A REVISION OF THE STRATIGRAPHY OF THE WOLLOMBI COAL MEASURES

(Wollombi Coal Measures Working Party of the Coalfield Geology Council of NSW)
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ABSTRACT

The Wollombi Coal Measures Working Party was established in August 2000 with the aim of resolving several concerns regarding the nomenclature of the Wollombi Coal Measures and its use in the Hunter Valley Coalfield. Recent exploration of the upper seams of the Wollombi Coal Measures at Broke and Denman have highlighted miscorrelations in the type bore as well as related issues that rendered the use of Wollombi Coal Measure nomenclature problematic at best, and thus requiring considerable modification. Detailed correlations of tuffaceous strata and seams of the both the Wollombi and the Newcastle Coal Measures have clearly demonstrated their similarity and established that the strata are indeed the same across the northern Sydney Basin. Since Newcastle Coal Measure nomenclature was better understood, more practical in its application and had historical precedence, replacement of the Wollombi Coal Measures with Newcastle Coal Measure nomenclature was proposed by the Working Party.

As a result the Wollombi Coal Measures Working Party recommended the following stratigraphic revisions to the Coalfield Geology Council. At the November meeting of the Council the following resolutions were subsequently ratified:

- That the entire Wollombi Coal Measure nomenclature be replaced with Newcastle Coal Measure nomenclature in the northern Sydney Basin.

- That Amoco Wybong DDH1 be adopted as the “Reference Bore” for the Newcastle Coal Measures in the Hunter Valley.

- That the base of the Newcastle Coal Measures in the Hunter Valley be raised to the top of the Watts Sandstone so as to conform to the same nomenclature in the Newcastle Coalfield. (The Watts Sandstone is therefore retained in Hunter Valley nomenclature and is recognised as the equivalent of the Waratah Sandstone in the Newcastle Coalfield.)

- That the Singleton Supergroup in the Hunter Valley now consists of the Newcastle Coal Measures, the Watts Sandstone and the Wittingham Coal Measures.

Significant outcomes of this work include:

- Miscorrelations identified by previous workers in the Type Bore for the Wollombi Coal Measures (DMDCK11) have been confirmed. Unfortunately these miscorrelations involve the same seams targeted in recent exploration programs at Broke and Denman. It should be noted that the Greigs Creek seam (the only seam name in use prior to the ratification of the Wollombi Coal Measures in 1975) has also been miscorrelated in the Type Bore.

- High-resolution correlations across the northern Sydney Basin have now been identified throughout the Wollombi and Newcastle Coal Measures. This has been a necessary outcome required to support the recommendations of the Working Party. High-resolution correlations of seams below the Great Northern and Fassifern seam equivalents have not been recognised nor published previously.

- Newcastle Coal Measure nomenclature has been successfully applied across both the southern and western perimeters of the Hunter Valley and has been shown to be considerably more practical than the existing Wollombi Coal Measure nomenclature. This included the successful correlation between Amoco Wybong DDH1 (AWYB1) and the recently drilled DM Ridgelands DDH10, DM Sandy Hollow and DM Cuan Ck borehole located several kilometres both west and north (Brunton & Moore 2004). This success represents the most practical test of this proposed revision.

- AWYB1 has been photographed and all seams reconstituted. All significant tuffaceous units and coal seams have been correlated with Newcastle Coal Measure equivalents. As this bore is the suggested “Reference Bore” for the Newcastle Coal Measures in the Hunter Valley it is planned that this data will be readily available from the Department of. Mineral Resources, including being available electronically on the internet.

- A table of suggested correlations for all bores studied by the Working Party have been included to assist future workers in using Newcastle Coal Measure nomenclature in the Hunter Valley. Due to the sparse spacing of relevant bores it is anticipated that such correlations will be subject to review in the future.

- Glen Gallic Colliery, the only mine that has exploited a seam in the Wollombi Coal Measures (Greigs Creek seam), was located in 2001. Both this abandoned mine and a nearby outcrop of this seam were recorded and located using GPS.

INCLUSIONS

Table 1 Bore Summary
Table 2 Suggested Regional Correlations
Table 3 Current Stratigraphy
Table 4 Proposed Stratigraphy

Figure 1 Bore Location Plan
Figure 2 Regional Cross Section
Figure 3 DMDCK11 – Miscorrelation of Upper Seams
Figure 4 DMDCK11 – Comparison with Adjacent Bores
Figures 5 to 9 Additional High Resolution Correlations

Plate 1 Nalleen Tuff in DMDCK11

Appendix 1 Geophysics of the Newcastle Coal Measures: Amoco Wybong 1
Appendix 2 Photography of the Newcastle Coal Measures: Amoco Wybong 1

SUMMARY

The Wollombi Coal Measures Working Party (WCMWP) was established in August 2000 with the aim of resolving several concerns regarding the nomenclature of the Wollombi Coal Measures (WCM) and its use in the Hunter Valley Coalfield. Recent exploration of the upper seams of the WCM at Broke and Denman identified miscorrelations in the type bore as well as related issues that rendered the use of WCM nomenclature problematic at best, and thus requiring considerable modification. The WCM stratigraphy was defined on correlations of clastic strata and coal, with no priority given to the more laterally persistent tuffaceous units. This runs contrary to the methodology currently in use in the Northern Sydney Basin.

The well documented similarities between the Newcastle Coal Measures (NCM) and WCM suggested replacement with NCM nomenclature could be considered, such a proposition being likely to promote a better understanding of the WCM strata and promote further research and exploration. Any significant review of WCM nomenclature also suggested the need to replace the type bore DM Doyles Creek DDH11 (DMDCK11). This is a result not only of the identified miscorrelations but also that this bore intersected large sections of strata that are atypical in the Hunter Valley (as it has similarly in the underlying Wittingham Coal Measures). This review was considered timely with the potential exploitation of these seams and the possible renewed interest in exploration that may follow.

BACKGROUND

Exploratory drilling in the late 1990's near Broke by the NSW Department. of Mineral Resources, and north of Denman by Powercoal (now Centennial Coal Ltd), intersected potentially economic coal seams which lie stratigraphically near the top of the Wollombi Coal Measures. Seams of the Wollombi CoalMeasures have long been recognised as equivalents of those from the Newcastle Coal Measures (David 1907, Booker 1954, Britten 1972 & 1975), however detailed correlations have only recently been proposed (Stevenson 1997 & 1999, Beckett et al., 1999 Creech 2000, Weatherall 1999, Kramer 1999, Kramer et al., 2001). The similarities between the Wollombi and Newcastle Coal Measures is reflected in the correlation of the three tuffaceous units previously identified in the Wollombi Coal Measures (Standing Committee on Coalfield Geology of NSW 1975) with the three tuffaceous units that are Formations in the Newcastle Coal Measures (refer Table 3).

The application of Wollombi Coal Measure nomenclature to the seams targeted in both exploration programs however proved problematic due to miscorrelations identified in the type section in DMDCK11. Such miscorrelations may have been manifest in part at least, to the priority given in Wollombi Coal Measure nomenclature to correlating seams and the intervening clastic strata. In recent times the emphasis has shifted to giving priority to correlating the more laterally continuous tuffaceous units in a given stratum. This is reflected in the current Newcastle Coal Measure nomenclature where seams (and intervening clastics) are informal units within Formations, bounded by tuffaceous units that are themselves Formations (Awaba, Warners Bay and Nobbys Tuffs).

The Wollombi Coal Measures Working Party (WCMWP) was established in August 2000 with the aim of resolving several issues concerning the nomenclature of the Wollombi Coal Measures (WCM) and the nominated type bore. The formation of this Working Party was considered timely with the potential exploitation of these seams and the possible renewed interest in exploration that may follow.

The Working Party had the following objectives defined:

1. To resolve issues regarding the identification and application of Wollombi Coal Measure nomenclature with particular reference to those seams targeted at Broke and Denman.

