

**LOCHINVAR COKING COAL PROJECT**  
*Attractive low ash coking coal project  
 ideally located to supply domestic UK  
 and Western European steel mills*

**Geology and Resource**

- 9 historic drill holes plus 10 NAE holes and over 100km of seismic lines
- 111Mt Resource
  - 49 Mt Indicated, 62 Mt Inferred
  - Nine Foot Seam (2.2m ave thickness)
  - Six Foot Seam (1.8m ave thickness)

**Secure Tenure**

- 100% NAE owned Exploration Licences and Conditional Underground Mining Licences from The Coal Authority

**Infrastructure**

- Immediate access to existing rail and port infrastructure

Strong support from local, regional and national government and community



**New Age Exploration Limited**

ASX Code: NAE

ACN: 004 749 508

**Resource Sector**

**Coking Coal**

**Countries of Focus**

**UK**

**Colombia**

**Board & CEO**

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**Gary Fietz (MD)**

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## LOCHINVAR RESOURCE UPGRADE AND PRODUCT QUALITY

- A total resource of 111 Mt comprising 49 Mt Indicated Resource and 62 Mt Inferred Resource has been defined following completion of Phase 1b drilling in July 2014

Coal Seam (Air Dried Basis)	Indicated Resource (Mt)	Inferred Resource (Mt)	Total Resource (Mt)
<b>Nine Foot Seam</b>	37	49	86
<b>Six Foot Seam</b>	13	13	26
<b>Total</b>	<b>49</b>	<b>62</b>	<b>111</b>

- In addition to the resource an Exploration Target<sup>1</sup> of 31 - 64 Mt has been identified
- Coal quality results now received for Phase 1b boreholes
- Results of NAE and historic drilling indicate Lochinvar will produce a high volatile, low ash coking coal at a high yield with the following indicative product quality:

	Indicative Product Quality	Units (Basis)
<b>Yield</b>	<b>75</b>	%
<b>Moisture</b>	<b>3.0</b>	% (Air Dried)
<b>Ash</b>	<b>5.0</b>	% (Air Dried)
<b>Volatile Matter</b>	<b>34.0</b>	% (Air Dried)
<b>Total Sulphur</b>	<b>1.4</b>	% (Air Dried)
<b>CSN</b>	<b>7</b>	
<b>Gray-King Coke Type</b>	<b>G6</b>	
<b>Phosphorous</b>	<b>0.007</b>	% (Air Dried)
<b>Gross Calorific Value</b>	<b>7775</b>	Kcal/kg (Air Dried)
<b>Vitrinite Content</b>	<b>70</b>	%
<b>Vitrinite Reflectance</b>	<b>0.84</b>	R <sub>o</sub> Max %

**NAE Managing Director, Gary Fietz, commented:** "The successful Phase 1b drilling program has resulted in the conversion of 44% of our initial Inferred Resource estimate to an Indicated Resource. This forms the foundation of our Scoping Study which is progressing well and will be completed by October."

<sup>1</sup> Exploration targets are conceptual in nature, and it is uncertain whether the targets will be converted to Mineral Resources

## LOCHINVAR RESOURCE STATEMENT (AUGUST 2014)

Following completion of the extended Phase 1b drilling program (6 holes) by NAE on 2 July 2014, an updated resource estimate has been completed.

A **total resource of 111 Mt comprising 49 Mt Indicated Resource and 62 Mt Inferred Resource** has been defined for the Nine Foot and Six Foot Seams as shown in Table 1 and Table 2.

The 49 Mt Indicated Resource represents a 44% conversion of the October 2013 Inferred Resource to Indicated status.

The total resource has reduced by 1 Mt from the October 2013 total resource as a result of reinterpretation of the basin margins and the results from Phase 1b drilling.

*Table 1 Lochinvar Nine Foot Seam Resource - Average Raw Coal Analysis (Air Dried Basis)*

Nine Foot Seam	Resource	Ave. Thickness	Moisture	Ash	Volatile Matter	Sulphur	CSN
Category	Mt	m	%	%	%	%	
Indicated	37	2.3	2.7	11.8	32.0	2.2	6.0
Inferred	49	2.1	2.4	14.5	31.8	2.2	6.0
<b>Total</b>	<b>86</b>	<b>2.2</b>	<b>2.5</b>	<b>13.4</b>	<b>31.9</b>	<b>2.2</b>	<b>6.0</b>

In the northern part of the resource (42 Mt) the upper and lower plies of the Nine Foot Seam are coalesced into a single seam with an average thickness of 2.7 metres. In the southern part of the resource (43 Mt), the Nine Foot Seam resource excludes the upper plies of the Nine Foot Seam as they are either not present or are split away from the main thicker part of the seam. The average Nine Foot Seam thickness in the southern part of the deposit is 1.6 metres (exclusive of upper plies).

Total stone parting in the northern area (not included in the resource shown in Table 1) is estimated at 9 Mt with an average total stone parting thickness of 0.38m. The dilution effects of this stone parting are incorporated into the 75% overall yield estimate for the resource.

*Table 2 Lochinvar Six Foot Seam Resource – Average Raw Coal Analysis (Air Dried Basis)*

Six Foot Seam	Resource	Ave. Thickness	Moisture	Ash	Volatile Matter	Sulphur	CSN
Category	Mt	m	%	%	%	%	
Indicated	13	2.0	2.9	9.2	32.4	2.4	7.0
Inferred	13	1.5	2.5	10.8	31.6	2.3	7.0
<b>Total</b>	<b>26</b>	<b>1.8</b>	<b>2.7</b>	<b>10.0</b>	<b>32.0</b>	<b>2.3</b>	<b>7.0</b>

An additional **Exploration Target of 31 – 64 Mt** has been identified in areas where there is insufficient information to define a resource. A breakdown of the Exploration Target is shown in Table 3.

