

# Annual Report

## EL 16/2010 Fingal



For the period 8/11/2012 to 8/11/2013

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**October 2013**

## **Abstract**

In this annual report the completion of the initial resource definition drilling program is discussed. Twelve holes were drilled for a total of 2668.9m. All the holes have now been logged, sampled and nine have been assayed. The outstanding detailed logs and assay results for two holes are reported on.

The coal resource was updated to take into account the drilling results and submitted as part of the Mining Lease approval process. Mining lease application 4M/2012 was granted by the Minister on the 17/09/2013 for an area of 1078ha.

A work program for year 4 is proposed which will include further drilling to the south and east of Mine Lease 4M/2012.

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## Introduction

Exploration Licence 16/2010 was granted to Hardrock Investments Pty Ltd on the 8<sup>th</sup> November 2010. The licence conditions required the holder to complete the following in the first two years;

1. Data review.
2. Drill two NQ holes to 450m.
3. Log and assay the core and do metallurgical laboratory testing of the coal.

The minimum expenditure was \$166 000.

On the three year anniversary of the licence the following work has been completed;

1. A data review was completed.
2. Twelve holes have been drilled for a total of 2668.9m.
3. All holes have been logged, sampled and nine have been assayed.
4. The coal resource was updated to take into account the drilling results and submitted as part of the Mining Lease approval process.
5. Mining lease application 4M/2012 was granted by the Minister on the 17/09/2013 for an area of 1078ha.
6. Environment Permit No. 8651 has been issued under the Environment Management and Pollution Control Act 1994 and the Development Application has been approved by the Break O Day Council.
7. Expenditure during the period 1<sup>st</sup> October 2012 to 30<sup>th</sup> September 2013 was \$642,396 making a total of \$4,139,310.

## Location

Exploration Licence 16/2010 Fingal is located 2.5km east and south of the township of Fingal (see locality map Figure 1 below).

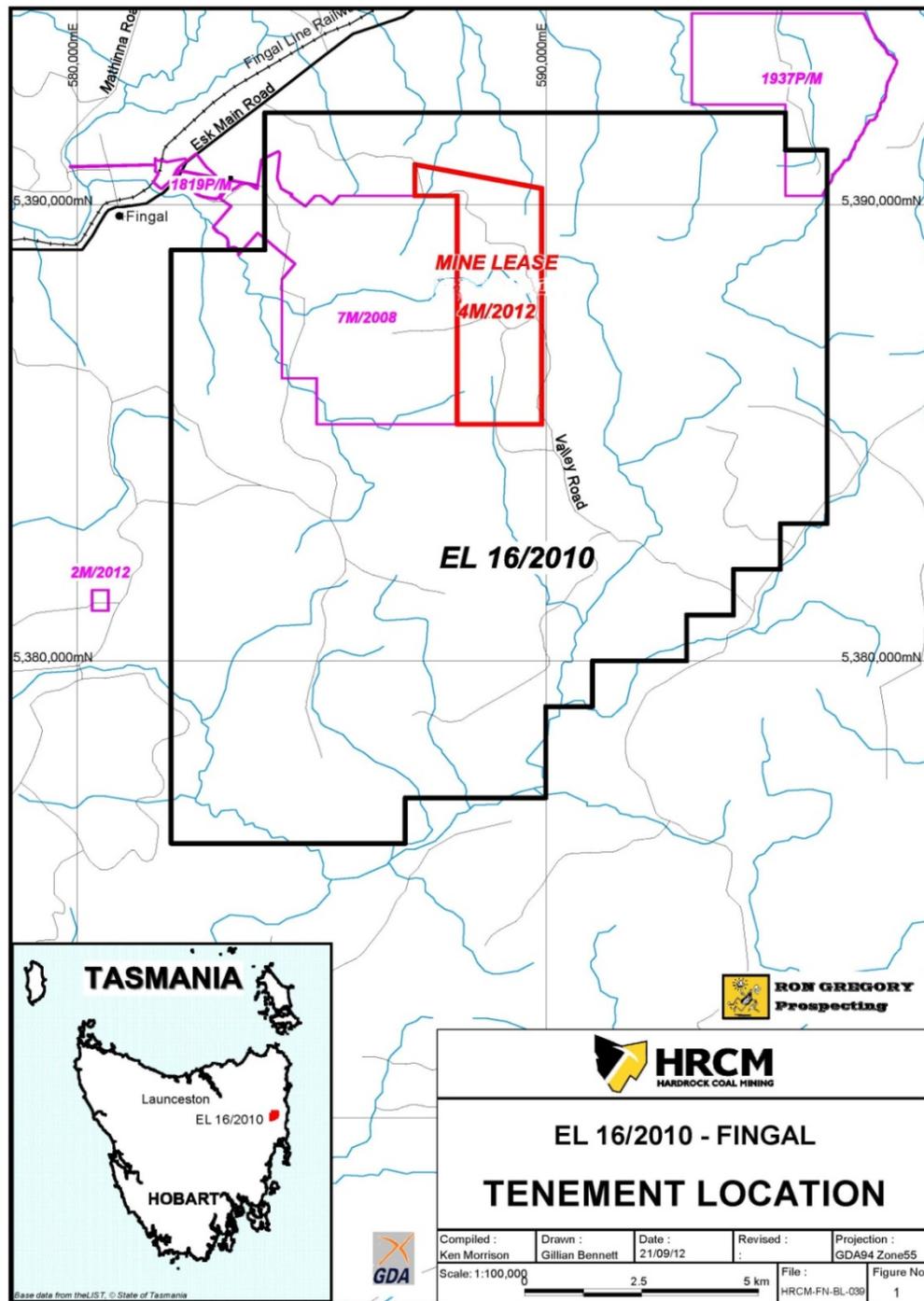


Figure 1. Locality map for EL 16/2010.

