Submission to the scientific inquiry into hydraulic fracturing in the NT.

By-product capitalisation of the NT shale gas: water, energy, roads and agriculture.

As someone with a history in water, oil & gas drilling/production throughout the NT, Australia and elsewhere, with close ties to land, and a dear interest in the welfare of ecological interests both locally and globally, I see a potential for an enormous agricultural bonanza associated with shale gas production in the NT. I'd be interested to discover answers to the following questions in order to assess this potential;

1) **General**
   a) Will wells be very close?
   b) How many wells
      i) In total
      ii) /pad, & /ha or /km^2?
   c) What drilling/production/wells-per-pad/ km^2 could be expected over the lifetime of the basin?
   d) What would be the pattern of drilling/production/maintenance/decommissioning be across each
      i) Well?
      ii) lease?
      iii) The entire basin?
      iv) The NT?
2) **Roads**
   a) What type of roads will provide access to the wells?
      i) Will they be all-weather?
   b) What is the maintenance plan for roads?
   c) Who will build and maintain the roads?
   d) Who will be allowed to use the roads?
   e) What traffic/usage patterns of the roads would be expected through each phase of the lifetime of the wells (just associated with the life of the wells)?
3) **Water**
   a) Disregarding drilling, how much water will be used for each well?
      i) But too, what are the water requirements for drilling each well, prior to fracturing and well development, etc.?
      ii) What specifically would a list of etcetera's include?
   b) Where will water used in the well for fracturing, etc., come from, and what is its composition at its source before additions?
   c) What will be added to water as it is injected into each well for fracturing?
   d) What will be added to water as it is injected into each well for other purposes?
   e) Will more water be required at any other production/maintenance phase of the lifetime of the well?
   f) How much of this water will be recovered, or what deficit of water will be used;
      i) Initially during fracturing?
      ii) During production?

iii) During the lifetime of the well?
(1) What is the expected lifetime of the well?
(a) What water usage/recovery cycles will the lifetime of well maintenance and production involve?

g) What will the recovered water contain?
i) Can 'contaminants' be removed and the water made safe for other uses (see also below)?
(1) Could-there/would-there be enough 'safe' water for agriculture, or any other commercial venture?
(a) Would water decontamination benefit from an energy input using
(i) Gas from the well;
1. In combustion engines to drive processes
2. As heat;
a. either by heat pumps from the gas as it reaches the surface?
b. by combusting gasses to produce heat to drive desalination for instance?
c. By harvesting pressure potentials of gas production driving filtration pumps and other machinery?
(ii) Sunlight, and other 'passive' inputs?
ii) Are any 'contaminants' of commercial value?

h) Would it be possible to use gas production wells concurrently to harvest agricultural/industrial/domestic water from aquifers above the gas?
i) Are those aquifers artesian or would energy be required to pump it?
(1) If so, how much energy; what level would sub artesian waters rise to?

4) Agriculture

a) What crops are suited to the soil types and geography/climates of the well sites?
b) Are any recoverable contaminants valuable to agriculture?
c) Would sufficient CO_2 from the wells be produced to benefit agriculture?
d) Water volume/composition suited to what crops?
i) Greenhouse/closed systems
ii) Extensive cropping
iii) Seasonality of supply and demand
e) Who could have access to agricultural leases (using the water/energy/road infrastructure) in partnership with landholders, gas companies, government and other stakeholders?
i) By ballot/bidding/invitation/assignment?
ii) Rental/leasing costs?
iii) Other costs associated with land use/assignment?
f) Who would regulate/administer the agriculture associated with gas production?
g) Distances from production to Point-of-sale/distribution and road types along route, and transporting options; back-loading etc.
h) Supply of any additional energy requirements through metered tapping of well gas?

If feasible agricultural/industrial potential exists;

- What maximum agricultural/industrial potential does each well/pad/km2/lease/basin provide at its site, prior to any export of residual gas supply?

- What number of wells would provide a feasible base for a 'sole-owner' enterprise?

Additionally, I'd have these questions;

Energy

- What communities/enterprises near the shale gas would/could benefit from gas supplies for energy generation during the lifetime of the project?
- What price differential exists between domestic and export markets?
- How much CO_2 would the project produce and how much of it could be harvested for agriculture or other uses?
    - Could any CO_2 be reinjected beneficially to the shale gas wells?

If anyone could point me to an accessible library where some such details are available, or to someone knowledgeable enough in these matters to chat with, I'd be much obliged.

Optimistic, energetic, local and interested,
Rick Hall

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