2. Review the relevance of the existing nomenclature and if warranted propose a stratigraphic revision and/or full replacement with Newcastle Coal Measure nomenclature.

3. Nominate a replacement type bore if appropriate.

In order to resolve the above issues practitioners currently working with Wollombi Coal Measure strata were invited to form the Wollombi Coal Measures Working Party. The inaugural meeting was held 25/8/00. Members of the Working Party were: Michael Creech (Convener) and Malcolm Ives (Centennial Coal), Darryl Stevenson, John Brunton and Russell Rigby, (Dept. of Mineral Resources), Gary Salter (BHP-Billiton – Bayswater Colliery), Chris Knight (Muswellbrook Coal), Bryan Atkins (Wambo Colliery), Peter Graham and Chris Smith (Oakbridge – Bulga and Sth Bulga Coal Mines).

Bores drilled in the Hunter Valley Coalfield that intersected significant sections of the Wollombi Coal Measures were selected by the Working Party (refer Figure 1 for locations). These bores (Table 1) were encoded onto an ECS database and major tuffs and selected seams were then correlated (Table 2). Sections were then prepared for consideration including a regional cross section (Figure 2).

Evidence for a significant miscorrelation in the type bore DMDCK11 was also gathered including re-examining and photographing the relevant units in the type bore. More information was also sought concerning the seam profile of the Greigs Creek seam both in the literature and by locating the Glen Gallic Colliery and recording an adjacent outcrop of the seam. This was the only seam name in use prior to the ratification of the Wollombi Coal Measure nomenclature (Standing Committee 1975). The philosophy of using the current nomenclature was also explored by comparing the holes drilled adjacent to DMDCK11 after 1975 (refer Figure 4). This exercise clearly illustrated the difficulty in using the current nomenclature.

Borehole Amoco Wybong 1 was selected as the preferred “Reference Bore” for the Newcastle Coal Measures in the Hunter Valley because all seams were intact (not destroyed for analysis) and downhole geophysics are available (Appendix 1). This bore is stored at the Department of Mineral Resources Londonderry Core Storage Facility. The relevant strata were photographed (Appendix 2) and some units relogged where necessary. All significant tuffaceous units and coal bearing units in the WCM portion of the bore were subsequently correlated to Newcastle Coal Measure stratigraphy. The high-resolution correlations recognised (Figures 5 to 9) in this work have not been recognised nor published previously and were required to support the notion that Wollombi Coal Measure nomenclature could be replaced by Newcastle Coal Measure nomenclature.

MISCORRELATION IN THE TYPE BORE DMDCK11 (ref Figure 3)

The possibility of a significant miscorrelation in the upper seams of the type bore DMDCK11 was first recognised by Darryl Stevenson during the DMR Broke drilling program of 1996. This program was designed to investigate coal resources of the Greigs Creek seam in the Broke-Wollombi district identified previously by Moffit (1983) and Baker (1987). Stevenson (1997) realised that he could not correlate seams in this area with those in the type bore. In particular the Greigs Creek seam appeared to have been misidentified as the Hillsdale seam. He also recognised the Hillsdale and Hobden Gully seams as being very similar to the Great Northern and Fassifern seams from the Newcastle Coal Measures (Stevenson 1999).

The Greigs Creek seam was mined shortly after World War 2 at Glen Gallic Colliery south of Denman (Figure 1). The location of this colliery was poorly recorded however it has now been located by GPS (MGA 284315E, 6400705N 220RL) as has an outcrop of the seam approximately 2km to the east (286095E, 6400219N, 220RL). The details of the outcrop location may be less accurate due to dense trees that effected GPS reception.

Two sections of the Greigs Creek seam have been recorded in the literature. The first section recorded was measured by the Joint Coal Board in December 1951 (JCB Seam Section and Analysis, GlenGallie Coal Company, Plan DC 118), and the second by F. W. Booker (1954). Booker indicated that the Greigs Creek seam outcropped for over 12km along the southern escarpment of the Hunter Valley and he stated that it was the uppermost seam of the Newcastle Coal Measures in this area.

It should be noted that historical precedence for the use of Newcastle Coal Measure nomenclature could have been considered by the Working Party. David (1907) may have been the first to suggest the existence of Newcastle Coal Measure strata in the Hunter Valley by referring to them as an annotation in a geological map of the Wingen area on page 109. Britten had also assigned seam names of the upper Newcastle Coal Measures to two bores in the Millfield area (AOG Millfield – hand written annotation in 1966, and AMAD Millfield – typed annotations in 1971). However these annotations and broad

commentary were apparently not considered when the WCM nomenclature was established a few years later.

The Greigs Creek seam has a distinctive stone band (tonstein) towards the roof recorded in both sections taken from Glen Gallic Colliery. This profile is repeated in drillhole Millers Hunter Valley 1 south of Sandy Hollow where the Greigs Creek seam was correlated by R. A. Britten.and P. A. Raymant in 1969 (refer written log). This same profile (though split) has now been recorded at outcrop 2km east of Glen Gallic Colliery (Figure 1). The uppermost seam in the Broke-Millfield area also includes the same stone band and was correlated as the Greigs Creek seam by Moffit (1983) and Baker (1987).

This same stone band is also present in the Great Northern seam on the western side of the Newcastle Coalfield and the extensive development of this seam is confirmed by drilling north of Denman (Figure 3). It is proposed herein that the Great Northern Seam of the Newcastle Coal Measures is equivalent to the Greigs Creek seam in the WCM, however it should be recognised that the original usage at Glen Gallic Colliery likely refers to the upper split of the Great Northern seam only.

In the type bore DMDCK11 the Greigs Creek seam was assigned to a poorly developed seam about 21m above the Great Northern seam equivalent. This stratigraphically higher seam was also intersected at Denman in DMDCK10 and AWYB1 about 30m above the Great Northern seam equivalent. It would appear that the seam called the Greigs Creek seam in DMDCK11 (the type bore) is equivalent to the Wallarah seam of the Newcastle Coal Measures and has therefore been miscorrelated.

This miscorrelation was compounded by the failure to recognise that the Greigs Creek seam (named the Hillsdale seam in DMDCK11) has split into two separate plies and the sandstone split has been miscorrelated as the Nalleen Tuff (Plate 1). This miscorrelation was recognised by Weatherall (1999) who sampled the tuffaceous unit below recognising this to be the Awaba Tuff equivalent. Subsequent results of chemical fingerprinting supported this modified correlation and confirmed the equivalent relationship of this tuff and the Awaba

Tuff of the Newcastle Coal Measures (Kramer et., al 2001). The miscorrelation of this tuff resulted in the split Hobden Gully seam incorporating the lower split of the Greigs Creek seam, the Nalleen Tuff and the lower split of the Fassifern seam (the upper split not being present). As such there is no corresponding seam name for the combined Fassifern seam in the current nomenclature of the Wollombi Coal Measures.

These miscorrelations in the type bore lead to confusion regarding the naming of the seams explored both at Broke, adjacent to the type bore (DM Broke DDH3 and DM Coolamin DDH1), and at Denman (refer DMDCK10 and AWYB1). In addition it clearly demonstrates, at least in the northern Sydney Basin, the inappropriateness of correlating seams and intervening clastic strata in preference to tuffaceous units. The understanding of this miscorrelation is simplified by reference to regional stratigraphy, in particular by reference to NCM nomenclature and the philosophy of prioritising the correlation of tuffaceous units over seams.

