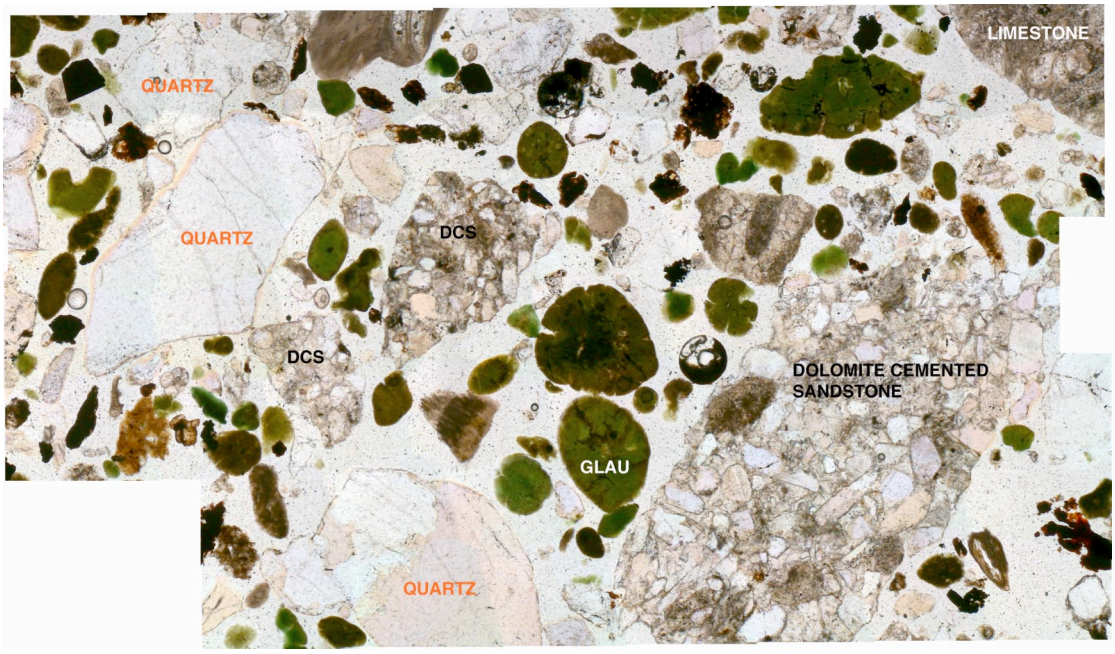
Rapid petrography of four cuttings samples from the West Seahorse-1 well, Gippsland Basin

Geotrack Report #957



An exclusive report prepared for 3D Oil, Pty Ltd., Melbourne

Report prepared by: I. R. Duddy

January 9 2006

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Geotrack Report #957

Rapid Optical Petrography Report for 3D Oil Pty Ltd

Date: 9 January 2006

Introduction

This brief petrographic report on four cuttings samples from West Seahorse-1, over the depth interval 1410 to 1425 m, was commissioned by Noel Newell of 3D Oil Pty Ltd in December 2005.

Aims and Objectives

The principal objective of the study is to investigate the nature of the ?dolomite cemented unit within Latrobe Group sandstones interpreted from logs and cuttings descriptions at 1418–1419 m. A specific aim is to provide any petrographic observations that might indicate the timing of dolomite cementation.

Samples

Four polished thin sections were prepared from cuttings from 5 m intervals between 1410 and 1425 m in the Latrobe Group classic sequence from the West Seahorse-1 well for optical petrography as listed below.

Sample No.	Depth (m)	General lithology of fragments	Comments
957-1	1410	Limestone/glauconite	Abundant coal; most rock fragments probably cavings
957-2	1415	Limestone/ glauconite	Abundant coal; most rock fragments probably cavings
957-3	1420	Sandstone, some carbonate cemented	Coal and glauconite common, probably cavings
957-4	1425	Sandstone, some carbonate cemented	Coal and glauconite common, probably cavings

Summary Petrographic Conclusions

1. The two shallower samples (GC957-1 and –2 from 1410 and 1415 m, respectively) consist largely of coal, fragments of limestone (including individual foraminifera) and glauconite pellets. Only very minor classic material was observed (a few free quartz grains only), and on this basis most of the material observed in these cuttings samples are regarded as having caved from shallower in the well. No photomicrographs are provided from sample 957-1, but similar caved material also occurs in sample 957-2, as illustrated in Figures 29 to 36.

2. The two deeper samples (GC957-3 and –4 from 1420 and 1425 m, respectively) also contain a significant proportion of cuttings fragments that include coal, fragments of limestone (including individual foraminifera) and glauconite pellets, but in addition contain a larger classic content. This clastic content consists of free grains of coarse-grained detrital quartz together with cuttings fragments of carbonate-cemented fine-grained quartz sandstone. These carbonate-cemented lithologies, common in both samples but more abundant in sample GC957-4 (1425 m), comprise the only carbonate cemented clastic lithologies in the four samples examined, and they presumably relate to the dolomite cemented zone identified in the logs. Semi-quantitative X-ray analysis confirms the carbonate cement in these fragments to be dolomite. See Figures 1 to 28.

3. Little information is available from these samples on the porosity of permeability of the coarser sandstones as they are present as free grains. The localised dolomite-cemented sandstones have effectively zero porosity, but semi-quantitative chemical analysis of a number of these fragments indicates that primary porosity prior to carbonate cementation was typically in the range 20 to 30%. Chemical analysis also indicates that these find-grained sandstones are largely composted of detrital quartz (60–70% normative quartz) with lesser potassium feldspar, variably altered to illitic clays.

4. It is noticeable that the uncemented clastic material in samples GC957-3 and –4, mainly detrital quartz, is significantly coarser (typically ~1 to 2 mm) than the detrital quartz in the dolomite cemented fragments (typically, 0.1 to 0.2 mm). This strongly suggests that dolomite cementation is favoured by a fine-grained lithology within the clastic sequence, and as such is ultimately controlled by the local depositional environment, with cementation occurring relatively soon after burial when primary porosity was still in the range 20 to 30%.

Recommendations

1. Similar petrographic assessment, including Scanning Electron Microscopy and X-ray chemical analysis, is recommended on complementary sequences from other wells in immediate vicinity to provide more detailed information on the nature and distribution on the dolomite cements in the Latrobe Group sequence.

Dr. Ian R. Duddy
Director

SEM X-ray chemical analysis and normative mineral calculations

A number of individual cuttings fragments of the dolomite-cemented sandstones from samples GC957-3 (1420 m) and 957-4 (1425 m) were subjected to low-magnification X-ray chemical analysis. In addition, the dolomite cement and K-feldspar grain were also analysed. The resulting analyses are listed in Tables 1 and 2.

A suite of normative minerals appropriate for sedimentary rocks were calculated from these chemical analyses to enable a simpler appreciation for the mineralogy of these dolomite-cemented Latrobe Group sandstones, with the results also listed in Tables 1 and 2.

Inspections of the tabulated results supports the petrographic observations that:

1. The carbonate cement in the sandstones is dolomite (analyses 957-3-6b and 957-4-11a);
2. The dolomite-cemented sandstones are composted dominated of quartz and altered feldspar, mostly orthoclase (the altered orthoclase is reflected in the amount of normative illite clay)
3. The dolomite cement makes up 19 to 37 % (by weight) of the sandstone fragments in 957-3 (Table 1) and 24 to 39 % (by weight) of the sandstone fragments in 957-4 (Table 2), representing around 18 to 35 volume % of the cemented fine-grained sandstones (Figure A, below).

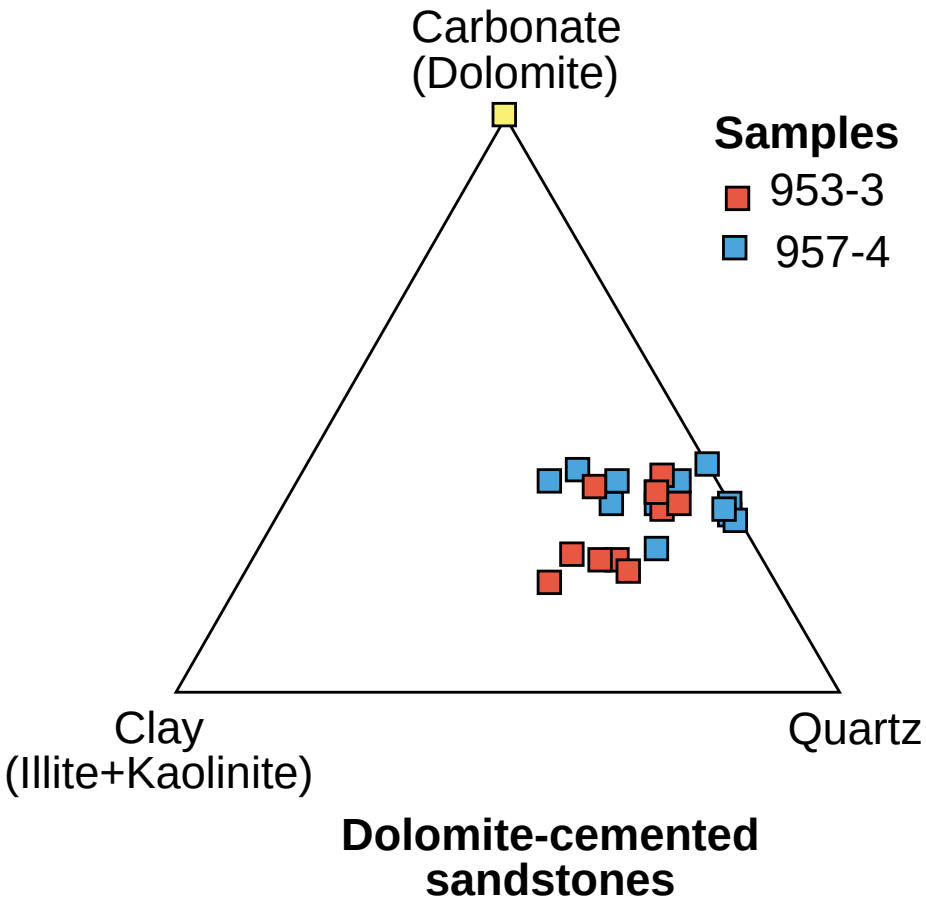

Figure A: Normative mineralogy of dolomite-cemented sandstones fragments in terms of normative Dolomite, Quartz and Clay (illite + kaolinite). The compositions of the fragments from both samples indicate a relative small range on the amount of dolomite cement with quartz and altered feldspar the dominant detrital constituents.

Table 1: Chemical composition and normative minerals, cuttings fragments from sample GC957-3

Oxide	957-3-1	957-3-1a	957-3-2	957-3-3	957-3-3a	957-3-4	957-3-5	957-3-6	957-3-6a	957-3-6b	957-3-7	957-3-7a
SiO2	74.15	70.36	73.94	76.33	65.94	75.03	70.9	71.69	64.76	0	72.83	69.78
Al2O3	9.51	12.4	3.76	8.69	8.22	2.85	2.84	3.75	21.48	0	10.87	14.65
TiO2	0	0	0	0	0	0	0	0	0	0	0	0
Fe2O3	0	0	0	0	0	0	0	0	0	0	0	0.48
FeO	0	0	0	0	0	0	0	0	0	0	0	0
MgO	7.86	8.08	10.76	7.01	12.25	10.56	12.5	11.37	1.09	49.34	7.66	6.59
MnO	0	0	0	0	0	0	0	0	0	0	0	0
CaO	7.45	7.77	11	6.74	12.51	11.33	13.6	12.16	0	50.66	7.39	6.05
Na2O	0	0	0	0	0	0	0	0	0	0	0	0
K2O	1.04	1.4	0.55	1.24	1.08	0.24	0.16	1.03	12.67	0	1.24	1.79
CO2	0	0	0	0	0	0	0	0	0	0	0	0
P2O5	0	0	0	0	0	0	0	0	0	0	0	0
SO3	0	0	0	0	0	0	0	0	0	0	0	1

Mineral	957-3-1	957-3-1a	957-3-2	957-3-3	957-3-3a	957-3-4	957-3-5	957-3-6	957-3-6a	957-3-6b	957-3-7	957-3-7a
Apatite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dolomite	22.4	23.3	31.1	20.3	34.9	31.9	37.2	33.7	0.0	100.0	22.2	18.7
Calcite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Siderite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pyrite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
Ilmenite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chlorite	3.9	3.9	4.2	3.4	4.8	3.6	3.9	3.8	1.9	0.0	3.7	3.6
Vermiculite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Anorthite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Albite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	59.6	0.0	0.0	0.0
Kaolinite	8.3	10.7	1.6	5.7	5.1	2.2	2.5	0.0	0.0	0.0	9.3	12.4
Illite	10.0	13.4	5.0	11.9	9.6	2.2	1.4	6.4	27.5	0.0	11.9	17.7
Quartz	55.5	48.6	58.1	58.6	45.6	60.2	55.0	54.5	11.0	0.0	52.9	46.9

Sample Details:

957-3-1 Dolomite cemented sandstone fragment, thin section location 1
957-3-1a Dolomite cemented sandstone fragment, thin section location 1
957-3-2 Dolomite cemented sandstone fragment, thin section location 2
957-3-3 Dolomite cemented sandstone fragment, thin section location 3
957-3-3a Dolomite cemented sandstone fragment, thin section location 3
957-3-4 Dolomite cemented sandstone fragment, thin section location 4
957-3-5 Dolomite cemented sandstone fragment, thin section location 5
957-3-6 Dolomite cemented sandstone fragment, thin section location 6
957-3-6a K-feldspar from dolomite cemented sandstone fragment, thin section location 6a
957-3-6b Dolomite cement from sandstone fragment, thin section location 6
957-3-7 Dolomite cemented sandstone fragment, thin section location 7
957-3-7a Dolomite cemented sandstone fragment, thin section location 7a

Table 2: Chemical composition and normative minerals, cuttings fragments from sample GC957-4

Oxide	957-4-1	957-4-2	957-4-3	957-4-4	957-4-5	957-4-5a	957-4-6	957-4-6a	957-4-7	957-4-7a	957-4-11	957-4-11a	957-4-12	957-4-12a
SiO2	79.77	73.78	78.66	79.63	77.16	71.59	76.35	68.88	72.27	61.92	72.82	0	67.48	62.72
Al2O3	1.56	5.49	0.94	2.21	3.4	6.52	7.54	9.8	4.22	12.23	1.67	0	6.26	8.49
TiO2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fe2O3	0	0	0	0	0	0	0	0	0	0.63	0	0	0	0
FeO	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MgO	7.58	8.27	7.91	7.09	7.39	8.47	5.81	8.02	9.13	9.21	9.64	40.53	12.32	13.49
MnO	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CaO	11.08	11.5	12.26	10.72	11.69	12.56	8.73	11.95	13.58	13.12	15.56	59.47	13.08	14.13
Na2O	0	0	0	0	0	0	0	0	0	0	0	0	0	0
K2O	0	0.96	0.23	0.34	0.36	0.85	1.57	1.35	0.79	2.4	0.32	0	0.85	1.16
CO2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P2O5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SO3	0	0	0	0	0	0	0	0	0	0.8	0	0	0	0

Mineral	957-4-1	957-4-2	957-4-3	957-4-4	957-4-5	957-4-5a	957-4-6	957-4-6a	957-4-7	957-4-7a	957-4-11	957-4-11a	957-4-12	957-4-12a
Apatite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dolomite	29.8	32.2	31.5	28.1	29.1	32.9	23.6	31.5	34.8	35.4	37.7	100.0	36.1	38.6
Calcite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Siderite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pyrite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
Ilmenite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chlorite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	4.2	4.8
Vermiculite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Anorthite	2.3	0.0	2.2	3.7	6.0	3.3	2.8	3.4	3.6	1.3	3.9	0.0	0.0	0.0
Albite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Orthoclase	0.0	0.0	0.0	1.2	1.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0
Kaolinite	1.0	2.7	0.0	0.0	0.0	2.8	0.2	4.8	0.0	3.3	0.0	0.0	3.6	4.9
Illite	0.0	8.6	0.0	0.9	1.4	7.6	14.6	12.2	5.4	21.2	0.0	0.0	7.5	10.1
Quartz	67.0	56.6	66.2	66.1	62.4	53.6	58.7	48.2	55.3	38.1	58.4	0.0	48.6	41.6

Sample Details:

957-4-1	Dolomite cemented sandstone fragment, thin section location 1	957-4-6a	Dolomite cemented sandstone fragment, thin section location 6a
957-4-2	Dolomite cemented sandstone fragement, thin section location 2	957-4-7	Dolomite cemented sandstone fragment, thin section location 7
957-4-3	Dolomite cemented sandstone fragment, thin section location 3	957-4-7a	Dolomite cemented sandstone fragment, thin section location 7a
957-4-4	Dolomite cemented sandstone fragment, thin section location 4	957-4-11	Dolomite cemented sandstone fragment, thin section location 11
957-4-5	Dolomite cemented sandstone fragment, thin section location 5	957-4-11a	Dolomite cement from sandstone fragment, thin section location 1
957-4-5a	Dolomite cemented sandstone fragment, thin section location 5a	957-4-12	Dolomite cemented sandstone fragment, thin section location 12
957-4-6	Dolomite cemented sandstone fragment, thin section locati	957-4-12a	Dolomite cemented sandstone fragment, thin section location 12a

Notes on the Photographic images

The image number is coded as follows:

E.g. 957-3rp1.jpg

:	.jpg	= file format
:	1	= last number is unique image number for that batch.
:	r	= objective magnification as given in the list below
:	p	= plane light; x = crossed polarised light
:	957-3	= sample number code – remaining code before objective code

957-3 = Geotrack Job 957, sample 3

r = X 5 OBJECTIVE - Width of field of view = 780 µm
y = X 10 OBJECTIVE - Width of field of view = 390 µm
g = X 20 OBJECTIVE - Width of field of view = 195 µm
b = X 50 OBJECTIVE - Width of field of view = 78 µm
w = X 100 OBJECTIVE - Width of field of view = 39 µm

Note: The first two Figures in this report are large format images; Figure 1A being a full scan of the thin section area for cuttings sample 957-4, 1425m and Figure 1B being a composite image of the a portion of the same sample made up of large number of overlapping photomicrographs (780 µm width of field) to gibe an image ~5 mm wide.

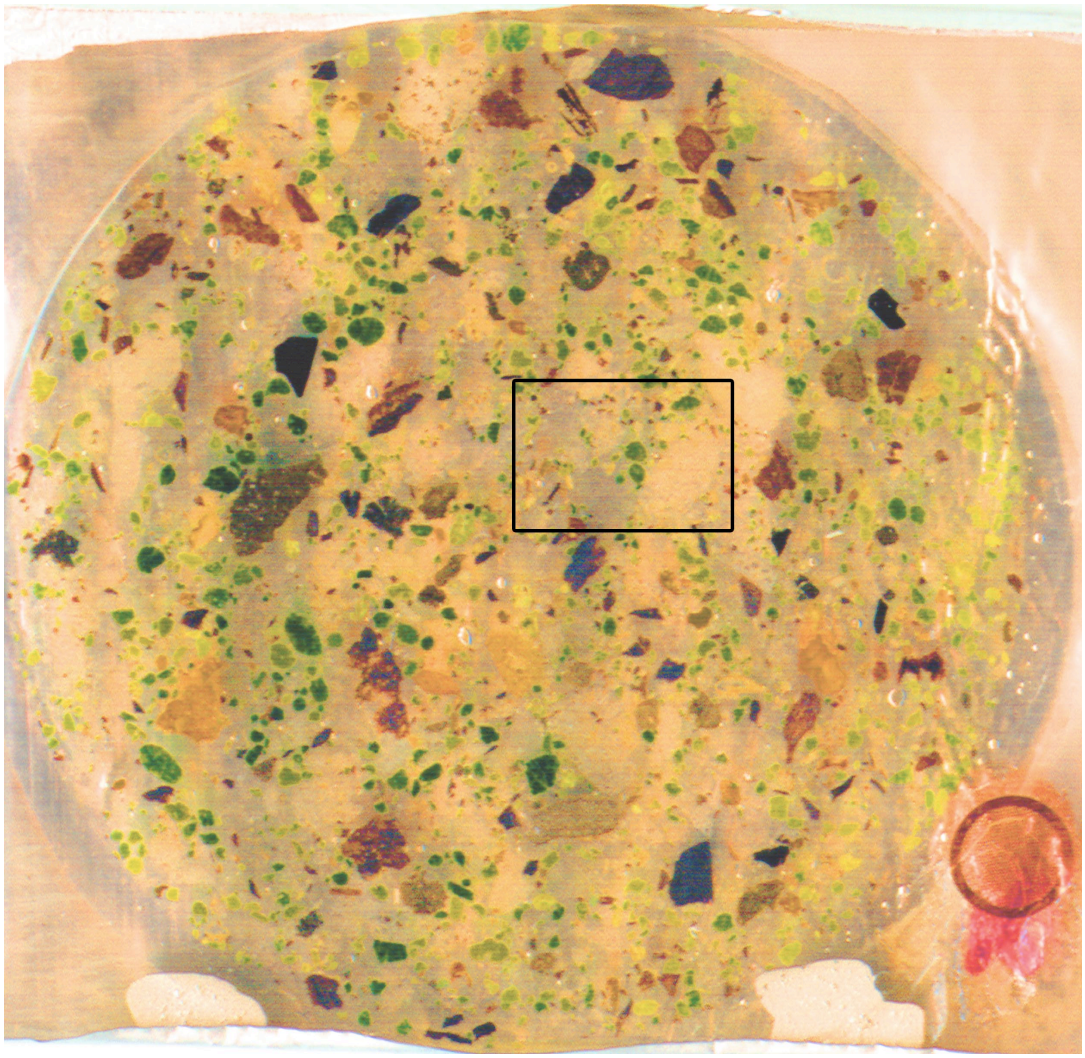

Figure 1.A: West Seahorse-1, 1425 m (cuttings). Width of photograph = 25 mm
Polished thin section of impregnated cutting sample. The sample consists mainly of large (1 to 2 mm dia) free detrital quartz grains (light grey – see Figure 1.B), and cuttings fragments of dolomite-cemented fine-grained quartz sandstone (milky colour), glauconite pellets (green), together with coal (dark) and minor limestone fragments. For inset see Figure 1.B.

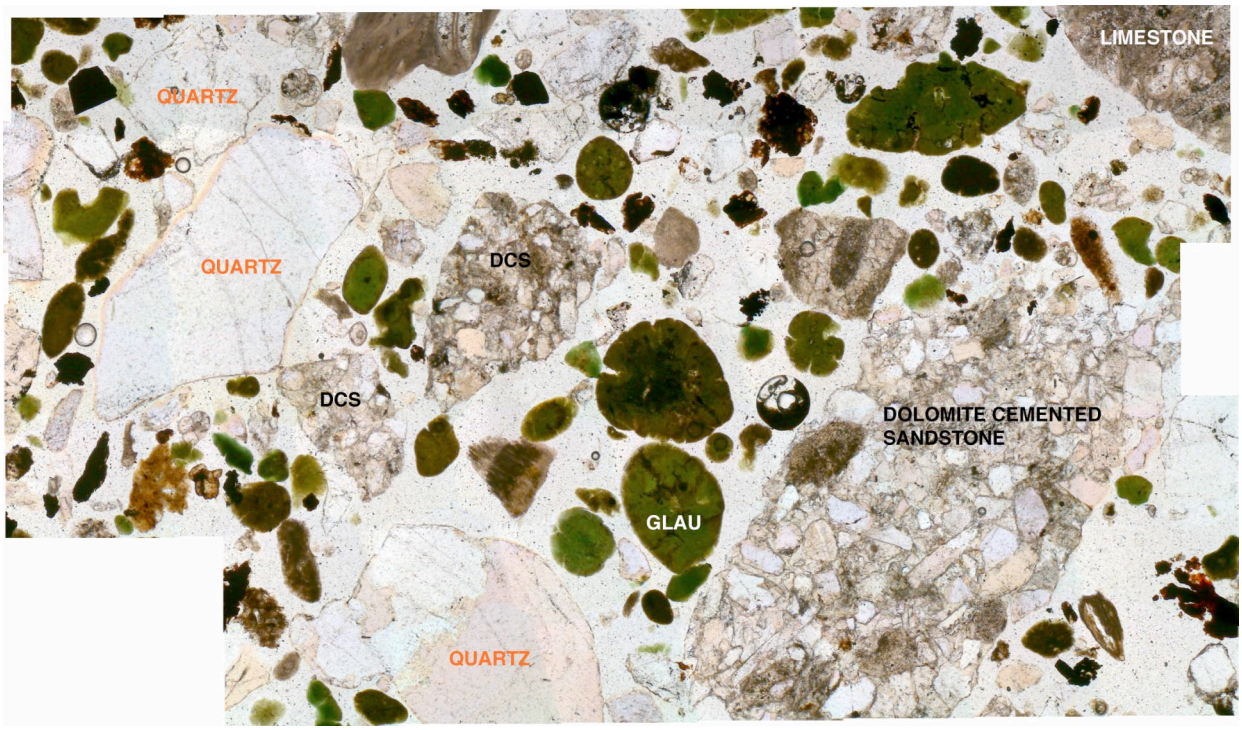

Figure 1.B: West Seahorse-1, 1425 m (cuttings). Width of photograph = 5 mm
Composite photomicrograph image on inset area from Figure 1.A. clearly showing large (1 to 2 mm dia) free detrital quartz grains (QUARTZ) and fragments of dolomite-cemented fine grained quartz sandstone (DCS), glauconite pellets (GLAU). It is clear that dolomite cementation is restricted to the very fine-grained sandstone lithologies, while the coarse-grained quartz typical of Latrobe Group channel sandstones is not cemented. Thus, cementation is considered to be mainly controlled by the depositional lithology.
The carbonate cement in these fine-grained sandstones has been confirmed as dolomite using EDAX on the SEM and volume calculations indicate primary porosity in the fine-grained sandstones at the time of cementation was around 20 to 30%.

