FALCON OIL & GAS AUSTRALIA

ABN 53 132 857 008

1 June 2014

Dr Allan Hawke AC
Commissioner
Hydraulic Fracturing Inquiry
GPO Box 4204
Darwin NT 0801

Dear Dr Hawke

Falcon Oil & Gas Australia Limited (**Falcon**) is the holder of Exploration Permits 76, 98 and 117 in the Beetaloo Basin under the *Petroleum Act* of the Northern Territory. On 2 May 2014 the Permits were renewed for a further five years subject to certain conditions specified by the delegate of the Minister for Mines and Energy. As the Permits are all located on pastoral leasehold land, this submission relates only to this type of land tenure.

The Australian Petroleum Producers and Explorers Association (**APPEA**) has prepared a comprehensive submission to the Inquiry covering all aspects of its terms of reference. Falcon fully supports the concerns and conclusions of the APPEA submission. In particular, the emphasis on best practice oilfield operations for well construction and testing, environmental management and on community engagement is supported.

The purpose of this submission is to provide you with additional specific information concerning Falcon's exploration activities in the Beetaloo Basin, an outline of the planned exploration program for the next five years and conclusions from the drilling of the Shenandoah No1A well.

Background

The Beetaloo Basin of the greater McArthur Basin in the Northern Territory is a Proterozoic and Cambrian age oil and gas bearing sedimentary depression and a separate depocenter within the greater McArthur Basin. The basin represents one of the few remaining sparsely explored onshore basins in Australia.

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PO Box 1276 Nightcliff NT 0814 Phone: 0402 029 152 Email: jcarroll@falconoilandgas.com

In its entirety, the Beetaloo Basin covers approximately 35,000 km² where a total of 12 wells have been drilled. Drilling of these wells was undertaken mainly by a Rio Tinto Group subsidiary, Pacific Oil and Gas, exploring for conventional hydrocarbons between 1984 and 1993. Wells were drilled with slim-hole, continuous-coring rigs to a maximum depth of about 2,000 m with the aim of stratigraphic tests. Most of the wells had good oil and gas shows and recovered gas and oil in DST. The core material, which is considered as a key in understanding unconventional resources, from these wells has been an invaluable source of information for subsequent exploration programs. While Pacific's activities never led to hydrocarbon production or development, the data from the cores demonstrated the presence of tight oil and gas and several horizons were shown to be prospective for unconventional oil and gas. Early stage seismic program, resulting in a total of 2,425 km of 2D seismic data, established a preliminary geological model of the basin.
Sweetpea Petroleum Pty. Ltd acquired Exploration Permits EP76, EP98, EP99 and EP117 in 2004. Sweetpea's initial analysis focused on the review of existing data, new basin modelling studies, evaluation of the available seismic data and reprocessing of ~1,000 km vintage seismic data, complemented with the acquisition of an additional ~700 km 2D seismic lines in 2006. In 2007, the first phase of drilling of the Shenandoah-1 well to 1,555 m TD was completed. The original intention was to reach 3,000 m TD and penetrate the Bessie Creek Formation. Drilling difficulties prevented achieving this goal and the well was cased and suspended at 1,555 m in the Kyalla Formation. Multiple gas shows recorded from cuttings and in the mud log over the entire Kyalla interval and streaming oil shows and fluorescence on cuttings from the Hayfield and Jamison sandstones gave encouraging indications on the potential of the basin centre.

Falcon acquired its interest in the Permits in 2009. During the first phase of exploration Falcon held four Permits – EPs76, 98, 99 and 117. In the process of renewing the Permits, Falcon surrendered EP99 on 28 April 2014 and the area of each of the other three was reduced.

Work Completed in the Beetaloo Basin

In the recent period of active exploration a significant amount of work has been completed including:

- All the historical geological and geophysical data from previous rounds of exploration in the 1980s and 1990s has been reviewed, evaluated and, where appropriate, included in the current data sets.

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- In 2006, 698.5 km of seismic lines within EP76 (60.2 km), EP98 (450.1 km), EP(A)117 (179 km) and 9.2 km in areas outside of the current permits was acquired. In addition, Sweetpea reprocessed vintage 2D seismic data of about 1,000 km. The 2006 exploration activities included a two-dimensional (2D) seismic survey to delineate hydrocarbon-prospective areas in the Beetaloo Basin. As part of the survey process, a major Environmental Impact Statement was prepared including the development of a technique for identifying potential archaeological sites which was accepted by the Northern Territory Government and has been used in subsequent exploration programs.

- In 2007 work commenced on the Shenandoah No1A well in the centre of the Basin. After a temporary suspension of drilling activities at 1,555 m depth, the well was successfully completed at a total depth of 2,741 m at the end of 2011. Well results have been successfully used in the analysis and evaluation of the seismic data. The testing of the Shenandoah No1A well included three vertical hydraulic fractures. Following the completion of that work, the well has been plugged and abandoned and the site was rehabilitated. Further information relating to this program is outlined below.

- Over the field seasons of 2011 and 2012, a major seismic program was undertaken involving the acquisition, processing and interpretation of 3,490 km of data at an estimated cost of approximately $80 million. This program confirmed the difficulty of acquiring data with consistent quality and pioneered new techniques for field operations that minimised environmental impacts.

- Since Falcon acquired the Permits in 2009, total exploration expenditure has been $106.2 million ($80 million on seismic data collection and analysis, $21.4 million on the Shenandoah No1A well and $5 million on other exploration activities).

Falcon is the operator of the Permits.

