South Wales RIGS Group Site Record
RIGS Description

SECTION A

General	South Wales
Site Name: Bwlch-y-Cwm Quarry (Blaengwynlais)	**File Number:** Site_CCC_128; Site_RAW_JRD_36
RIGS Number: 613	**Surveyed by:** SWGA (mineralogy); R A Waters and J R Davies (stratigraphy)
Grid Reference: ST 1440 8400 to ST 1470 8450	**Date of Visit:** 9th September 2007 (SWGA); RAW/JRD 19th October 2010
RIGS Category: Scientific, educational	**Date Registered:** **Owner:** Tarmac **Planning Authority:** Cardiff County Council, Caerphilly CBC
Earth Science Category: Mineralogical; stratigraphical, sedimentological	
Site Nature: Disused / dormant Quarry	**Documentation prepared by:** Lynda Garfield (mineralogy); R A Waters (stratigraphy)
Unitary Authority: Cardiff County Council, Caerphilly County Borough Council	**Documentation last revised:** 3rd March 2011
OS 1:50,000 Sheet: 171	**Photographic Record:** Attached
OS 1:25,000 Explorer Sheet: 151	
BGS 1:50,000 Sheet: 249	

RIGS Statement of Interest: Blaengwynlais Quarry forms part of a network of sites on the east crop of the South Wales Coalfield that demonstrate the stratigraphy and geological history of the Carboniferous Limestone on the east crop of the South Wales Coalfield. It has been proposed as a RIGS as it is an accessible site that provides excellent exposures for those interested in the stratigraphy, sedimentology and mineralisation of the middle part of the Pembroke Limestone Group.

Several key features in the dolomitised Pembroke Limestone Group, such as fossil soils/karst and barrier bars are well displayed in the quarry. The section in the youngest barrier bar is unique to this site and provides a critical piece of evidence to the understanding of the history of the Carboniferous Limestone in SE Wales. The quarry exhibits a wide range of dolomitisation styles. Mineralisation includes quartz, hematite, barite and calcite-infilled vugs; goethite pseudomorphs after pyrite are also present.

Not only does it offer an excellent locality for those interested in scientific research on the stratigraphy, sedimentology and mineralisation of the Pembroke Limestone Group, it also offers a good site for students to study fossil soils/karst, dolomites and mineralization.

Geological setting/context:

Blaengwynlais Quarry is a large disused or dormant quarry exposing an excellent continuous section through the middle part of the Pembroke Limestone Group. Older smaller quarries in the area have previously been recorded as the locality Bwlch-y-Cwm.

The Pembroke Limestone Group in the quarry is all dolomitised. The following formations are present:

High Tor Limestone 50 m +

Caswell Bay Mudstone 6.5 m

Gully Oolite 17 m

Black Rock Limestone Subgroup

Friars Point Limestone 30 m+

The late Courceyan to ?early Chadian, Friars Point Limestone comprises massive to thick bedded fine-grained dark grey dolomite with scattered crinoid debris. It was deposited in a mid ramp, offshore environment, occasionally stirred by storms. At c. 5 m below the top is a 4 cm-thick purple shaley clay that may possibly be a dolomitised palaeosol. This is overlain by 5 m of crinoid-poor fine-grained dolomite with vague planar to low angle lamination, which is capped by 1.25 m of pale grey to pink coarse-grained dolomite with low angle cross stratification. The coarse dolomite is capped by an undulatory palaeokarst overlain by a thin red/green shaly clay that infills pipes in the underlying dolomite, that is locally rubbly. The two paleokarsts represent late Courceyan to ?early Chadian shallowing and emergence on the inner and proximal mid ramp (Waters and Lawrence, 1987). Renewed transgression resulted in the deposition of the Gully Oolite.

