Greenvale Energy Limited
Exploration Update Alpha Project MDL/330

ASX Release
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Key Points

- Application for renewal of MDL 330 has been made and the board is confident of the granting of a five-year licence
- Work programs to update existing data and then establish a programme of infill drilling to upgrade the resource from an Exploration Target to a JORC 2012 Standard Reserve
- Initial work to be an updated survey of the tenement and verify the location of the historical drill holes.
- Scoping study to also be undertaken so as to review various feasible development options such as a chemical reductant, asphalt, activated carbon and oil. The review will also examine potential important applications for the Alpha oil shale in the Central Queensland region economy in the future.

Greenvale Energy Limited (ASX: **GRV)** is pleased to provide the following update on its activities for Alpha tenement:

Background

The Alpha deposit is located approximately 62km south of Alpha, a small farming town in Central Queensland and over the last 75 years the area has been explored by numerous parties over that period. As a result, significant exploration data is available from within MDL 330 and includes:

- 68 holes with total cumulative depth of 3,251.9m;
- down-hole geophysical logging on 26% of the holes; and
- 192 oil shale sample analyses.

The exploration work within the mining lease has shown an oil shale deposit that consists of 2 seams; an upper cannel coal seam and a lower torbanite/cannel coal seam. Torbanite is the richest variety of oil shale known.

Work conducted during the year has been designed to analyse the current dataset and provide a clear strategy for the future work programme. This work has consisted of:

- data search and validation
- technical evaluation interpretation and analysis;
- construction of a model of the deposit using Gemcom software; and
- estimate of oil shale exploration targets.

The work has highlighted that due to the relative age of the drilling data available and the lack of proper survey information, at the present time there is insufficient data to estimate a Resource of oil shale within MDL 330 according to the JORC Code 2012. However, it is possible to define Exploration Targets (see below) under JORC 2012 which are useful, in particular with the deposit model for an intended scoping and utilisation studies. The work also highlighted that the quality of the Alpha shale means it's potential is not necessarily limited to oil production.

The Board of Greenvale Energy have decided to fully define and, if economically feasible develop the Alpha deposit. A new work programme has been detailed and aims to continue the work from the previous years and update existing data and then establish a programme of infill drilling to upgrade the resource.

Licence update

As previously announced, the MDL 330 is due for renewal by 31 January 2017. The Company filed in July/August 2016 an application for the renewal of this licence for a further period of five years. Based on feedback provided from the Company's licence administrator, the Board is confident that this extension will be granted in the near future. More importantly, advice received from the technical administrators is that the licence continues to be in place, even if no confirmation has been received by 31 January 2017.

Exploration Targets

Statement of Significant Mineralisation

In accordance with Mineral Resources Regulation 2003, there is insufficient data to estimate a Resource of oil shale within MDL 330 according to the JORC Code 2012 at this time. Due to the relative age of the drilling data available and the lack of proper survey information, oil shale within MDL 330 can only be classified as an Exploration Target in terms of the JORC Code 2012. In accordance with the JORC Code it must be stated that the Exploration Target area is theoretical in nature at this time as insufficient information is currently available to estimate an oil shale Resource. Additional drilling will be required to demonstrate the Exploration Target potential and there is no guarantee that this work will result in an oil shale Resource**.**

Oil shale Exploration Targets have been estimated using GEMCOM Surpac® mining Software during the 2016 exploration year. The seam thickness, quality and depth was derived from the existing dataset which is not complete. For this reason, Exploration Targets have been identified and not an Oil Shale Resource. Because of the condition of the historic data the Exploration Targets are still conceptual in nature and additional exploration cannot guarantee that an Oil Shale Resource will result.

Appendix 1 set outs the summary of the current estimates of oil shale Exploration Targets and the assumptions used in the formulation of those estimates.

Statement of Resources and Reserves

At this time, no statement of Resources and Reserves has been possible as the data is partially out-dated (1940-1987), poorly preserved and often incomplete. As a result, the above is considered to be an Exploration Target in terms of the JORC Code 2012.

Overview of Exploration Work Programme

Set out below is a summary of the exploration work programme to be undertaken:

1. Ground Survey

The data review has highlighted the need for an updated survey of the tenement and the relocation of the historical drill holes. The previous survey was completed in 1985 using a theodolite and positioning was fixed to a survey benchmark for which the location is no longer known.

Accordingly, as a first stage of the current work programme, a modern accurate ground GPS survey is currently being undertaken by the Company and will be completed by mid-late January. This will be combined with publicly available topographic data that will also be acquired by the Company. In addition, various government survey benchmarks will be used to overlay on the existing topography from the project to correct any variation in the location and elevation and the survey data will be tied into the Australian Grid.

The key deliverables will be:

- the details of proximal permanent survey benchmarks that could be used for future surveying programs;
- the details of the fields survey exercise including surface features surveyed and the historical drill holes located and resurveyed;
- possible requirements for a permanent benchmark to be constructed at the Project site (if a permanent benchmark is deemed necessary, then this will be constructed, surveyed and reported accordingly); and
- the updated topographic map and DTM that can be used with confidence for resource modelling.

