



## South Wales RIGS Group Site Record

### RIGS Description

**SECTION A**

General	South Wales
<b>Site Name:</b> Abercriban Quarry	<b>File Number:</b> Site_RAW_JRD_27
<b>RIGS Number:</b> 607	<b>Surveyed by:</b> R A Waters and J R Davies
<b>Grid Reference:</b> SO 0660 1244	<b>Date of Visit:</b> 13 <sup>th</sup> October 2010
<b>RIGS Category:</b> Scientific, educational	<b>Date Registered:</b>  <b>Owner:</b> Unknown/Private <b>Planning Authority:</b> Powys County Council
<b>Earth Science Category:</b> Stratigraphical, sedimentological	
<b>Site Nature:</b> Quarry	<b>Documentation prepared by:</b> R A Waters
<b>Unitary Authority:</b> Powys County Council	<b>Documentation last revised:</b> DIS 31 <sup>st</sup> January 2011
<b>OS 1:50,000 Sheet:</b> 160	<b>Photographic Record:</b> Embedded in text
<b>OS 1:25,000 Explorer Sheet:</b> OL12	
<b>BGS 1:50,000 Sheet:</b> E231	
<b>RIGS Statement of Interest:</b>	
<p>The site is part of a network of early Carboniferous sites (RIGS and GCR) in south Wales that, collectively, allow the regional stratigraphy and carbonate sedimentology to be studied. The site forms part of the sub-network of sites for the Dinantian limestone crop that occurs north of the South Wales Coalfield, the so called 'north crop'.</p> <p>Abercriban Quarry provides a continuous section through most of the Abercriban Oolite Subgroup for which it is the type section. Accessible and clean quarry faces expose a wide range of features, including fossil soils, pertinent to the study of the sedimentology of limestones and dolomites, deposited in shallow seas and coastal swamps. The Abercriban Quarry RIGS also provides an alternative to the nearby GCR sites (Baltic Quarry and Cwar yr Ystrad) and can be used to demonstrate the features of the lower part of the Carboniferous Limestone succession in the central part of the north crop of the South Wales Coalfield.</p> <p>Although it is an important section for scientific research, it is also be an excellent site for students to study the features of shallow water limestones and dolomites.</p>	

### **Geological setting/context:**

The quarry is located in the middle of the eastern part of the north crop of the Carboniferous Limestone where the Courceyan to Arundian part of the Pembroke Limestone Group succession is preserved beneath the Holverian overstep. The quarry is the type locality for the Courceyan Abercriban Oolite Subgroup.

In the quarry, the subgroup consists of a 23 m – thick succession comprising three units of pale grey, variably oolitic, pelloidal and skeletal grainstones separated by three, thin, brown-weathering, stratabound dolomites. The contact with the underlying mudstones and thin limestones of the Avon Group is not seen, but lies approximately 3 m below the base of the quarry succession. The uppermost part of the subgroup is thought to be missing in the area as a result of deep karstification and pedogenesis during the late Courceyan and Chadian (Searle, 1988a, b; Dixon and Wright, 1993), prior to the deposition of the overlying, Arundian Llanelly Formation. The base of the Llanelly Formation is inferred to crop out some 50 m beyond the quarry to the east, suggesting that around 5 m of the subgroup is unexposed; this is borne out by the fact that the Abercriban oolite Subgroup is 29 m thick in Baltic quarry, just to the south (Dixon and Wright, 1993). The Abercriban quarry succession is shown in the log.

Although Barclay et al. (1988) left the Abercriban Oolite Subgroup undivided, some attempts have been made to correlate the oolitic and intervening dolomite units within the subgroup with those in the Clydach Valley Subgroup to the east (George 1954; Barclay 1989; Dixon and Wright 1993). In Abercriban quarry, the basal dolomite mudstone is probably the Sychnant Dolomite. Above this, George (1954) and Searle (1988a and b) have suggested that the lowest oolite unit is the Pwll-y-cwm Oolite and the remaining two, a lower and upper Blaen Onnen Oolite, the middle dolomite being the Pantydarren Formation.