This work completes the first phase of the evaluation of the development potential of the Basin. The next five year program will involve drilling and testing of wells to confirm the extent of the geological structures and their capacity to produce hydrocarbons in commercial quantities.

The studies completed so far indicate that the most significant resources in the Basin are what is termed 'unconventional' and will require an extensive network of wells and hydraulic fracturing to achieve production levels sufficient to justify the large investment required to move to production. The geological formations are such that the resource-bearing shales are at significant depths and with very low permeability. Thus, future wells will require hydraulic stimulation to produce commercial volumes of hydrocarbons.

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Next Phase

On 2 May 2014 Falcon announced that, subject to certain conditions, it had completed a Farm-Out Agreement with Origin Energy Resources Limited (**Origin**) and Sasol Petroleum Australia Limited (**Sasol**) to each acquire 35% of the Permits.

Under the terms of the Agreement with Origin and Sasol, there will be a significant five year work program on the Permits which will include:

- Three vertical exploration/stratigraphic wells and core studies.
- One hydraulic fracture stimulated vertical exploration well and core studies.
- One hydraulic fracture stimulated horizontal exploration well, commercial study and 3C resource assessment.
- Four hydraulic fracture stimulated horizontal exploration/appraisal wells, micro-seismic and 90 day production tests.
- Drilling/testing will be specifically planned to take the project towards commerciality.

Drilling will commence as soon as possible following completion of the Agreements with the objective of commencing field operation in 2014 subject to the normal regulatory requirements and rig availability.

In the entire lifetime of the project, Origin will be the Operator. Origin has extensive experience and expertise in east coast operations and was a pioneer in the development of the coal seam gas industry in Queensland. It will have access to Sasol's considerable experience and expertise in shale gas operations in other countries.

Shenandoah No1A Well

The Shenandoah No1A well program was undertaken between 2007 and 2011. As Falcon has been advised, the Department of Mines and Energy will refer in detail to the technical aspects of the drilling and testing of the well, this aspect will not be covered again here. The purpose of this section is to bring to the Inquiry's attention the major issues which might assist the Commissioner in the development of any recommendations for future regulatory action.

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The work Falcon completed in drilling, testing and plugging and abandoning the Shenandoah No1A well required comprehensive approvals from the regulatory authorities. There were delays in the program caused by the weather – in 2010 wet weather in southern Australia prevented the necessary equipment being moved to the Territory resulting in the suspension of the work program and in 2011 the extended wet season in the Territory prevented access to the well until very late in the year.

The delays in 2011 had a significant adverse impact on the total cost of the program and shortened the planned testing program. Despite these difficulties the testing was undertaken and the well was successfully plugged and abandoned by the end of 2011. In 2012, following an independent report on the rehabilitation of the site, the Department of Mines and Energy released in full the rehabilitation bond for EP98 which covered this project and the seismic acquisition undertaken in 2006.

One matter that particularly relates to the Inquiry's terms of reference is the groundwater monitoring regime that Falcon commissioned as part of the project. Recognizing the importance of the aquifer to pastoral production and the extensive nature of the system, Falcon undertook to conduct comprehensive testing of the groundwater adjacent to well operations before, during and after the testing of the well. An independent report compiled by AECOM concluded that there were no discernible impacts on the aquifer from the drilling and testing operations in 2011. The complete data set and conclusions from this testing was provided to the Department of Resources, the pastoral leaseholder and the Northern Land Council.

To assist the Inquiry, Falcon has identified the matters relating to the regulation of well operations that are relevant to its terms of reference, including:

- The regulatory framework must be robust, reflect best oil field practice and have clarity, not only in the documentation but also about which agency is responsible and who can issue approvals.

- Technology in the industry is advancing rapidly with the benefit that operations are safer and resources are extracted more efficiently with each new advance. The regulatory regime should be able to continuously accommodate these advances with minimum difficulty for regulators and operators.

- The relevant Government agencies need to have sufficient scope and depth of expertise to handle the volume of work associated with the number of operations at any given time across the Territory.

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- While it is most efficient for operators to deal with one agency, the most important issue is timeliness of approvals. Delays in approvals introduce unnecessary uncertainties and add significantly to the costs of exploration and production.

- All operational circumstances cannot be foreseen requiring regular and clear communication between site staff and the regulators to ensure that work is undertaken at the standard required without unnecessary and expensive delays. As the relationship between the operator and the regulatory bodies is important in meeting the objectives of both parties, regulatory frameworks which encourage this interaction will be to the benefit of all parties.

- Falcon's experience confirms APPEA's views on engagement with the pastoral leaseholder/s, the Land Council as representative of the Traditional Owners and the community in general. This greatly helps the understanding about the impacts of operations and the implications for the region in which the work is being undertaken.

- The early stage of the industry in Australia and the remoteness of well locations in the Territory creates difficulties in obtaining appropriate equipment and skilled operators as indicated above. In addition, the management of the Shenandoah No1A well required Falcon to bring in overseas expertise to develop and manage the testing program. It is anticipated that in future this expertise will become available locally (one of the reasons Falcon has partnered with Origin) but there will always be additional costs because of the distance between operations, suppliers and markets. Nevertheless, the development of the industry potentially provides opportunities for new industries in the Territory and benefits to regional areas that would not otherwise be available.

These comments should be considered in the knowledge that Falcon's drilling experience in Australia as an operator has been limited to one well. However, its parent company has drilled a number of wells in other areas and this experience was utilized in the planning and operations at the Shenandoah No1A well.

Please contact me if you require any additional information about Falcon's activities in the Northern Territory.

Yours sincerely

John Carroll
Country Manager Australia