuffs and flows. The eastern half is underlain by a complex package of felsic to mafic subaqueous flows, pyroclastics, resedimented volcaniclastics, sediments and heterolithic breccias. A north-south fault separates these two groups with a minimum of 250 metres of west side down displacement. A scattered and compositionally diverse suite of intrusive rocks comprise less than 1% of mapped outcrop and drill core, although extensive hornfelsing in outcrop, airborne geophysics and localized magmatic-hydrothermal alteration suggest a significant undefined intrusive component to both surface and subsurface geology.

The Dave claim is situated 95% within the eastern structural panel and underlain by Jurassic rhyolite flows, felsic to intermediate tuffs and heterolithic breccias (Figure 5). All outcropping lithologies are indurated and weakly hydrothermally altered. Drill hole Dav 94-40, collared on an IP chargeability anomaly, intersected moderately to strongly biotite-pyrrhotite altered tuffs and heterolithic breccias. Intervals of phreatic breccias and scattered quartz veins with Fe-As-Cu-Mo sulphides suggest proximity to a metalliferous magmatic-hydrothermal system.

GEOPHYSICS

Methodology and Equipment

A time domain induced polarization survey consisting of two N-S lines (Figure 5 for location) totaling 4.0 kilometers was used to investigate the distribution of polarizable and resistive material in the Dave claim. Pacific Geophysical Ltd. were contracted to completed the survey using a 6 man crew on July 29th, 30th and August 1st, 2nd. Data were acquired with a 1 second pulse using the EDA 6 channel Elrec 6 chargeability / resistivity receiver and 7.5 KW Huntec transmitter. Currents were generally above 1 Amp using several steel transmitter rods, aluminum foil and weakly salted water as required. At least 2 readings were taken at each station with more depending on secondary signal strengths and data repeatability. Potentials were measured using ceramic porous pots filled with Cu₂So₄ solution. The last station of each day was repeated the next morning to ensure data integrity and data

Line 1000 W 28+00 S 26+00 S 24+00 S 22+00 S 20+00 S 18+00 S 16+00 S 14+00 S 12+00 S 10+00 S APPARENT 753 651 670 611 565 502 473 470 475 575 552 561 515 477 474 439 422 456 448 415 399 307 Filter **RESISTIVITY** Pole-Dipole Array 770 586 483 258 227 213 321 465 587 968 609 527 500 524 487 388 388 495 459 464 589/, 312 n=1 ohm.m 778 560 602 589 390 353 329 454 511 559 640 631 642 411 466 545 405 420 551 476 459 363 n=2 528 580 645 741 528 463 404 442 459 415 636 663 / 552 383 453 521 434 452 528 456 337 315 n=3 538 633 759 896 622 529 388 400 391 449 658 600 548 362 409 519 456 430 496 373 288 n=4 614 577 737 876 979 672 501 365 365 (417 483 621 602 518 319 387 524 431 408 417 320 254 n=5 323 653 656 837 939 1016 626 466 347 384 439 477 631 568 460 294 378 485 405 352 358 290 a = 100 Mplot point Scale 1:10000 30+00 S 28+00 S 26+00 S 24+00 S 22+00 S 20+00 S 18+00 S 16+00 S 14+00 S 12+00 S 10+00 S 100 200 300 400 500 600 20 19 15 12 9.8 8.3 8.1 8.7 10 11 13 14 12 11 9.5 8.6 8.5 9.3 10 12 15 17 Filter TOTAL CHARGEABILITY (metres) 16 4.2 2.2 2.5 1.6 2.1 2.5 2.5 2.3 2.5 3.7 1.1 0.030 0.25 0.10 0.21 1.5 1.4 4 8.3 7.2 4.4 3.7 3.5 3.7 4.6 5.8 6.7 9.6 6.9 4.6 2.5 2 1.7 3.1 4.1 5.2 9.8 14 19 9.3 5.7 5.8 5.7 6.4 8.6 11 14 13 12 9.2 5.2 4.9 5.3 6.3 7.8 9.7 16 18 n=3 22 22 20 10 7.6 7.9 8.8 11 13 17 16 17 17 13 8.3 9.1 9.3 10 14 17 18 16 22 23 21 12 9.7 11 13 14 18 18 18 20 20 17 13 KENNECOTT CANADA EXPLORATION INC. 20 22 14 12 14 16 19 **BLACKWATER DAVIDSON PROJECT** DAVE CLAIM INDUCED POLARIZATION SURVEY Date: 97/08/06 NTS - 93F2 Fig. 6a PACIFIC GEOPHYSICAL

