Friday 28th September, 2012

Ms Sera Taschner
Commission Secretariat
GPO Box 3415
SYDNEY NSW 2001

Dear Sera,

The Relative Importance of Vegetation Associated with the Permian Sedimentary Rocks in the Proposed Coalpac Project Area

Description of the land unit type

The Colong Foundation for Wilderness Ltd has been asked to provide further information on the attributes of the ecosystems and landforms arising upon Permian sedimentary rocks of the Illawarra Coal Measures, comprising the Wallerawang, Charbon and Cullen Bullen Stratigraphic Subgroups.

The stratigraphic relationships for the sedimentary rocks in the project area are described in figure 4 on page 20 in Volume 1 of the Environmental Assessment and by a geology map (Drawing 6) on page 79 of Appendix O in volume 5 of the Environmental Assessment. These Illawarra Coal Measures are annotated as Pi on that geology map, which is a small part of the 1992, 1:100,000 Western Coalfield (Southern Part) Geological Series Map Sheet (Edition 1) - a composite map based on the topographic series sheets 8931 and part of 8830, 8831, 8930 and 8932, compiled by E.K. Yoo (Geologist) and G. Majchrzak Hamilton (Cartographer) published by the Department of Mineral Resources.

The landscape unit that the Colong Foundation believes is unique to this area can be described as a gently undulating landform of shallow valleys with ephemeral streams on Illawarra Coal Measures, capped in places by outliers¹ of Burra Moko Head sandstone of the Narrabeen Group of sedimentary rocks. The vegetation for the project area has been described at a regional level by Benson, D.H. and Keith, D.A. (1990) as consisting of Tablelands Grassy Woodland Complex on the Permian rocks and the Pagoda Rock Complex and Scribbly Gum – Stringybark Woodland developed on the Narrabeen Group of Triassic sedimentary rocks.

Comparison of Cumberland Ecology Vegetation Mapping with Regional Mapping of the Vegetation

The Benson and Keith vegetation mapping at 1:100,000 is coarse for project assessment work, but reveals the misleading vegetation mapping performed by Cumberland Ecology for the Environmental Assessment. The vegetation mapped by Cumberland Ecology as ‘Exposed Blue Mountains Sydney

¹ Note: an outlier is geological term for a stratigraphically younger unit surrounded by older rocks as seen in map view.
Peppermint – Silvertop Ash Shubby Woodland’ is a vegetation community named after the two most commonly found eucalypt trees in the Greater Blue Mountains Region. For the same locations within the project area Benson and Keith (1990) have identified and mapped ‘Tablelands Grassy Woodland Complex’, which is a poorly reserved plant community.

Benson and Keith report plant communities on the western part of the Wallerawang “map sheet associated with Permian and Devonian geology are also very poorly conserved.” … “Other woodland communities in the western part of the area (in map units 10h, 10m & 10n), and the Coxs River Swamps (20b) are not represented in any local reserves” (Benson & Keith, 1990, pg 330).

The Wallerawang_Veg_sht_and_Fig_3.1_App_J_composite.jpg image shows the different vegetation types compared for the project area on two inset maps, one by Benson and Keith, the other by Cumberland Ecology. The poorly reserved mapping unit “10h”, the Tablelands Grassy Woodland Complex has been misleadingly named and mapped by Cumberland Ecology as an Exposed Blue Mountains Sydney Peppermint – Silvertop Ash Shubby Woodland. So what is actually poorly reserved and rare is mapped by Cumberland Ecology as common.

Comparison of Cumberland Ecology Vegetation Mapping with Detailed 2006 Vegetation Mapping

A comparison of the Cumberland Ecology vegetation typing and mapping with the 2006, 1:25,000 Western Blue Mountains Vegetation Map by the then Department of Environment and Conservation (NSW)[DEC (NSW), 2006]) for the Hawkesbury-Nepean Catchment Management Authority is also informative.

