

South Wales RIGS Group Site Record RIGS Description

SECTION A

General	South Wales
Site Name: Stormy Down Quarry, Pyle	File Number: Site_RAW_JRD_44
RIGS Number: 618	Surveyed by: RA Waters & JR Davies
Grid Reference: SS 8430 8039 to 8428 8039	Date of Visit: October 2010
RIGS Category: Scientific	Date Registered:
Earth Science Category: Stratigraphy, sedimentology	Owner: Hobbs plc Planning Authority: Bridgend County Borough Council
Site Nature: Disused quarry	Documentation prepared by: Jerry Davies
Unitary Authority: Bridgend County Borough Council	Documentation last revised: 1 st February 2011
OS 1:50,000 Sheet: 170	Photographic Record: Attached
OS 1:25,000 Explorer Sheet: 151	
BGS 1:50,000 Sheet: E262	
<p>RIGS Statement of Interest: This forms part of a network of key sites (RIGS & GCR) which collectively illustrate facies development of the lower Carboniferous (Dinantian) carbonate ramp/platform in South Wales including sites of historical and educational interest. Stormy Down Quarry forms part of a sub-network of sites located to the south of the South Wales Coalfield, the so called south crop. The site provides an accessible and key section in the south crop Holkerian succession and allows the varied suite of rock types that make up the Stormy Limestone Formation to be examined.</p> <p>Stormy Down Quarry is the type section of the Stormy Limestone Formation and exposes the contact with the underlying Cornelly Oolite Formation. These units are of Holkerian Stage age and record a key phase in the evolution of the South Wales Dinantian succession; namely the transition from immature carbonate ramp into a mature platform stage. During this interval oolite shoal and barrier facies (Cornelly Oolite), located in the south crop region, sheltered a more quiescent northern lagoon in which a varied assemblage of shallow water and intertidal deposits accumulated (Dowlais Limestone). Over time, these back barrier units migrated southwards as the Stormy Limestone. In the Stormy Down area the basal beds of the Stormy Limestone overlie a clay horizon preserving well developed desiccation cracks on its upper surface.</p>	

Geological setting/context:

The pre-Holkerian Carboniferous Limestone succession in South Wales records deposition on an evolving carbonate ramp. The Vale of Glamorgan area, part of the 'south crop' succession, was the site of deeper and more distal ramp facies throughout much of this time. The Holkerian Stage signalled a significant evolutionary change; at the close of which a broad low gradient carbonate platform had been established throughout much of South Wales and the facies contrasts between the north crop and south crop successions largely abolished (Wilson et al., 1988).

Holkerian facies in the Vale of Glamorgan, in common with those in Gower, record the establishment of an extensive oolite shoal complex throughout the south crop region. This acted as a barrier to the north of which a broad more quiescent shelf lagoon was established. The latter was the site for deposition of a varied assemblage of shallow to inter- and supra-tidal carbonate facies. These comprise the heterolithic Dowlais Limestone of the north crop. Late in the Holkerian, as their protective barrier prograded southwards, these back barrier lagoonal facies migrated into the south crop region. The large limestone quarries in the Pyle-Cornelly area provide key sections though this Holkerian succession as well as the type localities for its component formations (Wilson et al., 1990). The lower 'oolite phase', the Cornelly Oolite Formation, takes its name from the extensive, and still active, Cornelly Quarry. The adjacent, currently 'mothballed' Stormy Down Quarry is the type locality for the succeeding 'lagoon phase' Stormy Limestone Formation, which also provides an extensive and more safely accessible section through the underlying oolite division. Collectively these Holkerian units comprise the Hunts Bay Subgroup which takes its name from sections in Gower (Waters et al., 2009). The thickness of shallow water facies this subgroup embraces, around 200 m in the Cornelly area, suggests that deposition was able to keep pace with a slowly rising Holkerian global sea level.

The section in Stormy Down Quarry, exposed in the north-eastern face, reveals a gentle NNW-dipping succession which includes the upper 10 m of the Cornelly Oolite overlain by an equivalent thickness of the Stormy Limestone (Photos. 1 & 2). The oolite unit comprises thick-bedded oolitic and skeletal packstones and grainstones locally cross-bedded and rich in intracasts of oolitic grainstone. Coquinas of brachiopod valves occur as discontinuous lenses and rolled solitary and compound corals are common at level 5-6 m below the top of the formation. All these features are consistent with accumulation in a high energy oolite shoal/barrier setting. A 2.5 m-thick bed of white, very well sorted ooid grainstone is well seen capping the Cornelly Oolite in the quarry (Photo. 1).

