



South Wales RIGS Group Site Record

RIGS Description

SECTION A

General	South Wales
Site Name: Barry harbour coastal cliffs	File Number: Site_RAW_JRD_39, including Site_263_11 and Site_VOG_115
RIGS Number: 614	Surveyed by: R A Waters and JR Davies
Grid Reference: ST 1045 6652 – 1033 6630	Date of Visit: 7 th October 2010
RIGS Category: Scientific, educational	Date Registered:
Earth Science Category: Stratigraphical, palaeontological, sedimentological, mineralogical,	Owner: Unknown Planning Authority: Vale of Glamorgan
Site Nature: Coastal cliffs and reefs	Documentation prepared by: R A Waters
Unitary Authority: Vale of Glamorgan Council	Documentation last revised: 22 nd February 2012
OS 1:50,000 Sheet: 171	Photographic Record: Attached
OS 1:25,000 Explorer Sheet: 151	
BGS 1:50,000 Sheet: 263	
RIGS Statement of Interest:	
<p>Barry harbour coastal cliffs forms part of a network of sites that demonstrate the stratigraphy and geological history of the Carboniferous Limestone on the south crop of the South Wales Coalfield. It has been proposed as a RIGS as it is an accessible site, with public access, that provides a key section for those interested in the stratigraphy, sedimentology, mineralogy and paleontology of the lower part of the Carboniferous Limestone.</p> <p>The site exposes c. 140 m of nearly continuous section through the Cwmyniscoy Mudstone (Avon Group), Barry Harbour Limestone and Friars Point Limestone formations (Pembroke Limestone Group). The section is the type locality for the Barry Harbour Limestone. A range of sedimentary structures, including cross bedding and burrowing, demonstrate, several major regional changes of sea level. The fossils from the section, notably corals and conodonts, have been studied in detail and as a result the site is one of the best dated sections in South Wales for this time interval. Silicification is common and the mineral beekite is well displayed. The section is as good as the GCR site in Gower at Three Cliffs Bay (Adams et al. 2004) that includes the Barry Harbour Limestone. Therefore the section should be regarded as an alternative to that site.</p> <p>Not only does it provide a key section for scientific research, it also provides an excellent section for students to study, limestones, sedimentary structures, fossil brachiopods and corals and silicification.</p>	

Geological setting/context:

The Barry Harbour site is a coastal section of low cliffs and reefs exposing an excellent, virtually continuous section through key contacts in the uppermost part of the Avon Group and the lowermost part of the Pembroke Limestone Group. The northern end of the section is defined by the Cold Knap Fault that downthrows late Triassic and Jurassic rocks (Penarth Group and Blue Lias Formation) against the Avon Group. The southern end of the section is defined by Watch House Bay. The section is described in detail in Waters and Lawrence (1987) and is the type locality for the Barry Harbour Limestone. The following formations are exposed:

Pembroke Limestone Group

Black Rock Subgroup

Friars Point Limestone	c. 30 m
Barry Harbour Limestone	c. 85 m

Avon Group

Cwmyniscoy Mudstone Formation	c. 25 m +
-------------------------------	-----------

The early Courceyan Cwmyniscoy Mudstone comprises buff weathering, grey mudstones with scattered thin very fine-grained packstone beds to 2 cm and a few thicker beds of fine to coarse skeletal packstone up to 0.24 m. Packets of strata rich in the thicker packstone beds form prominent reefs. The packstones in the succession are commonly dolomitised. The formation was deposited offshore, above storm wave base, in a mid ramp setting, the thick beds of packstone representing storm event beds.

The base of the Barry Harbour Limestone is gradational and corresponds with a re-entrant in the cliff. The early Courceyan formation predominantly comprises thin to medium bedded packstones with shaly partings. The packstones are commonly arranged in graded units, comprising basal brachiopod and crinoid rich lags passing up into fine-grained skeletal packstone. The fine-grained packstones are commonly dolomitised and exhibit HCS and planar and cross-lamination. Burrowing is common as is silicification. The latter occurs as scattered dog bone replacement cherts or the silicification of individual fossils, especially brachiopods as beekite. At the top of the formation is a 3 m-thick bed of massive, planar cross-bedded crinoidal grainstone known as the Yorke Rock Bed. The bed is partly obscured by boulder concrete related to a sewer outfall but can be seen in total at beach level. The onset of the formation records a regression together with a marked increase in carbonate production and a diminution in the amount of mud reaching the ramp. The formation was deposited above storm wave base and not far below fair weather wave base. The Yorke Rock Bed records further shallowing on the inner mid ramp, the bed recording deposition within fair weather wave base. The bed correlates with the Brofiscin Oolite seen further north up the ramp.

