# MARKET UPDATE- DECEMBER 2018

**31 December 2018**

## KEY POINTS

- **SRK continue to review Radio Frequency Microwave Simulations on the Alpha Oil Shale Project (the "Project") which may mitigate the need to mine the shale rock**
- **SRK is re-assessing the Resource on the Project with a view to determining the annual and total production levels that can potentially be achieved from the Resource**
- **SRK planning for the wells paths and determine the recoverable oil Resources**
- **The Gold Basin transaction has been advanced in the due diligence phase and definitive legal agreements. However, the transaction remains subject to agreement on the final terms of the initial level of ownership – that is, 100% or 50.01%. In-principle agreement has been received to a "Last Right of Refusal"**

Greenvale Energy Limited ("**GRV**" or "the **Company**") is pleased to provide the following update:

### Development of its Alpha Oil Shale Project

The Alpha Oil Shale Project (the **"Project"**), is located approximately 50 km south of the town of Alpha, Queensland. A thin lens shaped torbanite deposit is contained within the lower part of a coal seam in the Late Permian Colinlea Sandstone of the Galilee Basin. Torbanite from the Project is composed of alginite, vitrinite, inertinite, sporinite (derived from spores and pollen) and trace cutinite (cuticles), resinite (resins, fats, waxes) clay-sized mineral matter and pyrite.

SRK is reviewing the applicability of in-situ Radio Frequency Microwave Stimulation (RF) to produce oil from the Alpha Torbanite. The suitability of the RF to produce hydrocarbons will mitigate the requirement to mine shale and as a direct result drastically change the economics of the Project by reducing the costs associated with the producing oil form the Project. SRK has reviewed the technology having regard to the historical technical reporting and data on the Project.

SRK has captured all the historical technical reporting and on the Project, assessed the available magnetic data and identified the key well logs. A considerable amount of the historical pyrolysis data is available for oil shales and is applicable to the Project. Hydrous pyrolysis experiments using Green River shale have demonstrated products much more like natural petroleum than produced by conventional shale oil retorting. Slower heating rates and increased pressure generate more petroleum-like shale oil. Slow generation over a 12-month period requires very little RF energy input once the initial heating of the kerogen has been achieved, usually in the first one to three months. Burnham (2003) reported the effect of heating rate and pressure on oil yields showing that slower heating at higher pressures increased Fischer oil yields significantly.

Raw oil shale has very little permeability, both because it is a fine-grained rock and because organic matter to some extent is a pore filling material. Consequently, external reactants or heating fluids cannot penetrate very far. However, the low permeability is not a significant constraint for escape of generated product.

Under normal high temperature retorting, the gas and oil vapours, which have a volume much greater than the kerogen from which they are formed, escape readily through the porosity generated by the kerogen conversion. However, under natural petroleum generation conditions, oil and gas are in a single fluid phase, and the excess volume generated is too small to expel much of the generated fluid. However, the additional porosity formed is greater than can be withstood by the lithostatic overburden, so the rock compacts and expels the fluid. If the permeability is insufficient to expel the oil and gas at the rate it is expelled, the rock fractures and releases the product via high-permeability cracks (Burnham, 2003).

Bridges et al (1988) described the net energy recoveries for the in-situ dielectric heating of oil shale. They estimated net energy recovery factors of 0.3 to 0.5 for commercial RF in situ heating. Because energy is used to run the RF process the net energy recovery factor also needs to be considered. Based on all the available data SRK considers a net energy recovery of 0.5 is applicable to insitu production. High recoveries where liberated gas may potentially be used to power the microwave generation in the most efficient recovery process, could mean recoveries up to 0.7 are achievable.

SRK is re-assessing the Resource on the Project with a view to determining the annual and total production levels that can potentially be achieved from the Resource.

Detailed Landsat and topographic data have indicated the surface configuration of the deposit and the available access (**Figures 1 and 2**). The program will require sampling of torbanite to confirm the production characteristics and production potential of microwave digestion and understand how the production will compare to Fischer assays and historic measured oil recoveries.

