006

135909

SUMMARY DRILL RECORD

Area: Mt.Cattley, EL 14/85; Tas. **Hole No:** MCDD 6

Drilled: 12 June - 29 July, 1991 **Total Depth:** 798.0m

Collar co-ordinates:

AMG: approx: 399200 E 5404790 N **R.L.:** ~670m ASL
Azimuth: 315 AMG; 303 Magnetic
Inclination: -65 deg.

Hole Surveys:

Depth (m)	Azimuth (Mag.)	Dip
50	303.5	-63.5
100	304	-63.5
150	302	-63.5
200	308	-63
250	308.5	-63
300	307.5	-63
350	316	-63
400	318	-62.5
450	317.5	-62.5
500	319	-62
550	318.5	-61
600	320	-61
650	320	-60
700	323	-59.5
750	321	-58
798	323	-58

Drill Rig: Longyear 44
Contractor: Diamond Drilling Tasmania (P. Sharp)
Drilling Notes:

HQ core: 0 - 73.8m
NQ core: 73.8 - 798.0m
Drilling fairly straightforward except for zone of clayey, oxidised (Tertiary) basaltic breccia at about 180m depth; this unit included some plastic clayey zones which appeared to squeeze in to the hole and required patient re-reaming whenever the drill rods were re-run.
100% core recovery.
Class 12 32mm PVC casing to bottom of hole.

Logged by: W. Herrmann
Date: June - August, 1991

Target : Stratigraphic hole designed to elucidate the stratigraphic and structural interpretation and exploration significance of andesitic volcanics previously intersected by PanFin and DMMR sub basalt drilling between Middlesex and Beecroft Roads. Specifically to intersect correlates of the Que-Hellyer Volcanics on the western limb of an interpreted southwesterly plunging syncline west of MXRD1.

Summary Result :

MCDD6 intersected a sub Tertiary basalt sequence of turbiditic siltstones, felsic volcaniclastics, black siltstone and andesitic lavas, breccias and minor volcaniclastics which is substantially analogous to part of the basement sequence in MXRD1 and which appears to represent correlates of the lower part of the Southwell subGroup, the Que River Shale and the Que-Hellyer Volcanics. The Que River Shale correlate (black siltstone) in MCDD6 is considerably thinner, by a factor of about 0.25, than in MXRD1. Conversely, andesitic lavas and breccias which overlie a distinctive thin unit of andesitic volcaniclastic wacke and are tentatively correlated with the upper andesites and basalts of the Que-Hellyer Volcanics, are substantially thicker, by a factor of about 1.5, in MCDD6 compared to MXRD1.

The andesitic rocks intersected do not contain (megascopically apparent) hydrothermal alteration or significant sulphide mineralisation assemblages.
Oriented core measurements of bedded sediments overlying the Que River Shale correlate in MCDD6, indicate that the bedding trends about 285 deg. (AMG) and dips at about 40 deg. to the south.

Abbreviated Geological Log :

MCDD 6

0-329.2m	Tertiary basalt flows and associated breccias.
329.2-337.3	Tertiary silt/sand/gravel.
337.3-360.6	Turbiditic grey siltstone and subordinate interbedded wackes. Bedding trends about 285 deg. (AMG) and dips at 40 deg. to South.
360.6-364.0	Felsic volcaniclastic wacke.
364.0-383.3	Felsic pumiceous tuff-breccia
383.3-387.9	Mixed felsic volcaniclastic wacke and vitric tuffaceous siltstone.
387.9-400.1	Black siltstone.
400.1-529	Feldspar phyric Andesite
529 -616.8	Aphyric Andesite
616.8-674.2	Feldspar phyric Andesite
674.2-676.3	Andesitic volcaniclastic wacke, medium to coarse grained and crudely stratified.
676.3-752.6	Andesitic Breccia; medium to coarse grained mass flow type epiclastic and auto breccias with scattered large blocks of aphyric andesite.
752.6-798	Aphyric andesite, some zones of hyaloclastite and auto breccia.
798m	EOH.

