



Roundtable for Unconventional Gas Projects in South Australia

Exhibition Hall, National Wine Centre

Friday, 15 March 2013

Minutes

Attendees: See attached attendee register

Apologies: See attached apologies listing

Minutes: Yolanda López (DMITRE)

Introduction: Barry Goldstein opened with inviting attendees to take part in a brief opening discussion.

SG: Buses loose power with LNG therefore they can't handle the route – need dedicated engineering

AD: Data being accounted for

- Data re health from overseas
- Asking government to provide, inform policy

LNG for transport – micro LNG plants

- Get in touch with manufacturers
- Contract fuel price for years

AF: There should be LNG between Melbourne & Sydney

BG: This is a big issue for transport

- May go electric
- Savings per capita – cost per user will be less (production)

BR: Longer term unconventional, short term – lower unit costs for operators

BG: Problem with LNG – distance you can travel, emissions from diesel is better than LNG

GC: Water requirement is still unknown

BG: Clarified from Halliburton – understanding is 30 mega litres

- Enable people tenure

- Oil going up within 2 – 5 years
- Oil producers and gas producers work together re logistical issues
- If there needs to be more than 60 mega litres / day

GC: This is not enough per day

BG: Needs to be reused



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Breakout Session 1: Supply-chains – Paper #7

Discussion commenced: 9.40am

Discussion Leaders: Paul Goiak (DMITRE) and Barry Goldstein (DMITRE)

BG open: Part of the challenge of a high cost country is getting the products competitive on an international basis. If we don't get productivity competitive there will be a consequence. We need to learn from past experience, start from the existing knowledge base. Supply chains need to be more than 'drive in drive out,' they need to be efficient. If companies can reveal what are their supply chain requirements people can compete with this and bring down cost. Early warning is good and we don't want to sand bag the perspective.

It may be good to make a Gantt chart that includes rig versus years (from Thursday's session). This is what we will be asking people to speak about this afternoon, trying to elucidate what is the supply chain. Questions:

- How are we going to get the people / get an individual doing more than they are now regarding productivity? Facilitate people to acquire more skills.
- ???: Rather than just cooperate look for commitment to bring these people in. There is a resource shortage but we need to fill the initial stage, then people can be brought in by service companies but firstly a commitment needs to be made. From there develop cooperation to develop home grown resources.
- BG: What is the hurdle service companies are facing that makes them unable to make the commitment? What do you they need to see?
- ???: Commitment shown by Chevron has stopped. To put down large amounts of money – that is the start of commitment.
- BG: Knowing the cost for deliverability / LNG / investment we need more of the likes of Chevron coming in. We need to see the financial capacity of the players in a basin.

KC: There are different phases, currently those phases include:

- The exploration of play
- The development
- The construction
- Operations

There are different labor requirements for each phase. It's great the Government is thinking forward, they may even be getting a little ahead. Look at what we need for exploration plays etc and then build it up.

Action item: BG to provide chart with the different rigs with information.

BG: We can then see where we are in terms of progressing. Need to break this out into phases to recognise the mile stones and in order to be competitive each company needs to move in their supply chains. Also, can we get the Joint Ventures to work together in a way as to not go out separately but together with their number of rigs / plays? Become a bigger customer earlier.

KC: The big focus is on construction workforce and the operations workforce which is larger. They need to be experienced / technical people.

?: 15 year forecast in probabilistic terms: from 6000 wells to 1500 wells on something like a P90 where we want to compete. We need a good sense of where we are on the trail, start slow and then hit points. Also need a really good sense of where these inflection points will be (on all sides) as this adds to the decision of importing etc. It is fundamental to get to some agreement on projections including equipment, materials etc.

BG: Paul needs to get a clear understanding of the 'what ifs,' where the inflection points may be, therefore we need to start to plan now.