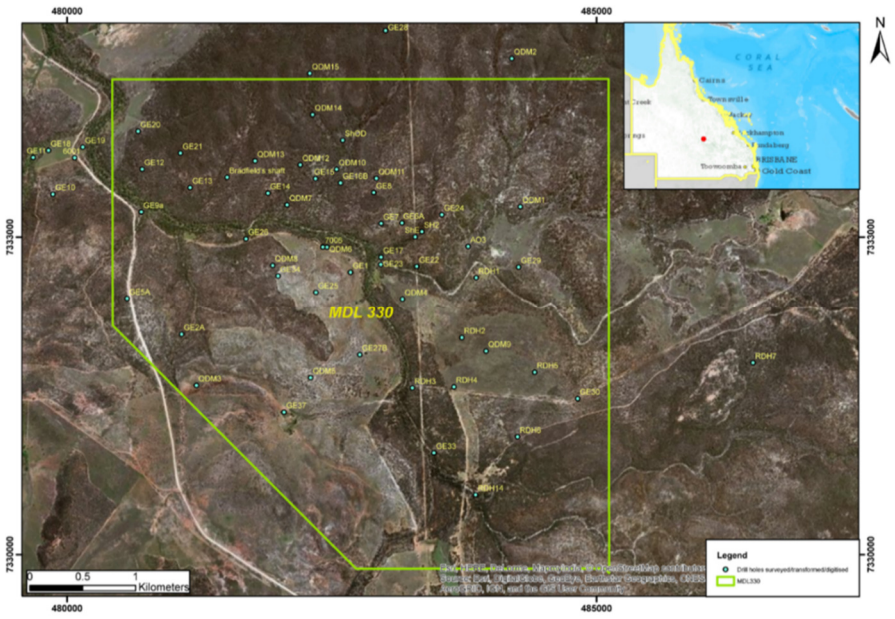


**Figure 1: Landsat image covering the Alpha torbanite deposit**

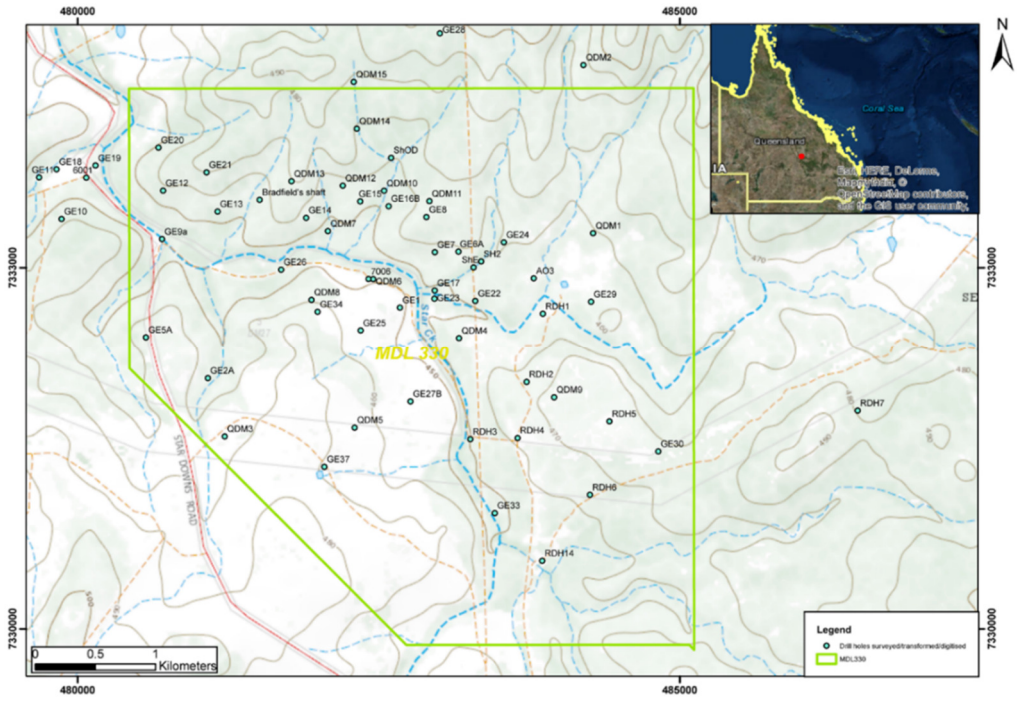


**Figure 2: Topographic data covering the Alpha torbanite deposit**

The production block configuration for the Alpha torbanite zone (**Figure 3**). The oil yields from the available sample data are shown in **Figure 4**. Modified Fischer assays for 145 ply samples of torbanite from 28 holes gave values ranging from 200 to 650 litres per tonne (l/tonne) with an average of 420 l/tonne. The average yield is almost 3 barrels of oil per tonne of shale.

