GOVERNMENT OF WESTERN AUSTRALIA

Environmental Protection Authority

Mr Damian Ogburn
Chief Scientist
Buru Energy Limited
Level 2, 88 William Street
PERTH WA 6000

Our Ref 13-404315
Enquiries Chris Stanley
Phone 6145 0845

Dear Mr Ogburn

NOTICE UNDER SECTION 39A(3)
Environmental Protection Act 1986

PROPOSAL: **Laurel Formation Tight Gas Pilot Exploration Program**
LOCALITY: **Shire of Broome and Shire of Derby-West Kimberley**
PROPONENT: **Buru Energy Limited**
DECISION: **Not Assessed – Public Advice Given**

Thank you for your letter referring the above matter to the Environmental Protection Authority (EPA).

This proposal raises a number of environmental issues. However, the EPA has decided not to subject this proposal to the environmental impact assessment process and the subsequent setting of formal conditions by the Minister for Environment under Part IV of the *Environmental Protection Act 1986* (EP Act). Nevertheless, the EPA provides the attached advice to you as the proponent, and other relevant authorities on the environmental aspects of the proposal.

The EPA's decision to not assess the proposal is open to appeal. There is a 14-day period, closing 28 January 2014. Information on the appeals process is available through the Office of the Appeals Convenor's website, www.appealsconvenor.wa.gov.au, or by telephoning 6467 5190.

Yours sincerely

Anthony Sutton
Director
Assessment and Compliance Division

13 January 2014

Encl

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PUBLIC ADVICE UNDER SECTION 39A(7)

Environmental Protection Act 1986

LAUREL FORMATION TIGHT GAS PILOT EXPLORATION PROGRAM (BURU ENERGY LIMITED)

Summary

The Environmental Protection Authority (EPA) has received a referral from Buru Energy Ltd for a proposal to carry out tight gas stimulation using hydraulic fracturing of four existing exploration wells in the Canning Basin area of Western Australia. The four wells to undergo hydraulic fracturing are Yulleroo 3, Yulleroo 4, Valhalla North 1 and Asgard 1. The proposal does not involve any clearing of vegetation as it is utilising existing wells approved by the Department of Mines and Petroleum. The hydraulic fracturing will occur at a depth of between approximately 2,000 and 3,000 metres below ground level and would include flaring of gas.

The EPA considers that the environmental factors associated with the proposal are:

- Inland Waters Environmental Quality;
- Hydrological Processes; and
- Rehabilitation and Closure.

The EPA acknowledges the 16 public comments received on this proposal. Nearly all opposed the proposal and called for the level of assessment to be set at API category B (proposal environmentally unacceptable). One submission supported the proposal.

The majority of environmental comments related to concerns about the hydraulic fracturing process, including concerns about the potential for groundwater pollution from well failure. Other concerns raised in the comments included:

- the amount of water used in the hydraulic fracturing process;
- possible ongoing contamination of groundwater after closure (abandonment) of the well, particularly from the use of chemicals in the hydraulic fracturing process; and
- the potential for air pollution, including from fugitive greenhouse gas emissions.

Many of the comments also focussed on the impacts from a full scale commercial gas production facility and the potential cumulative impacts of hydraulic fracturing in the Kimberley.

Lastly there were calls for any decision on the proposal to be delayed until the current Parliamentary Inquiry on hydraulic fracturing is completed.

The EPA has considered the proposal in accordance with the requirements of the *Environmental Protection Act 1986* and the *Environmental Impact Assessment Administrative Procedures 2012*. In making its decision on whether to assess the proposal, the EPA considered the values of the environment, the extent of the likely impacts, policies, guidelines, procedures and standards against which a proposal can be assessed, and the presence of other statutory decision-making processes which regulate the mitigation of the potential effects on the environment (see Section 7 Significance Test, Administrative Procedures 2012).

As a result the EPA considers that this small scale, "proof of concept", exploration drilling proposal is unlikely to have a significant effect on the environment. The EPA considers that the potential impacts associated with the proposal can be further evaluated, regulated and mitigated by the Department of Mines and Petroleum (DMP) and the Department of Water (DoW) to meet the EPA's objectives for the environmental factors identified for the proposal.

