Submission No 177

INQUIRY INTO COAL SEAM GAS

Name: Mr Anthony J Pickard

Date received: 2/09/2011

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General Purpose Standing Committee No. 5
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1st September 2011

Sir,

Re: Coal Seam Gas (Inquiry)

Introduction

My name is Anthony (Tony) Pickard and I have a small wool growing enterprise in the Jacks Creek area 40km south of Narrabri and adjacent to the Pilliga East State Forest. Eastern Star Gas has a Pilot Production complex (Dewhurst 8) 1500m to the north north-east on an adjacent property. (See photo below).

Aerial Photograph taken from North looking Southward

Killara Property showing Dewhurst 8 Pilot Production Complex

Anthony Pickard's Property Rockdale

I am 8km north east of the Bibblewindi Water Treatment and Bibblewindi Nine Spot complex, and there is a Production sized Core Hole (Dewhurst 6c) 4km to the South.

My property is 320ha in size and has an area of 210ha leased to the Namoi Catchment Management Authority (CMA) as a Biodiversity area, and a further 30ha cannot be developed without a Property Vegetation Plan (PVP).

I have over the course of years since late 2006, watched the march of Coal Seam Gas into the area. Since January of 2009 I have been documenting both in videos and photos the effects that this Eastern Star Gas (ESG) has been having on the assets, both Council and Private, as well as the slow break-down of the local Social Structure as ESG favours one person and organisation over another.

I have seen a Council that is trying to come to grips with this Industry only to have their decisions overturned in the space of less than 2 weeks by powerful lobbying of the some of these same Councillors, the type of lobbying that the normal ratepayer cannot match.

I have seen and recorded (photographic and video) many instances where Council assets have been damaged in the course of Coal Seam Gas Mining in the Narrabri Shire and there has been a clear breach of the Exploration Licences, as well as the Part 3A conditions, and only minor action has been taken by Council and State Government authorities, despite having the breaches reported to them accompanied by the recorded evidence.

These Coal Seam Gas miners pay no rates to Council, except for that on the little land that they own, and yet their proposed Development of 550 Well Sets, is going to cover an area of 2410ha, and yes, the project is mainly in the Pilliga State Forest. However, the Council, State and Federal controlled roads are used to access the area, and with a proposed construction workforce of some 500 and a permanent staff of some 200 when in full production, the movement of these people, let alone the heavy vehicles associated with this project, will put a big strain on the Shire Ratepayers if ESG does not contribute to Council for the usage of Council, State and Federal assets.

Because ESG has been able to get away with so much in the past, I fear that the very action of Coal Seam Gas Mining in an area of such importance to the health of Aquifer Waters, of the Southern Recharge of the Great Artesian Basin, the Namoi River, and the Darling River Basin and hence the Murray Darling Basin, will have a detrimental effect on the health of the water, farming, towns, the State of NSW and Australia's food security.

ESG has not held a full and open public meeting since August 2005, and has instead preferred to sponsor events, teams, and civic sporting related infrastructure (see Part 3A application May 2008, section 4-3). The only general public that they talk to are in small groups of no less than 1 and no more than 6. ESG has addressed Narrabri Council in open session, however it is mostly not advertised and there is very limited opportunity for questions from the public gallery.

Narrabri Council passed a Resolution in May of 2010 that ESG form a Community Consultation Committee. Nominations for that Committee were called for in March 2011, and to date no Committee has been formed. On June 3rd and 4th ESG held an Open Information Half Day, preferring to talk again to small groups, siting fears that a full and open public meeting may be hard to control. Questions were encouraged at these Information Half Days and I was told that my questions would be answered within 14 days. I am still waiting for my answers.

ESG has over the course of the past 10 years started to alter the water quality security of this region.

All this will have a flow on effect through all the surface and ground water systems, and hence have an impact on the social and economic conditions that exist today. While in the short term there may be benefits, these will only be for a small number of people. However, as the effect that this Industry will exert on the Environment via the placing of Treated Coal Seam Water, which is high in Sodium Bicarbonate – 134 parts per million (ppm) in a 230 ppm Total Dissolved Solids (TDS) after treatment water analysis (see page 19, of Attachment I), Sodium Bicarbonate is Alkali in nature and well above the existing levels of the Aquifers in the area. Below is an analysis of shallow (between 59 and 71 metre depth) water taken from my bore in 2009 showing the conditions, however, if quantities of Sodium Bicarbonate enter the aquifer systems, then the existing bicarbonate and alkalinity levels will rise permanently from those that now exist in my bore water.

ESDAT

Gw Sampling in July

Cotton CRC Namoi Catchment

	Electrical conductivity (uS/cm)	TDS (mg/L)	Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Chloride (mg/L)	Sulphate (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Alkalinity (Hydroxide) as CaCO3 (µg/L)	Alkalinity (total) as CaCO3 (mg/L)	Anions Total (meq/L)	Cations Total (meq/L)
EQL	1		1	1	1	1	0.2	0.2	1	1	1000	1	0.01	0.01
ANZECC2000			600#6				1000#7							
ANZECC-Barley	8000#5													
ANZECC-Beef Cattle		10000#14												
ANZECC-Cotton	7700#4													
ANZECC-Dairy Cattle		7000#13												
ANZECC-Irrigation-General							750#8							
ANZECC-Irrigation-Specified			460#18				700#18							
ANZECC-Pigs		6000#12												
ANZECC-Poultry		4000#11												
ANZECC-Sheep		13000#10												
ANZECC-Stock						2000#20		1000#19						
ANZECC-Stock-Risk								2000#17						
ANZECC-Sunflower	5500#2													
ANZECC-Wheat	5000#1													
Australian Drinking Water		500#3	180#3				250#3	250#3						
Early Season Cotton	1500#16													
Field ID G29, Sampled Date-Time 25/07/2009	178	85.71	22	<1	5	3	44.7	0.51	9	<1	<1000	9	1.46	1.39

– my bore figures.

Comments
#1 Unsuitable for Wheat irrigation.
#2 Unsuitable for Sunflower irrigation.
#3 Unsuitable for drinking.
#4 Unsuitable for Cotton irrigation.
#5 Unsuitable for Barley irrigation.
#6 Stunted growth for Cotton and Sunflower
#7 Risk to cotton growth.
#8 Risk of increased Cadmium intake by crops.
#9 Non-satisfactory for stock.
#10 Loss of production and a decline in sheep condition and health.
#11 Loss of production and a decline in poultry condition and health.
#12 Loss of production and a decline in pigs condition and health.
#13 Loss of production and a decline in dairy cattle and horses condition and health.
#14 Loss of production and a decline in beef cattle condition and health.
#15 Increased fouling potential of water.
#16 If used on early season cotton, the final yields could be diminished.
#17 Chronic acute health problems in stock.
#18 Causing foliar injury in Cotton and Sunflower.
#19 Adverse effects on stock.
#20 Adverse effects on cattle.

LocCode = G29

G29.xls 27/08/2009

Analysis of bore water at Rockdale taken in July 2009

What will happen if the quantities of treated coal seam water, as quoted in the Referral of proposed action 2011/5914, containing Sodium Bicarbonate are released into Bohena Creek, a major out flow creek, which for now is ephemeral? How long will the Bohena Creek stay ephemeral with between 42 and 84 ML of water per day put into it and containing between 9.64 and 19.27 tonnes of Sodium Bicarbonate per day?

Even if 20% of the treated coal seam water is used elsewhere that, still leaves between 33.6 and 67.2 ML per day discharge, and the quantity of Sodium Bicarbonate is now down to between 7.71 tonnes and 15.42 tonnes per day, all of it going into an already slightly alkaline water environment. Based on these figures of 80% discharge of treated coal seam water, then Bohena Creek will still become a flowing creek and the Sodium Bicarbonate will still heavily influence the alkalinity levels of the surrounding waters, thus changing the environmental outcomes of the entire catchment and basin water systems.

The standing water level in Bohena Creek today measured over 6km from the discharge point of the

Bibblewindi coal seam water treatment works is 600mm at the 6km mark going to permanent pools on the surface at the point of discharge.

Coal Seam Treated Water Outlet in Bohena Creek

Still it will take a few years for the effects to show, maybe after the gas mining has ceased, but you cannot deposit that much alkali material into the water system and hope it will go away. Currently the health of the Murray Darling River System is being assisted by the reduction and removal of water entitlements from the Agricultural Sector, however, this can be all for naught if as a result of coal seam gas mining and the discharge of alkaline waters is allowed to enter to proceed unabated.

I ask you to read my Comments to the Referral of proposed action 2011/5914, as given to the Department of the Environment, Water, Heritage and the Arts (Attachment 2).

Submission

I will start this submission by quoting from one of ESG's Review of Environmental Factors (REF) dated December 2006 and titled Water Treatment and Disposal Project. The REF concerns the Bibblewindi Treatment Complex and to date of writing this submission, it has no attachments, revisions, updates or modifications listed on the NSW DPI website. A request to that Department has been made, to try to uncover any "lost" paperwork, so until any is found and made publicly available, then that REF and the information contained within is ESG's Operation's Manual (Attachment 1).