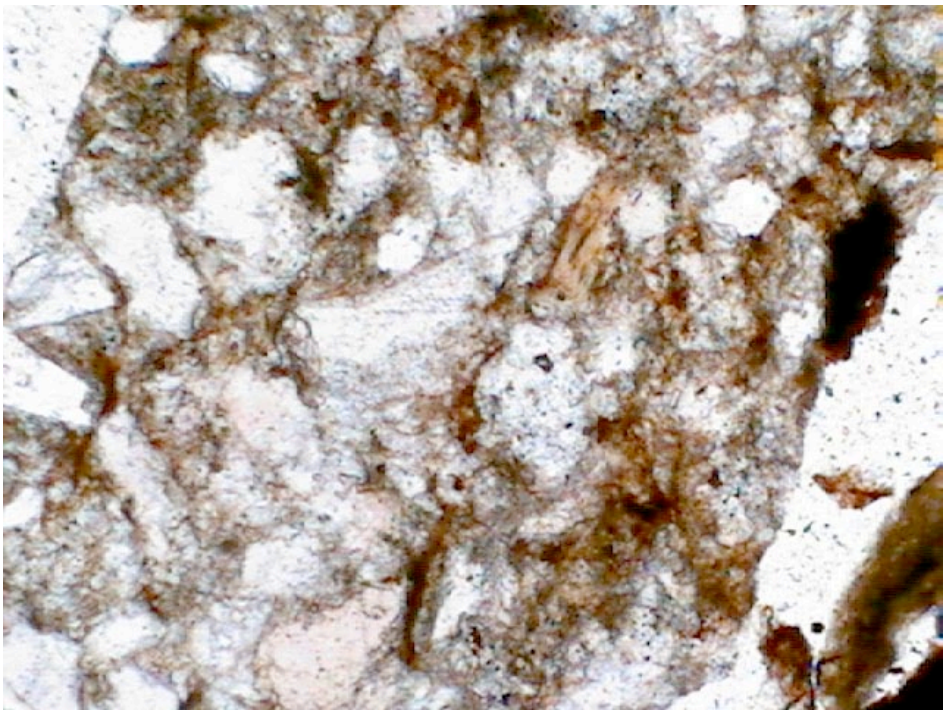

Figure 2: West Seahorse-1, Cuttings, 1420 m; (IMAGE: 957-3rp1.jpg).
Latrobe Group. Dolomite-cemented fine-grained quartz sandstone fragment.
Typical quartz grain-size ~0.1 to 0.2 mm.
Plane light; Width of field of view = 780 µm (X 5 OBJECTIVE)

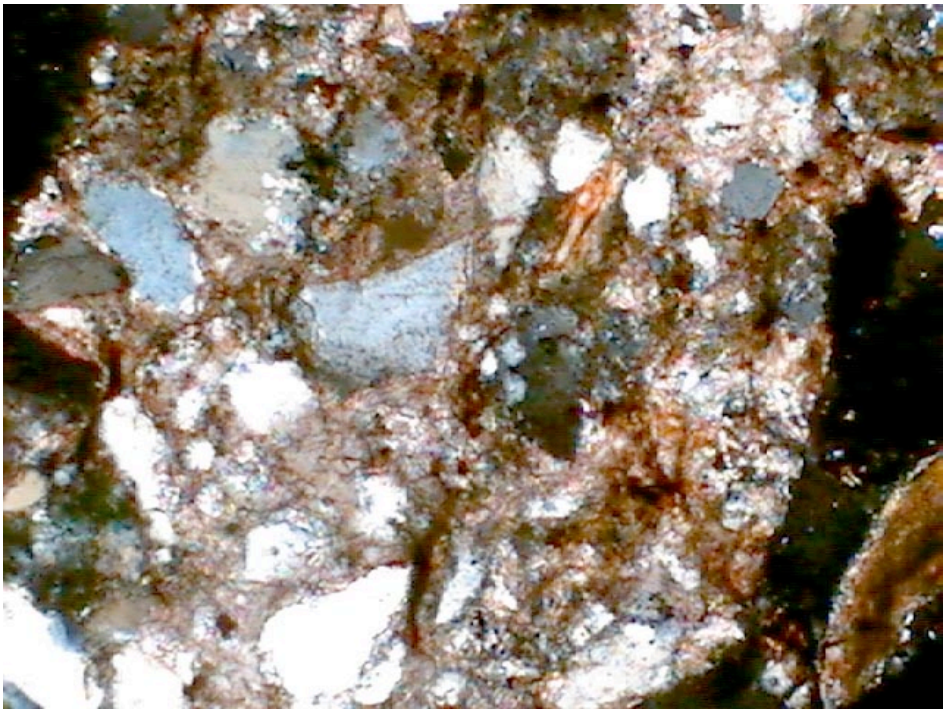

Figure 3: West Seahorse-1, Cuttings, 1420 m; (IMAGE: 957-3rx2.jpg).
Latrobe Group. Dolomite-cemented fine-grained quartz sandstone fragment same as Figure 2, but with crossed polars.
Crossed polars; Width of field of view = 780 µm (X 5 OBJECTIVE)

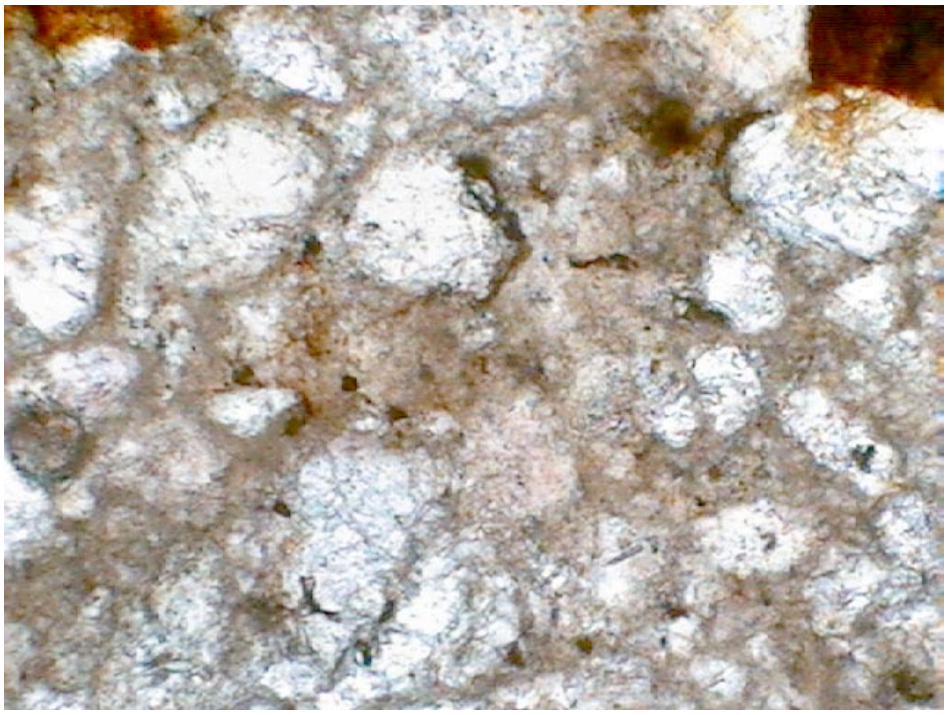

Figure 4: West Seahorse-1, Cuttings 1420 m; (IMAGE: 957-3rp3.jpg).
Latrobe Group. Dolomite-cemented fine-grained quartz sandstone fragment.
Plane light; Width of field of view = 780 µm (X 5 OBJECTIVE)

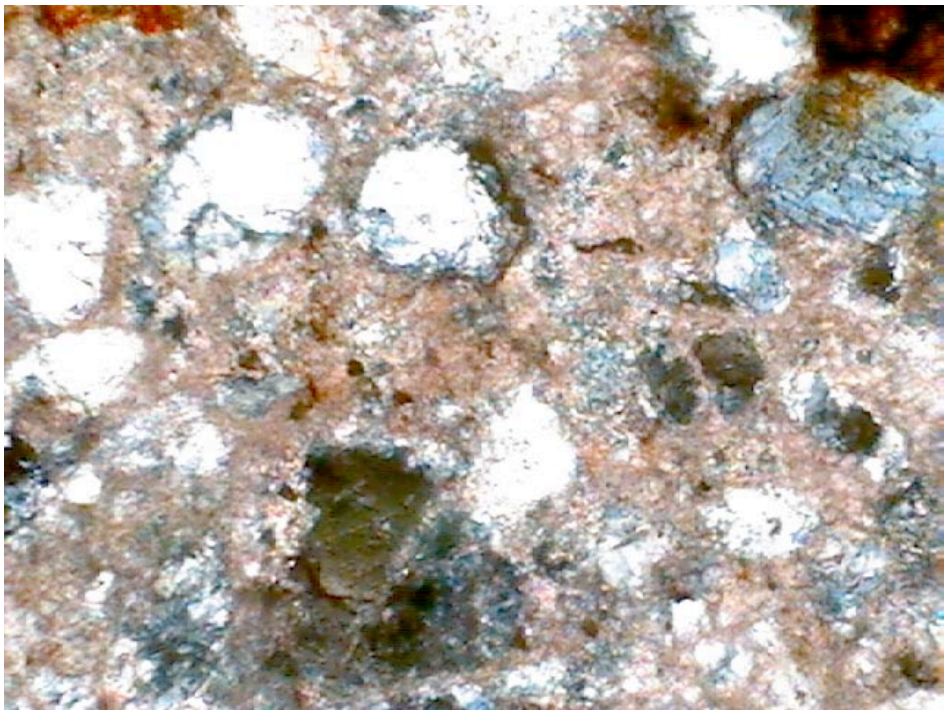

Figure 5: West Seahorse-1, Cuttings 1420 m; (IMAGE: 957-3rx4.jpg).
Latrobe Group. Dolomite-cemented fine-grained quartz sandstone fragment
same as Figure 4, but with crossed polars.

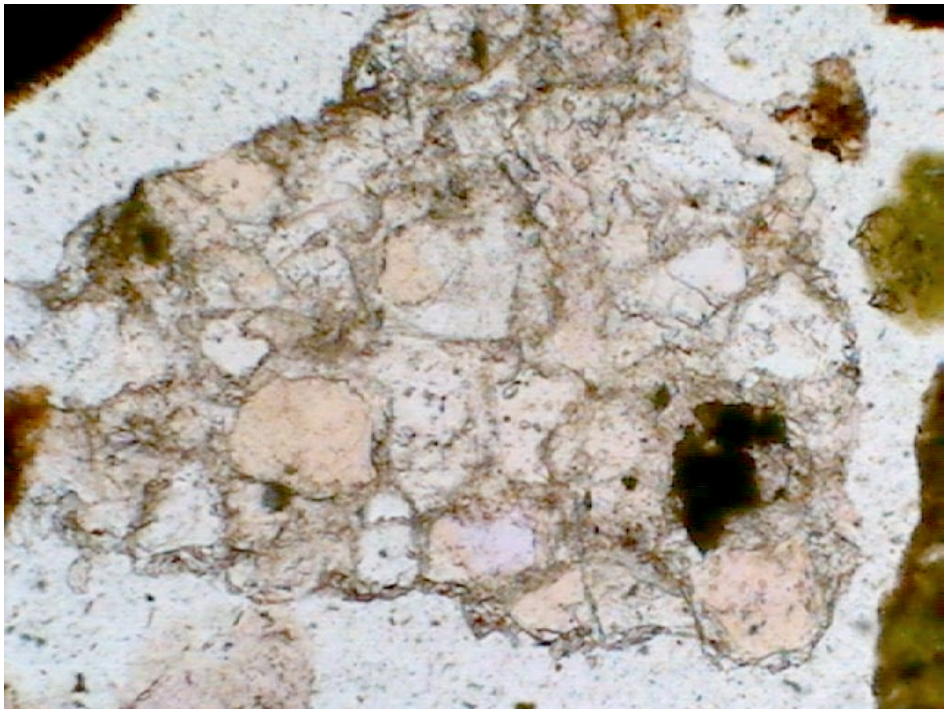

Figure 6: West Seahorse-1, Cuttings 1420 m; (IMAGE: 957-3rp5.jpg).
Latrobe Group. Dolomite-cemented fine-grained quartz sandstone fragment.
Plane light; Width of field of view = 780 µm (X 5 OBJECTIVE)