The current confusion involved in using Wollombi Coal Measure nomenclature can also be illustrated by referring to two bores subsequently drilled adjacent to DMDCK11 (Figure 4). The Lucernia Coal in DMDCK11 includes the Hartley Hill seam, Warners Bay Tuff and upper Australasian seam equivalents. An adjacent bore Amoco Wollombi Brook DDH1, contains a split Lucernia Coal in which the Australasian seam is reforming below, removing the Strathmore Formation and including part of the underlying Alcheringa Coal. Locating the boundaries and indeed identifying these units is highly problematic, with the potential for further miscorrelations. Similar difficulties can be seen when comparing DM Whybrow DDH2 to the west, including the already identified miscorrelations of the upper seams.

APPLICATION OF NCM NOMENCLATURE IN THE HUNTER VALLEY

A table of suggested correlations for all the bores in this study has been prepared (Table 2) however it should be recognised that some of these correlations are less certain than others and that additional drilling may result in revisions to this work in the future. These correlations are however included to assist workers to correlate Newcastle Coal Measure strata in areas more distant from the proposed “Reference Bore”, AWYB1.

The general philosophy of these correlations reflects that used successfully in the NCM of the Newcastle Coalfield. Priority is given to identifying the three major tuffaceous units, being the Awaba, Warners Bay and Nobbys Tuffs. Other tuffaceous units are also used for regional correlations, being the Mt Hutton, Stockrington and Edgeworth tuffs. In addition some bands within coal seams are used such as the “clayband” and “lowband” in the Dudley (or Young Wallsend) seam. A similar band has been informally recognised as the Fern Valley tuff (Figure 8).

The identification of one of these regionally significant tuffaceous units is confirmed if a coal bearing sequence is recognised immediately above or below the unit (such as the Great Northern seam above, or the Fassifern seam below the Awaba Tuff). If a correlatable tuff lies within clastic strata then its identification can only be by reference to its position between coal bearing strata some distance above and below (i.e. it is in about the right location). In these instances the correlation is not as certain.

Figures 5 to 9 illustrate these correlation principles by identifying high-resolution correlations of both tuffs and seams of the Newcastle Coal Measures in AWYB1. Examples from other Hunter Valley bores are included. A series of bores from the western perimeter of the Newcastle Coalfield (near Awaba Colliery) were selected for comparison.

A brief description of each seam in the Newcastle Coal Measures is provided below to assist future workers who may not be familiar with

them, to correlate these seams in the Hunter Valley and thereby confirm identification of the major tuffaceous units.

- The Vales Pt and Wallarah seams are not widespread but have been identified in bore DMDCK11 and at Anvil Hill north of Denman. They are generally less than one metre in thickness and are characterised by a tuffaceous siltstone to sandstone floor strata.

- The Great Northern seam is characterised by a prominent tuffaceous band near the top of the seam and a deteriorated basal section. It generally directly overlies the Awaba Tuff, and the roof generally defines the lowermost occurrence of conglomerate in this strata in the Hunter Valley. The Great Northern seam at several localities both in the Newcastle and Hunter Valley appears to thicken by accretion of top-coal. In particular this has occurred in the southwest of the Newcastle Coalfield where the target seam is a combined Great Northern – Wallarah seam at the Mandalong Mine and Wyong Coal Exploration areas. This mechanism has been identified at Denman (Anvil Hill and Ridgelands) where extra coal accretes above a tuffaceous band. This extra coal may represent the same combined Great Northern, Wallarah and Vales Point seams that exist in the southern Newcastle Coalfield.

- The Awaba Tuff can be generally recognised by its sandy nature and inclusion of muscovite mica. When less than about 5 metres thick it is composed of a series of fining upward units. Thicker sections will include overlying laminated and reworked units. It is predominantly off-white, cream or light grey in colour.

- The Fassifern seam (together with the Upper Pilot seam generally located near its base) contains a highly recognisable sequence of tuffaceous bands combined with a laterally persistent but vertically variable ash profile (refer Creech 2000). Across most of the Newcastle and Hunter Coalfields this seam is split, however the characteristic profile generally allows for easy identification of the split units. This seam (or at least the upper split) directly underlies the Awaba Tuff.

- The Pilot seam lies above the Mt Hutton Tuff and contains a recognisable sequence of tuffs, coal and tuffaceous bands. Possibly the most recognisable is a set of three bands towards the base of the Upper Pilot B, and the band midway in the last of the coal units in the Lower Pilot directly overlying the Mt Hutton Tuff (Figure 5).

- The Hartley Hill seam contains a very characteristic sequence of coal and tuffaceous bands at the roof and three tuffaceous bands towards the floor. Otherwise the lower two metres of coal is relatively free of tuffaceous bands. This sequence directly overlies the Warners Bay Tuff (Figure 6).

- The Warners Bay Tuff is predominantly made up of laminated and reworked tuffaceous units. It is not easily discrimanted from other adjacent tuffaceous units when thin (less than a metre in thickness) and adjacent coal strata may need to be referred to.

- The Australasian seam lies between the Warners Bay Tuff and Stockrington tuff and comprises a thick sequence of generally carbonaceous shales and brown tuffaceous bands (Figure 7). The cleanest section of coal is near the base. A light grey tuffaceous-shale unit commonly overlies a thin coaly unit that in turn directly overlies the Stockrington tuff.

- The Montrose seam is a relatively clean coal unit of about 3m thickness with a characteristic sequence of three tuffaceous bands at both the top and base of the seam. This unit can be identified directly underlying the Stockrington tuff and if split the first three bands are usually evident (Figure 7). This seam is located at the base of the Australasian seam in many bores in the Hunter Valley.

- The Fern Valley and Victoria Tunnel seams directly underly the Edgeworth tuff and display a complex sequence of carbonaceous shales and tuffaceous bands (Figure 8). One tuffaceous band containing a thin carbonaceous stringer has been informally identified as the Fern Valley tuff. This sequence of coal is best developed north of Denman.

- The Nobbys Tuff is recognisable due to its predominantly sandy nature and inclusion of biotite mica. The occurrence of biotite was also specifically noted in the Monkey Place Tuff (Standing Committee 1975).

- The seams equivalent to the composite West Borehole seam (Lambton Subgroup) and its splits are generally poorly developed in the Hunter Valley. The best examples have been found north of Denman, in particular DM Doyles Creek DDH14 (Figure 9). It should be recognised that these seams are also generally restricted to the north of the Newcastle Coalfield. The “clayband” and “lowband” in the Dudley seam can be identified in many bores in the Hunter Valley, generally located in the second coal split below the Nobbys Tuff.

REGIONAL DISTRIBUTION OF NEWCASTLE COAL MEASURES IN THE NORTHERN SYDNEY BASIN

The similarities between the Wollombi and Newcastle Coal Measures can also be seen in more regional terms with the distributions of seams in both the Hunter Valley and Newcastle Coalfields appear similar. The upper seams are the most consistently developed across both coalfields whereas the lower seams (below the Edgeworth tuff) are poorly developed to the south, towards the centre of the Sydney Basin. The known extent of the upper seams is limited in the Hunter Valley by outcrop to the north and east and by a lack of drillhole data to the south and west. The potential for undiscovered resources of these seams is highlighted by their suggested identification in bores at Merriwa (Amoco East Dunlop DDH1 and Amoco Doolans Creek DDH1 – Figure 2) and near Sandy Hollow (Millers Hunter Valley DDH1).

In common with both the Newcastle and Wollombi Coal Measures the seams between the upper and lower seams are generally poorly developed and banded, and suffer from numerous seam splits. The WCM strata is however more uniform in thickness than the Newcastle equivalents averaging approximately 200m between the Nalleen Tuff (Awaba Tuff equivalent) and the top of the Watts Sandstone (Waratah Sandstone equivalent). Commensurate with the more uniform development of the Wollombi Coal Measures is a lack of conglomeratic strata. This is in contrast with the numerous conglomerate units identified in the Newcastle Coal Measures in the Newcastle Coalfield. In this regard the Wollombi Coal Measures of the Hunter Valley are more akin to the southern Newcastle Coalfield where conglomerates are less dominant and the lower seams in the Lambton Formation are poorly developed.