## Land Tenure

EL 16/2010 is mostly State Forest with a narrow band of private property along the northern and southern boundary (see Figure 2 below).

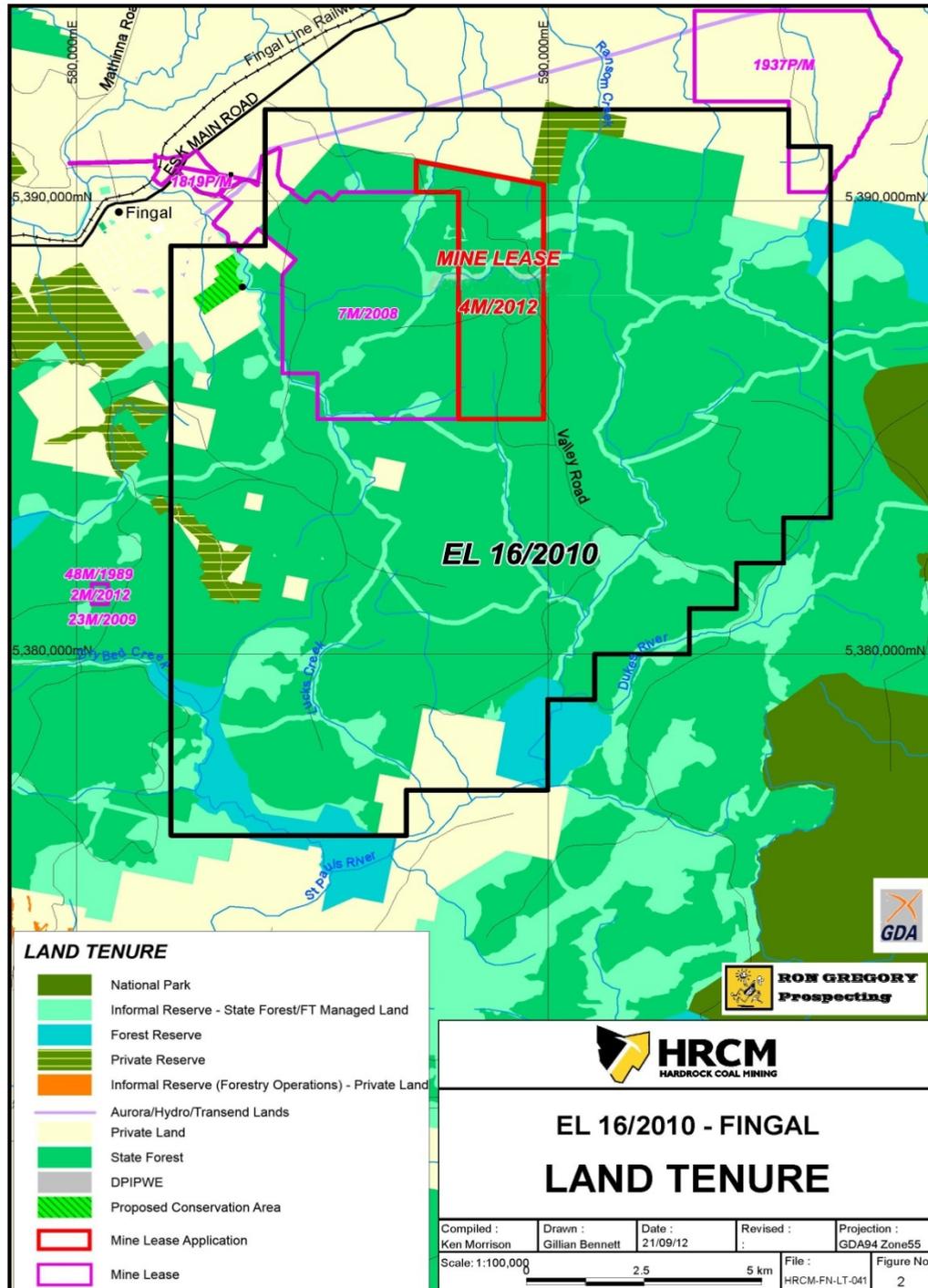


Figure 2. Land Tenure.

The three divisions of State Forest (State Forest, Informal Reserve and Forest Reserve) are all available for exploration and mining as are the areas of private property and the Private

Reserves. Mining Leases 4M/2012 and 7M/2008 (Duncan Lease) are excluded from the licence as is the Cullenswood lease (1937 P/M) in the north east corner.

## **Licence Details**

Tenement number:	EL 16/2010
Tenement name:	Fingal
Tenement location:	East and south of Fingal
Tenement granted:	8 <sup>th</sup> November 2010
Reporting period:	8 November 2012 – 8 November 2013
Tenement holder:	Hardrock Investments Pty Ltd
Tenement operator:	Hardrock Investments Pty Ltd
Tenement area:	156 sq km
Exploration logistics:	Ron Gregory Prospecting

# Regional Geology

Late Triassic coal measures in the Fingal Tier region comprise the uppermost sub division of the Late Carboniferous-Late Triassic Parmeener Supergroup (Tasmanian Geological Survey St Marys, Ben Lomond and Snow Hill 1:50,000 Sheets).

