



South Wales RIGS Group Site Record

RIGS Description

SECTION A

General	South Wales
Site Name: Black Rocks, Porthcawl (Newton Fault)	File Number: Site_RAW_JRD_51
RIGS Number: 624	Surveyed by: RA Waters & JR Davies
Grid Reference: SS 8475 7624	Date of Visit: October 2010
RIGS Category: Scientific, educational	Date Registered:
Earth Science Category: Structural, mineralogical, sedimentological	Owner: Crown Estates
Site Nature: Intertidal rock platform and beach exposures	Planning Authority: Bridgend County Borough Council
Unitary Authority: Bridgend County Borough Council	Documentation prepared by: Jerry Davies
OS 1:50,000 Sheet: 170	Documentation last revised: 1 st February 2011
OS 1:25,000 Explorer Sheet: 151	Photographic Record: Attached
BGS 1:50,000 Sheet: 262	
<p>RIGS Statement of Interest: The Newton Fault is a major NNW-SSE trending fracture that juxtaposes Carboniferous and Triassic rocks to the east of Porthcawl. It is one of a series of fracture belts in South Wales that appear to link beneath the Bristol Channel to similarly oriented structures in SW England (Wilson et al., 1990) where such faults experienced extensive lateral displacements during the Tertiary.</p> <p>Intertidal rock platform and beach exposures at Black Rock expose the Newton Fault plane and the faulted contact between lower Carboniferous limestones of the Pembroke Limestone Group, to the east, and Triassic breccias and conglomerates to the west. Bedding in the limestones is rotated against the fault. Both the Carboniferous and Triassic rocks are extensively mineralised in the vicinity of the fault, as is the fault plane itself. Such mineralization is known locally to date from the Triassic and early Jurassic period (Wilson, et al., 1990) suggesting that the fault existed and acted as a conduit for mineralising fluids at that time. The Newton Fault therefore has a long history and experienced several phases of movement of which Tertiary strike-slip displacements were possibly the most recent.</p> <p>The Newton Fault has a dramatic influence on the geology and topography of the Porthcawl area, but the fault plane itself is largely unexposed. The Black Rock exposures provide a unique section that allows the fault plane to be examined and its history of movement and associated mineralization to be studied. Such studies will contribute to the fuller understanding of the geological evolution of South Wales and of the Bristol Channel region as a whole.</p>	

Geological setting/context:

The Newton Fault is a powerful NNW-SSE trending fracture that traverses the ground to the east of Porthcawl where it juxtaposes Carboniferous and Triassic rocks. Faults with similar trends traverse the South Wales Coalfield where they known as 'cross faults' and relate to Variscan tectonism. However, the Newton Fault clearly underwent significant post Variscan movement and aligns with structures in South West England known to have been active as strike-slip faults during the Tertiary (Wilson et al., 1990). A long and complex history of movement is indicated yet there are few exposures of the Newton Fault plane to allow its kinematic history to be elucidated. Though unexposed inland, intertidal rock platform and beach exposures at Black Rocks to the east of Porthcawl offer the opportunity for such study.

The section reveals the faulted contact between dark limestones of the Friar's Point Limestone Formation (Pembroke Limestone Group) and distinctive red, pink and buff-weathering Triassic breccias and conglomerates (Photo 1). The fault plane is vertical and trends 012 degrees. The limestones to the east are well bedded with argillaceous seams and partings. Away from the fault, these strata strike east-west and dip to the south, but strikes rotate to NNW-SSE and dips steepen as the fault is approached from the east. Clasts in the flat-lying Triassic rocks comprise a range of local Carboniferous limestone types, including oolites, derived from several different levels of the Vale of Glamorgan succession (Wilson et al., 1990) (Photo 2). The angular and ill sorted nature of many of these clasts suggests deposition from debris flows on alluvial fans or the floors of wadies. Calcite and dolomite replacement of both the clasts and matrix is widespread (Photo 3).

Both the Carboniferous and particularly the Triassic rocks are extensively mineralised in the vicinity of the Newton Fault plane. Calcite and pink and white varieties of barites are the dominant minerals (Photo 4), but small, euhedral crystals of galena are also common. The fault plane itself, and its associated 2 m-wide zone of brecciation, is also host to such mineralization and it is clear that this fracture acted as a conduit for mineralising fluids. Such mineralization is widespread in the Vale of Glamorgan where it has been shown to date from the late Triassic to early Jurassic and to relate to extensional faulting in the region (Fletcher, 1988). Fault movements at this time, principally along E-W trending structures, also controlled Triassic and Jurassic facies development and thicknesses in the region and it is not unreasonable to infer that the Newton Fault, possibly acting as transfer or relay structure, was similarly influential at this time (Wilson et al., 1990).

The exposures at Black Rock are unique in revealing the Newton Fault plane and its juxtaposition of Carboniferous and Triassic strata. The section offers an unrivalled opportunity to study the history of movement on this structure and to assess its influence on late Triassic to early Jurassic mineralization and possibly deposition. Extensive exposures in the Triassic breccias and conglomerates present to the west of the fault are typical of the local alluvial fan/wadi facies and reveal the range of textures and suite of local Carboniferous limestones from which they were sourced. The effects of early and late diagenetic alteration of the clasts and matrix in these rocks are also well seen. In allowing the timing of these various processes and movements to be gauged, the Black Rock section compliments other mineral and Mesozoic RIGS and GCR sites in the South Wales region, but also has the potential





to contribute more widely to the structural understanding of the south-west UK.

References:

FLETCHER, C.J.N. 1988. Tidal erosion, solution cavities and exhalative mineralisation associated with the Jurassic unconformity at Ogmore, South Glamorgan. *Proceedings of the geologist's Association*, Vol. 99, 1-14.

WILSON, D, DAVIES, JR, 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: Strongly tide dependant			
Safety:		X	
Comment: Access is strongly tide dependant and the section is prone to rapid inundation during rising tides			
Conservation status: There are no known conservation designations of this RIGS			

OWNERSHIP/PLANNING CONTROL: Owner/tenant: Intertidal = Crown Estates Planning Authority: Bridgend County Borough Council Planning status/constraints/opportunities: There are no known planning constraints or opportunities
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CONDITION, USE & MANAGEMENT: Present use: None, intertidal rock surface and beach Site condition: Good Potential threats: Prone to become periodically covered by shifting beach sand Site Management: None, tidal processes dictate the state and accessibility of the site

SITE DEVELOPMENT: Potential use (general): Potential use (educational): Good teaching site offering excellent exposure of fault plane and associated mineralization, and good sections in local Triassic breccias and conglomerates
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Other comments:

Photographic Record



Photograph 1. Vertical fault plane of the Newton Fault exposed at Black Rock, Porthcawl showing steeply dipping Carboniferous Friar's Point Limestone to the east (left) juxtaposed against Triassic breccias to the west (right)



Photograph 2. Angular limestone clasts in pink dolomitic matrix, Triassic breccia, west of Newton Fault, Black Rocks, Porthcawl



Photograph 3. Calcite (white) and dolomite (brown) replacements of limestone clasts in Triassic breccia, Black Rocks, Porthcawl



Photograph 4. Triassic breccia with pink barites (pink) and calcite (white) mineralisation, Black Rocks, Porthcawl