



## South Wales RIGS Group Site Record

### RIGS Description

**SECTION A**

General	South Wales
<b>Site Name:</b> Argoed Isha Quarry	<b>File Number:</b> Site_RAW_JRD_43
<b>RIGS Number:</b> 617	<b>Surveyed by:</b> RA Waters & JR Davies
<b>Grid Reference:</b> SS 9930 7900	<b>Date of Visit:</b> October 2010
<b>RIGS Category:</b> Scientific	<b>Date Registered:</b>
<b>Earth Science Category:</b> Stratigraphic	
<b>Site Nature:</b> Mothballed limestone quarry	<b>Owner:</b> Argoed Quarry Ltd <b>Planning Authority:</b> Vale of Glamorgan County Council
<b>Unitary Authority:</b> Vale of Glamorgan County Council	<b>Documentation prepared by:</b> Jerry Davies
<b>OS 1:50,000 Sheet:</b> 170	<b>Documentation last revised:</b> 22 <sup>nd</sup> February 2012
<b>OS 1:25,000 Explorer Sheet:</b> 151	<b>Photographic Record:</b> Attached
<b>BGS 1:50,000 Sheet:</b> E262	
<p><b>RIGS Statement of Interest:</b> This forms part of a network of key sites (RIGS &amp; GCR) which collectively allow the evolution and facies development of the lower Carboniferous (Dinantian) carbonate ramp/platform in South Wales to be studied and which also includes sites of historical and educational interest.</p> <p>Argoed Isha Quarry provides an important section through the mid Dinantian limestone succession of the Vale of Glamorgan including parts of the High Tor Limestone Formation and Hunts Bay Oolite Subgroup, both components of the Pembroke Limestone Group. The section exposes the cross-bedded upper part of the High Tor Limestone Formation including a unit which displays evidence of temporary emergence and plant colonisation and which may correlate with a similar level in the Gower succession. A sequence of oolitic limestones (Cefnyrhendy Oolite Member) underlies the base of the Argoed Limestone Member for which this is the type locality and which is thought to mark a deepening event. A return to oolitic shoal conditions is marked by the upward passage into the Cornelly Oolite Formation.</p> <p>In providing evidence of multiple shoaling events in the upper Arundian and lower Holkerian succession in the Vale of Glamorgan the extensive Argoed Isha Quarry section was key to establishing the internal stratigraphy of the Hunts Bay Oolite Subgroup in this region of South Wales (Wilson et al., 1990). It remains an accessible and informative section which displays well the sedimentary structures and textures which allow these shallow water limestones to be interpreted.</p>	

### **Geological setting/context:**

During BGS surveying of the Pembroke Limestone Group of the Vale of Glamorgan in the late 1970s and early 1980s key differences emerged in the way the late Arundian and early Holkerian successions present in the west (Bridgend district) and east (Cardiff district) could be subdivided. The section at Argoed Isha Quarry was key to resolving these difficulties and to establishing the true nature of the stratigraphy and the lateral facies changes that occur between the two regions (Wilson et al., 1990; Waters et al., 2009). In the west and south the predominantly Arundian High Tor Limestone Formation ranges into the Holkerian Stage (Wilson et al., 1990) and underlies oolitic facies of the overlying Cornelly Oolite Formation, here the basal division of the wholly Holkerian Hunts Bay Oolite Subgroup. However, in the east and north of the Vale of Glamorgan oolitic limestones of Arundian age overlie the High Tor Limestone (Waters & Lawrence, 1988) and testify to the earlier appearance of Hunts Bay Oolite Subgroup facies in this area. This Arundian oolite is recognised as the basal Cefnyrhendy Oolite Member of an expanded Cornelly Oolite Formation. Locally separating this basal oolitic member from remaining parts of the formation is a thin succession of darker packstones of Holkerian age which Wilson et al. (1990) named the Argoed Limestone Member. The eastern face of Argoed Isha Quarry is the type locality for this latter division (Figures 1 & 2) and continues to provide an extensive section through the local Arundian to Holkerian stratigraphy that allows the key facies transitions and sedimentary events to be examined.

The rock succession exposed in Argoed Isha Quarry dips to the north at around 20° (Figure 1). In the south-eastern face of the quarry displays the upper 21 m of High Top Limestone. The lowest units comprise thin to medium-bedded grey-brown crinoidal packstones locally rich in gastropods. About 8 m above the base of the section, these are overlain by a distinctive ooid grainstone bed up to a metre thick which displays calcified plant rootlets (rhizoliths) below its undulating top. This records a minor shoaling event which culminated in emergence and plant colonisation and may equate with a similar level in the Gower High Tor Limestone succession (Ramsay, 1987). Overlying units in the quarry predominantly comprise skeletal packstones and grainstones with coarse-grained crinoidal lags, hummocky cross-stratification (Figure 3) and evidence of amalgamation. The presence of scattered ooids in well sorted peloidal grainstones in the uppermost beds of the High Tor Limestone, signals the transition into the succeeding 41 m-thick Cefnyrhendy Oolite Member that caps a further shallowing event. The oolite unit, now recognised as part of the Cornelly Oolite Formation (Wilson et al., 1990), is thicker-bedded and paler than the underlying High Tor Limestone, although true ooid grainstones first enter over 5 m above its base. Cross-bedding present throughout the member testifies to its accumulation in a high energy shoal setting.