It is considered unlikely that the survey information will be sufficient to provide a Resource statement but the accurate relocation of the historical drill-holes will allow the design of a new systematic in-fill drill program to prove up the deposit to a JORC standard.

2. *Scoping and Utilisation Studies*

The unique quality of Alpha oil shale has the potential to be used in diverse applications such as:

- a chemical reductant (replacing fuel oil) in smelting (including nickel processing)
- a source of asphalt
- a source of activated carbon
- a source of oil

Consequently, it is proposed to undertake a desktop scoping study that can examine these utilisation options. The above will also provide assistance with:

- resource modelling with new topography
- overall pit design, dump and drainage design options and potential mining schedule
- analysis of mining options and costs

In particular, the study will concentrate on the direct use of the rock as an industrial material and as a source of oil from a mini retort and refinery option. The review will also examine potential important applications for the Alpha oil shale in the Central Queensland region economy in the future.

ENDS

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Competent Person Statement

The Petroleum Resource estimation is based on the discovered Petroleum Initially in Place (PIIP); estimated using polygonal blocks. The methodology used is a deterministic method where the JORC 2012 guideline levels of categorisation (Measured, Indicated and Inferred) quantify the range of uncertainty or confidence levels for the deposit. The Exploration targets have been prepared by Daniel Madre M.Sc, who worked as a geologist and project manager for the Alpha Oil Shale Project during a period from 1980 to 1988. This included field work annually, well site geological duties, managing various exploration programs and other investigations during that time. In addition, Mr Madre completed a Master of Science degree from the University of Wollongong that featured a study of torbanite deposits of the world (including Alpha) as the subject of his Master's thesis.

Appendix 1

Current Exploration Target Estimates

Exploration Targets in MDL 330

TORBANITE			
Depth Range	**Oil Shale (Mt)**	**Oil Yeild (Lt/t)**	**Shale Oil (Mb)**
0-25m	2.03 - 2.65	362	4.86 - 6.05
25-50m	1.37 - 1.93	324	2.97 - 3.92
50-75m	0.19 - 0.45	264	0.27 - 0.75
75-100m	0.00 - 0.09	283	0.00 - 0.15
TOTAL	**3.59 - 5.11**	**338**	**8.10 - 10.86**
CANNEL COAL			
Depth Range	**Oil Shale (Mt)**	**Oil Yeild (Lt/t)**	**Shale Oil (Mb)**
0-25m	5.99 - 11.61	130	4.46 - 9.52
25-50m	11.02 - 16.33	133	9.28 - 13.70
50-75m	4.95 - 9.05	133	4.16 - 7.55
75-100m	0.37 - 2.95	122	0.24 - 2.27
TOTAL	**22.33 - 39.93**	**132**	**18.14 - 33.04**
TORBANITE + CANNEL COAL			
Depth Range	**Oil Shale (Mt)**	**Oil Yeild (Lt/t)**	**Shale Oil (Mb)**
0-25m	8.02 - 14.26	174	9.32 - 15.57
25-50m	12.39 - 18.26	153	12.25 - 17.61
50-75m	5.15 - 9.50	139	4.43 - 8.30
75-100m	0.37 - 3.03	127	0.24 - 2.42
TOTAL	**25.92 - 45.04**	**155**	**26.24 - 43.90**

In estimating this oil shale accumulation, the following assumptions have been made:

- low range oil shale Exploration Target is based on 500m influence of the torbanite lens from a known observation point for all oil shale seams with a minimum of 5 overlapping observations and more than 3 observations with quality analysis
- high range oil shale Exploration Target is based on ultimate limit of torbanite lens to a minimum 0.4m thickness cut-off where data is more widely spaced
- to compensate for oil shale lost to erosion, a 3m weathering halo was applied to the resource estimation. This assumes that no oil shale exists within 3m of the ground's surface.
- minimum seam thickness is 0.4m applied to the model
- a bottom limit of -50m elevation was applied to the model
- oil shale is estimated by depth ranges of 25m intervals from surface to a maximum depth of 100m below the surface
- seam intersections were based on recorded logs and lab analysis results,

- no mine recovery factor was used
- oil shale was restricted to within the boundary of lease areas
- a density for oil shale of was taken from sample analysis results for each individual seam.
- the quality has been included into the geological model and represents the actual distribution of the quality within the deposit as analysed in the oil shale core samples taken. Cores were composited at each point of observation for each individual seam. An IDW2 interpolation was used to populate the block model from the quality composites with a search radius of horizontal 2000m and vertical 100m from each sample observation.

JORC Code, 2012 Edition – Table 1 report

Section 1 Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections.)