The irregular master bedding plain that marks the base of the Stormy Limestone may record a brief period of emergence and karstification. Stromatolitic lamination in the overlying thin bed of calcite mudstone marks the onset of inter-tidal deposition. This is consistent with occurrence of the well formed, supra-tidal desiccation cracks present at the top of the overlying 20 cm-thick red and green clay bed; which, in common with Cornelly Quarry, are seen as casts on the base of the succeeding limestone (Photo. 3) (Wilson et al., 1990). Succeeding levels of the Stormy Limestone are characteristically heterolithic and include a complex succession of pale and dark skeletal and peloidal packstones, locally cross-bedded oncolitic, coquinoïd and intraclast grainstones, as well as wackestones and calcite mudstones with spar-filled

fenestral fabrics. The algal lamination common in these latter beds reveals well developed tufted and columnar stromatolite forms. Levels rich in *Chaetetes* and gastropods are also present. The assemblage is indicative of accumulation in a back-barrier setting, on tidal flats traversed by shifting intertidal channels and migrating tidal inlets, and in shallow subtidal lagoons.

Stormy Down Quarry offers a key section through the Holkerian succession of the south crop that compliments other sections in coeval and adjacent strata both locally (Argoed Isha Quarry; Pant Mawr Quarry (Cornelly)) and on the north crop (Welsh Quarry, Pant Mawr Quarry (Clydach), Careg Yr Ogof). It is the type locality for the heterolithic Stormy Limestone Formation; moreover it affords a safer and more accessible section through the upper part of the Cornelly Oolite in a site immediately adjacent to that formation's type locality, the still active Cornelly Quarry. The complex range of facies that characterise both formations are well displayed as is the contact between them. The section readily allows the processes that characterised a high energy shoal setting in place during the deposition of the Cornelly Oolite to be distinguished from those that operated within the succeeding Storm Limestone back-barrier lagoon including good evidence of supra- and inter-tidal deposition.

References:

WATERS, C N, WATERS, R A, BARCLAY, W J and DAVIES, J R. 2009. A lithostratigraphical framework for the Carboniferous successions of southern Great Britain (Onshore). *British Geological Survey Research Report*, RR/09/01.

WILSON, D, DAVIES, SMITH, M and WATERS, R A. 1988. Structural controls on Upper Palaeozoic sedimentation in south-east Wales. *Journal of the Geological Society of London*, Vol. 145, 901-914.

WILSON, D, DAVIES, J R, FLETCHER, C J N and SMITH, M. 1990. The geology of the South Wales Coalfield, Part VI, the country around Bridgend. *Memoir of the British Geological Survey*, Sheet 261 and 262 (England and Wales).

SECTION B

PRACTICAL CONSIDERATIONS:

Please score Accessibility and Safety Red Amber or Green

Accessibility:

X

Comment: Mothballed limestone quarry requiring permission from owners to gain access; main section is visible at the foot and in exposures above the north-eastern face of the quarry

Safety:

X

Comment: Steep quarry faces require hard hats and other appropriate protective measures to be used at all times; need to be aware of implications of any renewed quarry operations

Conservation status:

There are no known conservation designations of this RIGS

OWNERSHIP/PLANNING CONTROL:

Owner/tenant: Hobbs plc

Planning Authority: Bridgend County Borough Council

Planning status/constraints/opportunities:

There are no known planning constraints or opportunities

CONDITION, USE & MANAGEMENT:

Present use: Mothballed limestone quarry

Site condition: Good; all key parts of the section are well exposed and accessible

Potential threats: Re-opening of the quarry for further limestone extraction and/or infill

Site Management: Any redevelopment of the site should ensure that the critical north-eastern face of the quarry is preserved in its current form

SITE DEVELOPMENT:

Potential use (general):

Potential use (educational): Good teaching site for shallow water facies including oolite shoal and complex peritidal facies.

Other comments:

Photographic Record



Photograph 1. Entrance to Stormy Down Quarry with north-eastern face to the left



Photograph 2. North-eastern face of Stormy Down Quarry showing the base of the Stormy Limestone Formation (dashed white line) overlying Cornelly Oolite Formation



Photograph 3. Block showing casts of desiccation cracks on the base of limestone bed, from base Stormy Limestone Formation