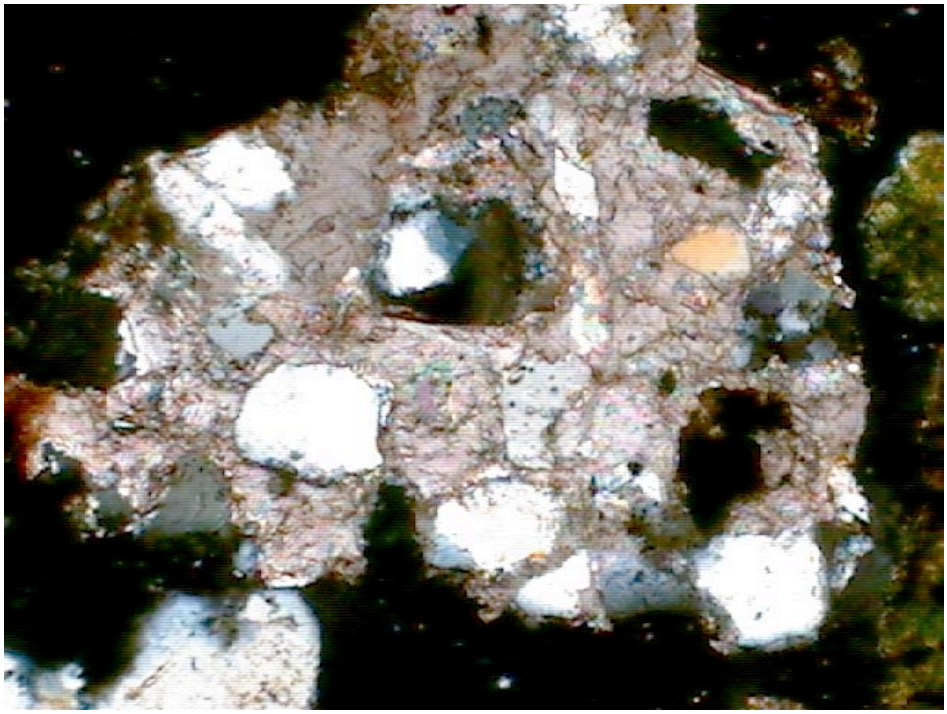

Figure 7: West Seahorse-1, Cuttings, 1420 m; (IMAGE: 957-3rx6.jpg).
Latrobe Group. Dolomite-cemented fine-grained quartz sandstone fragment - same as Figure 6, but with crossed polars.

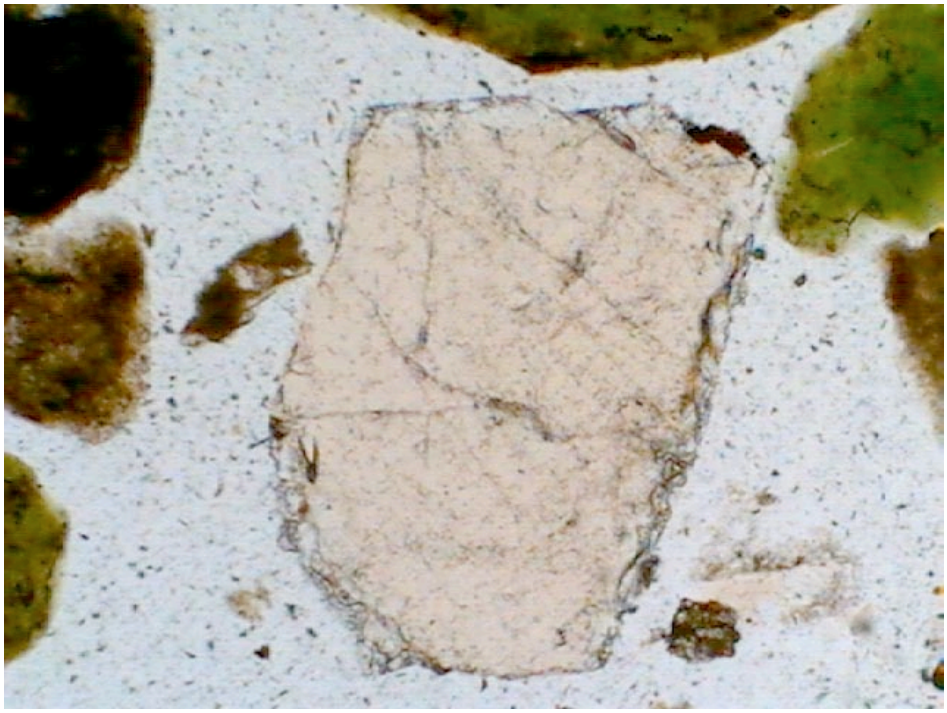

Figure 8: West Seahorse-1, Cuttings, 1420 m; (IMAGE: 957-3rp7.jpg).
Latrobe Group. Large single coarse-grained quartz grain – typical of the coarser Latrobe Group sandstones.
Plane light; Width of field of view = 780 µm (X 5 OBJECTIVE)

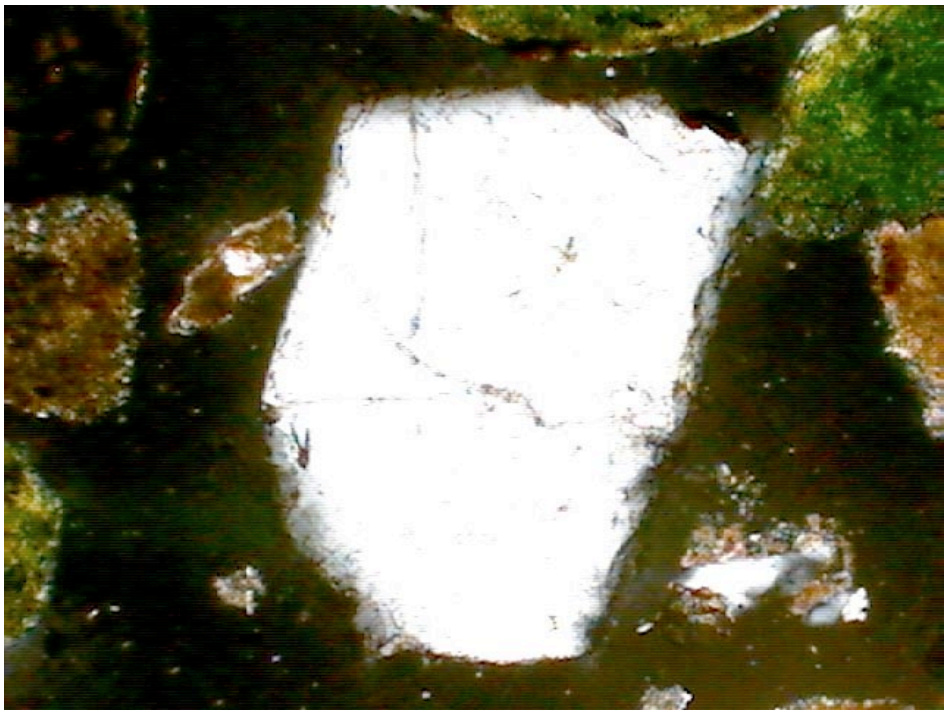

Figure 9: West Seahorse-1, Cuttings, 1420 m; (IMAGE: 957-3rx8.jpg).
Latrobe Group. Large single coarse-grained quartz grain – typical of the coarser Latrobe Group sandstones - same as Figure 8, but with crossed polars.

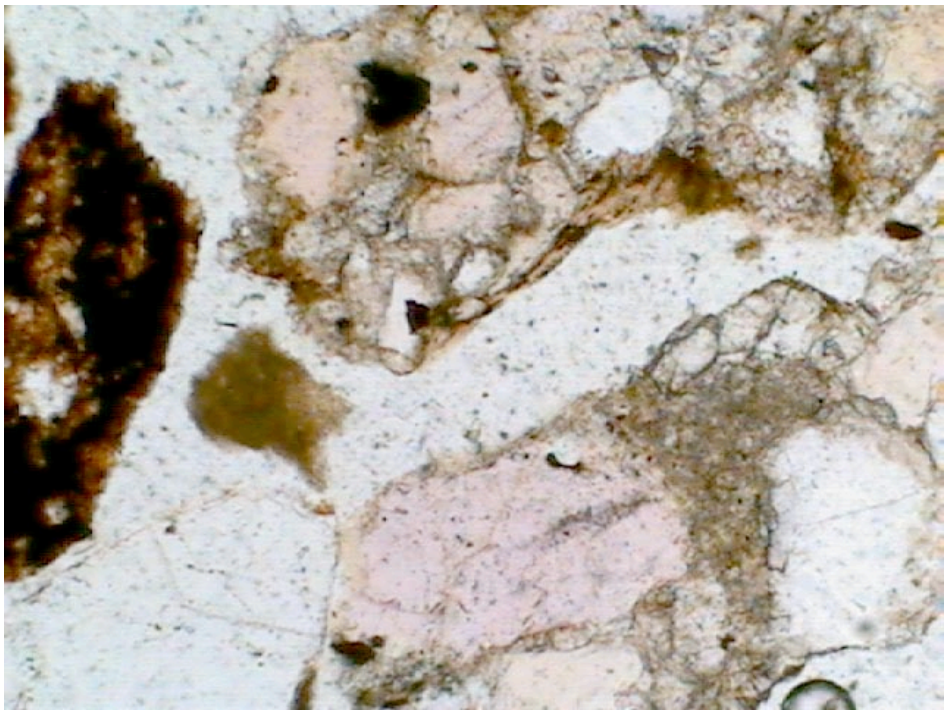

Figure 10: West Seahorse-1, Cuttings, 1420 m; (IMAGE: 957-3rp9.jpg).
Latrobe Group. Dolomite-cemented fine-grained quartz sandstone fragment and larger single quartz grains.
Plane light; Width of field of view = 780 µm (X 5 OBJECTIVE)

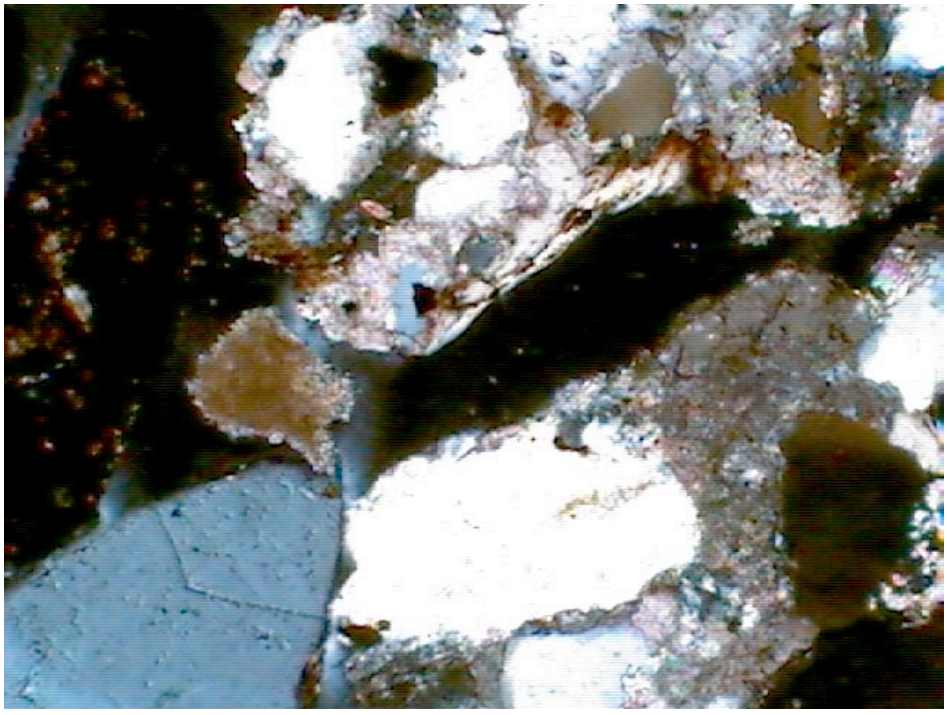

Figure 11: West Seahorse-1, Cuttings, 1420 m; (IMAGE: 957-3rx10.jpg).
Latrobe Group. Dolomite-cemented fine-grained quartz sandstone fragment and larger single quartz grains - same as Figure 10, but with crossed polars.