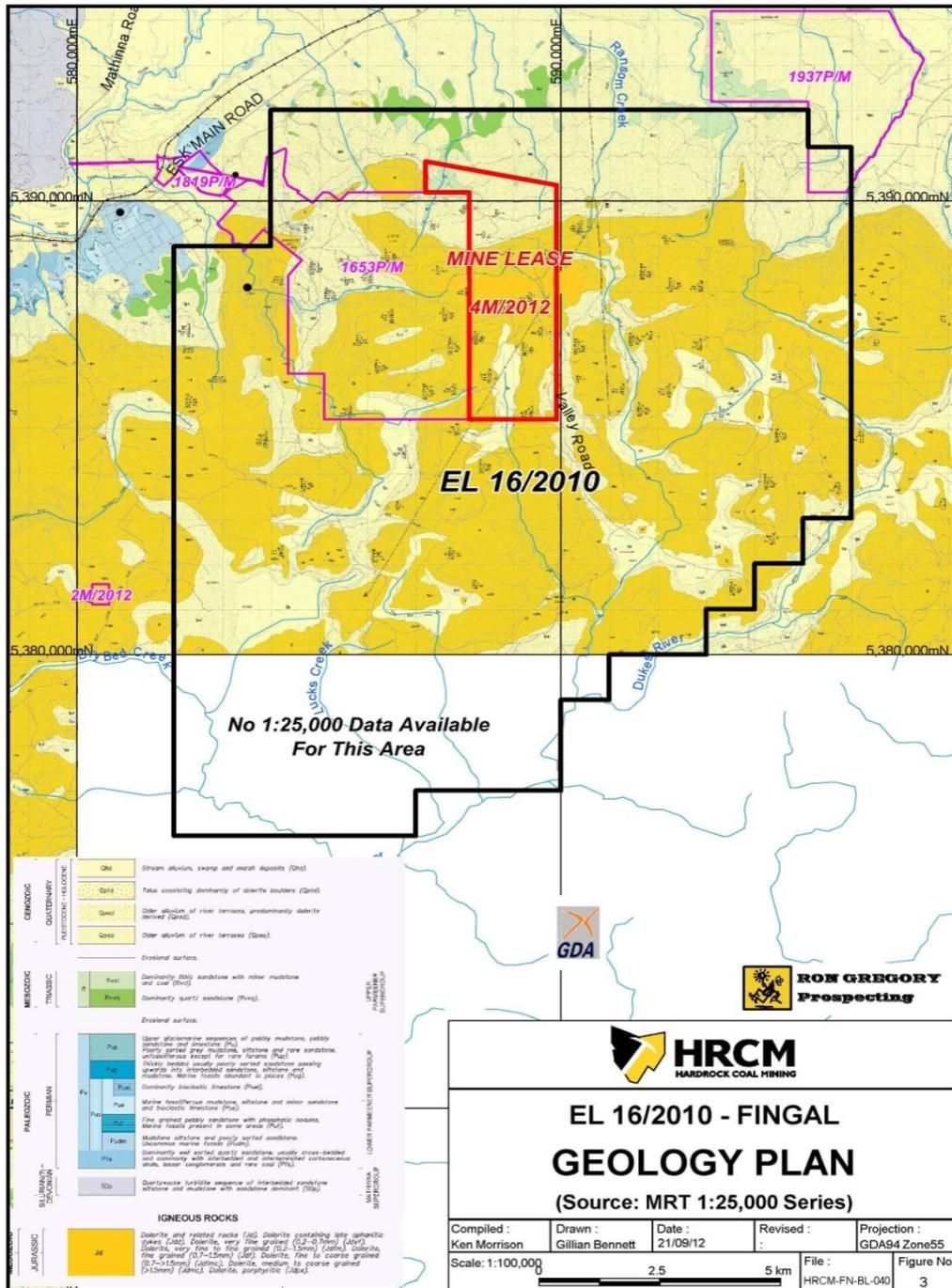


Figure 3. Geology Plan from MRT 1:25,000 map series.

The Parmeener Supergroup unconformably overlies a basement comprising folded Silurian-Devonian meta turbidites of the Mathinna Supergroup, which are locally intruded by Devonian granites (Figure 3, Tasmanian Geological Survey Bulletin 72). These basement rocks and the Permo-Triassic stratigraphy underlying the coal measures crop out around the Fingal Valley but, with the exception of Triassic quartz sandstones which form the economic basement to the coal measures, are not encountered during coal exploration drilling. At the regional scale the coal measures show a south easterly dip of 1-2°.

Large volumes of Jurassic dolerite have intruded the Parmeener Supergroup stratigraphy, and in the project area dolerite outcrop up to >400metres thickness covers most of the coal measures. Cainozoic tectonic rifting and periglacial landscape development processes through the Fingal Valley have produced the escarpment and benched dolerite talus slope morphology which characterizes the landscape of the project area. The dolerite and derived talus deposits impose significant costs for coal exploration drilling. Dolerite dykes, often infilling faults, are occasionally encountered in the Duncan underground coal mine immediately west of the project area, and probably exist within EL16/2010.

## **Coal Measures Geology**

Correlation of drill core intersections in the Fingal Tier area by the Department of Mines in the 1980s generated a series of 8 seams, labelled A to H from youngest to oldest (Tasmanian Geological Survey Bulletin 64). The coal seams are hosted within an approximate thickness of 250 metres of fluvial lithic sandstones and minor siltstones, argillic and carbonaceous mudstones, and minor airfall volcanoclastics. The lithic sandstones are in part sourced from a felsic volcanic province and the coal measures are dated at 214Ma via a rhyolitic volcanoclastic unit (Bacon and Everard, 1981), which occurs regionally but has not yet been recognised in the HRCM drill core. All 8 seams are recognised in the HRCM drilling but current resource modelling is only targeting F seam (Duncan seam). Several potential working sections have also been intersected in G seam (East Fingal seam) and C seam in the HRCM drilling to date. In addition, Department of Mines drilling indicates potential for D seam further east and south than the current Valley Road project area.