The above observations suggest that the palaeogeography of the Wollombi Coal Measures in the Hunter Valley is akin to the southern Newcastle Coalfield and that by considering the similarities between the two stratum (including the size, direction and migration of palaeochannels) regional exploration strategies can be undertaken. In addition a better understanding of peat formation in the Sydney Basin may be guided by the high-resolution correlations and regional

based philosophies promoted by this work and by supporting the Working Party's recommended revisions.

TABLE 1 BORE SUMMARY

DATE:24/09/01	CODE	DEPTH	ENCODED	LOADED	CORRELATED TUFFS (from)	CORRELATED UPPER SEAMS
AMOCO WYBONG	AWYB1	763.01	YES	YES	YES (AT)	YES
AMOCO WOLL.BROOK	WOLLBRK1	999.47	YES	YES	YES (AT)	YES
AMOCO GOULB. RIVER1	GOULBR1	609.41	YES	YES	YES (ET)	NO
DM GOULB. VALLEY 2	GOULBR2	461.50	YES	YES	YES (ET)	NO
BMR AGAP1S	BMRAGAP1S	159.61	YES	YES	YES(MHT)	YES
BMR AGAP5S	BMRAGAP5S	183.00	YES	YES	YES (ST)	NO
DM DOYLES CK1	DMDCK1	209.99	NO	NO	HEAVILY INTRUDED	
DM DOYLES CK2	DMDCK2	415.60	YES	YES	YES (ST)	NO
DM DOYLES CK3	DMDCK3	355.60	YES	YES	YES (ST)	NO
DM DOYLES CK5	DMDCK5	183.11	YES	YES	YES (ET)	NO
DM DOYLES CK6	DMDCK6	252.49	YES	YES	YES (WBT)	NO
DM DOYLES CK7	DMDCK7	348.52	YES	YES	YES (MHT)	NO
DM DOYLES CK9	DMDCK9	364.89	YES	YES	YES (AT)	YES
DM DOYLES CK10	DMDCK10	899.16	YES	YES	YES (AT)	YES
DM DOYLES CK11	DMDCK11	1097.60	YES	YES	YES (AT)	YES
DM DOYLES CK12	DMDCK12	127.34	YES	YES	YES (AT)	YES
DM DOYLES CK13	DMDCK13	804.30	YES	YES	YES (ST)	NO
DM DOYLES CK14	DMDCK14	634.14	YES	YES	YES (AT)	NO
DM DOYLES CK15	DMDCK15	266.00	YES	YES	YES (MHT)	NO
DM BROKE 1	DMBRK1	387.28	YES	YES	YES (MHT)	YES
DM BROKE 2	DMBRK2	314.00	YES	YES	YES (AT)	YES
DM BROKE 3	DMBRK3	125.37	YES	YES	YES (AT)	YES
DM BROKE 4R	DMBRK4R	266.50	YES	YES	YES (AT)	YES
DM WHYBROW 1	DMYBR1	161.33	YES	YES	YES (ST)	NO
DM WHYBROW 2	DMYBR2	449.35	YES	YES	YES (AT)	YES
DM WYBONG 1	DMW1	386.00	YES	YES	YES (MHT)	NO
DM WYBONG 2	DMW2	376.00	YES	YES	YES (ST)	NO
DM DENMAN 1	DMDE1	266.00	YES	YES	YES (NT)	NO
DM DENMAN 2	DMDE2	362.00	YES	YES	YES (ST)	NO
DM DENMAN 3	DMDE3	533.00	YES	YES	BASE - WCM	
DM DENMAN 4	DMDE4	595.00	YES	YES	BASE - WCM	
DM DENMAN 5	DMDE5	609.60	YES	YES	YES (ET)	NO
DM DENMAN 6	DMDE6	609.58	YES	YES	BASE - WCM	
DM DENMAN 7	DMDE7	572.37	YES	YES	YES (ET)	NO
DM DENMAN 9	DMDE9	610.36	YES	YES	BASE - WCM	
DM DENMAN12	DMDE12	365.76	YES	YES	YES (WBT)	NO
DM DENMAN13	DMDE13	250.12	YES	YES	YES (MHT)	YES
DM JUNCTION 1	DMJ1	242.80	YES	YES	YES (ET)	NO
DM JUNCTION 2	DMJ2	194.60	YES	YES	YES (ST)	NO
DM COOLAMiN 1	DMCOOL1	677.94	YES	YES	YES (AT)	YES
DM BROGHEDA 1	DMBR1	191.00	YES	YES	YES (WBT)	NO
DM JERRYS PLAINS 7	DMJP7	223.58	YES	YES	BASE - WCM	
DM GOULB. VALLEY 1	DMGV1	561.28	YES	YES	YES (WBT)	NO
AMAD MILLFIELD 1	AMADMILL1	256.95	YES	YES	NO TUFFS	YES
AMAD MILLFIELD 2	AMADMILL2	442.45	YES	YES	YES (AT)	YES
AOG MILLFIELD	AOGMIL	620.35	YES	YES	YES (AT)	YES
POWERCOAL A HILL 18	PAH18	364.80	YES	YES	YES (AT)	YES
POWERCOAL A HILL 47	PAH47	65.00	YES	YES	YES (NT)	NO
MCC ROSEHILL 11	MCCRH11	288.58	YES	YES	?	?
STH BULGA DDH 52	SBD52	129.06	YES	YES	YES (NT)	NO
STH BULGA DDH 58	SBD58	342.08	YES	YES	YES (WBT)	NO
STH BULGA DDH 59	SBD59	368.93	YES	YES	YES (WBT)	NO
MILLER HV 1	MHV1	119.54	YES	YES	YES	YES
AMOCO EAST DUNLOP 1	EDUNLOP1	1092.51	YES	YES	YES (NO AT)	YES
AMOCO DOOLANS CK 1	DOOLCK1	945.09	YES	YES	YES (AT)	YES
DM RIDGELANDS 1	DMRL1	168.40	YES	YES	YES (AT)	YES
DMRIDGELANDS 2	DMRL2	192.05	YES	YES	YES (AT)	YES
DM RIDGELANDS 3	DMRL3	180.03	YES	YES	YES (AT)	YES
DM RIDGELANDS 4	DMRL4	159.44	YES	YES	YES (AT)	YES
DM RIDGELANDS 5	DMRL5	159.48	YES	YES	YES (AT)	YES
	60 BORES	24360				