The DEC (NSW), 2006) vegetation mapping is of a much finer detail than the mapping by Cumberland Ecology, although Cumberland Ecology state that the DEC (NSW), 2006) mapping was used to “assist with identifying and describing the vegetation” (see page 2.1, Appendix J).

Cumberland Ecology claims that its ‘Exposed Blue Mountains Sydney Peppermint – Silvertop Ash Shubby Woodland’ mapping unit corresponds to DEC (NSW) (2006) Mapping Unit 30 of the Western Vegetation Map. This Cumberland Ecology mapping unit is not just Mapping Unit 30. This Cumberland Ecology unit would also capture DEC (NSW) 2006 Mapping Units 33 and 37, as well as units 35, 4, 44 and 11, when mapping the project area.

Similarly the Cumberland Ecology mapping unit titled ‘Cox’s Permian Red Stringybark – Brittle Gum Woodland’ is too generalised to capture the ecological diversity for project planning and does not just contain DEC (NSW)(2006) MU 37. This Cumberland Ecology mapping unit would contain MUs 30, 33 and 11 as well. Figure EA_Fig3.1_CoxsValley-Newnes_Merged.jpg shows the difference in mapping detail between DEC (NSW) 2006 and Cumberland Ecology’s efforts.

The generalisation of the Cumberland Ecology mapping in the manner described above would tend to hide the diversity of plant communities present on the Project Area. In other words, the Cumberland Ecology vegetation mapping units are inconsistent with and of a far more generalised nature than the 1:25,000 scale mapping compiled in 2006 by DEC (NSW).

The mapping by Cumberland Ecology is unsuitable for detailed consideration of a proposed mining project in this environmentally sensitive area. The generalisations made by Cumberland Ecology are
also inconsistent with the more generalised mapping by Benson and Keith, defining a map unit with a name that denotes a very common and well reserved forest type, rather than the poorly reserved forest type identified in 1990 at the regional level. These concerns are consistent with the evidence provided by Mr Chris Jonkers of Blackmans Flat for the Lithgow Environment Group regarding vegetation in the project area.

Mr Jonkers has observed the presence of ‘Sheltered Gully Brown Barrel Ferny Forest’, MU4 of DEC(NSW) (2006). In Lithgow Environment Group’s submission it was argued that areas of this type were not identified by Cumberland Ecology, would be cleared by the mining operations, and were not covered by Biodiversity Offsets. This mapping unit occurs in the deep gullies east of the highway below the escarpment of the Great Dividing Range, including the cave art site gully. Mr Jonkers has also observed isolated patches of MU1 ‘Sandstone Canyon Warm Temperate Rainforest’, indicated by the presence of a patch of Black Wattle (*Callicoma serratifolia*) not far from this cave.

In relation to MU 20, ‘Capertee Rough Barked Apple – Red Gum Yellow Box Grassy Woodland’ (this MU includes the EEC of Grassy White Box Woodlands), this veg unit was not identified on the DEC (NSW) 2006 Vegetation Map Sheet but has been observed by Mr Jonkers in the north-west corner of Ben Bullen State Forest on both sides of the Baal Bone Rail Loop, where Mr Jonkers found *Persoonia marginata*. Mr Jonkers believes that Yellow Box and occasional Blakely’s Red Gum (a tree that is also found in MU20) occur at the southern end of the project area east of the Highway and were not identified by Cumberland Ecology.

The Cumberland Ecology Flora Assessment of areas with Tableland Broad-leaved Peppermint – Brittle Gum – Red Stringybark Grassy Open Forest (equivalent to DEC (NSW) 2006 MU 33) didn’t identify *Bursaria spinosa* ssp *lasiophylla*, but Mr Jonkers found it at four sites in mainly this vegetation type within the proposed open-cut disturbance area. This plant is critical habitat for the Bathurst Copper Butterfly (*Paralucia spinifera*) that is listed nationally as a vulnerable species under section 178 of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). Native Blackthorn, *Bursaria spinosa* subsp. *lasiophylla* is the larval food plant of the Bathurst Copper Butterfly.