The Chadian Gully Oolite comprises a pale grey to cream, coarse-grained dolomite with relic oolitic texture. Numerous vugs are present infilled by calcite and other minerals. A thin unit of dolomite mudstone and two shaly clays are locally present c. 10 m from the top of the formation and probably represent a complex emergent event. At the top of the Gully Oolite is a paleokarst overlain by a thin, green, shaly clay that fills fissures in the underlying calcretised and dolomitised oolite. The Gully Oolite represents a high energy shoal environment, initially transgressive but later to become progradational (regressive) (Waters and Lawrence 1987). The palaeokarst at the top reflects a widespread late Chadian event that left the inner and proximal mid ramp emergent.

The overlying Arundian Caswell Bay Mudstone consists of thin bedded, locally cryptalgal, dolomite mudstones with a prominent unit of medium to coarse crinoidal dolomite near the top. These mudstones reflect the early Arundian transgression over the emergent inner ramp that established peritidal environments.

The Arundian High Tor Limestone rests with a sharp base on the Caswell Bay

Mudstone and predominantly comprises medium to thick bedded, variably crinoidal and pelloidal, medium to coarse-grained dolomites with low angle cross bedding. Vugs are common. Units of thinner bedded fine to medium grained, crinoidal and locally shelly dolomites occur in the middle part of the exposed succession. The low angle cross bedded, coarse bioclastic dolomites record high energy nearshore and barrier environments. The sharp base of the formation reflects a ravinement surface as the barrier passed northwards over the back barrier peritidal deposits of the Caswell Bay Mudstone during continuing transgression (Riding and Wright 1981). A return to a more offshore environment is demonstrated by the presence of the packets of finer-grained dolomites in the middle of the exposed succession. They are followed however by further high energy nearshore deposits. The barrier represented by most of the High Tor Limestone in this area was located in an east-west zone running just north of Cardiff. To the north lay the peritidal deposits of the coeval Llanelly Formation. The quarry provides one of the best exposures in the barrier in South Wales.

The dolomitisation of the quarry succession is complex. The dolomitisation of the perititidal deposits, like the Caswell Bay mudstone was probably pene - contemporaneous in a tidal flat environment subject to evaporation and/or an influx of fresh water from the land. The fine-grained dolomites of the Friars Point Limestone probably reflect the movement of a mixing zone of fresh and marine waters through the host sediment during emergence (Hird et al. 1987; Waters and Lawrence 1987), predominantly in the late Couceyan/early Chadian. The coarse-grained dolomites of the Gully Oolite and High Tor Limestone are thought to be the result of late stage ‘burial’ processes where the dolomitising fluids moved through joints and fissures (Hird et al 1987).

The coarse- grained vugy dolomites are associated with widespread mineralisation. Previously reported from Blaengwynlais/Bwlch-y-Cwm are quartz, hematite, baryte veining and calcite veining. (Squirrell and Downing 1969). Abundant quartz, goethite/hematite, baryte, calcite infilled vugs can be seen today. The quarry is known for goethite pseudomorphs after pyrite.

Although the mineralisation is not as prominent as that seen at Machen Quarry to the north-east, it is more prominent than that seen today around Tongwynlais to the south-west, and as such it provides an interesting, well exposed locality for those interested in the development of mineralization within the Carboniferous limestones in South Wales. This includes iron mineralisation and Mississippi Valley type hydrothermal mineralisation (Bevins and Mason 2000), and, more locally, the development of multi-phase euhedral calcite crystals widely known as “Taff’s Well calcites”.

References:

BEVINS, R.E. & MASON, J.S. 2000. *MINESCAN: Welsh metallophyte and metallogenic evaluation report. Glamorgan and Gwent.* Countryside Council for Wales Contract Science Report No. 386.

HIRD, K, TUCKER, M E and WATERS R A. 1987. Petrography, geochemistry and origin of Dinantian dolomites from South-east Wales. 359-77 *in* European Dinantian environments. MILLER, J, ADAMS, A E and WRIGHT, V P. (editors). *Geological Journal Special Issue* No 12. (Chichester: John Wiley).

SQUIRRELL, H C and DOWNING, R A (1969) *Geology of the South Wales Coalfield, Part I, the country around Newport (Mon)*, (Third edition), Memoir of the Institude of Geological Sciences Sheet 249 (England and Wales). (London: HMSO).