All known coal mined and drilled in the Fingal Tier area (apart from minor occurrences of thermally altered coal near dolerite contacts) would be classed as dull with minor bright bands, inertinite-rich, medium rank, low sulphur, sub bituminous steaming coal.

## **Previous Work**

Coal was first mined in the area to the east of Fingal in the mid 1880s with a description in Thureau (1883) of minor works. This followed the digging of an adit which was financed by the Government in 1864 and mining continued at a small scale until 1920 when two adits were driven on the Duncan seam (F seam) in Cat and Kitten Creek by the Fingal Coal Prospecting Syndicate (Bacon, 1991). H.J Yates opened the Fingal Colliery in 1942 and the Duncan Colliery opened next door in 1945 and was joined by the Tasmanian Mine in 1954 and all worked the Duncan seam. The Cornwall Coal Company consolidated these leases and has been continuously mining the Duncan seam since 1945. Production in 2009/2010 was 374 912 tonnes of washed coal (MRT Annual Report 2009/2010).

The first report of any works in the area covered by EL16/2010 is by Hills et al (1922) and describes an inspecting of an adit on Cardiff Creek. This adit was recently rediscovered by Ken Morrison and interpreted to be driven on the East Fingal or G seam. The Valley Mine or Barbers Mine first opened in 1955 as Barbers No. 1 and was renamed Valley Mine No. 1. Bacon (1991) describes the seam that was being mined as a locally developed lower split of the Duncan seam. After extracting 621 tonnes and driving three adits it appears that the seam was faulted out and the mine was abandoned in 1962.

Valley Mine No. 2 was in the next tributary of Cardiff Creek to the east and was started in 1963 with two adits being developed. Remnants of the novel electric drive mechanical mining machinery are to be found at the entrance to Valley Mine No. 2. Bacon (1991) reports that Valley Mine No. 2 closed as a result of the loss of markets when the Railton cement works changed from coal to oil fired boilers. Valley Mine workers in Fingal recollect that very poor roof and floor conditions were encountered and this affected the mines ability to operate profitably.

The Department of Mines (DOM) conducted a number of drilling campaigns over the area to the east and south of Fingal commencing in 1959 (see Threader and Bacon, 1983). The exploration was conducted by exempting land from the Mining Act of 1929. The initial program focussed around the Duncan Mine with 13 holes totalling 3000m.

In 1972 the program expanded further to the east with the aim of discovering a coal resource that would be large enough to fuel a power station that was planned for the Central Midlands. The Hydro Electric Commission was involved in a 25 hole program from 1972 which focussed on the potential of the area around the Valley Mines and to the south east. In a report by Salway et al (1979) the total measured plus indicated in situ reserves in the Valley Mine area was calculated as 33.38Mt. Clean coal reserves were estimated at 10.85Mt. The planned power station required 36Mt with an additional tonnage of 25Mt to be proven to meet the requirements.

In 1978 the drilling program expanded to the south and east of the Duncan Mine and was based on a 1km grid (see map Figure 5 for DOM holes). Sixty-nine holes were drilled by 1982 and reported on in Threader and Bacon (1983). Reserves of coal were estimated for various parts of the Fingal Coalfield as:

Duncan seam (F)	68Mt (measured, in situ)
D seam	101Mt (indicated, in situ)
East Fingal Upper Split (G)	60Mt (indicated, in situ)
East Fingal Lower Split (G)	44Mt (indicated, in situ)

The exempt area was lifted in the late 1980's and the Cornwall Coal Company subsequently held the ground as Retention Licences 8812 and 8816. No reports detailing any work done on these RLs could be located.

Special Exploration Licence 32/2003 held by Pure Energy Resources Ltd was granted in 2005 (see Anon., 2009). The licence was for coal seam gas only and covered 11,295km<sup>2</sup> over the eastern Tasmanian coal fields. Four holes were drilled which twinned DOM holes 41, 55, 59 and 89 in the southern part of EL16/2010. The drilling indicated severe and widespread gas under saturation and the ground was relinquished in 2009.

In October 2011 HRCM established a full time exploration base in Fingal. Drilling commenced in November 2011 (see Morrison et al, 2012). As of the end of 2012, 2668.9 metres had been drilled in 12 vertical holes located on 10 drill pads. The primary aim of the program was coal exploration leading to resource definition but additional geotechnical, hydro geological and environmental data were acquired where practical, to support mine planning and water management base line information.

The drilling program had two aims:

- To validate the earlier DOM drilling and refine boundaries to the deposit, by infill and step-out drilling to achieve normal industry standards of resource estimation levels of confidence in terms of seam correlation and the mapping of major faults. The target for the initial phase of exploration is to establish a viable F seam resource.
- To map out the optimum underground access route from near the Valley #2 exposure of F seam, through to the wider development of the target resource area under the Fingal Tier plateau (Figure 5).

All 8 seams comprising the Fingal Tier coal measures were encountered in the drilling. D seam is the most consistent in terms of seam stratigraphy and coal quality, and is the most reliable marker seam. The other 5 major seams (A, B, C, F and G) all show substantial variation in thickness, quality and the degree of seam splitting and merging, so careful correlation, including fault interpretation, is needed to evaluate resource potential. In general, the portion of F seam developed to working section thickness at Valley Road consists of an average gross seam thickness of approximately 2.2 metres, comprising ply's of dull and dull minor bright coal interstratified with dirt bands of several mm thickness, and interburden mudstone up to a maximum thickness of about 50cm. Coal quality, measured in terms of raw air dried coal ash content by proximate analysis, ranges down to 18% for the best quality plies and averages approximately 34% for the gross seam.

