South Wales RIGS Group Site Record
RIGS Description

SECTION A

General	South Wales
Site Name: Bendrick Rock	**File Number:** Site_RSK_13
RIGS Number: 674	**Surveyed by:** Russell Society
Grid Reference: ST1315 6681	**Date of Visit:** 14th August 2010
RIGS Category: Scientific	**Date Registered:** **Owner:** Vale of Glamorgan Council **Planning Authority:** Vale of Glamorgan Council
Earth Science Category: Mineralogical, stratigraphical, structural	
Site Nature: Rocky islet at high tide, foreshore exposed at low tide	**Documentation prepared by:** Dave Wellings/Lynda Garfield
Unitary Authority: Vale of Glamorgan Council	**Documentation last revised:** 28th February 2012
OS 1:50,000 Sheet: 171	**Photographic Record:** Attached
OS 1:25,000 Explorer Sheet: 151	
BGS 1:50,000 Sheet: E263	

RIGS Statement of Interest:
Bendrick Rock is a proposed as a RIGS on account of the relative amount and nature of the mineralisation seen in outcrop. Rather neglected geologically in the past, recent studies have shown interesting features of regional interest.

Occurrences of lead and zinc minerals in the Carboniferous Limestone including calcite, barite, quartz and galena, with minor zinc and very minor copper minerals. These form a part of the regional mineralisation within limestone, widely seen elsewhere in South Wales. However, some of the occurrences suggest mineralisation prior to the deposition of overlying (late) Trias; this is of interest as evidence suggests that the mineralisation is Jurassic in age.

Also, nearby to the east, it is thought that there could be a re-activated fault zone that marks a distinct difference in the geology and mineralogy of the areas either side of the zone, perhaps controlling in some way the circulation of mineralising fluids in the area, as well as the local palaeogeography, sedimentology and structure.

The Rock also offers an opportunity to examine the effects of alteration of lead and zinc minerals in a marine environment. It is possible that the area was worked for lead in the past.

Although not as easy of access as some other localities of mineralised Carboniferous Limestone in South Wales, nevertheless Bendrick Rock is considered worthy of RIGS status on account of the opportunities it offers for research into a further understanding of the regional mineralisation.

Geological setting/context:

Bendrick Rock is accessible at low tide from the shore road at ST13156720. At high tide it is an islet 25m by 10m of Carboniferous Limestone. At low tide the foreshore extends over 350m (E-W) by 500m with Carboniferous Limestone overlain to the north by more or less horizontal beds of red to grey marginal Triassic rocks (marl, siltstone, sandstone, and limestone). The Carboniferous Limestone, Black Rock Limestone Subgroup for the most part, dips steeply to the south at about 70°. It is reported to be widely dolomitised. Some of the limestones are rich in chert. The Carboniferous Limestone-Trias unconformity itself offers interesting features, with a few wave cut platforms, a paleo-cliff, and mineralisation in both the Limestone and basal Trias (some of which is interpreted as detrital galena).

There is a 340° fault just to the west which forms a prominent vertical gully, also one to the east. The Carboniferous Limestone is crossed by many tension fractures, mostly trending around 340°. The faults and fractures do not extend up into the overlying Trias.

On Bendrick Rock (and Mark Rock close by – qv) a surprising number of occurrences of interesting minerals have been found in the Carboniferous Limestone, principally calcite, baryte, quartz, galena, cerussite and zinc minerals (sphalerite, hemimorphite, hydrozincite, smithsonite), with very minor copper minerals. In fact, the more one looks, the more one finds. These minerals occur mostly in calcite veins along the 340° tension fractures, in veins in gullies along strike, or as disseminations of irregular veinlets within localised areas. Some of the occurrences suggest mineralisation, interpreted as Mississippi Valley Type (part of the regional MVT mineralisation), in the Limestone prior to the deposition of the overlying (late) Trias; this is of regional interest as other evidence elsewhere suggests that the mineralisation is of Jurassic age. The Rock also offers an opportunity in which to examine the effects of alteration of lead and zinc minerals in a marine environment.

The Carboniferous Limestone of Bendrick Rock, in comparison with the nearby exposures to the west on Barry Island, contains more chert, hosts more galena and baryte and calcite veins, is reportedly more dolomitised, and it formed a hill/island in Triassic times as it does now. Is there some underlying feature or parameter that has controlled all of these, perhaps related to the observation that nearby to the east, on the eastern side of the Cadoxton River, there could be a re-activated fault zone that marks a distinct difference in the geology and mineralogy of the two areas either side of the zone, perhaps controlling in some way the circulation of hydrothermal fluids in the area??

Regardless of any possible evidence of former working, the amount of galena and baryte found on some parts of Bendrick Rock (and Mark Rock) would have, based on observation from elsewhere in the UK, attracted the attention of past prospectors. However, although there are references to mining in Barry and/or Barry Island (the older references give “islets of Barry”), despite extensive searching by several people, no site has been positively identified. Could these refer to workings on Bendrick Rock; there are certainly indications of possible former workings?

References:

GARFIELD, L and WELLINGS, D. 2008. Minerals of the Glamorgan coast: Barry Island and adjacent areas, Russell Society.