TABLE 2 : SUGGESTED REGIONAL CORRELATIONS

BORE	STRAT. UNIT	FROM	TO
AMAD MILLFIELD 1	GREAT NORTHERN SEAM	249.366	252.390
AMAD MILLFIELD 2	GREAT NORTHERN SEAM	411.675	415.064
AMAD MILLFIELD 2	AWABA TUFF	415.064	420.697
AMAD MILLFIELD 2	FASSIFERN SEAM UPPER	420.697	420.932
AOG MILLFIELD	GREAT NORTHERN SEAM	283.410	290.350
AOG MILLFIELD	AWABA TUFF	291.590	298.570
AOG MILLFIELD	MOUNT HUTTON TUFF	346.520	350.760
AOG MILLFIELD	WARNERS BAY TUFF	389.950	392.840
AOG MILLFIELD	EDGEWORTH TUFF	445.290	446.420
AOG MILLFIELD	NOBBYS TUFF	488.690	490.290
AOG MILLFIELD	WATTS SANDSTONE	511.780	526.960
AOG MILLFIELD	DENMAN FORMATION	526.960	608.405
AMOCO WYBONG 1	WALLARAH SEAM	56.680	58.240
AMOCO WYBONG 1	GREAT NORTHERN SEAM	89.730	93.020
AMOCO WYBONG 1	AWABA TUFF	93.020	95.930
AMOCO WYBONG 1	FASSIFERN SEAM	95.930	103.140
AMOCO WYBONG 1	UPPER PILOT SEAM PLY A	103.140	104.450
AMOCO WYBONG 1	MOUNT HUTTON TUFF	116.280	119.000
AMOCO WYBONG 1	WARNERS BAY TUFF	154.260	159.680
AMOCO WYBONG 1	STOCKRINGTON TUFF	192.210	192.510
AMOCO WYBONG 1	EDGEWORTH TUFF	228.920	230.150
AMOCO WYBONG 1	FERN VALLEY TUFF	234.985	235.430
AMOCO WYBONG 1	NOBBYS TUFF	253.660	255.880
AMOCO WYBONG 1	WATTS SANDSTONE	283.440	307.800
AMOCO WYBONG 1	DENMAN FORMATION	307.800	330.130
BUCHANAN MANGOOLA 1	NOBBYS TUFF	26.670	27.737
BUCHANAN MANGOOLA 1	WATTS SANDSTONE	52.932	66.434
BUCHANAN MANGOOLA 1	DENMAN FORMATION	66.434	96.323
BMR AGAP1S	FASSIFERN SEAM LOWER	34.341	39.065
BMR AGAP1S	UPPER PILOT SEAM PLY A	39.065	40.297
BMR AGAP1S	MOUNT HUTTON TUFF	59.080	62.459
BMR AGAP1S	WARNERS BAY TUFF	104.508	112.154
BMR AGAP1S	STOCKRINGTON TUFF	158.179	158.788
BMR AGAP4S	NOBBYS TUFF	7.315	11.303
BMR AGAP4S	WATTS SANDSTONE	43.104	62.408
BMR AGAP4S	DENMAN FORMATION	62.408	105.156
BMR AGAP5S	STOCKRINGTON TUFF	29.312	29.749
BMR AGAP5S	EDGEWORTH TUFF	51.714	54.915
BMR AGAP5S	NOBBYS TUFF	88.392	97.536
BMR AGAP5S	WATTS SANDSTONE	122.580	135.382
BMR AGAP5S	DENMAN FORMATION	135.382	162.154
DM BROGHEDA 1	MOUNT HUTTON TUFF	32.000	34.500
DM BROGHEDA 1	WARNERS BAY TUFF	42.550	46.920
DM BROGHEDA 1	EDGEWORTH TUFF	88.230	94.590
DM BROGHEDA 1	WATTS SANDSTONE	122.350	136.940
DM BROGHEDA 1	DENMAN FORMATION	136.940	166.520
DM BROKE 1	GREAT NORTHERN SEAM	175.840	181.600

TABLE 2 CONTINUED

DM BROKE 1	MOUNT HUTTON TUFF	233.390	237.550
DM BROKE 1	WARNERS BAY TUFF	250.190	255.600
DM BROKE 1	STOCKRINGTON TUFF	319.800	320.100
DM BROKE 1	FERN VALLEY TUFF	354.840	355.140
DM BROKE 2	GREAT NORTHERN SEAM	45.430	46.180
DM BROKE 2	AWABA TUFF	46.180	48.570
DM BROKE 2	FASSIFERN SEAM UPPER	48.570	51.440
DM BROKE 2	MOUNT HUTTON TUFF	96.040	97.990
DM BROKE 2	STOCKRINGTON TUFF	149.760	150.090
DM BROKE 2	EDGEWORTH TUFF	159.160	159.900
DM BROKE 2	NOBBYS TUFF	190.820	192.230
DM BROKE 2	WATTS SANDSTONE	201.960	211.010
DM BROKE 2	DENMAN FORMATION	211.010	233.280
DM BROKE 3	GREAT NORTHERN SEAM	113.030	116.040
DM BROKE 3	AWABA TUFF	116.040	118.430
DM BROKE 3	FASSIFERN SEAM UPPER	118.430	121.750
DM BROKE 4R	GREAT NORTHERN SEAM	91.400	93.420
DM BROKE 4R	AWABA TUFF	93.420	95.660
DM BROKE 4R	FASSIFERN SEAM UPPER	95.660	98.730
DM BROKE 4R	MOUNT HUTTON TUFF	150.910	152.700
DM BROKE 4R	STOCKRINGTON TUFF	208.730	209.450
DM BROKE 4R	EDGEWORTH TUFF	218.210	218.890
DM BROKE 4R	NOBBYS TUFF	250.120	251.600
DM BROKE 4R	WATTS SANDSTONE	260.400	
DM COOLAMiN 1	GREAT NORTHERN SEAM	354.850	361.940
DM COOLAMiN 1	AWABA TUFF	362.950	365.420
DM COOLAMiN 1	FASSIFERN SEAM UPPER	365.420	366.550
DM COOLAMiN 1	FASSIFERN SEAM LOWER	394.030	397.020
DM COOLAMiN 1	UPPER PILOT SEAM PLY A	397.020	398.600
DM COOLAMiN 1	MOUNT HUTTON TUFF	420.750	422.630
DM COOLAMiN 1	WARNERS BAY TUFF	454.070	460.880
DM COOLAMiN 1	EDGEWORTH TUFF	512.080	512.940
DM COOLAMiN 1	FERN VALLEY TUFF	550.075	550.325
DM COOLAMiN 1	WATTS SANDSTONE	562.960	574.200
DM COOLAMiN 1	DENMAN FORMATION	574.200	593.620
DM DOYLES CK 1	WATTS SANDSTONE	83.960	103.450
DM DOYLES CK 1	DENMAN FORMATION	103.450	153.210
DM DOYLES CK 10	WALLARAH SEAM	70.134	72.847
DM DOYLES CK 10	GREAT NORTHERN SEAM	96.027	99.974
DM DOYLES CK 10	AWABA TUFF	99.974	103.358
DM DOYLES CK 10	FASSIFERN SEAM	103.358	110.841
DM DOYLES CK 10	UPPER PILOT SEAM PLY A	110.841	112.319
DM DOYLES CK 10	MOUNT HUTTON TUFF	124.054	127.605
DM DOYLES CK 10	WARNERS BAY TUFF	177.074	183.810
DM DOYLES CK 10	STOCKRINGTON TUFF	208.514	208.830
DM DOYLES CK 10	EDGEWORTH TUFF	228.783	229.713
DM DOYLES CK 10	NOBBYS TUFF	272.430	274.533
DM DOYLES CK 10	WATTS SANDSTONE	302.270	307.818
DM DOYLES CK 10	DENMAN FORMATION	307.818	347.426
DM DOYLES CK 11	WALLARAH SEAM	67.910	68.370
DM DOYLES CK 11	GREAT NORTHERN SEAM	89.992	101.239
DM DOYLES CK 11	AWABA TUFF	101.239	104.668