Eastern Star Gas states the following (*Taken from page 24 Section 3.3 Geology & 3.4 Regional Scale*

Drainage, The Bohena Coal Seam Gas Project, Review of Environmental Factors, Water Treatment and Disposal, PEL 238, Gunnedah Basin, New South Wales.)

Geologically, the extended area containing the Bohena CSG Project comprises the northern portion of the Permo-Triassic Gunnedah Basin, which forms the central part of the much larger Sydney-Gunnedah-Bowen Basin system. Jurassic and Cretaceous sediments of the Surat Basin sequence unconformably overlie the Gunnedah Basin sequence and outcrop over all except the easternmost areas of PEL 238 where Triassic, Permian and basement outcrops.

The Gunnedah Basin covers an area of more than 15,000 km. sq. And is bound to the east by the Hunter-Mooki Thrust Fault System and the New England Fold Belt, and to the west by the Lachlan Fold Belt where sediments gradually onlap. To the south, the basin is arbitrarily bound by the Mt. Coricudgy Anticline and to the north by the Bellata High, where the Permo-Triassic sequence thins over basement.

The Gunnedah Basin is a true foreland basin developed as the result of island arc accretion to the east. The Hunter-Mooki-Goondiwindi fault system to the east forms the effective present day eastern margin of the Basin.

Jurassic and Cretaceous sediments of the Surat Basin unconformably overlie the Gunnedah Basin sediments and thicken rapidly o the northwest. In the north-western portion of PEL 238, and beyond the limit of the Gunnedah Basin, sediments of the Surat Basin sequence directly overlie basement litholgies of the Lachlan Fold Belt.

The primary CSG target seams in the Early Permian Maules Creek Formation are located in the north-south trending, longitudinal depo-centre and eastern portions of PEL 238 within the Bohena Sub-basin, the coals lie at the depths ranging from 560 to 1000m and do not outcrop.

3.4 Regional Scale Drainage

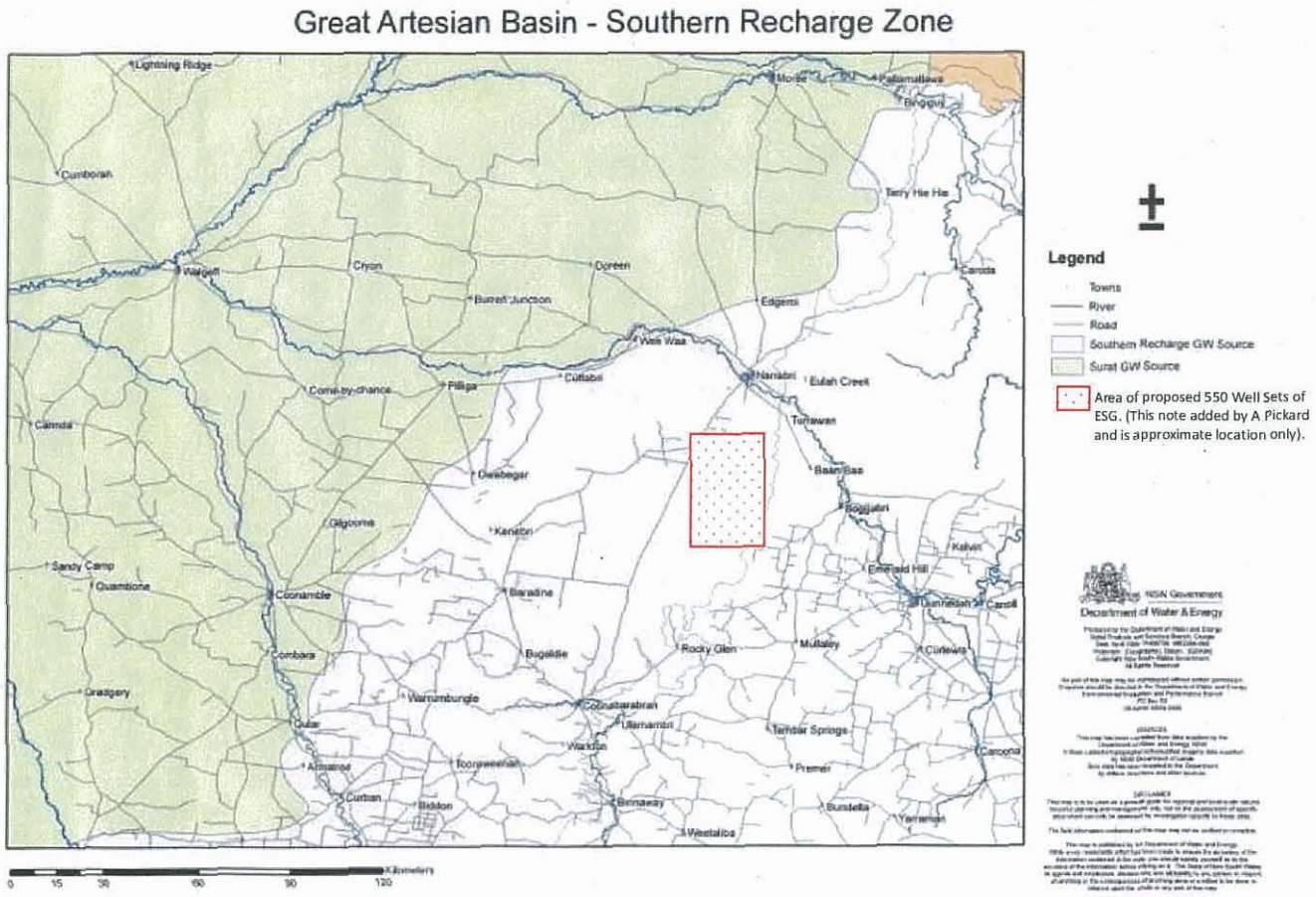
The Bibblewindi Nine Spot Area lies within the Namoi River Basin Catchment, one of the main tributaries of the Barwon Darling River System. The Namoi River Basin covers an area of 43,000 km. sq. and incorporates the region's major centres of Tamworth, Gunnedah, Narrabri and Walgett (Corkery and Assoc., 2004). The Bohena Creek sub-catchment covers an area of 1500 km.sq., and is the major drainage feature in the area. It is ephemeral in nature and flows only with significant rain fall in the catchment associated with significant rainfall in the catchment associated with the Warrumbungle Rangers some 60 km to the south.

I would at this stage like to mention, that the same admissions as above are in all the ESG's Production Lateral Pilot REF's, even the last Production REF, Tintsfield REF (November 2009) has the same admissions as to location with-in the Barwon Darling River System.

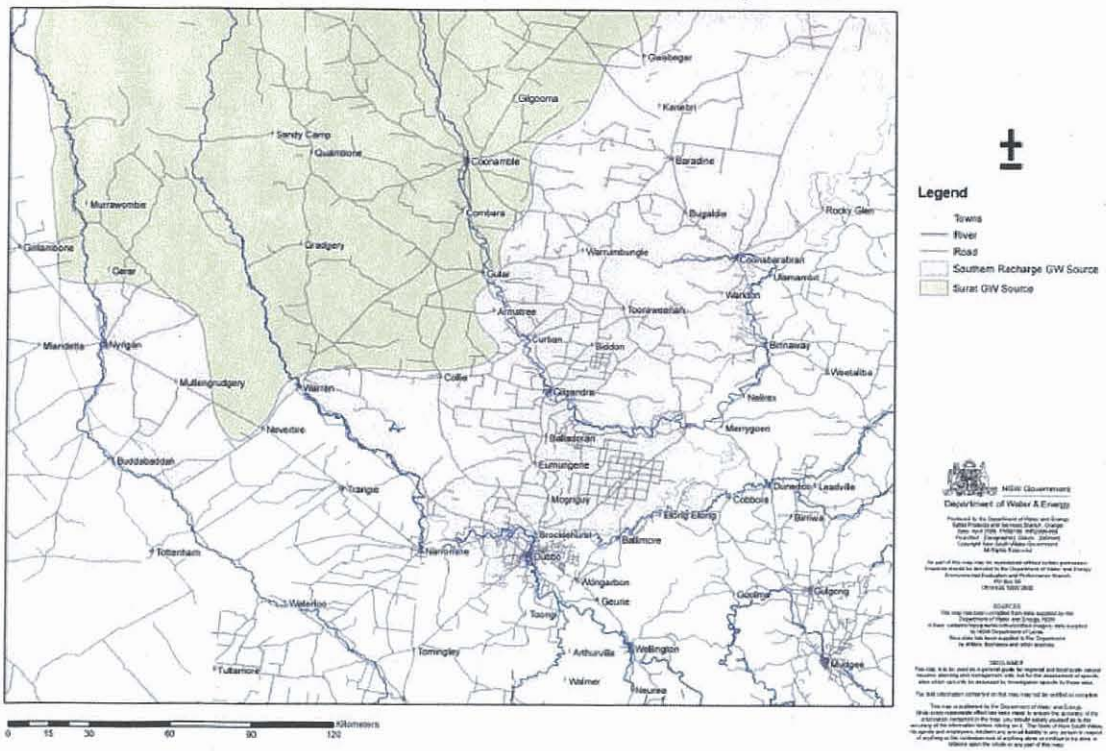
The following is a brief description of my concerns over the activities occurring in the Pilliga State Forest in regards to ESG and PEL238 in relation to how coal seam gas extraction will affect the Murray Darling Basin and associated systems and ultimately NSW as a food producing area.