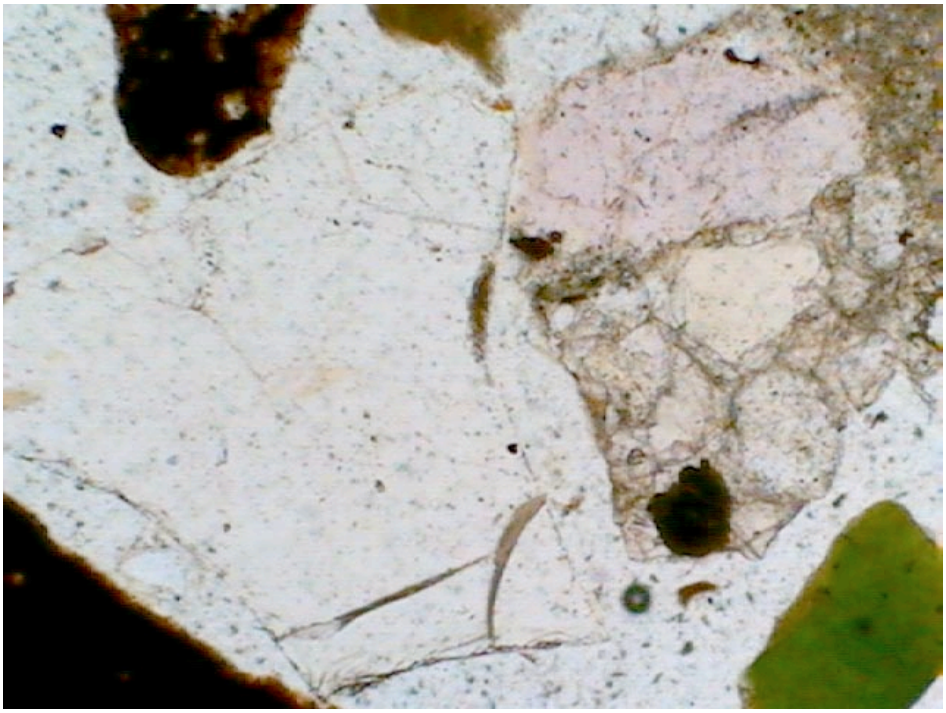

Figure 12: West Seahorse-1, Cuttings, 1420 m; (IMAGE: 957-3rp11.jpg).
Latrobe Group. Large single quartz grain and dolomite-cemented fine-grained quartz sandstone cuttings fragment. Glauconite is probable cavings.
Plane light; Width of field of view = 780 µm (X 5 OBJECTIVE)

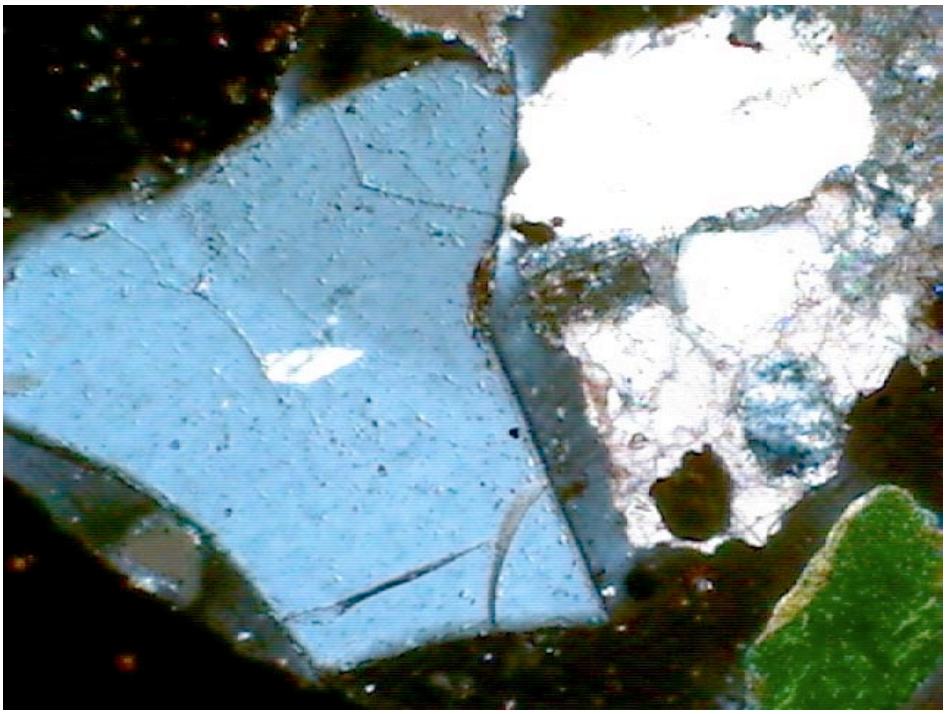

Figure 13: West Seahorse-1, Cuttings, 1420 m; (IMAGE: 957-3rx12.jpg).
Latrobe Group. Large single quartz grain and dolomite-cemented fine-grained quartz sandstone cuttings fragment. Glauconite is probable cavings - same as Figure 12, but with crossed polars.

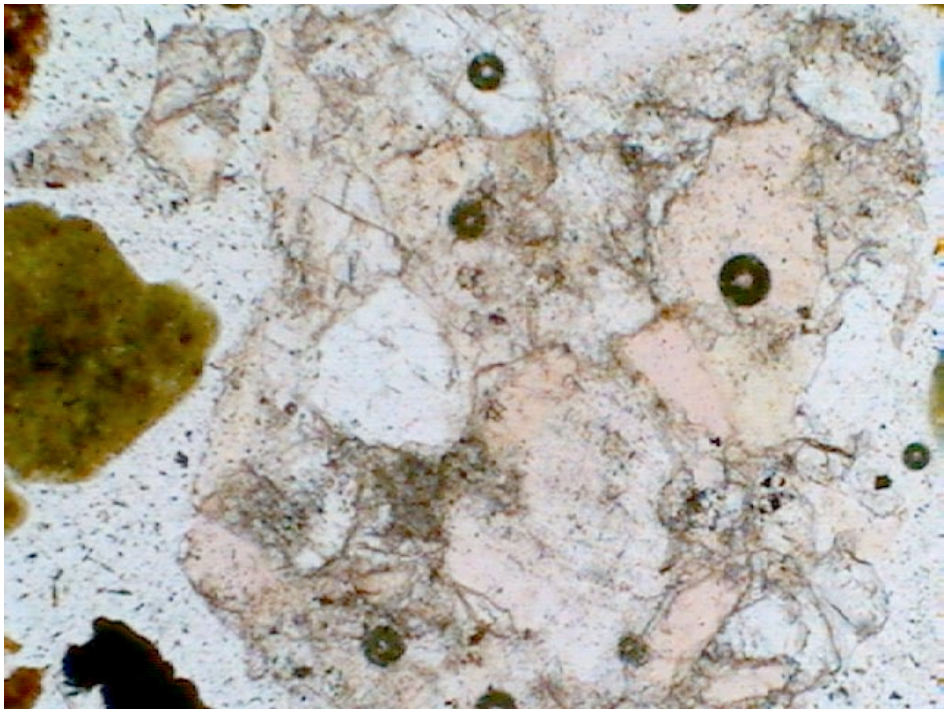

Figure 14: West Seahorse-1, Cuttings, 1425 m; (IMAGE: 957-4rp1.jpg).
Latrobe Group. Dolomite-cemented fine-grained quartz sandstone cuttings fragment. Glauconite is probable cavings.
Plane light; Width of field of view = 780 µm (X 5 OBJECTIVE)

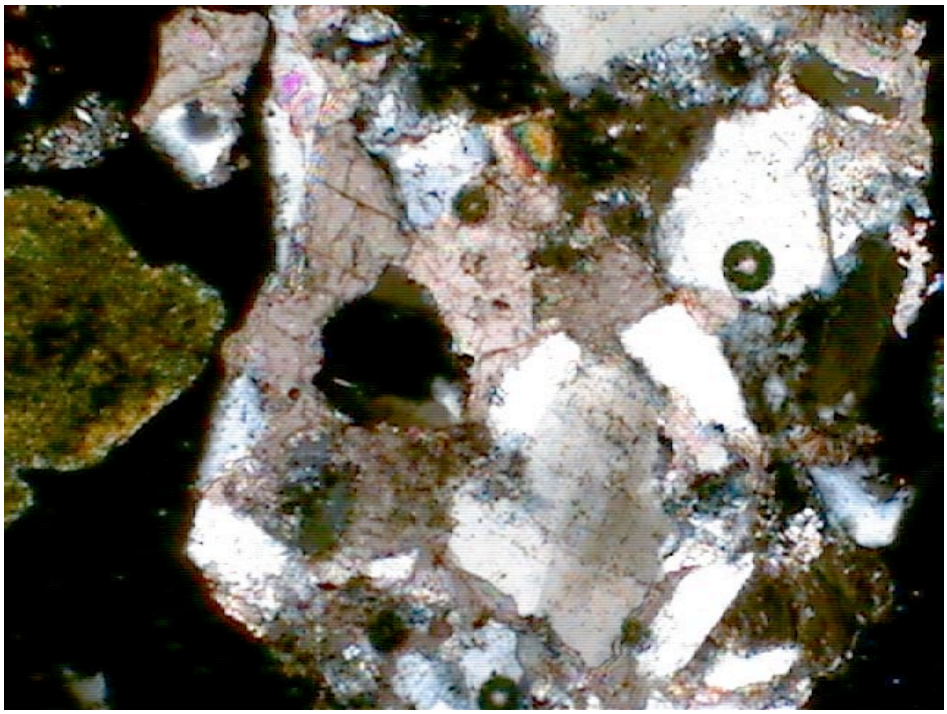

Figure 15: West Seahorse-1, Cuttings, 1425 m; (IMAGE: 957-4rx6.jpg).
Latrobe Group. Dolomite-cemented fine-grained quartz sandstone cuttings fragment. Glauconite is probable cavings - same as Figure 14, but with crossed polars.

Figure 16: West Seahorse-1, Cuttings, 1425 m; (IMAGE: 957-4rp3.jpg).
Latrobe Group. Dolomite-cemented fine-grained quartz sandstone cuttings fragment. Glauconite is probable cavings.
Plane light; Width of field of view = 780 µm (X 5 OBJECTIVE)

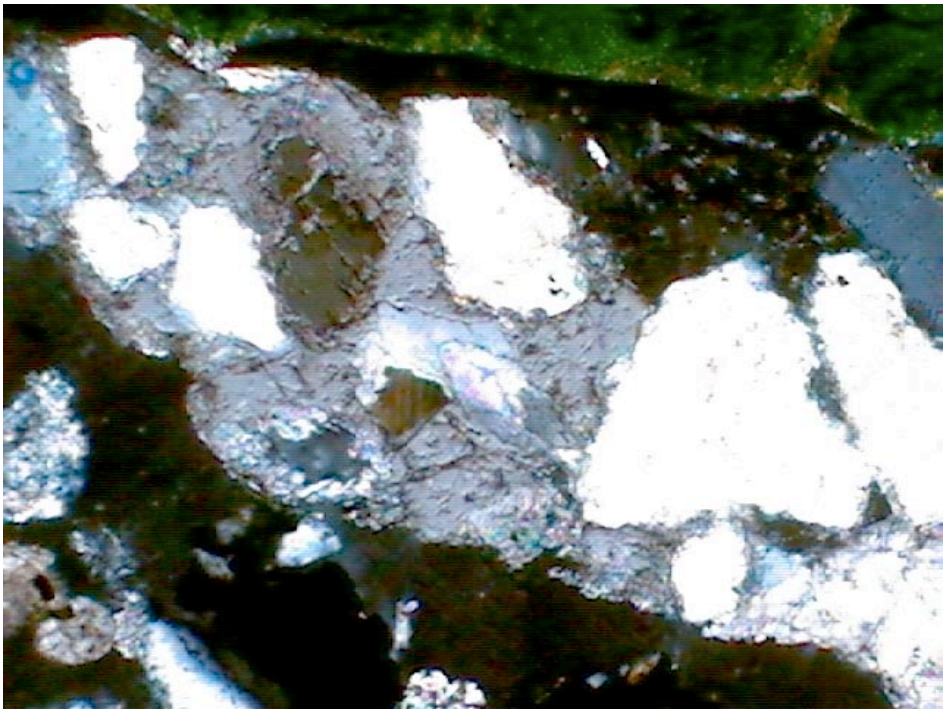

Figure 17: West Seahorse-1, Cuttings, 1425 m; (IMAGE: 957-4rx4.jpg).
Latrobe Group. Dolomite-cemented fine-grained quartz sandstone cuttings fragment. Glauconite is probable cavings - same as Figure 16, but with crossed polars.