TABLE 2 CONTINUED

DM DOYLES CK 11	FASSIFERN SEAM LOWER	115.519	119.192
DM DOYLES CK 11	UPPER PILOT SEAM PLY A	119.192	120.670
DM DOYLES CK 11	MOUNT HUTTON TUFF	128.320	134.900
DM DOYLES CK 11	WARNERS BAY TUFF	194.080	196.000
DM DOYLES CK 11	STOCKRINGTON TUFF	229.360	230.110
DM DOYLES CK 11	EDGEWORTH TUFF	275.980	279.270
DM DOYLES CK 11	NOBBYS TUFF	301.230	309.520
DM DOYLES CK 11	WATTS SANDSTONE	316.580	342.920
DM DOYLES CK 11	DENMAN FORMATION	342.920	366.640
DM DOYLES CK 12	GREAT NORTHERN SEAM	28.727	29.672
DM DOYLES CK 12	AWABA TUFF	29.672	32.675
DM DOYLES CK 12	FASSIFERN SEAM UPPER	32.675	32.812
DM DOYLES CK 12	FASSIFERN SEAM LOWER	38.588	41.590
DM DOYLES CK 12	UPPER PILOT SEAM PLY A	41.590	42.992
DM DOYLES CK 12	WARNERS BAY TUFF	85.024	88.194
DM DOYLES CK 13	EDGEWORTH TUFF	36.190	38.680
DM DOYLES CK 13	NOBBYS TUFF	83.241	85.080
DM DOYLES CK 13	WATTS SANDSTONE	117.800	131.475
DM DOYLES CK 13	DENMAN FORMATION	131.475	144.460
DM DOYLES CK 14	AWABA TUFF	58.064	62.636
DM DOYLES CK 14	MOUNT HUTTON TUFF	102.779	106.604
DM DOYLES CK 14	WARNERS BAY TUFF	151.150	154.915
DM DOYLES CK 14	STOCKRINGTON TUFF	192.344	192.756
DM DOYLES CK 14	EDGEWORTH TUFF	235.321	238.415
DM DOYLES CK 14	NOBBYS TUFF	256.718	261.046
DM DOYLES CK 14	WATTS SANDSTONE	307.452	321.610
DM DOYLES CK 14	DENMAN FORMATION	321.610	335.250
DM DOYLES CK 15	MOUNT HUTTON TUFF	35.174	36.759
DM DOYLES CK 15	WARNERS BAY TUFF	71.384	71.857
DM DOYLES CK 15	STOCKRINGTON TUFF	92.964	93.025
DM DOYLES CK 15	EDGEWORTH TUFF	109.880	111.359
DM DOYLES CK 15	NOBBYS TUFF	145.725	147.889
DM DOYLES CK 15	WATTS SANDSTONE	160.325	189.327
DM DOYLES CK 15	DENMAN FORMATION	189.327	221.696
DM DOYLES CK 2	STOCKRINGTON TUFF	45.601	47.877
DM DOYLES CK 2	EDGEWORTH TUFF	87.228	91.739
DM DOYLES CK 2	NOBBYS TUFF	259.933	264.810
DM DOYLES CK 2	WATTS SANDSTONE	270.434	301.410
DM DOYLES CK 2	DENMAN FORMATION	301.410	351.739
DM DOYLES CK 3	EDGEWORTH TUFF	125.035	125.782
DM DOYLES CK 3	NOBBYS TUFF	186.474	189.110
DM DOYLES CK 3	WATTS SANDSTONE	195.648	225.686
DM DOYLES CK 3	DENMAN FORMATION	225.686	239.204
DM DOYLES CK 5	EDGEWORTH TUFF	7.361	8.595
DM DOYLES CK 5	NOBBYS TUFF	45.217	49.545
DM DOYLES CK 5	WATTS SANDSTONE	63.231	107.701
DM DOYLES CK 5	DENMAN FORMATION	107.701	133.899
DM DOYLES CK 6	WARNERS BAY TUFF	15.728	22.936
DM DOYLES CK 6	STOCKRINGTON TUFF	83.988	84.795
DM DOYLES CK 6	EDGEWORTH TUFF	99.700	100.554
DM DOYLES CK 6	NOBBYS TUFF	136.038	145.624
DM DOYLES CK 6	WATTS SANDSTONE	156.384	188.113

TABLE 2 CONTINUED

DM DOYLES CK	6	DENMAN FORMATION	188.113	245.614
DM DOYLES CK	7	MOUNT HUTTON TUFF	31.989	35.982
DM DOYLES CK	7	WARNERS BAY TUFF	64.054	72.314
DM DOYLES CK	7	STOCKRINGTON TUFF	101.514	101.681
DM DOYLES CK	7	EDGEWORTH TUFF	144.399	145.024
DM DOYLES CK	7	NOBBYS TUFF	188.260	199.415
DM DOYLES CK	7	WATTS SANDSTONE	219.898	248.595
DM DOYLES CK	7	DENMAN FORMATION	248.595	321.442
DM DOYLES CK	9	GREAT NORTHERN SEAM	78.837	81.840
DM DOYLES CK	9	AWABA TUFF	81.840	83.998
DM DOYLES CK	9	FASSIFERN SEAM UPPER	83.998	87.417
DM DOYLES CK	9	MOUNT HUTTON TUFF	113.355	115.885
DM DOYLES CK	9	WARNERS BAY TUFF	155.357	157.658
DM DOYLES CK	9	STOCKRINGTON TUFF	189.570	189.875
DM DOYLES CK	9	EDGEWORTH TUFF	218.283	219.349
DM DOYLES CK	9	NOBBYS TUFF	250.271	252.115
DM DOYLES CK	9	WATTS SANDSTONE	258.227	270.815
DM DOYLES CK	9	DENMAN FORMATION	270.815	297.900
DM DENMAN	1	WATTS SANDSTONE	27.904	48.219
DM DENMAN	1	DENMAN FORMATION	48.219	67.742
DM DENMAN	12	WARNERS BAY TUFF	14.021	19.675
DM DENMAN	12	STOCKRINGTON TUFF	32.659	32.812
DM DENMAN	12	EDGEWORTH TUFF	86.761	87.676
DM DENMAN	12	NOBBYS TUFF	143.302	149.809
DM DENMAN	12	WATTS SANDSTONE	155.387	182.057
DM DENMAN	12	DENMAN FORMATION	182.057	248.214
DM DENMAN	13	FASSIFERN SEAM LOWER	23.690	28.455
DM DENMAN	13	UPPER PILOT SEAM PLY A	28.455	30.120
DM DENMAN	13	MOUNT HUTTON TUFF	47.250	48.600
DM DENMAN	13	WARNERS BAY TUFF	85.720	94.330
DM DENMAN	13	STOCKRINGTON TUFF	109.170	109.710
DM DENMAN	13	EDGEWORTH TUFF	145.490	146.435
DM DENMAN	13	NOBBYS TUFF	193.670	205.270
DM DENMAN	13	WATTS SANDSTONE	226.950	233.210
DM DENMAN	13	DENMAN FORMATION	233.210	249.420
DM DENMAN	2	STOCKRINGTON TUFF	25.146	25.573
DM DENMAN	2	EDGEWORTH TUFF	57.455	58.323
DM DENMAN	2	NOBBYS TUFF	84.704	96.637
DM DENMAN	2	WATTS SANDSTONE	119.512	143.226
DM DENMAN	2	DENMAN FORMATION	143.226	173.584
DM DENMAN	5	EDGEWORTH TUFF	41.194	42.413
DM DENMAN	5	NOBBYS TUFF	53.172	54.193
DM DENMAN	5	WATTS SANDSTONE	72.877	87.782
DM DENMAN	5	DENMAN FORMATION	87.782	147.096
DM DENMAN	7	EDGEWORTH TUFF	33.390	35.219
DM DENMAN	7	NOBBYS TUFF	71.917	75.133
DM DENMAN	7	WATTS SANDSTONE	87.020	106.908
DM DENMAN	7	DENMAN FORMATION	106.908	153.893
DM GOULBURN VALLEY	1	WARNERS BAY TUFF	15.525	19.880
DM GOULBURN VALLEY	1	STOCKRINGTON TUFF	62.785	63.170
DM GOULBURN VALLEY	1	NOBBYS TUFF	99.930	102.610

