Cambridge Carbonates Ltd
Expertise in carbonate and evaporite systems

Well name: KSL-02 | Date: 19 December 2018 | Scale: 1 : 50

Formation: Pont D'Arcole and Beveland Fm | Logging Team: Joanna GARLAND/Alberto RIVA/Peter GUTTERIDGE

Carbonates:

Sedimentary Structures:

- parallel lamination
- normal grading
- convolute laminae
- clasts rich breccia
- bioturbation

Components:

- coral/ benthic foraminifera
- green algae
- solitary rugose coral
- tabulate coral
- microbialites
- crinoids
- bivalves - rare rare
- brachiopod

Lithology:

- Limestone
- Limestone Breccia Clast Supported
- Limestone Breccia Mud Supported
- Argillaceous Limestone
- Argillaceous Dolomite
- Dolomite
- Calcareous Shale
- Mudstone/Shale
- Crystalline Palettes
- No core
- Dolomite Clast supported Breccia
- Breccia

Diagenetic features:

- horizontal stylolite
- subvertical stylolite
- vug
- pyrite
- clast supported breccia
- calcite pseudomorphs after evaporites

Karst features:

Karst association:

Clastics:

Sedimentary Structures:

- parallel lamination
- bioturbation

Components:

Main cement type:

- Dolomite
- Calcite

Fracture:

- Open fracture
- Cemented fracture

Depositional Environment:

- shoreal lagoonal
- hypersaline/ and slumped carbonates
- Tethys storm wave base

Bed contacts:

- scoured
- bioturbated

Thin sections	Core depth m	Clastic sedimentary structures / Dolomite Crystal Size / Grain Size / Clastic allochems	Carbonate sedimentary structures / Carbonate texture / Carbonate components / Thin section texture	KARST: Karst Texture / Karst Fabric / Karst Matrix	Lithology	Main Cement Type	Fractures (Structure, Dip)	Porosity Comment / Visible Porosity	Plug porosity (%)	Plug permeability (mD)	Depositional Environment	Depositional cycles	Formation	Comments
	233												Beveland Member	Black shale, homogenous dark clay with scattered pyrite.
	234													
	235													Dark grainstone. Fracture 2mm width, 20cm long, filled with calcite. Benthic forams, green algae, scattered corals, bioturbated.
	236													Grey, bioturbated, packstone to grainstone with variable amounts of shale. Plenty of forams, green algae. Vertical stylolites, cemented fractures (calcite cement).
	237							Intercrystalline	5.90	1.30				Bioturbated grainstone, with common shale. Porous, pyritic.
	238													Calcareous shale with dispersed pyrite, with scattered millimetric calcite crystals. Black.
	239													Tectonic breccia.
	240												Beveland Member	Black mudstone/shale with dispersed pyrite crystals. Not calcareous.
	241													Subvertical fractures.
	242													Dispersed calcite crystals within the shale
	243							Breccia						Black calcareous shale
	244													Brecciated calcite vein, with irregular contacts within the surrounding shales. Massive. Calcareous shale with floating cm-size crystals of calcite.
	245													Calcareous shale; black, with dispersed calcite crystals.
	246							Intercrystalline	3.90	2.60			Beveland Member	Argillaceous dolomite, black, with crinoid fragments, with thin shale intercalations.
	247													Argillaceous dolomite, black, with crinoid fragments.
	248													Brecciated calcite crystals within an argillaceous dolomite interval (20cm). Black dolomite, a bit argillaceous. Common crinoid fragments.
	249							Intercrystalline and vug						More shaley and porous, with vugs up to 1mm in size
	250													Grey dolomite with crinoids and scattered green algae. Fracture filled with dolomite cement (1mm thick)
	251							Intercrystalline						Argillaceous dolomite, strongly brecciated by tectonics, sometimes with abundant dispersed pyrite. Visible crinoids and scattered green algae. Rare open fractures with irregular aperture.
	252													
	253													Grey dolomite, argillaceous, with crinoid fragments and green algae, mostly represented by rubble.
	254													Shaley interval.
	255							Vug						Partially cemented vug – dolomite cement
	256													Rubble.
	257													Rubble.
	258							Vug	0.40	1.20			Beveland Member	Some lamination within dolomite. Partially cemented vug (dolomite cement).
	259													Rubble.
	260							Fracture						Open stylolitic fracture cross cutting dolomite cemented fracture.
	261							Intercrystalline & vug						Fine dolomite cemented hairline fractures. Rubble. Some intercrystalline porosity. Small vugs partially cemented by dolomite. Argillaceous.
	262							Fracture						Rubble. Dolomite cemented fractures cross cut by subhorizontal open fractures. Subhorizontal open fractures in argillaceous dolomite.
	263							Fracture & vug	2.40	1.40				Rubble. Thin breccia, dolomite cemented. Residual vuggy porosity.
	264													Minor hairline fractures in rubble, dolomite cemented. Rubble.
	265							Fracture						Cross cutting dolomite cemented fractures. Monomict mosaic fault breccia. Angular clasts ~50-150mm in size. Cemented by dolomite. 20cm thick interval. Vertical open fractures below breccia and partial dolomite cement.
	266													Cross cutting fractures, dolomite cemented. Dolomite cemented vug and hairline fractures. Rubble.
	267							Vug	5.20	3.0				Dolomite cemented fractures with porosity – appear almost zebra-like. Subhorizontal. Rubble.
	268							Fracture						Open, solution-enhanced, fractures. Rubble.
	269							Fracture						Dolomite cemented fractures and vugs cross cut by open fractures, vertical. Rubble.
	270							Vug						Cm-sized, partially cemented vug (dolomite cement)
	271													Rubble rich in crinoids, broken up bioclasts, brachiopods. Broken-up colonial coral.
	272								0.50	1.40				Rubble. Clay-rich interval with calcite cemented complex vugs and fractures, or cemented patches. Rubble. Some large crinoids, 5mm wide. Broken up.
	273													10mm thick dolomite cemented vein. Rubble.
	274							Fracture						Fractures post date stylolites. Possible sphalerite in dolomite cemented veins. Veins appear open – solution enhanced? Rubble.
	275												Beveland Member	Folded and fractured dolomite vein – early vein which has been compressed by overburden? Dolomite cements in thin veins.
	276							Vug	0.30	1.10				Open porosity in calcite-lined vug. Vug is 20mmx25mm in size. Possible Syringopora in rubble – broken up. Dolomite cemented vugs/complex fractures.
	277							Fracture						Fine to medium crystalline dolomite with scattered crinoids and broken bioclasts. Slightly calcareous, friable, very dark, clay-rich shale.
	278													Intensely fractured interval. Calcite cemented fractures have been re-fractured – open fractures.
	279							Fracture						Complex breccia interval – tectonic breccia. 35mm thick calcite cemented fracture. Entirely cemented with 2 generations of calcite cement. Initial cement is grey in colour, later cement is white. Open fractures taking advantage of stylolite. Intensely fractured, calcite-cemented subvertical hairline fractures. At least 2 generations cross cutting.
	280							Fracture						
	281							Fracture	0.70	1.40				Whole articulated brachiopods.
	282												Pont d'Arcole Fm equiv.	Depositional breccia.
	283													Well-preserved brachiopods, partially replaced by pyrite.
	284													Common, scattered, broken-up, bioclastic material. Large calcite cemented vein. Pyrite replaces bioclasts. Very clay-rich, calcareous. Very dark colour.
	285							Fracture						Bioclastic mudstone-wackestone with variable clay content. Strongly fractured – common calcite-cemented fractures and some breccia textures in places. Mudstone with thin bioclast-rich intervals. Pyrite replaces allochems.
	286													Calcareous shale – very clay rich. Rich in pyrite. Scattered bioclasts – broken up crinoids, shelly material. Pyrite frequently replacing bioclasts. Hairline fractures, calcite cemented.
	287							Fracture	1.00	1.20				Partially cemented fractures, brecciated in part.
	288													Dark, clay-rich shale, calcareous and finely laminated. Laminae locally disrupted. Frequent pyrite.