Figure 18: West Seahorse-1, Cuttings, 1425 m; (IMAGE: 957-4rp5.jpg).
Latrobe Group. Dolomite-cemented fine-grained quartz sandstone cuttings fragment.
Plane light; Width of field of view = 780 µm (X 5 OBJECTIVE)

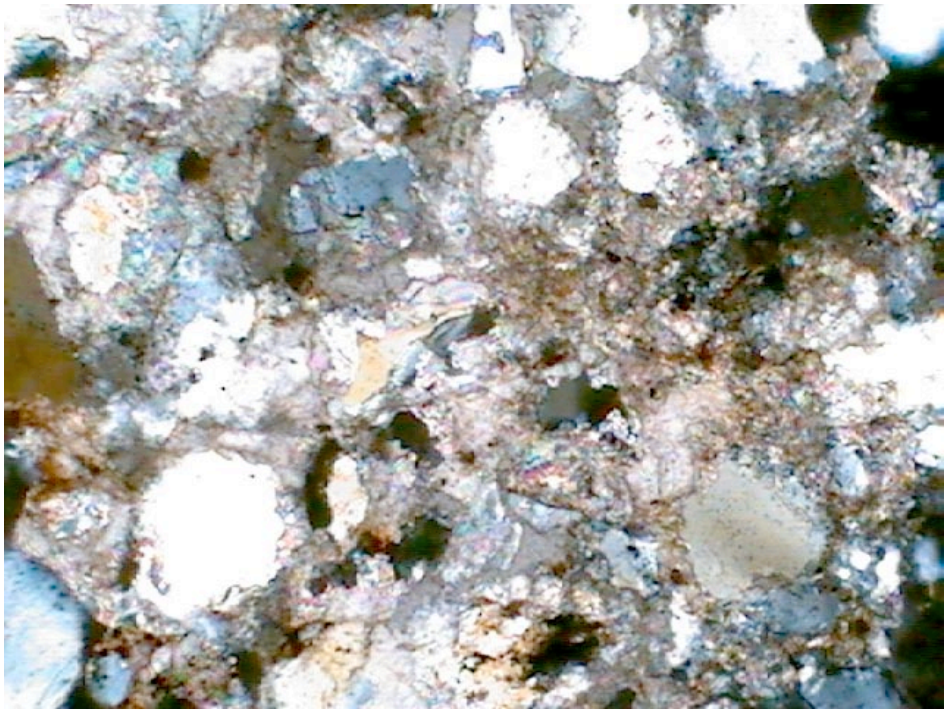

Figure 19: West Seahorse-1, Cuttings, 1425 m; (IMAGE: 957-4rx2.jpg).
Latrobe Group. Dolomite-cemented fine-grained quartz sandstone cuttings fragment - same as Figure 18, but with crossed polars.

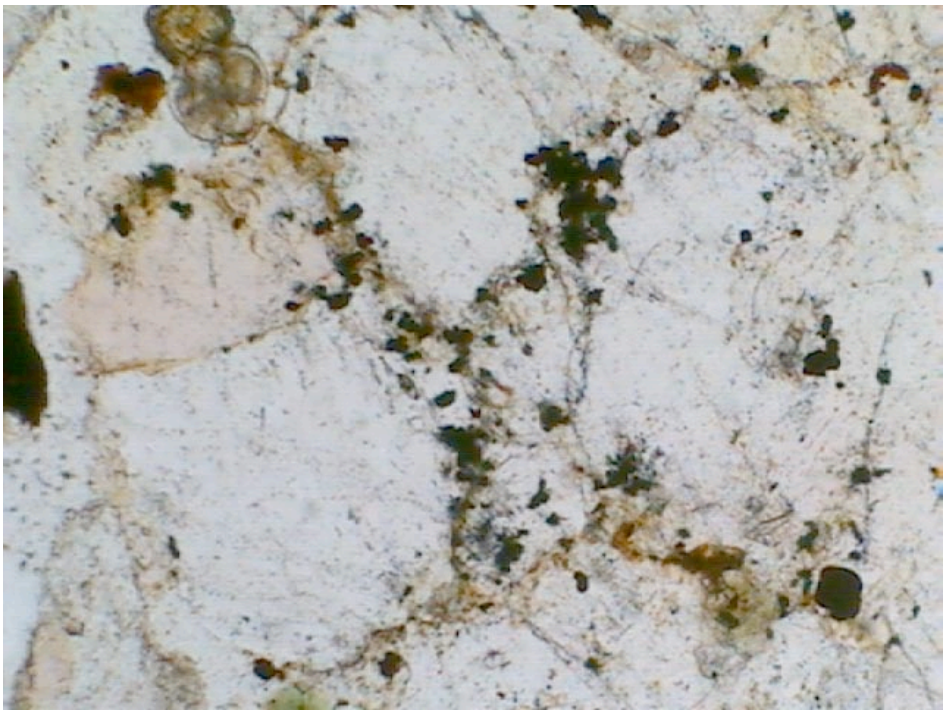

Figure 20: West Seahorse-1, Cuttings, 1425 m; (IMAGE: 957-4rp7.jpg).
Latrobe Group. Large polycrystalline quartz grain.
Plane light; Width of field of view = 780 µm (X 5 OBJECTIVE)

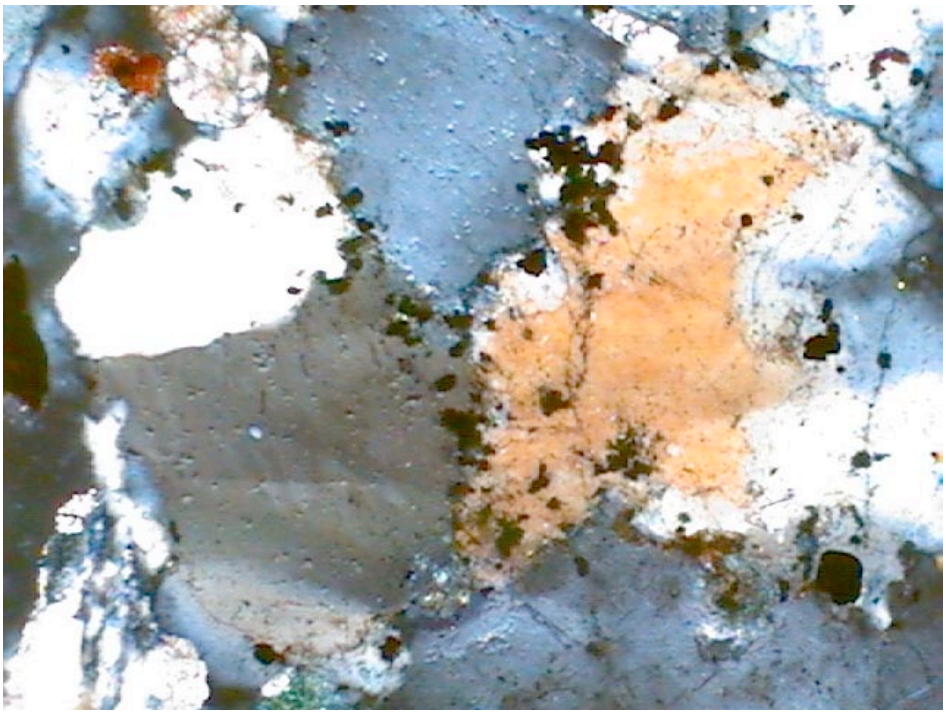

Figure 21: West Seahorse-1, Cuttings, 1425 m; (IMAGE: 957-4rx8.jpg).
Latrobe Group. Large polycrystalline quartz grain - same as Figure 20, but with crossed polars.

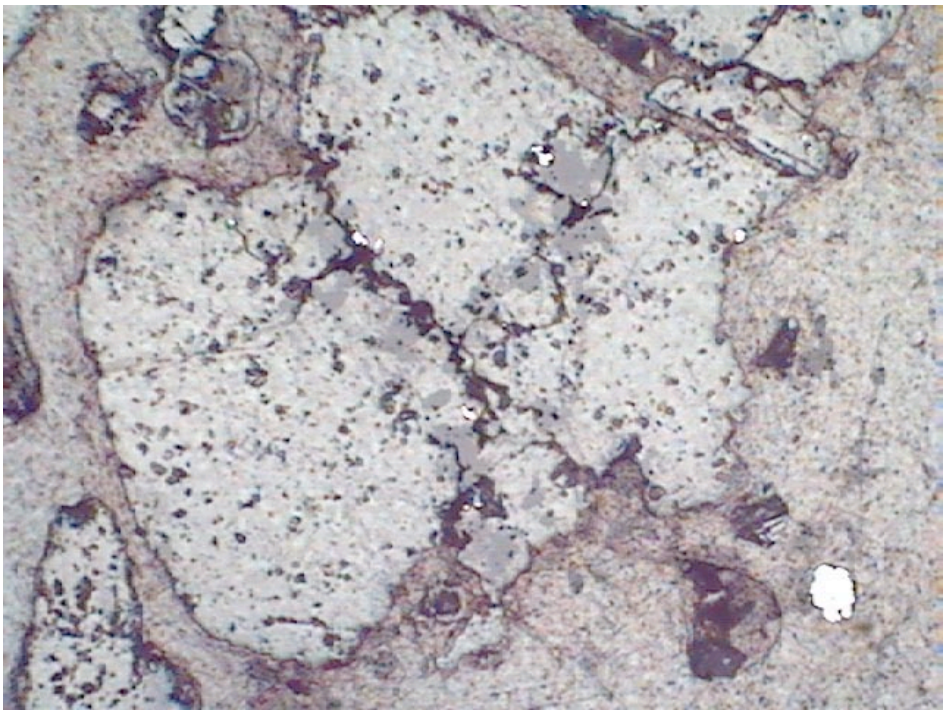

Figure 22: West Seahorse-1, Cuttings, 1425 m; (IMAGE: 957-4rx8.jpg).
Latrobe Group. Large polycrystalline quartz grain - same as Figures 20 & 21, but with reflected light.

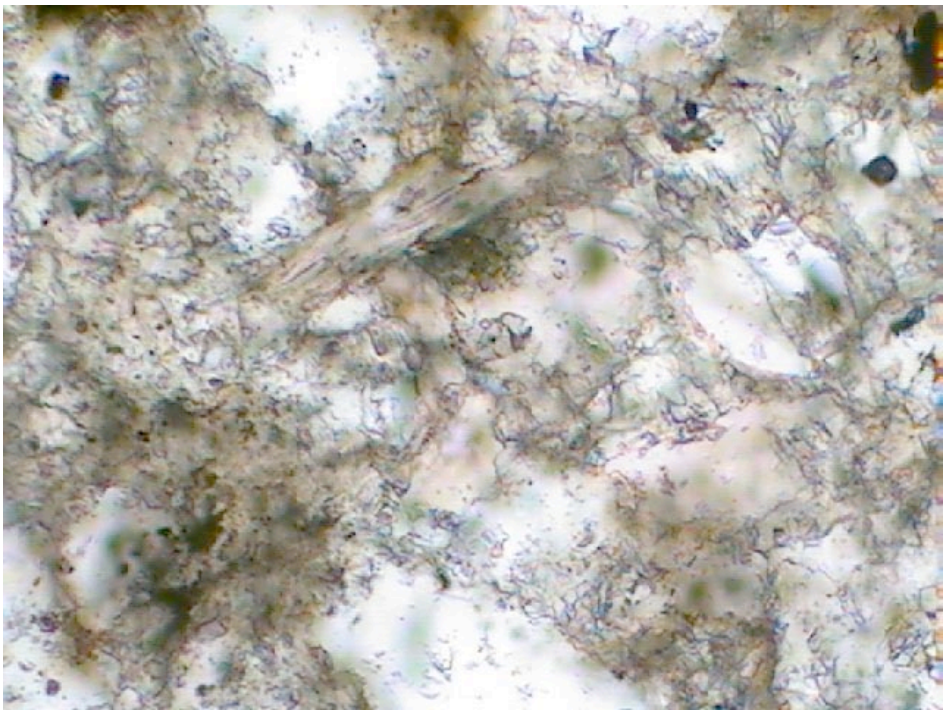

Figure 23: West Seahorse-1, Cuttings, 1425 m; (IMAGE: 957-4yp10.jpg).
Latrobe Group. Dolomite-cemented, fine-grained quartz sandstone cuttings fragment with uncompacted mica grain.
Plane light; Width of field of view = 390 µm (X 10 OBJECTIVE)

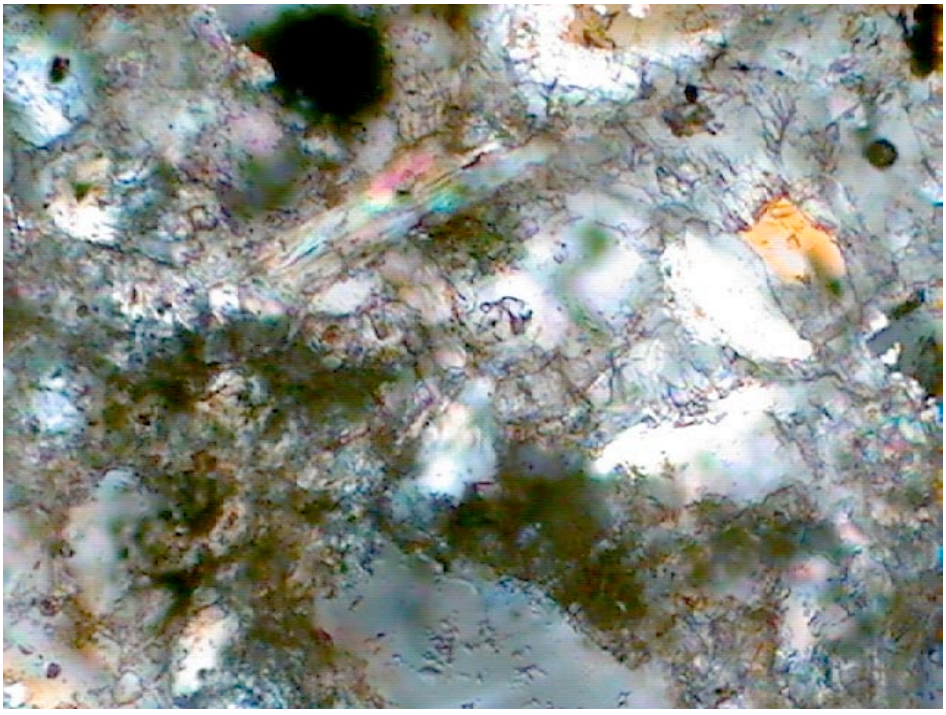

Figure 24: West Seahorse-1, Cuttings, 1425 m; (IMAGE: 957-4yx11.jpg).
Latrobe Group. Dolomite-cemented fine-grained quartz sandstone cuttings fragment with uncompacted mica grain - same as Figure 23, but with crossed polars.