*Table 3 Lochinvar Exploration Target*

<b>Coal Seam</b>	<b>Lochinvar Licence</b>	<b>Lochinvar South Licence</b>	<b>Total</b>
	<b>Mt</b>	<b>Mt</b>	<b>Mt</b>
Nine Foot Seam	2 – 20	15 - 27	17 - 47
Six Foot Seam	0 – 0	0 – 0	0 – 0
Five Foot Seam	14 – 17	0 – 0	14 – 17
<b>Total</b>	<b>16 – 37</b>	<b>15 - 27</b>	<b>31 - 64</b>

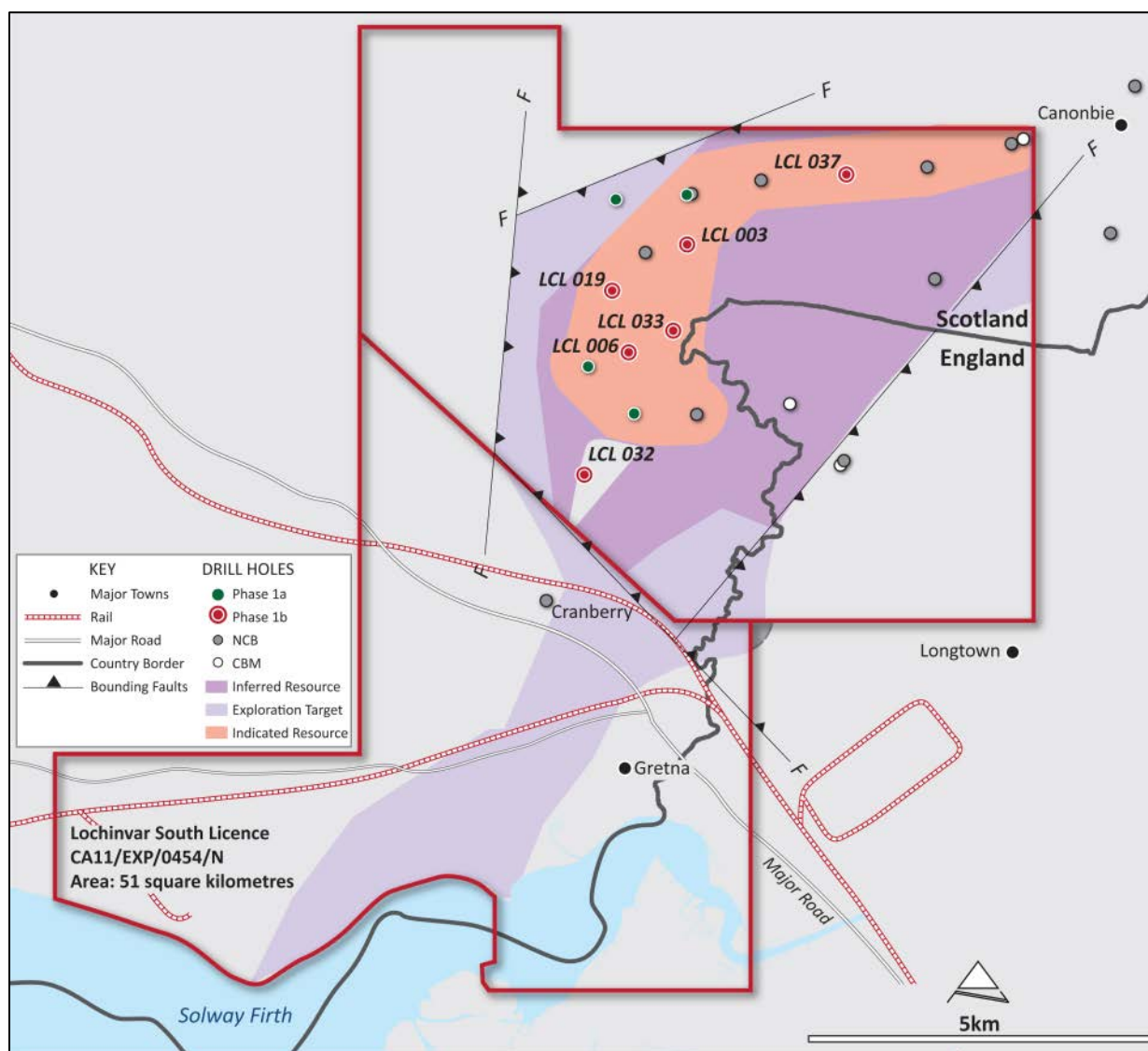
The Indicated Resource, Inferred Resource and the Exploration Target have been reported in accordance with the JORC Code (2012) and have been independently estimated by Palaris Australia Pty Ltd, an internationally recognised mining consultancy specialising in coal exploration and mining.

The resource estimate is based on 9 holes drilled by the National Coal Board (NCB) from 1979 through to 1983 and 10 holes drilled by NAE in 2013 and 2014. Over 100km of seismic data was also incorporated in the resource estimate providing interpretative evidence for the lateral continuity of coal seams.