MCDD 6 Geological Core Log

W.Herrmann, August 1991

Depths (m)	
0-337.3	Tertiary cover sequence:
0- 10.5	Weathered brown clayey basalt.
10.5- 19.1	Olivine phyric basalt; pale grey, sparsely (3%) vesicular, occaisional clayey weathered zones.
19.1- 20.5	Weathered reddish brown vesicular basalt.
20.5- 47.7	Glassy vesicular basalt; brownish to dark blackish grey colour. Vesicles ~10% vol, some parly filled with grey clayey material. Intermittent zones of brownish oxidation throughout.
47.7- 55.0	Olivine phyric basalt; pale-dark grey, vesicles ~40% in upper 1m decreasing to ~5% below. Includes a few reddish oxidised zones but mostly fresh.
55.0- 64.6	Olivine phyric basalt; similar to above but apparently a separate flow unit.
64.6-173.4	Sequence of thin, mostly vesicular basaltic flow units. Generally dark blackish grey, rather glassy but sometimes olivine phyric in more massive sections. Vesicles variable 1~30%, possibly indicating flow tops.
173.4-186.7	Basaltic volcanic breccia. Variable brownish and reddish (oxidised) clasts and lesser grey (unoxidised) clasts of mostly quenched glassy basalt in a granular silty-muddy-ashy matrix. Clasts generally 5-30mm, variably wispy/deformed angular or sub-rounded, matrix supported with clast content increasing downhole possibly indicating a graded mass flow breccia unit. The upper part, 174-174.4m, includes a 40cm unit of fine grained purplish grey volcaniclastic siltstone with planar bedding intersecting at ~50 deg. to LAOC. The unit overall is rather oxidised and clayey, particularly below 178m; this zone caused some problems and delays in drilling due to plastic clay closing in on the hole.
186.7-194	Olivine phyric basalt; pale grey, fine grained and unoxidised except for narrow brown selvedges to occaisional greenish grey clay/zeolite veins. Distinctly magnetic.
194 -201.7	Basaltic breccia. Possibly a hyaloclastite, variable fragment size upto 50mm, matrix of pale greenish grey amorphous looking clay/zeolite/? rich material. Variably oxidised.
201.7-210	Olivine phyric basalt; dark grey and rathewr glassy, occaisionally finely vesicular; fresh.

210 -225.9	Basaltic breccia, probably hyaloclastite. Variable clast size upto 50mm but usually <20mm, angular to subrounded mainly of dark glassy olivine phyric basalt, some vesicular scoriaceous basalt and occaisional well rounded xenoliths of Px+Ol ultramafic peridotite in a matrix of fine pale grey basaltic ash often altered to pale greenish/blue grey soapy clay/zeolite.
225.9-243.3	Olivine phyric basalt. Pale grey, massive, non vesicular, occaisional xenoliths of peridotite, fresh and magnetic.
243.3-275.8	Basaltic agglomerate. Very fragmental, abundant small and large (to 150mm) angular to rounded clasts of basalt, generally matrix supported in basaltic ash which in places has crude wispy foliation suggestive of ash flow. Generally rather porous and friable but still quite fresh and distinctly magnetic.
275.8-278.3	Basalt; fine grained, dark grey, massive, non-vesicular.
278.3-284.9	Basaltic agglomerate; similar to unit 243.3-275.8m.
284.9-311	Basalt; fine grained, dark grey, massive, generally non-vesicular, occaisional rounded xenoliths of coarse peridotite and vesicular basalt; distinctly magnetic.
311 -318.5	Basaltic agglomerate; similar to unit 243.3-275.8m.
318.5-329.2	Basalt; fine grained, grey, massive; slightly brecciated near base with rare clasts of baked sandy sediment.
329.2-337.3	Unlithified silt/sand/gravel. Dominantly a rather massive dark grey carbonaceous muddy silt with minor lignitic bands but locally pebbly and well stratified and sometimes graded (with facing uphole). Clasts are generally matrix supported, angular to rounded and consist of semi weathered basement lithologies including black siltstone, pale grey laminated felsic vitric tuff/siltstone and amygdaloidal andesite. A single core orientation survey at 331m indicates the bedding is sub horizontal.
337.3-798	Cambrian? basement sequence:
337.3-360.6	Turbiditic grey siltstone. Dominantly thinly bedded to laminated medium to dark grey fine grained siltstone, the paler bands tending to be somewhat "cherty" possibly

including some felsic vitric ash, interlayered with quite subordinate (10%) beds of medium grained, pale grey sandy micaceous wacke. The most substantial sub-unit of wacke occurs at 339.2-339.7m and there are a few others to 120mm thick between 347.3 and 348.5m and near 358.6m; they are distinctly micaceous and contain some pale greenish feldspar grains suggesting a mixed metasedimentary and felsic volcanic provenance. There is abundant facing evidence including flame structures, load casts, cross stratification and grainsize grading which consistently indicates the facing to be uphole. The finer grained siltstone is generally well bedded with consistent planar bedding intersecting the core at angles from 50 to 80 deg. to LAOC.