PG: PG's background is in manufacturing. He has been able to see many disciplines – where are the opportunities in this state? Looking for the high level themes which we need to focus on, do we need to develop centres of excellence? Educate local people on Unconventional Gas? Where should we be locating and clustering our industries to support the Cooper Basin? Realistic feedback is needed, especially through research and development. Where are the holes in this and where can Australia play a major role? Do we need to be talking about developing capability in Australia? Also, pre qualification in SA / Australia, we need to get an understanding from industry as industries can assist

KC: Current leading WA projects have proved there is a large pay off for local business if you can get it right. Do this by advertising well in advance for local business, successfully bidding for work, ensure safety ratings are meeting international standards. Supply-chain in WA Government has supported local business through website projects. Connect and advertise all the information available to the public. A similar website may be good for SA. Chevron make use of the local WA Chamber of

Commerce and Industry as they can provide an independent third party assessment regarding local steel manufacturers. Make clear the hurdles that need to be met.

BG: The construction phase – we envisage the next big construction project would be another gas plant in the north, based on the fact that we already have some there. As far as going to Darwin, we don't anticipate an LNG plant in SA. We do anticipate head room in existing plants. In future, this may float from one to the other; we need to see how the resource performs.

CT: Prequalification issue – encourage local supply of what is expected in the local oil and gas industry. Provide technical consultants as these standards need to be there to service suppliers not only bits of equipment. In SA the companies are small and can't produce enough people.

BG: If we can increment the spreadsheet of wells down to competencies, equipment and materials that are required through different junctures there is potential for people who have capacity / the qualifications. We need to let them know early what they need to do in order to spend the money for skills. Ensure we have done as much as we can to add local (Australian) resources.

PG: The Roadmap has been a benefit, we are now able to get the information to service the industry. We have begun to group the services and determine where to play / and not to play. We need to work with companies collectively regarding goods that different companies may need early on. Get specifics to see a realistic shortlist of things in order to make happen.

KC: Suggestion – look at interstate projects and focus on who missed out on work. Need to work on policy to see how / why they were successful and competitive internationally.

BG: Introduced Steve Begg (SB). Asked him to think of himself as a portal to the industry, how do you tailor the training of students?

SB: Through the advisory board. Their discussions involve all different areas of education, they are specific to petroleum.

BG: Will provide the representatives from any company that is associated with the Roundtable contact details to SB, he can broadcast what the University is churning out.

SB: The ASP program started 10 years ago. It is designed to be a program that enables people to hire people for the industry (all students go into industry). There aren't any home grown academics that can get work here. The ASP is run like a P&L (fixed costs), the only income is student fees therefore the ASP needs to know how many students they need to produce each year.

BG: Would we be able to get the companies to offer free flow lectures to the ASP? We need info from industry.

SB: Perhaps shared positions may be an option, for example working for 6 months at a time.

- AF: What capacity do you have to produce larger amounts of graduates in future?
- SB: Currently the ASP is at full capacity, it's not clear at the moment that the market demand is greater than graduates from states, if this were the case there would have to be enough staff to help.
- BG: Fyfe are a major player in pipelines. How do we cluster some other services where certain companies are lacking experienced people in?
- MP: This would be done on a case by case basis. We may need to do more in the facilities area, we will look for strategic partners to work with and may need to look at this more strategically in order to turn this around.
- BG: Recommended convening a meeting to come up with concepts early. Companies have the competence but they lack the capacity in a way they can offer a combined lot of services. The Cooper Basin has gone from one large venture and this has been an incubator for SMEs. Now at a fork in the road we have enough competing exploration enterprises. Competition is well served and one of the key drivers is that you don't have everyone grouped. Competition gets more money into a basin, however this means more money offered for bids. We don't want this to destroy wealth. We can get the Cooper Basin to become smaller blocks but small companies can't do it for the Unconventional Gas flows, we need larger companies to help. Regarding exploration, turning SMEs to LMEs, we want billion dollar companies rather than smaller ones. How do we enable those companies to be efficient? We can improve our website along with the ASP. We want TAFE to churn out the people. We will set up working groups but we need companies to share views in a staged way over the next 15 years in order to be successful. Reduce the perception of risk in order for them to come into the market as early as possible. If we can send younger people to companies to get experience and in return people here get cost benefit. We set up international training etc, looking for commitment to talk, to take risk so that you can cooperate to become competitive.
- CT: Can't give an exact overview of Supply-chain needs as we can be talking a range of chemical feed stocks. Need to know the project before we can go forward, this is driven by the product outcomes.
- SB: Cement engineers are an example where we need another model to educate these students at a degree level. Need a post graduate degree, may need a partnership and / or industry specific training. There could be a centre set up with the University.
- ??: Australia has low productivity in the field and skilled workers need to be trained to also become supervisors.
- BG: There needs to be some lessons learnt from the high pressure drilling in the Cooper Basin.
- GC: Be as open as you can. We are looking for geothermal therefore we are not too competitive.