Figure 25: West Seahorse-1, Cuttings, 1425 m; (IMAGE: 957-4rp12.jpg).
Latrobe Group. Dolomite-cemented, fine-grained quartz sandstone cuttings fragment with twinned feldspar grain.
Plane light; Width of field of view = 780 µm (X 5 OBJECTIVE)

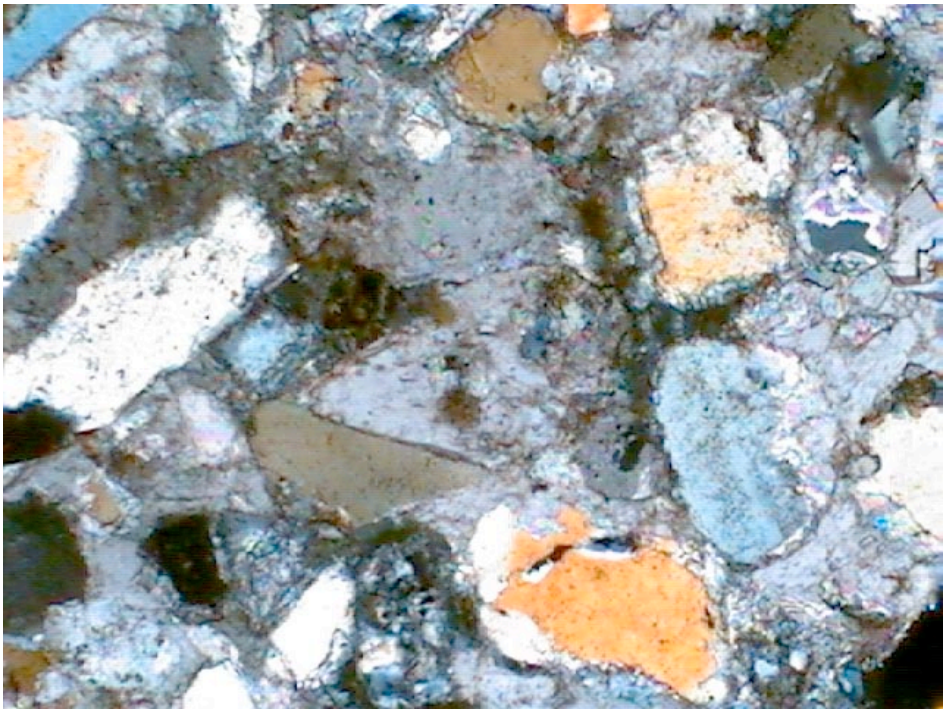

Figure 26: West Seahorse-1, Cuttings, 1425 m; (IMAGE: 957-4rx13.jpg).
Latrobe Group. Dolomite-cemented, fine-grained quartz sandstone cuttings fragment with twinned feldspar grain - same as Figure 25, but with crossed polars.

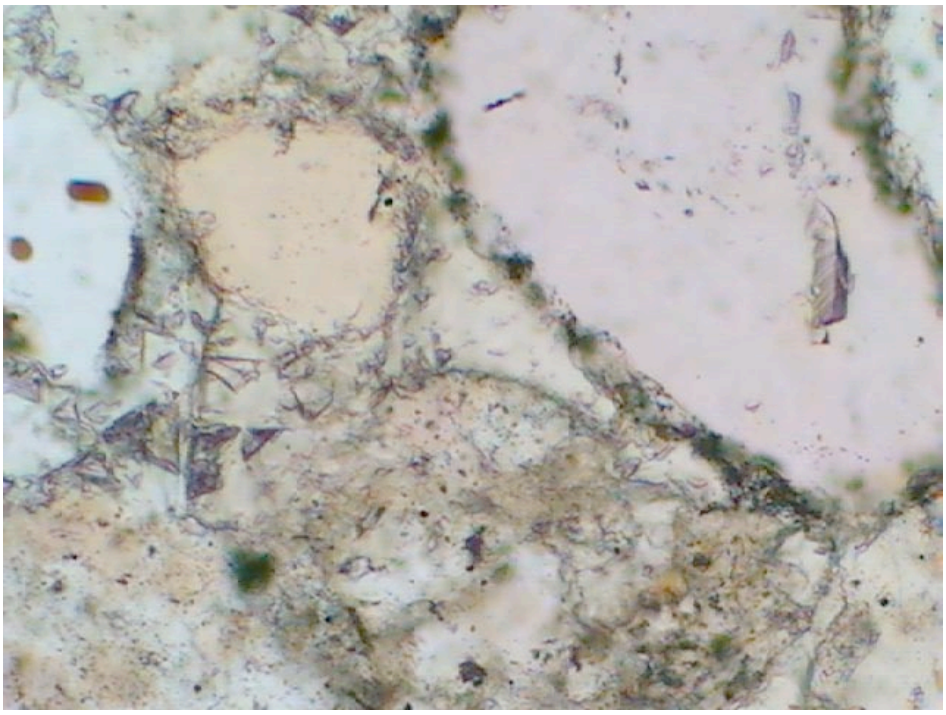

Figure 27: West Seahorse-1, Cuttings, 1425 m; (IMAGE: 957-4yp14.jpg).
Latrobe Group. Detail of dolomite cement in fine-grained quartz sandstone cuttings fragment.
Plane light; Width of field of view = 390 µm (X 10 OBJECTIVE)

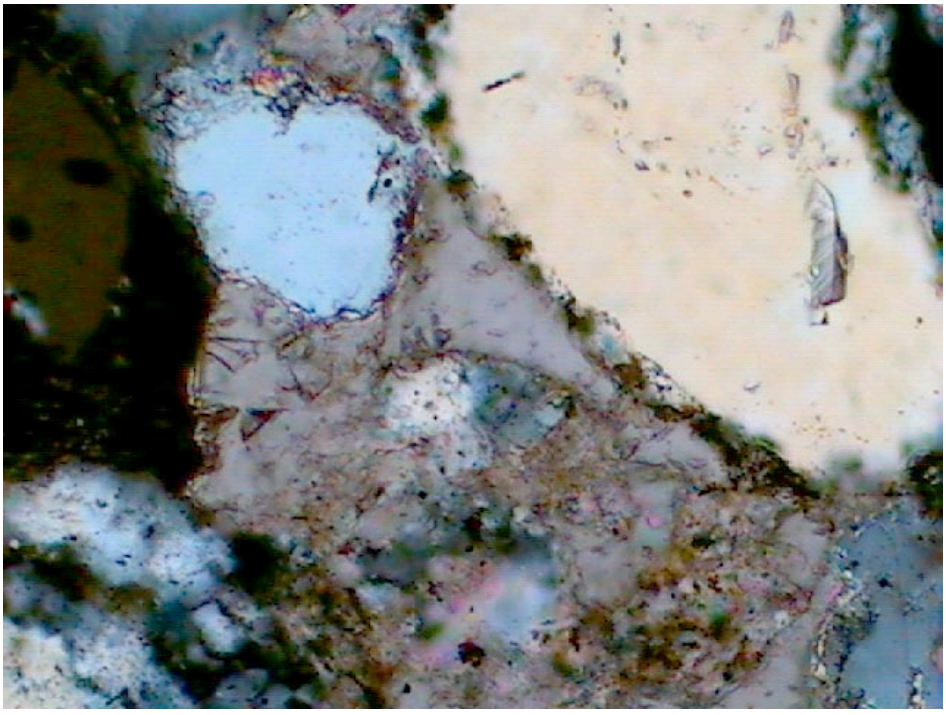

Figure 28: West Seahorse-1, Cuttings, 1425 m; (IMAGE: 957-4yx15.jpg).
Latrobe Group. Detail of dolomite cement in fine-grained quartz sandstone cuttings fragment - same as Figure 27, but with crossed polars.

Figure 29: West Seahorse-1, Cuttings 1415 m; (IMAGE: 957-2rp1.jpg).
Latrobe Group. Foraminifera – probable cavings contaminant from post-Latrobe Group section.

Plane light; Width of field of view = 780 µm (X 5 OBJECTIVE)

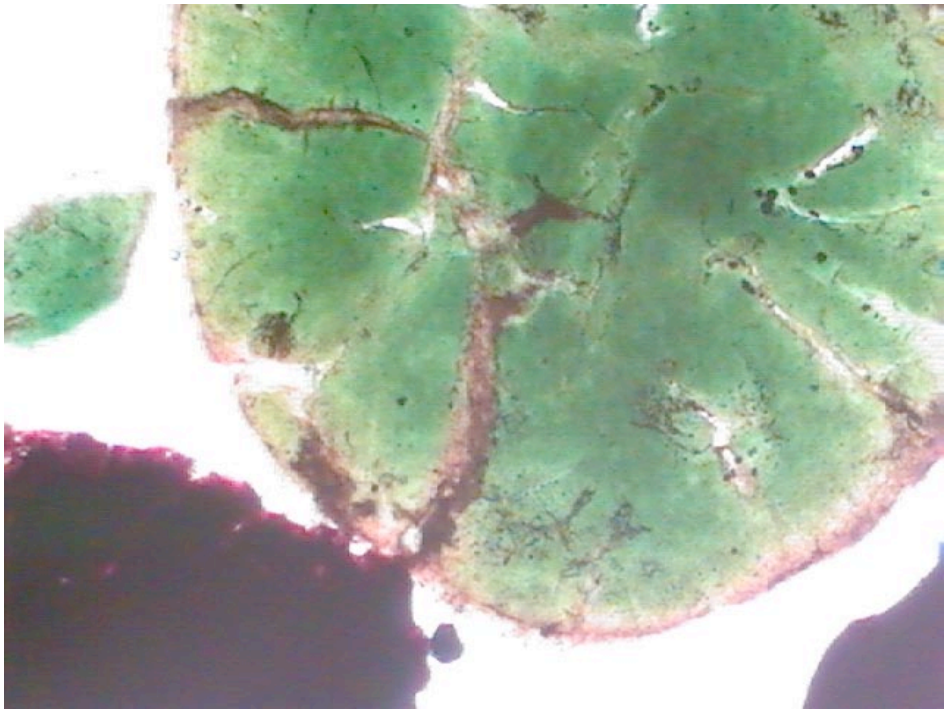

Figure 30: West Seahorse-1, Cuttings 1415 m; (IMAGE: 957-2rp2.jpg).
Latrobe Group. Glauconite pellet – probable cavings contaminant from post-Latrobe Group section.
Plane light; Width of field of view = 780 µm (X 5 OBJECTIVE)

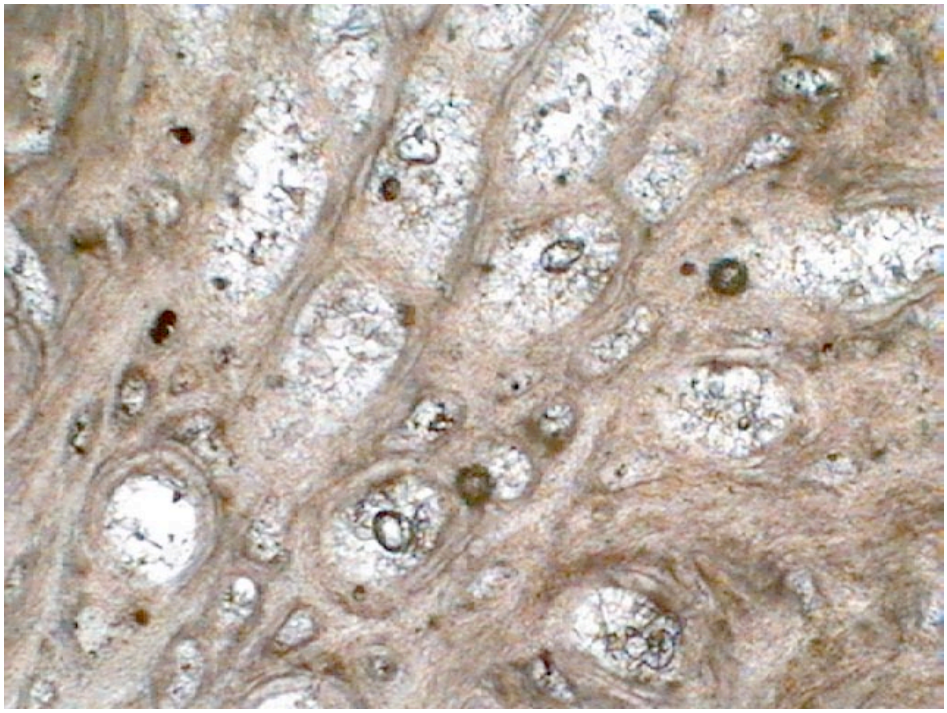

Figure 31: West Seahorse-1, Cuttings, 1415 m; (IMAGE: 957-2rp3.jpg).
Latrobe Group. ?Coral – probable cavings contaminant from post-Latrobe Group section.
Plane light; Width of field of view = 780 µm (X 5 OBJECTIVE)

