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Preface

This study forms part of a joint project between the Geological Survey of Canada and Saint Mary's University to investigate the provenance and diagenesis of reservoir sandstones in the offshore Scotian Basin. This report documents the distribution of diagenetic barite, sphalerite and other late diagenetic minerals and provides an interpretation of their paragenesis and relationship to hydrocarbon charge.

A subsequent journal publication will use the data in this report to relate barite and sphalerite distribution to the salt-tectonic evolution of the basin, based on seismic interpretation, and the thermal history of the basin, based on fluid inclusion studies. Barite is readily transported in basinal fluids >100 °C, yet is consistently a very late diagenetic mineral, implying that the source of Ba is due to late diagenetic breakdown of K-feldspars at 2–3 km depth, confirmed by co-variation of Ba and Rb in sandstones. Sulfur isotope data suggest that the SO_4^{2+} was derived from Argo Formation evaporites which include 1–7% anhydrite. Sphalerite is mobile only in saline formation water >140 °C and requires long-distance transport through sandstones with Zn-rich Fe-Ti oxides. Active detachment faults on salt welds provide pathways and a source of salt for migrating formation water. The particularities of source and transport of both barite and sphalerite allow the pathways of basinal fluids and their relationship to active salt tectonics to be inferred, providing indirect dating of the later stages of diagenetic paragenesis corresponding to times of hydrocarbon charge.

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Citation of figures and tables in appendices

Each appendix has figures and tables with similar alphanumeric designations. If any of these figures or tables is cited, the citation needs to include the number of the appendix.

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TABLE OF CONTENTS

Abstract ... 6
Introduction ... 7
Approach and Methods ... 8
Data presentation ... 10
- Chebucto K-90 ... 10
- Dauntless D-35 ... 10
- Glenelg E-58 ... 10
- Glenelg N-49 ... 11
- Kegeshook G-67 ... 11
- Louisbourg J-47 ... 11
- Mic Mac J-77 ... 12
- Onondaga O-95 ... 12
- Panuke B-90 ... 12
- Peskowesk A-99 ... 13
- Sable Island C-67 ... 13
- South Desbarres O-76 ... 14
- Tantallon M-41 ... 15
- Thebaud C-74 ... 15
- Wenonah J-75 ... 15
- Fluid inclusions ... 15
- Geographic and stratigraphic distribution of sphalerite and barite ... 16

Discussion ... 16
- The assemblage sphalerite - barite - Mn-siderite - pyrite ... 16
- Barite and carbonate mineral veins ... 18
- Diagenetic kutnohorite ... 19
- Sphalerite and barite in the diagenetic paragenetic sequence ... 20
- Relationship to Mississippi-Valley-type ore deposits ... 21
- Petroleum significance ... 21

Conclusions ... 22
References ... 22

Figures

Fig. 1. Map of the Scotian Basin showing sampled wells. ... 28
Fig. 2. BSE images of textures of diagenetic barite. ... 29
Fig. 3. BSE images of textures of diagenetic barite. ... 30
Fig. 4. BSE images of textures of diagenetic sphalerite. ... 31
Fig. 5. BSE images of carbonate minerals from Onondaga O-95. ... 33
Fig. 6. BSE image of detrital K-feldspar and associated diagenetic minerals ... 34
Fig. 7. Siderite veins from sample Sable Island C-67-2834.91 ... 35
Fig. 8. BSE images and X-ray maps of carbonate minerals from Sable Island C-67. ... 36
Fig. 9. BSE images of kutnohorite from Sable Island C-67. ... 37
Fig. 10. BSE images and X-ray maps of barite lenses from South Desbarres O-76. ... 38
Fig. 11. Microphotograph of barite lenses from South Desbarres O-76. ... 39
Fig. 12. Barite veins from Onondaga O-95. ... 40
Fig. 13. Sphalerite and barite distribution. ... 41

Appendices

Appendix 1, Wells studied ... 42

Appendix 2, Chebucto K-90, 4285.12 43
Appendix 3, Dauntless D-35, 3162.76 46
Appendix 4A, Glenelg E-58, 3551.29 52
Appendix 4B, Glenelg E-58, 3710.2 57
Appendix 4C, Glenelg E-58, 3763.29 63
Appendix 5, Glenelg N-49, 3667.33 66
Appendix 6, Kegeshook G-67, 2116.36 77
Appendix 7A, Louisbourg J-47, 4076.26 88
Appendix 7B, Louisbourg J-47, 4081.17 92
Appendix 7C, Louisbourg J-47, 4528.03 102
Appendix 7D, Louisbourg J-47, 5445.94 113
Appendix 8, Mic Mac J-77, 2815.22 143
Appendix 9A, Onondaga O-95, 3266.71 149
Appendix 9B, Onondaga O-95, 3268.67 157
Appendix 9C, Onondaga O-95, 3268.73 165
Appendix 9D, Onondaga O-95, 3269.82 174
Appendix 10B, Panuke B-90, 2434.33 202
Appendix 11A, Peskowesk A-99, 2208.09 205
Appendix 11B, Peskowesk A-99, 2212.91 209
Appendix 11D, Peskowesk A-99, 3796.33 216
Appendix 12A, Sable Island C-67, 2834.91 228
Appendix 12B, Sable Island C-67, 4085.83 248
Appendix 13A, South Desbarres O-76, 3809.66 259
Appendix 13B, South Desbarres O-76, 5952.65 276
Appendix 14, Tantallon M-41, 5928.37 285
Appendix 15, Thebaud C-74, 3918.64 and Thebaud 5 4934.34 300
Appendix 16, Venture 4, 5383.28 307
Appendix 17, Wenonah J-75, 3076.94 310
Appendix 18, Fluid inclusions 321
Appendix 19, Geochemistry of barite and siderite 328

Abstract

Cementation of sandstone by minor barite and sphalerite is widespread in the Scotian Basin at burial depths > 2 km. These minerals provide further constraints on diagenetic processes and the nature of reservoir-quality risk in the exploration of this basin. This report documents the mode of occurrence, geochemistry, and paragenetic sequence of diagenetic barite and sphalerite and the structural character of veins of these minerals. The texture and geochemistry of these minerals were analysed by scanning electron microscopy and electron microprobe on samples from conventional core from 17 wells, sampling the geographic and stratigraphic range of the basin. Barite and sphalerite post-date silica and carbonate cementation, occurring in veins or occupying secondary porosity. They occur with diagenetic chlorite, pyrite, and titania minerals.

Sphalerite is common in Tithonian rocks of the Eastern Scotian Basin and in Early Cretaceous rocks of the Central Scotian Basin. Barite is also common in the Eastern Scotian Basin, particularly in the Tithonian, but is less common and shows no systematic variation with stratigraphy in the Central Scotian Basin. Late barite veins cut Lower Cretaceous sandstones in the wells Wenonah J-75, South Desbarres O-76, and Onondaga O-95. The Sable Island C-67 well contains an unusual diagenetic assemblage including kutnohorite, late Mn-siderite and pyrite. Late dolomite is present in the Onondaga O-95 well.

Mississippi-Valley-type ore deposits show many similarities to the barite-sphalerite diagenesis described here, in the association with dolomitizing and Mn-rich fluids, the evidence for synchronous emplacement of hydrocarbons, and the ability of the fluids to create secondary porosity in quartz. The distribution of barite and sphalerite can be used to constrain models of fluid flow in the basin.

Introduction

The Scotian Basin (Fig. 1) is a passive margin offshore basin that initially formed during Late Triassic to Early Jurassic rifting. It is currently producing gas from Jurassic carbonate reservoirs (Deep Panuke) and uppermost Jurassic to Lower Cretaceous deltaic sandstones (Sable Project) and some oil was produced from 1992-1999 (Cohasset-Panuke). Deep-water exploration in the early 2000's discovered significant gas in a Cretaceous turbidite salt-bound minibasin (Annapolis) but most deep-water results were disappointing due to lack of good reservoir. The several km thick Lower Cretaceous sand-prone interval of the Scotian Basin appears unique on the eastern North American margin: it resulted from enhanced sediment supply as a result of rifting of the North Atlantic Ocean and accommodation created by salt tectonics (Pe-Piper and Piper, 2012).

One of the principal exploration risks in the Scotian Basin is reservoir quality. Poor porosity and permeability in sandstone reservoirs result from silica overgrowths on detrital quartz and later carbonate cementation. Both of these cements appear to predate the main hydrocarbon charge (Karim et al., 2011b, 2012) and may be inhibited by the development of early chlorite rims on framework grains (Gould et al., 2010). In some reservoirs, secondary porosity from the dissolution of quartz, feldspar and carbonate appears important. In places, the secondary porosity hosts either barite ($BaSO_4$) or sphalerite (ZnS) cements. Both minerals are characteristic of modern relatively low temperature hydrothermal systems.

In the central Scotian Basin, fluid inclusions in and the C-isotope composition of carbonate cements indicate a period of flow of hot (< 175°C and <23 wt % NaCl) basinal brines in the Aptian–Albian (Karim et al. 2012). Although no direct link with volcanism is known, the timing of these hydrothermal fluids corresponds to a period of regionally high heat flow in the Northern Appalachians, that resulted in high vitrinite reflectance in the lower Cretaceous Chaswood Formation on land and widespread paleomagnetic resetting of basement rocks. Regionally, temperatures determined from fluid inclusions are consistently highest in the western part of the Sable Sub-basin studied by Karim et al. (2012) and in the adjacent Abenaki carbonate bank at Deep Panuke (Wierzbicki et al. 2006). Farther east, trapping temperatures are (for similar burial depths) rather lower at Venture and in the Eastern Scotian Basin (Karim et al. 2011; Hanley 2011).

The objectives of this work are:

1) To document the mineral assemblage(s) associated with hydrothermal events apparently driven by the action of hot basinal brines across the central to eastern Scotian Basin, including changes from inboard to outboard wells (Fig. 1).

2) To determine the relative age of such mineral assemblages using the established paragenetic sequence of the studied wells.
3) To define the type of fluid transport that resulted in the precipitation of sphalerite, barite, kutnohorite, and late Mn-siderite and pyrite.
4) To establish if the distribution of sub-surface salt might have influenced the occurrence of these particular diagenetic mineral assemblages.

Approach and Methods

The selection of samples for this study was based on the following considerations:
1) The need to work on exploratory wells with conventional cores, but also to study a range of geographic, stratigraphic and structural settings.
2) Some previous studies on the diagenesis of the early Cretaceous sedimentary rocks have reported the presence of barite and/or sphalerite, e.g. Karim et al. (2008), Pe-Piper and Piper (2009), and Pe-Piper et al. (2010).
3) The advantage of selecting samples from stratigraphic horizons with previous work on fluid inclusions (Karim et al., 2011b; Karim et al., 2012), which provide a context for the evolution of fluids in the basin.

Sampled wells are illustrated in Figure 1 and listed in Appendix 1. Conventional cores from all the studied wells have been logged and sampled in the past at the Canada-Nova Scotia Offshore Petroleum Board Geoscience Research Centre in Dartmouth, Nova Scotia. Further details on the stratigraphic and sedimentological setting of the samples, and their associated diagenesis, are available in the following Open Files, theses and journal publications:

Dauntless D-35 well: Pe-Piper and Piper (2009)
Venture field: Karim et al. (2010b)
Louisbourg J-47 well: Pe-Piper et al., 2010
Tantallon M-41 well: Piper et al. (2010)
Peskowesk A-99 well: Pe-Piper et al., 2006; Okwese, 2010 (MSc thesis)
Sable Island C-67, Wenona J-75, Mic Mac J-77, Onondaga O-95, South Desbarres O-76 wells: Gould et al. (2011a)
Glenelg E-58, N-49, Chebucto K-90 wells: Karim et al. (2008)
Thebaud C-74 well: Okwese (2010) (M.Sc. thesis)
Kegeshook G-67 well: Foley (2008) (B.Sc. Honours thesis)
Panuke B-90, Cohasset A-52 wells: Gould et al. (2011b), Karim et al. (2011a)

Selected core samples were carefully brushed and washed to remove any remnant drilling mud and other contaminants such as minerals evaporated from residual seawater. Polished thin sections, impregnated with blue epoxy, were made for most of the sandstone samples. Polished thin sections were studied under both transmitted light petrographic microscope, and Scanning Electron Microscope (SEM) at the Regional Analytical Centre at Saint Mary's University. Our main purpose was to locate and further study grains of barite, sphalerite and associated minerals (Appendices 2 to 16). The SEM used is a LEO 1450 VP SEM with a maximum resolution up to 3.5 nm at 30 kV. Detection limit is >0.1%. The SEM uses a tungsten filament to supply electrons to produce a back-scattered electron image (BEI) of the grains on the polished thin section and return an atomic number. The SEM was also used to confirm the identification of minerals that were not easily identified by petrographic microscope through the use of energy dispersive spectroscopy (EDS) (Appendix 2). Selected samples were further studied using the electron microprobe, in order to obtain chemical mineral analyses of better quality and compare them to our EDS analyses.

The electron microprobe mineral analyses were done at the Regional Electron Microprobe Centre located at Dalhousie University to determine the composition of both detrital and diagenetic minerals (Appendices 1 and 19). The microprobe is a JEOL-8200 electron microprobe with five wavelength spectrometers and a Noran 133 eV energy dispersive detector. The beam was operated at 15 kV and 20 nA, with an average beam diameter of 5 microns. Elements measured were Si, Al, Ti, Cr, Fe, Mn, Mg, Ca, Na, K, P, Zr, and Ba. The system used was the wavelength dispersive spectrometer (WDS).

All samples come from conventional cores, in order to avoid the barite from drilling mud mixed with cuttings. Despite this precaution, for each thin section the origin of the barite was judged grain by grain. In some samples it was obvious that drilling mud barite had penetrated along fractures, grain boundaries or dissolution voids (e.g. Appendices 3, 5, 7A, 8; summary in Appendix 1). Our criteria for separating diagenetic minerals, our prime focus, from both detrital and contaminants from drilling mud were: straight crystal outlines, mode of occurrence (e.g. veins, pods), and textural relationships with both framework and other diagenetic minerals.

Data Presentation

Using the methods described in the previous section, a large number of backscattered electron (BSE) images and mineral analyses have been collected (Appendices 2-16). Important textural relationships of diagenetic barite and sphalerite with both detrital and diagenetic minerals present in the studied sandstones are shown in Figures 2, 3 and 4. The data presentation in this section is based in these figures.

Chebucto K-90 well

Sample 4885.12, Middle member, Missisauga Fm. This sample contains diagenetic barite that fills pores along intergranular boundaries, and it is associated with Fe-calcite that it has probably partly replaced. The detrital feldspars have partly been replaced by kaolinite and late pyrite and chlorite. No sphalerite has been identified.

Dauntless D-35 well

Sample 3162.76, Upper member, Missisauga Fm. Some of the barite in this sample that fills pores might be of diagenetic origin, but most is clearly from drilling mud. No sphalerite has been identified.

Glenelg E-58 well

Sample 3551.29, Upper member, Missisauga Fm. This sample contains both diagenetic barite and sphalerite. The diagenetic barite shows replacive textures against detrital quartz and straight crystal outlines where it faces pore space. The sphalerite is associated with detrital K-feldpars and engulfs ankerite. It appears that ankerite has partly replaced detrital K-feldspar, and sphalerite later partly replaced both. In other areas, sphalerite seems to have partly replaced both kaolinite and ankerite. Some sphalerite, like barite, may show replacive texture against detrital quartz and straight crystal faces against pore space.

Sample 3710.20, Upper member, Missisauga Fm. The diagenetic barite in this sample fills pores, probably derived by dissolution of detrital K-feldpar, together with chlorite, siderite and Fe-calcite. The sphalerite, often with late pyrite and/or siderite, fills pores or replaces both kaolinite and Fe-calcite. Textures suggest that kaolinite has replaced K-feldspar.

Sample 3763.29, Upper member, Missisauga Fm. No diagenetic barite has been identified in this sample. The sphalerite present shows textures similar to those in sample 3710.20. The sphalerite together with late pyrite have partially replaced Fe-calcite (Fig. 4E).

Glenelg N-49 well

Sample 3667.33, Upper member, Missisauga Fm. This sample contains diagenetic barite, that fills pores and seems to have replaced kaolinite and Fe-calcite. No diagenetic sphalerite has been identified in this sample.

Kegeshook G-67 well

Sample 2116.36, Upper member, Missisauga Fm. Neither diagenetic barite nor sphalerite have been identified in this sample.

Louisburg J-47 well

Sample 4076.26, Middle member, Missisauga Formation. Most of the barite in this sample seems to be from drilling mud. Three analysed barite occurrences texturally appear diagenetic, filling pore space, and all have high SrO content (up to 4.5% wt; Appendix 19). Barite from drilling mud in this sample does not contain detectable SrO. No sphalerite has been identified.

Sample 4081.17, Middle member, Missisauga Formation. The diagenetic barite in this sample, often with straight crystal outlines, fills pores or engulfs detrital K-feldspar or albite and quartz (Fig. 2B) or replaces Fe-calcite (Fig. 2F) that seems to have been partially dissolved. The detrital quartz in contact with the diagenetic barite often shows dissolution voids and irregular fractures (Fig. 2A). No sphalerite has been identified.

Sample 4528.03, Mic Mac Fm. The diagenetic barite in this sample, together with late siderite and ankerite, fills pore space that probably was created by quartz dissolution mostly along grain boundaries. In some analysed spots, barite has partly replaced kaolinite, and in others it is associated with very small grains of celestite. Elsewhere, barite fills large pores together with albite. Such pores probably were products of detrital feldspar dissolution. In this sample sphalerite is often associated with fractured quartz (Fig. 4A) and albite. It fills pore space and it may have partially replaced kaolinite (Fig. 4A).

Sample 5445.94, Mic Mac Fm. The detrital quartz grains in this sample show a variable degree of grain dissolution. Often the diagenetic barite crystals have a straight crystal outline, and they may engulf Fe-calcite. Textural evidence suggests that the barite has partially replaced the carbonate cement. Barite also fills larger dissolution voids, where other minerals present include albite, ankerite and Fe-calcite. In general barite fills pores both of primary and secondary origin (Fig. 2D). Similar dissolution voids, but smaller, also occur in detrital quartz. Most carbonates show embayed contacts with quartz, whereas barite may have embayed or euhedral contacts with quartz (Fig. 2E). In the former case, barite may have replaced calcite, whereas in the latter case, barite may be filling the pore space. Parallel fibers of chlorite have been seen to cut, in a trellis-type texture, diagenetic barite grains (Fig. 3A). These lamellae may accommodate the Fe produced from the replaced Fe-calcite. In places the dissolution of the quartz is pronounced (Fig. 3B). In the same figure barite seems to have partially replaced detrital apatite. This sample also contains sphalerite with a variable mode of occurrence. It has been seen growing along the cleavage planes of detrital muscovite (Fig. 4B), whereas in other places it seems to have partially replaced Fe-calcite or siderite cements. It is also often associated with chlorite.

Mic Mac J-77 well

Sample 2815.22, Middle member, Missisauga Fm. Sphalerite has been found in this well and it seems to have replaced minerals in a lithic, probably volcanic, clast. Chlorite rims all the primary mineral grains in the clast, but not the sphalerite. On the contrary, sphalerite seems to have invaded along the chlorite rims. This observation suggest that sphalerite formed after the chlorite rims. Sphalerite also seems to have straight crystal outlines where it grows in pore space. Diagenetic barite was not seen.

Onondaga O-95 well

Sample 3269.82, Middle member, Missisauga Fm. Petrographic microscope study showed this sample contains early micrite cement (20%) and later sparry carbonate cement (5%), and pyrite (3%) (Gould et al. 2011). SEM study shows an interesting diagenetic assemblage (Fig. 5; Appendix 9D). The most common cement is ankerite that has been later dolomitized (Figs. 5A, B, C). The dolomite occurs either as stringers in early ankerite that make the ankerite appear inhomogeneous (Fig. 5C) or it fills pores in the form of concentric layers (Fig. 5D). In some of the pores filled with concentric dolomite layers are some homogeneous patches of late ankerite that partly or completely fill the remainder of the pore (Fig. 5G). The same sample also contains early kaolinite, which is engulfed by the early ankerite (Fig. 5E), illite, and rare chlorite.

This sample also contains late carbonate-sulfate veins that cross-cut the detrital grains and the above described diagenetic cements. These veins are almost always composite and consist of a combination of the minerals barite, late ankerite, late Fe-calcite and occasionally kaolinite (Fig. 17, Appendix 9D). The kaolinite that fills veins seems to be spatially related to an early kaolinite that is cut by the veins and has a different texture (Fig. 5F).

Panuke B-90 well

Sample 2381.85, Upper member, Missisauga Fm. Neither diagenetic barite nor sphalerite have been identified in this sample.

Sample 2434.33, Upper member, Missisauga Fm. This sample contains sphalerite but no barite. The sphalerite together with late pyrite fills pores, and it seems that they have partially replaced Fe-calcite, which probably earlier has replaced K-feldspar.

Peskowesk A-99 well

Sample 2208.09, Cree Member, Logan Canyon Fm. This sample has no clear textural evidence that analysed barite was of diagenetic origin and not from drilling mud invading along fractures.

Sample 2212.91, Cree Member, Logan Canyon Fm. Both diagenetic barite and sphalerite are present. The diagenetic barite is rare and fills pores. Other minerals identified in these pores include chlorite, carbonates and feldspars. Such pores may be products of K-feldspar dissolution. The sphalerite is also rare, developed along fractures in detrital chloritized biotite (Fig. 4C).

Samples 2238.65 and 2245.84, Cree Member, Logan Canyon Fm. Neither diagenetic barite nor sphalerite have been identified in either sample.

Sample 3796.33, Mic Mac Fm. Diagenetic barite seems to have partially replaced quartz overgrowths and Fe-calcite. It also often fills pore spaces, some of which seem to be related to detrital quartz dissolution. In some analysed spots barite engulfs albite. Sphalerite also seems to have partially replaced Fe-calcite. It often fills pore spaces created by the dissolution of both detrital quartz (Fig. 4D) and K-feldspar. In such pores chlorite and late pyrite are also present. Sphalerite has also been seen to have grown along the cleavage planes of detrital K-feldspar.

Sable Island C-67 well

Sample 2834.91, Naskapi Member, Logan Canyon Fm. This sample is a laminated fine grained sandstone within a predominantly shaly interval. No diagenetic barite was found in this sample, but sphalerite has precipitated in pores created by the dissolution of K-feldspar, replacing Fe-calcite cement, and along the cleavage planes of detrital muscovite (Fig. 6). The muscovite has been partially replaced by Mn-siderite.

This sandstone is cut by vertical, mm-wide, zones (Figs. 7A, B), with Mn-siderite filling all the pores between the detrital minerals, which comprise mostly quartz and K-feldspar. Some illite, Fe-rich chlorite, and pyrite are also present (Table A-5 and Figs. 15-20 in Appendix 12A). These zones are irregular, as if they originated as fractures, but there is no petrographic evidence for fracturing. Some thin beds within the sandstone also appear partly cemented by Mn-siderite (Figs. 7A, B).