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases, more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.*	• Historical data used dating back more than 75 years until 1987. Sampling was a result of core drilling, test pits and outcrop • Where possible downhole geophysics were re-interpreted, reconciliation of borehole log & sample interval • Original data includes a mix of imperial measurements and analysis techniques including Destructive Distillation to measure oil yield in gallons/ton to Modified Fischer assay oil yields in litre/tonne
Drilling techniques	• *Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	• Mainly core drilling using standard and triple tube core techniques
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• Core recovery data is not available for any of the drilling programmes • It is not known if there is any bias in the sample data caused by core recoveries
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource*	• Geological logging only and many hardcopy logs are difficult to read

Criteria	JORC Code explanation	Commentary
	estimation, mining studies and metallurgical studies. • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• Quantitative only • 40% of holes have downhole geophysics
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• whole core was sampled and no information regarding sub-sampling is available
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.*	• Laboratory analyses were carried out in QMD lab and certified labs using standard procedures for the date of sampling • Lab certificates are only partially complete
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage*	• None at this time

Criteria	JORC Code explanation	Commentary
	(physical and electronic) protocols. • *Discuss any adjustment to assay data.*	
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• Topography survey is old and benchmarks used are no longer known • Collar survey was carried by ground survey but in 22 holes the actual collars were not located
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• Drill holes are relatively evenly spaced over the deposit area • Continuity is established by the drill pattern • Analyses results were composited for each point of observation and an IDW_2 interpolation was applied
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• Vertical drill holes are appropriate in a flat lying deposit
Sample security	• *The measures taken to ensure sample security.*	• No information
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• Oil yield results tend to correlate between results obtained decades apart indicating reliability

Section 2 Reporting of Exploration Results-

(Criteria listed in the preceding section also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• MDL 99% owned by Alpha Resources Limited
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• Exploration has been done by at least 3 different parties over a 75-year period all acknowledged
Geology	• *Deposit type, geological setting and style of mineralisation.*	• Sedimentary deposit with a simple horizontal bedding
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* ○ *easting and northing of the drill hole collar* ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* ○ *dip and azimuth of the hole* ○ *down hole length and interception depth* ○ *hole length.* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	• 68 drill holes Yes Yes Yes Yes Yes No drill data was excluded
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• Cannel coal and torbanite oil shale were treated separately and not aggregated

Criteria	JORC Code explanation	Commentary
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').*	•
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	•
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	•
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	•
Further work	• *The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	•

Section 3 Estimation and Reporting of Mineral Resources

(Criteria listed in section 1, and where relevant in section 2, also apply to this section.)

Criteria	JORC Code explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.* • *Data validation procedures used.*	• Raw data was collated tabulated • Checks were made against drill logs, geophysics and sample analysis interval
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• The Competent Person has been to the site many times the last being 2014
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* • *Nature of the data used and of any assumptions made.* • *The effect, if any, of alternative interpretations on Mineral Resource estimation.* • *The use of geology in guiding and controlling Mineral Resource estimation.* • *The factors affecting continuity both of grade and geology.*	• Simple geology gives relatively high confidence in the geological interpretation • Data is old and not well preserved • Lithological descriptions are not reliable and the definition between torbanite and cannel coal oil shales is not clear
Dimensions	• *The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	• 3000m X 2000mX100m
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.* • *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.* • *The assumptions made regarding recovery of by-products.* • *Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation).*	• See Appendix 1 in this announcement • Target scale agrees with previous resource estimate • None • Total sulphur may be a deleterious element but has not been estimated

Criteria	JORC Code explanation	Commentary
	• *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* • *Any assumptions behind modelling of selective mining units.* • *Any assumptions about correlation between variables.* • *Description of how the geological interpretation was used to control the resource estimates.* • *Discussion of basis for using or not using grade cutting or capping.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	at this time • Block size in the model is 20mX20mx1m • Ave sample spacing is approximately 500m and a search radius of 2000m was used in the horizontal and 100m vertical • A minimum thickness of 40cm was used as an arbitrary cut-off
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	• Tonnage is estimated on the basis of the lab density measurement but no moisture basis is given
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• 40cm thickness cut-off was assumed as a minimum mining thickness
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.*	• No recovery factors or dilution were applied • Targets were estimated by depth increments to indicate mining depth
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	• N/A
Environmen-tal factors or assumptions	• *Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be*	• No environmental factors have yet been considered although the area is remote from towns or housing

Criteria	JORC Code explanation	Commentary
	reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.	
Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.* • *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.* • *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	• 29 lab density measurements were made mainly from core samples. Sample sizes and moisture basis are not known • Density was estimated from the lab analysis measurement results
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).* • *Whether the result appropriately reflects the Competent Person's view of the deposit.*	• No resources at this time • The age and condition of the raw data downgrades the classification of the deposit to Exploration Target status only at this time • The Competent Persons familiarity with the project history is confident a resource estimate will be possible with further work
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• The overall scale of the Exploration Targets correlates with previous resource estimates
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation*	• Confidence in the raw data is low because of the relative age of the information and the lack of detail available. New data is required to support the original information and give confidence to future resource estimates.

Criteria	JORC Code explanation	Commentary
	should include assumptions made and the procedures used. • *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	