Measurements as follows:

343m	70deg. to LAOC
346	70 "
347.6	65 "
350.3	60 "
352	60 "
354.4	60 "
356	55 "
359	50 "
359.7	80 "
360.4	60 "

Oriented core specimens were obtained at 352m and 355m and indicate bedding orientations as follows:

352m : strike 290 (AMG), dip 40 south;
355m : " 280 " , " 45 "

The rock is virtually unmineralised apart from traces of disseminated pyrite (and perhaps chalcopyrite) most notably in the coarser wacke layers and in some of the darker, slightly graphitic, siltstone beds. There are rare narrow veinlets of white calcite at irregular intervals and orientations, generally <1/m of core, but these are not associated with significant sulphide mineralisation.

The lower contact at 360.6m is sharp, planar and conformable to bedding and is marked by a 1cm thick band of mixed felsic volcanic/silty sediment containing about 40% disseminated, blebby pyrite.

360.6-364 Felsic volcaniclastic wacke.

A crudely stratified medium grained felsic epiclastic sediment composed of crystals of creamy to greenish grey feldspar (1-2mm, 10-30%) and clear grey often euhedral quartz (1-3mm, ~5%) and occaisional wispy "fiamme" of pale olive/apple greenish sericitised pumice clasts contained in a medium grained sandy/silty grey matrix of felsic volcanic ash. Pumice clasts increase in the lower 0.5m of the unit and the lower contact is essentially transitional over a few tens of centimetres. Generally not well sorted; the crude but regular stratification is identified by occaisional 1cm bands of darker grey crystal rich vitric ash; this banding is parallel to a weak eutaxitic/compaction foliation and to the bedding lamination in the overlying siltstone.
Bedding/banding intersects the core at about 65 deg to LAOC.
An oriented core specimen from 360.9m has allowed the following bedding orientation measurements:

360.5m:	strike	285 (AMG),	dip	35	south;
360.7	"	290	"	35	"
361.1	"	300	"	33	"
361.3	"	290	"	35	"

364 -383.3 Felsic pumiceous tuff-breccia.

An unsorted and unstratified felsic epiclastic rock composed of prominent apple green coloured wispy clasts (fiamme) of qtz + feldspar phyric sericitised pumice and angular, irregular or subrounded rigid clasts of grey to pinkish grey fine grained glassy rhyolite-dacite supported in a murky pale grey, siliceous ashy matrix. The The clast size is rather variable from 2-50mm but averages 10-20mm and they generally constitute about 10-20% of the volume increasing to 20-25% with increasing average clast size towards the base of the unit. This rock probably originated as a partly graded mass flow epiclastic deposit. The wispy fiamme define a crude compaction foliation which intersects the core at about 60 deg. to LAOC. A 12cm thick bed of pale grey vitric tuffaceous siltstone at 381.7m exhibits thin bedding laminations which intersect the core at 60 deg. to LAOC.
The lower contact is fairly sharp and conformable with bedding below but does not represent a major compositional change.

383.3-387.9 Mixed felsic volcaniclastic wacke and vitric tuffaceous siltstone.

A generally well stratified epiclastic wacke of essentially felsic volcanic composition and sub-divisible as follows:

383.3-384 medium grained pale grey felsic volcaniclastic sandstone; bedding intersects core at ~50 deg to LAOC.

384 -387 dominantly fine grained to almost cherty thinly laminated grey to dark grey tuffaceous siltstone with thin laminae and occaisional beds upto 10cm thick of sandier volcaniclastic material; a few wispy qtz + feldspar pumice clasts between 384-384.5m. Bedding planes intersect core at 40-50 deg to LAOC.

387 -387.9 sandy felsic wacke consisting of feldspar and quartz crystals and small, often flattened, lithic fragments to 10mm in a pale grey vitric/siliceous matrix with weak planar eutaxitic/compaction foliation intersecting core at 50-60 deg to LAOC.

The entire unit contains a trace (<0.3%) of disseminated pyrite and rare traces of brown sphalerite in occaisional carbonate veinlets (eg: at 386m) but is not significantly mineralised or hydrothermally altered.