RIDING, R and WRIGHT, V P. 1981. Paleosols and tidal flat/lagoon sequences on a Carboniferous carbonate shelf: sedimentary associations of triple disconformities. *Journal of Sedimentary Petrology*, 51, 1323-39

WATERS, R A, and LAWRENCE, D J D. 1987. *Geology of the South Wales Coalfield, Part III, the country around Cardiff.* (Third edition). Memoir of the British Geological Survey, Sheet 263 (England and Wales). (London: HMSO).

SECTION B

PRACTICAL CONSIDERATIONS:

Please score Accessibility and Safety Red Amber or Green

Accessibility:			X
Comment: Although access is currently barred by the quarry, it offers good access just off the road.			
Safety:			X
Comment: Quarry faces need examining for stability. Quarry floor is level with few obstructions.			

Conservation status:

Likely to be standing planning for aggregate extraction. Need to be checked.

OWNERSHIP/PLANNING CONTROL:

Owner/tenant: Tarmac

Planning Authority: Cardiff County Council, Caerphilly CBC

Planning status/constraints/opportunities:

Likely to be standing planning for aggregate extraction. Need to be checked.

CONDITION, USE & MANAGEMENT:

Present use: None. Disused or dormant quarry

Site condition: Quarry faces and quarry floor are fairly free from vegetation although this has been encroaching since the quarry stopped working.

Potential threats: Quarry could become active again. Otherwise increasing vegetation growth would obscure the faces.

Site Management: Suggest that selected parts of the site are cleared of vegetation every few years.

SITE DEVELOPMENT:

Potential use (general):

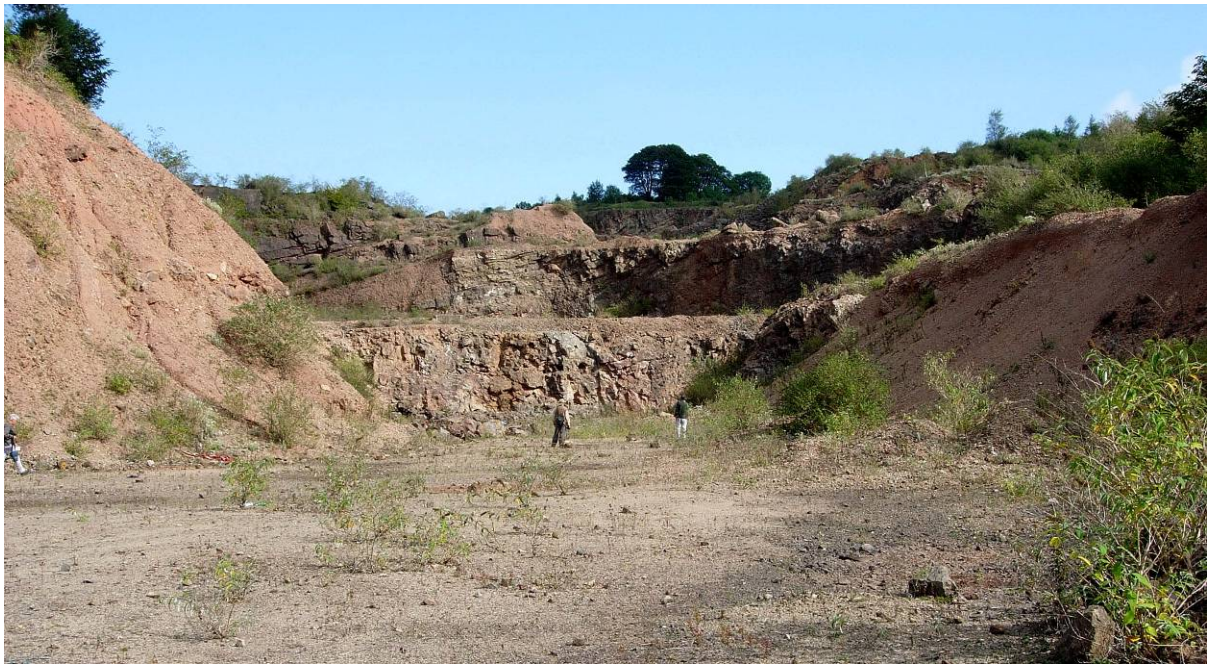
Potential use (educational): Good site for those interested in the stratigraphy, sedimentology and mineralization of the Pembroke Limestone Group, including

scientific/research study. Good site for students to study mineralisation, dolomites as well as the stratigraphy of the Pembroke Limestone Group.