The Sychnant Dolomite is a dolomite mudstone and seen just downhill from the lip of the quarry on the south side. The three grainstone units are predominantly oolitic with local crinoidal and shelly beds and lenses. Coquinoid units rich in brachiopods and gastropods are common in units 2 and 3. Low angle cross-stratification and small scale trough and planar cross bedding can be observed and record deposition in a shallow shoal environment. The bases of the grainstone units are sharp and erosive, unit 2 downcutting into the underlying stratiform dolomite by 0.3 m. The top of unit 1 is sharp with possible rhizoliths. The top of unit 2 is undulatory with the upper 8 cm locally rubbly and containing anastomosing green mudstone stringers and calcretised limestone nodules. All these feature record subaerial exposure at the top of the grainstone units..

The upper two stratiform dolomites are lenticular, brown weathering dolomite mudstones. The middle one contains nodules and vugs of limonite and locally passes into a rubble of radial fibrous (columnar) calcite with clay filled interstices. Searle (1989) has interpreted the columnar calcites as pedogenic. The upper unit comprises dolomite mudstone with lenses of grey mudstone. Searle (1988a and b) has interpreted the stratiform dolomites as the muddy deposits of a schizohaline swamp with ephemeral ponds. The dolomitisation is interpreted as the result of the mixing of marine and meteoric waters during the wet season in a monsoonal climate. It did not affect the underlying grainstones as they were cemented prior to deposition of the swamp sediments.

The quarry sequence records a series of northward directed transgressive events, each beginning with the deposition of back barrier swamp muds on an emergent surface. This was followed by transgressive barrier grainstones that eventually prograded back southwards to leave behind an emergent surface.

**References:**

BARCLAY, W J. 1989. *Geology of the South Wales Coalfield, Part II, the country around Abergavenny* (Third edition). Memoir of the British Geological Survey, Sheet 232 (England and Wales). (London: HMSO.).

BARCLAY, W J, TAYLOR, K, and THOMAS, L P. 1988. *Geology of the South Wales Coalfield, Part V, the country around Merthyr Tydfil*. (Third edition). Memoir of the British Geological Survey, Sheet 231 (England and Wales). (London: HMSO.).

DICKSON, J A D and WRIGHT, V P. 1993. Carboniferous Limestone of the north crop of the South Wales Coalfield. 331-349 in *Geological Excursions in Powys*. WOODCOCK, N H and BASSETT, M G. (editors) (Cardiff: University of Wales Press, National Museum of Wales).







GEORGE, T N. 1954. Pre-Seminular Main Limestone of the Avonian Series in Breconshire. *Quarterly Journal of the Geological Society, London*, Vol. 110, 283-322.

SEARLE, A 1988a. Pedogenic dolomites from the Oolite Group of South Wales. *Geological Journal*, Vol. 23, 157 -69.

SEARLE, A 1988b. The limitation of 'cement stratigraphy' as revealed in some Lower Carboniferous oolites from South Wales. *Sedimentary Geology*, Vol. 57, 171-183.

SEARLE, A. 1989. Pedogenic columnar calcite from the Oolite Group (Lower Carboniferous), South Wales. *Sedimentary Geology*, Vol. 62, 47-58.

## SECTION B

<b>PRACTICAL CONSIDERATIONS:</b> Please score Accessibility and Safety Red Amber or Green			
<b>Accessibility:</b>			X 
Comment: Access via track to farm and then a farm track to quarry			
<b>Safety:</b>			X 
Comment: Quarry faces fairly stable. Care needed crossing dry stone wall			
<b>Conservation status:</b> None			

<b>OWNERSHIP/PLANNING CONTROL:</b> <b>Owner/tenant:</b> West of stone wall traversing quarry - Occupier of farm at SO 0635 1222; east of stone wall traversing quarry – open access land owned by ?? <b>Planning Authority:</b> Powys/Brecon Beacons National Park <b>Planning status/constraints/opportunities:</b> Unlikely to have standing planning for aggregate extraction as in National Park
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<b>CONDITION, USE &amp; MANAGEMENT:</b> <b>Present use:</b> disused quarry, now farmland and used for sheep grazing. <b>Site condition:</b> Quarry faces and floor are relatively free from vegetation apart from a few small saplings growing on the east face. A 2m high dry stone wall cuts the quarry into two parts (to the east is open access land) and this has to be crossed to access the quarry; the owner recommends crossing on the southernmost side. The quarry faces are commonly gentle enough to be accessed by sheep tracks, while a path runs up the north face so that the top of the quarry can be accessed easily. <b>Potential threats:</b> Increasing vegetation. <b>Site Management:</b> The dry stone wall needs to be protected from damage by people crossing it.
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<b>SITE DEVELOPMENT:</b> <b>Potential use (general):</b> <b>Potential use (educational):</b> Good site for students to study the sedimentology of limestones and dolomites. Important site for scientific researchers wanting to study the early Dinantian history of the north crop and aspects of carbonate sedimentology.
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<b>Other comments:</b>
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## Photographic Record



Photograph 1. East face of quarry, showing the middle and upper, brown-weathering, stratabound dolomites separating units of pale grey oolitic grainstone.



