

**J. TUACH GEOLOGICAL CONSULTANTS, INC.
DIAMOND DRILL CORE LOG**

LATITUDE _____	Tests _____	Dip _____	Magnetic _____	Corrected _____	Project No. _____	Hole No. <u>2928</u>
DEPARTURE <u>10.650N 12.950E</u>	Depth _____	_____	Bearing _____	Bearing _____	Property <u>Middle Branch - Buchans</u>	
ELEVATION <u>3817</u>	_____	_____	_____	_____	NTS _____	Grid Name <u>Mine grid</u>
DIP AT COLLAR <u>-90°</u>	_____	_____	_____	_____	Date started <u>04/08/77</u>	Completed <u>31/08/77</u>
BEARING _____	_____	_____	_____	_____	Contractor _____	
TOTAL DEPTH <u>2064</u>	_____	_____	_____	_____		
CORE SIZE <u>BQ</u>	_____	_____	_____	_____		
REMARKS _____	_____	_____	_____	_____	Logged by <u>J. Harris (1996)</u>	

Depth & Lithology	Description	Alteration	Mineralization
0 - 80'	- Overburden		
80 - 126'	- Foliated mafic to intermediate volcanics - tuffaceous? - Some interbedded felsic - dacitic tuffs - Medium to dark green and buff - 80 - 86' - mafic - strongly foliated 80 - 85° to the core - 105 - 107' - foliation at $\approx 45 - 50^\circ$ to the core then almost parallel to core from 107 - 108 and gradually back to 65 - 70° to the core near base of unit, foliation also weakens down hole - Altered felsic zones 86 - 87' and 112 - 119' - very likely was prominent quartz - Some quartz and plagioclase phenos. throughout - Some calcite wisps and veinlets throughout	Moderate chloritic and sericitic alteration Felsic zones are also weakly to moderately silicified	<1% disseminated pyrite
126 - 500'	- Prominent quartz - rhyolite to dacite - porphyritic flow (or tuff?) - About 20 - 30% large quartz and altered feldspar phenocrysts in an aphanitic grey to pink groundmass - grey colour result of silicification - Upper contact sheared and silicified - 161 - 162' and 165 - 165' - bright green alteration - soft, fine grained, mica? - 199.2 - 202.6' - resembles Engine House ore locally - Thurlow - 222 - 227' - fractured and brecciated some carbonate and black chlorite infill - Patchy silicification and chloritic alteration appears to die out down hole - 310 - 404' - dominantly pink colour - massive - 404 - 413.8' - alteration breccia - along core? - split - 413.8 - 475' - moderate to strong alteration	Feldspars altered to sericite - weak to moderate local silicification of groundmass - also zones of black chloritic alteration - also locally coating fractures 102.3 - 185' - strong black chloritic alteration with moderate silicification 199.2 - 202.6' - very strong black chloritic alteration and local silicification 206.5 - 207.5' - moderate chloritic alteration and silicification - 397 - 397.5' - grey silicification and carbonate veining	Generally less than 1% dissem. py. but locally to 1% near alteration - @ 131 - 1" zone of chloritic alteration with 5% py. and cpy. - 143 - 145 3 - 5% py. associated with moderate chloritic and silicic alteration 182.3 - 185' - to 5% py and cpy. associated with alteration - some grey to purplish barite or fluorite @ 185' 199.2 - 202.6' - to 10% py. and cpy. as disseminations and semi-massive bands (1.86% Cu) 239 - 242' - 2 - 3% py. with silicification