Please ask Geoff about any information, the need of early wells has been discussed. Productivity – be cautious about stating that we are low producing. We have harsh conditions. There is support from Halliburton and other companies which enables you to conquer new challenges.

PG: Are there any broad issues around safety that we should be talking about in the industry?

BG: Safety is not a new concept in the industry. Silicosis has come out of the woodwork as a public concern, which is another industrial hazard which gets managed in an appropriate way. Industry needs to communicate better, get some FAQs across the board as a matter of public trust. APPEA run safety conferences every year to focus on OH&S.

AF: How about incentives? How do we start the ball rolling? Talk to the Government and take up the line to see if there could be tax incentives.

BG: Our Minister has asked 'should we take the royalties from gas sold to SA enterprises and use that as a reduction on payroll tax to manufacturing?' How does the general population see a benefit across the country? BG is not a fan of this concept but happy to listen. Co-locating of people at Tonsley to make this easier, from operator's perspective is an aspiration. We need to understand the trigger points to change companies' minds to make that jump.

PG: We are in early stages of trying to understand what a centre of excellence may look like at Tonsley. Keep an eye out over the next three to six months for changes / updates.

BG: Minister has agreed and is trying to arrange a dinner with industry leaders and the Premier to have the conversation.

??: Training hubs around offshore – Australian Maritime Complex expanded to offshore, good traction.

Closed: 10.45am



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Presentation 2

Beach Energy

Presented by Mark Pitkin

Looked at the magnitude of what has happened with shale gas in the USA, specifically the key players in the Barnett. Exploration in the 1990s took off quickly.

Haynesville – high rate shale field

Eagleford – liquids associated with gas

Marcellus – primary location

Look back at the annual production coming from the shale in US, equaled 3 BCF (Barnett to TCF per annum).

The Barnett started working on the horizontal wells (kicked off 2004) grew to 9000 wells by 2010 totaling 5BCF per day. They found the right way to access the resource. In 2008 they were up to producing 2500 wells per year. This is the type of success SA would hope for. We are looking for a modest representation of this.

180 rigs in the Barnett, when gas dropped off so did the rig count in the 2009 Global Financial Crisis.

Haynesville kept going due to lease requirements maintained a very high rate.

Southwestern Press Release – last 6 years shown got the Barnett going. Southwestern went immediately to horizontal wells having learnt from the Barnett.

Started lateral 800 to (now) 1500m increasing stages and lengths.

Haynesville is producing the same as the Barnett. Haynesville now has 2200 wells in production.

Cost and efficiency makes these plays successful, the drilling days are down to 25 days.

Southwestern's first well took 55 days to drill by 2007 and went down to 15 by driving down drilling days and cost effectiveness.

DMITRE has approximately 170 wells per year predicted and every 2-3 days a well finishes. There are 4-8 fracing stages a day but with the right technology can place 8 stages per day, this however depends on the methodology you are employing.

Should be approximately 30 trucks per day going down the main road and 15-20 mega litres of water per day with well connections every 2-3 days.

The key thing is to get drilling rates down, technical knowledge transfer, acquisitions / learning, bring in skilled professionals and labor. Are there currently visa opportunities or short term incentives?