This sandstone also contains a number of carbonate clasts. One such clast (Fig. 8) consists of a carbonate-clay-rich muddy pellet or intraclast now principally of kutnohorite (A in Fig. 8) and a bioclast now principally of Fe-calcite (B in Fig. 8). Both clasts are partly dissolved and are rimmed by a mixture of chlorite, illite and Mn-siderite. Another clast is zoned with calcite in the core and kutnohorite in the rim, with a thin outermost rim of Mn-siderite (Figs. 6, 7, Appendix 12). Both calcite and kutnohorite have been partially dissolved. Still another carbonate bioclast (B in Fig. 9A) is adjacent to a detrital K-feldspar grain (C in Fig. 9A). Both grains are partially dissolved, and are surrounded by Mn-siderite rims. In parts of the bioclast B (Fig. 9) it seems as if kutnohorite developed in dissolution voids of pre-existing ankerite. Thus kutnohorite is mostly found at the rim of the bioclast, whereas the ankerite contains several dissolution voids.

Sample 4085.83, Lower member, Missisauga Fm. Diagenetic barite, with straight crystal outlines, is in contact with mixtures of K-feldspar and Fe-calcite. This texture suggests that the Fe-calcite had partially replaced detrital K-feldspar and that later the barite has partially replaced both. The detrital K-feldspar has either been dissolved or has partly or completely been replaced by Fe-calcite. The pores have been filled later by chlorite, illite, sphalerite and pyrite. Sphalerite engulfs Fe-calcite, that probably has replaced K-feldspars and occasionally also engulfs relics of K-feldspar. Occasionally, sphalerite together with pyrite fills pores. These minerals are often associated with diagenetic albite, which they appear to partially replace (Fig. 4F). Dissolution voids are very common in the detrital quartz of this sample.

South Debarres O-76 well

Sample 3809.66, Lower member, Missisauga Fm. Diagenetic barite fills pore spaces with relics of detrital K-feldspar. In other places it engulfs small albite grains, probably of diagenetic origin or left from dissolved K-feldspar. It also engulfs Fe-calcite and ankerite, and it may contain pyrite inclusions. Two large barite lenses are seen in a fracture slightly oblique to the bedding plane (Figs. 10, 11). The fractures on both sides of the barite grains are filled with dark brown to black minerals (Figs. 11-13, Appendix 13A). These minerals include siderite with banded texture, and pyrite, chlorite, Al-phosphate, and fragments of detrital quartz and ankerite. The siderite seen in these fractures is Mn-rich (up to 2% MnO, Appendix 13A).

Sample 5952.65, Mic Mac Fm. The diagenetic barite in this sample often fills dissolution voids within detrital quartz (Fig. 3C). It also replaces ankerite that has replaced albite (Fig. 3E). Diagenetic TiO_2 minerals have also partially replaced ankerite. The sphalerite fills voids that have created mainly along detrital quartz grain boundaries, often together with ankerite and chlorite, or it may engulf quartz (Fig. 4G). Chlorite also often precipitates along inter-granular boundaries (Fig. 3C)

Tantallon M-41 well

Sample 5928.37, Verrill Canyon Fm, equivalent to Middle member, Missisauga Fm. The diagenetic barite engulfs albite and it replaces Fe-calcite, that probably has replaced albite (Fig. 3C). Barite also fills voids along inter-granular boundaries of detrital grains. The sphalerite has partly replaced feldspars (albite and K-feldspar) or fills dissolution voids replacing kaolinite or Fe-calcite (Fig. 4H). Late pyrite, siderite and chlorite show the same mode of occurrence.

Thebaud C-74 well

Sample 3918.64, Lower member, Missisauga Fm. Both diagenetic barite and sphalerite fill dissolution voids (Fig. 3D). They have probably partially replaced kaolinite. Chlorite, pyrite and TiO_2 minerals show the same mode of occurrence.

Wenonah J-75 well

Sample 3076.94, Upper member, Mississauga Fm. The upper part of this 13 m long core shows widespread evidence of sub-vertical fractures and brittle shear zones (Gould et al., 2011, p. 115–119). The studied sample is from a subvertical vein in sandstone. The vein in places appears brittly deformed (Appendix 16, Figs. 4, 7), which suggest that deformation continued after the invasion of the veins. The vein in places contains xenoliths from the host sandstone, and although predominantly barite, also contains patches of Fe-calcite (Appendix 16, Fig. 1). There is textural evidence that barite was the last mineral to crystallise (Appendix 16, position A in Fig.7). The host sandstone contains varying quantities of kaolinite (0.5 to 10%) and quartz overgrowths (0.1 to 7%). Several of the samples from the same core have late, pervasive pore-filling carbonate minerals (up to 50%) that have been identified as Fe-calcite, calcite and ankerite (Gould et al., 2011a). The same diagenetic minerals are present in the sandstone cut by the barite vein.

Fluid Inclusions

Polished thin sections for four samples from three different wells have been studied, using the petrographic microscope, looking for fluid inclusions in barite. A short petrographic description of these samples follows. Illustrations are provided in Appendix 18:

Louisbourg J-47 well, sample 5445.94: The occurrence of fluid inclusions in barite in this sample is variable. In some places (Appendix 18, Figs. 1, 2)) they do not show well defined linear distribution, whereas in other places (Appendix 18, Figs. 3, 4) they show linear distribution, and the distribution direction may be along a fracture or cleavage plane. They are mostly two phase fluid inclusions.

South Desbarres O-76 well, sample 3809.66: The fluid inclusions in barite in this sample show a linear distribution perpendicular to fractures (Appendix 18, Fig. 5), and they are mostly two phases fluid inclusions.

Wenonah J-75 well, sample 3076.94: Fluid inclusions in this sample are very common and their size is variable (e.g. Appendix 18, Fig. 6). They often show well defined linear distribution along micro-fractures (e.g. Appendix 18, Figs. 7, 8, 9) or they may be perpendicular to horizontal fractures (e.g. Appendix 18, Fig. 10) as well. In some places they may not show well defined distribution, but they are present near fractures (e.g. Appendix 18, Fig. 11). They are mostly two phase fluid inclusions.

Geographic and stratigraphic distribution of sphalerite and barite

Sphalerite in the Eastern Scotian Basin is best developed in the deeper parts of the wells in the Mic Mac Formation (Fig. 13). In the central Scotian Basin, however, it is most abundant in the Middle and Upper members of the Missisauga Formation, but almost absent in deeper strata. Sphalerite has been found in only two of seven wells examined in the Logan Canyon Formation: in the Naskapi Member of Sable Island C-67 and in the basal Cree Member of Peskowesk A-99.

Barite is absent from samples in the most inboard wells of the Scotian Basin, even those that contain sphalerite (Mic Mac J-77; Panuke B-90). It is most abundant in the most deeply buried strata in the Eastern Scotian Basin. Barite cement is less abundant in the Central Scotian Basin, where it shows no systematic variation with depth of burial. Barite has been found in only two of seven wells examined in the Logan Canyon Formation: in the basal Cree Member of Peskowesk A-99 and Cohasset A-52 (Appendix 1).

Discussion

The assemblage sphalerite – barite - Mn-siderite - pyrite

Barite and/or sphalerite have been found in 16 of the 17 studied exploratory wells (Fig. 1). The exception is the Kegeshook G-67 well, where the available core is shallow (2.2 km, Upper Mississauga Fm.). These minerals are commonly associated with Mn-siderite and pyrite together with some chlorite. These minerals seem to be more abundant and their textural relationships better expressed in deeper samples from the same well (Appendix 1).

The mineral paragenesis barite - sphalerite - Mn-siderite - pyrite in general fills pores that represent either primary or secondary porosity. The largest of such pores seem to be products of feldspar dissolution, mostly K-feldspar. However, detrital quartz is also commonly fractured and partially dissolved, providing space for the precipitation of this late mineral assemblage. These minerals have partially replaced earlier cements such as kaolinite, albite, Fe-calcite and ankerite. More rarely they have partially replaced relics of detrital minerals such as K-feldspar and apatite.

Crystallisation temperatures for hydrothermal barite range from 70–250 °C (Samson and Russell, 1987; Kontak et al., 2006). Barite associated with sphalerite, galena, or other sulfides probably has higher temperatures of formation (Davis et al., 2003). Barite solubility is strongly dependant on temperature. Barite solubility decreases as pressure decreases and with decreasing temperature below 100 °C (Hanor, 2000). Seafloor brine seeps in the Gulf of Mexico, derived from thick Jurassic salts, are sites of barite precipitation at the sea floor, with SO_4^{2+} derived from seawater (Sassen et al., 2004; Roberts et al., 2010), but deep subsurface precipitation of barite from saline brines involves SO_4^{2+} derived from the brines (Griffith and Paytan, 2012). Although barite is readily transported in basinal fluids >100 °C, it is consistently a very late diagenetic mineral. This implies that the source of Ba is from a late diagenetic reaction, probably the breakdown of K-feldspars. The dissolution of K-feldspar in the Scotian Basin begins at 2 km burial depth and is largely complete by 3 km (Pe-Piper, 2012).

Under reducing conditions, indicated by the co-occurrence of sphalerite and pyrite, Zn transport is favoured by chloride complexes in basinal brines, whereas carboxylate complexes probably play only a minor role (Giordano, 2002). A salinity of ~17% NaCl equivalent is required for major transport of Zn in chloride complexes (Hanor, 1996), although some brines with >10% salinity may transport Zn (Giordano, 2002). Crystallisation of sphalerite generally occurs at temperatures of 140–200 °C (Samson and Russell, 1987). Thus the different distribution patterns for barite and sphalerite (Fig. 13) probably result from the need for saline basinal fluids to transport sphalerite.

The emplacement of barite and/or siderite documented in this study was associated with pervasive fracturing in several wells e.g. Louisburg J-47, Wenonah J-75, South Debarres O-76, and Sable Island C-67 (Appendix 1). For example, sample 2834.91 from Sable Island C-67 shows vertical zones (Figs. 7A, B) with Mn-siderite, together with some illite, Fe-rich chlorite and pyrite, filling all the pores between the detrital minerals, mostly quartz and K-feldspar (Fig. 8C). These zones cross cut the bedding plane of a fine grained sandstone (Figs. 7A, B). As discussed earlier these zones preserve no petrographic evidence for fractures. This suggests that any initial fracturing preferentially occupied the carbonate cement, and that the original cement dissolved, and the new cement, mostly Mn-siderite, precipitated in the resulting porosity.

In South Debarres O-76, in sample 3809.66, lenses of barite (Figs. 10, 11) resemble bedding-parallel "beef" described by Cobbold et al. (2013). This system of fractures cuts detrital minerals, e.g. quartz, and earlier diagenetic minerals, e.g. ankerite (Figs. 12, 13 in Appendix 13A). The more likely suggested cause for “beef”-type veins are seepage forces due to fluid overpressure (Cobbold et al., 2013). The South Debarres well shows strong overpressure, e.g. the Repeat formation tester (RFT) data in Figure 11D. A single test at depth 3725 m indicates overpressure, but all other tests above 4150 m indicate hydrostatic pressure. Tests immediately above and below the depth of the studied sample, 3809.66 m, also show hydrostatic pressure. Thus, although the depth of the studied sample is above the continuous overpressure zone now, it might have been in the overpressure zone in the past, and hydraulic fracturing later released the pressure.

Barite and carbonate mineral veins

The mode of occurrence of barite, whether as veins or cement, depends on the structure related to the particular well. Based on seismic reflection profiles (MacLean and Wade, 1993; Kendell, 2012), wells associated with substantial faulting, such as the Onondaga O-95, South Debarres O-76, and Wenonah J-75 wells, are those in which veins of barite and carbonate minerals are found in conventional core. Otherwise, the fluids that precipitated sphalerite, barite, Mn-Mg-siderite, pyrite, chlorite and illite seem to have followed other paths of weakness. Such paths include: a) mineral cleavage e.g. muscovite (Figs. 4B, 6), and chloritized biotite (Fig. 4C); b) fractures in detrital minerals e.g. quartz (Fig. 4A) and K-feldspar; c) grain boundaries (Fig. 4G); d) dissolution voids in detrital minerals especially quartz and K-feldspar (Figs. 4H, 6); and 5) dissolution of earlier carbonate cements (Figs. 2D, F; 4E, H). Widespread microfractures may be produced by hydraulic fracturing related to release of overpressure (Laubach et al., 2010) and many may reseal through the crack-seal process or continued growth of crystals (Wiltschko and Morse, 2001). Sealing is evidence in the vertical zones in Figure 7 and the linear zones of secondary fluid inclusions (Appendix 17; also Karim et al., 2011), implying sealing of microfractures after the crystallisation of barite, Mn-siderite and other later cements. However, no general patterns of microfracturing and sealing were recognised in the course of this study.

The Onondaga O-95 well is located above a salt dome with substantial faulting over its crest, showing offsets to the base of Miocene (MacLean and Wade, 1993). Textures of both cement and vein minerals help to establish the following order of events: 1) A carbonate, probably calcite, was produced by near-sea-floor diagenesis, preventing early compaction of framework grains (e.g. Fig. 5A). 2) This early cement was replaced later by ankerite. This ankerite is characteristically inhomogeneous and contains many micropores (Fig. 5B, C). 3) Larger residual pores appear to have been pathways for dolomitizing fluids, which produced concentric zones of dolomite with varying Mg content (MgO ranges between 18 and 21%, Fig. 5E) presumably by solid-state replacement of the ankerite. 4) The residual pores were then filled by massive or sparry ankerite (Fig. 5G, analysis 6), similar to sparry ankerite filling veins (Fig. 5F).

The Onondaga O-95 well also shows subvertical veins created by extensional fracturing. Such veins are filled by barite, calcite, ankerite and kaolinite may occur in places (Fig. 12). There is no evidence of vein filling synchronous with vein opening. The suggested sequence of events might have been as follows: a) Fracture opens. b) Kaolinite precipitates locally, where there was sufficient availability of Al (Fig. 12E). c) Ankerite or in places Fe-calcite fills much of the vein engulfing the late kaolinite (Fig. 12D, E). The relationship of the ankerite to Fe-calcite is unclear. d) Barite fills the remainder of the vein, and in places replaces ankerite and Fe-calcite (Fig. 12D, F).

Diagenetic kutnohorite

Kutnohorite is a trigonal mineral of the dolomite group and forms a solid-solution series with dolomite and ankerite. It is white, pale pink or light brown. The pink shade is due to increased Mn and the brown colours are due to increased Fe content. It is found in manganiferous sediments associated with rhodochrosite, aragonite and calcite. It is also found in sedimentary exhalative deposits together with other Mn-bearing carbonates and silicate minerals.

Kutnohorite has been identified and analysed in sample 2834.91 m from Sable Island C-67 well. The diagenetic mineral assemblage in this sample is: Fe-calcite, Mn-siderite, chlorite, illite and quartz overgrowths. Based on the textures of minerals seen in the two grains described and analysed (Fig. 8; also Figs. 2 and 3, Appendix 8A) from this sample, one of them is a calcite bioclast (B) and the other a carbonate-clay rich muddy pellet or intraclast (A). The intraclast grain now consists mostly of kutnohorite. Both grains, the calcite and the kutnohorite, are now rimmed by and partially replaced by Mn-siderite. The kutnohorite grain seems to be the most affected by the Mn-siderite replacement. The Mn-siderite is intermixed in places with chlorite and illite. The textures indicate that this replacement post-dates the formation of silica overgrowths on detrital quartz. Several other clasts in the same sample have kutnohorite as a main component. In Fig. 9A two grains, a detrital K-feldspar and a bioclast (C), are rimmed by Mn-siderite, while both K-feldspar and the ankerite in the bioclast have been partly replaced by kutnohorite. In another bioclast (Figs. 9B, C), the kutnohorite shows dissolution voids and the Mn-siderite often rims pores lined by chlorite and illite. This relationship of Mn-siderite to the silicate diagenetic minerals is present throughout the sample.

The origin of kutnohorite is debatable. It does not appear to be the product of sea floor diagenesis, as it post-dates quartz overgrowths and ankerite. Ankerite is widespread as a late carbonate cement in the Lower Cretaceous sandstones of the Scotian Basin (Karim et al., 2010). Mn is very sensitive to changes in Eh and it is possible to replace ankerite by kutnohorite by changing the Eh of formation waters. Our stable isotope data (Karim et al., 2012) suggest that ankerite forms a mixing line between ferroan calcite and siderite, as if early siderite was replaced by ankerite. The replacement of kutnohorite by Mn-siderite is a volume reduction reaction, since siderite has much smaller molar volume (29.43) compared to kutnohorite (66.38), creating thus secondary porosity. However, the molar volume of kutnohorite is very similar to that of ankerite (64.50), so the presence of secondary porosity is not evidence of earlier replacement of ankerite by kutnohorite. The analysed sandstone bed is within a thick shale interval (Naskapi Member) and the abundance of Mn may be related to a source in the shales.

Sphalerite and barite in the diagenetic paragenetic sequence

We have found no direct textural evidence for the relative age of barite and sphalerite. Sphalerite is more common in deeper samples or in intervals where other data (e.g. fluid inclusions, Karim et al., 2012) suggest higher temperatures (e.g. Sable Island C-67, Glenelg E-58) (Appendix 1). Barite continued to crystallise in greater amounts, in the form of veins or as cement, at shallower depths (and probably lower temperatures), e.g. in the wells Peskowesk A-99, Wenonah J-75 and Onondaga O-96, whereas sphalerite becomes rare in depths <3.5 km.

Secondary porosity resulting from dissolution or replacement of K-feldspar commonly contains sphalerite and/or barite, together with chlorite, pyrite and titania minerals, but there is no clear evidence of the relative age of these diagenetic minerals among themselves (Figs. 3D, E, 4F). The barite lenses in the oblique fractures in South Desbarres O-76 are rimmed by Mn-siderite, chlorite and illite (Figs. 10, 11). This relationship in an opening fracture suggests that the barite is the youngest mineral. On the other hand, in one other case, chlorite cuts barite (Fig. 3A).

The textural relationships seen in Figure 9C indicate that kutnohorite replaces ankerite, but Mn-siderite, chlorite and illite are all later than kutnohorite (Fig. 8). The dolomite in the Onondaga O-96 well has replaced widespread ankerite cement (Figs. 5E, G), but is followed by sparry ankerite (Fig. 5G). If this sparry ankerite is the same as that in the subvertical veins (Fig. 12), then it is followed by barite (Fig. 12D).

In some wells, fracturing and dissolution of quartz resulting in enhanced secondary porosity (e.g. Fig. 3B; 6). Three of the five samples with large amounts of secondary porosity in quartz are the deepest (Tithonian) samples from the Sable Island C-67, Louisbourg J-47 and Peskowesk A-99 wells and all contain sphalerite (Appendix 1). The other two are Upper Missisauga samples from Glenelg E-58 and Wenonah J-75, the former also containing sphalerite. Quartz dissolution suggests hot corrosive fluids that dissolved previous cements and precipitated new cement minerals, consistent with the high temperatures and salinity required to transport and deposit sphalerite. Such fluids may also have been responsible for leaching Zn out of Fe-Ti oxides in sandstones.

Relationship to Mississippi-Valley-type ore deposits

The minerals barite and sphalerite are typical components of Mississippi-Valley-type (MVT) ore deposits. Such deposits form in carbonate host rocks in sedimentary basins. Commonly, MVT ore deposits include hydrocarbons, and the associated fluids produce widespread dolomitization (e.g. Gregg, 2004; Davies and Smith, 2006). In the case of the Scotian Basin, a possibly related dolomitization affected the Upper Jurassic Abenaki Formation (Wierzbicki et al., 2006) and the dolomitization in Onondaga O-96 may also be related. MVT deposits generally form where sulphate and chloride ions are available from evaporite deposits in the basin, with transport of Ba, Mn, Pb and Zn occurring through chloride complexing in hot brines (Basuki and Spooner, 2002). Precipitation of sulphides requires reduction of sulphate derived from evaporite deposits to sulphide. This may result from organic matter released during dolomitization of host limestone (Wenz et al., 2012; Reid et al., 2013). Silica (quartz, chalcedony) is a common gangue mineral in MVT deposits (Wenz et al., 2012; Conliffe et al., 2013). This implies that the ore-bearing fluids were capable of corroding quartz and transporting silica. Such a process is consistent with the observations of secondary porosity in quartz in deeply buried sandstones in the Scotian Basin (Appendix 1).

Petroleum significance

In the Scotian basin, the main hydrocarbon charge followed partial cementation by silica and Fe-calcite–ankerite cements in sandstone reservoirs, as indicated by hydrocarbons principally in secondary fluid inclusions (Karim et al., 2011, 2012). Hydrocarbon charge has been generally interpreted to be most active in the Late Cretaceous (Williamson, 1995; OETR, 2011). The mobility of late Ba and Zn, precipitating as barite and sphalerite, post-dates the Fe-calcite–ankerite cements in sandstone reservoirs and is broadly synchronous with hydrocarbon charge. Their co-occurrence with titania minerals is probably related to the availability of organic acids (Hays et al. 1996; Parnell 2004). Ba and Zn mobility is strongly dependant on availability of these two elements in detrital minerals and on the temperature and salinity of basinal fluids. Detailed basin modelling, of the type carried out by Stover et al. (2001) in the Gulf of Mexico, is beyond the scope of the present study. Nevertheless, the variable stratigraphic and geographic distribution of barite and sphalerite in the Scotian Basin provides a means of validating future quantitative fluid-flow modelling.

Conclusions

1. Barite and sphalerite are among the last diagenetic minerals to form in porous sandstones of the Scotian Basin. They commonly occupy secondary porosity from the dissolution of framework quartz and feldspar, together with Mn-siderite, pyrite, chlorite and titania minerals. Sphalerite is also common in microfractures along grain boundaries and in the cleavage of detrital minerals. Barite is also found in veins.

2. The paragenetic sequence of late diagenetic minerals, following widespread Fe-calcite or ankerite cementation, involves development of secondary porosity including dissolution of feldspar. This may be followed by further precipitation of sparry ankerite, or at higher temperatures the development of sphalerite, pyrite, titania minerals and chlorite cements. Mn- siderite develops locally. Barite appears to be the last cement to fill veins and may thus also be the last cement to fill pores.

3. In Onondaga O-95, dolomitizing fluids moved through residual porosity and replaced ankerite with dolomite with variable Mg content. Porosity was finally closed by precipitation of sparry ankerite.

4. In the Naskapi Member of the Sable Island C-67 well, the Mn, Ca carbonate kutnohorite has replaced carbonate pellets and bioclasts. This kutnohorite post-dates quartz overgrowths and ankerite and is replaced by Mn-siderite.

5. The precipitation of barite and sphalerite cements shows many similarities with processes involved in the formation of Mississippi-Valley-type ore deposits. The mobility of Ba and Zn was probably synchronous with hydrocarbon charge and the distribution of barite and sphalerite cements can provide constraints on fluid movement in the basin.