HOLE NO. 2928

Depth & Lithology	Description	Alteration	Mineralization
126 - 500' (Cont'd)	- 462 - 463' - silica - carbonate - chlorite vein breccia or cemented fault breccia - 475 - 500 - locally weakly altered - 2 - 3 small chloritic zones may be inclusions - Fairly abrupt contact at 80 - 90° to the core	404 - 413.8' - chlorite - sericite and silicic alteration and some carbonate veining $\approx 10^\circ$ to the core 413.8 - 475' - moderate to strong, fracture controlled black chlorite - sericite and silicic alteration	303 - 303.5' - 3 - 5% py. with silicification 323 - 323.5' - strong silicification with $\approx 5\%$ py. 404 - 413.8' - 5 - 8% pyrite and local chalcopyrite 413.8 - 475' - to 5% pyrite with alteration
500 - 618'	- Volcanic breccia - pyroclastic - Assorted pink to grey rhyolitic fragments and prominent quartz - rhyolite fragments and a few mafic volcanic fragments (mainly pink rhyolite) in a prominent quartz dacitic tuff matrix - Fragment size varies from chips to large pebbles, amygdoidal mafic from 512 - 513' maybe a boulder - Local carbonate veining along with core, matrix becomes more mafic down hole - @ 572' - weakly foliated mafic (@ 45° to the core) interbed or boulder - 600 - 615' - no lithic clasts, mafic tuff? interbed 609.5 - 610.5' - 615 - 618' - somewhat sheared fragmental with amygdoidal basalt and rhyolitic fragments	Weak to locally moderate sericitic and chloritic alteration of matrix	Very little pyrite in matrix, some clasts with disseminated pyrite massive py. fragment (1" x <0.5") at 507.3' 600 - 615' - <1% dissem. py. fleck magnetite @ 610'
618 - 627'	- Maroon rhyolite or rhyolitic tuff - Sheared and altered - weak to locally strong foliation at 70 - 80° to the core, but locally folded - lower contact more strongly sheared - foliated - 624 - 627' - maybe hematitized tuff	Hematitized Weak sericitic alteration	
627 - 753'	- Arkose and Arkosic conglomerate - Mainly rhyolitic clasts but also mafic volcanic and locally jasper - Some sections (beds) with well rounded pebbles - 704 - 711' - lithic arkose - no pebbles - Rhyolite - fine grained pink rhyolite dyke - 635 - 638 and 638 - 647 - intrusive contacts and at 718 - 727 and 729 - 743 - 747 - 753' - possible tuffaceous matrix - 2 bands of porphyritic rhyolite - flows or fragments - matrix commonly sheared and chloritic		
753 - 782'	- Rhyolite - brown to greenish colour - Cut by hairline epidote and hematite veinlets - Abundant tiny phenocrysts of white and orange feldspar and quartz - Lower contact sheared at $\approx 80^\circ$ to the core	Hematitic alteration and some weak sericitic alteration	
782 - 786'	- Rhyolite dyke - fine grained pink and green - 783 - 784' - some fault gouge - Contact from altered green to pink - somewhat gradational over 1 - 2" - Slickensides on fractures	782 - 784' - strong sericitic alteration to soft green rock - some black chlorite on fractures	

HOLE NO. 2928

Depth & Lithology	Description	Alteration	Mineralization
786 - 794'	- Arkosic pebble conglomerate as above - 788 - 790' - highly fractured to fault breccia - Lower contact at 45° to core		
794 - 806'	- Rhyolitic dyke - fine grained - pink		
806 - 815'	- Arkosic conglomerate - as above - Irregular lower contact - some large clasts or flows/dykes of rhyolite in lower 2 - 3'		<1% pyrite
815 - 1008'	- Rhyolite - similar to 753 - 782' - Massive to locally flow banded - small white and orange feldspar and quartz phenos - A few indistinct mafic? xenoliths - Locally brecciated by epidote - silica veinlets - 980 - 996' - bleached and altered - possible cemented fault breccia @ 985 - 986'	Hairline epidote stringers throughout, local hematite stringers and fracture coatings 895 - 897' - brecciated with epidote stringers and alteration 980 - 996' - brecciated with epidote - silica alteration (cement)	
1008 - 1064'	- Dacitic crystals vitric tuff - Green to grey green - porphyritic with small quartz and white and a few pink feldspars - Maybe arkosic locally i.e. @ 1020' - 1028 - 1029' - pegmatite vein along core - 1035 - 1040' - contains rhyolitic, andesitic and a few granitic clasts (conglomerate) - 1040 - 1064' - local lithic rich zones and some siltstone to fine sandstone beds - bedding @ ≈ 50° to the core	Hematite stringers over upper 2 - 3' 1016 - 1023' - brecciated by pale green silica - epidote alteration	Siltstone beds contain up to 2% disseminated pyrite <1% pyrite elsewhere
1064 - 1067'	- Conglomerate - heterolithic cobbles - rhyolite, mafic volcanic and a few granitic pebbles		<1% pyrite in matrix
1067 - 1093'	- Very fine grained pyritic siltstone with a few sandstone and conglomerate beds - bedding generally 50 - 60° to the core - 1069 - 1070' - conglomerate bed - 1084 - 1087' - conglomerate bed - rare grains - Pb-Zn - basal contact conformable - sheared or altered - epidote - silica at ≈ 50° to core		very finely disseminated py. in siltstone 5 - 10%, - 1069 - 1070' - altered pyritic clasts - pyritic siltstone clasts and a few grains - clasts of Pb, Zn, sample 1068.6 - 1069.4
1093 - 1113'	- Dacitic tuff to Pyroclastic breccia - Feldspar porphyritic - abundant plagioclase - Mainly dacitic lithic fragments with indistinct boundaries - A few thin siltstone to sandstone beds	epidote - silica - veining to vein breccia locally	<1% pyrite