The Resource and Exploration Target are constrained by:

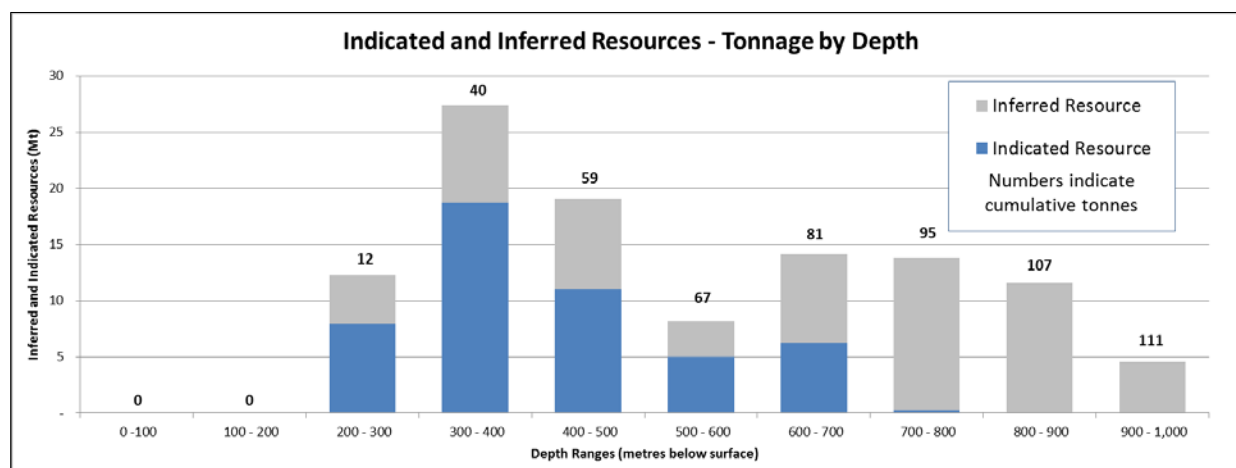
- A minimum seam thickness of 1.2 metres
- A maximum depth of cover of 1,000 metres
- A maximum parting distance of 0.8m between coal plies of the Nine Foot Seam where the upper plies are split from the lower ply of the seam in the south of the deposit
- The area within NAE's Coal Exploration Licence CA11/EXP/0515/N (Lochinvar) and CA11/EXP/0545/N (Lochinvar South).

The extent of the Indicated Resource, Inferred Resource and Exploration Target are shown in Figure 1.



**Figure 1 Indicated, Inferred Resource and Exploration Target Location - Lochinvar Project**

A breakdown of the resource by depth is shown in Figure 2. 95 Mt of the total resource, including 74 Mt from the Nine Foot Seam, is shallower than 800m depth. All of the Indicated Resource is shallower than 800m depth.



**Figure 2 Indicated and Inferred Resource Tonnage by Depth**

The seam thickness, depth and dip of the Nine Foot Seam and Six Foot Seam are, in general, favourable for underground mining.

Geological data collected from the two phases of drilling and a re-interpretation of the available seismic data has increased the understanding of the Lochinvar structure. Palaris recently completed a revised structural interpretation which identified an increased density of faulting compared to the previous interpretation (see Figure 3). Mine plans in the Scoping Study will be based on this revised structural interpretation.

Additional minor faults have also been interpreted on seismic profiles which are not included in the revised structural interpretation due to very low confidence in fault existence, orientation and extent.

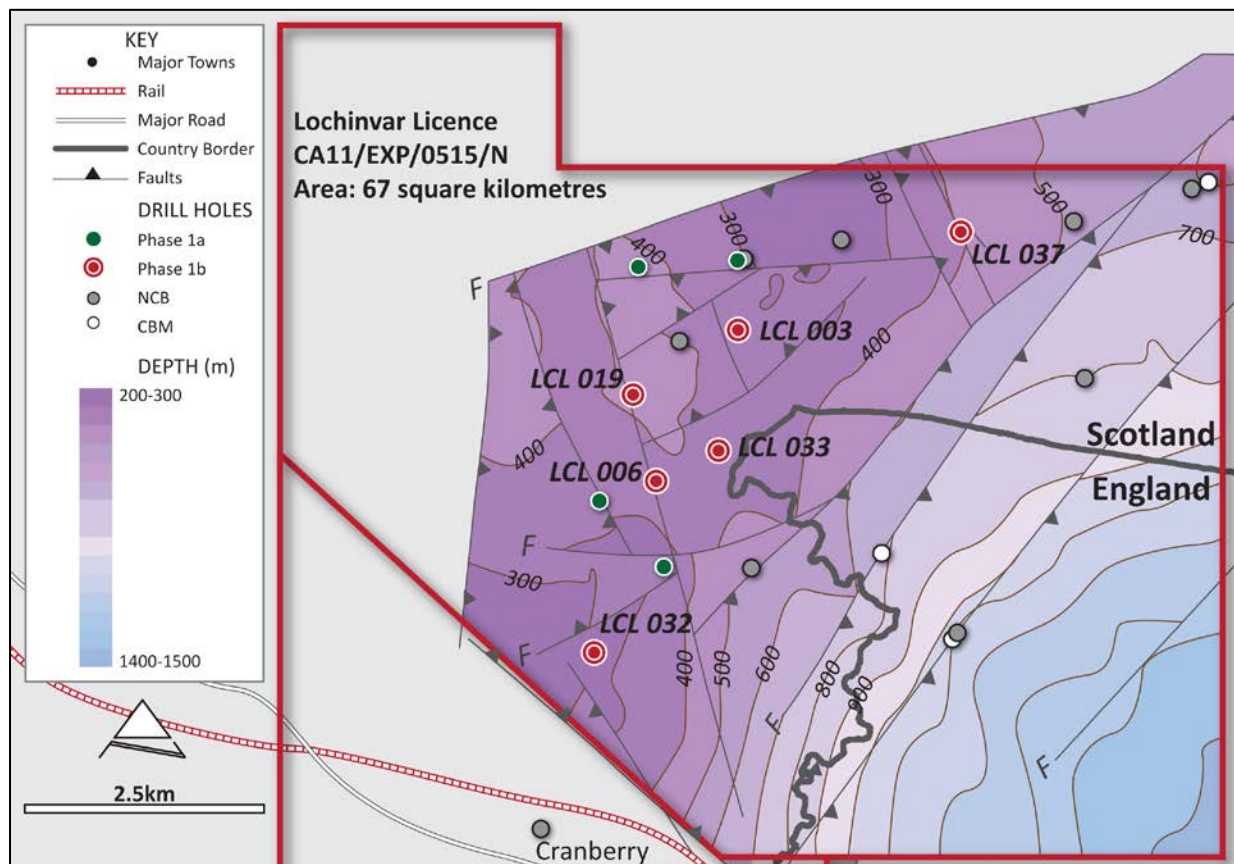


Figure 3 Lochinvar Structural Interpretation

## LOCHINVAR COAL QUALITY

Coal quality results now received for Phase 1b boreholes include raw coal analysis, washability tests and clean coal analysis results.

