



South Wales RIGS Group Site Record

RIGS Description

SECTION A

General	South Wales
Site Name: Coast section east of Barry	File Number: RAW_JRD_41
RIGS Number: 616	Surveyed by: R A Waters and J R Davies
Grid Reference: ST 1334 6703 – 1368 6704	Date of Visit: 7 th October 2010
RIGS Category: Scientific, educational	Date Registered:
Earth Science Category: Stratigraphical, sedimentological	Owner: Planning Authority: Vale of Glamorgan Council
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: Embedded in text
OS 1:25,000 Explorer Sheet: 151	
BGS 1:50,000 Sheet: E263	

RIGS Statement of Interest:

The coast section east of Barry 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, and paleontology of the lower part of the Carboniferous Limestone. Although the site is within the Hayes Point to Bendrick Rock GCR site for Permian and Triassic red beds (Benton et al. 2002) and the Bendrick Rock GCR site for fossil reptiles (Benton and Spencer 1995), the Carboniferous Limestone outcrops in the lower part of the cliffs, below the Triassic rocks, and on the foreshore, and is therefore a separate entity.

The site exposes c. 22 m of continuous section through the middle part of the early Courceyan Avon Group, all three component formations, the Tongwynlais, Castell Coch Limestone and Cwmyniscoy Mudstone being present. A range limestone lithologies and sedimentary structures, including cross bedding and burrowing, demonstrate, two major regional changes of sea level. The microfossils from the section, called 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.

Not only does it provide a key section for scientific research on the Avon Group, it also provides an excellent section for students to study, limestones, sedimentary structures and limestone fossils.

Geological setting/context:

The site forms an inlier of Avon Group overlain unconformably by the marginal facies of the Triassic Mercia Mudstone Group. The early Courceyan, Avon Group is exposed in a 22 m-thick, continuous section on the coast, east of Barry. The succession dips gently westwards, exposing the middle part of the group, which is the most distal of Avon Group sites in SE Wales. The section is figured and described by Waters and Lawrence (1987). Although the site is within the Hayes Point to Bendrick Rock GCR site for Permian and Triassic red beds (Benton et al. 2002) and the Bendrick Rock GCR site for fossil reptiles (Benton and Spencer 1995), the Avon Group outcrops in the lower part of the cliffs, below the Triassic rocks, and on the foreshore, and is therefore a separate entity.

The following formations are exposed:

Cwmyniscoy Mudstone c. 7 m

Castell Coch Limestone c. 10 m

Tongwynlais Formation c. 5 m

The Tongwynlais is exposed near the low water mark and comprises grey mudstones with thin sheets of fine to coarse skeletal packstone to 0.15 m thick. Most of the packstones are dolomitised. The sheets exhibit tops with current ripples and sharp bases with trace fossil casts. A packet of thicker bedded dolomitised grainstone sheets exhibits HCS. Towards the top of the formation is a metre thick, reddened composite packstone bed with abundant soft sediment deformation. The formation was deposited in an offshore, mid ramp environment within storm wave base, the packstone sheets representing storm-generated event beds. It was initiated as the first major transgression onto St Georges land that drowned the Old Red Sandstone coastal plain.

The base of the Castell Coch Limestone is sharply defined by the incoming of partly dolomitised, thick bedded, reddened crinoidal grainstone. High energy structures include, HCS, low angle cross bedding and small to medium scale dunes. Two progradations may be recognised separated by 3m of offshore interbedded mudstones and skeletal packstone sheets. Near the top of the upper progradation are 0.5 m thick unidirectional dunes and large scale wave ripples. The formation represents a regional shoaling event, driven by the southward progradation of a series of high energy shoals from the inner to mid ramp.

The base of the Cwmyniscoy Mudstone is sharp and taken at a prominent 0.5 m thick unit of interbedded mudstone and thin packstone sheets that represents renewed transgression and a return to offshore conditions. It is overlain by a 4m thick packet of thin to thick bedded, storm-generated, skeletal packstones with subordinate mudstones. HCS is present in some of the packstones, while one prominent bed contains abundant mudstone intraclasts. This packet is overlain by more typical Cwmyniscoy Mudstone comprising mudstones with thin to medium bedded skeletal packstone sheets, recording offshore muddy mid ramp deposition within storm wave base.

The site is one of the key sections used to date the early Courceyan Avon Group in SE Wales using conodonts, the macrofauna having little or no resolution (Waters and Lawrence 1987).

References:

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.

BENTON, M J and SPENCER, P S. 1995. Fossil reptiles of Great Britain. *Geological Conservation Review Series No. 10*, Chapman and Hall, London.

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:

Comment: Site can be accessed via coastal footpath and from Trading Estate. Full section only seen at low tide.

Safety:

Comment: Care needed scrambling down low cliffs to reefs. Visitors need to be aware of tides.

Conservation status: The site is within the Hayes Point to Bendrick Rock GCR site for Permian and Triassic red beds (Benton et al. 2002) and the Bendrick Rock GCR site for Fossil reptiles (Benton and Spencer 1995)

OWNERSHIP/PLANNING CONTROL:

Owner/tenant: Unknown but probably Crown Commissioners.

Planning Authority: Vale of Glamorgan

Planning status/constraints/opportunities: The site is within the Hayes Point to Bendrick Rock GCR site for Permian and Triassic red beds (Benton et al. 2002) and the Bendrick Rock GCR site for Fossil reptiles (Benton and Spencer 1995)

CONDITION, USE & MANAGEMENT:

Present use: None

Site condition: No problems as mainly in intertidal zone.

Potential threats: Movement of beach gravel obscuring lowest reefs periodically.

Site Management: No suggestions.

SITE DEVELOPMENT:

Potential use (general):

Potential use (educational): Not only does it provide a key section for scientific research on the Avon Group, it also provides an excellent section for students to study, limestones, sedimentary structures and limestone fossils.

Other comment:

Photographic Record



Photo 1: General view of section on foreshore below cliffs in horizontal Triassic rocks



Photo 2: Massive cross bedded crinoidal grainstones of the Castell Coch Limestone overlain unconformably by horizontal Triassic rocks.



Photo 3: High energy structures including large wave ripples and small dunes in crinoidal grainstones of the Castell Coch Limestone



Photo 4: Interbedded mudstones and skeletal packstone sheets of the Cwmyniscoy Mudstone. Triassic rocks form reef beyond sandy area.