The boundary between the gently undulating shallow valleys on Illawarra Coal Measures capped in places by pagoda outliers of Burra Moko Head sandstone is also an identified Priority Fauna Habitat. The Office of Environment and Heritage (2012) found that the ‘rocky escarpments and pagoda formations are another important fauna habitat in Gardens of Stone National Park as they provide habitat for at least four high or moderate priority fauna species. Though the status of the broad-headed snake and brush-tailed rock wallaby in the park is uncertain, the rocky escarpments and pagoda areas, together with adjacent sheltered rocky gorges, provide the highest quality available habitat for these species in the park. Both the large-eared pied bat and eastern cave bat are highly likely to roost in these environments, with the potential for maternity roosts of either or both species. The eastern bentwing-bat may temporarily roost in deeper overhangs or caves. Rosenberg’s goanna also uses these environments’ (page 79). These observations apply to the project area, where the broad-headed snake has been recorded by Mr Ian Brown.

The ‘Tablelands Grassy Woodland Complex’ is of course where the majority of the thirteen threatened vertebrate species are found.
Irreplaceability of the Project Area vegetation and its relation to offsets

When considering the irreplaceability of the native vegetation proposed for open-cut mining, it is very important to consider the past and potential future cumulative losses of native vegetation from the Lambert’s Gully Mine, Ivanhoe, Invincible and Cullen Valley Mines, Pine Dale and Neubeck’s Creek open-cut coal mines upon map unit Benson and Keith (10h), Tablelands Grassy Woodland Complex. In regard to the more detailed 1:25,000 by DEC (NSW) 2006 the mapping units MU4, as well as MU 20, 33, 37 and possibly others may become critically endangered within the broader (10h) community.

DEC (NSW) (2006) only found 71ha of MU4, Sheltered Gully Brown Barrel Ferny Forest in the study area of 157,356ha. Only 1,041 ha of MU 33, the Tableland Broad-leaved Peppermint – Brittle Gum – Red Stringybark Grassy Open Forest were identified and 3,048 ha of MU 37 Cox’s Permian Red Stringybark – Brittle Gum Woodland.

There were 797 ha of MU35 Tableland Gully Mountain Gum - Broad-leaved Peppermint Grassy Forest, 1586ha of MU11 and Tableland Gully Snow Gum - Ribbon Gum Montane Grassy Forest and of MU44. Fragments of the MU1 ‘Sandstone Canyon Warm Temperate Rainforest’ that covers only four hectares of the DEC (NSW) 2006 study area, while MU8 ‘Newnes Plateau Sheltered – Brown Barrel Forest’ is not extensive either, covering 2,200ha and may be present. These constituent vegetation communities are components of the Tablelands Grassy Woodland Complex and are all at risk of being open-cut mined. All are situated upon the Illawarra Coal Measures.

It is reasonable to reserve examples of all these vegetation types. Given that the best coal seam, the Lithgow Seam, has been mined by underground methods below the Ben Bullen State Forest, this forest represents the most appropriate locality for these rare vegetation types to be reserved under the National Parks and Wildlife Act, 1974.

The proposed off-sets and trade-offs not located on flatter Illawarra Coal Measures are irrelevant to the future conservation efforts for these forest types. These vegetation communities are associated with a geological substrate and it is perplexing that Cumberland Ecology claims and maps their presence where Permian Illawarra Coal Measures are not present. For example, the western half of the Hillcroft property is situated upon undifferentiated Palaeozoic metamorphic rocks. The proposed new offset of Gulf Mountain is also not located on Permian sedimentary rocks. Such proposed exchanges are not a ‘like for like’ biological offset as the geologies are so different.

Exchanges of vegetation communities on talus slope Permian sedimentary rocks (i.e. 10i – the well reserved Talus Slope Woodland of Benson and Keith) for flatter valleys of Permian sedimentary rocks are also proposed (i.e. 10h - the poorly reserved map unit).