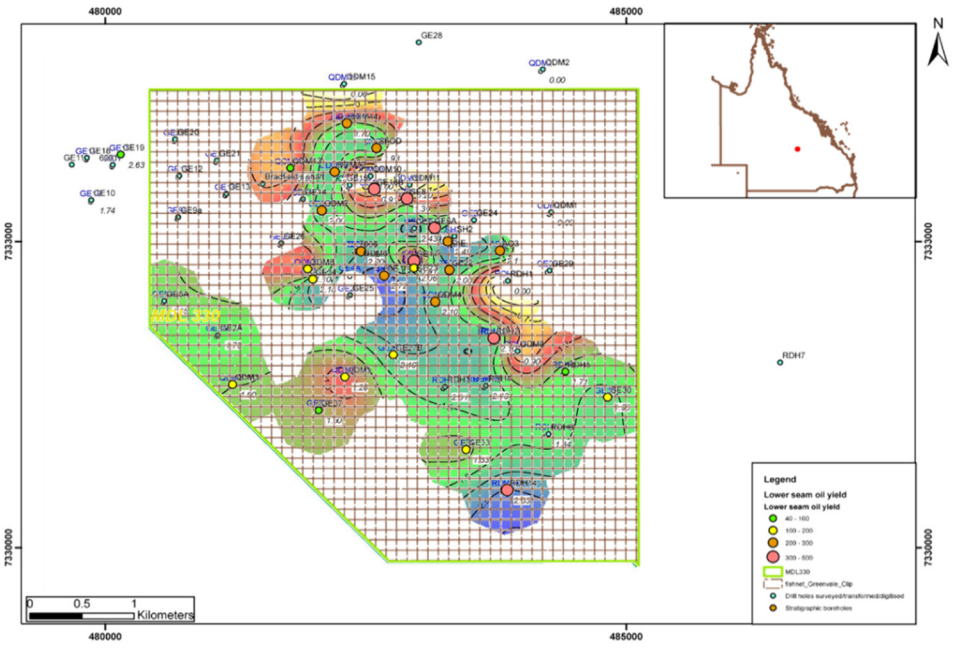


**Figure 3: Block map to review the potential for torbanite resources in MDL330**

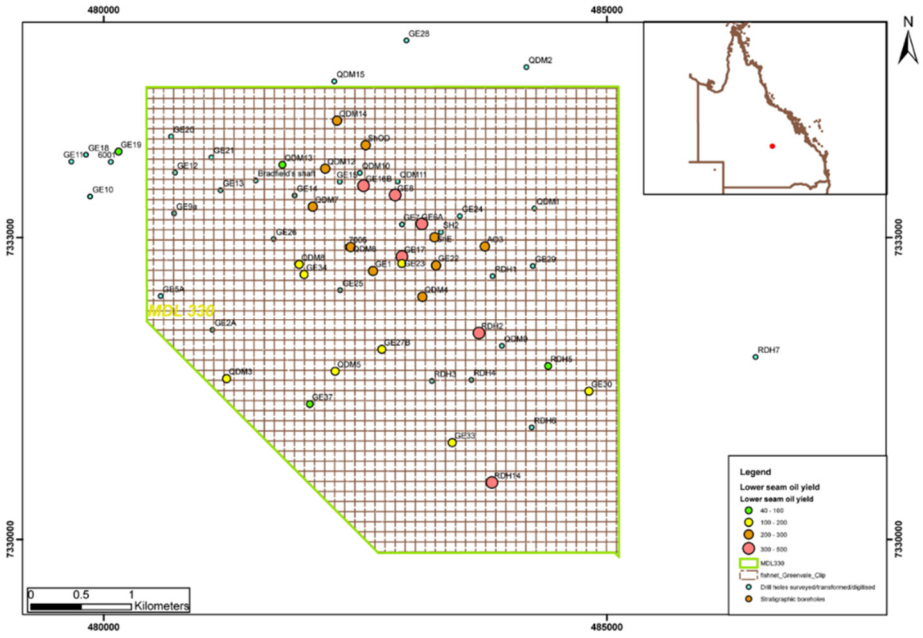


**Figure 4: Measured oil yields from drill holes in the Alpha torbanite deposit**

### *Forward Program*

SRK will plan for the wells paths and determine the recoverable oil Resources as the next step in its review process.

Sampling and analysis of Alpha torbanite will be needed to confirm the hydrocarbon production characteristics and production potential of microwave digestion. It will also be important to understand how the production will compare to Fischer assays and historic measured oil recoveries.

Some gas is liberated in the RF process, but this could be used to generate electricity to power the microwave antennae.

### *References*

Bridges, J.E. and Sresty, G.C., 1988. Update on Radio-Frequency In Situ Extraction of Shale Oil. Colorado School of Mines Quarterly. 83:4. pp35-43 https://catalog.hathitrust.org/Record/003578997.

Burnham, A. K., 2003. Slow Radio-Frequency Processing of Large Oil Shale Volumes to Produce Petroleum-like Shale Oil U.S. Department of Energy Lawrence Livermore National Laboratory.

### Acquisition

On 24 September 2018, the Company announced the entering into Heads of Agreement of the Gold Basin transaction (the **"Transaction"**). As announced, the proposed Transaction initially involves the acquisition of a 50.01% interest in a holding company in exchange for an investment of A$550,000. In turn, that holding company has a right to earn a 50.01% interest in a company who has the ownership of various claims in Phoenix Arizona, USA. Under the terms of the Heads of Agreement, the Company is to have the right but not the obligation to acquire the remaining interest so as to achieve 100% ownership.

The Transaction has been advanced in the due diligence and definitive legal agreements have been drafted are ready for execution. The main outstanding issue remains agreement between the parties on the acquisition of 49% interest so as to provide the Company with a clear path to achieving 100% ownership. The previously announced Heads of Agreement noted that the Company had an option to acquire all of the 100% shareholding. However, subsequent negotiations have resulted in "in-principle agreement" agreement for a "Last Right of Refusal". The Directors remain confident that agreement on the remaining 49% interest will be reached between the respective parties in the coming weeks.

### Contact details

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