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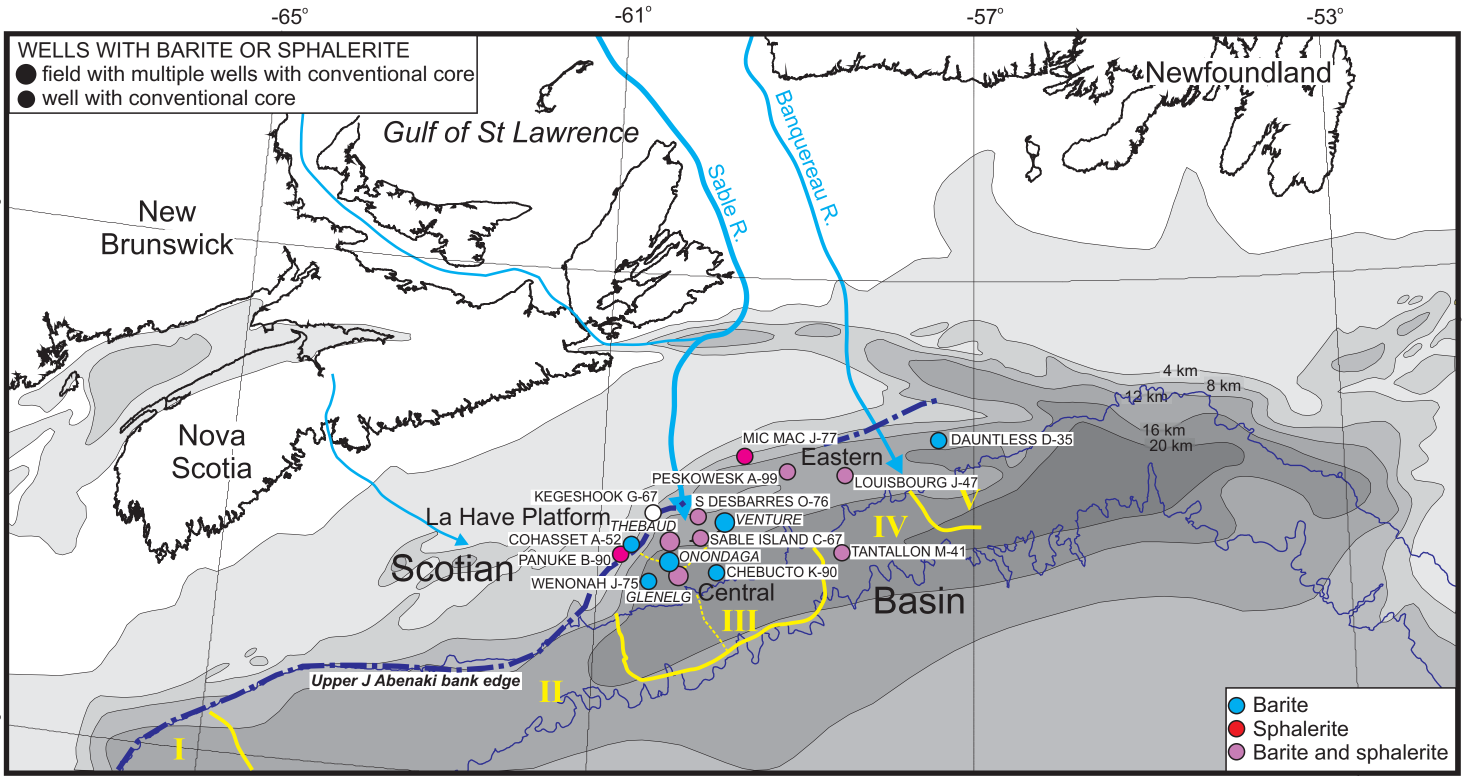


Figure 1. Isopach map (km) of the Scotian Basin showing sampled wells and the occurrence of sphalerite and barite. Also shows the salt tectonic provinces I–V of Shimeld (2004); the seaward limit of the Upper Jurassic carbonate bank (Wade and Maclean, 1990); and the generalized position of Early Cretaceous rivers (Zhang et al., 2014). Isopachs from Williams and Grant (1998).

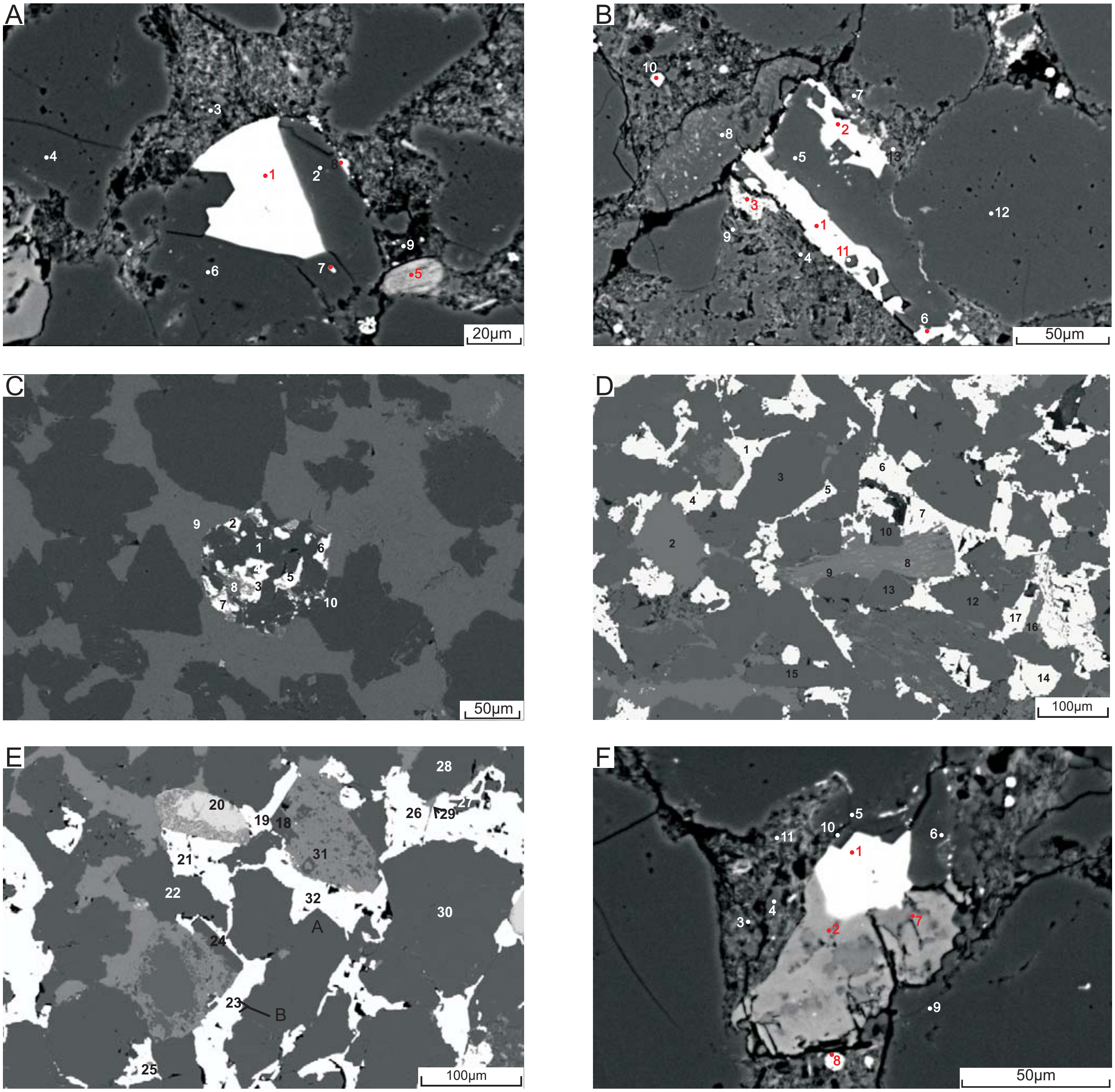


Figure 2: BSE images of representative textures of diagenetic barite and other associated minerals, Numbers on the images are numbers of mineral analyses. **A**: Louisbourg J-47-4081.17 (Appendix 5B, Fig. 7). Diagenetic barite (1) in straight crystal contacts with detrital quartz (2, 6, 7, 4). **B**: Louisbourg J-47-4081.17 (Appendix 5B, Fig. 9): Diagenetic barite (1) engulfs detrital quartz (11, 13) and albite (5). **C**: Louisbourg J-47-5445.94 (Appendix 5D, Fig. 12): Diagenetic barite (14) fills dissolution voids in detrital quartz. **D**: Louisbourg J-47-5445.94 (Appendix 5D, Fig. 32): Diagenetic barite fills primary or secondary porosity. In places, it appears to have partially replaced diagenetic carbonates.
E: Louisbourg J-47-5445.94 (Appendix 5D, Fig. 33): Similar to panel D, In places, quartz grains have euhedral outlines or overgrowths (position A). In other places quartz is partially dissolved (position B).
F: Louisbourg J-47-4081.17 (Appendix 5B, Fig. 6): Diagenetic barite (1) replaces Fe-calcite (2).

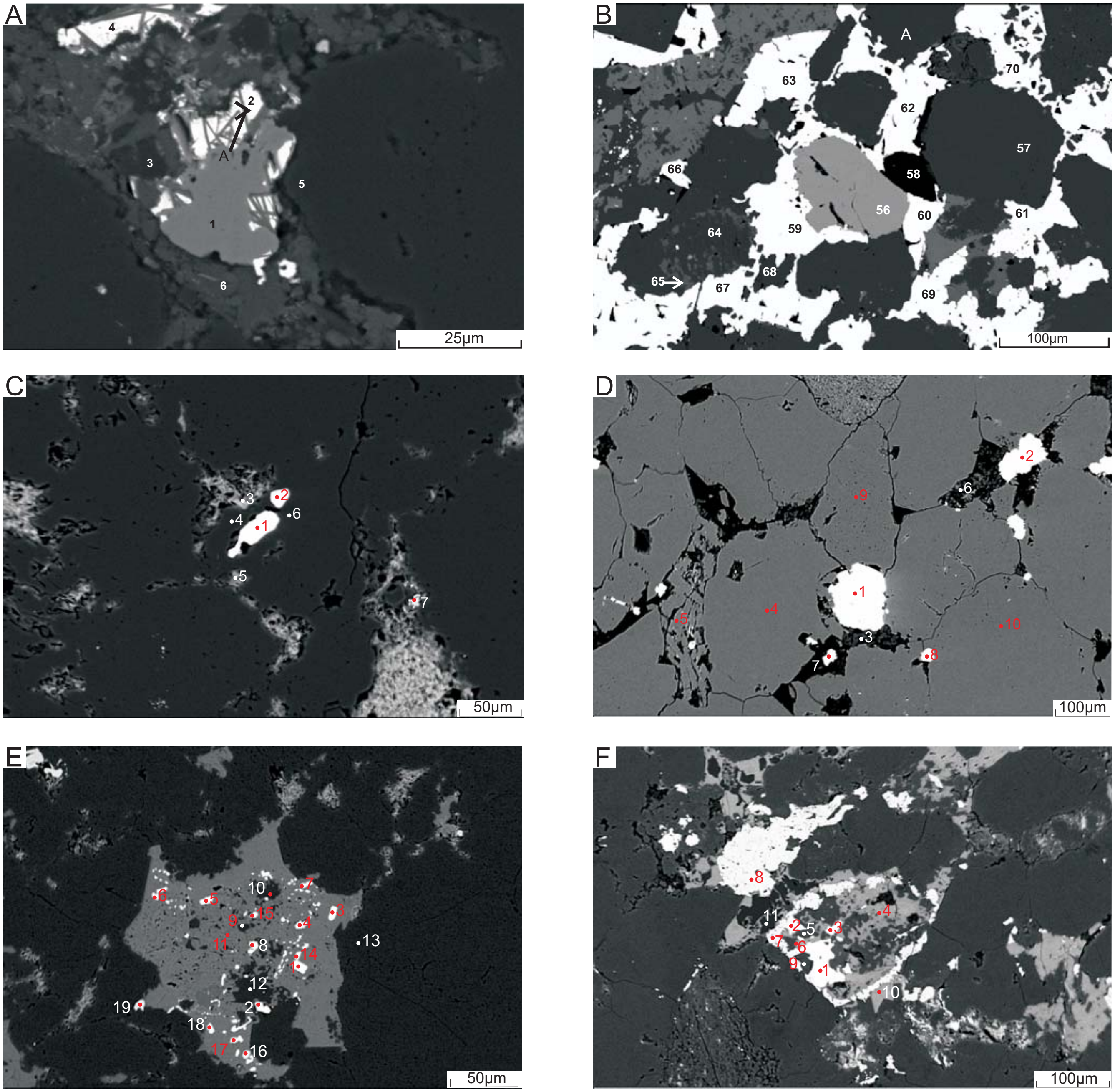
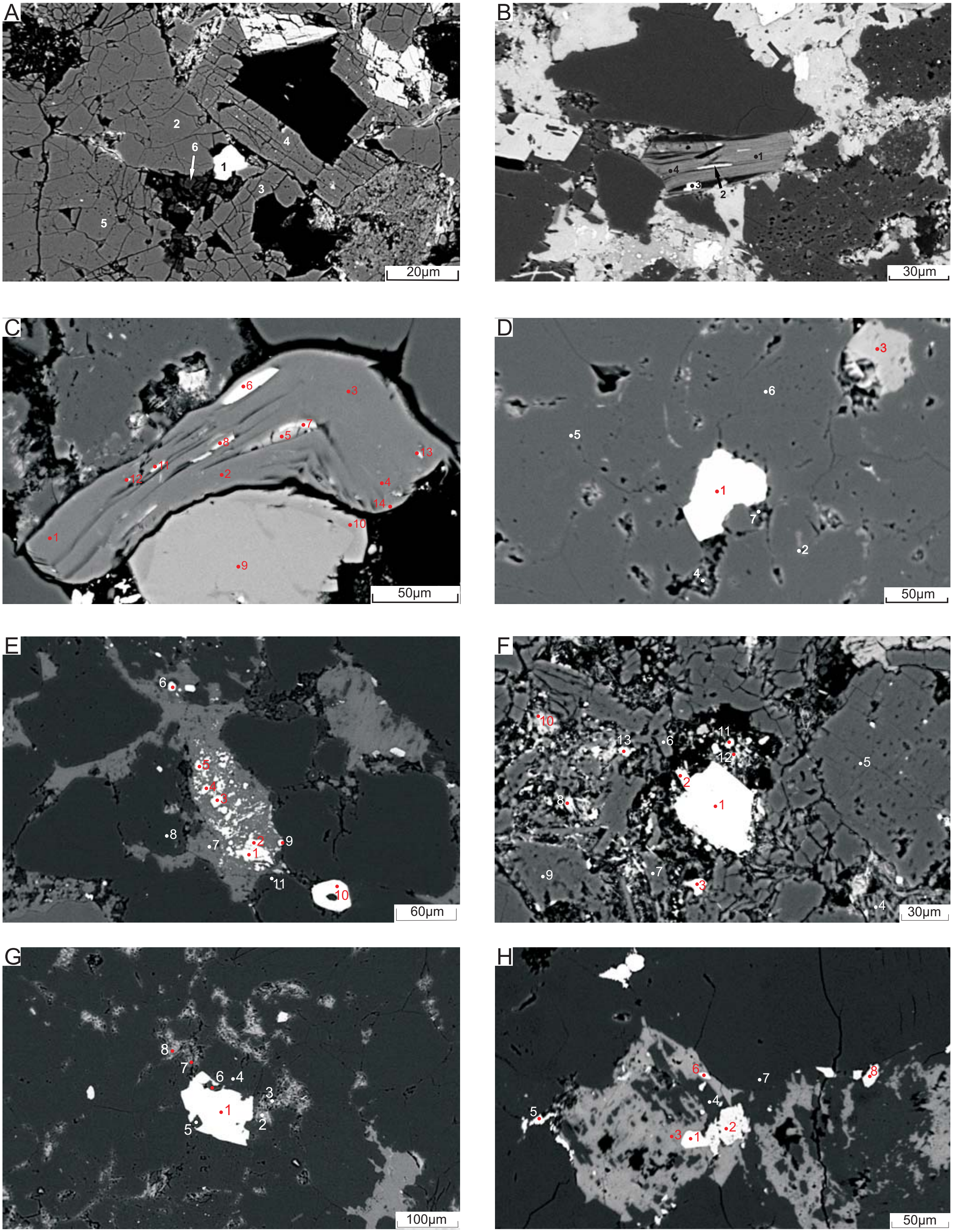


Figure 3: **A**: Louisbourg J-47-5445.94 (Appendix 5D, Fig. 18): Diagenetic barite is cut by chlorite trellis lamellae (position A). **B**: Louisbourg J-47-5447.94 (Appendix 5D, Fig. 35): Similar to Fig. 2D, but the dissolution of quartz seems more pronounced (position A). Barite (59) also seems to have partially replaced a detrital looking apatite grain (56). **C**: South Desbarres O-76-5952.65 (Appendix 13B, Fig. 9): Diagenetic barite fills dissolution voids in detrital quartz (4, 6). Chlorite precipitates always along inter-granular boundaries (3, 7). **D**: Thebaud C-74-3918.64 (Appendix 15, Fig. 1): Diagenetic barite (1) fills dissolution voids and it has probably replaced kaolinite (3). Late pyrite (2), TiO_2 minerals (7) and chlorite (6) show the same mode of occurrence. **E**: South Desbarres O-76-5952.65 (Appendix 13B, Fig. 4): Diagenetic barite (14-17) and late pyrite (2, 4) have partially replaced ankerite (11) that has replaced albite (10, 12). **F**: Tantallon M-41-5928.37 (Appendix 14, Fig. 15): Diagenetic barite (1-3) and late siderite (7, 8) engulf albite (5) or Fe-calcite (4) that has replaced detrital feldspars (5, 9, 11).

Figure 4: BSE images of representative textures of diagenetic sphalerite and other associated minerals: **A**: Louisbourg J-47-4528.03 (Appendix 5C, Fig. 10): Diagenetic sphalerite (1) associated with fractured quartz (2, 3, 5), albite (4) and kaolinite (6). **B**: Louisbourg J-47-5445.94 (Appendix 5D, Fig. 36): Muscovite (1, 4) with diagenetic sphalerite growing along the cleavage (2, 3). **C**: Peskowesk A-99-2212.91 (Appendix 7B, Fig. 6): Diagenetic sphalerite (6), apatite (7, 8), chlorite (11), and ankerite (5) form along the cleavage of detrital chloritized biotite (1, 2, 3, 4, 14) that also contains inclusions of pyrite (12, 13). **D**: Peskowesk A-99-3796.33 (Appendix 74, Fig. 2): Diagenetic sphalerite (1) in contact with quartz (5, 6) with dissolution voids. **E**: Glenelg E-58-3763.29 (Appendix 4C, Fig. 1): Sphalerite (1, 4, 5) and late pyrite (2, 6) replace Fe-calcite (7). **F**: Sable Island C-67-4085.83 (Appendix 12B, Fig. 1): Sphalerite (1, 2) and late pyrite (3) fill pores. It seems that these minerals together with chlorite (8, 10) have partially replaced albite (4-7). The albite grains also seem to be diagenetic, because their straight crystal outlines. They also seem partially dissolved, because of the presence of dissolution voids in the larger grains (5). These voids are partially filled with barite and pyrite. **G**: South Desbarres O-76-5952.65 (Appendix 13B, Fig. 3): Sphalerite (1) engulfs quartz (5). Chlorite (7) fills inter-granular voids. **H**: Tantallon M-41-5928.37 (Appendix 4, Fig. 3): Sphalerite (1) and late siderite (2, 6) have partially replaced Fe-calcite (3), that probably has replaced albite or K-feldspar (14).


A
20µm
B
30µm
C
50µm
D
50µm
E
60µm
F
30µm
G
100µm
H
50µm

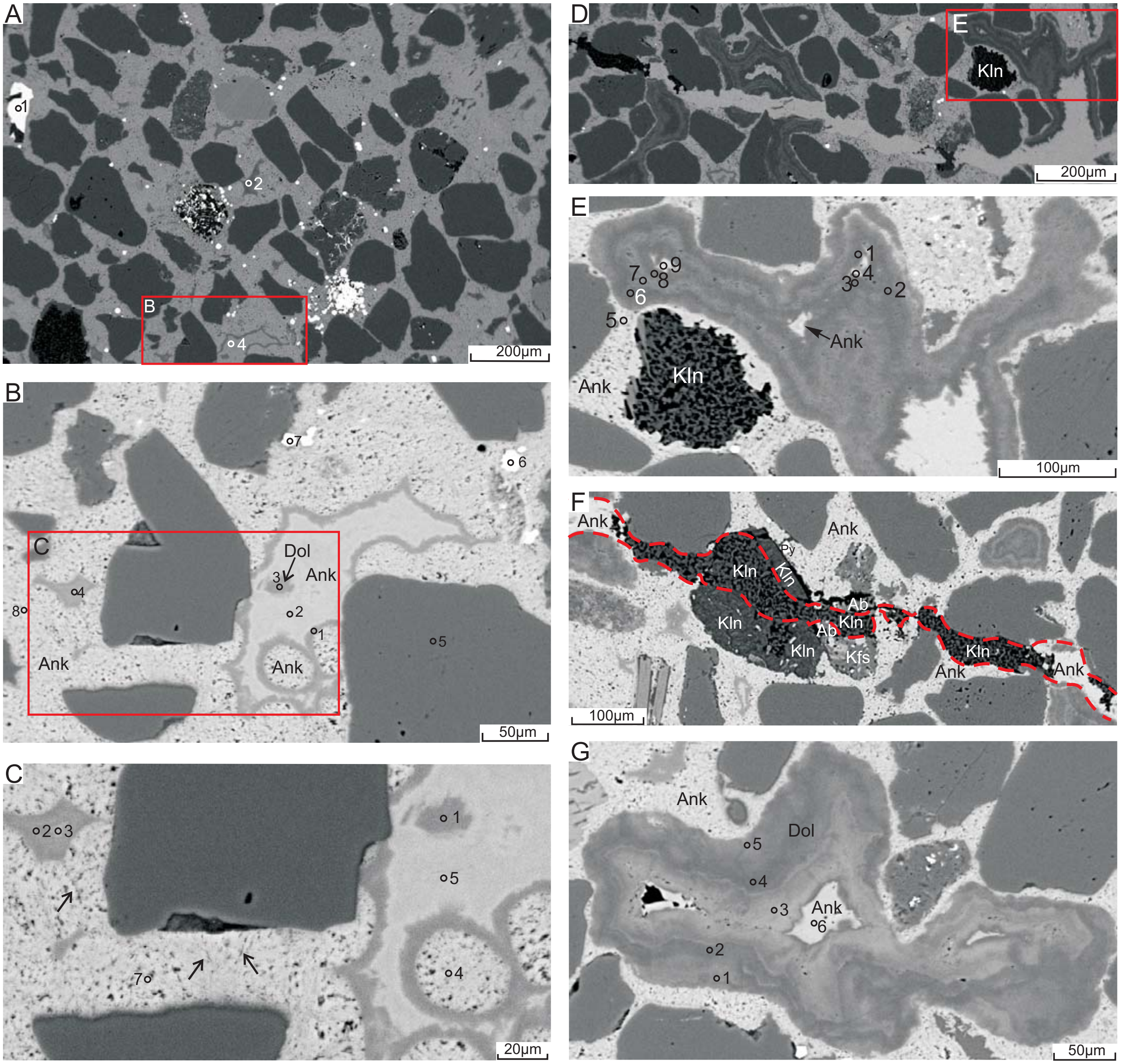


Figure 5: BSE images of the carbonate minerals in sample 3269.82 from the Onondaga O-95 well (Appendix 9D). **A, D**: Detrital grains not in contact. The interstitial space is filled mostly with ankerite cement. **B**: The ankerite cement (2, 8) is riddled with grey spots of dolomite (1, 3). Other minerals present include pyrite (6, 7), calcite (4) and detrital quartz (5). **C**: Part of Fig. 7B enlarged showing the dolomite stringers and spots (arrows). Minerals present include ankerite (4, 5, 7), dolomite (1, 2) and calcite (3). **E**: Pore filled with early kaolinite (kln) engulfed by the early ankerite (5). Concentric layers of dolomite (1-3, 6-9) surround ankerite patches (4, 9). **F**: Late kaolinite (2, 3, 8, 9, 29) fills a vein. Early kaolinite (1, 14) is cut by the vein and has texture different from that of the late kaolinite. **G**: Concentric layers of dolomite (1-5) surround late ankerite (6).