Firstly, please note that nowhere has ESG mentioned the main under lying feature that underpins 95% of the Lease that they hold, this being the Southern Recharge Area of The Great Artesian Basin. ESG have, by clever wording, led many a reader to believe that their entire operation is in a basin called the Surat, with the geology of Pilliga Sandstone.

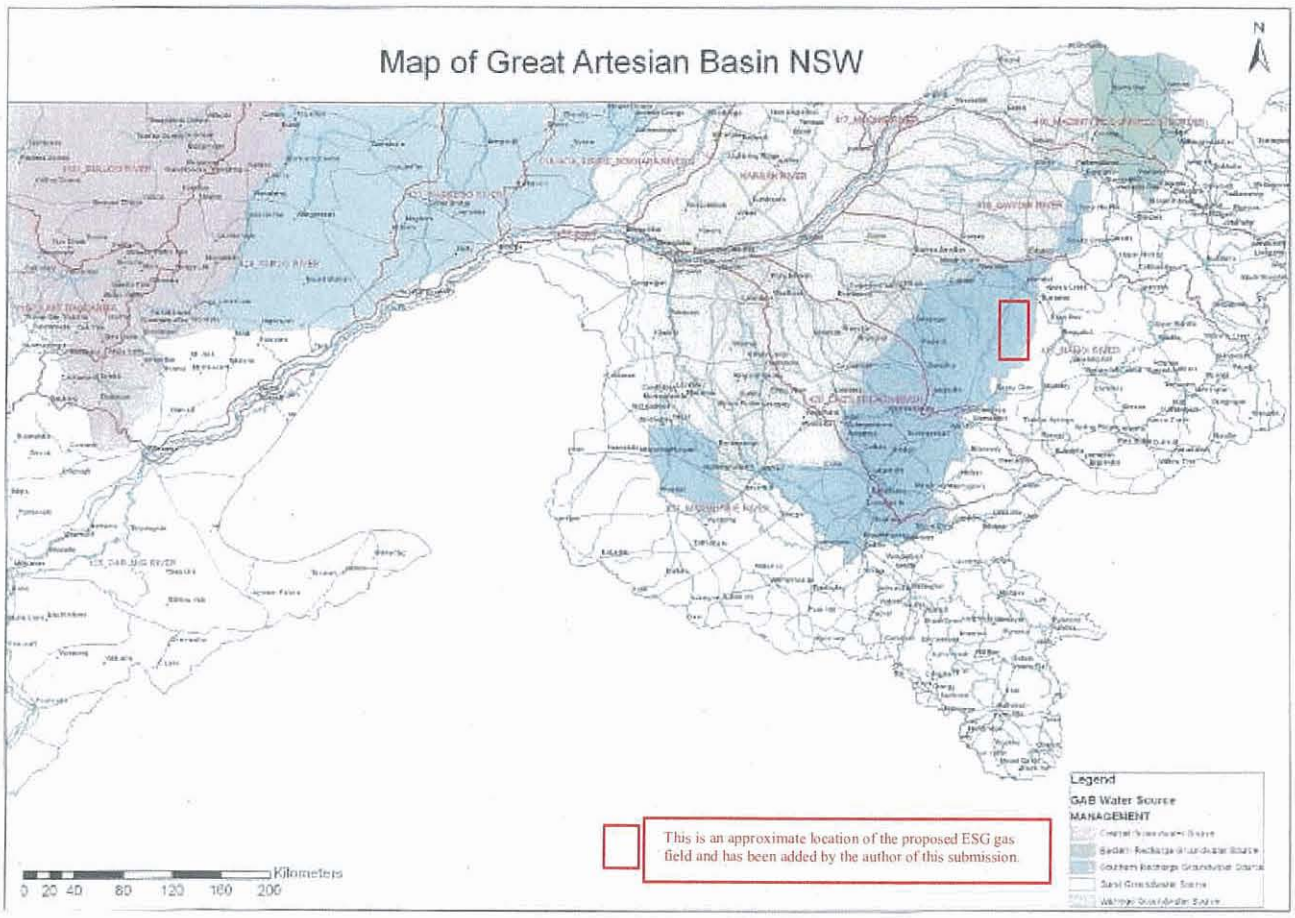
A quick look at the attached NSW Department of Water Map, (also see page 144 of the original Guide to the proposed Basin Plan Volume 1, MDBA publication no. 60/10), will confirm that ESG is indeed operating in all places through the Great Artesian Basin (GAB), and in at least 40% of their lease sits directly on the Southern Recharge of the Great Artesian Basin. All the proposed development is in that area and as there is proven interconnectivity between the Namoi River and the GAB, thus any pollution or aquifer interference must eventually affect the Murray-Darling Basin and its river systems, thus affecting the viability of NSW Agriculture in all its forms.



Great Artesian Basin - Southern Recharge Zone



Map of Great Artesian Basin NSW



This is an approximate location of the proposed ESG gas field and has been added by the author of this submission.

The above 3 maps have only had the proposed 550 Well Sets superimposed. The full PEL's have not yet been superimposed as these are only areas of exploration and at this stage not heavily influencing potential water discharge into the Namoi River system as will occur if 550 Well Sets are approved.

ESG has stated in the Referral of proposed action to the Australian Government Department of Sustainability, Environment, Water, Population and Communities - Narrabri Gas Field Development – April 2011, that "*Preliminary modelling of water production has been undertaken for the project and is estimated to range between 0.08 and 0.16 ML per well per day although production may be outside this range*". That equates to a range of between 44 and 88ML of production water per day from the 550 Production Well Sets. The targeted seam here is **the Bohena Seam or as is sometimes called the Maules Creek Seam.**

What has not been taken into account is the amount of brine concentrate that is extracted from the coal seam water during treatment. Now again, quoting the only public document that is available, that being "The Water Treatment and Disposal Project" REF dated December 2006 (see page 48 of Attachment 1, *5.2.9* Brine Management).

The expected rates of recovery from the treatment of coal seam production water will require the ongoing management of up to 0.42ML/day of concentrates, with an expected concentration of around 43,000mg/L TDS and a relatively neutral ph of +/- 7.5. **ALL THIS FROM ONLY 9 (NINE) WELLS,** because the three at Bohena are not connected to the Bibblewindi treatment area.

A simple calculation based on Eastern Star Gas' own extracted water figures per well, as given in the December 2006 REF (see Attachment 1), of produced water per 9 (nine)wells per day being 1.43ML/day, and based on the current 20 coal seam water extracting production wells:

At a concentrate rate of 0.42ML/ day (1ML=1000 m^3 or 1,000,000L)

(0.42/9) 20 = 0.93ML of concentrate per day

0.93 x 365 = 340.66ML of concentrate per year

Looking now at the proposed Narrabri Gas Field as presented to the NSW Department of Planning, and using the produced water figures as presented to the Federal Government EPBC Comments in April 2011, the following can be calculated:

Now if the 550 well sets are added to the above calculation and only the verticals are extracting coal seam water, then:

(0.42/9) x 550 = 25.67ML/day

or 25.67 x 365 = 9,368.31ML/year

That means a dam of at least 9,368,319.9 m^3 in size just to hold the concentrate production of 1 year and a dam surface area of 94 hectares if the depth is 10 metres, that is a dam whose size is about 500m x 1,880m x 10m, and that is to hold just one year's production of brine concentrate.

Where is this water going to be stored?
Will it be stored?

The only solution for disposing of this amount of concentrated coal seam water, is to process it further to remove the saleable salts (and this has its own set of new problems), or, reinject the concentrate back into the coal seam, again with its own set of problems.

However, the calculation above will be only half the story if Eastern Star Gas decides to install

electric submersible pumps, as they have done at Bibblewindi 21H, these amounts will then double, as will the amount of produced water and treated water discharged into the Bohena Creek system.

As a side note, a tour of Eastern Star Gas' discharge point into Bohena Creek on August 25th 2011, revealed that Bohena Creek was flowing for 500 metres and slowly increasing. A simple check of the flow rate revealed that at the outfall, observed over a period of 30 minutes, was as follows:

Low Flow: Amount of discharge (at 0.5L/10 sec) into Bohena Creek was approx. 3.45ML/day
High Flow: Amount of discharge (at 1 L/10 sec) into Bohena Creek was approx. 6.90ML/day

These calculations are based on the amount of water discharging from the 16th hole from the end of the pipe and its highest point (this is where we considered the best place to give an average flow over the entire 25 hole per row and 5 row discharge. The discharge is not level, but rather goes up hill (see Attachment p9 containing photos and videos taken on day).

While there is no saying that Eastern Star Gas discharges are in excess of the approved and stated 1ML/ day, 1ML/day has never caused Bohena Creek to run so far, the previous recorded best was 200 metres. The weather has been warm and the depth of the Creek water table, measured upstream approx. 800 metres, on the southern side of the X-Line/Bohena Creek crossing where the water table was measured at 900mm depth at a "dry flow cut", and 1000mm deep as a measure from the Creek surface. So water flowing through the sand in Bohena Creek is not a factor. (See from the Attachment p9 how the water level at the outlet has risen and is being maintained).