### Raw Coal Analysis Results

Raw coal analysis results for the 6 Phase 1b boreholes are shown in Table 4.

**Table 4 Phase 1b Drilling Results – Raw Analysis (Air Dried Basis)**

Borehole	Seam Thickness	Coal Thickness	Moisture	Ash	Sulphur	Volatiles	CSN
	m	m	%	%	%	%	
<b>Nine Foot Seam</b>							
<b>LCL-003</b>	2.15 <sup>3</sup>	1.84	2.84	12.0	4.36	32.4	7.0
<b>LCL-006</b>	1.59	1.59	2.75	8.5	1.99	31.6	5.5
<b>LCL-019</b>	1.69 <sup>3</sup>	1.69 <sup>3</sup>	2.67	11.7	2.89	32.5	5.0
<b>LCL-032</b>	0.70	0.59	1.79	30.8	1.73	28.8	5.0
<b>LCL-033</b>	1.89	1.59 <sup>3</sup>	3.01	26.5	1.98	26.5	5.0
<b>LCL-037<sup>1</sup></b>	1.82	1.82	2.63	11.0	2.39	33.0	7.0
<b>Six Foot Seam</b>							
<b>LCL-033</b>	0.75	0.75	3.2	7.4	1.54	31.2	6.5
<b>LCL-037<sup>2</sup></b>	3.23	3.23	3.0	7.4	2.09	33.0	7.0

<sup>1</sup> Steep dips and evidence of faulting were encountered in borehole LCL-037. After correcting for dip, the true vertical thickness of the Nine Foot Seam in borehole LCL-037 is 1.6m which is interpreted as being truncated by faulting.

<sup>2</sup> Steep dips and evidence of faulting were encountered in borehole LCL-037. After correcting for dip, the estimated true vertical thickness of the Six Foot Seam in borehole LCL-037 is 2.3m.

<sup>3</sup> Thickness of some intersections have been revised from those included in the 30 June 2014 Quarterly Report as a result of interval corrections or removal of some plies subsequent to receipt of ply-by-ply coal analysis results.

### **Washability Test and Clean Coal Analysis Results**

Washability Test and Clean Coal Composite analysis results for the 6 Phase 1b boreholes are shown in Table 5.

A 75% overall yield estimate applies to the Nine Foot Seam Resource and includes an adjustment for plant inefficiencies. The estimate accounts for the parting between the Nine Foot Lower and Upper Seams but flexibility exists to significantly increase yield in the northern area of Lochinvar simply by mining the Nine Foot Lower Seam only. The high yield of Lochinvar coal enhances the quality of the project.

**Table 5 Phase 1b Drilling Nine Foot and Six Foot Results – Clean Coal Analysis (Air Dried Basis)**

	LCL-003 <sup>4</sup>	LCL-006	LCL-019	LCL-032	LCL-033	LCL-037	LCL-033	LCL-037
	NINE FOOT SEAM						SIX FOOT	
<b>Yield (%)</b>	82	86	75	61	64	89	87	94
<b>Moisture (%)</b>	2.8	3.1	2.4	2.4	3.0	2.6	3.0	3.2
<b>Ash (%)</b>	5.0	3.0	3.2	5.2	2.9	2.9	1.6	3.1
<b>Vol. Matter (%)</b>	35	32.4	34.0	35.5	33.6	35.3	33.6	33.9
<b>Total Sulphur (%)</b>	3.40	1.08	1.68	0.91	1.54	1.88	0.68	1.48
<b>CSN</b>	7.0	7.0	7.0	7.0	7.0	7.5	5.5	7.5
<b>Gray King</b>	G7	G5	G6	G6	G6	G7	G4	G6
<b>Phosphorous (%)</b>	0.004	0.001	0.004	0.007	0.019	TBC	<0.001	TBC
<b>Gross CV (Kcal/kg)</b>	7,762	8,004	7,934	7,839	7,954	8,032	8,049	7,973
<b>Vitrinite (%)</b>	76.4	67.8	69.5	75.2	71.4	TBC	79.6	TBC
<b>R<sub>o</sub>Max (%)</b>	0.82	0.87	0.84	0.77	0.87	TBC	0.89	TBC
<b>Fixed Carbon (%)</b>	57.2	61.5	60.4	56.9	60.5	59.2	61.8	59.8

<sup>4</sup> LCL-003 clean coal analysis excludes 0.13m (at 27% ash) interval at the top of the seam. This 0.13m interval is included in the raw coal results in Table 4.

### Indicative Product Quality

An indicative Lochinvar Coal product quality has been determined based on coal quality results from Phase 1b and previous drilling as shown in Table 6.

These results confirm the potential for Lochinvar to produce a low ash high volatile coking coal product that will be attractive to the UK and European steel industry and provide a strong platform for the completion of the Lochinvar Scoping Study.

