General Questions:

We are told 'special concrete' will be used. How will regulations guarantee that this concrete will hold up in years to come?

What distance will there be between wells and/or pads? Will a minimum be included in the regulations? If so how was the minimum determined?

What will be the regulation regarding the storage and transport of chemicals?

How will the gas be transported to the 'grid' or 'market' once it is extracted? Is it likely that a network of pipelines will need to be built?

Relating to the DME Submission:

Pg 144 of the Dept Mines & Energy submission shows Site Visit Environment Checklist – will these visits conducted on a regular basis?

"Northern Territory National Parks Permits may be granted over land in a NT declared park, reserve or wilderness zone only after a consultation process between this Department and the Minister administering the Territory Parks and Wildlife Conservation Act has been completed. If the Permit is granted as a result of this process, it may be subject to stringent conditions agreed to between the appropriate Ministers."
Question – which parks does this currently apply to and have any stringent conditions ever been applied/enforced? Does process include identification of threatened species, flora etc. How is affect on environment or wildlife monitored in these areas – left to licensee to monitor?

"Permits granted over land in a declared National Park, reserve or wilderness zone will require special conditions. The condition/s will be determined following the conclusion of the consultation process between this Department and the Minister administering the Territory Parks and Wildlife Conservation Act."
Question: An Independent body such as the NT EPA should be part of this process. Will this occur? National Parks should be exempt from gas operations.

"Reporting
This section should contain: • Arrangements for the Routine Reporting about the activity that is carried out. The reporting arrangements must be appropriate and adequate in relation to the size and nature of the activity."
Question: What/who determines 'adequate' ?

"Further, all well suspensions, completions and abandonments must be undertaken in accordance with Clauses 528, 529 and 530 of the Schedule, and Clause 536 of the Schedule requires that an operator submit a Well Completion Report within six months of rig release. "
Question – will they be required to do this when suspending over the wet season? If not why not?

"DME refers all environment plans to the EPA for comment before approval is granted. "
Question: why is this only for comment when the EPA usually approves Environmental Assessments for all other mining operations? Will the NT EPA have more management of approving EA and more power to investigate incidents? The NT EPA inform me they have never investigated a single aspect to hydraulic fracturing in the NT.

"During the hydraulic fracturing of the Shenandoah-1A well, the re-use of flowback water as a fracture water source for future wells was investigated. Five of the eight water storage tanks contained flowback water as overflow. It was found that the effectiveness of the friction reducers were not compromised by the use of the flowback water."
Question: Has this option of using flow back water as fracture water source been investigated any further? Is it likely that this can be included in legislation regarding water use?

"PetroFrontier's 2012 drilling program of horizontal well and hydraulic fracturing (Baldwin 2HST1, Owen 3H and MacIntyre 2H) has resulted in a future possibility of using only water as a carrying and fracturing agent with no added chemicals."
Question – has this been pursued and if found successful, could it apply to all fracking in NT?

"Fracturing fluid typically consists of 98.5% water and sand, and 0.50% chemical additives. To protect commercial confidentiality, the composition of the additives is not fully disclosed to the public. However, in the United States, the FracFocus Chemical Disclosure Agency provides public access to reported chemicals used for hydraulic fracturing. The chemical data presented on this site has been submitted on a voluntary or regulatory basis by the participating oil and gas companies."
Question –will chemical disclosures be included in legislation? If not why not?)

"In Santos's 2014 drilling plans it has stated that waste storage and transport to licenced disposal facilities will be undertaken in accordance with the relevant legislation and guidelines. Waste generation will be minimised to ALARP. Pits used during drilling activities to store drilling muds will be used to store flowback or waste water also. The structural integrity of the pits will be confirmed prior to being lined with High Density Polyethylene. The flowback fluid will be allowed to evaporate and the remaining sludge will be removed and disposed of. If required, the fluid will be transferred to the Mereenie Central Treatment Plant interceptor pond."
Question: How will this happen with wet season? Will ponds be covered and tested to ensure they are waterproof. How will Santos ensure that heavy rain will not leak into or directly fill up ponds, mix with residue and overflow? How many and what kind of employees will remain on site during the wet season?

"Several fracture monitoring technologies including microseismic arrays and tiltmeters are currently in use and under development. Pressure sensors loaded into the production casing along which fractures are generated can be used to monitor

the growth of fractures. These will be employed by Santos as noted in its 2014 drilling/ environmental plan for the Northern Territory. Santos also states that given the low population density and lack of infrastructure in the area of its operations in the Amadeus Basin, the induction of seismic events is not considered a credible risk. "
Question: This states pressure sensors will be used by Santos but does not mention any other current licensees. Are any other licensees using this technology and will legislation to make this compulsory be implemented?