The only apparent exception is perhaps the remote area proposed at Yarran View to the north. The Yarran View property is of course not located upon Illawarra Coal Measures but rather the Shoalhaven Group and Narrabeen Sandstones (Reference: 1:500,000 Sydney Basin Geological Sheet (Special)).

This leaves only the small isolated fragment at Hillview as the sole offset on the appropriate geology.
Reservations since 1990 mapping did not improve reservation status of the community at risk

Since the publication of the Benson and Keith regional vegetation mapping the Gardens of Stone National Park was reserved in 1994. This park is mostly Permian sedimentary rocks of the Shoalhaven Group, the basement Palaeozoic metamorphic rocks and even some Silurian limestone.

The Illawarra Coal Measures rocks do not outcrop extensively in the Gardens of Stone National Park and the Mugii Murum-ban State Conservation Area. Where these strata do outcrop in these reserves they do so on a steeply sloping talus slopes that develop different vegetation, mapped by Benson and Keith as the Talus-slope Woodland (10i), not (10h). This latter talus slope community (10i) may be also present on Blackmans Crown to the north (it is just off the Wallerawang vegetation map). Neither the Talus-slope Woodland vegetation type nor the Tablelands Grassy Woodland Complex on Permian sedimentary rocks extends to the Turon National Park to the north-west. Turon National Park is located on older geology.

Significance of the Project Area’s Geodiversity

The Tablelands Grassy Woodland Complex on undulating Illawarra Coal Measures located within the Coalpac proposal represent a unique reservation opportunity. These poorly reserved forests form a ‘carpet’ below platy pagodas, that is, those pagodas with ironstone banding which are ‘distinct and significant’ on the world scale as explained in Washington, H. and Wray, R (2011). These pagodas are found in the project area along the edge of the Great Dividing Range, on the Ben Bullen Range and as nearby outliers of Triassic sedimentary rock.

There is no doubt that the pagodas found on the escarpment next to the proposed open cuts are platy pagodas, as Dr Washington has observed them.

Pagodas are found in the Grose Sandstone in the Triassic, particularly the Banks Wall and Burramoko Head series. The proposed open-cut coal mining would not destroy pagodas by wholesale removal, since the open-cut is restricted to the outcrop of Permian sedimentary rocks. The Foundation and other environment groups believe that blasting and high wall mining could shake and crack the pagodas and so cause collapse through these mechanisms.

Coalpac appears to be ignoring a peer-reviewed scientific paper, co-authored by Dr Wray, a sandstone geomorphologist who co-wrote the book ‘Sandstone Landforms’ and has visited sandstone landforms all around the world. Dr Wray has never seen anything like platy pagodas anywhere else in the world other than in the Gardens of Stone region.

The Project Area represents a unique opportunity to reserve under the NPW Act poorly protected, publicly-owned forests at risk of becoming threatened by on-going open-cut coal mining. The ‘Tablelands Grassy Woodland Complex’ on undulating Illawarra Coal Measures is also associated with good examples of the unique pagoda landscape, and can be reserved without loss of the high quality Lithgow Coal Seam, that seam having already been mined.
Notes on the relationship between the proposed Coalpac open-cut mine, the Western Coalfield of NSW and the Gardens of Stone Stage 2 Reserve Proposal

The Coal Industry in the Western Coalfield is Healthy

The coal industry in the Western Coalfield continues to be healthy. In the last twenty years production of raw coal has doubled and employment been more or less steady. The main growth continues to be to the north at Ulan.