- Logging – take out some logging from zones with little interest
- Rig availability – new build or retrofit? There are issues with existing rigs but there may be rigs from the US that could be brought in
- Trucking services, there will always be rigs moving
- Mud chemicals, the price defines the options to do something locally
- Cementing services and all services – should we get a long term contract or is it beneficial to go to a spot price system, does this make it cheaper?
- Standardise pieces of equipment and efficiency will go up
- Need access to global providers. Assistance with yards, equipment modifications, visas and skills professionals
- Lay down staging areas
- Transport efficiencies – look at other ways to get more infrastructure required at ports
- Water access management – think smartly, use coproduced fluids. Some management system dispose of it in the right method. It is important to maintain area within the standards we went into the basin with

Question:

CT: Long term contracts? Competition is always better, the US always has competition and keeps prices low this, in turn, fosters innovation and opportunity to learn from multiple service companies

BG: 15 rigs at a time isn't enough for competition. Need to get information from North America, refer to the McKenzie study. We need to innovate right down the cost line to international stages, how much competition can we obtain?



Government of South Australia

Department for Manufacturing,
Innovation, Trade, Resources and Energy

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Presentation 4

Halliburton

Presented by Mary McGowen

Began with discussion, look at needs as a service company, what keeps Halliburton doing what they do?

Why is fracturing too expensive? We don't have the volume like the United States does.

Daily water in mega litres was taken the P90 from the Roadmap and calculated a conservative estimate from this. Extra water from coproduced water after dealing with fracture needs; there is polymer needed from this and is important from international sources – these are major road blocks from our end.

Issues Halliburton have include keeping track of time as we are waiting for water most of the time. How do we get the water there? Is there an action plan in order to bring water to fracing faster?

Idea: BG: On western flank, expect that there will be considerable water, in the past have produced 30 mega litres per day.

Andrew: Is there an issue around the water quality?

Often times Halliburton has to clean the water before using it. This may be an entire business for a water specialist, from a location and quality perspective. **Someone within DMITRE perhaps, we need a working group to go through these issues. Halliburton has posed the problem to SA Water.**

Also, need to get chemicals on location etc. Sealed roads in the basin would be preferred as a super highway won't make a difference, at present, once you come out into the basin you get stuck.

Halliburton needs to give specific details to Government in order for them to help ie provide statistics / metrics.

BG: Be the focal point when it comes to road versus rail (refer Paul Goiak).

Currently Demobilising 200 – 250m out of Moomba.

Two problems, local rain and flooding in this area.

Create plans that don't depend upon dry season. We need to weather proof operations.

The issue is clay and soil in the Cooper Basin when moving large trucks.

Sealed roads - not only wet versus dry but also focus on heavier vehicles.

Santos: Rollerdon machine may be helpful, however its maximum speed is 40km/h, this is not particularly efficient or cost effective.

If you didn't have to wait for supplies what would be the amount of money saved?

MM: Reduce mobilisation days from 5, being able to half the cost would be huge.

BG: Watch the patchwork of certain bridges being changed so that there isn't a bottle neck. Need to ensure paved roads aren't going to get ruined when there's a flood. This is a topic for the operators in the Basin. Government can then know what they want from us.

Part of the problem is that all vehicles must meet road ready specifications, there aren't any desert or unique vehicles used here that are in places such as Libya.

What are we allowed to bring in? Regulatory commissions.

It would be good to have a one stop shop for chemicals and a water storage facility.

What could help is if the operators could schedule where they need the fracking and when. Make a timeline and keep them together.

Operators could use higher pressure well heads this would help reduce time and ensure safer well heads.

Government body for extremely heavy vehicles, there needs to be across state consistency.

How do we get effective exemptions, is this through DMITRE?

Inductions – in Queensland every person / company has to go through inductions. We need to get these online (CSG side of things) it would be good if there was one standardised induction for all.

BG suggestion: Locals need to be located in United States etc so we can be seen to be an exchange of information and in turn educate the workforce. Government can fund scholarships etc.

Trade design rules.

What is the volume point that becomes a problem? Frac crews are currently supporting 2-3 rigs (are capable at present) with one spread, beyond 5, Halliburton need to bring in more equipment.

Easier for someone who has a foothold already to expand.

Question: Is this graph a P90 amongst the PMEs? Do these numbers work for you? What are the projections for the next several years regarding other companies?

- Hard for the companies to say if this projection reflects their success due to their individual future plans

Action item: Layer on what is probabilistic, based on Unconventional.

Next year there will be approximately 8 wells fracing, therefore we are ahead of schedule at present (based on graph).



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Presentation 6

Ensign

Presented by Travis Beinke and Peter Koutsoukos

Ensign is a drilling contractor. The company originated in Canada and North America.

They cater for in house engineering expertise, designing and building their own rigs. These items are developed along with customer needs and continues to evolve.

Initially grew through acquisition and has now switched to focus on building own rigs.

Current have rigs in Australia and will bring in additional rigs into Australia.

ADR Rigs in the last five years were initially through the Coal Seam Gas market. There has now been a large increase in activity that will add another 6 towards the end of 2013.

Requirements and local suppliers needed, however current challenges faced:

- People: increase number of rigs coming in – need 40-50 people per rig
- Need an additional 200 personnel by 2014
- At this stage rely on expat experience – currently have a number of expats working on a ... basis

Currently work on an RTO, nationwide standard of qualification. Ensign has applied this throughout Australia.

Ensign invest in ADR training which is the future of their company. They have already built two in North America and have sent Australian crews across for training.

The majority of oil field equipment comes from North America as it is still more economical to do it this way rather than buying from Australia. There have been increased suppliers in Australia but it is still not economical, especially when it comes to specialised equipment.

Apply API as a minimum on all rigs, engage local business and vendors as very few have the API certification capacity.

Local people don't understand what Ensign require and are therefore not cost competitive.

Logistics – when faced with several rigs moving at same time the issue of a shortage of specialised rig moving equipment in Australia comes about. This includes cranes, wide trucks and rig move times are impacted which then impacts costs.

The Department for Transport and Roads is an area where we have seen improvements but it can be challenging at times to move larger, taller than standard loads. Sometimes there are agreements to close roads or apply for permits. Ensign understands what is required by Australian standard but it is a grey area as to who to consult and what does / doesn't comply.

Investment – minimise shut down after rain and other events as this impacts everyone down the line.

Supply – we would like to see locally stocked supplies (at Moomba or nearby) this would allow Ensign to cut costs.

Cut down on costs flying in specialised personnel, we need that specialised knowledge close to home.

Need resources for recertification of OEM equipment as we can't always conduct the recertification without the knowledge from specialists.

Previously Ensign brought in existing drilling rigs (operating in North America) and there were an enormous amount of work to make the rig compliant with the standards in Australia.

Electric motors and junction boxes are not accepted here purely because it's a different standard, this needs to be changed. It is possible to get this changed over time.

When we call out a third party assessor they look at it very black and white. This means we change all the electric motors on a rig which creates an extreme amount of cost for the company.

If the third party understood the mapping from one standard to another (USA to Australia) it would make it much easier. This may be a training issue, it may be that the people undertaking the assessment don't understand the work they are doing. This is something that can be fixed by talking to relevant authorities.

The gatekeeper is not qualified to see that the mapping and this can't be done from different areas of the world. There is a trade barrier which is deliberate, free trade agreement? Would be good to have a free trade **zone** agreement.

Sometimes the company in the US doesn't even stock the part Australia needs because they don't need it originally.

Key issue – the people who are looking at the equipment didn't have the kind of certification to be in the position to say that this maps ok. The issue is the people don't have

the certificate to make the call. You would have to be dual ticketed, work in Australia but understand all the standards internationally.

Transport – aligning with operators in order to drive costs down. From time to time the suspension or particular trailer design is not recognised in Australia. Ensign have employed consultants to try and map it to Australian certified equipment but this is timely and not cost effective. Usually we don't have the luxury of time and it's easier to refit the equipment but it's expensive.

Need to change what the certificates require when you buy parts for rigs.



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Day Two Final Discussion and Close

Discussion Leader: Barry Goldstein (DMITRE)

BG asked that each attendee voice what they have taken from these sessions, add comments and give feedback.

? Learnt what the water requirements are and what we can do with technologies to assist.

? Explore air transport in the Cooper Basin, get one air strip that could land really big equipment this may also employ more people

? Very interesting but still a lot of work to do

DH: Openings regarding logistics in the field are different to the past

? Narrow down the recommendations to a few we can excel in

PC: Interesting aspect is the openness from all parties

MMc: Like to see the super shopping / supply assistance

MP: Couple ideas that can be auctioned right away. Excited about the Tonsley project, more efficient local tailored induction process

? Would like to see an economic analysis, see how much things actually cost to get done, specifically costs regarding a P90. Would be good to download spreadsheets from the web. Unsure whether the assumptions and models are correct but competition is good

? Learn from the intense conventional drilling in the next few years

? Drilling in-fills is a rational way of getting through the learning curve

? Wireline logging – don't need thirty stages

Tim K: Positive outcomes, learning from North America, learn from previous lessons. It is critical to have dialogue regarding compressing efficiencies, no one has figured it out

- ? Want to spend more time dealing with DMITRE and keep communication open
- ? Good communication dialogue, it's going to be interesting to see if we can come up with solutions
- ? Skills shortage – any initiatives come from this will assist the industry as a whole
- ? Great opportunity to solve the infrastructure problem. It's time for major construction companies to take the load, there's no reason we shouldn't be building rigs etc in Adelaide, at Tonsley Park
- ? How the supply chain works, specifically balance risk and reward. Should try and learn from previous ventures, what extent has Queensland shared in these issues? Skills in the industry, should look also at other jurisdictions. Proven we are good at solving transport / road issues but need to address the basin issues
- ? If Moomba is seen as a major hub we need to assist major service providers

MM: Move away from exploration appraisal

- ? The Northern Territory are working with similar issues
- ? Need national consistency when breaking down some barriers. Need a clear, concise direction
- ? Issues can be overcome by collaboration – facilitate competition
- ? Excited about the next couple of years, specifically critical mass of operations
- ? Seen community issues in Queensland, we need to educate how we are taking away risks
- ? Need to make this resource acceptable to community
- ? Look forward to seeing progress
- ? How are we going to implement these ideas? It's going to take a lot of work to do this in time
- ? Government sponsored industry supported training centre
- ? International relations
- ? Demonstrates that we are ahead of other states. Keep the dialogue going and we can progress further

BG: doesn't want anyone lagging behind (interstate), he doesn't want less of a market for gas companies

? Regardless of our jurisdictions we come across the same issues. Thanks to SA's Roadmap it makes Queensland issues easier to work out

Santos' points raised a year ago have been in the top ten recommendations, it's time to break the subcommittees and take on strong points and see them through. We can't leave them unresolved yet again

BG: Top 5 working groups as a result of these discussions are as follows (look at companies aware of issues, who is best for the job, work with Queensland):

- Roads / transport – including electrical wiring – wharf to drill site solution
- Water – waste water in basin – logistical issue - minimum cost distribution issues – other sources of water (flood season etc) – include co-regulators on panel
- Collocation / training – incentives – look towards meeting at APPEA
- \$3.5 million funding – greenhouse gas research – remote sensing UCL – point source measurements – want CSIRO / GA – can get methane listing via NASA (don't want to reinvent the wheel)
- Joint ventures coming together – Moomba hub / industrial hubs in the Cooper Basin

? Well head, access to data, hard to get data out of GA however accessing data is key

BG recapped the key points resulting from the two day sessions:

Investment Attraction

Will clarify retention license issues

Make sure we cover how pipelines know the marketed signal

Endeavour to get people into the ASP to help educate

Say when well data has come in more rapidly perhaps via newsletter, schedule of due dates and availability

Will foster basin wide baseline studies. Ensure each of the operators know what the other is doing. JVs working together on environmental monitoring, it may be less costly to work collaboratively, constructive for public and industry

Do a better job at all levels and being clear about 'resource' / 'reserve' regarding Unconventional

Transport

JV working group – QLD and SA

Question of rail – cost of entry

Working directly with QLD and Minister to talk and ensure no surprises

Aircraft – what is the in / out – tie with rig forecast

Skills shortage – working group

Bullet board for rigs and crews – understand rig count

Training – certification – there is currently a bottleneck regarding USA versus Australia

Environment

Fact sheets – work with APPEA and QLD

Sharing rigs and crews

Operators sharing surveys – good for service companies

BG thanked guests

Closed: 4.30pm