TABLE 2 CONTINUED				
DM GOULBURN VALLEY	1	WATTS SANDSTONE	117.100	143.000
DM GOULBURN VALLEY	1	DENMAN FORMATION	143.000	174.630
DM JUNCTION	1	EDGEWORTH TUFF	30.450	31.490
DM JUNCTION	1	FERN VALLEY TUFF	35.820	36.215
DM JUNCTION	1	NOBBYS TUFF	57.280	59.180
DM JUNCTION	1	WATTS SANDSTONE	73.930	100.280
DM JUNCTION	1	DENMAN FORMATION	100.280	154.300
DM JUNCTION	2	STOCKRINGTON TUFF	18.580	18.920
DM JUNCTION	2	EDGEWORTH TUFF	38.210	39.510
DM JUNCTION	2	NOBBYS TUFF	65.410	71.360
DM JUNCTION	2	WATTS SANDSTONE	97.500	105.820
DM JUNCTION	2	DENMAN FORMATION	105.820	159.790
DM RIDGELANDS	1	GREAT NORTHERN SEAM	133.075	137.650
DM RIDGELANDS	1	AWABA TUFF	147.520	151.650
DM RIDGELANDS	1	FASSIFERN SEAM	151.650	160.280
DM RIDGELANDS	1	UPPER PILOT SEAM PLY A	162.510	163.510
DM RIDGELANDS	2	GREAT NORTHERN SEAM	125.290	126.820
DM RIDGELANDS	2	AWABA TUFF	132.430	133.690
DM RIDGELANDS	2	FASSIFERN SEAM UPPER	133.690	136.735
DM RIDGELANDS	3	GREAT NORTHERN SEAM	157.460	162.700
DM RIDGELANDS	3	AWABA TUFF	162.700	165.540
DM RIDGELANDS	3	FASSIFERN SEAM UPPER	165.540	169.345
DM RIDGELANDS	3	FASSIFERN SEAM LOWER	170.505	175.390
DM RIDGELANDS	3	UPPER PILOT SEAM PLY A	175.390	176.390
DM RIDGELANDS	4	GREAT NORTHERN SEAM	127.300	131.500
DM RIDGELANDS	4	AWABA TUFF	137.660	143.350
DM RIDGELANDS	4	FASSIFERN SEAM	143.350	153.035
DM RIDGELANDS	4	UPPER PILOT SEAM PLY A	155.300	156.540
DM RIDGELANDS	5	WALLARAH SEAM	98.000	98.800
DM RIDGELANDS	5	GREAT NORTHERN SEAM	132.070	136.465
DM RIDGELANDS	5	AWABA TUFF	138.000	140.955
DM RIDGELANDS	5	FASSIFERN SEAM	140.955	149.170
DM RIDGELANDS	5	UPPER PILOT SEAM PLY A	149.170	150.840
DM WYBONG	1	FASSIFERN SEAM LOWER	19.800	23.980
DM WYBONG	1	UPPER PILOT SEAM PLY A	29.000	30.190
DM WYBONG	1	MOUNT HUTTON TUFF	49.400	53.720
DM WYBONG	1	WARNERS BAY TUFF	90.620	96.120
DM WYBONG	1	STOCKRINGTON TUFF	123.400	123.760
DM WYBONG	1	EDGEWORTH TUFF	163.060	164.030
DM WYBONG	1	FERN VALLEY TUFF	170.045	170.495
DM WYBONG	1	NOBBYS TUFF	194.570	197.800
DM WYBONG	1	WATTS SANDSTONE	222.470	246.600
DM WYBONG	1	DENMAN FORMATION	246.600	271.260
DM WYBONG	2	STOCKRINGTON TUFF	20.520	21.210
DM WYBONG	2	EDGEWORTH TUFF	71.060	72.460
DM WYBONG	2	NOBBYS TUFF	91.400	102.950
DM WYBONG	2	WATTS SANDSTONE	123.670	137.730
DM WYBONG	2	DENMAN FORMATION	137.730	179.840
DM WHYBROW	1	STOCKRINGTON TUFF	21.770	26.510
DM WHYBROW	1	EDGEWORTH TUFF	64.440	65.780
DM WHYBROW	1	NOBBYS TUFF	84.530	92.950

TABLE 2 CONTINUED				
DM WHYBROW	1	WATTS SANDSTONE	109.410	130.850
DM WHYBROW	1	DENMAN FORMATION	130.850	
DM WHYBROW	2	GREAT NORTHERN SEAM	108.000	116.900
DM WHYBROW	2	FASSIFERN SEAM LOWER	134.610	137.930
DM WHYBROW	2	UPPER PILOT SEAM PLY A	137.930	138.805
DM WHYBROW	2	MOUNT HUTTON TUFF	154.765	157.810
DM WHYBROW	2	WARNERS BAY TUFF	217.820	219.510
DM WHYBROW	2	STOCKRINGTON TUFF	309.110	309.250
DM WHYBROW	2	EDGEWORTH TUFF	334.420	336.920
DM WHYBROW	2	NOBBYS TUFF	354.230	362.615
DM WHYBROW	2	WATTS SANDSTONE	367.860	417.000
DM WHYBROW	2	DENMAN FORMATION	417.000	
AMOCO DOOLANS CK	1	GREAT NORTHERN SEAM	328.550	329.130
AMOCO DOOLANS CK	1	AWABA TUFF	336.670	340.240
AMOCO DOOLANS CK	1	FASSIFERN SEAM UPPER	340.240	340.810
AMOCO DOOLANS CK	1	FASSIFERN SEAM LOWER	351.280	353.140
AMOCO DOOLANS CK	1	UPPER PILOT SEAM PLY A	353.140	354.260
AMOCO DOOLANS CK	1	MOUNT HUTTON TUFF	374.125	374.405
AMOCO DOOLANS CK	1	EDGEWORTH TUFF	423.850	424.870
AMOCO DOOLANS CK	1	NOBBYS TUFF	445.540	447.140
AMOCO DOOLANS CK	1	WATTS SANDSTONE	448.660	461.970
AMOCO DOOLANS CK	1	DENMAN FORMATION	461.970	464.800
AMOCO EAST DUNLOP	1	GREAT NORTHERN SEAM	659.125	659.850
AMOCO EAST DUNLOP	1	FASSIFERN SEAM LOWER	685.920	688.630
AMOCO EAST DUNLOP	1	UPPER PILOT SEAM PLY A	688.630	689.840
AMOCO EAST DUNLOP	1	MOUNT HUTTON TUFF	702.510	702.940
AMOCO EAST DUNLOP	1	EDGEWORTH TUFF	743.140	748.080
AMOCO EAST DUNLOP	1	NOBBYS TUFF	769.000	775.000
AMOCO EAST DUNLOP	1	WATTS SANDSTONE	779.000	785.000
AMOCO EAST DUNLOP	1	DENMAN FORMATION	785.000	792.510
AMOCO GOULBURN RIVER	1	EDGEWORTH TUFF	47.090	48.080
AMOCO GOULBURN RIVER	1	FERN VALLEY TUFF	52.795	53.170
AMOCO GOULBURN RIVER	1	NOBBYS TUFF	64.870	67.130
AMOCO GOULBURN RIVER	1	WATTS SANDSTONE	83.000	120.680
AMOCO GOULBURN RIVER	1	DENMAN FORMATION	120.680	157.550
DM GOULBURN VALLEY	2	WARNERS BAY TUFF	78.260	79.800
DM GOULBURN VALLEY	2	NOBBYS TUFF	133.190	135.250
DM GOULBURN VALLEY	2	WATTS SANDSTONE	147.600	165.070
DM GOULBURN VALLEY	2	DENMAN FORMATION	165.070	199.920
GOLDFIELDS ROXBOROUGH	1	NOBBYS TUFF	84.535	93.192
GOLDFIELDS ROXBOROUGH	1	WATTS SANDSTONE	113.208	126.269
GOLDFIELDS ROXBOROUGH	1	DENMAN FORMATION	126.269	161.391
MILLERS HUNTER VALLEY	1	GREAT NORTHERN SEAM	31.690	33.751
MILLERS HUNTER VALLEY	1	AWABA TUFF	33.751	35.942
MILLERS HUNTER VALLEY	1	FASSIFERN SEAM LOWER	48.713	52.011
MILLERS HUNTER VALLEY	1	UPPER PILOT SEAM PLY A	52.011	53.130
MILLERS HUNTER VALLEY	1	MOUNT HUTTON TUFF	82.790	85.228
MILLERS HUNTER VALLEY	1	WARNERS BAY TUFF	118.543	
POWERCOAL ANVIL HILL	18	GREAT NORTHERN SEAM	22.180	25.900
POWERCOAL ANVIL HILL	18	AWABA TUFF	28.420	31.640
POWERCOAL ANVIL HILL	18	FASSIFERN SEAM	31.640	39.810