Above the Yorke Rock Bed, the Friars Point Limestone begins with a return to packstones very similar to those of the Barry Harbour Limestone. However by the Tower, they are rapidly replaced by darker, foetid, highly bioturbated, argillaceous

very crinoidal packstones, typical of the Friars Point Limestone. All trace of tractional lamination has gone and burrowing is the main fabric. Remnants of crinoid rich event beds disrupted by bioturbation are preserved as streaks, wisps and clots. Shaly partings are common. The onset of the formation records a major transgression in the mid Couceyan with continued deepening resulting in deposition in the deeper part of the mid ramp, predominantly below mean storm wave base.

Fossils from the section, notably corals and condonts, have been studied in detail (Waters and Lawrence, 1987; Mitchell 1981) and provide one of the few key data points in S Wales for dating of the limestones of the Black Rock Subgroup.

About half way along the Barry Harbour section, two small Triassic outliers are seen high up on the cliff. They comprise roughly horizontally bedded limestone pebble breccias sitting unconformably on the southward dipping Carboniferous Limestone. They belong to the marginal facies of the Mercia Mudstone Group. They provide an alternative section to the same deposits displayed in the Triassic GCR site on the eastern side of the harbour at Barry Island (Benton et al. 2002).

References:

Adams, A, Wright, V P and Cossey, P J. 2004. South Wales – Mendip shelf. 393- 476 *in* British Lower Carboniferous Stratigraphy. Cossey, P J, Adams, A E, Purnell, M A, Whiteley, M J, Whyte, MA, and Wright, V P. (editors). *Geological Conservation Review Series*, No 29. (Peterborough: Joint Nature Conservation Committee).

Benton, M J, Cook, E and Turner P. 2002. Permian and Triassic red beds and the Penarth Group of Great Britain. *Geological Conservation Review Series* No. 24, Joint Nature Conservation Committee, Peterborough.

Mitchell, M. 1981. The distribution of Tournaisian and early Visean (Carboniferous) coral faunas from the Bristol and South Wales areas of Britain. *Acta Palaeontologica Polonica*, 25, 577-585.

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).

PRACTICAL CONSIDERATIONS: Please score Accessibility and Safety Red Amber or Green			
Accessibility:			X
Comment: Cliffs and reefs can be accessed easily from Watch House Bay at low tide. Full public access.			
Safety:			X
Comment: care needed to avoid being cut off by tide. Care needed on slippery reefs in intertidal zone			
Conservation status: Unknown			

OWNERSHIP/PLANNING CONTROL: Owner/tenant: Unknown, but some will be Crown Commissioners Planning Authority: Vale of Glamorgan Council Planning status/constraints/opportunities: Unknown
--

CONDITION, USE & MANAGEMENT: Present use: coastal cliffs and reefs with full public access. Site condition: Excellent except for seaweed and barnacle growth in intertidal zone. Recently the sewer outfall near Watch House Bay has been upgraded and a mass of boulders in concrete added to strengthen it. This has obscured a key contact. Potential threats: Further insensitive remedial work to sewer outfall Site Management: Authority responsible for sewer outfall to consult before any further work is executed.
--

SITE DEVELOPMENT: Potential use (general): Potential use (educational): It provide a key section for scientific research into the stratigraphy, sedimentology, palaeontology and mineralogy of the early part of the Carboniferous Limestone. It also provides an excellent section for students to study, limestones, sedimentary structures, fossil brachiopods and corals and silicification.

Other comments:

Photographic Record



View across Barry harbour showing section in middle distance.



Typical thin to medium bedded Barry Harbour Limestone with HCS.



Triassic breccias unconformably overlying Barry Harbour Limestone