In general the entire coal measures sequence dips to the southeast at 1-2° and in the area drilled by HRCM to date the deposit is subdivided by a system of arcuate faults into four main fault blocks. The bounding faults all show a normal sense of movement and vertical offsets at the top of F seam in the 5-30 metre range. Most of the major faults mapped by HRCM, together with the north-south trending Mitchell Fault mapped by DOM show a curved form and trends which are disconformable with the regional landscape fabric.

A 3.5 km long section captured 15 drill holes with F seam working sections or intersections good enough to be considered worth including in a resource sufficient for Measured confidence level estimation. The section shows that although the total thickness of the F seam coal-mudstone stratigraphic package thins towards the southeast, there is no evidence of the Valley seam pinching out and being replaced by another part of F seam. The persistence of a working section thickness in the middle of the F seam coal-mudstone package is fairly consistent along strike, at least as far southeast as DOM23. It was recommended that more drilling be done around the area south of DOM41 where the logs indicate that a sandstone roof to F seam and less mudstone interburden are likely.

# **Exploration Completed in the Year Ending 8<sup>th</sup> November, 2013**

## ***Introduction***

HRCM maintained a full time exploration base in Fingal, consisting of housing, office facilities, a core logging yard, a core shed and safe core storage area and storage facilities for consumables and pallets of drill core. The main activity for this year has been completion of the logging and assaying of all the drill holes and continuation of the resource and environmental studies needed to achieve the granting of the mine lease from MRT.

## ***Drilling Program***

Drilling commenced in November 2011 and currently 2668.9 metres have been drilled with 12 vertical holes located on 10 drill pads (see Table 1 and Figure 4 below). Written logs are presented in Appendix A with collar coordinates in GDA 94 and sample depths and numbers.

Three rigs have been used; Stacpoole Enterprises, from Launceston, have operated a truck mounted B90 Mobile rig and a track mounted light weight CMV rig, and Spaulding Drillers, from Devonport, have operated a truck mounted DR2H percussion rig. The total meterage comprises 1933 metres of HQ3 and NQ3 core plus 727 metres of open hole percussion (down hole hammer) chips. The B90 universal rig was used in both diamond coring and percussion modes, the CMV rig was used entirely for coring on shallow holes and the Spaulding DR rig was used entirely for percussion pre collar drilling through dolerite and dolerite talus, and for the acid mine drainage sampling program in drill hole VR010.

All core and chips were logged, photographed and sampled, and all pallets of core and reference chip trays are stored, at the Gray St Fingal exploration base.

**Table 1 Valley Road Drilling Summary – November 2013**

HOLE ID	E	N	RL	EOH	DRILLING COMPANY/METHOD
VR001	589431.8	5388423.4	828.13	576.05	Stacpoole B90: open PC, HQ3, NQ3
VR002	588328.6	5390042.4	581.42	224.45	Stacpoole B90: HQ3, NQ3
VR003	588745.4	5390342.2	556.45	217.30	Stacpoole B90: HQ3, NQ3
VR004A	587822.1	5390338.2	455.26	29.2	Stacpoole CMV: HQ3
VR004B	587819.1	5390337.4	455.01	90.8	Stacpoole CMV: HQ3
VR004C	587824.8	5390339.3	455.44	35.25	Stacpoole CMV: HQ3
VR005	587808.0	5390437.2	436.20	55.65	Stacpoole CMV: HQ3
VR006	589143.5	5390231.9	573.39	232.0	Stacpoole B90: HQ3, NQ3
VR007	588443.8	5389239.1	661.32	333.1	Stacpoole B90: HQ3, NQ3
VR008	588179.3	5389580.5	623.60	258.8	Spaulding DR2H open PC, Stacpoole HQ3, NQ3
VR009	588834.9	5388379.8	786.91	426.2	Spaulding DR2H open PC, Stacpoole HQ3
VR010	588197.9	5390240.5	540.94	181.0	Spaulding DR2H open PC
			<b>TOTAL m</b>	<b>2668.9</b>	
			cored	1941.9m	
			percussion	727m	

HOLE ID	PURPOSE	COMPLETION STATUS	REHAB
VR001	EXP	Locked steel cap – waiting for water testing	Yes
VR002	EXP	Open with HQ drill string stuck down hole	Yes
VR003	EXP,WPT, PZO	Piezometer installed and operating, grouted to surface	Yes
VR004A	BEN	Sealed with Octoplugs, earth fill cap	Yes
VR004B	EXP	Sealed with Octoplugs, earth fill cap	Yes
VR004C	ENV	Sealed with Octoplugs, earth fill cap	Yes
VR005	EXP	Sealed with Octoplugs, earth fill cap	Yes
VR006	EXP, WPT	Sealed with grout to near surface	Yes
VR007	EXP, WPT	Sealed with grout to near surface	Yes
VR008	EXP, WPT	Sealed with grout to near surface	Yes
VR009	EXP, WPT	Piezometer installed and operating, grouted to surface	Not yet
VR010	ENV	Steel casing slotted over F and G seams, bottom hole grouted	Not yet
	EXP=Exploration		
	PZO=Piezometer		
	WPT=Water packer testing		
	ENV=Environmental sampling		
	BEN=Beneficiation sampling		

At the time of writing the last annual report (2011/2012) the detailed 1:20 scale logs and sample results were not available from VR008 and VR009. These are presented in Appendix B