**Table 6 Indicative Lochinvar Coal Product Quality**

	Indicative Target Specification	Unit (Basis)
<b>Yield</b>	75	%
<b>Moisture</b>	3.0	% (Air Dried)
<b>Ash</b>	5.0	% (Air Dried)
<b>Volatile Matter</b>	34.0	% (Air Dried)
<b>Total Sulphur</b>	1.4	% (Air Dried)
<b>CSN</b>	7	
<b>Gray- King Coke Type</b>	G6	
<b>Phosphorous</b>	0.007	% (Air Dried)
<b>Gross Calorific Value</b>	7775	Kcal/kg (Air Dried)
<b>Vitrinite Content</b>	70	%
<b>Vitrinite Reflectance</b>	0.84	% R <sub>o</sub> Max

**Competent Persons Statement**

The Resources estimate is based on information compiled by Dr John Bamberry, who is a Member of the Australasian Institute of Geoscientists (Member No. 4090). Dr Bamberry is a Principal Geologist with Palaris. He has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity he is undertaking to qualify as a Competent Person, as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Dr Bamberry has over 25 years' experience in exploration and mining of coal deposits.

Neither Dr Bamberry nor Palaris have a direct or indirect financial interest in, or association with New Age Exploration Ltd, the properties and tenements reviewed in this report, apart from standard contractual arrangements for the preparation of this report and other previous independent consulting work. In preparing this report, Palaris has been paid a fee for time expended based on standard hourly rates. The present and past arrangements for services rendered to New Age Exploration Ltd do not in any way compromise the independence of Palaris with respect to this review.



## JORC Table 1

### Section 1 - Sampling Techniques and Data

Criteria	Commentary
<i>Sampling techniques</i>	All coal seams at the Lochinvar Project occur in the subsurface. Sampling was undertaken ply by ply sampling across whole intersections of target coal seams. Sampling methods on recent holes were conducted with internal work procedures that were consistent with acceptable industry standards. Sampling standards have been revised by NAE in line with best industry practice.
<i>Drilling techniques</i>	Sampling of coal for analysis has been undertaken by use of conventional core drilling in holes 7.8 to 8.8cm diameter (historical holes), PQ-size core (LCL-001, LCL-004, LCL-005 and LCL-030) and HQ-size core (LCL-003, LCL-006, LCL-019, LCL-032, LCL-033 and LCL-037).
<i>Drill sample recovery</i>	Linear core recovery is not noted on historical logs, but NCB coal analysis reports describe core recovery reported on a length by volume basis. Core recovery is generally >90% by length, including the new holes drilled by NAE. Core losses from coal seams are considered not to bias the coal quality results, as they sit within a normal population of ash contents for the project.
<i>Logging</i>	Detailed lithological logs are available for recent and historical holes. The standard of logging adequately supports the resource estimate. Recent lithological logs have been corrected using geophysical logs.
<i>Sub-sampling techniques and sample preparation</i>	Whole coal seams were sampled ply by ply and combined into logical composites for washability and clean coal composite tests. Most recent cores have been sub-sampled by Rotary Sample Divider of crushed core. Core from LCL-001 was subdivided with a circular saw and either half sent to different laboratories. Comparative analysis of core analyses from either half did not conform to reproducibility standards. However, mathematical weighting of the sample results compared favourable to the historical Bogra borehole that was twinned by LCL-001. Sub-sampling and preparation techniques of historical holes are not well documented. Sample preparation from NAE holes, excepting LCL-001, is documented in a sampling and analysis procedural documents.
<i>Quality of assay data and laboratory tests</i>	<p>Historical coal analysis was undertaken by the NCB. Original copies of coal analysis for the Glenzierfoot, Staffler and Timpanheck boreholes have been located and record proximate analysis, float-sink analysis and numerous clean coal composite tests. Hand-written coal quality data is available for Woodhouselees bore, but most historical analysis data has not been located or verified. Coal analysis on NAE bores includes ply by ply analysis, float-sink analysis and clean-coal composites. Testing has been carried out mostly at the Environmental Service Group laboratory, whose materials testing is accredited to ISO/IEC 17025:2005.</p> <p>NAE have revised and documented new analytical procedures which were implemented after LCL-001. Historical geophysical data collection utilised a coal combination sonde with the log suite including caliper, bed resolution density, long space density and gamma ray. Current geophysical data was collected by Robertson Geologging Limited with the log suite including natural gamma (API), caliper (mm), bed resolution density (CPS), high resolution density (CPS), density (gm/cc) and sonic velocity (µs/ft). In some holes, acoustic scanner data was also collected and not all sections of holes could be logged.</p>
<i>Verification of sampling and assaying</i>	Coal seam intersections and the stratigraphy encountered in each borehole have been correlated and verified by various parties, including Palaris and NAE. Since the NCB boreholes intersect considerable depth, they have been used in geological studies of the area and, as such, the stratigraphy of boreholes, such as Becklees, is well established.
<i>Location of data points</i>	Survey data for the Lochinvar Project is recorded in the Ordnance Survey National Grid coordinate system which is the geographic grid reference used in Great Britain. Collar coordinates for recently drilled boreholes (2013 series) have been surveyed by a registered surveyor using differential GPS; accuracy of historical borehole collars is unknown.
<i>Data spacing and distribution</i>	Borehole data intersecting the coal sequence is in the order of 0.5 to 1.5 km spacing, and is mainly concentrated within areas where the coal is <1000m deep. The seismic lines that have sampled the licence area provide a good coverage of the area and are orientated southwest-northeast and southeast-northwest.
<i>Orientation of data in relation to geological structure</i>	Seismic survey lines and exploration drilling have been used to interpret geological structure in the Lochinvar Project area. Seismic lines were surveyed in NW-SE to SW-NE orientations, and as such, it is considered that major geological structures impacting the coal seams have been identified.
<i>Sample security</i>	No specific sample security measures are in place other than ensuring that the coal analysis laboratory is custodian of coal samples to be tested.
<i>Audits or reviews</i>	No evidence of review or audits of historical data is known to exist. However, each page of some logs of historical boreholes has been verified by someone, presumably by the logger, or a peer. Palaris reviewed the standard operating procedure used for hole LCL-001, and consider them to be in line with industry practice. New standard operating procedures were developed after his hole and have been used by exploration geologists.