Comparative figures for the three mining centres in the Western Coalfield are presented below:

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ULAN</td>
<td>150 approx</td>
<td>562</td>
<td>558</td>
<td>0.52</td>
<td>6.79</td>
<td>9.44</td>
</tr>
<tr>
<td>RYLSTONE</td>
<td>150 approx</td>
<td>143</td>
<td>120</td>
<td>-</td>
<td>-</td>
<td>1.12</td>
</tr>
<tr>
<td>LITHGOW</td>
<td>930</td>
<td>1,195</td>
<td>1,064</td>
<td>3.55</td>
<td>6.77</td>
<td>11.13</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,230</td>
<td>1,900</td>
<td>1,742</td>
<td>4.67</td>
<td>14.18</td>
<td>21.7</td>
</tr>
</tbody>
</table>

Coal production has continued to increase with total saleable coal production in the Western coalfield for 2008-09 at 24.79Mt (NSW Minerals Council website).

Coal Reserves

In the last 30 years despite a production increase from 4.67 million tonnes to 21.7 million tonnes of coal annually, coal reserves in the Western Coalfield have risen from 250 million tonnes in 1962 to nearly 1,000 million tonnes of recoverable coal in 1991-92 to 1,793.25 million tonnes of recoverable coal reserves in 2006-07 (Coal Industry Profile data, 2008).

For the Western Coalfield and for the proposed Gardens of Stone National Park, the most recent semi-detailed information available is still the Sniffin, M. Sayers, P. and Beckett J., 1986, NSW Coal Resources and Reserves report prepared by the Department of Mineral Resources.

Total coal resources in the Western Coalfield are 4,340 million tonnes based on the 1986 report and includes inferred reserves. This figure refers to coal within coal mining and exploration tenements, although the figure apparently does not include large areas held by the Department of Mineral Resources.

**COAL RESOURCES** (million tonnes, 1986 data)

<table>
<thead>
<tr>
<th></th>
<th>Western coalfield</th>
<th>NSW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured and</td>
<td>2,630</td>
<td>34,356</td>
</tr>
<tr>
<td>indicated reserves</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### COAL RESOURCES (million tonnes, 2006-07 data)

<table>
<thead>
<tr>
<th></th>
<th>Measured reserves</th>
<th>Indicated reserves</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>ULAN</td>
<td>405.8</td>
<td>995.3</td>
<td>1,401.1</td>
</tr>
<tr>
<td>RYLSTONE</td>
<td>43.4</td>
<td>23.2</td>
<td>66.6</td>
</tr>
<tr>
<td>LITHGOW</td>
<td>378.5</td>
<td>377.7</td>
<td>756.2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>827.7</td>
<td>1,396.2</td>
<td>2,223.9</td>
</tr>
</tbody>
</table>

Within the Western coalfield 1,793.25 million tonnes were believed to be recoverable coal reserves in 2006-07 by the mining industry (Industry Profile, page 131, 2008), which would yield saleable reserves of about half that figure. These estimates are consistent with the above mining industry profile data for the individual coal mines in the western coalfield for the returns of that financial year.

Even allowing for production growth the above data indicate that there is sufficient coal available to meet power station demand of up to 8 million tonnes per year for the foreseeable future. The Atlas of NSW states that the “southern sector of the Western coalfield, between Lithgow and Ben Bullen, supplies coal to the local power stations and the export thermal market. The Lithgow seam is most important followed by the Katoomba seam that is mined east of Lithgow”.

In 1993 the Springvale Colliery was specifically developed for the needs of Mt Piper Power Plant. The Angus Place Colliery has a purpose built haul road to this power plant. The Springvale and Angus Place coal mines can produce 8.5 million tonnes of coal a year. In 2006-07 the combined measured coal resources for these two mines was 154.3 million tonnes and the combine indicated resources were 171.2 million tonnes, giving a total of 325.5 million tonnes of coal. These two mines alone can provide coal to both power plants for over a decade and probably two. The Airly Colliery and the mines of Rystone District, combined with the Clarence Colliery could extend these resources for the foreseeable future. It is perplexing that power generators in developing countries are purchasing thermal coal from these mines for power generation at a higher price than Tru-Energy/Energy Australia (a Chinese owned company) is willing to pay to feed power plants specifically located on this coal field.