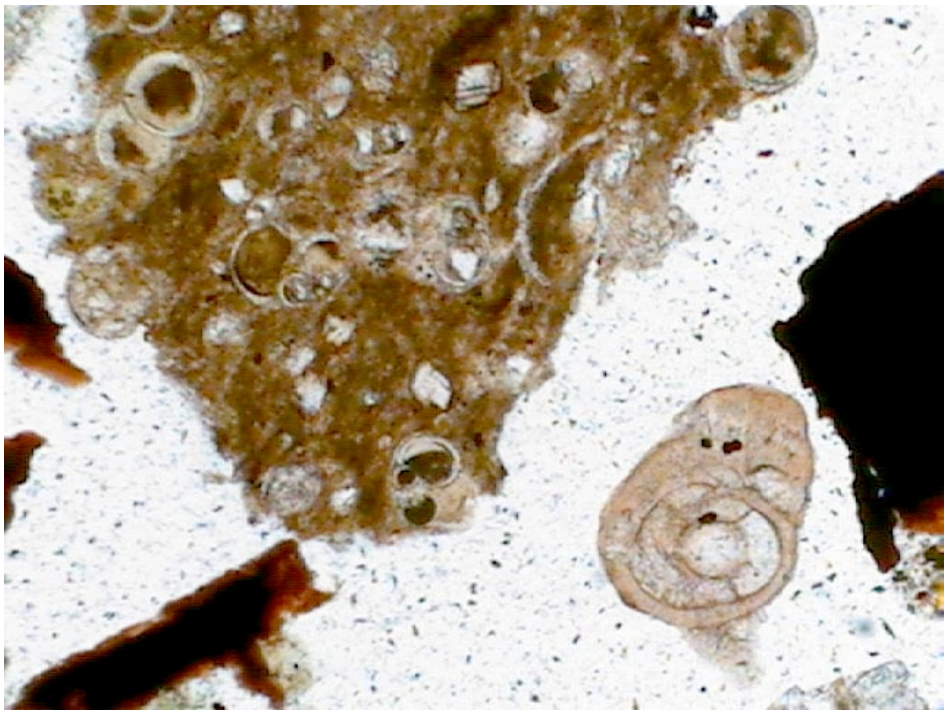

Figure 32: West Seahorse-1, Cuttings 1415 m; (IMAGE: 957-2rp4.jpg).
Latrobe Group. Marly limestone and foraminifera – probable cavings contaminant from post-Latrobe Group section.
Plane light; Width of field of view = 780 µm (X 5 OBJECTIVE)

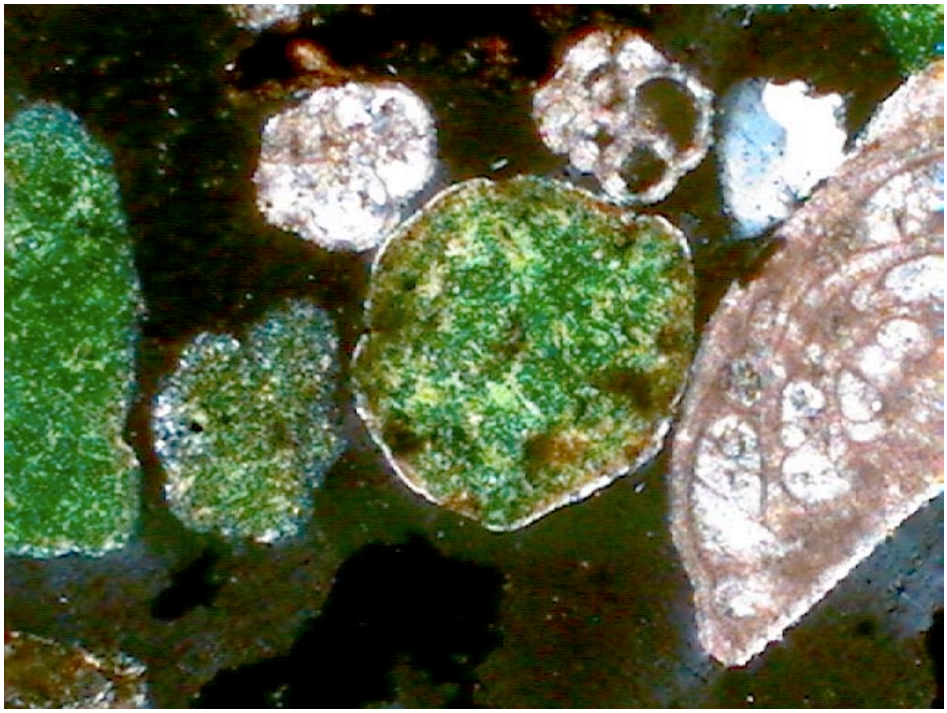

Figure 33: West Seahorse-1, Cuttings 1415 m; (IMAGE: 957-2rx5.jpg).
Latrobe Group. Glauconite pellets and foraminifera – probable cavings contaminant from post-Latrobe Group section.
Crossed polars; Width of field of view = 780 µm (X 5 OBJECTIVE)

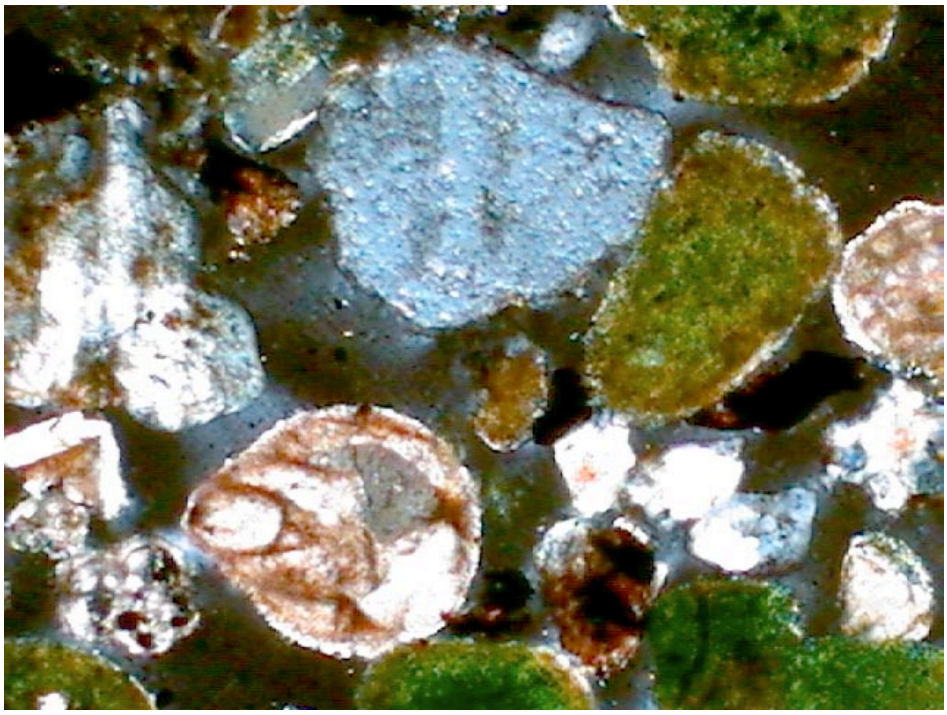

Figure 34: West Seahorse-1, Cuttings 1415 m; (IMAGE: 957-2rx6.jpg).
Latrobe Group. Detrital quartz grain (grey). The glauconite pellets and foraminifera are probable cavings contaminants from the post-Latrobe Group section.
Crossed polars; Width of field of view = 780 µm (X 5 OBJECTIVE)

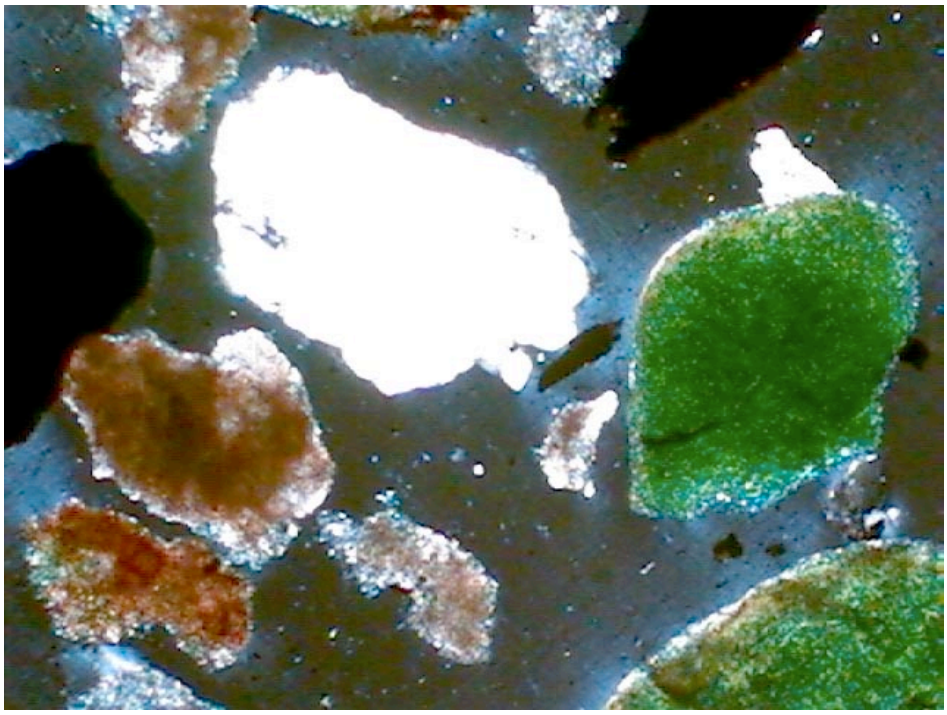

Figure 35: West Seahorse-1, Cuttings 1415 m; (IMAGE: 957-2rx7.jpg).
Latrobe Group. Detrital quartz grain (white). The glauconite pellets and limestone fragments are probable cavings contaminants from the post-Latrobe Group section.
Crossed polars; Width of field of view = 780 µm (X 5 OBJECTIVE)

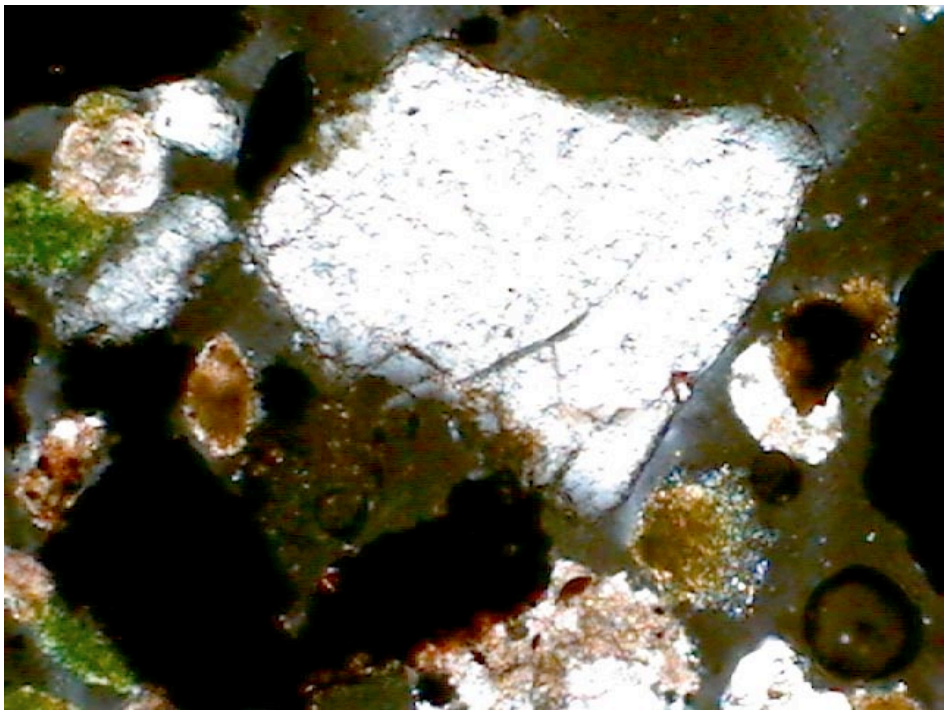

Figure 36: West Seahorse-1, Cuttings 1415 m; (IMAGE: 957-2rx8.jpg).
Latrobe Group. Detrital quartz grain (grey). Other fragments in the image are probable cavings contaminants from the post-Latrobe Group section.
Crossed polars; Width of field of view = 780 µm (X 5 OBJECTIVE)