If the concentrate is not to be processed further and the salts are extracted for commercial gain then the only option is to reinject the concentrate, and that then brings problems with the bore casings, cement, etc, not to mention what it will do to the aquifer systems should it escape into the GAB strata.

Is Coal Seam Gas really worth the risk?

Yet on June 4th 2011, at a Community Information Day, I was quoted a figure based on current modelling of between 7 to 10ML of Production Water from the 550 Production Well Sets. Those who were present were and , both Eastern Star Gas Managers.

I find this difference from the Referral Document to be so staggering as to be well beyond belief. That was not all; the final straw was when, with a straight face, I was informed that Sodium Bicarbonate was not included in the TDS (Total Dissolved Solids) component of a Water Analysis. So then, why has Eastern Star Gas placed this component in its water analysis contained in Attachment 1 and Attachment 3?

I ask you to refer to my comment to this, especially the calculation table (Attachment 4).

Eastern Star Gas' Bohena Coal Seam Gas Project, Water Treatment and Disposal Project REF of December 2006, clearly shows on page 17 that the coal seam gas water has a number of heavy metals contained within it, along with some traces of radio-active material, both active and passive, in fact coal seam gas is linked to long since decayed radio-active material, through the presence of Helium Gas.

Helium is mainly found in natural gas or coal seam gas, in concentrations of up to 7% by volume, and as stated above, was created by natural decay of radioactive elements (Thorium and Uranium)

{source: Helium – Wikipedia}.

Eastern Star Gas, in their submission of 2009, number 77r, to the Federal Senate Inquiry on the effects of Mining on the Murray Darling Basin, stated "there were no heavy metals in the coal seam water," yet their own Water Analysis located in the Water Treatment and Disposal Project REF of 2006, states otherwise.

So who is correct, Eastern Star Gas Senior Management or the Water Testing Laboratory?

At this point I would like to draw your attention to another REF and this one is targeting a different Coal Seam **the Hoskisson's coal seam**, this one titled **Tintsfield Water Management Plan**, which only became available May 10th 2011. In this REF, on page 20 under Water Production Modelling, ESG states, *"The preliminary production modelling carried out for the Tintsfield pilot indicates that water production from the three Tintsfield wells is heavily dependent upon the final technical characteristics of the lateral wells. Early estimates of flow rates based upon drill stem tests carried out on the Tintsfield-1 core hole have suggest flow rates of up to 1000 barrels (160kL) of water per well per day initially before trending downwards to 500 barrels (80kL) per well per day after 6 months in operation. In cumulative terms, the daily water production from the pilot can be expected to approximate 3000 barrels (480kL)."*

I would like to point out that two different REF's for two different areas and from two different targeted Coal Seams give the same Production Water yield (See Attachments 1 & 5). That to me is a bit strange, and gives rise to the thought of **Interconnectivity of the Coal Seams.**

So if this is correct then what about the waters of the Aquifers in the Great Artesian Basin and the Coal Seams? Can the Aquatards have a fault in them, allowing water from above to replenish the waters removed below?

<u>Contamination by Chemicals, Drilling Fluids, Coal Seam Gas Water.</u>

I draw your attention to the following ESG REF's on the subject of how they decommission Drill Ponds.

From the Dewhurst-8 Lateral Production Pilot REF, June 2009 (page 56), Attachment 6 and from the REF, 2008 Narrabri Coal Seam Gas Lateral Program – Lateral Production Pilot A, amended 25/07/08 page 43, (Attachment 7)

These are just samples of the REF's that explain ESG's method of filling in a Drill Fluid Pit. The method used is simple:

1. Pump off as much of the fluid that contains drilling chemicals and the salty coal seam water as the pump can remove
2. Roll out the plastic liner, leaving the drill cuttings soaked in drilling chemicals and salts from the coal seam water behind
3. Fill in the pit, thus sealing the contaminated cuttings below ground to leach into the water table.

I draw your attention to Eastern Star Gas REF titled Tintsfield CSG Pilot and dated November 2009 (see Attachment p10), where on page 32 under section 4.9 Waste Management, sub-section 4.9.1 Drilling Fluid and Cutting Disposal:

At the completion of the drilling activity,

1. *The fluids contained within the sumps will be pumped out and disposed of in the lined evaporation pond located at Bohena.*
2. *The cuttings settled in the bottom of the pit will be removed and stockpiled on the site.*
3. *The liner will be removed from the sump for disposal at the Narrabri waste depot; and*
4. *The excavation will be backfilled with a mixture of subsoil and the retained cuttings before the replacement of the topsoils.*

These drill cuttings are supposed to be no bigger than grains of course sand as stated by ESG in their REFs, however at Bohena 2 and Bibblewindi 22 they have been seen and recorded to be as large as a 50 cent piece. These cuttings also contain a percentage of the drilling chemicals and the salts that have settled out of the drilling fluid and mixed with the cuttings. (See Attachment p11).

It is this mixture, full of chemicals and salts including heavy metals (See Attachment 1, Water Treatment and Disposal Project REF 2006) that will leach into the Aquifer environment every time it rains.

The main drilling chemical is Potassium Chloride which in small amounts is said to be good, according to ESG, however, the product does carry a warning on the Material Safety Data Sheet, Section 12: Ecological Information (Attachment 13), which reads:

"Environment: Limited ecotoxicity data was available for this product at the time this report was prepared. Ensure appropriate measures are taken to prevent this product from entering the environment."

According a Senior Hydro- & Environmental Consultant with the company SRK Consulting *"from nothing to 100%"* of drilling fluids can be lost, *"but [he thinks] they would probably loose at least 50% of their fluids on a drilling program targeting permeable formations with water in it."*(See Attachment p11a).

This chemical has the ability, if the intake is sufficient, to kill a human, and as the Coal Seam Gas Companies will not release any data as to the amount of Potassium Chloride used per well, nor will they release what percentage of this chemical is "lost" whilst drilling a well, the water table and Aquifers could contain a lethal dose and once in the water table there is no way of removal, and no way of knowing who will be affected until it happens.

In Eastern Star Gas' REF "TINTSFIELD CSG PILOT" dated November 2009 (Attachment p10), on page 32 under Subsection 4.9.1 Drilling Fluid and Cuttings Disposal they describe the above disposal method.

In 2009, when I asked of the DII in Maitland, as to how the drill ponds were decommissioned, he described the same process and informed me that it was an approved decommissioning method for all the drill ponds and collection ponds that Eastern Star Gas had. I have seen no other method of pond decommissioning in any REF since or any amended document that is publically available on the internet.

Is the NSW Government willing to gamble that nothing will occur, given that there would be as many as 150 filled-in collection and drill ponds, in the manner described above, within the Pilliga State Forest?

I have at least 7 such ponds within 1500 metres of my house and main bore and within 1000 metres of my secondary bore. These ponds are the ponds of the Dewhurst 8 Pilot Production Complex, and there are plans for a Reverse Osmosis Plant, two (2) associated dams and at least one (1) very large, treated water unlined holding dam.

So why shouldn't I be concerned?

ESG has never spoken to me about their plans; I have only gleaned this information from publically available documents and REF's. (See Attachment 6, REF Dewhurst 8).

If ESG was removing these contaminated cuttings, then there would be a grey trail from every site, due to the tipping trucks not being water tight, thus any fluid can leak out. There are no grey fluid trails visible so the conclusion is that the contaminated cuttings are left on site. If the contaminated cuttings are removed from the site then where is the approved lined dumping site for this material and where is this mentioned in REFs?

I have included some photographs that show the salt build-up around the pond edges. These ponds are all unlined and these salts and chemicals have and will find their way into the water table and aquifers. There also photos showing dead and dying trees and sterilised soil that can only have occurred if the drilling fluid and coal seam water cocktail were allowed to be spilt onto the ground and hence enter the Aquifer System. These photos show a range of abuse of Licence PEL238 conditions over 10 years and are from Bohena 2, Bohena 7, Dewhurst 10 to Bibblewindi West 22 and Bibblewindi 16., (see Attachment 8).

The unlined coal seam water collection pond at Bibblewindi 22 was put in for the company TDC for the purpose of receiving the coal seam water that was bought up as the result of coal seam dewatering pump repairs in 2010. This unlined collection pond has had the salt build up documented since 2010 (see Attachment p12). The unlined pond was filled in sometime between Sunday August 21 and Thursday August 25. Whilst this is not an issue, the following is: "What happened to the salt contaminated soil from around the sides and base of the hole? Where did the brown muddy water outside the fence come from? Was it displaced when the hole was filled in? Look closely at photos on Sunday and then the photos taken on Thursday. That water in the bottom of the pit on Sunday is outside the fence on Thursday. (See photographs in Attachment p12).

Was the hole filled in leaving the salts where they were, or were the salts and soil dug out and taken away? If so where were they taken too?