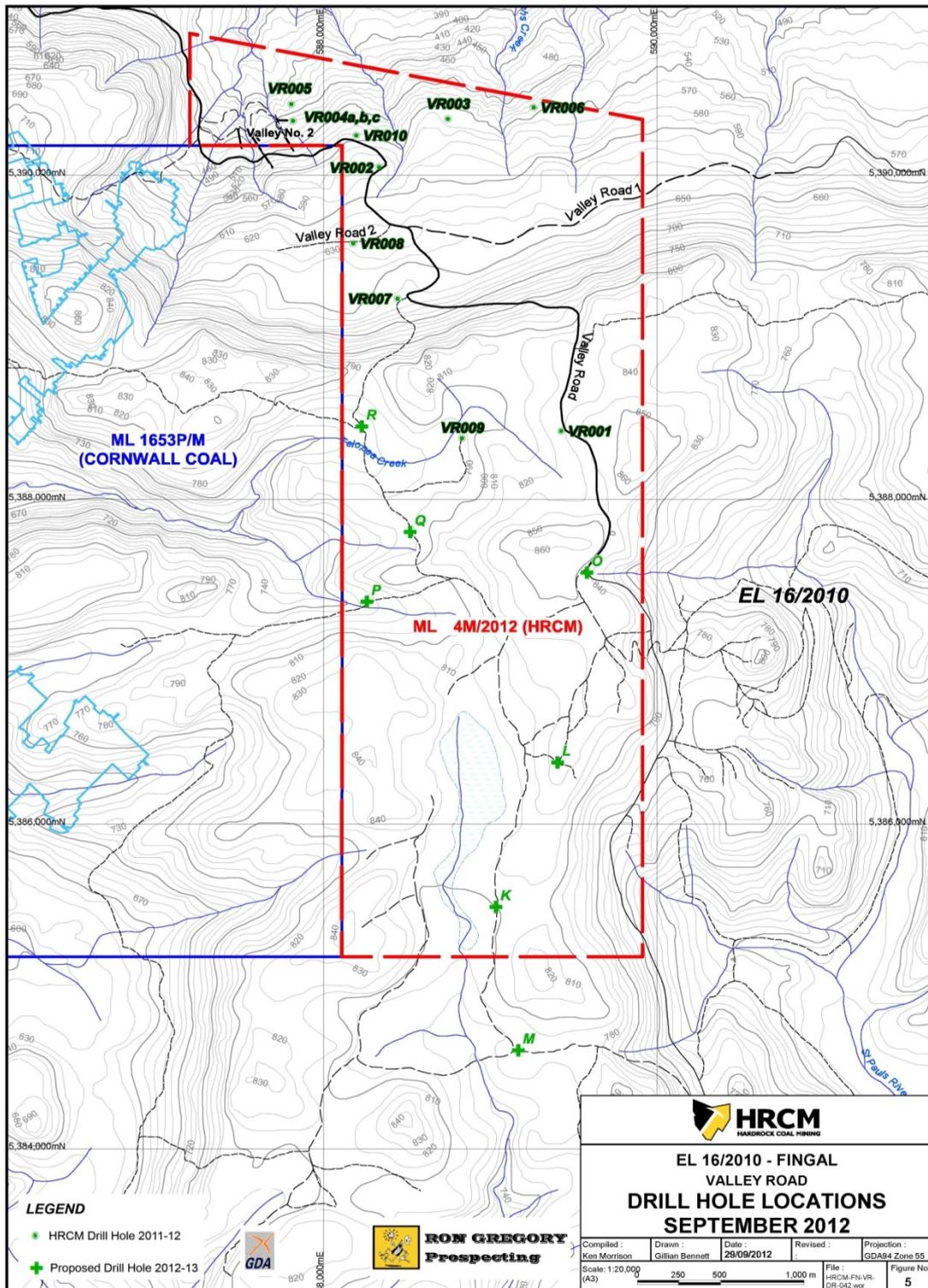


Figure 4. Drill hole locality map.

## ***Exploration Results and Discussion***

The VR series exploration drilling program had two aims:

- To validate the earlier DOM drilling and refine boundaries to the deposit, by infill and step-out drilling to achieve normal industry standards of resource estimation levels of confidence in terms of seam correlation and the mapping of major faults. The target for the initial phase of exploration is to establish a viable F seam resource.
- To map out the optimum underground access route from near the Valley #2 exposure of F seam, through to the wider development of the target resource area under the Fingal Tier plateau (Figure 5).

The logging, core processing and sampling procedure involves the following steps:

- 1:200 scale hand drawn graphic geological logging of the entire hole.
- 1:20 scale drafted logging of each coal seam judged as a significant intersection. Assay results are later added to these logs.
- Photographing of chips and core for the entire hole.
- Photographing of core intervals selected for assaying.
- Sampling, weighing and packing of core samples for assaying.
- Spread sheet data entry of log summary and sample details.
- Core and chip tray storage.

Appendix A contains summary logs of all the holes, Appendix B 1:20 scale seam logs from VR008 and VR009 and assay results in Appendix C for VR008 and VR009.

The Annual Report for 2011/2012 (see Morrison et al, 2012) reported in detail on the Valley Road geology.

An updated interpretation of the faults is presented in Figure 5 below. It is based on the method of structure contour mapping the top F seam surface and inserting faults where they are required to accommodate substantial vertical displacement and/or displacement persistent along strike. At the exploration stage of surface drilling only the major faults can be identified and they are the structures most important to use in resource definition. It is accepted that local washouts, seam splitting and merging, seam roll and folding will occur due to a combination of depositional, lithostatic load and tectonic deformation but these are mine scale features rather than major structural boundaries at the deposit scale.