"In the United States, a single pad (site) may contain from 2 to 30+ wells to achieve the lowest possible environmental footprint and offer better ways of monitoring wells, in addition to cutting time and expense. If fresh water aquifer contamination is a concern, shallow monitoring wells can be drilled at the perimeters of the pad."
Question – does/will this occur? And will it be legislated?

"The differences in climate in the Top End of the Northern Territory compared with the arid centre could potentially result in a regional variation of risk. For example open pit storage for waste water in the dry season in the Top End will pose little risk of overflow into soil and surface water sources.
However the wet season poses more risk and operators must demonstrate how this will be managed especially during development and production operations when activities are not confined to the dry season as with exploration activities."
Question: How does licensee demonstrate this and how is this evaluated to ensure that it will be adequate? Is demonstration this compulsory or will licenses be refused if an applicant cannot or do not demonstrate this? Is it likely that pipelines will be constructed to carry waste?

"In accordance with Clause 110 of the Schedule, DME or third party Inspectors have the ability to carry out operational and environmental audits. Compliance monitoring is carried out to ensure that activities take place in accordance with the approved work program and EP. Desk top auditing requires the assessor to respond to specific well integrity and barrier validation triggers which will ultimately confirm that the well was constructed to levels exceeding American Petroleum Institute (API) standards. "
Question: Will regular audits be included in regulation/legislation?

The quantities of all oil or gas lost by burning, venting to the atmosphere, flaring or mixing with other circulating fluids in the course of any well repair, recompletion or other similar operation shall be reported to the Director as soon as practicable after the relevant event.
Question: What action will follow a report? What happens if there is a large escape ie long well repair releases a significant amount of gas? What penalties will apply to companies who cause major pollution? What penalties will apply if pollution is found to be the result of negligence?

"The current regulatory framework does not explicitly address water use, however it is intended that this will be included in the new Environment and Resource

Management Regulations that are currently being developed by DME."
Question, How will this be addressed? The Oil and Gas industry should not be exempt from the Water Act. Will this be changed?

"No variations to the EP and other plans are permitted without re-approval, and compliance is managed through site visits and self-reporting."
Question: how often site visits and by whom?

"The CSIRO's research into fracture propagation points to a horizontal orientation to fracture growth in Australian shales although work in this area is ongoing."
Question: This implies a lack of knowledge about the nature of fracture propagation in Australia and only 'points' to a horizontal orientation with no suggestion of how extensive this could be.

"The submission also mentions a depth of 90m in the US however the ALCOOLA report has recommended a 600m minimum."
Question: Will this be integrated into the regulations?

"In the case of Shenandoah-1A the separation distance between the Lower Kyalla fracture zone and the Tindall Limestone Aquifer measures over 1300 metres.44 The recommended separation zone is 600 metres (especially in areas where fracture data is incomplete or absent) based on a survey in 2013 of fracture propagation – both natural (due to igneous activity) and artificial (due to hydraulic fracturing). …vertical separation distance between the Tindall Limestone Aquifer and the Lower Kyalla fracture target in the Beetaloo area is over 1300 metres. Santos states in its 2014 drilling/environmental plan that the Mereenie aquifer is separated from the target formations by over 500 metres. Santos has modelled maximum fracture propagation for Mereenie to be in the order of 70 metres."
Question: Will the DME rely on the modelling done by licensee or which independent experts or studies does the DME refer to in order to support the results of the licensee? Ie is a licensee allowed to set their own boundaries in regards to separation zones or does a minimum (ie 600m ALCOOLA recommendation) apply in all circumstances?

"Durham University's 2013 study on upward fracture propagation proposes that regulators should consider setting a distance limit of at least 600 metres between aquifers and fracture targets, especially in new areas where fracture data is incomplete or absent."
Question: Is this part of regulation or legislation in the NT or will it be considered for legislation/regulation?

"Fracturing fluids are injected into geological formations at high pressure. Once pressure is released, fracture fluid, methane, compounds (including NORM's – naturally occurring radioactive materials) and interstitial water from the deposit flow back to the surface. This waste needs to be properly handled."
Question: How will this regulated and monitored?

"In the United States, some issues have been identified but an assessment by the European Union is that these incidents are due to improper handling practices."
Question: How will the DME safeguard against ‘improper handling practices’?