Line 2200 W 30+00 S 28+00 S 26+00 S 24+00 S 22+00 S 20+00 S 18+00 S 16+00 S 14+00 S 12+00 S **APPARENT** 792 791 821 1005 1081 1231 1119 1123 1157 964 778 668 618 671 615 618 504 458 389 364 390 RESISTIVITY Pole-Dipole Array //631 613 772 1360 1397 2019 1165 985 1137 798 765 704 695 947 712 850 | 638 482 | 300 271 | 405 624 (872 714 906 1193 115 1127 1108 1240/ 1423 680 615 672 797 756 705) 488 429 321 344 757 944 725 831 1147 1086 11/19 1216 1415 11/41 651 574 618 608 804 579 575 391 433 366 395 n=3 737 793 954 717 824 1149 1095 1189 1297 1164 947 653 572 577 590 618 473 463 381 473 391 354 n=4 767 802 960 744 841 1157 1152 1237 1997 974 787 582 545 552 481 519 401 459 408 491 344 n=5 971 776 820 999 772 847 1237 1184 1091 949 823 812 580 515 459 419 455 406 484 413 436 295 n=6 a = 100 MScale 1:10000 TOTAL 14 14 14 15 16 20 20 20 19 19 18 18 CHARGEABILITY Filter (metres) 11 9.1 9.3 9.7 9.8 6.1 8.2 11 10 11 11 15 21 16 13 13 12 13 15 18 21 n=2 22 11 12 13 12 14 11 12 14—14 12 16 18 24 20 19 19 22 ' 16 18 18 21 18 19 21 23 21 20 20 KENNECOTT CANADA EXPLORATION INC. **BLACKWATER DAVIDSON PROJECT** DAVE CLAIM INDUCED POLARIZATION SURVEY Date: 97/08/06 NTS - 93F2 PACIFIC GEOPHYSICAL Fig. 6b merging accuracy's. Data processing included decay analyses with averaging and/or median decay statistics to decrease data noise. Pseudosections of Total Chargeability (msec) and Apparent Resistivity (Ω m)were generated from manually cleaned data and plotted using Geosoft (Figures 6a, 6b).

Results

Data acquired were of high quality with repeatability's generally within 10%. Apparent resistivities on line $1000 \,\mathrm{mW}$ range from $200 \,\Omega\mathrm{m}$ to $1000 \,\Omega\mathrm{m}$ and on line $2200 \,\mathrm{mW}$ from $200 \,\Omega\mathrm{m}$ to $1400 \,\Omega\mathrm{m}$. Total chargeabilities on line $1000 \,\mathrm{W}$ range from 0 msec to 24 msec and on line $2200 \,\mathrm{W}$ from 5.8 msec to 31 msec. Depth penetration is interpreted to range from $200 \,\mathrm{m}$ to $250 \,\mathrm{m}$. Topography effects in the data are negligible except for limiting bedrock investigation below the felsic volcanic lithocap to n=6 and possible n=5.

Discussion

Chargeabilities generally increase with depth indicating a source at a depth >150m centered on 1000 W, 1600 S, and 2200 W, 1900 S with considerable spatial extent. The chargeability anomaly magnitude is comparable to the historically identified anomaly associated with the shallow (<100m) PEM mineralization. Apparent Resistivities are non-descript showing no distinct correlation with measured chargeabilities indicating a possible sulfide overprinting event. IP inversions using commercial 2-D inversion software confirms the presence of a deep chargeable body in the center of the Dave claim lying beneath and to the north weakly altered volcanics (lithocap?).

LINECUTTING AND GPS SURVEYING

Linecutting

The southern extension of the Pem grid to tieline 2000 S was established on the Dave claim in 1994 to accommodate IP and geochemical surveys. Linecutting in 1997 consisted of establishing a tieline at 3000 S and extending lines 1000 W and 2200 W beyond 3000 S for the subsequent IP survey. Lines were compassed (line of sight where possible), chainsaw cut and picketed at 25 meter stations. Trees exceeding 17 centimetres in diameter were left standing. A total of 4050 metres of line was cut on the Dave claim. Linecutting contractors were Sabre Exploration of Penticton B.C. in the period June 22-29 and Durfeld Geological Management of Williams Lake, B.C. in the period July 24-27.