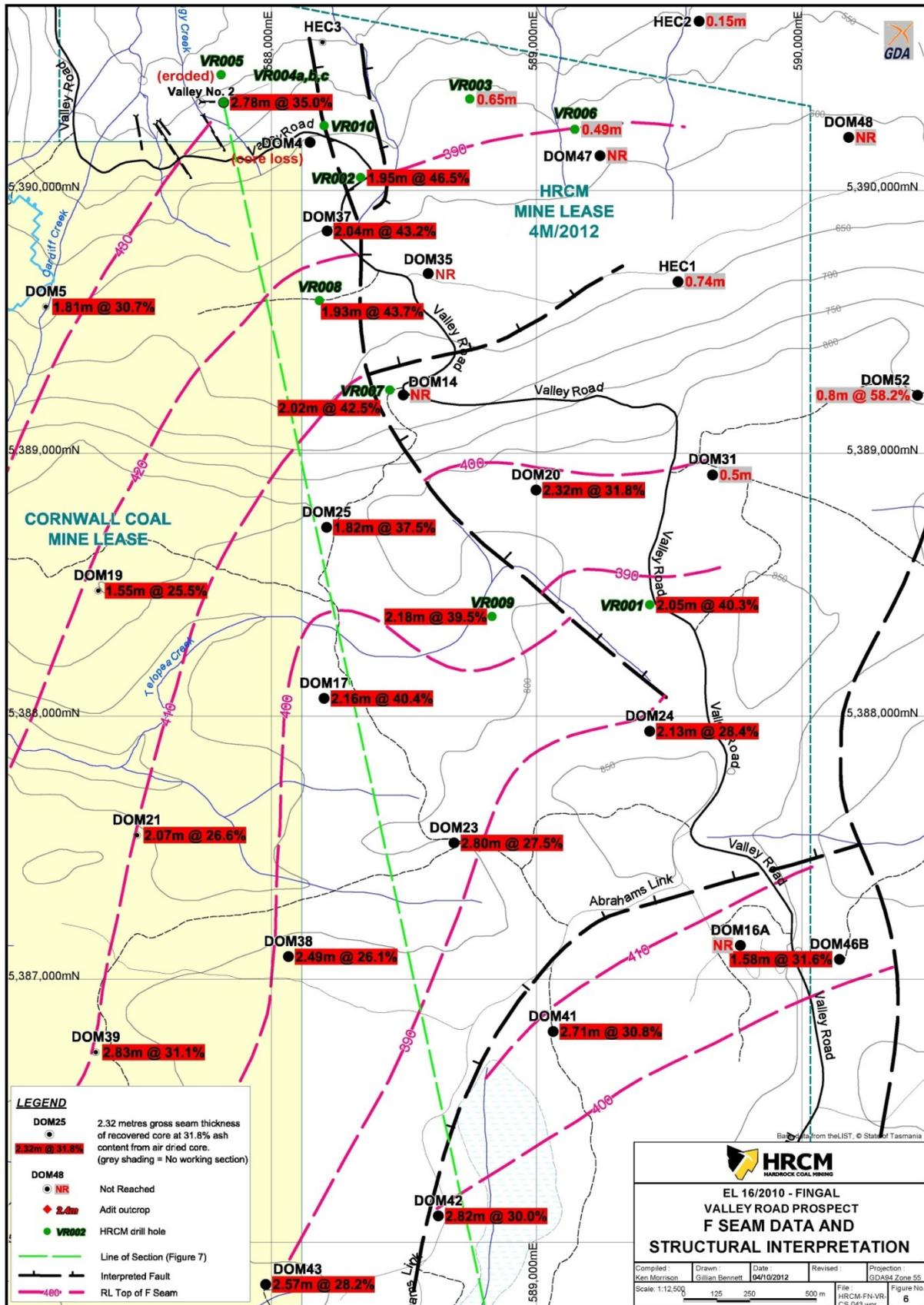


Figure 5. F Seam data and structural interpretation.

Figure 5 shows that in general F seam (and by extrapolation the entire coal measures sequence) dips to the southeast at 1-2° and that in the area drilled by HRCM to date the deposit is subdivided by a system of arcuate faults into four main fault blocks. The bounding faults all show a normal sense of movement and vertical offsets at the top of F seam in the 5-30 metre range. Most of the major faults mapped by HRCM, together with the north-south trending Mitchell Fault mapped by DOM, in part based on the gravity-magnetics interpretation of a persistent dolerite thickness discontinuity, show a curved/arcuate form and trends which are disconformable with the regional landscape fabric. In terms of down thrown offset of the coal measures, the faults controlling the prominent escarpment and talus fans along the northern Fingal Tier plateau edge are no more important than the major faults trending approximately north-south. There is a case for considering the Mitchell Fault as one of a zone of interconnected structures rather than a single boundary structure.

The fault interpretation has implications for resource definition, mine planning and the siting of future exploration drill holes. The north-eastern fault block, containing VR003 and VR006, is down thrown relative to both the western block and the south-eastern block. The fault separating the western and north-eastern blocks is interpreted as the boundary between working section thickness of F seam in holes VR004b, VR002 and VR008 to the west, and thin sub economic F seam to the east. This fault provides a boundary for the proposed underground mine roadway access route.

The western fault block, containing holes VR004b, VR002, VR008 and VR009, the central eastern block containing VR007 and VR001, and the southern block to be drilled by HRCM in the 2012-2013 licence year, cover the main part of the F seam resource identified to date. The arcuate northeast-southwest trending fault splaying off Mitchell Fault in the Abrahams Link Road area (Figure 5) indicates a displacement of up to 30 metres between DOM41 and DOM23, down thrown to the north. The northwest-southeast trending fault separating the western and central eastern blocks, and also heading towards Mitchell Fault, indicates down throw to the east of 5-15 metres between VR009 and VR001.

The major fault displacements have clearly occurred post Triassic coal measures and in many cases the faults are probably of Tertiary age, or at least post Jurassic dolerite. The apparent coincidence of faulting and the abrupt thinning of F seam in the northeastern fault block suggests that some major faults may be located on structures which were active in the Late Triassic, and exerted some control on coal formation and preservation within the fluvial basin.