TABLE 2 CONTINUED				
POWERCOAL ANVIL HILL	18	UPPER PILOT SEAM PLY A	39.810	40.960
POWERCOAL ANVIL HILL	18	MOUNT HUTTON TUFF	54.575	57.640
POWERCOAL ANVIL HILL	18	WARNERS BAY TUFF	95.300	106.640
POWERCOAL ANVIL HILL	18	STOCKRINGTON TUFF	130.320	133.750
POWERCOAL ANVIL HILL	18	EDGEWORTH TUFF	166.735	167.755
POWERCOAL ANVIL HILL	18	FERN VALLEY TUFF	172.765	173.270
POWERCOAL ANVIL HILL	18	NOBBYS TUFF	199.890	202.170
POWERCOAL ANVIL HILL	18	WATTS SANDSTONE	225.500	244.710
POWERCOAL ANVIL HILL	18	DENMAN FORMATION	244.710	268.700
PRICE ANDERSON HUNTER VALLEY	1	GREAT NORTHERN SEAM	19.794	21.577
PRICE ANDERSON HUNTER VALLEY	1	AWABA TUFF	21.577	26.975
PRICE ANDERSON HUNTER VALLEY	1	FASSIFERN SEAM	26.975	34.168
PRICE ANDERSON HUNTER VALLEY	1	UPPER PILOT SEAM PLY A	34.168	35.226
PRICE ANDERSON HUNTER VALLEY	1	MOUNT HUTTON TUFF	62.435	65.815
PRICE ANDERSON HUNTER VALLEY	1	NOBBYS TUFF	205.000	215.000
PRICE ANDERSON MANGOOLA	1	NOBBYS TUFF	32.000	35.000
PRICE ANDERSON MANGOOLA	1	WATTS SANDSTONE	62.255	80.772
PRICE ANDERSON MANGOOLA	1	DENMAN FORMATION	80.772	113.096
STH BULGA DDH	52	NOBBYS TUFF	42.200	44.270
STH BULGA DDH	52	WATTS SANDSTONE	53.280	67.220
STH BULGA DDH	52	DENMAN FORMATION	67.220	87.940
STH BULGA DDH	58	WARNERS BAY TUFF	16.400	18.260
STH BULGA DDH	58	STOCKRINGTON TUFF	81.280	81.480
STH BULGA DDH	58	EDGEWORTH TUFF	96.900	99.000
STH BULGA DDH	58	NOBBYS TUFF	127.580	129.400
STH BULGA DDH	58	WATTS SANDSTONE	136.280	149.800
STH BULGA DDH	58	DENMAN FORMATION	149.800	169.140
STH BULGA DDH	59	WARNERS BAY TUFF	23.780	25.960
STH BULGA DDH	59	EDGEWORTH TUFF	111.420	113.660
STH BULGA DDH	59	FERN VALLEY TUFF	139.460	140.000
STH BULGA DDH	59	NOBBYS TUFF	147.700	149.760
STH BULGA DDH	59	WATTS SANDSTONE	159.820	173.060
STH BULGA DDH	59	DENMAN FORMATION	173.060	191.460
AMOCO WOLLOMBI BROOK	1	GREAT NORTHERN SEAM	53.820	56.200
AMOCO WOLLOMBI BROOK	1	AWABA TUFF	56.200	60.450
AMOCO WOLLOMBI BROOK	1	FASSIFERN SEAM UPPER	60.450	63.270
AMOCO WOLLOMBI BROOK	1	FASSIFERN SEAM LOWER	79.890	81.235
AMOCO WOLLOMBI BROOK	1	UPPER PILOT SEAM PLY A	81.235	82.620
AMOCO WOLLOMBI BROOK	1	MOUNT HUTTON TUFF	88.390	92.710
AMOCO WOLLOMBI BROOK	1	WARNERS BAY TUFF	121.750	123.670
AMOCO WOLLOMBI BROOK	1	STOCKRINGTON TUFF	164.650	164.910
AMOCO WOLLOMBI BROOK	1	EDGEWORTH TUFF	220.980	221.820
AMOCO WOLLOMBI BROOK	1	NOBBYS TUFF	252.130	253.740
AMOCO WOLLOMBI BROOK	1	WATTS SANDSTONE	255.230	273.360
AMOCO WOLLOMBI BROOK	1	DENMAN FORMATION	273.360	294.740

TABLE 3 CURRENT STRATIGRAPHY OF THE NORTHERN SYDNEY BASIN

(Note: Only the three Formation Tuffs from the Newcastle Coal Measures can be correlated directly)

NARRABEEN GROUP

					Moon Isl. Beach Formation	Vales Point seam
	Glen Gallic Subgroup	Greigs Ck Seam				Wallarah seam
		Redmanvale Ck Formation				
		Dights Creek Coal	Hillsdale Coal M.			Great Northern seam
			Nalleen Tuff Member	.....	Awaba Tuff	
			Hobden Gully Coal M.		Boolaroo Formation	Fassifern seam
				NEWCASTLE		Upper Pilot seam
WOLLOMBI	Doyles Ck Subgroup	Waterfall Gully Formation				Mt Hutton tuff
		Pinegrove Formtn.	Hambledon Hill M.			L. Pilot seam
			Wylies Flat Coal M.			
			Glengowan Shale M.			
	Horseshoe Creek Subgroup	Lucernia Coal	Eyriebower Coal M.			
			Longford Ck Silt M.			
			Rombo Coal M.			Hartley Hill seam
			Hillside Claystone M.	.....	Warners Bay Tuff	
COAL			Carramere Coal M.	**COAL**	Adamstown Formation	Australasian seam (upper)
		Strathmore Formation				
		Alcheringa Coal				Australasian seam (lower)
		Clifford Formation				Stockrington tuff
						Montrose seam
						Wave Hill seam
						Edgeworth tuff
						Fern Valley seam
	Apple Tree Flat Subgroup	Charlton Formation	Stafford Coal Member	**MEASURES**		Victoria Tunnel seam
MEASURES			Monkey Place Tuff M.	.....	Nobbys Tuff	
		Abbey Green Coal			Lambton Formation	Nobbys seam
						Dudley seam
						Yard seam
						Borehole seam
	Watts Sandstone			Waratah Sandstone		
WITTINGHAM COAL MEASURES			Denman Formation	**TOMAGO COAL MEASURES**	Dempsey Formation	

TABLE 4 PROPOSED STRATIGRAPHY OF THE NORTHERN SYDNEY BASIN			
NARRABEEN GROUP			
NEWCASTLE COAL MEASURES	Moon Island Beach Formation	Vales Point seam	
		Wallarah seam	
		Great Northern seam	
	Awaba Tuff		
	Boolaroo Formation	Fassifern seam	
		Upper Pilot seam	
		Mt Hutton tuff	
		Lower. Pilot seam	
		Hartley Hill seam	
	Warners Bay Tuff		
	Adamstown Formation	Australasian seam	
		Stockrington tuff	
		Montrose seam	
		Wave Hill seam	
		Edgeworth tuff	
		Fern Valley seam	
		Victoria Tunnel seam	
	Nobbys Tuff		
	Lambton Formation	Nobbys seam	
		Dudley seam	
		Yard seam	
		Borehole seam	
Watts Sandstone		Waratah Sandstone	
WITTINGHAM COAL MEASURES	Denman Formation	**TOMAGO COAL MEASURES**	Dempsey Formation

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