SECTION B

PRACTICAL CONSIDERATIONS: Please score Accessibility and Safety Red Amber or Green			
Accessibility:		X	
Comment: Access is across the rough rocky tidal foreshore; the Cadoxton River has to be crossed and this can be difficult after heavy rain.			
Safety:		X	
Comment: Care needs to be taken in crossing the rough rocky terrain of the Rock; also care needs to be taken to ensure that people are not cut off by the tide			
Conservation status: There are no known conservation designations of this RIGS			

OWNERSHIP/PLANNING CONTROL:

Owner/tenant: Vale of Glamorgan Council

Planning Authority: Vale of Glamorgan Council

Planning status/constraints/opportunities:

There are no known planning constraints or opportunities

CONDITION, USE & MANAGEMENT:

Present use: None

Site condition: The higher part offers excellent exposure, but much of its lower part is covered in marine growth, pebbles, sand and mud. The terrain is rocky and uneven.
Potential threats: A Severn Barrage would seriously affect the amount of exposure and access.

Site Management: None, other than possible clearance of some parts to search for archaeological artefacts related to possible former mining, although any such clearance would be quickly infilled by the effects of the next tides.

SITE DEVELOPMENT:

Potential use (general):

Potential use (educational): Good site for those interested in the study of regional Mississippi Valley type mineralisation especially its age and genesis. Good site for studying the Carboniferous –Trias unconformity.

Other comments:

The site was investigated in detail in 2005 to 2008, visited again on 14 August 2010. Any visitis best made at times of spring low tide. There is plenty of scope for further investigation. Garfield L and Wellings D (2008) recommended Bendrick Rock for RIGS designation on account of the level of mineralisation and the potential it offers in understanding the genesis and age of the mineralisation on a regional scale.

Photographic Record

Bendrick Rock at high water, south view

Bendrick Rock at low water, view south

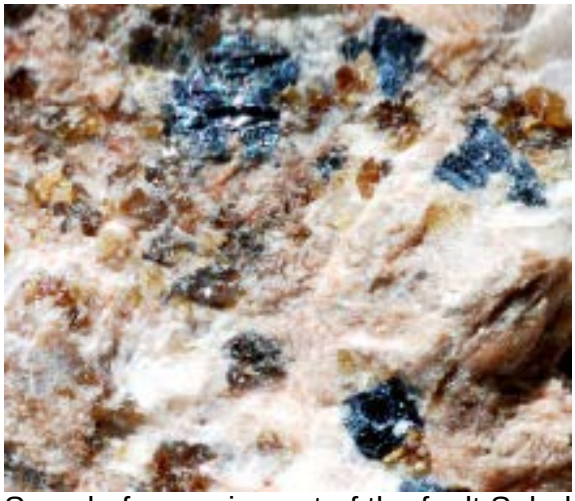
Highest point of Bendrick Rock. Carboniferous Limestone (Black Rock Limestone Subgroup) dipping at 70˚, looking east.

South side showing roughly parallel 340˚ tension fractures with mineral veins. View west from top of the Rock

340˚ tension fracture, with calcite-baryte vein, ST1308 6679. Hammer 28cm

Vein east of the fault. View south from the north end, from ST 1313 6683. Could this area once have been mined? Hammer 28cm long.

Close up of a vein showing calcite and barite crystals



Sample from vein east of the fault Sphalerite and galena in barite. Field of view c7mm. XRD Amgueddfa Cymru- National Museum of Wales NMW X-1634

Galena, east of the Rock ST 1317 6681

View east along the east-west (250˚) gully north-west of the highest point, with overlying marginal facies Trias and unconformity

Silicified fossil material in chert ST 1316 6682. Field of view 4cm

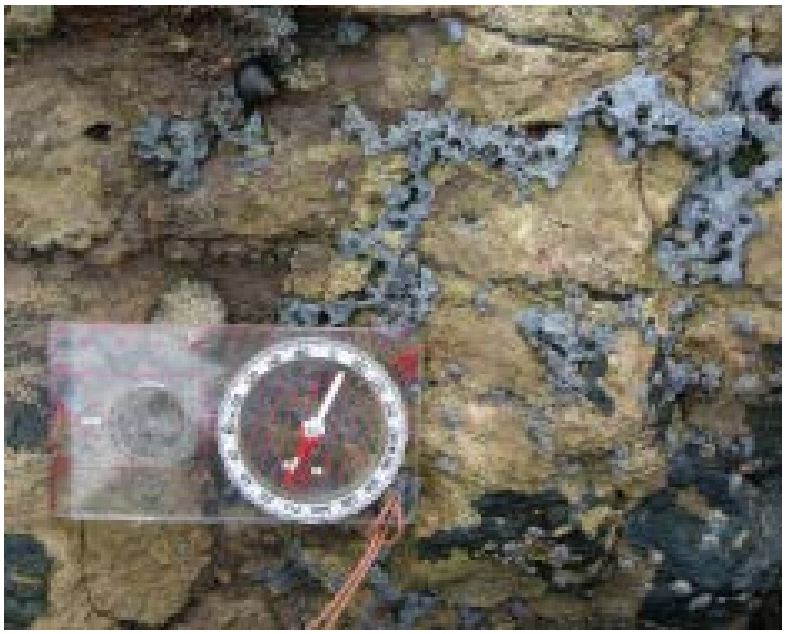
Close up showing calcite-baryte-galena in the lowermost Trias. Compass 10cm long. ST 1311 6683

Carboniferous – Trias unconformity, wave cut platform. Paleo-cliff behind figure. View looking west. ST13076683.

Galena in the Carboniferous Limestone.

Galena on bedding surface close to the unconformity.

Area of irregular veinlets with galena and barite. Hammer 28cm long



Galena in relief on surface, area of irregular veinlets (compass 10cm long)

Annotated Sketch