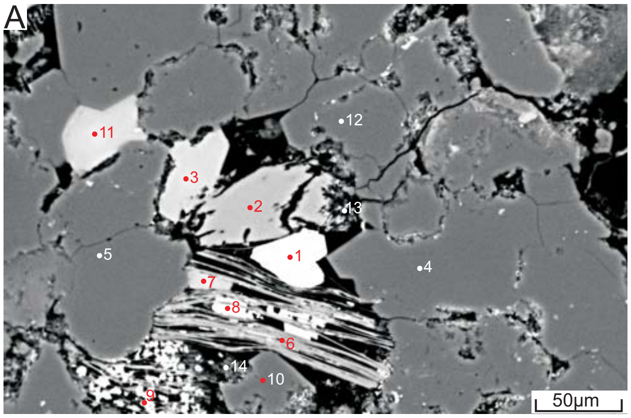


Figure 6: BSE image of detrital K-feldspar and associated diagenetic minerals: Sable Island C-67-2834.91 (Appendix 12A, Fig. 1). Dissolution of detrital K-feldspar (2) creates pore where Fe-calcite (3) and sphalerite (1) precipitate. Sphalerite (8) and Fe-calcite (7) also precipitate along the cleavage planes of muscovite (6). There is also some replacement of muscovite by Mn-siderite (9).

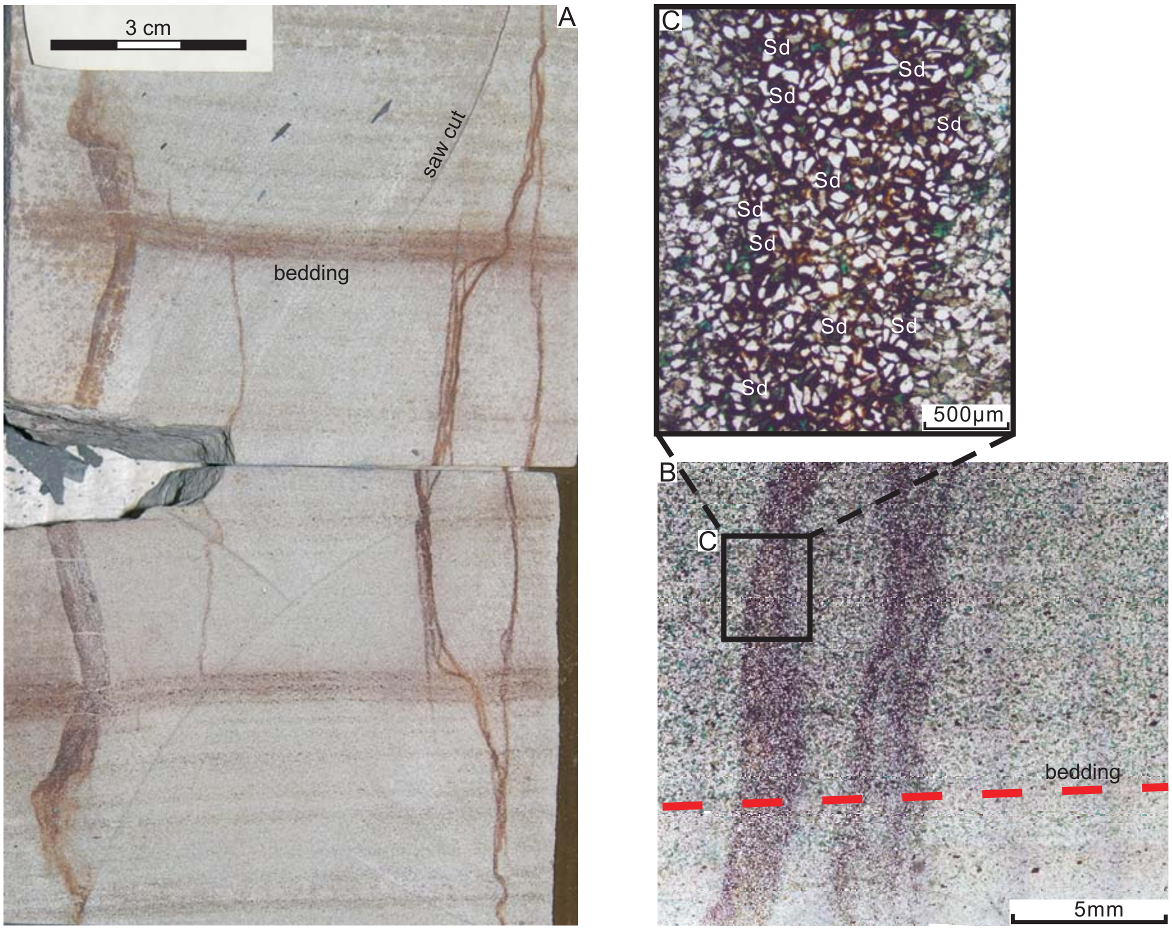


Figure 7: **A**: Core photograph of sample Sable Island C-67-2834.91.
B: Microphotograph (ppl) of an enlarged area from Fig. 8A. Both images show vertical zones cross-cutting the bedding (red dashed line). **C**: Enlarged area from one of these zones shows that all the pores between the detrital minerals within these zones, mostly quartz and K-feldspar, are filled mostly with Mn-siderite and very small amount of illite, chlorite and pyrite.

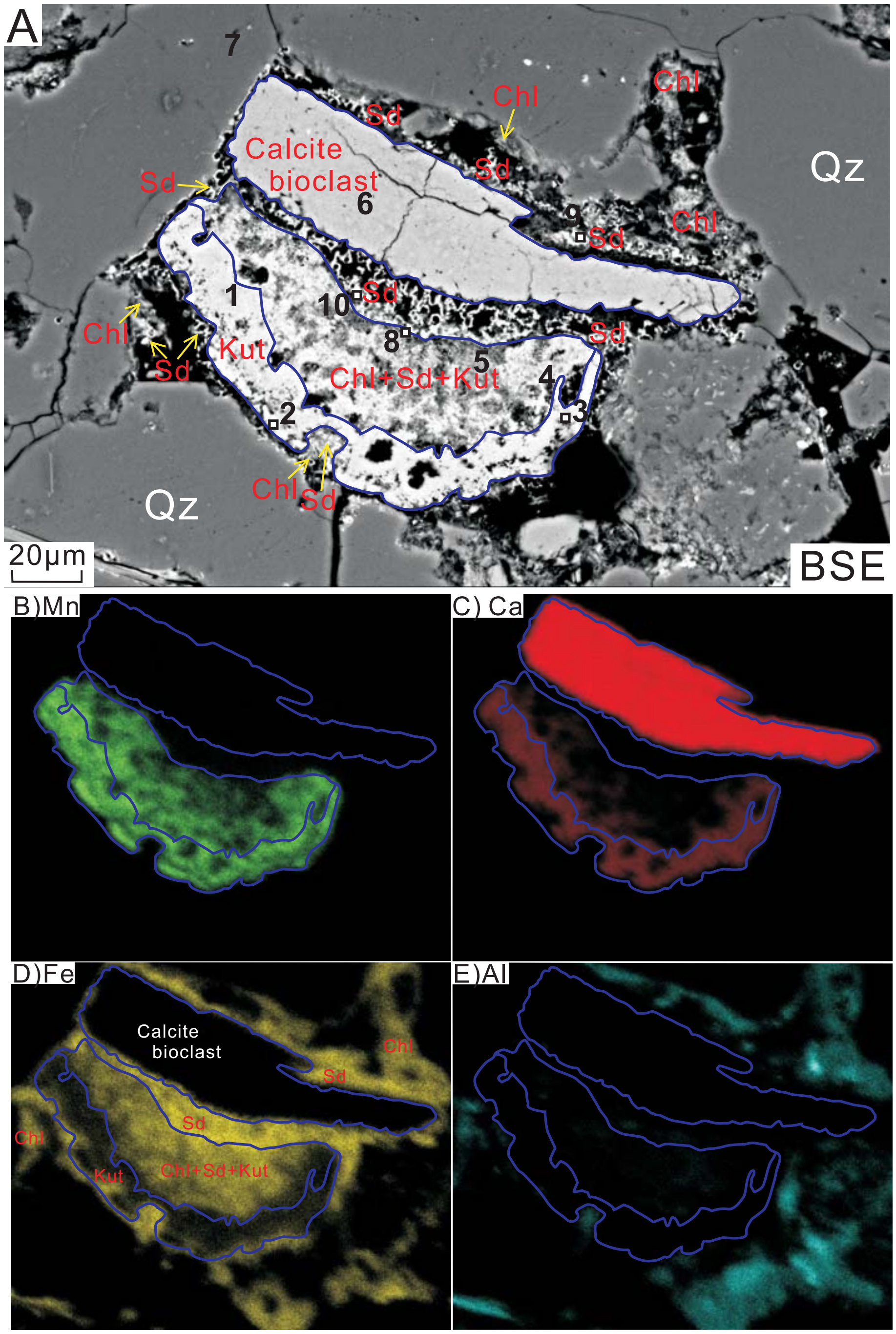


Figure 8: BSE images and X-Ray maps of carbonate minerals from Sable Island C-67-2834.91 (Appendix 12A, Figs. 2-4). **A**: BSE image of carbonate-clay-rich kutnohorite muddy pellet or intraclast (A) and calcite bioclast (B). Both A and B are now dissolving and they are rimmed by a mixture of chlorite, illite and Mn-rich siderite (8, 9, 10). **B– E**: X-ray maps of distribution of the elements Mn, Ca, Fe and Al.

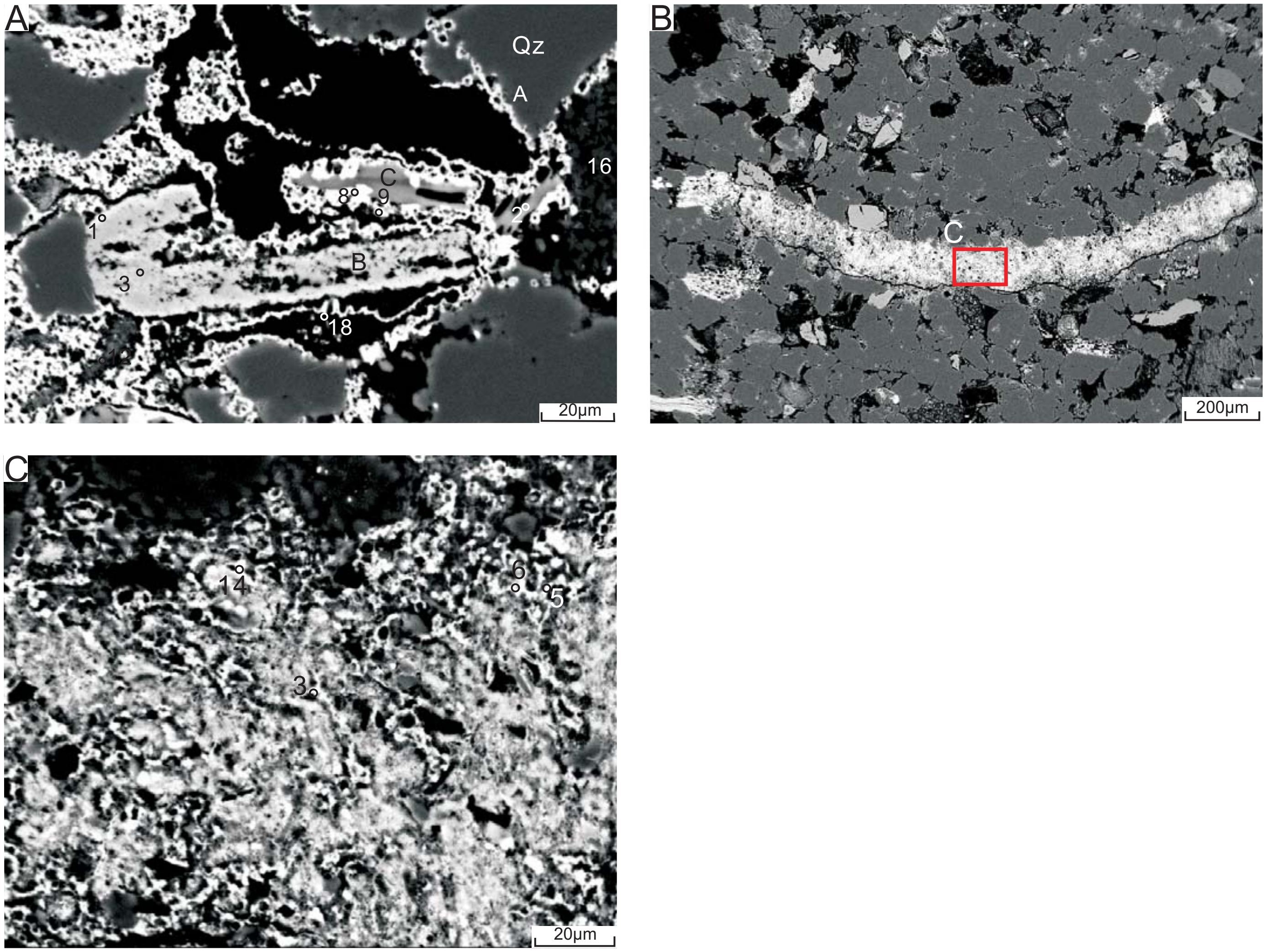


Figure 9: Representative BSE images of sample 2834.91 from Sable Island C-67 well. **A**: Two detrital grains, a K-feldspar (position C) and a carbonate bioclast (position B) have been partially dissolved and are surrounded by Mn-siderite rims (18, 8, 9). In the bioclast kutnohorite is found on the rim (1) and it has partially replaced and filled in dissolution voids of pre-existing ankerite (3) (see also Fig. 11 in Appendix 12A). The detrital quartz grains are rimmed by Mn-siderite rims (position A). **B**: Curved carbonate bioclast is located along a fracture. This fracture does not cut any detrital mineral. **C**: The bioclast from B contains a mixture of Mn-siderite, kutnohorite, chlorite and illite. The bright rims made up mainly of Mn-siderite (3, 5, 6, and 14) developed along dissolution voids.

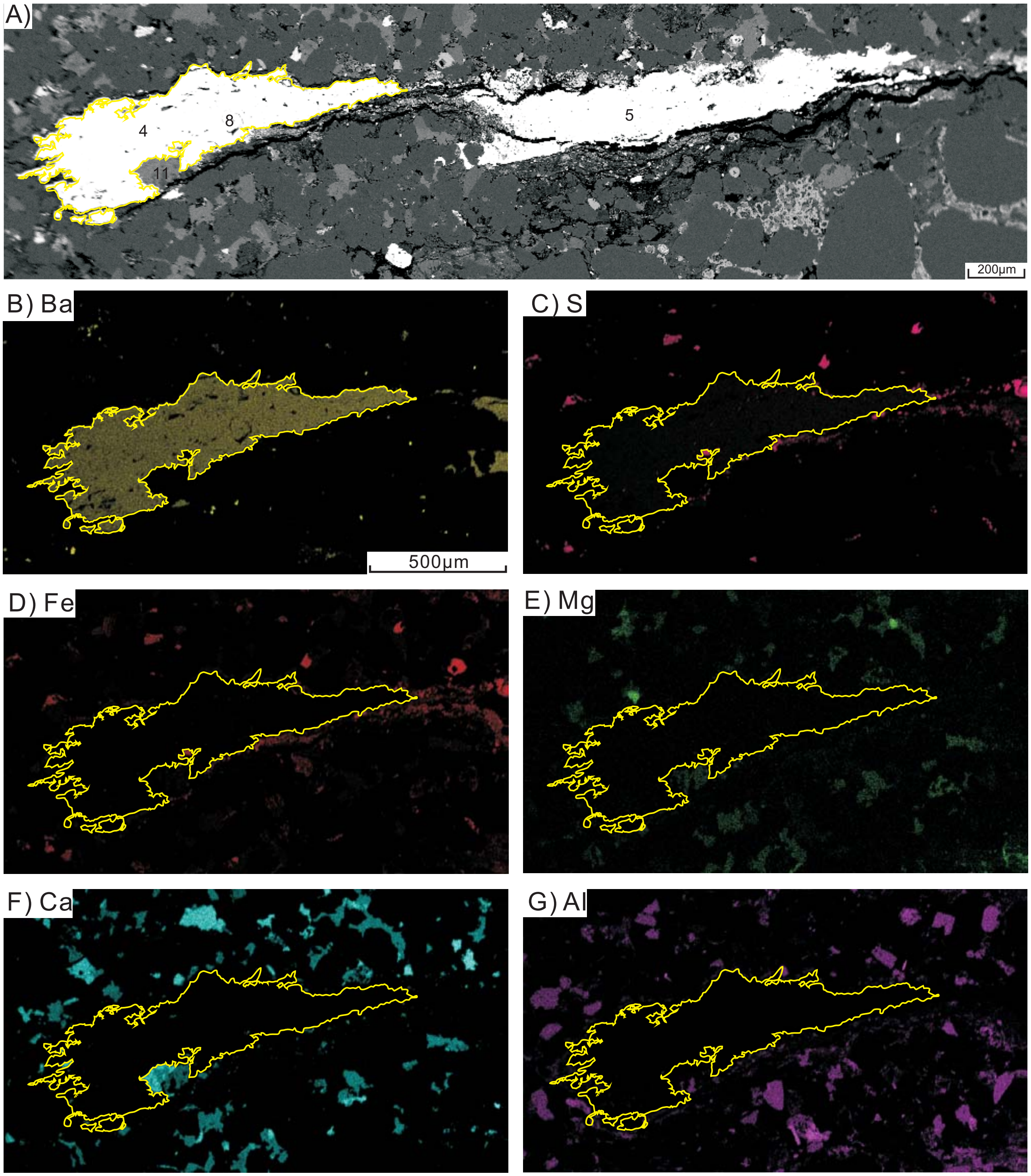


Figure 10: BSE images and X-ray maps of barite from South Desbarres O-76-3809.66 (Appendix 13A, Fig. 4). **A**: BSE image of barite (4, 8, 5) vein or pod that has been cut by a shear fault. The barite engulfs ankerite (11). **B-G**: X-ray maps for Ba (barite), Fe, Mg (pyrite, carbonate, chlorite), S (pyrite), Ca (carbonate), and Al (chlorite) (Appendix 13A, Fig. 6).

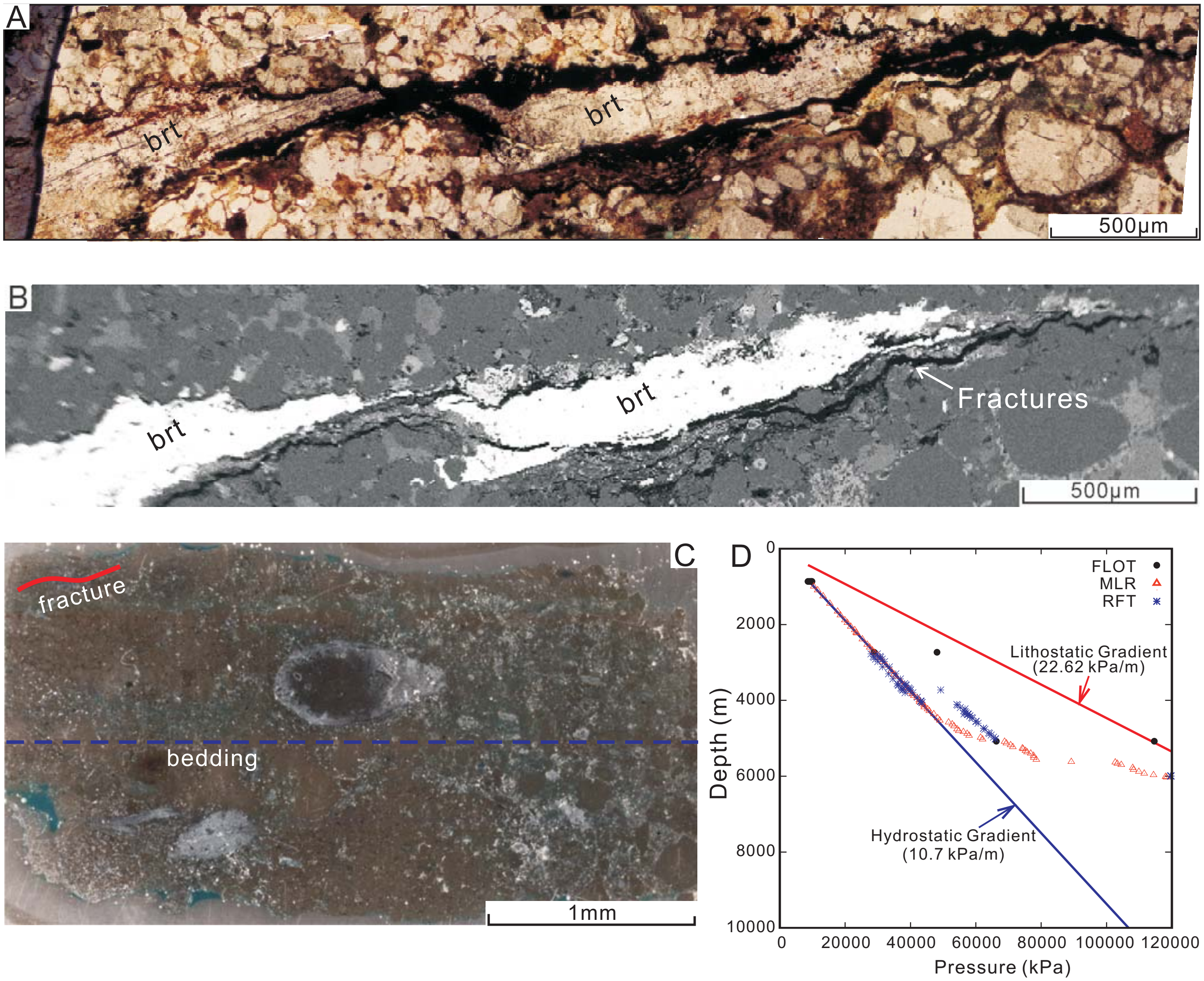


Figure 11: **A**: Microphotograph (ppl) from the sample 3809.66 from South Debarres O-76 well. Black-brown minerals (Mn-Mg siderite, pyrite and chlorite) fill the fractures that lie on both sides of the barite grains. **B**: BSE image shows a "beef"- type vein morphology for the barite grains. **C**: Scanned polished thin section of the same sample. Red, solid slightly oblique line shows the direction of the fracture and blue dashed line indicates the bedding of the sample. **D**: Depth versus pressure diagram of the South Debarres O-76 well with depth of the top of overpressure below 4150 m. FLOT= Formation leak –off test; MLR= Mud log response; RFT = Repeat formation tester; Brt= barite.