Photograph 2. General view of quarry showing stone wall



Photograph 3. General view of quarry looking south.

# Annotated Sketch

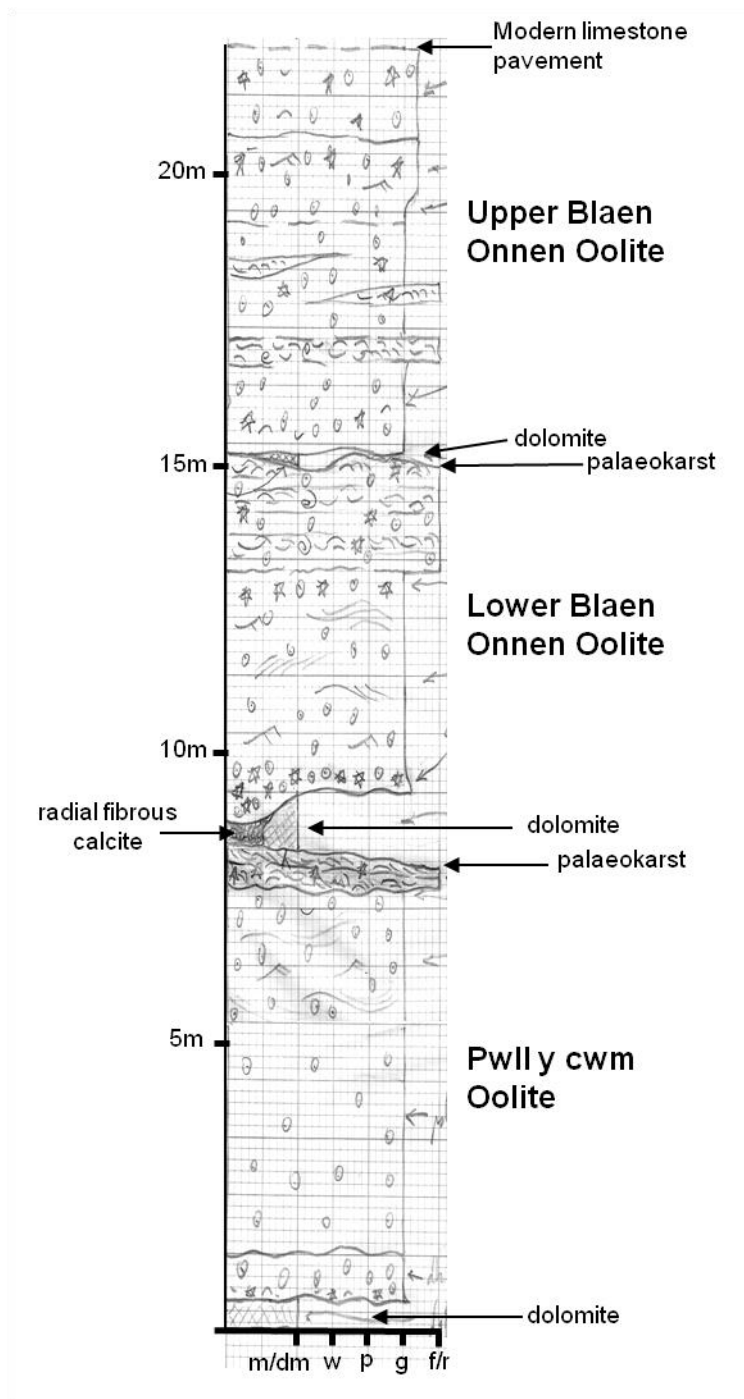


Figure 1. Modified field log of Abercriban Quarry (textural key: m/md, mudstone/dolomite mudstone, w, wackestone, p, packstones, g, grainstone, f/r, floatstone/rudstone)