Hydrological processes

Water will be sourced from the Canning Basin and 31 megalitres of water is required for the proposal. The proponent has existing licences for the proposal, regulated by the DoW in accordance with the *Rights in Water and Irrigation Act 1914*. The EPA is of the view that it is unlikely that the proposed groundwater abstraction would result in any significant impact on the environment or on other groundwater users.

The target geological formation is the Laurel Formation. There is a large vertical separation, including 1,500 metres of impermeable rock at Yulleroo and 600 metres at Valhalla/Asgard, between the shallower aquifers in the area, including those used as a water supply, and the saline aquifers in which the hydraulic fracturing is occurring. The DoW advises that this exceeds the quoted expected propagation distance for fractures. This impermeable rock would act as a containment barrier for vertical growth of the hydraulic fracture and prevent impacts on overlying aquifers. Therefore the EPA considers that the risk of impacts on the hydrogeological function of the shallower aquifers is low.

Inland waters environmental quality

In relation to the risk of groundwater contamination, it is important to note that, in contrast to coal seam gas hydraulic fracturing operations in eastern Australia, the targets for hydraulic fracturing in the current proposal are significantly deeper and therefore further from groundwater aquifers that are utilised as water supplies. The Laurel Formation and the surface aquifers that are used as potable water supply in the area are separated by between 600 metres and 1,500 metres of impermeable rock. The vertical separation and the presence of confining layers between the overlying aquifer and the fracture zone, is expected to be sufficient to protect the water resource from potential contamination by chemicals or hydrocarbons.

In relation to the issue of well integrity and leakage, EPA Environmental Protection Bulletin No. 15 *Hydraulic fracturing of gas reserves* (2011) notes the importance of ensuring that cement casings meet best practice industry standards and of maintaining well integrity in order to reduce the risk of blow outs and potential impacts to groundwater and surface water systems. The bulletin further notes that adequate contingency plans are important in this regard.

The DMP has advised that the well stimulation program will be assessed by the DMP and the information provided must detail all integrity checks to be undertaken on the existing wells prior to the commencement of activities. Before any stimulation operations can commence, the integrity of the steel casing of the wells will need to be confirmed through pressure testing. The DMP has also been informed that Buru Energy Limited (Buru) will conduct cement bond logs (CBL) on all four wells that form part of this proposal. CBLs provide data on the integrity and quality of the cement work of petroleum wells. The DMP will not approve hydraulic fracture stimulation activities on wells that do not pass integrity tests.

The DMP also advised that during any hydraulic fracturing, the proponent is required to report daily on the results of well integrity checks. Impacts of well integrity failure and associated mitigation and contingency measures will need to be outlined in Buru's Environment Plan (EP) for the activity. The DMP is yet to complete an assessment of the EP. If this information has not been included in the EP for the activity, the DMP will request that this information be included. Should a breach of well integrity be detected at any stage during or after hydraulic fracture stimulation, the operator will be required to rectify the issue and investigate any environmental implications.

The proponent has undertaken toxicity testing on the drilling fluid proposed to be used for this proposal. The toxicity testing carried out on rainbow fish has indicated that the fluid is non-toxic. In addition, the chemicals being used will need to be disclosed in accordance with DMP's *Chemical Disclosure Guideline* that was released in August 2013.

The DoW advises that surface activities (storage and use of chemicals, water storage ponds etc) pose a contamination risk to surface and groundwater resources. The proponent proposes best management practice of chemical storage and use, the use of high density polyethylene (HDPE) liners on water storage ponds and to monitor seepage to groundwater. The DoW advises that the groundwater monitoring program and flowback water monitoring and management is adequate given the short duration of the exploration program.

The proponent also proposes to conduct the exploration program during the dry season to further reduce the risk of minor spills impacting on surface water resources. Although the DoW agrees that this will reduce the risk, the DoW recommends that the proponent develop a contingency plan to manage unexpected

dry-season runoff. The DoW concludes that the proposed exploration program poses a minor risk to surface and groundwater.