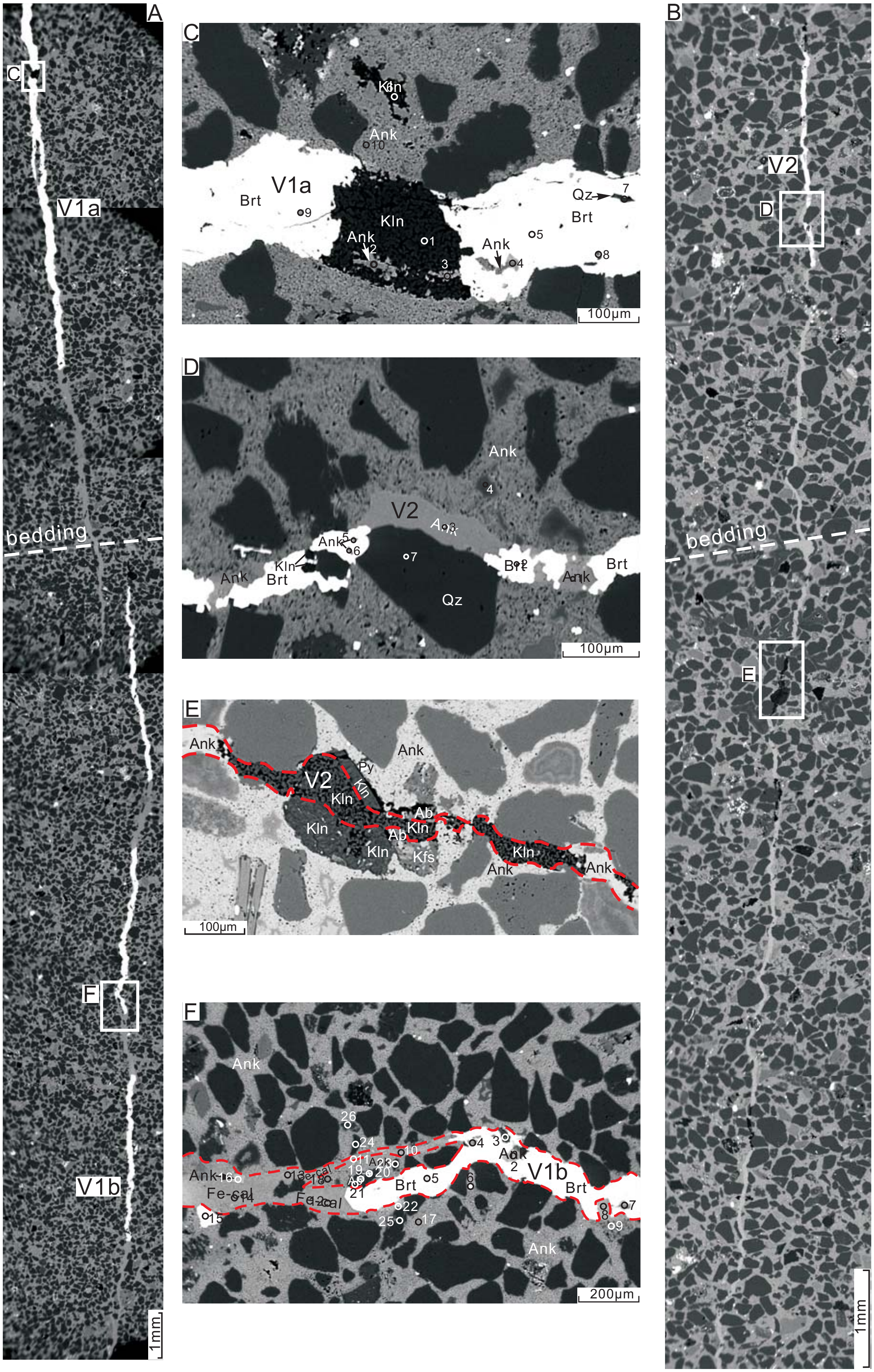


Figure 12: Representative types of veins (V1a, V1b, V2) seen in sample Onondaga O-95-3269.82 with images of representative mineral textural relationships. Mineral symbols: barite (brt), ankerite (ank), quartz (qz), kaolinite (kln), Fe-calcite (Fe-cal). The location of panels C-F are shown in panels A and B.

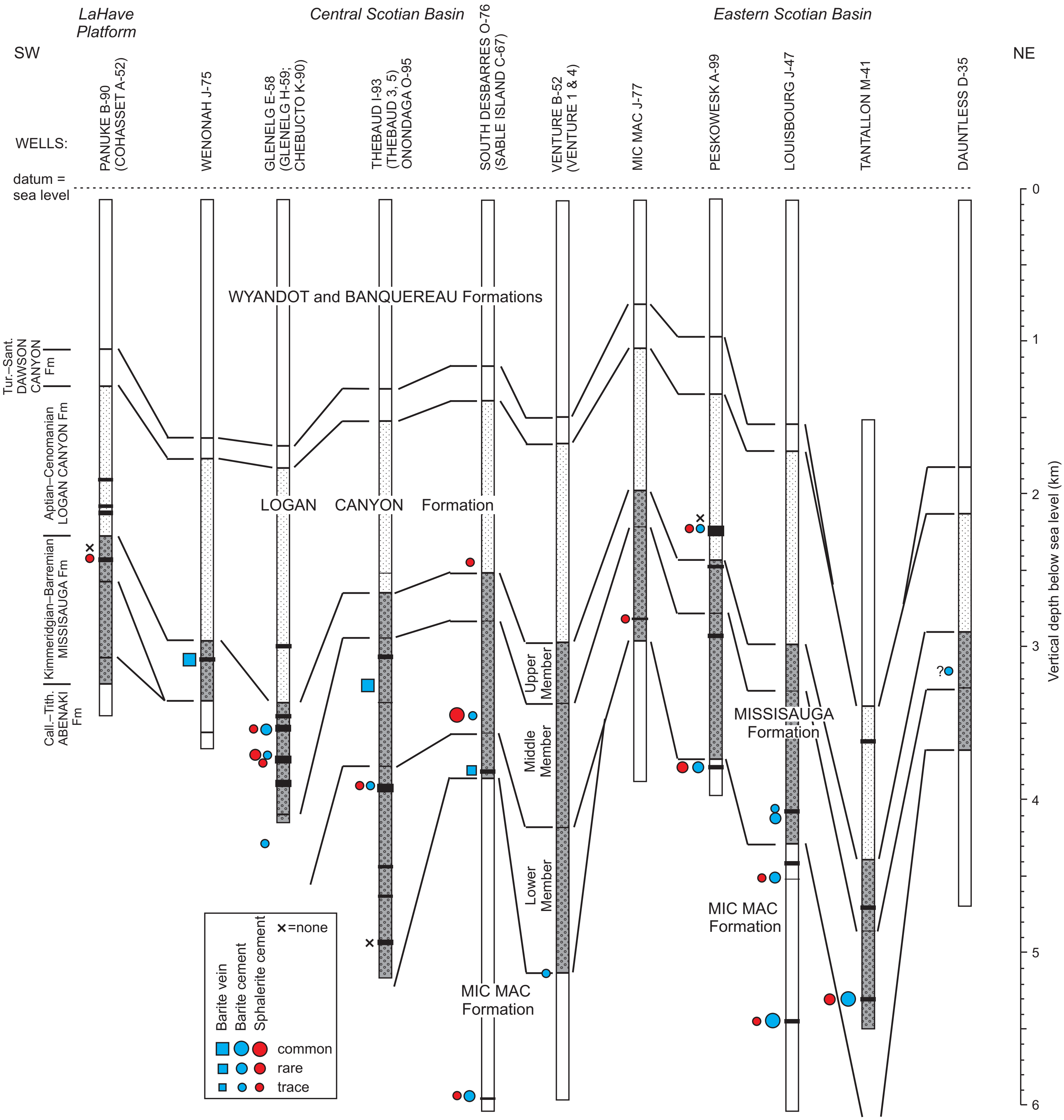


Figure 13: Stratigraphic variation in the abundance of sphalerite and barite mineralisation. Data projected in at appropriate stratigraphic level from wells in (parentheses). Full data summary in Appendix 1.Black bars in stratigraphic columns indicate conventional core.

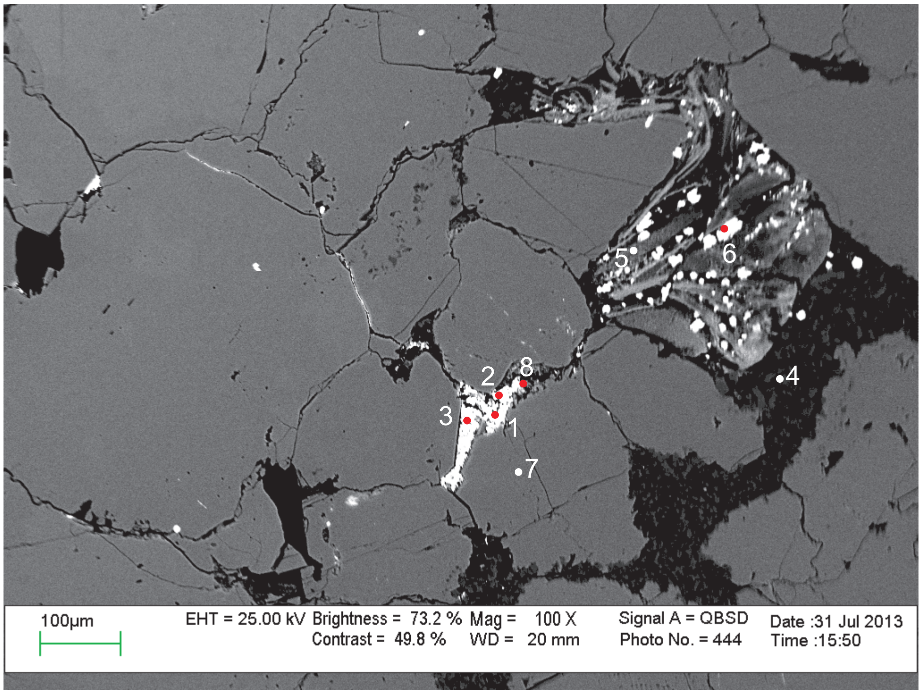
Appendix 1: Well intervals investigated in detail for barite, sphalerite and related minerals

Well	Area	Degree of faulting[1]	Sample Depth[2]	Facies[3]	Permeab -ility mD	Porosity %	Member	Qz[4]	Abundance[5]	
									Brt	Sph
Chebucto K-90	Central	moderate	4285.12	4x			Upper Miss.	2	A	-
Dauntless D-35	Eastern	moderate	3162.76	9g	1401	21.6	Upper Miss.	1	A†	-
Glenelg E-58	Central	moderate	3551.29	9g	8.1	17.2	Upper Miss.	3	B†	A
			3710.2	0b			Upper Miss.	2	A	B
			3763.29	0m			Upper Miss.	2	-	A
Glenelg N-49	Central	moderate	3667.33	4n	393	19.8	Upper Miss.	1	B†	-
Kegeshook G-67	LaHave	none	2116.36	5s	183	25.8	Upper Miss.	1 F	-	-
Louisbourg J-47	Central	low	4076.26	3y	0.01	5.5	Middle Miss.	1	A†	-
			4081.17	5b	0.02	4.1	Middle Miss.	1	B†	-
			4528.03	4x	0.74	8.4	Mic Mac	2 F	B†	A
			5445.94	10s			Mic Mac	3	C†	A
Mic Mac J-77	Eastern	high	2815.22	4g	2380	22.9	Middle Miss.	0	-	A
Onondaga O-95	Central	high	3266.71	4o	0.04	4.6	Middle Miss.	?2	-	-
			3268.67	4o	0.06	2.4	Middle Miss.	1	-	-
			3268.73	4o	3.69	10.9	Middle Miss.	1	-	-
			3269.82	9g	0.03	2.0	Middle Miss.	2	[C] †	-
Panuke B-90	LaHave	none	2381.85	9g	260	22.5	Upper Miss.	?1	-	-
			2434.33	3o			Upper Miss.		-	A‡
Peskowesk A-99	Eastern	low	2208.09	5	0.01	12.3	Cree	0	?A†	-
			2212.91	4x	345	24.8	Cree	1	A†	A
			2238.65	4x	300	25.0	Cree		-	-
			2245.84	4x	1510	25.8	Cree	1 F	-	-
			3796.33	5	0.52	7.5	Mic Mac	3	C†	C
Sable Island C-67	Central	? moderate	2834.91	0b			Naskapi	2	-	A
			4085.83	4n/5m			Lower Miss.	4	A†	C
South Desbarres O-76	Central	high	3809.66	9g	14.3	17.8	Lower Miss.	2	[B]†	-
			5952.65	9g			Mic Mac	2	B†	A
Tantallon M-41	Eastern	? low	5928.37	10s			Middle Miss.	2	C†	A
Thebaud C-74	Central	moderate	3918.64	9g	0.96	8.6	Lower Miss.	1	A†	B
Thebaud 5	Central	high	4934.34	4			Lower Miss.	2 F	-	-
Venture 4	Central	moderate	5383.28	2b			Lower Miss.	2	A	-
Wenonah J-75	Central	high	3076.94	2b			Upper Miss.	3 F	[C]†	-

[1] Based on seismic section through well illustrated by MacLean and Wade (1993)
[2] m below RT
[3] facies as in Gould et al. (2011, 2012). Thick bedded sandstones are most common in facies 4 and 9; thinner sandstones with more interbedded mudstones in facies 0, 2 and 5.
[4] amount of secondary porosity in quartz (0 = none to 4 = high); F = highly fractured quartz
[5] – = absent, A = trace, B = rare, C = common [ ] indicates vein-filling † with chemical analysis
‡ sphalerite in fracture

In addition to the samples above, seven sandstones from the Cree Member were assessed for sphalerite and barite: Glenelg E-58 3006.02, N-49 3000.66, Kegeshook G-67 1907.39, Panuke B-90 2075.19 and 2108.15, and Cohasset A-52 2352.98 and 2390.52. No sphalerite was found; a trace of barite was present in one sample from Cohasset A-52 2352.98.

Appendix 2: Scanning Electron Microscope Backscattered Electron Images for Chebucto K-90 4285.12



1. Barite+ Fe-Calcite
2. Barite + other
3. Barite
4. Kaolinite
5. K-feldspar + Chlorite
6. Pyrite
7. Quartz
8. Chlorite + K-feldspar

Figure 1: K-90 4285.12 m. site 1 (SEM). Diagenetic barite is associated with Fe-calcite (1) and it has probably partially replaced it. Detrital K-feldspars has partly been replaced by kaolinite (4), chlorite (5), and late pyrite (6).

Table A: Scanning Electron Microscope chemical analyses of sample 4285.12 from the Chebucto K-90 well.

Sample	Site	Position	Mineral	SiO_2	Al_2O_3	FeO	MgO	CaO	Na_2O	K_2O	SO_3	Cl	BaO	B_2O_3	Total
K-90 4285.12	1	1	Brt+Fe-Cal+Qz	23.15	5.42	1.60	0.66	8.07	0.81	0.70	32.89	0.57	26.13		100.00
K-90 4285.12	1	2	Brt+other	18.68	1.63	0.49					33.11	0.79	45.32		100.02
K-90 4285.12	1	3	Brt	1.09	0.26						19.23		32.23	47.22*	100.03
K-90 4285.12	1	4	Kln	49.45	36.55										86.00
K-90 4285.12	1	5	Kfs+Chl	51.17	30.21	8.30	1.26		0.54	6.78	0.57	1.14			99.97
K-90 4285.12	1	6	Py	3.10	1.74	30.40			1.89	0.59	61.63	0.67			100.02
K-90 4285.12	1	7	Qz	99.99											99.99
K-90 4285.12	1	8	Chl+Kfs	46.21	29.50	14.67	3.22			4.64	0.65	1.13			100.02

Note: * high B_2O_3 probably an artifact from the SEM

In this and all subsequent tables of appendices 2-17, all the EDS (SEM) analyses have been recalculated either to 100 or to appropiate totals depending on the amounts of H_2O and other volatiles the mineral might contain. All mixed analyses have also been recalculated to 100%.

Appendix 3: Scanning Electron Microscope Backscattered Electron Images for Dauntless D-35 3162.76

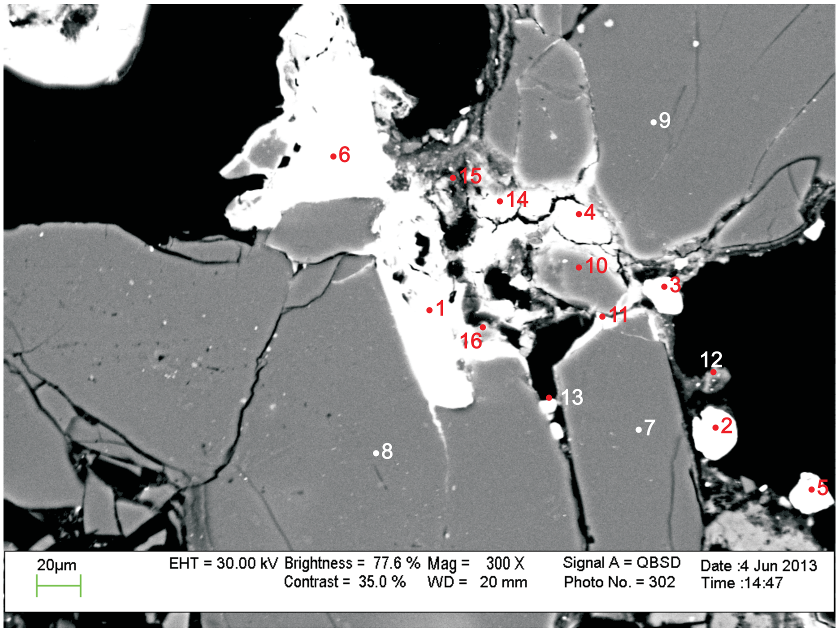


Figure 1: D-35 3162.76 m. site 1 (SEM). Probably diagenetic barite (2,3).

1. [1]PbO
2. Barite
3. Barite
4. Mixture
5. Barite
6. [1]PbO
7. Quartz
8. Quartz
9. Quartz
10. Quartz
11. PbO + others
12. Quartz
13. Barite + others
14. Mixture
15. Mixture
16. Quartz

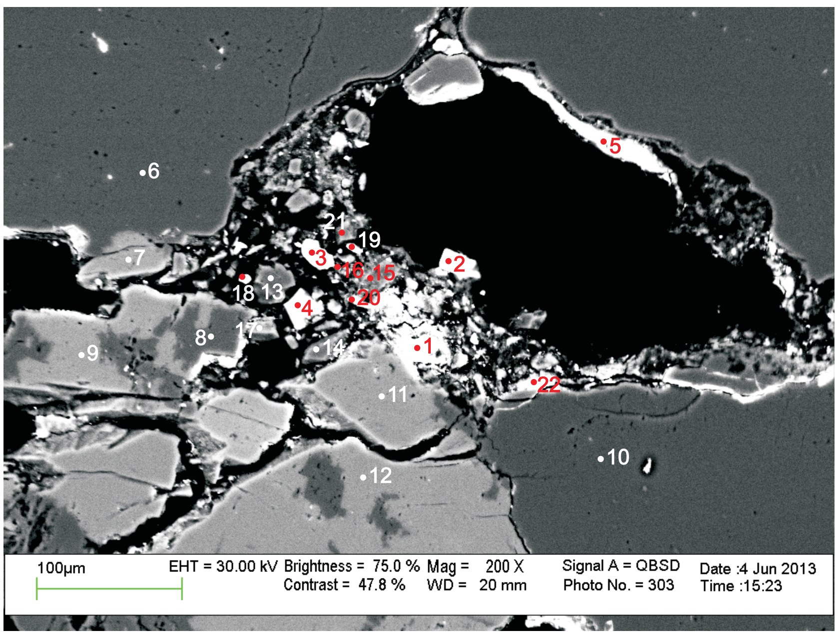


Figure 2: D-35 3162.76 m. site 2 (SEM). Probably diagenetic barite (2,3).

1. [1]PbO
2. Barite
3. Barite
4. Pyrite
5. [1]PbO + others
6. Quartz
7. K-feldspar
8. Albite
9. K-feldspar
10. Quartz
11. K-feldspar
12. K-feldspar
13. Quartz
14. Quartz
15. Quartz
16. Chlorite + others
17. K-feldspar
18. Barite + others
19. Barite + others
20. Barite + others
21. Quartz
22. Mixture

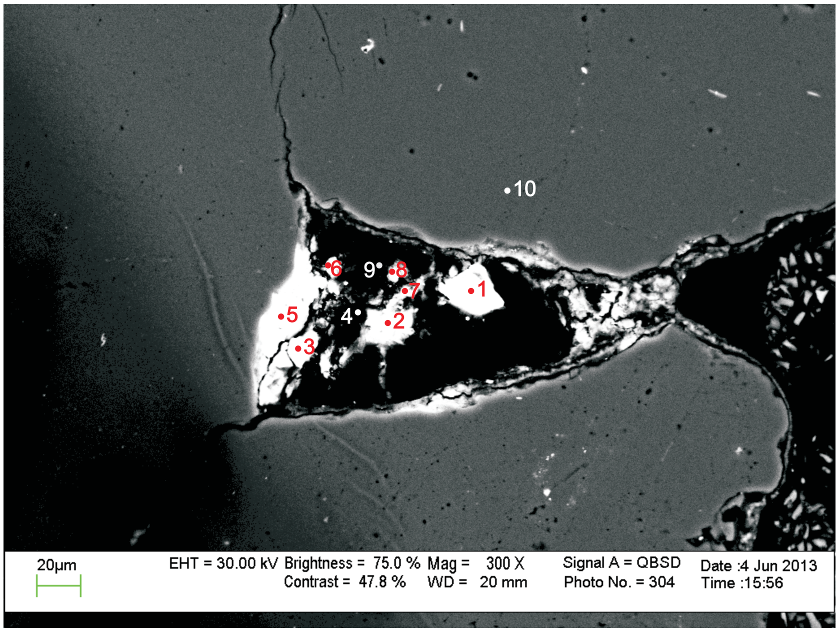


Figure 3: D-35 3162.76 m. site 3 (SEM). Barite probably from drilling mud.