GPS Surveying

One day of GPS surveying was carried out by Durfeld Geological Management on July 5. Locations determined included 50 metre stations along tieline 3000 S and the Dave LCP and Faw 3 LCP. Legal Corner Posts for the Pem and Deb No 1 claims were established in 1996. The instrument used was a Trimble Pathfinder Pro XL that utilized post-processing of community base station data in from Prince George to provide differential UTM coordinates. All Blackwater-Davidson data is in NAD 83 datum. The published horizontal accuracy is 2 to 5 metres. Check surveying of known topographic features confirmed this level of accuracy.

	APPEND	IX I	
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	Statement o	of Costs	
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STATEMENT OF COSTS

Salaries

Andrew Cole - Project Geophysicist

July 29,30 August 1,2

1000.00

Room and Board

21 man days @ 50.00/day

1800.00

IP Survey

Pacific Geophysics

July 29,30 August 1,2 4.0 kilometres @ 1200.00/km.

4800.00

Linecutting

Sabre Exploration

July 27

June 22,23,24 3.0 kilometres @ 820.00/km

1.0 kilometre @ 800.00/km

3260.00

GPS Surveying

Durfeld Geological Management

Durfeld Geological Management

July 5

1/2 day @ 800.00/day

400.00

TOTAL

\$11,260.00

	APPE	ENDIX II		
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S	tatement of	f Qualificat	ions	

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David B. Fleming, P.Geo

I, DAVID B. F. CERTIFY:	LEMING, of 5435 Paton Drive, Ladner in the Province of British Columbia, DO HER	ŒBY
1.	That I am a Project Geologist employed by Kennecott Canada Exploration Inc. with offices at suite 354-200 Granville Street, Vancouver, British Columbia.	
2.	That I am a graduate of the University of British Columbia with a Bachelors Degree in Geological Sciences (1979).	
3.	That I am a member in good standing of the Association of Professional Engineers and Geoscientists of British Columbia.	
4.	That this report is based on fieldwork carried out under my supervision.	
Dated at Vanco	ouver, British Columbia, this 20th day of October, 1997	
N T	$Q_{\cdot, -}$	

Dated at Vancouver, British Columbia, this 215 day of October , 1997

Andrew Cole

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	APPENDI	IV III		
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	Referen	ices		
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	APPENDIX IV
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	Global Positioning Survey (GPS) Procedures

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GLOBAL POSITIONING SURVEY (GPS) PROCEDURES

EQUIPMENT

Trimble Pathfinder Pro-

- an eight channel (GPS) receiver.
- connected to an MC-V data logger.
- running Asset Surveyor software supplied by Trimble.

Portable Computer-

- AST 486 with colour monitor.
- with the Pathfinder Post Processing Software supplied by Trimble installed.

FIELD PROCEDURE

Trimble Pathfinder Pro

- was transported in a back-pack and the antennae was placed on a staff, or on a magnetic mount on a vehicle.
- to achieve acceptable accuracies the unit configuration was checked and set to the following settings:
 - elevation mask 13 degrees
 - SNR mask 6.0
 - PDOP MASK 6.0
 - PDOP switch 6.0
 - in point feature I second intervals
 - in line feature 3 to 10 second intervals

- Software

- files were opened and using the Asset Surveyor software and data was stored as lines or nested points.
- within the Asset Surveyor software labels were attached to these line and/or point features.
- at the end of each survey day the data-logger was connected to the computer and the raw data (.ssf) down loaded. The completed traverses were displayed on the screen and areas of additional traversing planned.

POST PROCESSING

The post processing consisted of Data Correction and preparation of data files and plan maps.

- Differential Data Correction
 - requires base data files for the hours of the survey. The base data files for this survey were purchased from a community base station located at Prince George operated by Forey Management Ltd.

P.O. Box 4438 Station Main. Williams Lake, B.C. V2G 2V5

- the Trimble Pfinder software uses these base data files to calculate the corrections that are applied to the field data to generate the corrected (.cor) file. The accuracy of the corrected data is better than 2 to 5 metres and often found to be less than a metre.

- Output Data

- the Trimble Pfinder software can export the data in various forms. Durfeld Geological Ltd. supplied the ASCII and DXF files for this survey. All data in the GPS is stored in WGS84. The Trimble software is capable of outputting in all the major world grid systems. The data is generally output in Universal Transverse Mercator using NAD83 or NAD27.

COMPUTER ASSISTED DRAFTING

The DXF files can be imported to a computer assisted drafting systems and combined with grid and topographic maps to generate the project base maps. The ASCII files store a permanent grid record of all the mapped features.