HOLE NO. 2928

Depth & Lithology	Description	Alteration	Mineralization
1113 - 1129'	- Interbedded pyritic siltstone and arkosic sandstone (Wacke) with thin tuffaceous interbeds		1 - 3% disseminated pyrite
1129 - 1133'	- Heterolithic breccia - conglomerate mainly rhyolite and pyritic siltstone clasts	Some sericitic and silicic alteration of matrix	1 - 2% pyrite
1133 - 1142'	- Interbedded - dark grey to black pyritic siltstone and dacitic tuff as above	Some black chloritic alteration - also local bright green mica? and hematitization	
1142 - 1175'	- Intermediate - dacitic tuff - Plagioclase crystals throughout, massive - Faint fragmental appearance but may be due to alteration - Somewhat gradational lower contact	Somewhat chloritic throughout and weak pale green silicic and/or sericitic alteration	
1175 - 1311'	- Intermediate Pyroclastic breccia - Local pumiceous tuff clasts and/or matrix - Altered intermediate to mafic clasts with wispy and embayed edges - rims are amygdoidal with quartz and/or chlorite - Local bright green "mica" grains or alteration - Lower contact sheared and chloritic @ 45 - 50' to the core	1176 - 1182' - strong sericitic alteration and local silicification Some silicification of clasts and common silicification of matrix - some very local black chloritic alteration	pyrite 1- 3% disseminated in matrix and in altered clasts 1282 - 1283 ≈ 1% dissem. Pb-Zn, with silicification and in amygdules, limited to this area - 1305 - 1306 - to 10% barite in matrix - not seen elsewhere
1311 - 1418'	- Rhyolite breccia? strongly altered - Light grey to buff - Locally silicified fragments are outlined by soft sericitic matrix - 1350 - 1363' - massive grey silicification - may not have been brecciated - 2 small fault gouge to shear zones 1311 - 1315' - 1371 - 1385' - locally weaker alteration - Flow banding evident in some clasts - Lower contact somewhat gradational	Strong silicification throughout with local soft yellowish sericite	pyrite generally <1% local Pb-Zn mineralization i.e. 1346 - 1348' 1385 - 1418' - patchy Pb-Zn mineralization and local barite - often as veinlets
1418 - 1434'	- Intermediate Pyroclastic breccia - similar to 1175 - 1311' - Clasts are amygdoidal and sometimes tuffaceous as above, occasional rhyolite clasts - Lower contact gradational and may just reflect degrees of alteration	Silicification and local sericitic alteration of groundmass and clasts. Locally unit appears to have been brecciated by the alteration	5%+ disseminated pyrite with silicification and along edges of clasts - also <1% Pb-Zn, cpy and barite as local concentrations
1434 - 1445'	- Light grey to buff altered rhyolite? - Altered feldspar and tiny quartz phenos. - Upper 2 - 3' may be more altered version of overlying unit - Gradational contact - alteration	bleached and altered throughout - moderately silicified and cut by wormy white silicification	3 - 5% py and 2 - 3% Pb-Zn and cpy. as disseminations and stringer veinlets with silicification and locally barite veinlets

HOLE NO. 2928

Depth & Lithology	Description	Alteration	Mineralization
1445 - 1473'	- Pumiceous tuff? strongly altered - Very similar to above unit but with wispy sericitic pumice between rhyolitic clasts becomes gradational more sericitic (tuffaceous) downwards - Pale grey green colour	Silicified rhyolite clasts - strong sericitic alteration of matrix	Mineralization similar to above but gradually dies out downwards - some barite veinlets to bottom of unit - very minor base metals below 1460
1473 - 1588'	- Pyroclastic breccia (intermediate footwall type - Thurlow) - Pumiceous - clasts are often tuffaceous and some show layering - flattening, variety of clast types - rhyolite, jasper but mostly intermediate tuff - 1513 - 1531' - lighter colour - more felsic? - Some clasts of altered pyritic rock (siltstone?) - a few clasts of massive py. i.e. 1541' - @ 1568' - small pyritic gouge - also 2" pyritic gouge at 1588' and 2 or 3 small gouges between	Strong sericitic alteration of groundmass and clasts - local silica flooding also some silicified clasts Some wispy darker sericitic - chlorite mixed - 1568 - 1588' - very strong sericite - silica alteration	Local disseminated Pb-Zn and/or barite also along stringers fractures - sometimes fairly strong 1%+ i.e. 1505 - 1508' @ 1562 and 1567 - 1568' - pyrite in fragments and disseminated average 2 - 5% locally contains disseminated grains of pink mineral - leucoxene? 1567 - 1588' - ≈ 15 - 20% finely disseminated pyrite - no obvious base metals
1588 - 1604'	- Mafic Pyroclastic breccia - Amygdoidal mafic fragments with wispy and embayed boundaries - Tuffaceous matrix - a few fragments of silicic alteration with Pyrite	Moderate chloritic and some sericitic alteration - also carbonate alteration throughout	<1% pyrite in altered clasts
1604 - 1662'	- Pink rhyolitic dyke - massive, porphyritic - feldspar - Upper contact chilled and slightly irregular at ≈ 15° to the core - Lower contact chilled and weakly flow banded at 30° to the core		
1662 - 1672'	- As for 1588 - 1604'		1662 - 1672' - more pyritic 3 - 5% overall, rare fleck sphalerite
1672 - 1709'	- Altered felsic to intermediate tuff - Pale grey to buff and locally green - cut by stockwork mineralization - Alteration dies out away from veins and fractures to a greener colour - Locally wispy lapilli and flattened shards apparent - locally amygdoidal - carbonate	Moderate to strong silicification and sericitic alteration	Pb-Zn, cpy. and py. generally limited to fractures and veinlets - quartz - carbonate ± barite veinlets
1709 - 1735'	- Mafic to intermediate breccia - altered (similar to 1588 - 1604') - Gradational from above and maybe less altered version - Contains several interbedded zones of grey alteration as above - Gradational to more altered at ≈ 1735'	Moderate to locally strong sericitic and/or silicic alteration - local black chloritic alteration	Overall about 1 - 2% sulphides Minor disseminated pyrite and occasional Pb-Zn mineralization, usually along fractures or veinlets in more altered zones
1735 - 1782'	- Altered tuff - similar to 1672 - 1709' pale grey green colour - Locally obviously fragmental as above - interbeds? (maybe originally an intermediate tuff) - Laths of sericite after feldspar throughout - Local spherules of silicified material - Fragments - clasts of amygdoidal basalt? (altered) more common towards base - Gradational to more obvious fragmental at ≈ 1782'	variable silicification and sericitic alteration	<1% disseminated pyrite and occasional disseminatal sphalerite