1. Barite + others
2. Barite + others
3. [1]PbO + others
4. Barite + others
5. [1]PbO + others
6. [1]PbO + others
7. Mixture
8. Mixture
9. ?
10. Quartz

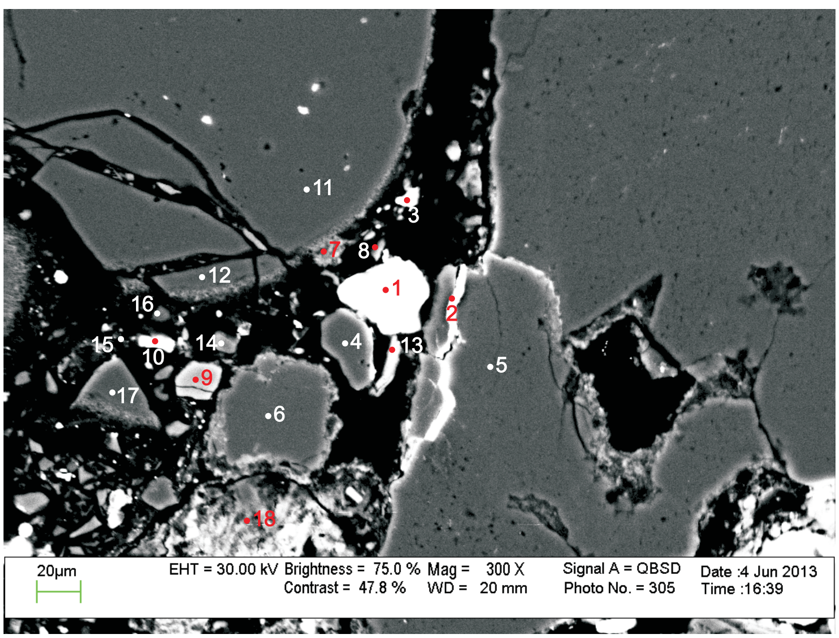
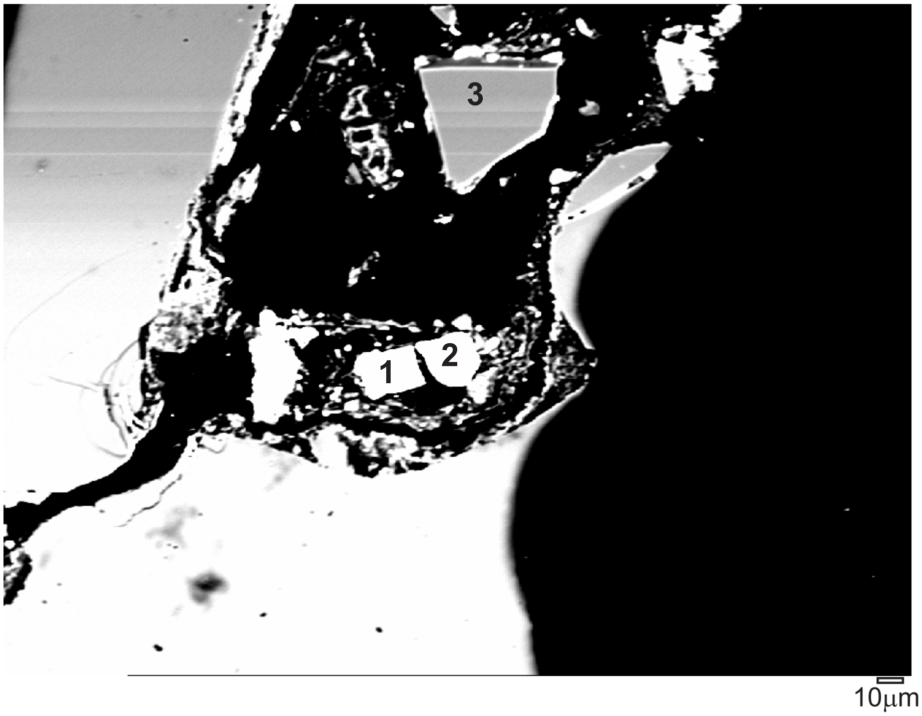


Figure 4: D-35 3162.76 m. site 4 (SEM). Barite probably from drilling mud.

1. Barite
2. [1]PbO
3. Barite
4. Quartz
5. Quartz
6. Quartz
7. Chlorite
8. Quartz
9. Ankerite
10. Barite + others
11. Quartz
12. Quartz
13. Chlorite + others
14. Quartz
15. Barite + others
16. Quartz
17. Quartz
18. K-feldspar + Chlorite



1. Diagenetic Barite
2. Diagenetic Barite
3. Quartz

Figure 5: D-35 3162.76 m (Probe). Diagenetic barite cement, core sample (from Pe-Piper and Piper, 2009, fig.15).

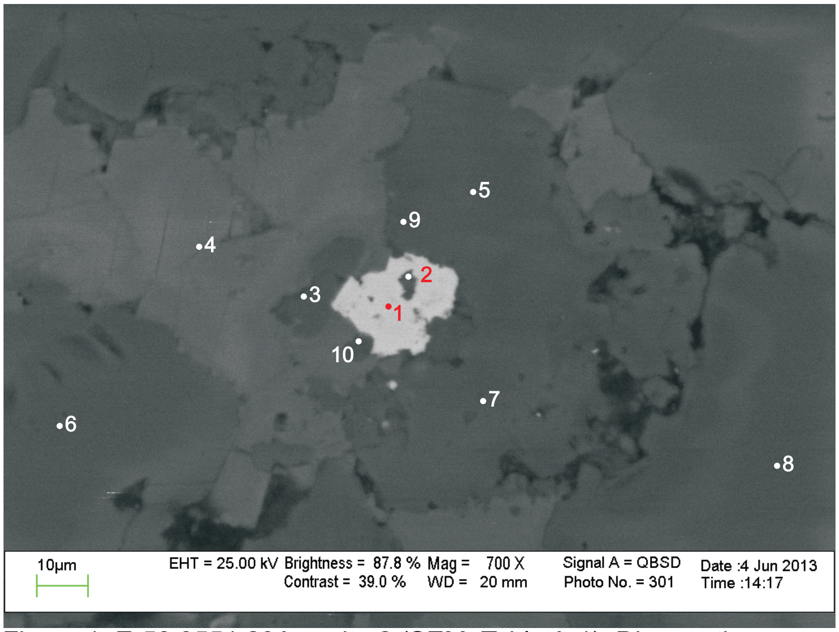
Table A: Scanning Electron Microscope chemical analyses of sample 3162.76 from the Dauntless D-35 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MgO	CaO	Na_2O	K_2O	SO_3	Cl	ZnO	As_2O_3	SrO	BaO	PbO	Total
D-35 3162.76	1	1	[1]PbO	8.39														91.63	100.02
D-35 3162.76	1	2	Brt									38.83					61.18		100.01
D-35 3162.76	1	3	Brt									40.15					59.86		100.01
D-35 3162.76	1	4	Mix	61.25		2.44	0.68			2.63	1.34							31.66	100.00
D-35 3162.76	1	5	Brt									38.90					61.10		100.00
D-35 3162.76	1	6	PbO															100.01	100.01
D-35 3162.76	1	7	Qz	99.99															99.99
D-35 3162.76	1	8	Qz	99.99															99.99
D-35 3162.76	1	9	Qz	99.99															99.99
D-35 3162.76	1	10	Qz	99.99															99.99
D-35 3162.76	1	11	[1]PbO+others	66.44		1.32				1.81	1.07							29.35	99.99
D-35 3162.76	1	12	Qz	98.90		0.89			0.22										100.01
D-35 3162.76	1	13	Brt+others	29.95		4.80	0.71			1.50		24.00	0.70				35.94	2.41	100.01
D-35 3162.76	1	14	Mix	62.04		2.42	1.07		0.87	3.09	1.69		0.78					28.05	100.01
D-35 3162.76	1	15	Mix	44.17	1.85	15.83	6.07	5.34	2.20	3.20	1.64	4.99	1.32					13.38	99.99
D-35 3162.76	1	16	Qz	96.97									0.51		0.01			2.51	100.00
D-35 3162.76	2	1	[1]PbO	19.49		1.81												78.70	100.00
D-35 3162.76	2	2	Brt	4.04		1.98						37.03					56.93		99.98
D-35 3162.76	2	3	Brt	1.56								37.91					60.54		100.01
D-35 3162.76	2	4	Py	0.30			27.58					72.12							100.00
D-35 3162.76	2	5	[1]PbO+others	38.10		3.48	2.17			3.48			1.82					50.98	100.03
D-35 3162.76	2	6	Qz	99.99															99.99
D-35 3162.76	2	7	Kfs	66.29		18.06					15.65								100.00
D-35 3162.76	2	8	Ab	68.86		18.95			0.24	11.95									100.00
D-35 3162.76	2	9	Kfs	66.14		17.80					16.04								99.98
D-35 3162.76	2	10	Qz	99.99															99.99
D-35 3162.76	2	11	Kfs	66.38		17.93					15.66			0.04					100.01
D-35 3162.76	2	12	Kfs	66.32		17.80					15.90								100.02
D-35 3162.76	2	13	Qz	99.75			0.23												99.98
D-35 3162.76	2	14	Qz	99.99															99.99
D-35 3162.76	2	15	Qz	99.99															99.99
D-35 3162.76	2	16	Chl+others	41.46	7.86	19.93	14.83	7.13	4.35	1.58	1.06	1.80							100.00
D-35 3162.76	2	17	Kfs	66.34		17.55				1.86	14.25								100.00
D-35 3162.76	2	18	Brt+others	10.42		2.40	0.66					36.61					49.94		100.03
D-35 3162.76	2	19	Brt+others	48.50		8.05	1.16	0.75	0.62	1.20	0.53	14.46					24.76		100.03

Table A: Scanning Electron Microscope chemical analyses of sample 3162.76 from the Dauntless D-35 well.

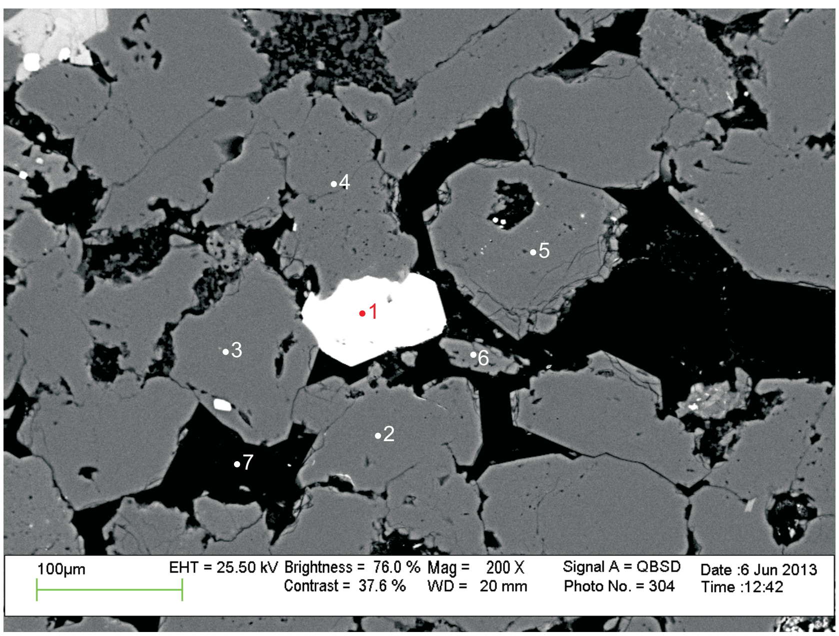
Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MgO	CaO	Na_2O	K_2O	SO_3	Cl	ZnO	As_2O_3	SrO	BaO	PbO	Total
D-35 3162.76	2	20	Brt+others	29.41		7.52	0.57	1.04	0.46	1.27	0.36	23.82					35.54		99.99
D-35 3162.76	2	21	Qz	99.99															99.99
D-35 3162.76	2	22	Mix	40.45	11.73	3.34	1.87			3.73	0.55		1.55					36.77	99.99
D-35 3162.76	3	1	Brt+others	9.37		1.28				2.43		35.63					47.58	3.72	100.01
D-35 3162.76	3	2	Brt+others	11.10		2.85		1.03		0.94		26.22					53.72	4.12	99.98
D-35 3162.76	3	3	PbO+others	55.11		3.91	0.78			4.44	0.82							34.94	100.00
D-35 3162.76	3	4	Brt+others	15.00		6.01						36.31	5.58				37.11		100.01
D-35 3162.76	3	5	[1]PbO+others	34.36		2.48	1.40			1.71								60.07	100.02
D-35 3162.76	3	6	[1]PbO+others	51.30		3.82	1.12			4.46			1.75					37.54	99.99
D-35 3162.76	3	7	Mix	50.36	0.52	20.96	11.46	10.20	2.31	1.86	0.48				0.45			1.41	100.01
D-35 3162.76	3	8	Mix	44.39		20.75	11.55	9.24	5.37	4.37	0.43		0.45					3.46	100.01
D-35 3162.76	3	9	?	36.17		11.45		10.18					42.20						100.00
D-35 3162.76	3	10	Qz	99.99															99.99
D-35 3162.76	4	1	Brt									39.08				1.60	59.34		100.02
D-35 3162.76	4	2	[1]PbO	23.83			0.98											75.20	100.01
D-35 3162.76	4	3	Brt	8.66		2.31						24.70					64.34		100.01
D-35 3162.76	4	4	Qz	99.99															99.99
D-35 3162.76	4	5	Qz	99.99															99.99
D-35 3162.76	4	6	Qz	99.77			0.23												100.00
D-35 3162.76	4	7	Chl	48.12		14.14	15.63	7.12											85.00
D-35 3162.76	4	8	Qz	95.79		1.04	0.28		0.36		0.23	0.97					1.31		99.98
D-35 3162.76	4	9	Ank				8.60	13.68	33.72										56.00
D-35 3162.76	4	10	Brt+others	11.32		2.93	0.45	0.80		1.08		31.14					52.29		100.01
D-35 3162.76	4	11	Qz	99.99															99.99
D-35 3162.76	4	12	Qz	99.99															99.99
D-35 3162.76	4	13	Chl+others	42.29	1.10	21.26	19.77	10.46	0.84	0.93	3.35								100.00
D-35 3162.76	4	14	Qz	99.99															99.99
D-35 3162.76	4	15	Brt+others	63.28		15.44	4.25	2.59	1.34	1.58	1.57	4.49	0.73				4.72		99.99
D-35 3162.76	4	16	Qz	88.35		5.20	2.83	0.86	0.71		0.66	0.95	0.43						99.99
D-35 3162.76	4	17	Qz	99.99															99.99
D-35 3162.76	4	18	Kfs+Chl	58.72	1.30	24.51	4.35	5.82		0.75	4.54								99.99
Notes:																			
1. Only barite found																			
2. Sites 1,2= probably diagenetic barite; sites 3,4= barite probably from drilling mud																			
3. [1]PbO= contaminant from polished thin section preparation																			

Appendix 4A: Scanning Electron Microscope Backscattered Electron Images for Glenelg E-58 3551.29



1. Sphalerite
2. Sphalerite + K-feldspar
3. Quartz
4. Ankerite
5. Quartz
6. Quartz
7. Quartz
8. Quartz
9. Quartz
10. Sphalerite + Ankerite + K-feldspar

Figure 1: E-58 3551.29A m site 2 (SEM, Table A-1). Diagenetic sphalerite (1) is associated with K-feldspar (2,10) and engulfs ankerite (10). It is as if ankerite has partly replaced detrital K-feldspar and sphalerite replaces both, K-feldspar relics and ankerite.



1. Barite
2. Quartz
3. Quartz
4. Quartz
5. Quartz
6. Albite
7. Quartz + other

Figure 2: E-58 3551.29 m. site 2 (SEM, Table A-2). Diagenetic barite (1) with replacive texture against detrital quartz (3,4) and straight crystal faces in pore space.

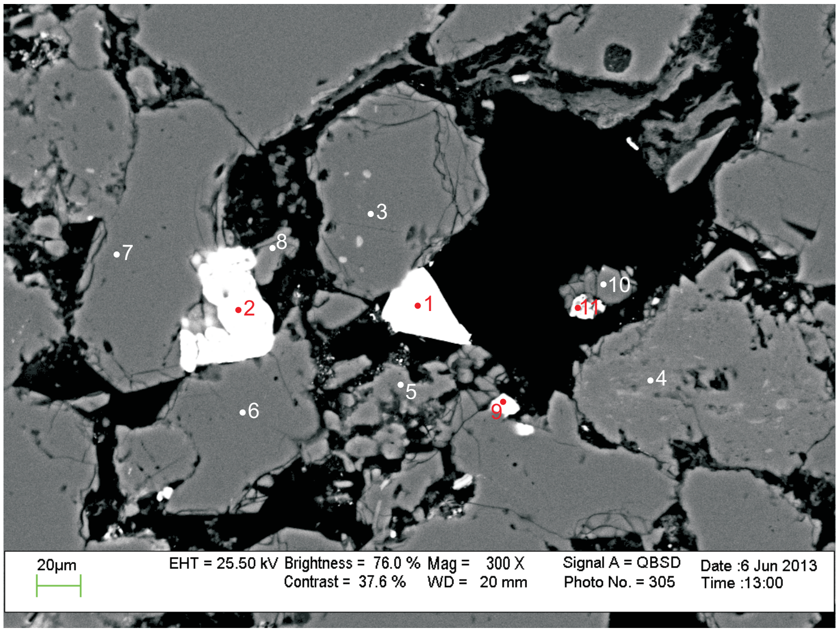


Figure 3: E-58 3551.29 m. site 3 (SEM, Table A-3). Similar to Fig. 2.

1. Barite
2. Zircon
3. Quartz
4. Albite
5. Quartz
6. Quartz
7. Quartz
8. Quartz
9. Rutile
10. Quartz
11. Rutile

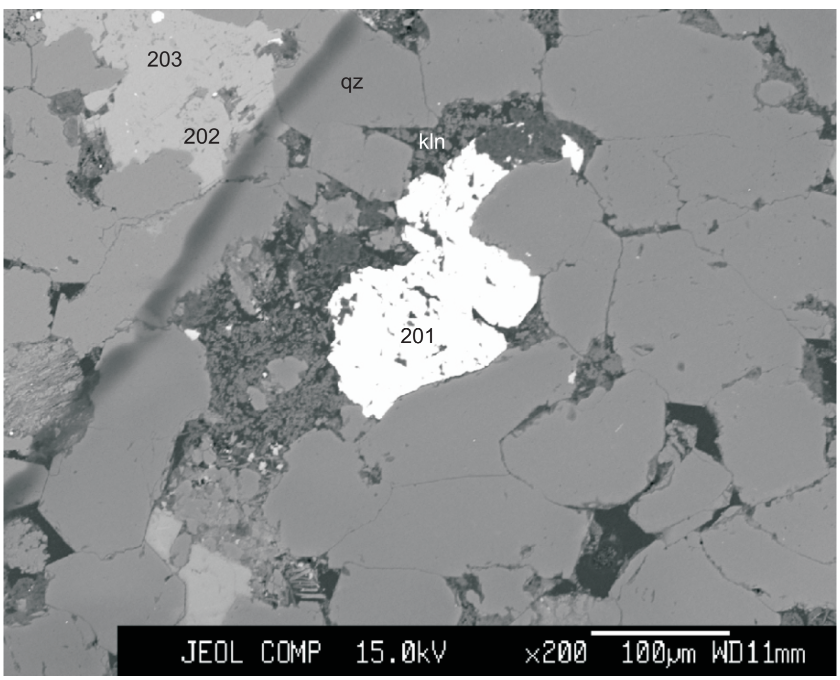


Figure 4: E-58 3551.29 m (Probe). It seems that kaolinite changes to ankerite (202, 203) and barite (201) (from Karim et al., 2008,Fig. 54).

201. Barite
202. Ankerite
203. Ankerite

Table A-1: Scanning Electron Microscope chemical analyses of sample 3551.29 from the Glenelg E-58 well.

Sample	Site	Position	Mineral	SiO_2	Al_2O_3	FeO	MnO	MgO	CaO	K_2O	SO_3	ZnO	Total
E-58 3551.29	2	1	Sph								53.76	46.24	100.00
E-58 3551.29	2	2	Sph+Kfs	26.68	20.41	1.18				3.60	24.87	23.27	100.01
E-58 3551.29	2	3	Qz	95.26	3.21				0.77	0.76			100.00
E-58 3551.29	2	4	Ank			13.26	1.19	10.85	30.70				56.00
E-58 3551.29	2	5	Qz	99.99									99.99
E-58 3551.29	2	6	Qz	99.99									99.99
E-58 3551.29	2	7	Qz	95.60	3.74					0.65			99.99
E-58 3551.29	2	8	Qz	99.99									99.99
E-58 3551.29	2	9	Qz	99.99									99.99
E-58 3551.29	2	10	Sph+Ank+Kfs	37.26	26.02	4.08		1.44	8.27	5.14	11.26	6.52	99.99
Notes: 1. Diagenetic sphalerite													

Table A-2: Scanning Electron Microscope chemical analyses of sample 3551.29 from the Glenelg E-58 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MgO	CaO	Na_2O	K_2O	SO_3	Cl	Sc_2O_3	Y_2O_3	ZrO_2	BaO	HfO_2	ThO_2	Total
E-58 3551.29-2	2	1	Brt									34.38					65.64			100.02
E-58 3551.29-2	2	2	Qz	99.99																99.99
E-58 3551.29-2	2	3	Qz	99.99																99.99
E-58 3551.29-2	2	4	Qz	99.99																99.99
E-58 3551.29-2	2	5	Qz	99.99																99.99
E-58 3551.29-2	2	6	Ab	70.53		18.46				11										99.99
E-58 3551.29-2	2	7	Qz+other	73.31		6.56	4.7	2.06	3.02		1.69		8.68							100.02
E-58 3551.29-2	3	1	Brt	2.8					0.41			33.14					63.67			100.02
E-58 3551.29-2	3	2	Zrn	30.01		4.21	1.12		1.89		1.02			0.8	3.4	52.68		2.61	2.25	99.99
E-58 3551.29-2	3	3	Qz	99.99																99.99
E-58 3551.29-2	3	4	Ab	68.65		19.61			0.41	10.57	0.78									100.02
E-58 3551.29-2	3	5	Qz	99.99																99.99
E-58 3551.29-2	3	6	Qz	99.99																99.99
E-58 3551.29-2	3	7	Qz	99.99																99.99
E-58 3551.29-2	3	8	Qz	99.99																99.99
E-58 3551.29-2	3	9	Rt	0.56	99.45															100.01
E-58 3551.29-2	3	10	Qz	99.99																99.99
E-58 3551.29-2	3	11	Rt	13.67	85.09		0.75		0.24		0.26									100.01

Notes: 1. Diagenetic barite

Appendix 4B: Scanning Electron Microscope Backscattered Electron Images for Glenelg E-58 3710.20

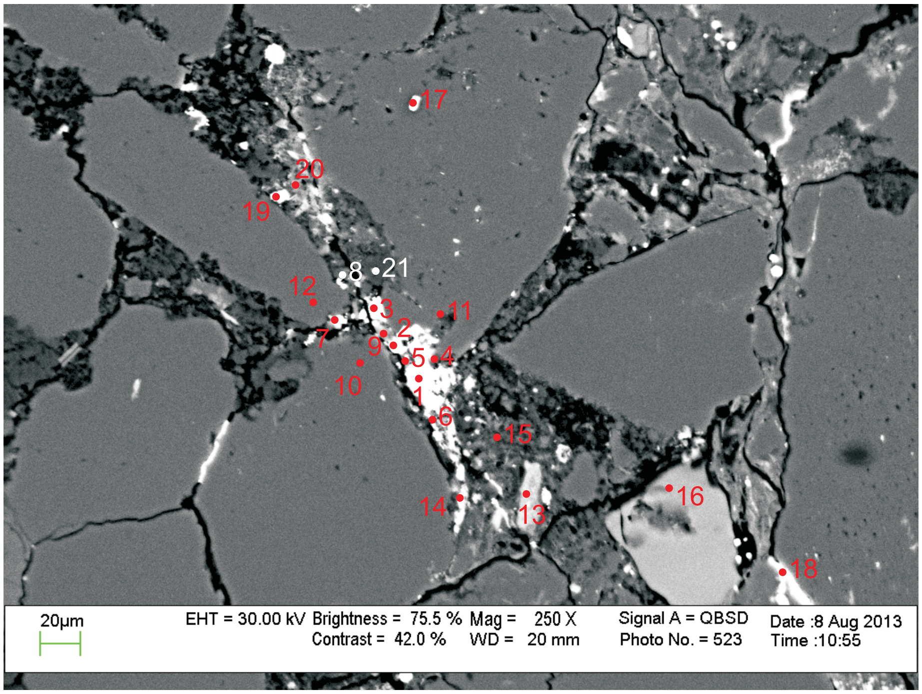


Figure 1: E-58 3710.20 m. site1 (SEM). Diagenetic barite (1,2,3) fills pores probably derived by dissolution of detrital K-feldspar grains (20) together with chlorite (13), siderite (5) and Fe-calcite (3,6). Kaolinite (21) might have also have earlier replaced K-feldspar.