The claim that Coalpac’s coal is essential to the on-going operation of Mt Piper Power Plant is nonsense. There cannot be anything more than a small marginal price difference between domestic and overseas coal prices. As export prices fall, local consumers will be advantaged and long term contracts more readily secured.

#### Claims made by Shoalhaven Starches

Shoalhaven Starches operate under a 2003 Department of Planning approval that has a consent condition that only allows the plant to use coal with a sulphur content not exceeding 1%. The claim that Coalpac is the only suitable coal has no basis.
Below is an extract from their 2008 Environmental Assessment for the plant. Shoalhaven Starches do not commit to replacing coal-fired boilers but it was given serious consideration, though not budgeted.

5.1.3 Fuel use switching

Natural gas

The proposed plant will mainly use natural gas as the primary fuel source (refer to Table 4). Natural gas produces much lower greenhouse emissions than the amount of coal of equivalent energy. Using natural gas in the proposed plant instead of coal saves approximately 187,680 t CO2-e/a.

Coal

Following the plant expansion, 109 kt of coal will be used at Bomaderry (gross). Coal is a very emissions intensive fuel, and its use will create approximately 274,000 t CO2-e, or 34% of all gross emissions. If the existing coal-fired boiler was replaced with a natural gas fired boiler, emissions could be reduced by around 81,000 t CO2-e (a reduction of 30% compared to the coal emissions, and 10% of the total gross emissions). Replacement of the coal-fired boiler has not been included in the current budget for the proposed plant.

Diesel

Shoalhaven Starches uses 880 kL of diesel fuel annually, and this volume will not change following the upgrade. This results in annual emissions of approximately 1,910 t CO2-e. By switching to a biodiesel blend, emissions could be reduced. A 10% biodiesel (canola) blend would result in total emissions of 1,880 t CO2-e, a reduction of 30 t CO2-e annually, or 0.004% of gross emissions. Any changes would be insignificant.

Shoalhaven Starch can use any coal from NSW. It certainly has not used Coalpac coal from before 2006. The following table shows the specifications of NSW coal resources:

<table>
<thead>
<tr>
<th>Coalfield/Coal type</th>
<th>Southern</th>
<th>Western</th>
<th>Hunter</th>
<th>Newcastle</th>
<th>Gunnedah*</th>
<th>Gloucester</th>
<th>Oaklands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal Quality Parameters</td>
<td>Domestic</td>
<td>Thermal</td>
<td>Domestic</td>
<td>Thermal</td>
<td>Domestic</td>
<td>Thermal</td>
<td>Domestic</td>
</tr>
<tr>
<td>Moisture % (ad)</td>
<td>1.0</td>
<td>1.1</td>
<td>1.3</td>
<td>2.5</td>
<td>2.6</td>
<td>3.2</td>
<td>2.7</td>
</tr>
<tr>
<td>Ash % (ad)</td>
<td>0.7</td>
<td>0.6</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Vm (%) (ad)</td>
<td>22.9</td>
<td>20.8</td>
<td>27.0</td>
<td>30.5</td>
<td>28.7</td>
<td>25.3</td>
<td>32.7</td>
</tr>
<tr>
<td>Ts % (ad)</td>
<td>0.40</td>
<td>0.45</td>
<td>0.50</td>
<td>0.65</td>
<td>0.55</td>
<td>0.40</td>
<td>0.50</td>
</tr>
<tr>
<td>Se (kcal/kg)</td>
<td>75.70</td>
<td>75.70</td>
<td>55.50</td>
<td>68.00</td>
<td>66.00</td>
<td>54.60</td>
<td>68.10</td>
</tr>
<tr>
<td>(MJ/kg)</td>
<td>31.8</td>
<td>28.2</td>
<td>23.2</td>
<td>28.8</td>
<td>27.6</td>
<td>24.5</td>
<td>28.3</td>
</tr>
<tr>
<td>CSN</td>
<td>6.5</td>
<td>1.5</td>
<td>4.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.5</td>
<td>2.0</td>
</tr>
<tr>
<td>Afl (C)</td>
<td>1540</td>
<td>1500</td>
<td>1500</td>
<td>1420</td>
<td>1460</td>
<td>1270</td>
<td>1300</td>
</tr>
<tr>
<td>Def (Flow)</td>
<td>1590</td>
<td>1500</td>
<td>1500+</td>
<td>1560</td>
<td>1570</td>
<td>1510</td>
<td>1510</td>
</tr>
<tr>
<td>HG</td>
<td>68</td>
<td>68</td>
<td>65</td>
<td>49</td>
<td>49</td>
<td>49</td>
<td>50</td>
</tr>
<tr>
<td>Gray-King</td>
<td>G3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Max. Fluid</td>
<td>(ddm)</td>
<td>1800</td>
<td>-</td>
<td>1000</td>
<td>-</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td>Phosphorus No</td>
<td>-</td>
<td>0.061</td>
<td>0.030</td>
<td>0.002</td>
<td>0.011</td>
<td>0.009</td>
<td>0.010</td>
</tr>
</tbody>
</table>