The succeeding darker and thinner bedded Argoed Limestone Member is 6.5-m-thick in Argoed Quarry (Figure 2) where its base is taken to equate with the base of the Holkerian Stage. In other sections in the northern part of the Vale, its sharp contact with the underlying Cefnyrhendy Oolite is irregular and displays evidence of dissolution consistent with a period of subaerial exposure. Though the planar contact in Argoed Quarry displays no such features, an overlying mottled red and grey clay seam may represent the remnants of a former paleosol. Above the base of the member, a metre of dark grey, fine-grained packstones underlies a distinctive 1.5 m-

thick bed of dark grey calcite mudstone that is readily observed throughout the quarry and has been widely noted at other sections where the succeeding packstones are known to contain Holkerian foraminifera (Waters & Lawrence, 1988; Wilson et al., 1990). Scattered ooids in the uppermost bed of the member herald the transition into the overlying parts of the Cornelly Oolite Formation up to 35 m of which is exposed in the northern face of the quarry. Cross-bedded ooid grainstones dominate this shoal unit, but in which intervals of thinner-bedded fine-grained packstones may record periods of deeper, more quiescent deposition. Beds of intraclast floatstone show that in places early, likely submarine, cementation of the shoal facies occurred and that these lithified units were then broken-up and reworked probably during major storms. Evidence for early and multiple phases of dolomitisation are also well seen in these floatstone beds most notably in two beds 17 to 20 m above the top of the Argoed Limestone Member.

Argoed Isha Quarry provides a regionally significant section through the Arundian to Holkerian succession of the northern Vale of Glamorgan exposing all the key contacts and local facies transitions. It is the type locality for the Argoed Limestone Member, the base of which marks the base of the Holkerian Stage. The sedimentary features of the underlying, upward shoaling, Arundian succession, including the Cefnyrhendy Oolite Member, are well displayed and include clear evidence of an earlier emergence event and associated plant colonisation. The readily accessible section displays well the sedimentary structures and textures which allow these shallow water limestones to be interpreted including evidence of the early diagenetic processes that affected them.

#### **References:**

RAMSAY, ATS. 1987. Depositional environments of Dinantian limestones in Gower, South Wales. In: J Miller, AE Adams and VP Wright (editors), *European Dinantian Environments*, Wiley & Sons, Chichester. 265-308.

WATERS, CN, WATERS, RA, BARCLAY, WJ AND DAVIES, JR. 2009. A lithostratigraphical framework for the Carboniferous successions of southern Great Britain (Onshore). *British Geological Survey Research Report*, RR/09/01.

WATERS, RA AND LAWRENCE, DJD. 1988. The geology of the South Wales Coalfield, Part III, the country around Cardiff. *Memoir of the British Geological Survey*, Sheet 263 (England and Wales).

WILSON, D, DAVIES, JR, FLETCHER, CJN 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:



Comment: Mothballed limestone quarry in which the relevant parts are readily accessible, but the site is currently used as a store for aggregate and the entrance and lower levels of the quarry are regularly accessed by heavy plant and aggregate lorries

#### Safety:



Comment: Steep quarry faces present a rock fall hazard and care needs to be taken with lorries visiting the site; hard hats and high vis jackets should be worn at all times.

#### Conservation status:

There are no known conservation designations of this RIGS

### OWNERSHIP/PLANNING CONTROL:

**Owner/tenant:** Argoed Quarry Ltd

**Planning Authority:** Vale of Glamorgan County Council

#### Planning status/constraints/opportunities:

There are no known planning constraints or opportunities

### CONDITION, USE & MANAGEMENT:

**Present use:** Mothballed formed limestone aggregate quarry

**Site condition:** Good, the key part of the quarry is still accessible and all the key features of the stratigraphy are visible

**Potential threats:** Resumption of operations at the site and excavation of the key western face

**Site Management:** Monitor usage and recommend preservation of the south-eastern face of the quarry if feasible

### SITE DEVELOPMENT:

**Potential use (general):**

**Potential use (educational):**

**Other comments**



## Photographic Record



Figure 1. General view of northerly dipping succession in Argoed Isha Quarry showing the base of the Argoed Limestone Member (dashed line)



Figure 2. Type locality of the Argoed Limestone Member (arrowed) in Argoed Isha Quarry, note the prominent dark grey calcite mudstone bed above the head of the figure.



Figure 3. Close-up of hummocky cross-stratification in the upper part of the High Tor Limestone in Argoed Isha Quarry