## Section 2 - Reporting of Exploration Results

Criteria	Commentary
<i>Mineral tenement and land tenure status</i>	<p><i>Lochinvar Licence</i> - NAE hold title to Coal Exploration Licence <i>CA11/EXP/0515/N</i>, covering the project area known as <i>Lochinvar</i>. NAE later acquired Coal Exploration Licence <i>CA11/EXP/0545/N</i> covering the project area known as <i>Lochinvar South</i>. Both tenements are wholly leased to NAE.</p> <p><i>Lochinvar South Licence</i> - On the 27th of May 2014, NAE received Coal Exploration Licence <i>CA11/EXP/0545/N</i> from the Coal Authority. The agreement allows NAE to conduct coal exploration activities in the Lochinvar Coal Project area for a period of five years. The exploration tenement covers an area of 5,100 ha and is wholly leased to NAE. Subsequent to the Coal Exploration Licence, associated Underground Conditional Licence <i>CA11/UND/0182/N</i> has been issued to NAE.</p>
<i>Exploration done by other parties</i>	<p>The Lochinvar Project area has been explored for coal, oil and gas since the mid-1950s. Available data from 12 historical exploration boreholes has been utilised in combination with current data in the assessment of the tenement. Nine seismic lines totalling 64.15km have been collected over the Lochinvar Project area. The seismic data is a mix of dynamite sourced seismic lines acquired by British Coal between 1980 and 1983, and Vibroseis data collected by Lennox Oil Company between 1986 and 1987.</p> <p>The NAE licence area is overlapped by PEDL159 currently held by Dart Energy. The previous tenement holder, Greenpark Energy, drilled several wells in the PEDL that also were located within the Lochinvar Project area. These wells included wells that twinned the Broadmeadows and Becklees bores. In addition, a well drilled in the central part of the licence area (Englishtown) provides useful evidence for the continuity of coal. Not all data is publicly available from these wells.</p>
<i>Geology</i>	<p>The Canonbie Coalfield is located at the north-eastern end of the Solway Basin where NAE hold their exploration title. This basin complex contains Carboniferous-age deposits with a thickness of up to 8,000 metres. The target coal seams of the Lochinvar Coal Project occur in the Middle Coal Measures of the Upper Carboniferous Pennine Coal Measures. In the Canonbie Coalfield, the Solway Syncline is bounded in the north and east by faults, and to the south and west, by unconformity and poor development of coal seams.</p> <p>The Pennine Coal Measures are exposed at the surface to the north-east of the Lochinvar Coal Project, where they have been historically mined, and dip beneath the unconformable Permian-Triassic New Red Sandstone sediments (St Bees and Eden Shales Formations) to the south-west. Precise limits of the Canonbie Coalfield are poorly understood as the coalfield is concealed by the Permian-Triassic sediments.</p>
<i>Drill hole Information</i>	Boreholes utilised in the reporting of exploration results were drilled during the two exploration phases of the NCB (1950's, 1980's) and the recent drilling by NAE (2013-14). Appendix A lists the borehole intersections of seams in the Middle Pennine Coal Measures.
<i>Data aggregation methods</i>	Weight averaging techniques for data aggregation was done by weighing of quality parameters by length by density whereas density was weighted by length. CSN was weighted by length.
<i>Relationship between mineralisation widths and intercept lengths</i>	Boreholes have been drilled vertically to intercept coal seams. Dip has been recorded on drill logs. The geological model takes into account the top and bottom intercepts of seams in the model and can be interrogated to provide true thickness. Boreholes entered into the geological model have been corrected for deviation where this data is available; however, only very basic deviation data has been collected on historical holes.
<i>Diagrams</i>	Table of intercepts are provided in Appendix A.
<i>Balanced reporting</i>	<p>Average thickness of target seams intersected in boreholes are listed below:</p> <ul style="list-style-type: none"> <li>◆ Six Foot seam: 1.65m</li> <li>◆ Nine Foot Upper Split 1 (9FU1): 0.41m</li> <li>◆ Nine Foot Upper Split 2 (9FU2): 0.43m</li> <li>◆ Nine Foot Lower: 1.67m</li> <li>◆ Five Foot seam: 1.0 m</li> </ul> <p>In the northern part of the project area, the Nine Foot Upper and Nine Foot Lower seams are separated by thin parting. There, the range of thickness of the whole of the Nine Foot seam is 2.2 to 3.4m.</p>
<i>Other substantive exploration data</i>	No other substantive exploration work has been undertaken in the coalfield.
<i>Further work</i>	NAE are planning a subsequent phase of exploration. This may include seismic surveys and in-fill drilling in the Lochinvar licence, and reprocessing of seismic in Lochinvar South, with possible scout drilling.