The total sulphur (Ts%) is highest in the Hunter and Newcastle coal fields but all meet the consent condition requirement. The Industry Profile (2008) reports coal from Cullen Valley as having a moisture content of 8%, ash from 13.5 – 24%, volatile matter 24.5 to 26.9, total sulphur of 0.5%,
specific energy of 5580 to 6510 (k/cal/kg) or 23.4 to 27.2 (Mj/kg) and a crucible swelling number of 1 (Invincible has a CSN of 2). The Cullen Valley coal has an ash fusion temperature for deformation of 1260 °C and flow of 1600 °C and a hardgrove grindability index of 45 to 46. Invincible colliery gives its phosphorus content as 0.007% and has similar characteristics to Cullen Valley except for a higher moisture content. There is nothing special about these characteristics, except that it probably has lower energy and higher ash contents than claimed in the statistical returns provided for the Industry Profile 2008.

From the above considerations it can be readily adduced that Shoalhaven Starches can source its coal from any mine in NSW, except perhaps for the higher sulphur content coal arising from certain mines in the Hunter and Newcastle areas.

**Proposed National Park Extensions in relation to the Coal Resource**

In the last two decades most of the coal exploration effort and investment in coal mining infrastructure has occurred in the Ulan section of the Western Coalfield where very thick coal seams are mined by open-cut methods.

In the Lithgow and Rystone areas there are two different coal seams, the Lithgow seam and the Katoomba seam, which are mined largely by underground techniques (Industry Profile, 2008, page 51). Coal mining is confined to areas where relatively clean coal occurs over a height of 1.5-2.5 metres, the so-called "working section". Further north at Ulan, very large open-cut mines work a 12 metre coal thickness known as the Ulan seam. The coal from the Ulan mine is transported by a custom-built 150 kilometre Sandy Hollow railway to Muswellbrook and thence to Newcastle. During the 1980's the Department of Mineral Resources carried out several large coal drilling programmes in the Western coalfield. This Government exploration has extended from Ulan south to Rylstone, and has shown that the thickness of coal increases northwards towards Ulan.

Compared to the Ulan, Lithgow and Katoomba coal seams, the Lidsdale and Irrondale seams are inferior in quality, and the others, the Middle River and Moolarben seams, are hardly worth mining. Australia is a wealthy country and it can well afford to protect a representative example of the Tablelands Grassy Woodland Complex on undulating Permian Illawarra Coal Measures.

In making such a decision no unique coal resources will be sterilized or the security of the national power grid affected. Such claims have no basis in fact and a casual examination of the coal resources of the Western Coalfield establishes that there are decades of alternative resources available for energy supply.

Thank you for the opportunity to make a further submission.

Yours faithfully,

Keith Muir O.A.M.
Director
The Colong Foundation for Wilderness Ltd
References:


