SUBMISSION re ARMOUR ENERGY Application to vary Environmental Authority EPPG00342913 (to supplement earlier submission)

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Energy and Extractive Resources
Department of Environment and Science
GPO Box 2454
Brisbane QLD 4001
Attn: Manager (Assessment)

05/11/2018

Dear Sir

Please consider this information that I provide to supplement the submission I made prior to the original closing date for the Armour Energy application. With an extension of 20 days and the availability of Armour Energy's supporting documents I was able to look at other aspects of the application. I note that residents of Surat have still not been made aware of this application by anybody other than myself and a couple of concerned Surat residents. Indeed a lady who is 10km east of Surat (15km from PL71) only asked on 28/10/2018 via Facebook for details as she hadn't been able to attend the meeting I organised. The Gasfield Commission set up a pop up office in Surat for a day, nobody attended. This is a rural area, people are busy with the drought. More effort must be made to allow the people this application impacts to have a say. I note that I met with Richard Fenton from Armour Energy for 2.5 hours and he could not convince me that this project should be approved. I have also forwarded various proforma submissions opposed to the application from concerned citizens, local indigenous elders and former fracking industry employees.

Thank you for considering this submission.

Sincerely
Leanne Brummell
30 Victoria Street
St George 4487

I have used the Power Point format for this part of my submission to make it easier for you to identify which pieces of the application I am discussing.

I have copied and pasted the relevant bits with the link to where I found them and the page numbers.

My comments and the questions I wish you to consider are in bold coloured text.

I sincerely hope this saves you time and makes my concerns easily understandable. Please feel free to phone or email me anytime if there's anything you are not clear about.

Leanne Brummell Ph 0455 344 862

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Pg 15

Proposed Amendment
(h) unauthorised releases of volumes of contaminants, in any mixture, to land greater than: i. 200 L of hydrocarbons; or ii. 200 L of stimulation additives; or iii. 500 L of stimulation fluids; or iv. 1 000 L of brine; or v. 5 000 L of untreated coal seam gas water; or vi. 5 000 L of raw sewage; or vii. 10 000 L of treated sewage effluent.
(i) the use of restricted stimulation fluids
(j) groundwater monitoring results from a landholder's active groundwater bore monitored under the stimulation impact monitoring program which is a 10% or greater increase from a previous baseline value for that bore and which renders the water unfit for its intended use
(k) (k) monitoring results where two out of any 5 consecutive samples do not comply with the relevant limits in the environmental authority.

These are large volumes of contaminants. 4990L of raw sewerage would not be nice? Would it have to be reported? 950L of brine could contain NORMS.

Any spillage of any of these things should be investigated and fines imposed. (Fines are a joke, they are not large enough to act as a deterrent anyway)

What restricted stimulation fluids is this application approving? Not sufficient detail.

Pg 15

G5 (SMC - Waste 7; and SC PESCC 29)	**Existing condition:** NA **Proposed condition:** Produced water and stimulation flow-back water may be re-used in: a) Drilling and well hole activities; **and** b) Stimulation activities

https://phys.org/news/2018-09-slick-black-shale-fracking-combine.html

This link has info from a new study

Radioactivity in fracking wastewater comes from the interaction between a chemical slurry and ancient shale during the hydraulic fracturing process, according to Dartmouth College research.

"The stuff that comes out when you frack is extremely salty and full of nasties," said Mukul Sharma, a professor of earth sciences at Dartmouth and head of the research project. "The question is how did the waste become radioactive? This study gives a detailed description of that process."

Pg 15

L4 (SMC – Well activities 5)	**Existing condition:** NA **Proposed condition:** Polycyclic aromatic hydrocarbons or products that contain polycyclic aromatic hydrocarbons must not be used in stimulation fluids in concentrations above the reporting limit.

Polycyclic aromatic hydrocarbons are nasty. This link contains some information.
https://www.sciencedirect.com/topics/earth-and-planetary-sciences/polycyclic-aromatic-hydrocarbons?fbclid=IwAR3e-1h2vgh4h1avaTX-VzbtuIExJistMcdFOVdrkTulSKdlQRRbUpsxwa0

The application is to allow fracking of 41 wells (19 existing plus 22 new wells). Verbal assurances from Armour Energy today that 'we won't be fracking all of them' may prove meaningless down the track when they need to frack to maintain their profit margin. Approval will allow fracking of 41 wells. Adding the concentrations 'not above reporting limits' together (plus the cumulative impact in other areas by other companies) how much crap are we allowing to be injected and what will the cumulative long term impact be?

L7 (SMC - Well activities 9)	**Existing condition:** NA **Proposed condition:** Practices and procedures must be in place to detect, as soon as practicable, any fractures that cause the connection of a target gas producing formation and another aquifer.

If this project has a risk of 1 why would Armour Energy be asking for this condition? They say it's so far below the Great Artesian Basin it's impossible for a connection to an aquifer or aquitard to occur. **They don't have a crystal ball.** It is not impossible that one fracking explosion could set off a series of events that see an earthquake occur and fractures open up that disrupt the present aquifers. The precautionary principle must come into effect when you are deciding on something that can impact Australia's most precious water resource, the Great Artesian Basin.

Pg 18 The second stage is to drill the production section of the hole, which is cased with perforated casing

Each well will be perforated at depth

Which is it? Are they using perf guns to blow perforations in the casing under the ground? Or is it already perforated before they put it under the ground? (I'd think that would block up).

Is this what they intend to do? (Video explains perf gun use)

https://www.youtube.com/watch?v=chVdgUBUMLU&fbclid=IwAR09PYdMGte97lmarIog0_hefgWNhoHS76PG1G9k7C7E1XGQWzwItjQZu1g&app=desktop

The stimulation fluid will then be pumped back to the surface (flowback) with an expected 60% of the stimulation fluid returning to the surface. Note that PL71 is a "wet-gas" field (methane, plus various liquid hydrocarbon components) and so there is a much lower volume of flowback expected to return to the surface when compared to a conventional oil or coal seam gas well.

40% of stimulation fluid to remain in the ground. Multiply this by all the wells that have been and will be drilled in the area in the future.

Well stabilisation dosing may be undertaken to preserve the HFS job between well completion and well production.

What chemicals are used to stabilise wells and in what amounts? Another blank cheque.

Flowback fluid will be collected and temporarily stored in modular, pre-fabricated tanks supplied by service and equipment supplier, Kinetic. Flowback fluid will be reused wherever possible and later disposed of offsite at a facility which can lawfully accept the fluid. A HFS operation takes up to a week for each well. Prior to the HFS operation, the well pad and temporary tanks for water fluid management are constructed. After the HFS operation is completed the flow back of fluids will be managed and the site will be rehabilitated leaving only the operating well-head facility.

What tests will be carried out before flowback fluid is reused to drill or frack? What chemicals will be tested for? If a Kinetic tank fails who gets the blame for environmental disaster? Kinetic or Armour Energy?

Any hydrocarbon liquids will be collected and pumped to storage tanks and then will be transported to an offsite facility for processing.

Again, there is a risk of an accident while transporting these liquids.

Pg 22

Air quality in the vicinity of PL71 is impacted to varying extents by dust emissions from traffic on unsealed roads, industrial activities, wind erosion and dust storms. In addition to dust, the surrounding industrial uses emit other gaseous emissions, including oxides of nitrogen (NOx), carbon monoxide (CO), sulphur dioxide (SO_2) and VOCs.

Call me cynical, but this sounds like Armour is getting it's excuse ready for future emissions complaints – it's not our fault, it was pre-existing. The gas industry has historically found something else to blame for nearly every complaint made in the Qld gasfields.

Historical data indicates the presence of fugitive gas emissions from natural gas seeps in and around Surat and the broader Roma region as early as 1889 (well before the expansion of the natural gas industry in the region) (APPEA, 2016).

A condition should be imposed that Armour Energy use a FLIR camera to record existing emissions over the entire properties in this application (and probably neighbouring properties too). Down the track they will be saying any new emissions are 'naturally occurring and have always been there'. They, not the property owners, should be made to get the baseline data for this.

Pg 22

To identify ambient air quality levels, data was obtained from the Queensland Government monitoring network (EHP, 2017). The nearest monitoring network station to PL71 is located at Miles Airport, approximately 100 km north-east of the tenure boundary. This station is one of four stations established by the Queensland Government for the Western Downs region monitoring network of South West Queensland.

Air Quality has been measured from 100km away!
This is not good enough. (Incidentally, the four air quality monitors situated around the gasfields are often not working for considerable lengths of time and any results must be interpreted accordingly).

Air quality monitoring at the site must be undertaken so that baseline data is available. Again this should not be at the expense of the landholders.

Pg 25

the low ambient concentration of the gases and the high assimilative capacity of the air catchment mitigates against severe impacts of air emissions from the petroleum activities.

We are out in the middle of nowhere, it's not going to matter if there are emissions ☹

This suggests a lack of concern. It points to a total disregard of impacts from emissions on wildlife and vegetation.

Pg 33

All fire-fighting equipment will be maintained in good working order and personnel will be trained in the use of this equipment and notified of nearby available sources of water

There is a drought. Armour Energy will need to ensure it has sufficient water onsite to fight its own fires. Relying on neighbours and the Rural Bushfire Brigade and expecting them to risk their lives protecting gas infrastructure is not acceptable. The locals do not want fracking to be approved. There is no social license for fracking and new wells.

Pg 34

No blasting activities are proposed and therefore no risk assessment has been undertaken for potential vibration impacts upon sensitive receptors.

No blasting is involved? What then is perforating at depth? What is fracking? Isn't it akin to blasting?

There is growing evidence that fracking causes earthquakes. Given this project involves drilling holes straight through the Great Artesian Basin I think it would be prudent to monitor for seismic activity as a large earthquake could create pathways for water to flow that weren't there previously. A red light system as is being used by Cuadrilla in Lancashire in the UK should be compulsory. Armour Energy doesn't see a risk to any sensitive receptors, but don't even consider the risk to Australia's most important water resource.

Pg 43

It is not envisaged that the proposed activities will generate significant quantities of waste. Nonetheless, waste generated will be managed and disposed of appropriately. The Roma Landfill has an estimated lifespan of up to 30 years and sufficient capacity to deal with waste generated (Pacific Environment Limited, 2015), and pest access will be negligible due to waste management and containment practices. Additional vehicle movements associated with waste transport shall be minimised through appropriate waste segregation and onsite reuse, wherever possible.

On this basis, the likelihood of potential impacts to waste environmental values is rated as 2 (unlikely) and the corresponding consequence of impacts has been determined as minor. The risk of environmental harm to waste environmental values and the surrounding environment is therefore categorised as low.

Just because all the waste is going offsite does not mean it won't have an impact. NORMS and toxic salt are going to have a big impact SOMEWHERE for many years. This needs to have a rating of 10. There is still no solution to the salt problem this industry is creating. (I spoke with Andrew Garnett the Director of the Centre for Coal Seam Gas at the University of Qld on 10 October and he confirmed this).

5.8.1 Surface water

PL71 is predominantly situated in the Condamine-Balonne Basin, with the south-east corner located in the Moonie Basin. Watercourses in the Condamine- Balonne Basin are mostly ephemeral with the exception of major watercourses (i.e. the Condamine and Balonne Rivers). The catchment is heavily impacted by anthropogenic pressures including land use, riparian management, water infrastructure and point source pollution and is also highly modified as a result of agricultural and grazing practices.

Existing surface water within PL71 includes non-perennial watercourses, Kyeen Creek (situated approximately 1.1 km from the closest proposed activities) and Christmas Creek (located in the south-eastern corner 400 m from the closest well).

Pg 43

Google maps clearly shows where the water runs. As mentioned in the first part of my submission, the creeks in the area will be impacted by floods.

I don't believe Armour Energy cares about the impact on water, their sole concern is profits for shareholders. The next slide shows where they already fracked without locals even knowing.

PL511 - Where Armour Energy has constructed and fracked a well named Myall Creek 4A and announced on 1 November they have spudded well Myall Creek 5A. This approval also states Maranoa Council to supply water. It's a drought, how do they get water if no one else can?

Locals would have opposed fracking here if they had known about the application.

You can clearly see where the water runs.

Pg 48

The water bodies present within PL71 are non-perennial with flow mainly occurring in response to heavy rainfall. Potential impacts from HFS fluid are only likely to occur during extreme rain events causing storage tanks to overflow, however this is extremely unlikely to occur. The consequence of such an event occurring would be minor with minimal, short term and have recoverable minor impact on water uses and biota.

A spillage in the Pilliga has not been able to be rehabilitated in over ten years. Damage is hardly likely to be very short term. This needs to be looked at. A heavy rain event can occur out of nowhere. Roads will be impassable. A solution for storage tanks overflowing is 100% necessary.

Pg 50

For example, the total water requirements decrease for a multi-well, multi-lateral wellsite as compared to single well sites as the flowback water from one well can be recycled for other wells on the same site resulting in lower losses and water management efficiencies. Armour Energy therefore plans to implement multi-well pads with multiple laterals each employing multiple sequentially staged fracs in order to minimise its long-term footprint on the environment.

I don't think Armour Energy realises that environment includes under the ground as well. Every single well can fail. They can fail at the point of intersection with the Great Artesian Basin.

All these huge holes it intends to create under the ground aren't going to magically disappear. From the time they frack the whole thing is going to be trying to get back to a status quo vis-à-vis pressure.

Armour Energy has chosen the method that will cost them the least. Models of gas reserves in the Surat Basin were not accurate. They can't extract this resource without fracking. Fracking has been banned by many Countries and even some Australian States. There must be good evidence that fracking is bad for those decisions to have been made. I included some of this evidence in my initial submission.

Pg 50

The service companies performing the HFS campaign typically utilise the most ecologically friendly additives available to minimise surface and sub-surface environmental impacts. In almost all cases, the additives are commonly found in most homes and the polymers used are common thickeners used in foods and personal hygiene products. Oxidisers and enzymes are used to aid natural degradation, breaking down the long-chained polymers into small simple sugars that can be flowed back with the base water to the surface at the conclusion or clean-up of the stimulation treatment. Armour Energy will disclose all additives used by them in the HFS of any well to the regulator.

The application clearly asks that restricted chemicals be allowed to be used. Haliburton were contracted to do fracking on PL511. They will use whatever they have to, to achieve the desired result.
If it is all so safe why the secrecy? I do not trust this company for a minute. Confidential Commercial Information (CCI) is a code for we can't tell you, you wouldn't let us do it. Why aren't Safety Data Sheets on a publicly accessible database?

5.9.2.1 Pre-stimulation groundwater monitoring

If any water is produced from the target hydrocarbon-producing formation while drilling, it will be water quality tested. This will enable a more accurate prediction of any possible contaminant concentrations in the post-stimulation flowback water. The parameters that will be tested will be in accordance with the stimulation management procedures developed under the proposed conditions.

Who is going to test the water? A truly independent body or is this going to be self regulated? I think corners will be cut to increase profits. This testing must be totally independent. We don't allow drunk drivers to self monitor alcohol levels, why would we let a gas company self monitor?

Pg 52

5.9.6 Risks and Impacts

There is the potential for HFS fluids to impact upon the surrounding environment, specifically:

- losses of well integrity may cause stimulation fluids to leak into overlying or underlying aquifers;
- although highly unlikely, due to the vertical separation, fracture pathways could migrate beyond the stimulation impact zone, resulting in interconnection of aquifers or HFS fluid vertically migrating into overlying and underlying aquifers;
- surface exposure to chemicals; and
- remnant stimulation fluid in formation.

The risk and magnitude of potential impacts have been assessed as very low (in accordance with **Sections 5.9.6.1** to **5.9.6.3**).

Richard Fenton from Armour Energy told me that he cannot 100% guarantee safety of the water. (He did say he can give me an assurance that it will be, but he has a financial interest in this application being approved). Who are we to make a decision that even has the slightest risk of ruining water that future generations will be reliant upon? This industry will be gone in 30 years at the outside. What legacy will be left? I oppose this application being approved because there is no 100% guarantee that Australia's most precious water resource won't be impacted.

5.9.6.2 Target Formation Water Quality

As previously discussed, there will be some residual stimulation fluid that remains within the target formations following stimulation activities and flowback although the actual volume remaining from the proposed 3 megalitre fluid volume would be less than 600KL.

The low concentrations and relatively benign nature of the chemical additives used in the stimulation fluid would result in limited impact to groundwater quality (particularly because the target Rewan Formation is a liquid hydrocarbon bearing formation, and water that might be extracted would already be unsafe for domestic or agricultural uses). Armour Energy has determined the consequence of stimulation fluids negatively impacting upon water quality in all target formations as being minor.

Armour Energy is playing down the amount of stuff to be left in the ground. This figure is per frack. Multiple fracks are to occur at 41 wells. This is what this permit would allow. This needs to be looked at in terms of the entire current and future Australian gas field footprint.
This is an experiment. We do not know the long term impact of leaving stuff in the ground, the chemical changes that may take place, how the earth will move in the future. I believe we need to err on the side of caution and not approve this application. We do know that every single well will fail over time after it is abandoned.

Pg 53

Hazard from mixed stimulation fluids and flowback fluids	
• The chemicals are diluted and mixed as a part forming the stimulation fluid and therefore have different hazardous properties than the raw chemicals • based on the dilution ratio of the chemicals, the likely hazard associated with the diluted chemicals would likely to extend as far as mild irritations to gastrointestinal effects. • Fluids are considered likely to be toxic to aquatic environment and to soil organisms due to the elevated salinity. This is a low risk as the wells sites are required to be at least 100m from a watercourse. • Fluids are expected to be of low toxicity to stock, however the water would still not be considered suitable for stock watering purposes.	• The chemicals that are present in the stimulation fluid are in lower concentrations than the undiluted product and are therefore have a lower hazard and health risk. • Ensure that the stimulation fluids is appropriately stored on site in lined ponds or storage vessel to avoid uncontained spills to soil. • Ensure that the fracture stimulation ponds are maintained behind a secure stock proof fence. • Ensure that a suitably certified, or regulated waste contractor is engaged for the removal of the flowback fluid from the ponds

If the water isn't even suitable for stock it doesn't need to be in an agricultural area. This says it will be stored on-site in lined ponds. Elsewhere it says transported off site in containers? Which is it? In both scenarios there is risk of rain overflowing the storage receptacles. This is putting farming land at risk. Where do kids of future grow food when the industry creates irreparable damage?

Pg 55

5.9.7.1 Well Construction and Integrity

Well construction shall be undertaken in accordance with the industry document, 'Code of Practice for the construction and abandonment of petroleum wells and associated bores in Queensland' (DNRM, 2017) and Armour Energy's 'Well Integrity Management Plan' (Armour Energy, 2018).

The casing programme will consist of 9 5/8 -inch casing set below the Bungil Formation, followed by 7-inch casing to just above the Rewan Formation and 4 ½ inch casing cemented across the Rewan Formation to a total depth. This design will seal off water flows from the Bungil Formation to reduce the risk of cross-flows between aquifers and the uncontrolled release of well bore fluids to surface, throughout the life of the well.

All casing and tubing has been manufactured to strict standards and complies with the latest edition of ISO 11960, and shall be set at appropriate depths to provide an adequate safety margin between the formation fracture pressure and anticipated pressures during well control and casing cementation operations.

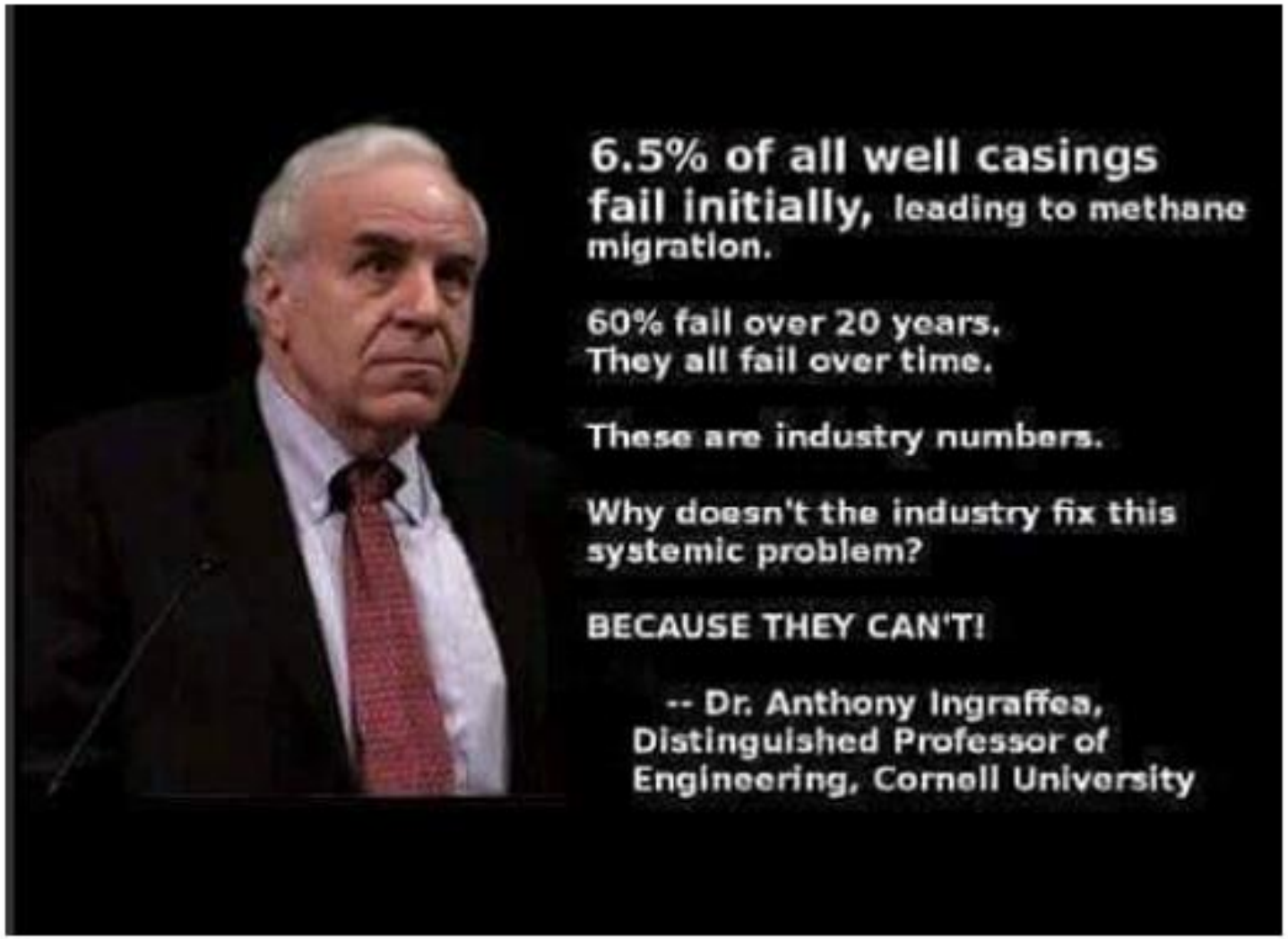
Well casing specifications (10,000psi) significantly exceed the proposed HFS surface pressures in order to maintain well integrity. Critical casing loads and safety factors have been calculated for each casing string, utilising specialised well analysis software and real-time monitoring undertaken of pressure and temperature effects during the proposed activities.

Purpose-designed cement and installation techniques shall be used address geologically-specific conditions for each petroleum well to provide a robust seal that isolates the well from the surrounding formations and protects the well materials from extreme formation conditions.

Appropriate cement laboratory testing procedures shall be carried out on representative samples of the mix water, cement and additives to confirm the resulting primary cement slurry meets the requirements of the well design.

As I noted in the first submission, well construction is steel and cement. All wells WILL eventually fail. This leaves pathways for water and contaminants to move. Armour takes great pains to point out they are fracking so far below the surface nothing can come up. However there is a known risk that the well can and will eventually fail anywhere along its surface in other formations and the effect of this is not acknowledged in the application. My concern with these legacy issues was acknowledged as a very good question by the Director of the Centre for Coal Seam Gas. Armour Energy is concerned with getting the resource, taking its profits and leaving. There is no concern for the long term future impacts.

They don’t tell us this about the pipes- Every Single Well fails over time!!



Pg 55

Fracture modelling (taking into account the individual properties of the petroleum well, target formation, stimulation fluid, etc.) predicts a fracture height (i.e. vertical) and flowing fracture length (i.e. horizontal) of up to 17 m and 178 m, respectively.

Models are just educated guesses.
They are not accurate.

Pg 56

Fracture migration may be monitored using radioactive tracers (as an additive to the stimulation fluid).

We are not talking about one well or one frack. What is the cumulative impact of all the radioactive tracers being used in the past and in the future? Where is radioactive waste to be stored? There is no solution to the large amount of toxic waste this industry is knowingly going to produce.

Pg 56

- biocides and surfactants will be contained in sealed plastic containers that dissolve in water, therefore requiring no human contact to add them to the stimulation fluid mix. Operators will be trained in the handling and storage of biocides and surfactants;

Why is this necessary if everything we use is so benign… oh that's right, it's 'practically' everything.

- A monitoring programme will be implemented, including testing of stimulation pond water after stimulation. Stimulation pond water will not be directed to any other non- stimulation pond or to the treatment system until test results show that it is acceptable in quality; and

More self monitoring? I think this needs to be done by an independent body. Once again it talks about ponds. There are reports of mass killing of birdlife in such ponds. What mitigation measures are in place? Also risk of overflow.

Pg 56

The following chemicals will not be used in stimulation: naphthalene, phenanthrenes, benzene, fluorenes, ethylene glycol, toluene, ethylbenzene, xylene, phenol, ethylene, diesel, kerosene, aromatic solvents, formaldehyde.

Makes you feel good doesn't it? Signing this approval leaves it wide open for Armour Energy or their fracking contractor to use any number of substances that will prove harmful to the environment. You need to know what you are signing. If I was the person given this responsibility I would not sign without knowing and understanding exactly what substances are being used for each and every frack. No blank cheque. Departmental approval required at each point.

Pg 57-61

Rehabilitation

There is no mention of ongoing monitoring of abandoned wells. Armour Energy intends to leave the site, wells in the ground, never to return. These wells, which WILL decay over time, will be a legacy issue for future landholders. Possible scenarios include sink holes, earthquakes, water loss down pathways down the sides of the wells in the upper levels, contaminants into water. There is no mention of the long term future.
Is this monitoring and repairing to be left to the State Government and hence, the taxpayer, to look after in perpetuity?
Armour Energy shareholders will be long gone with their profits.

This is not an issue just with this application, it is the same for all resource industry applications. There is no mechanism for long term impacts that are 100% going to happen.

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Emergency Response Plan

Pg 23-24

3. Spill	Armour Emergency Number: 1800 911 216
SERT	**Actions by site**
Initiate Basic Response • First responder to raise the alarm • Site ERT Leader to activate the ERP • Establish if the loss of containment (LOC) can be isolated at the source without risk. • All attempts should be made to stop the spill at the source, upon confirming operational safety • Obtain details of the incident. Source, Extent (size), wind direction. • Activate general alarm and muster. • Prepare to isolate parts of the plant. • Ensure all personnel have been accounted • Initiate contact with emergency services.	**Initial Response** • Pay attention to fire and health hazards • Activate containment operations immediately • All attempts should be made to stop the spill at the source if it is safe to do so to prevent the spill from leaving the site or entering any potential waters, • If the LOC is severe, notify Kincora terminal and evacuate to a safe distance • Stop all non-essential personnel and vehicles from entering area or running over the saturated area/s • Use available spill response equipment (spill kits, absorbents, containments systems) • Spill Kits will contain the following; - Containment booms - flexible tube-like barriers used to contain the spill - Kitty litter - Organic matter and absorbent pads to soak up the spill - Plastic bags for removal of the kitty litter and absorbent pads - Gloves - Cable ties. • Operators must wear the necessary PPE before attempting to deal with the spill, refer to Chemical SDS • If you are the identifying person, once

This does not say to take photos, record video of the incident and the clean-up.

I think this should be an important step in the reporting of spills to the Department.

A picture paints a thousand words and will be much more effective than just writing something along the lines of a chemical drum spilt. Covered with kitty litter and removed. Photos will also be a good way to gauge rehabilitation.

Pg 29

7. Trespass	Armour Emergency Number: 1800 911 216
SERT	**Actions by site**
Initiate Basic Response • SERT to obtain information about the emergency. - Number of people. - Location. - Damage or type of protest. • If threat to safety or wellbeing of Armour Energy employees, SERT Leader to activate ERP • Notify field operators of situation and direct them to away area of concern • Muster the site if appropriate • Contact the Police.	**Initial Response** • Muster if required • Always avoid physical confrontation • Personnel response could be filmed • Check vehicles, plant and equipment for damage • Provide updates to the SERT if situation changes • Lock down facilities if required to remain safe • Inform SERT of exact location
Ongoing Response • Maintain contact with the first responder • Maintain contact with emergency services and advise if situation changes i.e. numbers increase, threats received or damage to property • Consider ESD of the plant • SERT Leader to notify GERT	**Ongoing Response** • As directed by the SERT
Recovery • Liaison with Emergency Services • Ensure that the termination of the emergency is communicated. • Ensure the incident area is not disturbed before the investigation is complete. • Perform Recovery and Post-Incident Clean-Up process • Log the incident into the Armour Energy Incident Management system with any remedial actions identified. • Provide a debrief to all personnel onsite	**Recovery** • Assist with the recovery phase as directed by the Site Emergency Team leader • Do not return to work until declared as safe

This is about the threat of protestors. I think it is more likely to be terrorists who would be interested in accessing the site, seeing as Armour Energy is working towards being the major supplier of Domestic gas on the East Coast. Disrupting supply would have far reaching consequences.

I don't think the threat of terrorism has been considered and I think it should be. Local police would be unlikely to be able to deal with such an event.

Is there a plan for terrorism?

I think local communities are at some risk being in proximity to the site.

Pg 32

9.	Major Structural/ Mechanical Failure

Note: Major structural/ mechanical damage may also result in the following scenarios:

1. ***Pollutant spill on ground***
2. ***Gas, crude, condensate release***
3. ***Fire/ Explosion in plant/ Field/ Building.***

This makes no mention of the local community or nearby property owners and livestock.
What procedures are in place to evacuate them if required?
How does Armour Energy deal with a huge explosion and fire? Relying on the local rural fire brigade who want farms not gas in their backyards is not a good enough solution.

Pg 35

12. Bushfire	Armour Emergency Number: 1800 911 216
SERT	**Actions**
Initiate Basic Response • Activate ERP • Obtain information about the fire: • Location – How close to plant / field – Land Type, Size / type of fire / wind direction • Any injured / missing personnel • Coordinate checking of fire break area • Consider ESD of any plant • Muster personnel • Account for all personnel • Activate ERT • Initiate contact with emergency services and land owners	**Initial Response** • Inspect fire break areas and clear if necessary • If on scene, personnel to move to safe position as directed and provide regular updates • Personnel to muster • Determine water source • Be vigilant, monitor for sparks/embers • Assess firefighting capability i.e. trained person and equipment on site • Is evacuation required • Is ESD of plant required
Ongoing Response • SERT Leader to notify GERT • Determine if evacuation is required • Maintain contact with and take advice from the first responder or ERT members	**Ongoing Response** • Provide basic firefighting activities if safe to do so - only small fires. • Monitors can be used on small grass fires • Isolate hazardous energy and make equipment safe • Assist with coordinating Rural fire service as required
Recovery • Ensure that the termination of the emergency is communicated. • Ensure the incident area is not disturbed before the investigation is complete. • Perform Recovery and Post-Incident Clean-Up process • Log the incident into the Armour Energy Incident Management system with any remedial actions.	**Recovery** • Assist with the recovery phase as directed by the Site ERT Leader • Do not return to work until all facilities and damage have been declared as safe

Assist with coordinating Rural Fire Service – why do the locals have to put their lives at risk for this industry?

Determine water source – there is a drought, there is no water.

Personnel move to a safe position – your fire you fight it.

This is an ongoing issue in the gas fields. The industry does not have an adequate plan to protect its infrastructure without putting other people's lives at risk.

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Well Integrity Management Plan

Pg 4

Well design should use as reference appropriate legislation and standards, including as:

- Petroleum and Gas (Production and Safety) Act 2004
- Petroleum and Gas (Production and Safety) Regulation 2004
- Code of Practice for constructing and abandoning coal seam gas wells and associated bores in Queensland
- Alberta Energy Regulator, Directive 008: Surface Casing Depth Requirements
- Alberta Energy Regulator, Directive 009: Casing Cementing Minimum Requirements
- Alberta Energy Regulator, Directive 010: Minimum Casing Design Requirements

This application concerns Qld. Aren't wells supposed to be built to Australian Standards? Why would we be building anything to an American requirement?

Pg 5

2.7 Risk Assessment

A risk assessment shall be carried out during the well planning phase, ie prior to mobilisation to drill a well. The risk assessment shall include a review of the risks associated with an uncontrolled escape of gas or well fluids to the environment.

The risk assessment process is to provide an outcome where mitigation of risks is achieved to yield well integrity operations where risks are managed to be ALARP (As Low As Reasonably Practical).

ALARP is not good enough. Reasonably Practicable if it doesn't impact profits? Case in point fugitive emissions. Technology exists that could monitor in real time but the gas industry doesn't use it. Government should make it a requirement that FLIR technology is required. ALARP is a blank cheque.

Pg 8

In future, should appraisal or production wells indicate minor integrity issues and maintenance may be delayed until a campaign of work is being carried out in the area, then a dispensation to facilitate delaying repair or maintenance work must be approved by CEO. Request for dispensation would be initiated via the Change Management Procedure.

So Armour Energy is fully expecting that wells will develop integrity issues and are asking that they can just fix them when they feel like it. Not good enough.

Pg 10-13

Appendix 3: Example risk assessment post well construction outcomes

Well Status	Failure Mode	Possible Consequence	Mitigation
Shut in	Corrosion causing failure at Tubing Head or Casing Head Flange	Leak in TH/CH	Periodic Wellhead inspections and maintenance Change out TH during workover as required
Flowing	Corrosion causing failure at Tubing Head or Casing Head Flange	Leak in TH/CH	Periodic Wellhead inspections and maintenance Change out TH during workover as required
Shut in	Catastrophic wellhead breakage caused by impact	Large leak to environment	Protect wellhead with fencing or concrete blocks Fence off wellheads. Gated/ locked access road
Flowing	Catastrophic wellhead breakage caused by impact	Large leak to environment	Protect wellhead with fencing or concrete blocks Fence off wellheads. Gated/ locked access road
Shut in	Production Casing corrosion	Gas leak in annulus, pressure on annulus	Full cement returns to surface while casing. Production packer with corrosion inhibiter held in annulus QA/QC all cement jobs. Use corrosion inhibitor and production packers.

Armour lists a whole stack of things that can and do go wrong with wells during and after construction.

This is not a low risk operation.

It is dangerous. It can cause significant human and environmental harm.

It does not have a risk factor of 1. They make it sound like it's more dangerous crossing the road.

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ARMOUR ENERGY (SURAT BASIN) PTY LTD

Document Title	**Parknook (PL 71) Operations Environmental Management Plan**
Document Number	**SUR-ENV-GEN-PLN-003**

Pg 8

A record of complaints, incidents of environmental harm, and actions taken in response to complaints or incidents will be maintained and retained for 5 years. Documentation for the purposes of the EA must be consistent with the requirements of the EA,

This information should be available forever. It may help in repairing failed wells that are going to need maintenance forever. It should also, in my opinion, be publicly accessible so that operations are transparent for the communities that will be living amongst the legacy issues.

Pg 13

3.2.3 Proposed Environmental Protection Control Strategies

Potential impacts on the identified environmental values will be managed using the following control strategies:

- Armour has committed to not relying on groundwater extraction for water supply for drilling or stimulation. Water for operation, maintenance and development activities will be sourced through commercial agreements, or from local landholders under compensation arrangements.

Approval of the application will be taking scarce water from the agricultural industry and from the residents of the town of Surat and downstream. This is not acceptable, especially in drought. This company becoming a player in the water market will push up prices of water for farmers who can scarce afford it.

This socio-economic impact has not been considered in the application.

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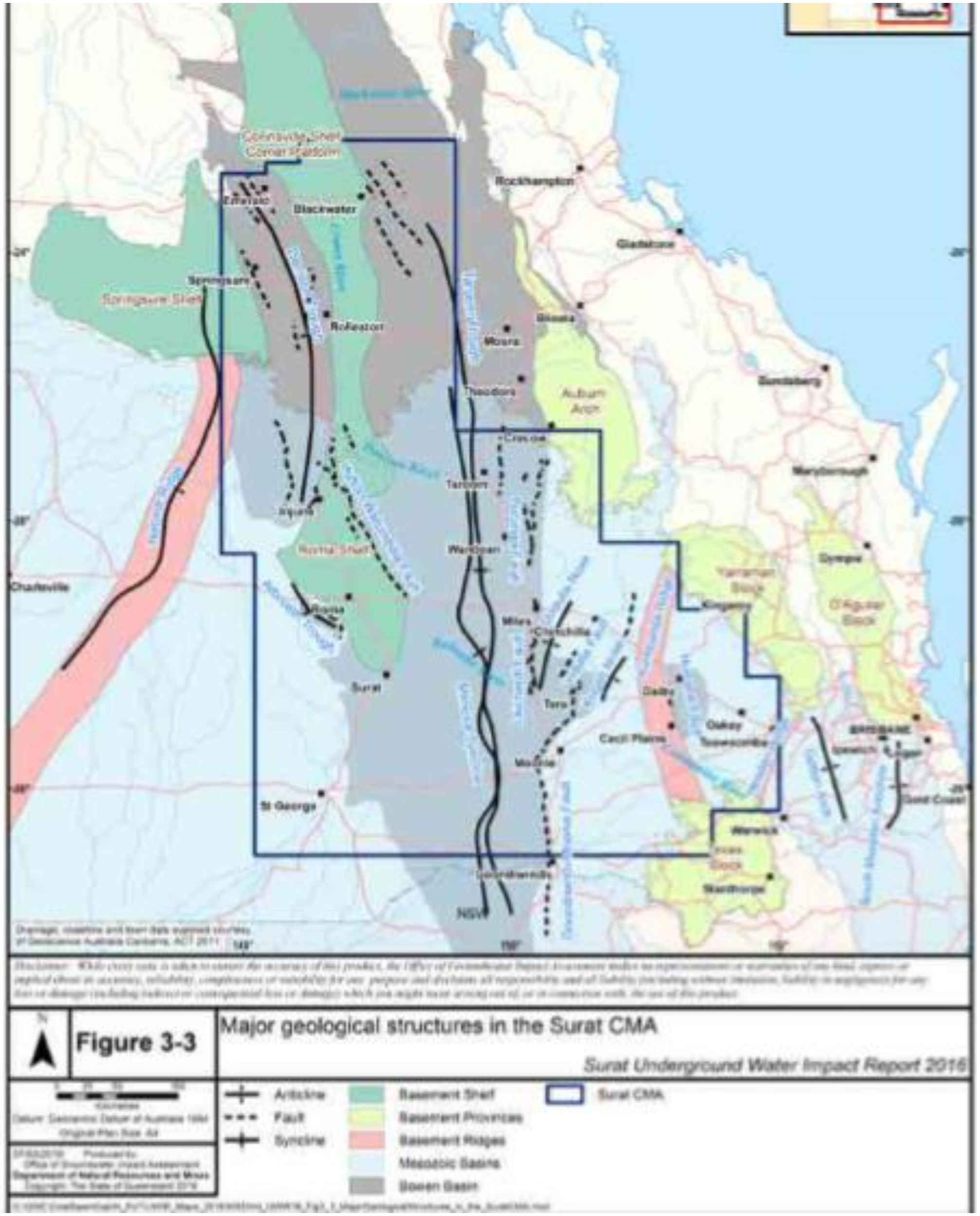
Pg 27

The Surat Cumulative Water Impact Report 2016 shows the proximity of fault lines (black dotted) to Surat and Roma (closer to where fracking has already been allowed on PL511). Was that considered in that approval?? It should be considered in this approval.



Thankyou for taking the time to read both parts of my submission. I note that all the rules surrounding the gas industry were amended on 1 September 2018 and I was only able to briefly skim through these within the deadline imposed.

In between writing the first and second parts I was able to meet with the Director and the Research Manager from the Centre for Coal Seam Gas at the University of Qld. They confirmed my concerns. There is no solution to the salt problem at this stage. There is no solution to stopping wells from eventually decaying. Approving this application will be knowingly leaving legacy issues for future Queenslanders. I would imagine the Queensland Government will be legally accountable as the body issuing approval.

Armour Energy are not able to 100% guarantee that water will not be impacted.

This project competes with farmers and rural towns for scarce water resources.

Recent legislation means that persons impacted outside of PL71 are unable to receive compensation, signing the approval means you agree to this.

Do neighbours then hold the Queensland Government accountable?

A Facebook poll in the local area which ran for seven days had 112 respondents. 83% do not want Fracking in the Maranoa and Balonne Shires.

A visit to Surat revealed that only 3 locals are employed by Armour Energy.

30 St George residents so far have signed a petition to the Balonne Shire Council saying they do not want fracking to occur in the Balonne Shire or near Surat and that Council make known opposition in dealings with Stakeholders.

Underground water from PL71 flows to the Balonne Shire. This has not been considered in the application.

What is the impact to the towns in the Balonne Shire if something does go wrong and there is a major disruption to the Great Artesian Basin? How do these towns that rely 100% on Artesian water get water? Does Armour Energy 'make good'? How? It's not in the application.

Remember too the Surat Cumulative Water Impact Report is only based on models. Models are never accurate, they are only models.

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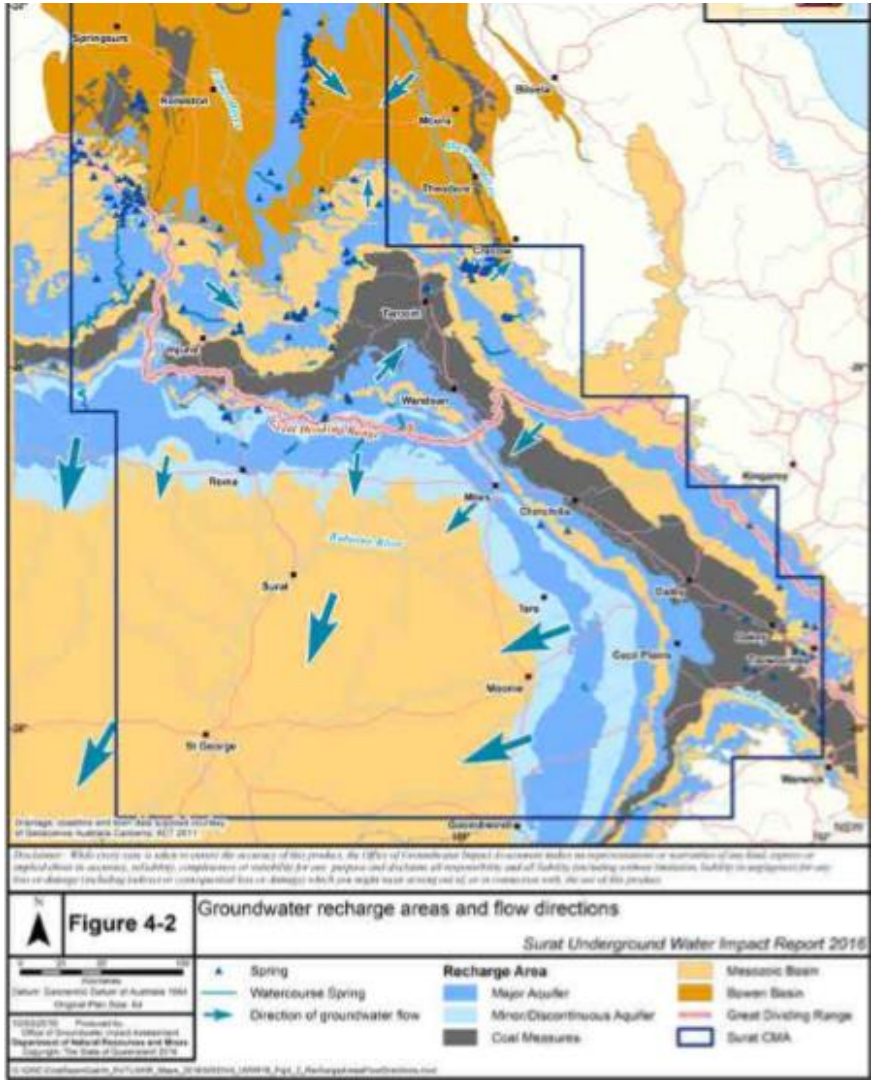

I ask that for the reasons I have given in this and in my first submission that the application be denied.

Sincerely

Leanne Brummell
30 Victoria Street
ST GEORGE 4487
0455 344 862

Condamine River on fire at Chinchilla.

But don't worry they've fixed it with Poly Pipe and Duct Tape.