The lower contact is very sharp but broken and associated with a centimetre or two of grey clayey pug suggesting a minor fault contact; the 1m above the contact contains a few short zones of moderately intense fracture cleavage.

387.9-400.1 Black siltstone.

A fine grained dark grey to black siltstone, locally rather massive but generally with fine pale grey silty laminae defining the bedding planes. The orientation of bedding is slightly variable :

388.2m	:	80 deg to LAOC
390.4		55 "
393		60 "
395.2		70 "
398.7		55 "
399.6		subparallel to LAOC (indicating minor slumping near the contact)

The unit is generally not significantly mineralised but there are occaisional thin trains of pyrite crystals and framboids upto 20mm, usually subparallel to bedding.

400.1-529 Feldspar phyric Andesite.

Generally: a feldspar phyric extrusive andesite composed of moderately abundant (~10%) stumpy tabular phenocrysts of plagioclase scattered throughout a pale green/blue grey fine granular/glassy matrix. The rock is variably massive, amygdaloidal, weakly flow structured or brecciated and can be crudely texturally subdivided as follows:

400.1-410	"Pepperitic" andesitic breccia; with irregular andesite clasts partly matrix supported in a dark grey cherty siliceous base.
410 -432	Andesitic autobreccia?; small to medium (upto 100mm) fragments of andesite (40-50% vol.) in a slightly paler andesitic matrix. A 50mm wide fracture vein at 416.2m contains coarse crystalline pale brown sphalerite and minor chalcopyrite; there are occaisional diseminated specks of pyrite (<0.2% vol) but the rock is otherwise not significantly mineralised.
432 -434.5	Andesitic "pepperitic" hyaloclastite? breccia; angular to irregular fragments of andesite in a dark grey cherty siliceous matrix containing minor (~0.5%) disseminated pyrite, many fragments have paler bleached, perlitically fractured margins.
434.5-490	Andesitic autobreccia?: essentially similar to interval 410-432m but containing short intervals of massive coherent, somewhat amygdaloidal andesite. Prominent amygdales first appear at about 448m, generally constitute about 2-5% of vol. and consist of two types: * small, <3mm, semi flattened or teardrop shaped amygdales filled with dark chlorite?; sometimes defining a weak flow fabric. * larger, 2-10mm, rounded and

often semi spherical amygdales filled with white carbonate. There are sporadic, locally to 2-5% of vol., brittle fracture veins filled with white and straw coloured carbonate; one of these at 437.8m contains coarse slugs of galena and minor chalcopyrite but the veins otherwise do not contain significant sulphides.

490 -529 Massive/pillowed Andesite: feldspar phyric and amygdaloidal as above but tending to be of massive coherent or pillowed lavas; pillows identified by patchy light and dark colouration, zones of weak flow fabric, bleached selvedges, and (especially from 493-499m) some characteristic swirly patches of dark cherty interpillow material with traces (<1%) of pyrite.

Patchily developed jigsaw breccia with massive vuggy carbonate infill occurs locally but is devoid of sulphide mineralisation. Carbonate veining and breccia fill increases rather sharply below 505m and in the interval 505-605m probably averages around 2% of volume although quite erratically developed; some individual veins are upto 300mm thick. Feldspars remain clearly outlined and apparently fairly unaltered. The matrix component of autobrecciated sections is typically bleached? a shade paler than the fragments perhaps indicating some low grade diagenetic? alteration but this is not associated with significant pyrite mineralisation.

529 -616.8 Aphyric amygdaloidal Andesite.

529m marks a fairly abrubt change to aphyric andesite but otherwise of similar colouration and amygdale type to that of the unit above. The andesite is generally pale green/blue grey with fine "granular" (devitrified glassy?) matrix with carbonate and chlorite? amygdales (locally abundant, variable from 1-30% vol) sometimes defining a weak flow fabric. The rock appears to be a pillowed lava with pale, massive blocks and pillows, tending to be highly amygdaloidal near the margins, separated by short zones of darker "chloritic" green grey glassy? partly auto or hyaloclastically brecciated lava.

As above, there is fairly abundant white carbonate in veins and breccia infill but it is not associated with significant sulphide. Carbonate content diminishes to ~1% vol below 605m.

616.8-674.2 Feldspar phyric Andesite.