**Section 3 - Estimation and Reporting of Mineral Resources**

Criteria	Commentary
<i>Database integrity</i>	<p>The data for this project resides in several formats and includes the softcopy records of original logs, laboratory reports and geophysical logs. Additionally, LAS files for geophysical data have been recovered from the BGS. The data is sorted into logical folder structure for each borehole, and a final “locked” copy of the geological log of boreholes in Excel format.</p> <p>Seam interval data has been loaded into geological model developed using Ventyx Stratmodel software (Minescape suite 5.7.85.0). The seam picks are maintained within the geological model currently by the Competent Person.</p>
<i>Site visits</i>	<p>The Competent Person has not visited the Lochinvar Coal Project but has been involved with the design of the drilling program, analytical testing procedures and interpretation of geological data.</p>
<i>Geological interpretation</i>	<p>The stratigraphy of the Middle Pennine Coal Measures has been the topic of various studies that have utilised the data from historical boreholes to derive their conclusions. The continuity of coal seams is evidenced by their reflections in seismic surveys covering the area and the intersections in boreholes. Coal seams form reasonable marker bands in the sequence, but stratigraphic location is also aided by the presence of marine bands, such as the Cambriense (Riddings) Marine Band, which identifies the top of the Middle Coal Measures, and the Queenslie Marine Band, which marks the base of this sequence.</p> <p>The naming conventions used in the geological interpretation are fairly simple and for the most part, whole seams have been identified and not broken into named ply units. Splitting occurs in the Nine Foot seam and has been recognised through correlation using lithological characteristics, stratigraphic position and geophysical logs.</p> <p>Stratigraphy detail has now been documented by NAE in an internal document produced by NAE staff (<i>Study of sedimentary units within the Lochinvar Project Licence</i>), which has aided in the understanding of the geology of the area.</p>
<i>Dimensions</i>	<p>The NAE Lochinvar licence area covers a total area of 6,752 ha. Of that area, the majority is potentially coal-. For coal seams considered to have resource potential in this estimate, a 1,000m depth of cover limit coincides with the interpreted location of a fault that trends SW-NE near the Becklees bore (Becklees Fault).</p> <p>The target coal seams are tabular bodies that are dipping at 5 to 10 degrees, generally south-eastwards. The modelled thicknesses are in part impacted by the faulting included the model and a large area of extrapolation at depth (southeast of Becklees). Other seams which are not included in the Resource estimate, such as the Seven Foot seam, are represented by fewer data points.</p> <p>The NAE Lochinvar South licence area covers a total area of 4,360 ha. Coal in the Nine Foot seam is considered to exist at depth over an area of 1,266 ha (29% of licence area). The thickness of the Nine Foot seam in Lochinvar South is extrapolated from the geological model, and is based on an average (extrapolated) thickness of the coal seam multiplied by a small and large target area. The presence of Middle Coal Measures in this area is based on the postulated extension of the Solway Basin, as identified by the British Geological Survey.</p>
<i>Estimation and modelling techniques</i>	<p>A geological model was constructed in Stratmodel, the modelling package within the Ventyx Minescape suite of software. The model consists of upper and lower bounding surfaces of prospective coal seams, and the unconformable and conformable surfaces represented in the sequence. Sixteen faults have been incorporated into the model.</p> <p>Boreholes and seismic data (largely used for fault interpretation) were included in the seam modelling. The interpolators used in the geological model were FEM for thickness and trending, and PLANAR for surfaces; these interpolators are proprietary estimators of the Minescape software.</p> <p>A model of composited coal quality data for the Nine Foot and Six Foot Seams was compiled using the raw coal quality data from boreholes. Inverse distance squared was used to interpolate and extrapolate quality data.</p> <p>The estimation was done in Minescape software using the “Reserves&gt;Sample&gt;Polygon” option. Outputs of the software were checked manually for some, but not all blocks.</p>
<i>Moisture</i>	<p>Total moisture tests have been undertaken only on the more recent data collected by NAE. Historical data shows that air-dried moisture content is between 2-3% (ad). The total moisture content of the coal is 6% (ar) in LCL-001. The tonnes have not been adjusted to in-situ moisture basis and have been quoted in an air-dried basis.</p>
<i>Cut-off parameters</i>	<p>A minimum mineable thickness of 1.2 metres was applied in determining limits of coal resources within the tenements. This limit is considered to be a practical lower height limit for continuous miners to attain in the United Kingdom. In addition to this thickness limit, a depth of cover limit of 1,000 metres was applied to the resource. In this case, this depth of cover limit largely coincides with the large SW-NE fault that passes close to the Becklees borehole. Down-dip of this fault, sections of coal are located that meet the criteria &gt;1.2 m thick and &lt;1000m depth of cover, but these smaller blocks of coal have been excluded from the coal on the basis of their accessibility.</p> <p>In the north of the Lochinvar lease the Resource includes the upper plies of the Nine Foot Seam where the parting distance from the main Nine Foot Lower Seam is less than 0.8m. In the south of the Lochinvar lease (south of the split line) the upper plies of the Nine Foot Seam are excluded from the Resource as they are i) not present or ii) exceed 0.8m distance from the main Nine Foot Lower Seam.</p> <p>A western mining limit to the coal resources was defined by Velseis’ interpretation of seismic data. Beyond this, and between geological structures identified by Palaris, an area that could be targeted for further exploration was identified, where the coal may exist. The coal in this area was identified as a potential Exploration Target.</p>
<i>Mining factors or assumptions</i>	<p>The author assumes that this coal will be mined by underground methods, with the coal resource accessed via a drift.</p>

<i>Metallurgical factors or assumptions</i>	No metallurgical factors have been considered to limit the resource. Washing of the coal in a coal handling and preparation plant will enable removal of dilution and an improvement on the saleability of the product.
<i>Environmental factors or assumptions</i>	Reject materials from processing this coal will be higher in sulphur content than the product coal. The potential environmental impacts of higher sulphur rejects or tailings materials has not been taken into account in this analysis, as the project is at a very early stage. However, consideration of a potential middlings product, derived as a secondary product, has been considered in coal analysis of LCL-001 as an option to potentially maximise coal utilisation and minimise waste disposal.
<i>Bulk density</i>	Relative densities for each seam were modelled in a similar fashion to other coal quality properties. These density models were used in Resource estimation and determination of Exploration Targets. The densities used in this estimate were quoted at air-dried basis
<i>Classification</i>	<p>Geological filters were applied to coal seams in the Lochinvar Project area to define which seams were above a minimum mining thickness of 1.2m. A maximum depth of cover of 1,000m was applied to the coal to delineate potential coal resource or exploration target.</p> <p>Polygons of influence of radii of 500m and 1,500m were generated around valid points of observation for both the Six Foot and Nine Foot seams, and resultant polygonal shape rationalised to the basin limit and the limits as defined in the first step.</p> <p>Coal within points of observation &lt;1,000m apart were classified as Indicated Coal Resources and those with points of observation &gt;1,000m but &lt;3,000m were classified as Inferred Coal Resources. Areas defining coal outside of the polygons, but meeting thickness and depth criteria, were included as "Exploration Target". Additional Exploration Target was identified in the Five Foot seam, and in the Nine Foot seam in Lochinvar South.</p>
<i>Audits or reviews</i>	Technical reviews of the estimates have been undertaken with NAE staff during the process of deriving these numbers. No external reviews or audits have been undertaken.
<i>Discussion of relative accuracy/ confidence</i>	<p>The relative accuracy of this estimate has not been quantified. A number of factors that affect the estimate include:</p> <ul style="list-style-type: none"> <li>◆ the structural complexity of the deposit and the moderate possibility of additional structures that have not yet been identified by seismic or drilling</li> <li>◆ the correlation of the geological structure is subject to different interpretations</li> <li>◆ the location of the split line in the Nine Foot seam</li> <li>◆ further test work is required to determine the bed moisture content</li> </ul>