As for contamination from the chemicals, I have included some photos of Sodium Chloride and Potassium Chloride as found at the site Bibblewindi West 22 in 2009. The stacks are in the open and some of the bags are split and spilling (just after these photos were taken we had 15mm of rain). (Attachment 9).

Also included are a series of photographs taken in December 2009 showing the drill pits at Dewhurst 8, 16H, 17H and 18H over-flowing. The over flow occurred twice, and thus the ponds were washed out twice, this water entered Jack's Creek and hence the Namoi River. (See Attachment 10).

I have also included photos of the Culgoora-2 overflow of December 2010. This site was built in a flood way and had 300 mm of water covering the whole site, thus the Drilling Pit was washed out

and all the chemicals contained also washed out. There are photos that show pallets of chemicals, Potassium Chloride, Sodium Chloride, still in water. These chemicals and drill pit contents would have ended up in the Namoi River or leaching into the ground off-site, and thus entering the Aquifer systems. (Attachment 11).

As a final example of contamination, I include a press release from Eastern Star Gas concerning a spill that occurred in February 2010 into a creek known as Mollee Creek. An attempt to clean-up the spill had been made, however drilling fluid being water with chemicals in suspension, soaked quickly into the ground, taking much of the chemicals and salt (sodium chloride) with it, this in turn will enter the Aquifer system. (Attachment 12).

Potassium Chloride carries a warning from the supplier Rheochem in the Material Safety Data Sheet, section 12: **Limited ecotoxicity data was available for this product at the time this report was prepared. Ensure appropriate measures are taken to prevent this product from entering the environment.** (Attachment 13)

All these warnings, and yet, on Culgoora-2 there were 17 tonnes of Potassium Chloride. The over-flowing pits at the various sites still had a percentage Potassium Chloride in them, the Mollee Creek spill contained Potassium Chloride and all the unlined pits (see Attachment 8) had Potassium Chloride, and this Chemical is used in vast quantities as a drilling aid. Potassium Chloride is readily dissolved in water, so once it is spilt it travels into the Aquifer system readily and never leaves the system once the chemical is below root level. **Too much Potassium Chloride will kill plant, animal, aquatic and terrestrial, as well as human life.**

Nature and Effectiveness of Remediation.

The Petroleum (onshore) Act, may have written clauses that apply to Remediation of Damage, however, there is no one at home when it comes to action and prosecution of these Clauses, and hence Companies, The Senior Management and Directors of Coal Seam Gas extractors, like Eastern Star Gas get away scot free.

What little action that has been taken has been completely useless and actually has helped the Companies involved. (If the stick does not hit hard then why be afraid of it!)

A good, current example of Eastern Star Gas not carrying out any remedial works can be found at the following Bohena sites: Bohena 2, 3, 5 and 7. These sites have large areas of "tree kill" adjacent too, very near too, or down slope of the actual filled in or surviving drill ponds, and are in addition to other environmental complaints to the Department of Industry and Investment, Maitland, over the course of almost 2 ½ years.

The ponds at Bohena sites, according to Eastern Star Gas, were drilled by an earlier exploration company, and hence, Eastern Star Gas is not responsible for the environmental damage caused by a previous operator. The exact reported quote by of Eastern Star Gas on the Local Prime News of August 18th 2011 is:

"The Vegetation damage was caused, in 2001, by a previous operator and the Company (ESG) has been co-operating with Government agencies, and implemented rehabilitation procedures." (See Attachment p13).

Also quoted was the following:

"At all times, Eastern Star Gas has co-operated with Government Agencies and implemented agreed rehabilitation procedures" and "Eastern Star Gas' operating procedures are different to its predecessors. Eastern Star Gas is building a business that can co-exist with the native fauna and flora of the Pilliga."

Stakeholder Relations, Eastern Star Gas.

I doubt if really believes his own words about the environmental damage at Bohena 2 was caused by an earlier Operator, when there was the water pump lifting rig owned by TDC, lifting out the water pump from one of the 2 (two) wells located on that pad, and to add further, there is a photo in a NSW mineral Resources publication showing ESG production flaring the well (see Attachment p14).

Taking into account the above information, and in addition, it has also been recorded in that same publication that Bohena 2 is a production well. Eastern Star Gas did have a major part to play in the drilling of one of the two wells at the location known as Bohena 2, and hence has a direct link to the unlined drill pond where the drilling chemicals and coal seam water, that is now killing the vegetation located around and down slope of the filled in pond site.

There are other sites near Bohena 2 that were either test production units or were placed into full production. Some of these are Bohena 5 and Bohena 7; is ESG going to deny, like they did at Bohena 2, that someone else is responsible for the dead forest only located on the down slope away from these old Drill Ponds?

What of Bohena 4 and 4L, the first lateral well drilled by ESG in 2004? Then there is the development of Bohena 3 by ESG over the well drilling by a previous operator? At all these sites there is "tree kill", and it is all down slope of the filled in, unlined drill ponds.

Even the water collecting in the depressions of the unlined drill ponds is avoided by the majority of native and feral wildlife. On a tour of these wells on 29th August 2011, there were sightings of 4 (four) sets of pig and 3 (three) Roo tracks visible at Bohena 5 only, and none at any of the other filled in drill pond depressions.

As I feel the visual word is better in this case than the printed, I have included photographs of unlined and salt encrusted drill ponds dead native animals inside the well site areas and in the spudded well heads taken at the following sites: Bohena 2, 3,4 & 4L, 5, 7, as well as Bibblewindi 22(2009 and 2011), Bibblewindi 16(2011), Dewhurst 10(2010), Culgrooa 2(2010), Dewhurst 8, 16H, 17H, 18H. I have also included a range of aerial photographs taken in 2010 showing well pads, however, no remediation has taken place to date. (See attachment p14a). I can also produce better than 20 hours of video that shows environmental damage and spill, going back to the middle of 2009, most of which have been presented to the DII but not actioned by them. (See Attachment p17 regarding the list of reports to the DPI, plus video of 26 current reports).

To date Eastern Star Gas has not carried out any serious remediation to these or other sites, either their working or the workings of their predecessors. In fact the cost of such an operation would far exceed the company's value.

No, best to bluff it out until the sale to Santos, then a precedent will have been set as to who is responsible for the damage caused by a previous operator, and Santos,

along with Eastern Star Gas and its Directors will be home free, leaving the NSW Government and the locals, along with all those who depend on the Great Artesian Basin waters, to ponder the costs for now and to future generations.

A perfect example of the attitude that Eastern Star Gas has to following guidelines in relation to Environmental matters, is the NSW Department of Planning Directors Generals 2008 direction, that by December 2009, Eastern Star Gas was to have in place a 3:1 Habitat Offset. This Habitat Offset was not in place in the agreed time and Eastern Star Gas was caught out. So, in late 2010 Eastern Star Gas applied for, and in February 2011, was granted an extension until August 2011 to have the Offset in place. Now Eastern Star Gas is all but sold to Santos, so what will happen now to the Habitat Offset requirement?

Effect Related To Hydraulic Fracturing

This method of stimulating the coal or shale seams in order to give up the gas easily, can and has been proven in many parts of the world, including Australia, to have nasty side effects.
Eastern Star Gas carried out a number of fracture stimulations of the vertical series of wells known as the Bibblewindi Nine Spot and the Bohena wells, including some put down in the Bohena area by a previous operator, First Sourcery. One of these wells is in current production with Eastern Star Gas and is called Bohena 3. Other probable candidates are Bohena 2 (where Eastern Star Gas is currently removing the water pump from a production test well) and Bohena 7 (which was in production and still has all of its plumbing fitted, but has no generator). There could be more fracced wells in the Bohena field.

Records that I have, show that Eastern Star Gas was fracture stimulating its vertical wells in the Bohena and Bibblewindi Fields back in 2004, culminating in September 2006 with four wells at Bibblewindi being fracced in two (2) days.

It was this last fraccing that sent a small earth tremor through the bed rock and caused the gravel packing around my stock and domestic bore to slip and close off most of the aquifers from entering the bore casing. The matter was reported to Eastern Star Gas who promptly denied any wrong doings. The Department of Water in Narrabri was also informed and confirmed, by my description of events, smell of water, and what that water did to the ground when emptied upon it, that indeed the gravel pack had slipped, and they indicated that a small earth movement would be enough to cause the slip, especially in a bore that had been down 20 years or more.

All this was relayed to Eastern Star Gas, who despite what was presented in their answer submission #77r to the First Senate Inquiry into the Effects of Mining on the Murray Darling Basin, of September 2009, denied that the damage was caused by their fraccing, claimed to have offered assistance, but to this day I have not received any. I will not go into the long tale that is contained in both mine and Eastern Star Gas' submissions/responses to that Inquiry. Suffice to say, despite Eastern Star Gas saying that according to a local expert in the matter, I would never remove the old bore because the poor quality casing had collapsed, my wife and I along with a 44 gallon drum and a 13 horsepower tractor removed the failed unit in October 2010, from 59 metres down, with the water supply line full of water and held to the pump by the old rural fittings. Did I mention that that was one (1) year after Eastern Star Gas had said that they had reliable evidence that I was using a new bore? I would like to meet this "expert". Throughout the whole episode Eastern Star Gas never offered any help of any kind, and I am fed-up with this Company being able to deliberately mislead whomever they wish.