1. Barite
2. Barite + other
3. Barite + Fe-Calcite
4. Kaolinite + Barite + Chlorite
5. Barite + Siderite
6. Barite + Chlorite
7. Barite + other
8. Kaolinite
9. Barite + other
10. Quartz
11. Quartz + other
12. Quartz
13. Chlorite
14. Barite + Chlorite
15. Kaolinite
16. K-feldspar
17. Pyrite
18. PbO
19. TiO2
20. K-feldspar + Apatite + Calcite
21. Kaolinite

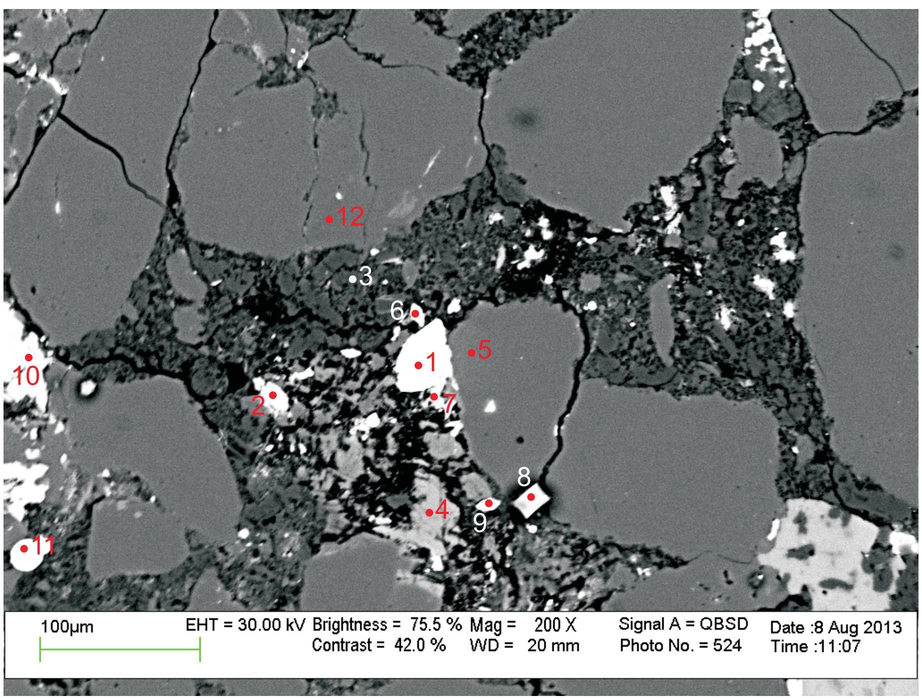


Figure 2: E-58 3710.20 m. site 2 (SEM). Sphalerite (1) together with late siderite (2) and pyrite(11) fill pores, probably derived by K-feldspar (4) dissolution. Early kaolinite (3) may also have precipitated in similar pores.

1. Sphalerite
2. Siderite
3. Kaolinite
4. K-feldspar
5. Quartz
6. Siderite
7. PbO
8. ?
9. Siderite
10. Siderite
11. Pyrite
12. Quartz

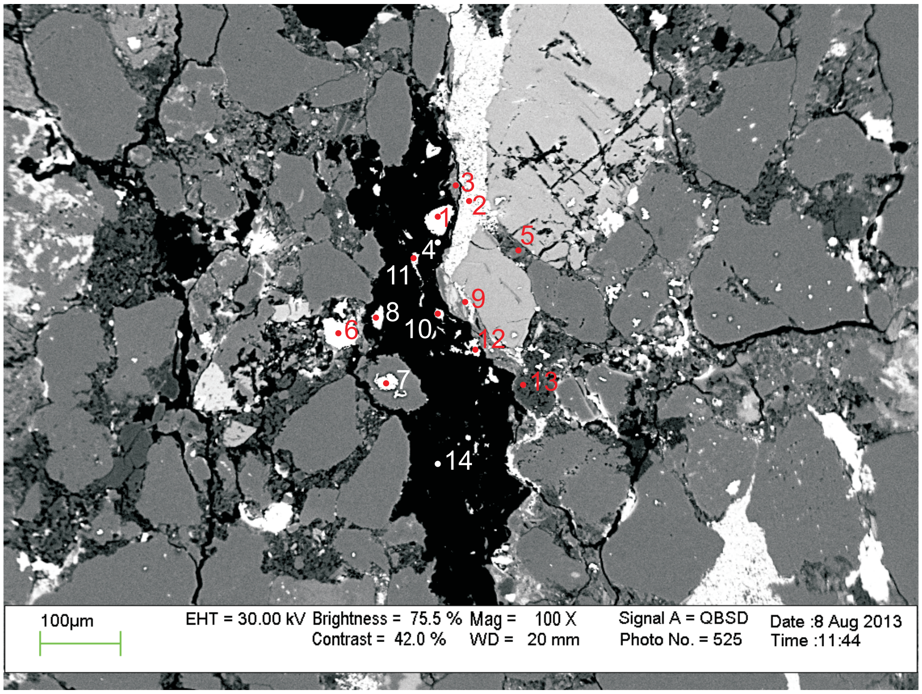


Figure 3: E-58 3710.20 m. site 3 (SEM). Sphalerite (1,8) occurs in pores filled with kaolinite (4). Siderite (2) and chlorite (3) seem to have partially replaced K-feldspar (9).

1. Sphalerite
2. Siderite
3. Chlorite
4. Kaolinite + Sphalerite
5. Quartz
6. PbO
7. PbO + Quartz
8. Sphalerite
9. Siderite + K-feldspar
10. Pyrite
11. Pyrite + Sphalerite + PbO
12. PbO
13. Kaolinite
14. Hole

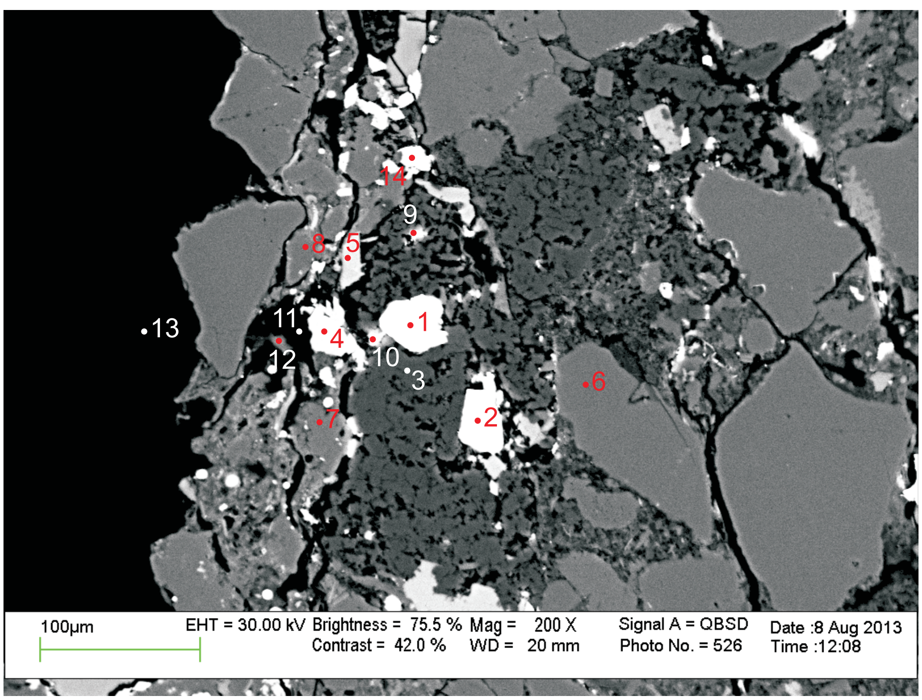


Figure 4: E-58 3710.20 m. site 4 (SEM). Sphalerite (1,2) together with siderite (4, 14) engulf kaolinite (3) and fill pores, probably produced by feldspar dissolution (5,7,8), where kaolinite had precipitated earlier.

1. Sphalerite
2. Sphalerite
3. Kaolinite
4. Siderite
5. K-feldspar
6. Quartz
7. Albite
8. Quartz + K-feldspar
9. PbO + Albite
10. PbO + K-feldspar
11. Hole
12. Quartz
13. Hole
14. Siderite

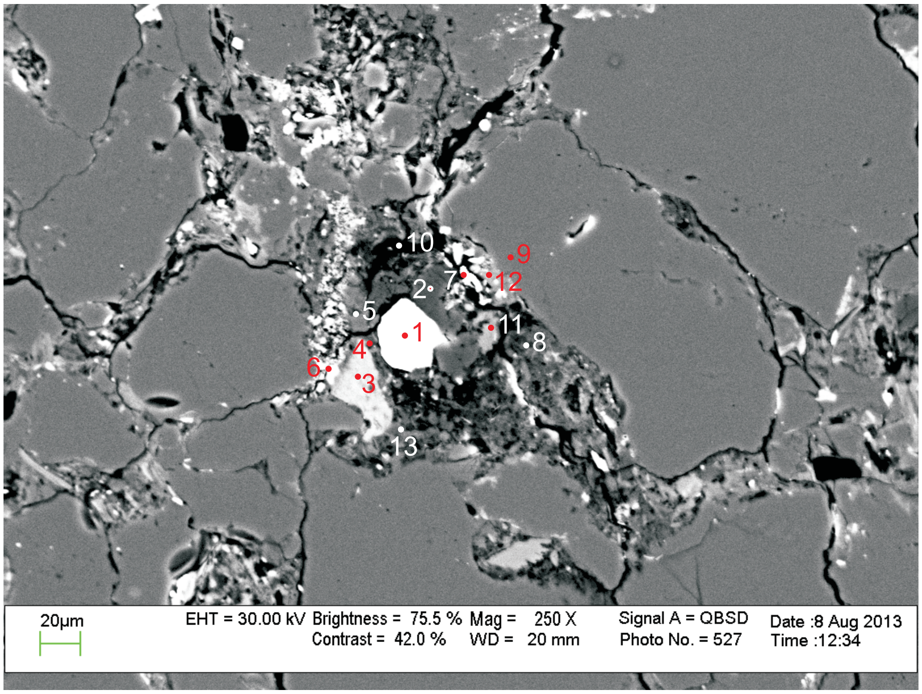


Figure 5: E-58 3710.20 m. site 5 (SEM). Similar to Fig. 4.

1. Sphalerite
2. Kaolinite
3. Chlorite
4. Chlorite + K-feldspar + Sphalerite
5. Quartz
6. Apatite
7. PbO
8. Chlorite + K-feldspar
9. Quartz
10. K-feldspar
11. K-feldspar + Chlorite
12. K-feldspar + Chlorite
13. K-feldspar + Chlorite

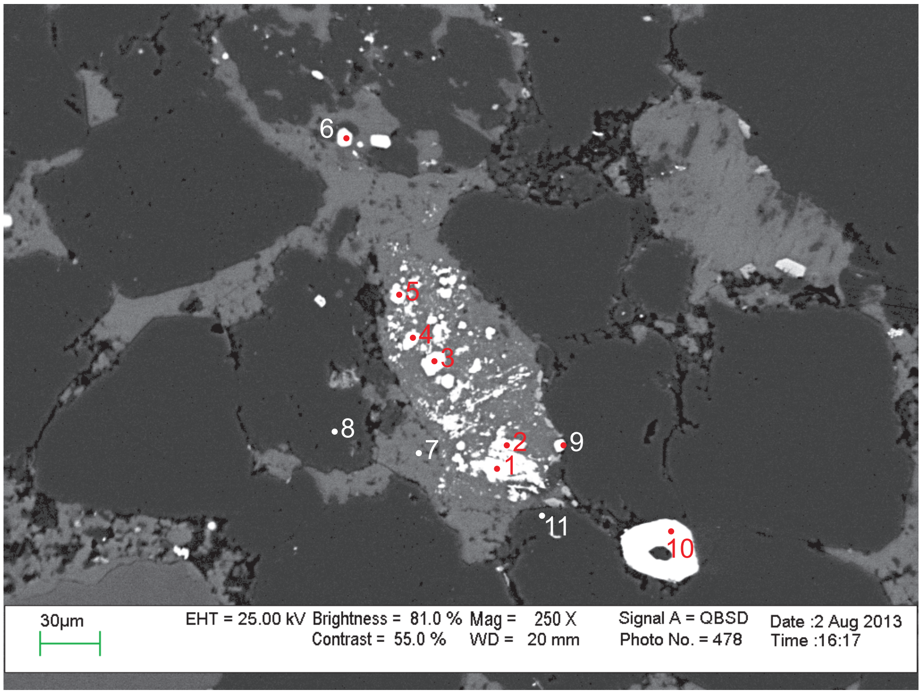
Table A: Scanning Electron Microscope chemical analyses of sample 3710.20 from the Glenelg E-58 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	NiO	CuO	ZnO	As_2O_3	SrO	Sb_2O_3	BaO	PbO	Total	Actual Total
E-58 3710.20	1	1	Brt+other			1.08	9.19			1.67	0.65	0.26		35.83		1.31	0.33				5.01		44.67		100.00	96.72
E-58 3710.20	1	2	Brt+other	4.94		3.10	18.73			2.03	0.74			26.87		2.14	0.78				4.87		35.80		100.00	82.94
E-58 3710.20	1	3	Brt+other	21.14		0.83	6.07		0.71	1.48				29.69		1.20	0.24				3.21		35.42		99.99	118.02
E-58 3710.20	1	4	Kln+Brt+Chl	52.03		32.58	5.98		0.53	0.69		0.72		2.70		1.14					0.79		2.86		100.02	93.03
E-58 3710.20	1	5	Brt+other	9.93		5.99	28.01		1.09	2.84	1.13	0.26		20.68		4.24	0.97				4.58		20.28		100.00	67.53
E-58 3710.20	1	6	Brt+Chl	32.90		22.64	11.73		1.19	1.68		1.25		13.28		2.77	0.38				5.16		7.02		100.00	82.55
E-58 3710.20	1	7	Brt+other	18.20		6.71	10.01			2.00	0.65			27.57		1.39	0.47				2.59		30.42		100.01	105.99
E-58 3710.20	1	8	Kln	47.41	0.40	18.94	7.50		0.84	0.59	0.30	1.81		7.57		0.62									86.00	110.79
E-58 3710.20	1	9	Brt+other	59.88		6.84	14.81	0.21	0.75	1.82	0.42	0.57		5.92		1.97	0.37			0.70			5.77		100.03	103.01
E-58 3710.20	1	10	Qz	99.99																					99.99	128.54
E-58 3710.20	1	11	Qz+other	83.98		15.17	0.36			0.20		0.29													100.00	122.87
E-58 3710.20	1	12	Qz	99.99																					99.99	127.99
E-58 3710.20	1	13	Chl	29.53	5.11	19.56	22.30		6.68	0.63		0.29				0.72	0.19								85.00	94.28
E-58 3710.20	1	14	Brt+Chl	32.90		22.09	21.24	0.23	2.80	1.74		1.07		8.12		0.96					2.78		6.07		100.00	94.77
E-58 3710.20	1	15	Kln	49.58	0.37	31.28	1.54		0.63	0.30		1.76				0.53									86.00	101.32
E-58 3710.20	1	16	Kfs	65.97		17.89					0.47	15.14											0.54		100.01	130.7
E-58 3710.20	1	17	Py+other	14.65		0.40	22.27				1.29			61.13						0.28					100.02	226.35
E-58 3710.20	1	18	PbO	37.99	24.94	12.15	1.72		1.34		0.44	3.11				1.16								17.14	99.99	102.39
E-58 3710.20	1	19	TiO2	17.43	68.86	9.28	2.35			0.60		1.32				0.16									100.00	105.76
E-58 3710.20	1	20	Kfs+otherl	43.25	3.77	24.13	9.39		2.62	7.70	0.54	4.35	3.37			0.88									100.00	92.39
E-58 3710.20	1	21	Kln	49.09		36.67	0.13			0.12															86.00	102.42
E-58 3710.20	2	1	Sph	0.41		0.32	0.77							51.11					47.41						100.02	194.32
E-58 3710.20	2	2	Sd	0.67			44.48	0.95	7.35	2.55															56.00	64.85
E-58 3710.20	2	3	Kln	48.92		36.78	0.19									0.11									86.00	102.2
E-58 3710.20	2	4	Kfs	65.54		17.86					0.74	15.18											0.69		100.01	125.27
E-58 3710.20	2	5	Qz	99.99																					99.99	130
E-58 3710.20	2	6	Sd	6.53		2.40	37.95	0.77	5.59	1.39	0.67	0.36							0.33						56.00	69.83
E-58 3710.20	2	7	PbO	43.81		12.81	1.93		0.60	0.73	8.20	1.60		3.45		8.90			0.70					17.30	100.03	93.4
E-58 3710.20	2	8	Hl	1.99		0.32					46.51					50.81								0.37	100.00	153.21
E-58 3710.20	2	9	Sd	5.52		3.65	34.72	1.04	5.60	2.55	2.11	0.43				0.38									56.00	74.84
E-58 3710.20	2	10	Sd+Qz	18.72		1.11	66.95	1.68	9.12	1.85		0.34				0.26									100.03	65.5
E-58 3710.20	2	11	Py	0.17			28.21							71.64											100.02	219.72
E-58 3710.20	2	12	Qz	99.99																					99.99	127.99
E-58 3710.20	3	1	Sph				2.98							51.74				1.05	44.23						100.00	187.31
E-58 3710.20	3	2	Sd+Chl	20.26	0.77	14.61	50.84	1.37	5.02	4.09	0.9	1.19				0.96									100.01	77.6
E-58 3710.20	3	3	Chl	43.50	1.00	22.39	10.09	0.19	2.37	0.90	0.54	3.50				0.51									85.00	91.46
E-58 3710.20	3	4	Kln+Sph	41.86		22.88	2.12		1.99			2.58		20.83		2.46			5.28						100.00	22.44
E-58 3710.20	3	5	Qz	96.58		3.12	0.30																		100.00	130
E-58 3710.20	3	6	PbO																			4.12		95.88	100.00	84.44
E-58 3710.20	3	7	PbO+Qz	76.75																				23.25	100.00	30.63
E-58 3710.20	3	8	Sph	0.36			1.78							50.79				0.80	46.29						100.02	162.38
E-58 3710.20	3	9	Sd+Kfs	16.28	0.87	7.46	54.78	1.25	13.03	4.25		1.81				0.26									99.99	76.51
E-58 3710.20	3	10	Py				29.15			0.25	0.63			69.97											100.00	197.9
E-58 3710.20	3	11	Py+Sph+PbO	1.13			30.28			0.45				58.83		0.98			1.12					7.21	100.00	32.88
E-58 3710.20	3	12	PbO	17.88		7.18	1.89					1.05												72.00	100.00	54.52
E-58 3710.20	3	13	Kln	49.02		36.25	0.41					0.15				0.17									86.00	102.11

Table A: Scanning Electron Microscope chemical analyses of sample 3710.20 from the Glenelg E-58 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	NiO	CuO	ZnO	As_2O_3	SrO	Sb_2O_3	BaO	PbO	Total	Actual Total
E-58 3710.20	3	14	hole											65.92		34.08									100.00	1.52
E-58 3710.20	4	1	Sph	0.26			0.58							51.49					47.67						100.00	189.49
E-58 3710.20	4	2	Sph	0.26			0.35							51.07					48.34						100.02	192.04
E-58 3710.20	4	3	Kln	48.65		37.13													0.21						86.00	104.93
E-58 3710.20	4	4	Sd				45.80	0.90	7.10	2.20															56.00	64.43
E-58 3710.20	4	5	Kfs	50.68	2.49	20.29	15.06		2.02		0.35	9.09													99.98	111.37
E-58 3710.20	4	6	Qz	99.99																					99.99	130.81
E-58 3710.20	4	7	Ab	68.90		18.91				0.11	11.86	0.19													99.97	126.59
E-58 3710.20	4	8	Qz+Kfs	89.55	0.83	5.23	1.76		0.28			1.35		1.00											100.00	126.61
E-58 3710.20	4	9	PbO+Ab	42.70		26.21	0.46				0.84					1.00								28.81	100.02	72.76
E-58 3710.20	4	10	PbO+Kfs	43.02		18.56	0.76				1.39	1.43							1.47					33.36	99.99	56.58
E-58 3710.20	4	11	hole				26.71									73.29									100.00	1.45
E-58 3710.20	4	12	Quartz	92.46		4.95	0.58		0.38			1.06				0.57									100.00	77.73
E-58 3710.20	4	13	Hole													100.00									100.00	1.15
E-58 3710.20	4	14	Sd	0.42			46.60	1.10	7.15	0.73															56.00	66.17
E-58 3710.20	5	1	Sph	0.21			0.64							50.99					48.17						100.01	194.26
E-58 3710.20	5	2	Kln	48.81		37.06	0.13																		86.00	106.52
E-58 3710.20	5	3	Chl	31.75		20.67	23.66		8.09	0.23	0.33					0.26									85.00	103.1
E-58 3710.20	5	4	Chl+Kfs+Sph	48.73	5.27	27.19	3.33		1.34	0.34		2.77		6.94		0.71			3.39						100.01	107.22
E-58 3710.20	5	5	Qz	92.03	0.58	5.29	0.81		0.28			0.77				0.21									99.97	121.03
E-58 3710.20	5	6	Ap	4.77		2.23	3.85		0.70	46.36		0.25	37.47		4.11	0.26									100.00	112.13
E-58 3710.20	5	7	PbO	24.02		7.43	4.21		1.19			1.14												62.01	100.00	76
E-58 3710.20	5	8	Kln+Chl+Kfs	56.43	1.60	31.63	3.38		1.39	0.59	0.43	3.32				1.23									100.00	93.34
E-58 3710.20	5	9	Qz	99.99																					99.99	132.01
E-58 3710.20	5	10	Kfs	62.17		23.18	1.61		0.86			9.66				2.51									99.99	51.58
E-58 3710.20	5	11	Kfs+Chl	54.81	5.29	26.72	3.43		3.50	0.45		5.01				0.81									100.02	100.63
E-58 3710.20	5	12	Kfs+Chl	59.85		22.69	5.25		3.86			8.06				0.26									99.97	100.97
E-58 3710.20	5	13	Kfs+Chl	71.32	0.30	20.14	2.11		1.06		0.54	3.77				0.75									99.99	107.05