**Appendix A - Summary of seam intercepts**

Bore	Code	6F	9FU	9FL	9F	3F	5F	BT	7F
BECKHALL	From	246.40	262.38	263.61		267.80	278.03	316.54	
	To	248.00	263.33	265.32		268.10	278.65	317.63	
	Thick	1.60	0.95	1.71		0.30	0.62	1.09	
BECKLEES	From	1,115.06	1,126.54	1,147.54		1,154.57	1,168.29	1,175.80	1,183.49
	To	1,116.68	1,126.92	1,149.62		1,155.25	1,169.78	1,176.35	1,183.64
	Thick	1.62	0.38	2.08		0.68	1.49	0.55	0.15
BOGRA	From	293.21	309.41	310.34		315.32	328.01	338.30	345.14
	To	295.25	309.88	312.90		315.74	328.89	339.24	345.65
	Thick	2.04	0.47	2.56		0.42	0.88	0.94	0.51
BROADMEADOWS	From	580.77			602.79	608.70	623.76	636.65	641.32
	To	582.90			606.16	609.45	625.03	637.86	642.10
	Thick	2.13			3.37	0.75	1.27	1.21	0.78
CROOKHOLMFARM	From	427.02			448.54	453.68	465.23	472.41	491.79
	To	428.50			453.00	454.37	466.43	473.26	493.19
	Thick								
EVERTOWN	From	496.65			514.46	523.36	543.21	551.31	557.44
	To	498.50			517.33	523.77	544.62	552.27	558.55
	Thick	1.85			2.87	0.41	1.41	0.96	1.11
GLENZIERFOOT	From	793.41			805.96	811.80	822.00	830.61	839.32
	To	794.49			808.42	811.96	823.40	831.25	839.52
	Thick	1.08			2.46	0.16	1.40	0.64	0.20
KNOTTYHOLM	From	445.31			470.41				
	To	446.84			474.12				
	Thick	1.53			3.71				
ROWANBURNFOOT	From	550.44			573.79		596.95	608.74	618.60
	To	552.75			577.95		598.58	610.21	620.17
		2.31			4.16		1.63	1.47	1.57
STAFFLER	From	524.63	535.90	549.74		555.19	569.34	577.74	588.17
	To	525.75	536.50	551.25		555.64	570.86	578.74	589.37
	Thick	1.12	0.60	1.51		0.45	1.52	1.00	1.20
TIMPANHECK	From		402.72	404.15				438.47	444.40
	To		403.19	405.72				439.24	444.50
			0.47	1.57				0.77	0.10
WOODHOUSELEES	From	901.36	906.25						

Bore	Code	6F	9FU	9FL	9F	3F	5F	BT	7F
	To	902.21	907.47						
	Thick	0.85	1.22						
LCL-001	From	295.02	311.64	313.13		317.46			
	To	296.80	312.97	315.05		317.58			
	Thick	1.78	1.33	1.92		0.12			
LCL-004	From	313.23			321.98	327.68	340.73	349.21	357.44
	To	313.77			323.89	328.01	341.59	349.79	357.82
	Thick	0.54			1.85	0.33	0.86	0.58	0.38
LCL-005	From	318.22			326.49	331.45	344.33	352.82	359.25
	To	318.84			327.91	331.97	345.16	353.60	359.59
	Thick	0.62			1.42	0.52	0.83	0.78	0.34
LCL-003	From		340.29	341.91		346.95	362.80		
	To		341.60	343.35		347.56	363.64		
	Thick		0.89	1.44		0.61	0.84		
LCL-019	From		400.46	400.76		405.65	423.06	429.81	
	To		400.67	402.45		405.92	423.67	430.13	
	Thick		0.21	1.69		0.27	0.61	0.32	
LCL-033	From	335.54		344.12		360.83	375.03	383.93	390.33
	To	336.29		346.89		361.25	376.06	384.96	390.87
	Thick	0.75		1.89		0.42	1.03	1.03	0.54
LCL-006	From			326.24		331.66	345.18	353.60	
	To			327.83		332.04	346.28	354.34	
	Thick			1.59		0.38	1.10	0.74	
LCL-032	From		278.43	283.63		293.98			
	To		278.59	284.33		294.21			
	Thick			0.70		0.23			
LCL-037	From	404.5			422.4	424.79	441.80		
	To	407.8			424.3	425.78	442.65		
	Thick	3.23 <sup>1</sup>			1.82 <sup>2</sup>	0.99	0.85		

<sup>1</sup> Steep dips and evidence of faulting were encountered in borehole LCL-037. After correcting for dip, the true vertical thickness of the Six Foot Seam in borehole LCL-037 is 2.3m

<sup>2</sup> Steep dips and evidence of faulting were encountered in borehole LCL-037. After correcting for dip, the true vertical thickness of the Six Foot Seam in borehole LCL-037 is 1.6m which is interpreted as being truncated by faulting.