That is how fracture stimulation has affected me personally.

I believe the fracture stimulation of the Bibblewindi 9 Spot caused the cement seal between the well casing or casings of the Bibblewindi wells and the Aquatards that separate the Great Artesian Basin and the coal seams below, to pull away from the rock strata and bleed water from the Great Artesian Basin Southern Recharge, to the coal seams below.

This point can be borne out by asking the question; "Why would a company that has vast experience in drilling and hence water control, first put in pumps of one size in the Bibblewindi Lateral Production Pilot A just 4000m to the South West of the Bibblewindi Nine Spot in 2008, and then in 2009, drill two lateral shields, sighting the need for more water removal because the size of the original pumps at the lateral pilot could not handle the volume of water. Then in 2010 ESG applied for and obtained permission to put in larger pumps, because despite the extra pump capacity that the shields gave to the lateral field, it was not enough, and now it is not only the verticals that have pumps on them but electric submersibles have been put down the laterals (horizontal) of the shields as well. (Re: Bibblewindi 21H, see Attachment p16).

So where, if not the GAB, is the water coming from? Where is the science to back up the claims made by Eastern Star Gas that their fraccing has not damaged the seal to the GAB?

While on the subject of fraccing, Santos, in May of 2010 at a Public Consultation Evening held at the Gunnedah Theatre Complex, stated in an answer to a question on fraccing in the Gunnedah Basin Coal Seams, "that even though the seams were vertical they would be fracture stimulating and that the maximum distance from the horizontal gallery that a fracc can go is 250 metres, hence they will be using a 500 metre well line spacing," and that is the well line spacing similar to what Eastern Star Gas has proposed for the Narrabri Project that is now before the NSW Department of Planning.

<u>The Role of Local Government in Coal Seam Gas.</u>

Local Government should have a big role to play deciding what goes on within its boundaries and these duties should include: enforcing, without favour, the clauses contained within the various Licences and Approvals under which the Extractive Coal Seam Gas Industries operate, as well as the Local Government Act. However, a good case in hand where that power should not be granted, due to historical favourable bias towards the Gas Companies, is Narrabri Shire Council.
This Council, along with nine (9) Gas Companies and the Federal and State Governments, contributed, in 2003 (see Attachment p16a) to a study, that had as part of its stated aims, "to find ways to ensure that any existing Regulations that may obstruct the development of the Coal Seam Gas Industry, be identified," and then recommend changes to these Laws, Regulations and Rules.

Narrabri Shire Council, unfortunately, does not have a good record when it comes to enforcing even the Local Government Act upon the coal seam gas Company Eastern Star Gas. This failing goes back to January 2009 when Council was informed that a mining camp had been set up on private land, cleared for the purpose, and that this camp had been occupied since mid-December 2008. A search of Council records showed that no Development Application had been made, despite the Council requirement for a DA stating that if the temporary number of people residing were more than a prescribed number or the stay longer than the prescribed time exceeded the Councils Regulations, then one was required, and consequently, Eastern Star Gas was notified and put in the necessary Development Application. The camp was approved in July 2009.

No action was taken against either the owner of the land or Eastern Star Gas for this serious breach

of the Local Government Act and Councils own Policies.

There is more! In the course of putting down the pad for the camp, Eastern Star Gas' contractor badly damaged the Council road known as Westport Road to the tune of $450,000, by Councils estimate. Eastern Star Gas eventually paid the Narrabri Shire Council in March 2010, $124,487.00, of which Council spent $97,832.67 half repairing, half the length of Westport Road that was damaged, and putting the remainder, $26,654.33, into the Councils General Fund. No entered record for this money has been found in the Councils Accounts. (See Attachment p17).

Then there is the Mollee Creek drilling fluid and coal seam water spill (see Attachment 12), that occurred on Council controlled land in February 2010. Nothing has been done regarding this matter either.

Then there was the Collins Park Lighting Committee, which as an official Council 355 Committee had the same powers as Council. This committee approved without application, a large advertising sign for Eastern Star Gas to be permanently displayed. The only problem was that in May 2011 of Narrabri Shire Council admitted at a Council Meeting that that Committee was an ILLEGAL Committee, and hence, had no powers to grant Approvals. Council has been requested to remove this illegal advertising for Eastern Star Gas, but too date the advertising remains. Eastern Star Gas knows that the sign is not approved and they have not ensured that it comes down, as any responsible corporate citizen would. Hence they have gained advantage by illegal means.

<u>Relative Air Quality and Environmental Impacts.</u>

This subject is touched upon in every part of this submission, and so I will be brief.

Not being an authority on the subject, but speaking as someone that has read and observed some of these impacts, it is fairly obvious that some, if not all, of the practices associated with the extraction of coal seam gas do add to the accumulated level of methane in the atmosphere and also to the environmental damage as found in the Pilliga State Forest.

Even Eastern Star Gas has admitted that there is environmental damage to the Pilliga State Forest caused by a previous Coal Seam Gas operator (see Prime Tamworth 7 News of 18-8-2011, statement – Attachment p13a). Eastern Star Gas will not admit to causing any damage themselves, however reports to the DII show otherwise. If they did not, why then in early August of 2011, in response to my 26 complaints (see Attachment p17a), did the DII have four (4) of its Maitland Field Compliance Staff, two (2) DECCDW people and a person from state Forest here, according to of DII Maitland, at my kitchen table.

As for other environmental impacts that this industry will have on the natural environment, that will greatly depend on how long it takes for all the buried Drilling Chemicals combined with the Salts bought up from the Coal Seam to leach out and start killing the vegetation and how long it takes these chemicals and salts to be noticed in the GAB Aquifers and river waters. But once in and noticed it is too late.

I will point out in fairness to Eastern Star Gas, a lot of what they are doing in terms of pond decommissioning and treated water releases, even the release of raw methane into the atmosphere, was known to the Government, because Eastern Star Gas put it in print and obtained Government Approval, but unfortunately there are many instances where they have exceeded the approval either by accident or deliberately.

That then brings us back the lack of Government control and policing of the industry.

Eastern Star Gas has the amount of methane that it is releasing to the atmosphere on pages 5-23, 5-24, 5-25, 5-26 and 5-27 of the Part 3A Environmental Assessment of Project Application 07_0023, dated May, 2008. The same figures are again printed on page 31 of the PAL 2 Bibblewindi Lateral Pilot – Supplementary REF dated June 2009, and again on page 45, 46 of the PEL 238 Tintsfield CSG Pilot REF dated November 2009. This company has, and is still, venting direct to the atmosphere, along with flaring and consuming the gas for power generation.

Eastern Star Gas has been caught leaving open main venting valves on low level drains, and now, at the vent on the well heads themselves (see Attachment p18). These photos show 1000 L clear plastic tanks that are open at the top and have yellow hoses running into them from open valves attached to the gas lines. The water in the tanks is darkening to black from the material bought up with the gas from the coal seam; a tar like substance, mentioned later in this submission.

I will let my photographs do the talking for me, as they show a recorded history snap shot over the past 2 ½ years, and if needed I can provide over 20 hours of videos some are included as Attachments.

Known Side Effects of Burning Methane Based Natural Gas.

I can speak with a fair bit of authority on this subject, having owned and operated Blackheath Heating Centre in the Blue Mountains, where we were agents for Brivis, Braemar, Beefeater and Rinnai. I carried many installs of the afore mentioned units.

The manufactures of condensing exhaust gas heaters and that includes Brivis (see Attachment p18a), have a section where they warn the installers of such units, to keep the condensate away from cement and copper earth stakes as it is acidic.

The early Brivis High Efficiency units had a problem handling the condensed acidic exhaust, as this ate away a plastic fitting, prompting replacement of this part.

Now this warning applies to the products of the exhaust and is a direct reference to the dangers of the products of combustion. The non-condensing heaters have the same problem with their exhaust, it is just that in most cases the condensing occurs away from the exhaust point and is not noticed because of the exhaust dissipation, and however the burning of the gas still creates an acidic vapour. Nowhere is this more noticeable than on a cold day in a cold climate and I am sure that many of you have noticed vapour trails coming from gas heater exhausts on roofs.

In the Blue Mountains, on many houses that are equipped with roof exhausts, have a stain of acid attack either on the concrete roof tiles or on the metal roof iron. This is a direct result of acids in the exhaust. Even within the house this exhaust causes problems with premature failure of many fabrics due to rot caused by gas heater exhaust.

Why, even the NSW Education Department issued guide lines for the health of students and teachers in regards to un-flued gas heaters.

Problems are known with regard to burning gas containing methane and at Government level.

I have been observing the flaring of the non-required coal seam gas that Eastern Star Gas is burning

at the Bibblewindi Complex. Since the start of my observations in early August I have noticed a steady build-up of black smoke and red flame associated with the main flame itself, as a holder of First Class Motor and Second Class Steam Marine Engineering Qualifications, the flame was not right. This indicates that there was a benzene or tar influence in the flame (see Attachment p19). This is borne out when you look at the dark colouring of the water in the 1000L plastic tanks that are attached to the open vent lines of Bibblewindi 24 and 25 (see Attachment p18). I can also supply video of both the venting and the flames taken on August 25th, 2011, and by the deposits found at the automatic vent on the western side of Bohena Creek on the gas supply line from the Bibblewindi 22, 23, 24 and 25 gas/waterline (see Attachment p19a).