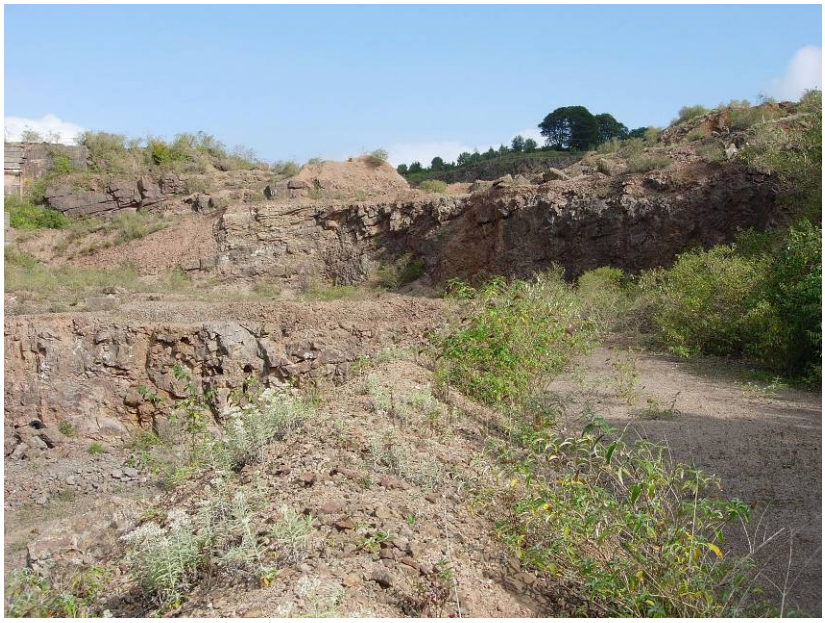
Potential for good parking, access and safety.

Other comments:

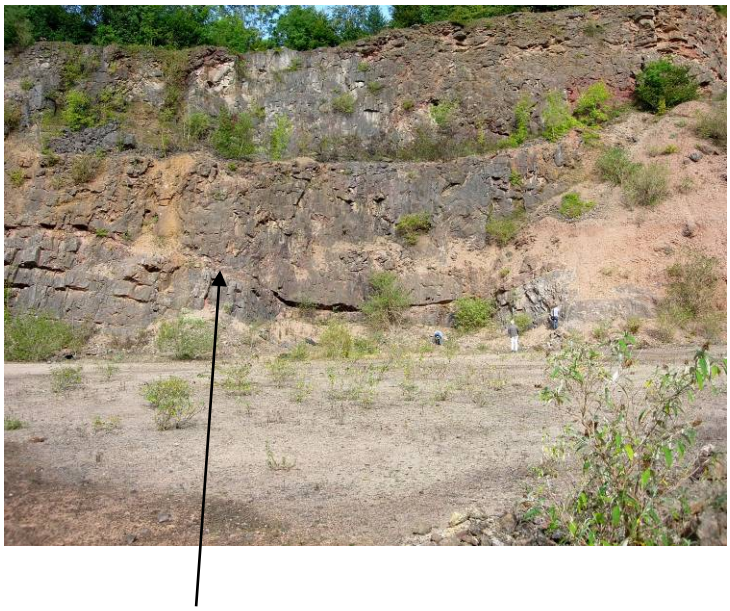
Photographic Record



General view along the quarry, Pembroke Limestone Group



Another view along the quarry, Pembroke Limestone Group



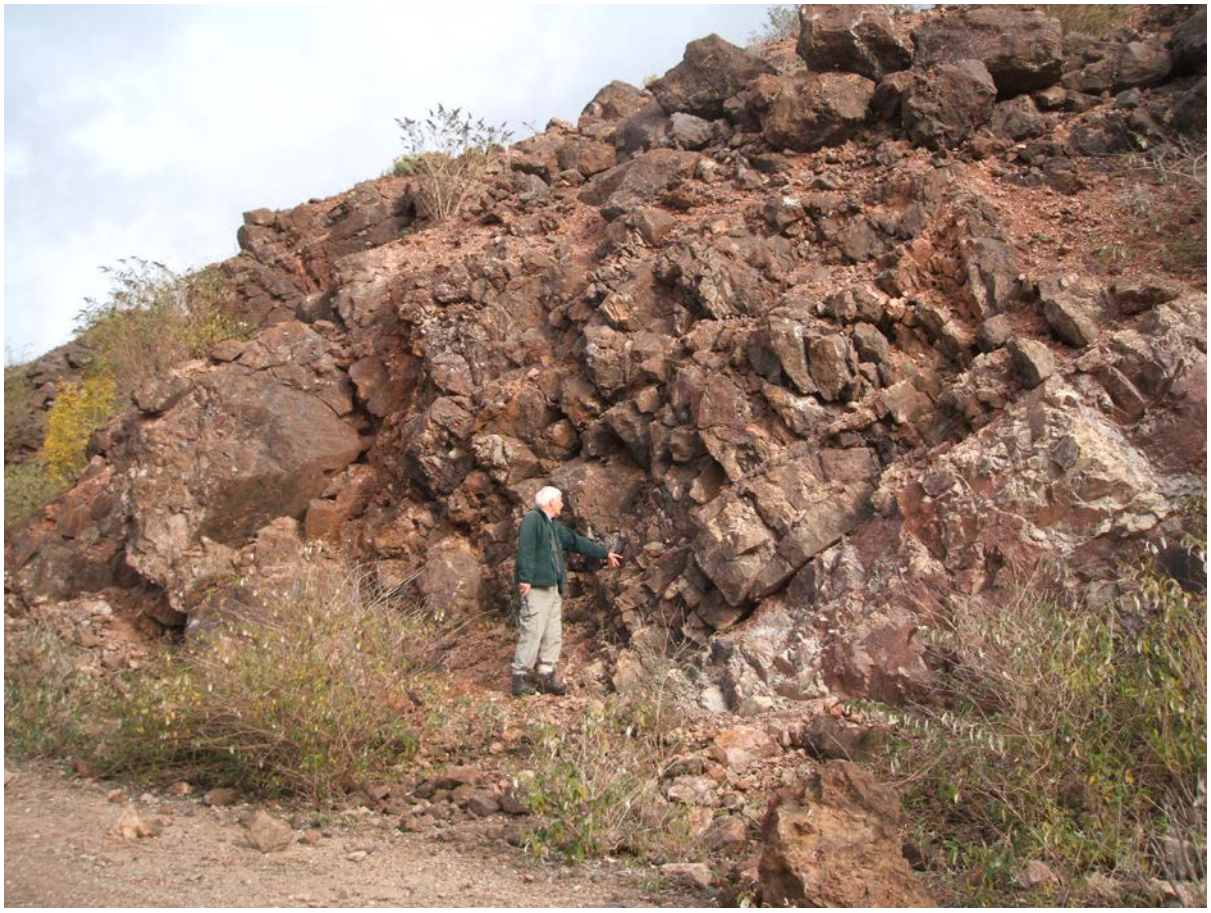
Baryte veining

Baryte - field of view 10cm across

Photographs by Lynda Garfield

Paleokarstic surface at the base of the Gully Oolite. Red clay filled pipes descend into the underlying Friars Point Limestone

Paleokarst at the top of the Gully Oolite overlain by Caswell Bay Mudstone



Contact between the thin bedded Caswell Bay Mudstone and the thick bedded to massive High Tor Limestone. The dolomites of the High Tor Limestone contain abundant mineralised vugs.