## **Year 4 Exploration Program**

Activities within EL16/2010 will consist of:

- Two of drillholes to the base of the coal measures. The location of the holes is to be finalised early in 2014 but there are two possible scenarios (a) holes marked EL16\_A14 and EL\_B14 on the attached plan which are positioned to define the 1.8m thickness limit of the F seam to the south and south-west of the ML or (b) EL16\_C14 and EL\_D14 on the attached plan which will further define the southern limits of the resource. In either case the drillholes will be in excess of 400m deep,
- Analysis of prospective coal samples,
- Inputting of data into the geological, structural and coal quality model. This model will progressively include the ML, EL16 and EL17, and

- The use of downhole geotechnical tools if there is one available in Tasmania at the time.

The total expenditure will be in the order of \$475,000

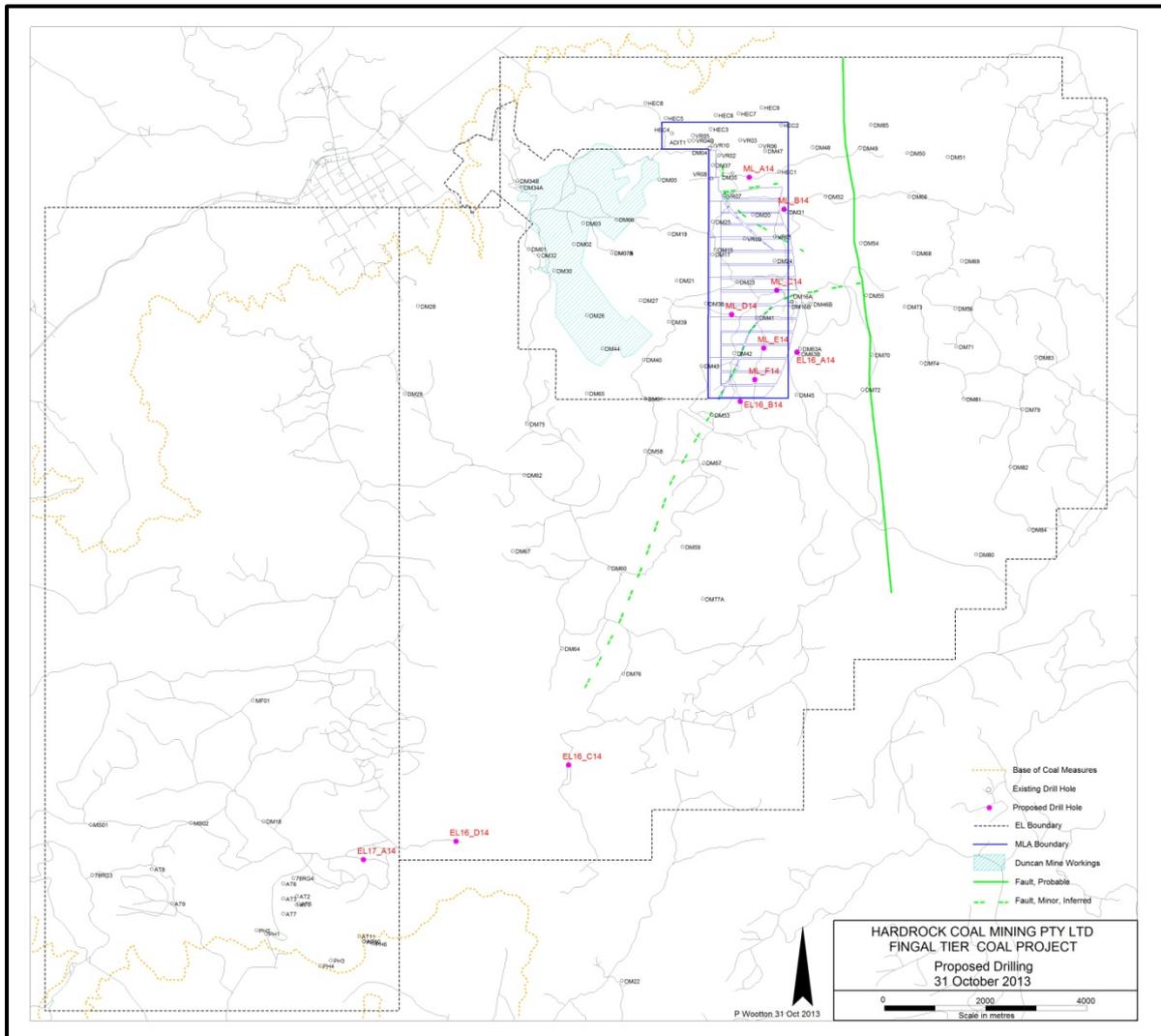


Figure 6. Proposed drilling on EL 16/2010

## Environment

All on ground works have been approved by Mineral Resources Tasmania and abided by the requirements of the 5<sup>th</sup> Edition of the Mineral Exploration Code of Practice.

The current rehabilitation status of the 12 holes drilled to date can be seen in the drill hole summary Table 1. Following on from the last report VR007 and VR008 were recently grouted to surface, VR009 had a Piezometer installed and was grouted to surface and VR010 had slotted steel casing placed over F and G seams and was grouted from the bottom.

## Expenditure

Cumulative total expenditure on EL 16/2010 at the 30<sup>th</sup> September 2012 was \$3,496,914. Expenditure during the period 1<sup>st</sup> October 2012 to 30<sup>th</sup> September 2013 was \$642,396 making a total of \$4,139,310. This cross-matches to the 2013 Q3 report. Expenditure by category for the 2012 to 2013 period is therefore;

Geology and exploration support activities	\$148,400
Drilling	\$361,666
Feasibility	\$64,373
Administration and Others	\$67,957
<b>TOTAL</b>	<b>\$642,396</b>

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