How Gas Mining Has and Will Impact Upon My Property and Wellbeing.

As a committee it is important to examine all the impacts of Coal Seam Gas Mining. The impact ESG's operations are having on my wife and I is very stressful in that we don't know what the future holds regarding exactly how much our property is going to be affected by the proposed development of Coal Seam Gas Mining. As ESG has never directly approached us, we have always initiated contact with minimal to nil reciprocity. We have found the whole situation to be mentally draining and stressful and extremely time consuming as it has taken my wife and I away from our farm duties.

My wife and I have invested both time and money on improving our property which we had hoped to pass on to family members, however, due to the uncertainty surrounding the possible effects of Coal Seam Gas Mining and the inability of governments to make decisions regarding this industry and adequate compensation choices to landholders, we are in a constant state of limbo and have seen our property value decline.

My property, which is 322.9ha in total size, has a Namoi CMA Biodiversity area of 211ha, so that leaves 110ha, of which only 80 hectares is suitable for income.

Over the course of time and with the help of Namoi CMA programs, I have developed a strategy of appropriate sized "cells" that range in size from 2ha to 10ha. These cell type paddocks enable the stock to be moved around to obtain the best feed and to allow the cells to recover, hence causing no environmental damage as the older methods tended to do, whilst allowing more stock to be carried than the older methods.

However, as a consequence of this, it means that any, drilling or maintenance activity by the gas companies, along with the gas wells, roads and associated infrastructure, on my land, would not enable the use of cell grazing, and hence I would not be able to farm.

I also have concerns over the control of feral animals, especially those who have a tendency to attack sheep and other domestic farm animals, of all shapes and sizes as well as ages.

Who is going to lay the baits in the Forest, for feral animals, when it is full of gas wells and associated infrastructure? What about the farmer's right to protect his animals with a gun? How can a farmer be assured that at some point of time the gas field employees will not allow their dogs to escape and attack the farm and native animals on his land? Even animals that have been abandoned, because the owner is moving on, will pose a big threat in itself, as it does now, but more so if there are bigger numbers being abandoned.

Legal Rights of Property Owners and Property Values

With regard to property rights it appears that there is no fixed basis in government policy or in the Petroleum (Onshore) Act for adequate compensation for inconvenience or loss of productivity caused by Coal Seam Gas Mining, unlike the Coal Industry which has established principles in dealing with these matters. It all seems to be left up to the strength of character and negotiating skills of the landowner versus the Coal Seam Gas Miner. As a result of this imbalance in the system the landowner will always come off second best. The landowner's rights should be protected by Government legislation.

What rights have farmers when one day one politician says one thing the next he says another. Politicians say we need the Coal Seam Gas Industry for the benefits it brings in income to the State, as well as the so called State self-sufficiency and dependency on others, but will not talk to the farmers, only to the supposed Farming Industry Representative Body.

Really what is prime agricultural land? How do you define it? What about sustainable grazing country, is that not prime also?

So really, do farmers have any rights?

I know that my property has already suffered a down turn, when only 3 months ago I got one of the local real estate agents, with years of farm experience, to value my property. In fact, this agent valued my other property 2 years ago, and gave an accurate answer within 24 hours. Yet, he could not give me an answer at all, except to say, why not offer it to the gas mines or a neighbour, the latter offered $350,000, take it or leave it 18 months ago. That price was well below the then value of $400,000. So what chance now? The gas miners do not buy, and they pay very little for the Government given right to do what is needed to extract the gas from the coal seam.

What are my rights?

What plans do the gas companies have in that case?

There is also the question of access to my stock dam, not to mention the matter of a contract with the Namoi CMA for at least another 7 years for the Biodiversity, the Soil Conservation Dam area and the Stock Dam (8 years).

From my observations of the gas company Eastern Star Gas have a very poor record of closing gates, an undesired habit where stock is involved. Then there is the noise of the drilling, 24/7 for the duration of that activity. I have already had cause to lodge a complaint in 2009 about that to the DII, the complaint was upheld. Not to mention the dust generated by the activity, and then once all the associated wells and infrastructure are in place, there is the constant drone of the well head generators the sound which, on a still day or night, can travel long distances (we can hear the generators at Bibblewindi when the conditions are right).

I also have a major concern, given what I have already observed first hand of this industries environmental record, about the industry's ability to prevent any form of accidental spill of either drilling fluids or the coal seam water on my land, or soil and water contamination caused by the practice of burying the contaminated drill cuttings on the site of the disused drill ponds, on neighbouring or near lands that may have a direct or indirect impact upon my land or my water source. Will my property be able to recover from any of the above described causes?

If the property cannot fetch a good and fair price on the open market because of the gas industry activity then who will compensate me, and at what rate?

Then there is the question of the value of my land not only for selling but for rating. Will the local Council amend their rating policy to compensate for the drop in the value of my land and who will compensate the Counsel for loss of income?

Contribution of CSG to Energy Security and as a Transport Fuel.

This is a very complex issue, as the proposed gas field at Narrabri will only be supplying a small percentage of the total extracted to the Australian market, and like Queensland most of the gas will be exported overseas to fill a growing market. The Australian people will be the mine of the world and left with a token amount and a monumental problem if the science, as provided by the gas companies goes only a little bit horribly wrong.

There is a raging debate as to the actual amount of gas released to the atmosphere during the extraction, processing and transport phases of the operation. Then there is the actual burning, how is it to be done? What type of power plants? Boilers, gas turbines or reciprocating engines? What temperatures are the exhausts going to be? Will they be hot enough to create nitrous oxides in large quantities or too cold and produce an exhaust that is high in water vapour saturated in carbon dioxide and hence acidic (see: Known Effects of Burning Methane Based Natural Gas).

With regard to the use as a transport fuel, yes it has some uses: ships can use the boil-off as a fuel, and large vehicles can use it as a fuel also, but not cars at this stage due to the size and weight of the pressure storage tanks needed. Then there are the filling stations and who will operate them, not to mention the added risk of gas escape at these points. What is the range (distance of travel) of these vehicles? Can a farmer use this fuel simply and safely in his existing tractors with simple conversions, or will he need to buy a new one? What is the calorific value of this fuel compared with, say existing or bio diesel?

Really is the transmission to this fuel really worth the risk, given that even the gas industry admits that it is only of short term in nature?

In a document found on the Narrabri Shire Council's website, written in 2007 titled "Assessment of Opportunities for Narrabri Shire from Coal Mining & Gas Extraction in the Gunnedah Basin," there is a small entry that intrigues, and it goes like this:

"NSW is locked into long-term gas supply contracts with the Moomba gas field in South Australia. The demand for gas in NSW is however growing and the State is purchasing gas to meet the additional demand from other suppliers."

Surely, if this is the case, then at what cost to the NSW tax payer will the cancelling of these long-term contracts be? If they cannot be altered at no cost, then what about the gas developments in NSW? Does that mean, that the gas produced in NSW, has to be sold off-shore?

Royalties Payable to the State.

There is at present a moratium on any royalties from gas mining for 5 years from the commencement of production, and a gradual increase to 10% over a number of years. This is wonderful for the gas

companies as the start of the exemption of royalties is not really clear. Is it meant that the royalties are payable on the whole field 5 years after the first well is bought into production, or is it on each well as it is bought into production?

If it is the latter then a smart gas company could abandon a well 4 years and 364 days after commencement, and avoid any royalty payment. Or another option is to cease production at the 4 year 364 day mark and carry out some work on the well itself that improves the performance of the well, hence, in effect creating a new well, and the time period starts again.

Where will any royalties be spent? Will it be in the Shire that is affected by the, exploration and production of this gas? How much will those areas get? Who will determine where this 'windfall' is to be spent (leaving that decision to the Shires themselves could possibly mean that the area and infrastructure most affected by the gas companies will not get adequately served).

Regional Development, Investment and Employment

Sure there is a good opportunity for many in the community to have well-paid jobs, but at the expense of what other industry? In this region the main employer is the farming sector, and if the work force that is needed for that sector is diminished to a figure below what is required to keep the agricultural sector sustainable, then that industry will contract, and the unworked lands are left to go to whomever. The agricultural industry will never fully recover from the down turn that a work force shortage will bring.

Coal seam gas is not a renewable resource and once a gas field is exhausted that is it, save, one hopes, for the rehabilitation and then that is the end. The boom has gone, industries that set up relying on the coal seam gas will be forced to close or move on, what then will be the prospects for employment of the gas field and other associated workers? Agriculture down sized as a result of losing farm workers to the coal seam gas industry and when the coal seam gas is exhausted the agricultural industry will not be able to take up many of them, besides the skills gained in a gas field may not be conducive with agricultural enterprises.

So what then is the real gain in terms of Humanitarian costs?