HOLE NO. 2928

Depth & Lithology	Description	Alteration	Mineralization
1782 - 1837'	- Mafic fragmental - dark green to grey green - Assorted sizes of chloritic mafic fragments in a tuffaceous matrix - Fragments often amygdoidal - smaller chloritic fragments are generally wispy - Fault gouge @ 1809' - Basal contact fairly sharp @ $\approx 50^\circ$ to the core	Matrix is moderately altered to sericitic and chlorite	<1% disseminated py.
1837 - 1907'	- Grey to grey green altered tuff - similar to above altered units - Hint of wispy and flattened lapilli and/or shards locally - Locally spherulitic - Interbands of above amygdoidal mafic fragmental (less altered) - Generally hard and massive - uniform	Variable silicification and sericitic alteration - disseminated laths and blobs of sericite after feldspar	to 1% disseminated pyrite Occasional - disseminated sphalerite with quartz - carbonate veins down to 1846'
1907 - 1990'	- Mafic fragmental (Pyroclastic breccia) - Similar to above fragmental units - Some intermediate to felsic clasts - Common amygdoidal (calcite) clasts, quite a few altered pyritic clasts - 1950 - 1980' - core is rubbly with quite a few shear and gouge zones - mostly at $45 - 50^\circ$ to the core	Moderate chloritic and sericitic alteration - matrix is locally silicified	py. - $\approx 1\%$ mainly in clasts @ 1957' $\approx 2\%$ sheared and silicified with 1 - 2% Sphalerite and pyrite
1990 - 1997'	- Rhyolitic dyke - brown to pink massive, plagioclase phenocrysts - intrusive contacts		
1997 - 2064'	- As for 1907 - 1990' - 2017 - 2019' - altered felsic and intermediate fragments heavily pyritized - Below 2019' becomes more massive mafic flows - Thin gouge @ 2045' - Rubbly core and often sheared 2054 - 2064'	Chloritic and local sericitic alteration dies out downwards Some epidote stringers and alteration below 2019'	very thin conformable bands of Pb-Zn @ 2007 and at 2016' - very likely on small shears but may be (beds?) pyrite generally around 1% but 2017 - 1019', 5 - 8% in matrix and fragments between 2023 and 2030' - some Pb-Zn and cpy. along quartz - epidote veinlets
	2064' - E.O.H.		

HOLE NO. 2928

Depth & Lithology	Description	Alteration	Mineralization
	SAMPLES 1068.6 - 1069.4' - conglomerate with Pb-Zn 1345.5 - 1348.5' - altered rhyolite - Pb-Zn <1% 1413 - 1418' - altered rhyolite Pb, Zn, Ba <1% 1434 - 1445' - altered rhyolite Py, Pb, Zn, Ba 1445 - 1454' - altered tuff Py, Pb, Zn, Ba 1566 - 1568' - altered tuff Py, Pb, Zn, Ba 1581 - 1585' - quartz - ser. altered - to 20% Py. 1682 - 1687' - quartz - ser. altered Py, Pb, Zn, cPy stockwork		

HOLE NO. 2928

SHEET NO. _____

HOLE NO. 2928

PROPERTY Middle Branch - Buchans

[illegible]