Having considered the above, the EPA is of the view that potential risks of groundwater contamination associated with this proposal are low as the activities are occurring at depths far below any aquifers being used as a water supply. In addition, well integrity can be adequately evaluated and regulated by the DMP to ensure that any impacts to the environment are not significant. The EPA recommends that, prior to approval, the DMP should consult with the DoW as to requirements for water quality monitoring and that the DMP should impose conditions of approval requiring the proponent to carry out such monitoring and to carry out remediation in the event of spillage or contamination.

Rehabilitation and closure

The DMP has advised that onshore petroleum wells must be plugged in accordance with clause 529 of the *Onshore Petroleum Exploration and Production Requirements 1991*. The Requirements include (but are not limited to) isolating hydrocarbon reservoirs with cement plugs and filing the well with inhibiting fluids to preserve integrity. Plugging a well in accordance with the Onshore Schedule mitigates the potential for well integrity failure post-closure. The DMP has advised that the well plugging and abandonment procedures required in Western Australia are world's best practice.

As stated previously, it is also important to note that, in contrast to coal seam gas hydraulic fracturing operations in eastern Australia, the targets for hydraulic fracturing in the current proposal are significantly deeper and therefore further from groundwater aquifers. This greater vertical separation significantly reduces any risk of groundwater contamination from wells that have been plugged and abandoned.

In light of the above, the EPA is of the view that the well closure procedures required in Western Australia will adequately mitigate the potential for failure of well integrity post closure.

Other issues raised in public comments

Health risk from chemicals associated with hydraulic fracturing

Some commenters expressed concerns about potential health impacts from the proposed exploration drilling from contamination of groundwater.

As noted the above, under the Western Australian regulatory arrangements for hydraulic fracturing, companies are required to declare all chemicals used and the chemicals being used have been classified as being non-toxic.

The EPA is of the view that it is unlikely that there would be any significant public health impacts from chemicals to be used in the current proposal.

Call for EPA to consider impacts of future production

A number of commenters called for the EPA to consider not just the current proposal for exploration drilling but also the wider implications if gas is found and a production field were to be developed.

Under the *Environmental Protection Act 1986,* the EPA is obliged to consider a proposal as referred. Any future proposal for a production operation would be considered on its individual merits and any environmental assessment undertaken by the EPA would consider the environmental acceptability of the proposal.

Cumulative impacts of hydraulic fracturing

An interagency working group has been formed to ensure a "whole-of-government" approach is taken to best practice regulation of the emerging tight gas industry (natural gas from shale or tight rocks). The DMP in consultation with other State agencies is currently preparing a document outlining a framework for development of the tight gas industry in Western Australia. The framework aims to provide the community, non-government organisations and industry with an understanding of tight gas, its resource potential, the technologies used to develop these resources and the regulatory processes that are currently in place to effectively manage the development of the industry. The Office of the EPA is involved in the preparation of this framework to ensure environmental matters are given proper consideration.

The EPA's Environmental Protection Bulletin No. 15 *Hydraulic Fracturing of Gas Reserves* (2011) outlines the likely environmental issues that are relevant to this industry and how they can be considered. This Bulletin can be accessed on the EPA's website www.epa.wa.gov.au.

Delaying a decision pending outcome of the Parliamentary inquiry on hydraulic fracturing

The EPA acknowledges that the State Legislative Council's Environment and Public Affairs Committee has commenced an inquiry into the "Implications for Western Australia of Hydraulic Fracturing for Unconventional Gas". The EPA is, however, obliged to consider proposals as they are submitted and in a timely manner.

The EPA has considered the proposal in accordance with the requirements of the *Environmental Protection Act 1986* and the *Environmental Impact Assessment Administrative Procedures 2012.* In making its decision on whether to assess the proposal, the EPA considered the values of the environment; the extent of the likely impacts; policies, guidelines, procedures and standards against which a proposal can be assessed; the presence of other statutory decision-making processes which regulate the mitigation of the potential effects on the environment; and the level of public concern.