616.8m marks another abrupt change back to feldspar phyric amygdaloidal andesite megascopically similar to that above 529m. Stumpy tabular euhedral phenocrysts of grey fresh looking feldspar (~2mm, ~5% vol) small rounded / elliptical dark chlorite? filled amygdales (~5% vol) and sparser, larger white carbonate filled amygdales occur in a fine grained or glassy pale green grey matrix. The contact at 616.8m is sharp and associated with a 10cm thick deformed bed? of sandy andesitic wacke. This is underlain, down to about 632m, by an andesitic lava breccia, probably of hyaloclastic origin, in which small to medium sized (<150mm) often subrounded, elliptical and flattened fragments of not very rigid looking amygdaloidal andesite are closely crowded with a sparse interstitial, angular/shardy medium grained granular matrix. Below 632m the rock is alternately of coherent-massive andesite and brecciated character with sections upto a couple of metres thick representing either thin flows or large blocks and pillows separated by more or less fragmental hyaloclastic? andesitic breccias as above.

White carbonate veins and breccia infilling are present in patches, locally to 10% of vol. and averaging perhaps 1% of vol., but are not associated with significant sulphide mineralisation.

674.2-676.3 Andesitic volcaniclastic wacke.

This is a uniformly greenish grey coloured, medium to coarse grained, crudely stratified sediment of essentially intermediate volcanic derivation. The coarser "beds" of upto 20cm thickness are composed of andesitic lithic grains to about 5mm grainsize and occaisional clasts of 10-40mm diameter. The rather indistinct bedding appears to be planar and intersects the core at about 60 deg. to LAOC.

676.3-752.6 Andesitic breccia.

This a a consistently medium to coarse fragmental unit composed dominantly of aphyric amygdaloidal andesite.

The upper part, above about 680m, has a mass flow epiclastic character with small to medium sized (upto 50mm) angular, irregular or subrounded clasts of mixed pale and dark, mostly aphyric andesite, comprising about 50% of the rock volume, supported in a matrix of fine granular and/or murky de-vitrified andesitic detritus.

Below 680m the rock has the appearance of an andesitic lava breccia with rather abundant fragments and blocks of pale, aphyric, amygdaloidal andesite (2-30cm, av:10-15% vol.) in a breccia base composed of finer, rather angular fragments of dark greenish grey amygdaloidal andesite (5-30mm, ~60% vol.), separated by a rather sparse interstitial matrix of pale, murky devitrified? andesitic glassy material and/or white carbonate. The angular form of the dark fragments and the tendency to a jigsaw fit pattern in places, is suggestive of an origin as auto-brecciated lava (with, perhaps, local superimposition of hydraulic brecciation and carbonate infill) rather than mass flow epiclastic deposition.

The lower part of the unit, below 745m, is essentially a fairly indeterminate transitional zone between the andesitic breccia above and the rather more coherent andesite below.

White carbonate veining is common throughout the unit, and locally intense; a zone of carbonate + quartz veins of upto 20cm thick in the interval 696-700m is associated with strong marginal to semi-pervasive pale buff coloured bleaching of the host rock which is, however, devoid of significant sulphide mineralization. Elsewhere the andesite appears to be relatively unaltered and unmineralized.

752.6-798 Aphyric (weakly amygdaloidal) Andesite

This rock unit has a more uniform pale greenish grey colouration and consists dominantly of fairly massive coherent andesite lava or lava pillows but nevertheless includes numerous short

sections of medium grained fragmental hyaloclastic and/or auto-brecciated andesite.

The coherent andesite is pale greenish grey, aphyric and containing fairly sparsely distributed (generally <1-2% vol.), often semi aligned amygdales of the familiar two types:

i) small, elliptical, dark chlorite-pumpellyite? filled amygales and:

ii) larger, rounded amygdales of white carbonate sometimes stained reddish by minor hematite. Hematite is also present as a minor constituent of the carbonate matrix in some breccia zones.

The interval 768.7-770m is of hyaloclastite breccia consisting of small splintery/angular fragments of aphyric andesite matrix supported in a base of pale grey murky siliceous or carbonate rich material.
Below about 776m short sections or blocks of coherent andesite are interspersed with zones of fragmental character giving the impression of a partly pillowed, partly auto/hyaloclastically brecciated flow unit.

The andesite in this unit generally appears to be fresh and unaltered, without significant sulphide mineralisation apart from occaisional specks and vesicle filling slugs of pyrite.

798.0 End of Hole.