To further illustrate this point, our local paper The North Western Courier, not long ago carried a story showing that the rental market in Narrabri had risen to $750 per week for a basic 3 bedroom house. The installer of my solar system informed me that, in May of 2011 he and 3 other people were paying $1000/week for a 3 bedroom plus sleep-out.

The cost of fuel in Narrabri, with a Woolworths 4 cent discount docket, after discount is 1 cent cheaper than Boggabri and 3 cents dearer than Coonabarabran. Gunnedah Woolworths is 139.9 for E10 after discount while Narrabri is 142.9 after discount (figures as of August 31st 2011).

Electricians are harder to get, and waiting times are getting longer, especially for those on poorly serviced roads. There is a critical shortage of other tradespersons within the area as well.

Then there is the problem of fly-in workers staying in purpose built camps, good for the camp owners, bad for the town in general and only good for those few businesses that can supply the camps with the volume of product required at the price demanded.

Yes, employment will be good for the short term and things may even prosper for some, but for some

in the short term there will be nothing, and for many and the town after the short boom of the gas bubble there will be nothing, because nothing will be put in place to cover such an event, it has not in the past, and if history is any thing to go by, there will be nothing in place for the future.

The Petroleum Act 1991 and Interaction with any Other Act

As far as I have read and understood the Petroleum (Onshore) Act 1991, it seems to be a stand-alone act with little reference to any other Act.

The Petroleum (Onshore) Act needs to be crossed referenced with other Acts, such as the Minerals Mining Act, The Local Government Act and the EP&A Act, to name a few, for without such a link there is no meaning in any words uttered.

As an example; earlier this year Narrabri shire Council was approached by Eastern Star Gas to do a seismic survey in the western part of the Shire, covering 260km of Shire roads. Now as the Shire is responsible for the roads and road verges within its Shire boundaries, and just like any other property owner, the Shire Council has to have a negotiated Access Agreement before any work can be carried out on Council's Assets.

Eastern Star Gas gave a presentation at a full Council meeting, which included the public gallery, and told the Councillors that it did not need Councils permission to do the seismic survey on the Council Assets as the State Government, via the Department of Industry and Investment, had given them permission, but they (Eastern Star Gas), had decided, in the interests of maintaining good relations, they would ask Council's permission. During Eastern Star Gas' address there were continual veiled references to possible legal action if Council did not agree to an automatic Access Agreement to the seismic survey. Council did not agree, at least the Councillors did not agree and hence, the seismic survey, at least on Council roads, has not gone ahead as yet. This just shows that Council can be subjected to pressure if it does not know its grounds or is not part of the Act under which these gas miners operate.

Another example is road damage caused in the course of exploration and development. Councils just do not know, or are not certain of; their rights to compensation for damages to Council Assets and/or infrastructure under the various licences and approvals the gas companies operated which are contained within the Petroleum (Onshore) Act 1991.

The laws around coal seam gas extraction may have been easy to understand once, however in July of 2004 a Committee was formed consisting of Federal, State, Coal Seam Gas Companies and Narrabri Shire Council to, amongst other things, *"provide options to overcome the physical and regulatory constraints to further exploration and address those significant factors that frustrate the servicing of potential markets in the region."* Narrabri Council contributed $5,000 to the Study, which was carried out by Roland Sleeman, now an Eastern Star Gas Director. Narrabri Shire Council was the only Council that contributed to this Study, and had a seat on the Management Committee. (See Attachment p16a).

This Committee made many recommendations to apply to have the laws around the Pilliga State Forest changed to ensure that it was always accessible for coal seam gas exploration and development. Other recommendations were in respect to pipelines, community service obligation payments, direct subsidies, State-based regulatory activities and requirements, land access negotiation processes, the interaction between coal and petroleum legislation, the respective rights of parties under that legislation, and an overhaul of the State pipeline licencing requirements.

Really Narrabri Council assisted in recommending the mess that it finds itself in today, along with the rest of NSW.

The title of the Report is: "Facilitating the Development of Natural Gas in North Eastern NSW", and is available free from the DPI Bookshop.

Conclusion

My concerns about the effects that the Coal Seam Gas Industry are not in any way, in order of priority.
I have grave concerns for the future of the Pilliga State Forest, for the environment in general, for all agricultural lands in NSW as well as my own land.

I have concerns for the aquifers not only of the Great Artesian Basin, but all the aquifers that under-pin both big and small rural production that has fed this Nation and supported many others through our export of clean, agricultural products.

To allow an industry, that by its own admission, is short term and has never produced any real convincing science or studies to back up its claims that it has not and will not in any way affect any of the environments that exist around the areas of its operation, to sacrifice the future of our rural sector just for someone's short term gain is so hypocritical as to beggar belief.

There is plenty of visual evidence that this industry is having a detrimental effect on the environment.

As has been put in the above any introduced change to the natural established existing order in the past has had consequences that are now well evident and permanent (dead trees and ground around Bohena and other wells). The introduced alkaline waters will travel quickly and spread fast in the surface waters, and who knows will even dissipate at a fast rate, but it is the alkaline waters that enter the slow moving ground water aquifer system that is the problem. Once the alkaline waters enter the aquifer systems there is no ability to remove them, hence, these aquifers become the bank to supply the surface waters with a highly alkaline water recharge, either through pumping or through the natural process of interchange.

The effect on the towns and communities and the food and agricultural producers that rely on this water will be devastating.

This will not happen overnight and the effect may not be fully felt for 20 years or more, but if alkaline water, the bye-product of Coal Sean Gas Mining, is introduced into the water supply chain, then the long term viability of this Basin and all the water supply areas that may have Coal Seam Gas Mining in their region, is bleak indeed.

We know too little of the long term effects of this finite Coal Seam Gas Resource, it is non-renewable, but does contain many unanswered questions.

This will not be a one off, for already the water introduced into Bohena Creek is having an effect on the environment with its introduced rising water levels in a naturally dry area. This area is acid soil and Eastern Star Gas is introducing alkaline treated coal seam gas water, so something will change. **You cannot mix acid with alkaline and not have a reaction.** The effect that this introduced alkaline water will have on the waters of the various naturally occurring alkaline aquifers, where the

level of alkalinity is relative to the depth, increases the levels of alkalinity all the way through the complete water chain, thus having an effect on the entire viability of the Namoi River water system, the Barwon River systems and basin, the Darling River systems and hence the Murray Darling Basin affecting social, environment, food production, land use and the hence the individuals and communities that depend on these river and basin systems for their very existence.

There are various studies still being undertaken, ie the Namoi Water Study, and these should be taken into consideration when making any decisions regarding Coal Seam Gas Mining.

I have not singled out Eastern Star Gas; however, as they have applied to go to full production, and are in my region, and as I have experience and first-hand knowledge with the effect on the local environment of their operation and that of the Companies that they have taken over, I felt best to concentrate on an area where I live, and how ESG has and will affect the area in which I live and run my Farming enterprise, small though it may be.

I have only pointed out the problems with the company operating in my area, but if these problems are indicative of the industry, then it is an industry that NSW could do without.

What has been provided here to back up my comments is but a small percentage of a photographic and video collection on the activities of the Coal Seam Gas Miner, Eastern Star Gas. If you require any further photographic or video documentation please do not hesitate to contact me.

For extra background information please refer back to submissions:

- The Effects of Mining on the Murray Darling Basin of September 2009 (Submissions 77, 77r and the Reply to 77r – Attached).
- My Comments to the EPBC Inquiry of April/May 2010 reference to 2011/5914. (Attached)
- The Murray Darling Basin Inquiry into the effects of coal seam gas mining on the basin (July 2011). (Attached)

Yours sincerely,

Anthony J Pickard

Submission 0177 – Attachments

Attachment 1:	REF Water treatment and Disposal Project
Attachment 2:	Comment on EPBC referral 2011-5914
Attachment 3:	ESC Facts Sheet CSG & Narrabri's water resources
Attachment 4:	Water Table calculation exert from EPBC
Attachment 5:	REF Tintsfield Water Management Feb 2010
Attachment 6:	REF Dewhurst 8
Attachment 7:	REF Lateral Production Pilot A
Attachment 8:	Photos – range of abuse of Licence PEL 238
Attachment 9:	NaCl & Kcl on Bibbklewindl 22
Attachment 10:	O-flowing drill ponds at Dew8 CSG Pilot Dec 09
Attachment 11:	Flooding of Culgoora 2 core hole Dec 2010
Attachment 12:	ESG Media release Mollee Crk spill
Attachment 13:	Potassium Chloride MSDA sheet
Attachment p9	Bohena Creek flowing as result of Water Discharge
Attachment p10	REF Tintsfield CSG Pilot Nov 2009
Attachment p11	Photos – lumps of coal extracted Salt build up
Attachment p11a	Email from SRK Consulting
Attachment p12	Photos & Video of Bibblewindi 22
Attachment p13	Prime 7 Fox's comments Bohena 2
Attachment p14	Bohena 2 TDC Rig removing CS water pump
Attachment p14a	Collection of photos
Attachment p16	REF Bibblewindi Shield Laterals
Attachment p16a	Narrabri Council & ESG 2003 study
	Submission to MDB Inquiry CSG Impacts
	Submission - Comment to EPBC