Appendix 4C: Scanning Electron Microscope Backscattered Electron Images for Glenelg E-58 3763.29



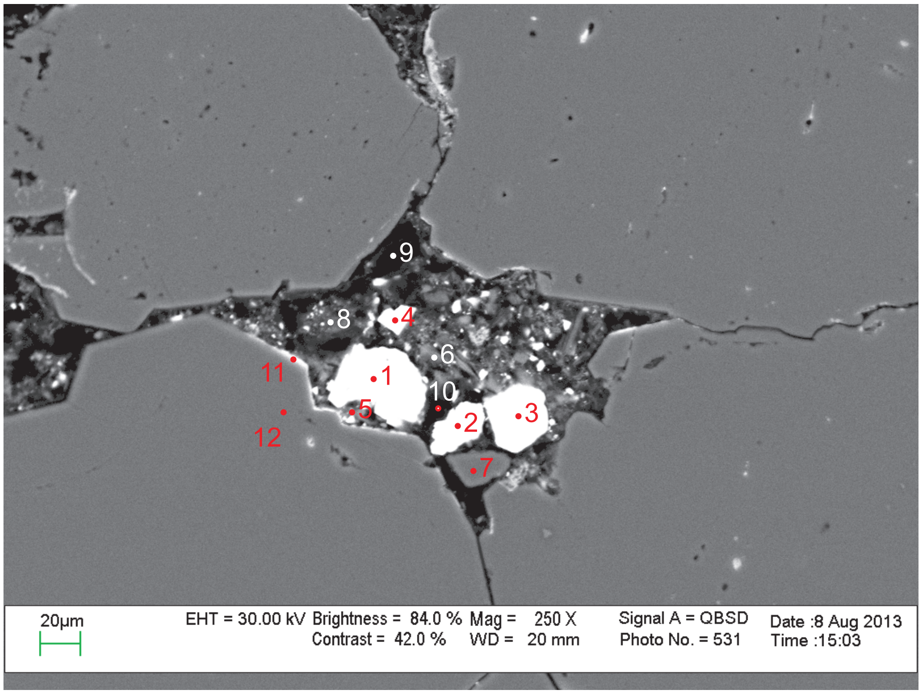
1. Sphalerite
2. Pyrite + Sphalerite
3. Pyrite
4. Sphalerite
5. Sphalerite
6. Pyrite
7. Fe-Calcite
8. Quartz
9. Pyrite + other
10. Zircon
11. Quartz

Figure 1: E-58 3763.29 m. site 1 (SEM). Sphalerite (1,4,5) and late pyrite (2,6) have partially replaced Fe-calcite.

Table A: Scanning Electron Microscope chemical analyses of sample 3763.29 from the Glenelg E-58 well.

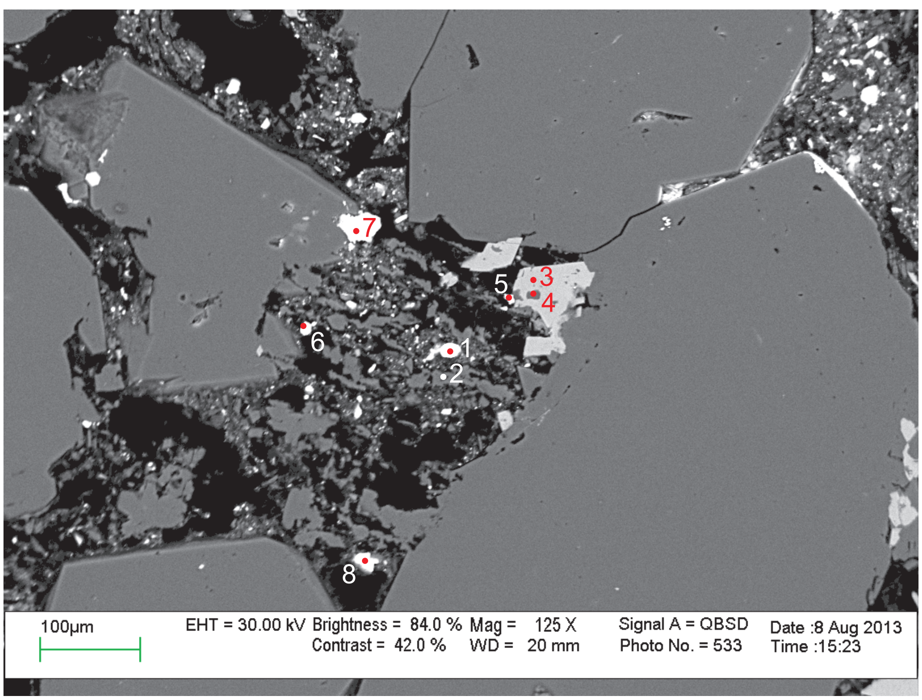
Sample	Site	Position	Mineral	SiO_2	Al_2O_3	FeO	MnO	CaO	Na_2O	K_2O	SO_3	NiO	ZnO	ZrO_2	HfO_2	Total	Actual Total
E-58 3763.29	1	1	Sph	0.32		1.48		0.34			51.84		46.04			100.02	172.57
E-58 3763.29	1	2	Py+other	5.88	1.57	24.98		0.94	0.62	0.76	64.52	0.46	0.29			100.02	186.01
E-58 3763.29	1	3	Py			27.40		0.70			71.89					99.99	207.14
E-58 3763.29	1	4	Sph	0.34		3.98		0.98			53.54		41.16			100.00	167.82
E-58 3763.29	1	5	Sph	0.58		6.99		0.95			55.86		35.62			100.00	169.15
E-58 3763.29	1	6	Py	0.21		27.16		0.57	0.90		71.14					99.98	205.98
E-58 3763.29	1	7	Fe-Cal	2.36	1.68	2.11	0.26	49.47		0.12						56.00	50.75
E-58 3763.29	1	8	Qz	99.99												99.99	109.1
E-58 3763.29	1	9	Py+other	21.86	1.30	22.81	0.21	0.50	0.84	0.39	52.09					100.00	135.81
E-58 3763.29	1	10	Zrn	31.36										67.50	1.13	99.99	113.29
E-58 3763.29	1	11	Qz	99.99												99.99	110.47

Appendix 5: Scanning Electron Microscope Backscattered Electron Images for Glenelg N-49 3667.33



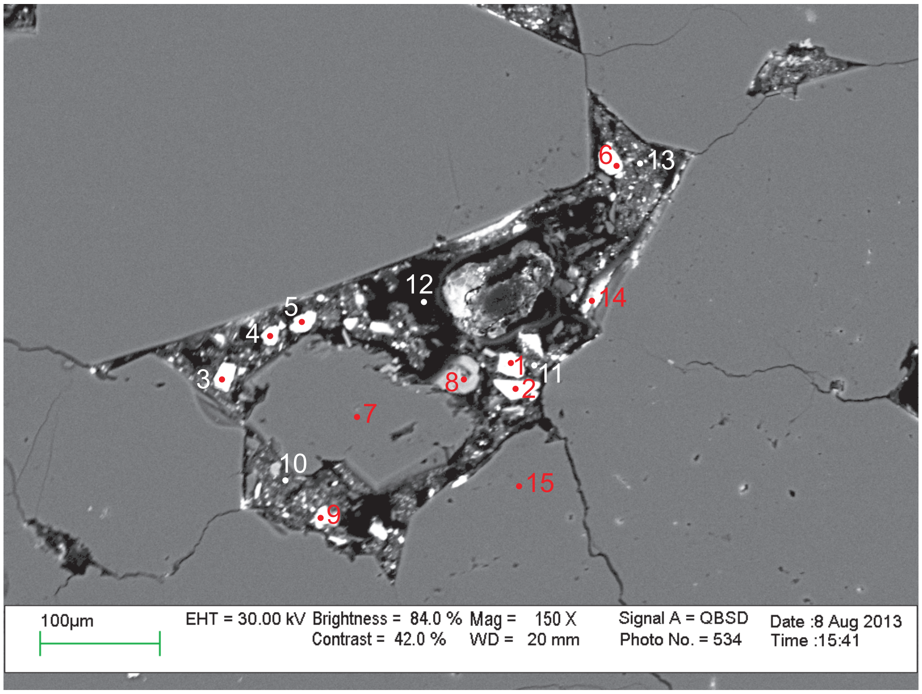
1. Barite
2. Barite
3. Barite
4. Barite
5. Albite
5. Kaolinite
7. Quartz
8. Kaolinite + Barite
9. Fe-Calcite+ Barite + hole
10. Barite + Fe-Calcite
11. PbO + Quartz
12. Quartz

Figure 1: N-49 3667.33 m. site 4 (SEM). Diagenetic barite (1,2,3,4) fills pores and it seems to have partially replaced kaolinite (5) and Fe-calcite (10).



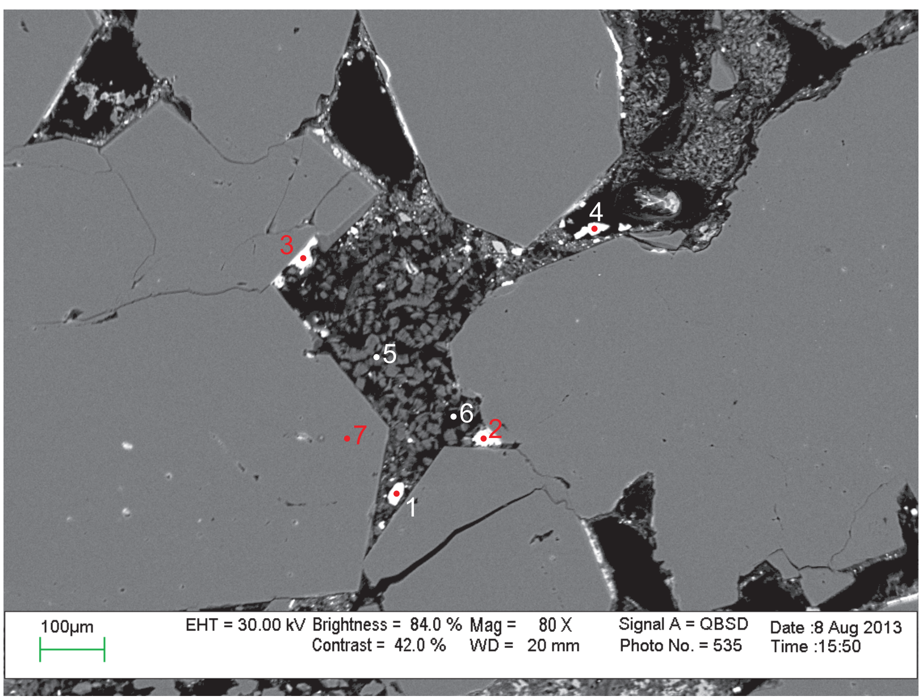
1. Barite
2. Albite
3. Magnetite
4. Quartz
5. PbO + Albite
6. Barite
7. PbO
8. Barite

Figure 2: N-49 3667.33 m. site 6 (SEM). Pore-filling diagenetic barite (1,8).



1. Barite
2. Barite
3. Barite
4. Barite
5. Barite
6. Barite
7. Quartz
8. Apatite
9. Barite
10. K-feldspar + Barite + Calcite
11. K-feldspar + Barite + Calcite
12. Hole
13. K-feldspar + Barite + Calcite
14. PbO
15. Quartz

Figure 3: N-49 3667.33 m. site 7 (SEM). Pore-filling diagenetic barite. It seems to have partially replaced Fe-calcite and K-feldspar (10,11,13).



1. Barite
2. PbO
3. PbO
4. Barite
5. Kaolinite
6. Hole
7. Quartz

Figure 4: N-49 3667.33 m. site 8 (SEM). Diagenetic barite (1,4) that has partially replaced kaolinte (5).

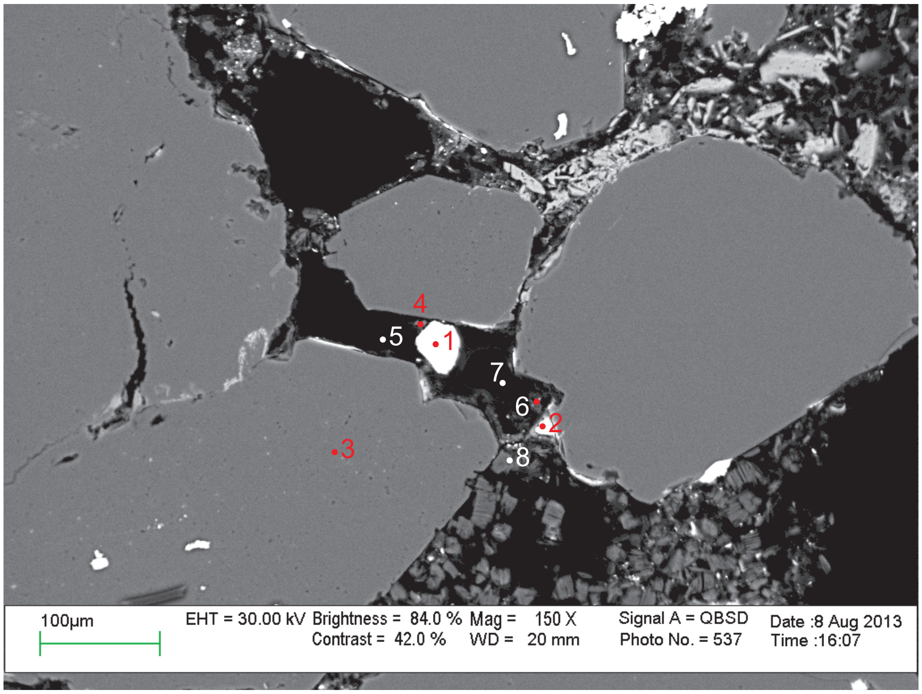


Figure 5: N-49 3667.33 m. site 10 (SEM). Pore filling diagenetic barite (1) has partially replaced Fe-calcite and feldspar (6).

1. Barite
2. PbO
3. Quartz
4. Albite + Barite
5. Hole (+Calcite?)
6. Barite + Fe-Calcite + K-feldspar
7. Hole (+Calcite?)
8. Kaolinite

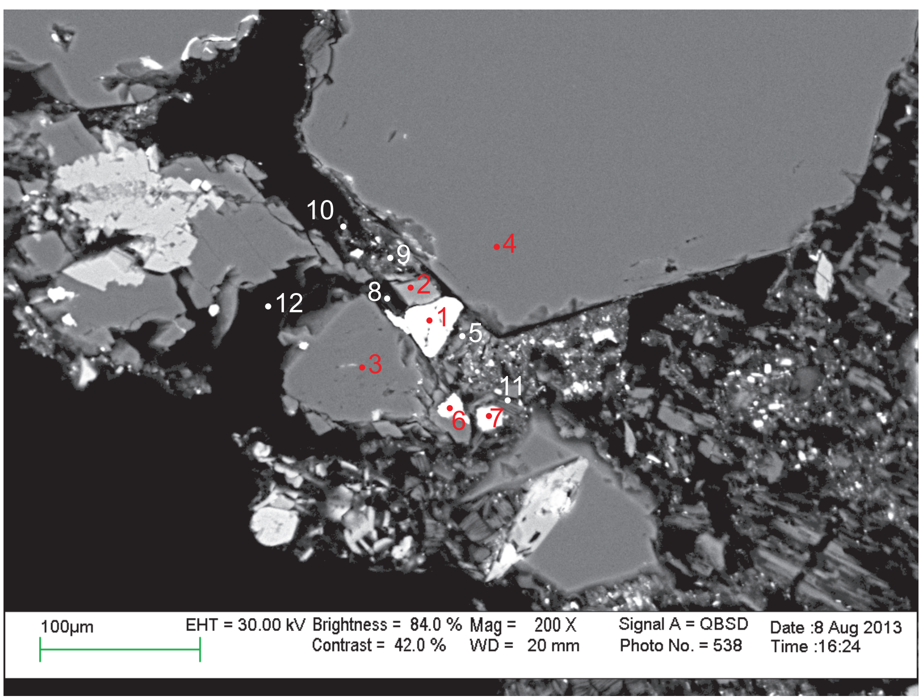
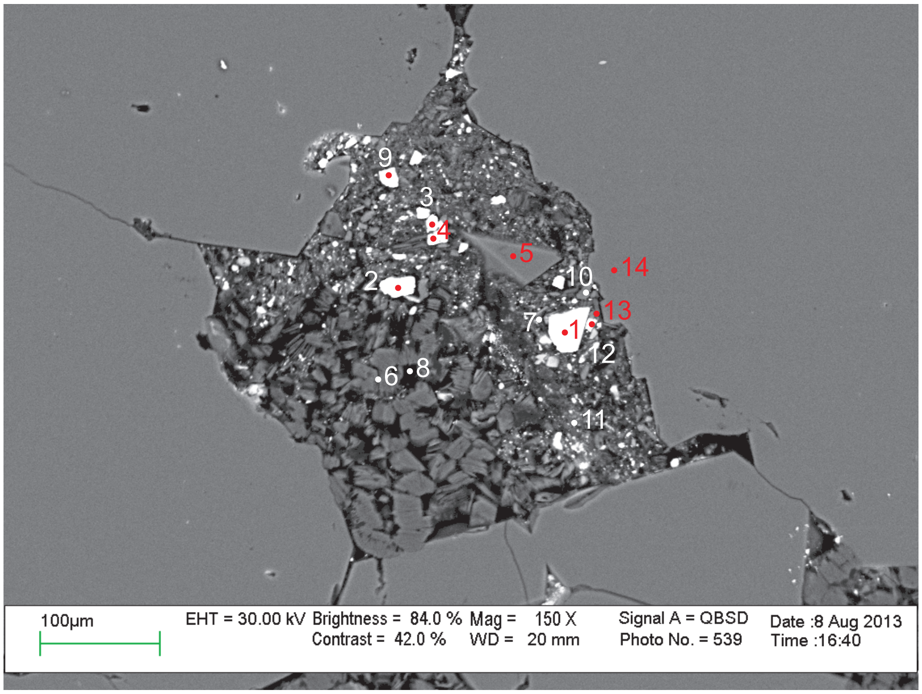


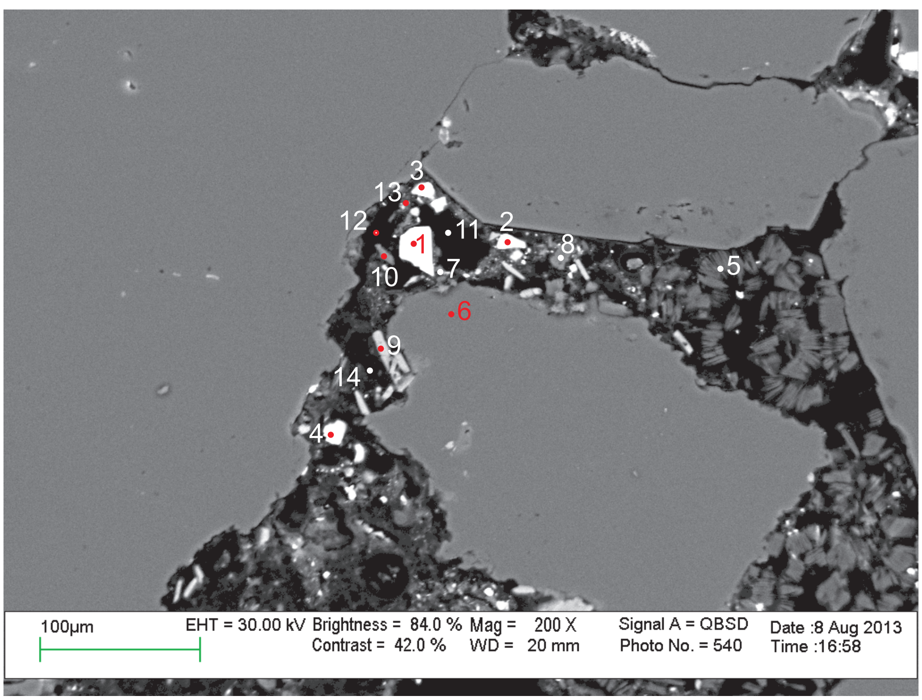
Figure 6: N-49 3667.33 m. site 11 (SEM). Diagenetic barite engulfs Fe-calcite. Fe-calcite has partially replaced feldspars (5,9,10,11).

1. Barite
2. Fe-Calcite
3. Albite
4. Quartz
5. Fe-Calcite + K-feldspar + PbO
6. PbO
7. Barite
8. Hole + Fe-Calcite
9. Barite + K-feldspar + Barite
10. Albite + Calcite + hole
11. Fe-Calcite + K-feldspar + Barite
12. hole



1. Barite
2. Barite
3. Barite
4. Barite
5. Quartz
6. Kaolinite
7. Barite + Fe-Calcite + K-feldspar
8. Kaolinite + hole
9. Barite
10. Fe-Calcite + K-feldspar + Barite
11. Fe-Calcite + Albite + Barite
12. Barite + Fe-Calcite + K-feldspar
13. Fe-Calcite + Albite + Barite
14. Quartz

Figure 7: N-49 3667.33 m. site 12 (SEM). Pore-filling diagenetic barite (1,2,3,4) has partially replaced kaolinite and Fe-calcite that has also partially replaced feldspars (10,11,12,13).



1. Barite
2. Barite
3. Barite
4. Barite
5. Kaolinite
6. Quartz
7. Fe-Calcite+Barite +K-feldspar
8. Albite
9. Apatite
10. Quartz
11. Hole +Fe-Calcite
12. Hole + Fe-Calcite
13. Fe-Calcite+Barite +K-feldspar
14. Apatite

Figure 8: N-49 3667.33 m. site 13 (SEM). Pore-filling diagenetic barite (1,2,3) and ?drilling mud barite (4).

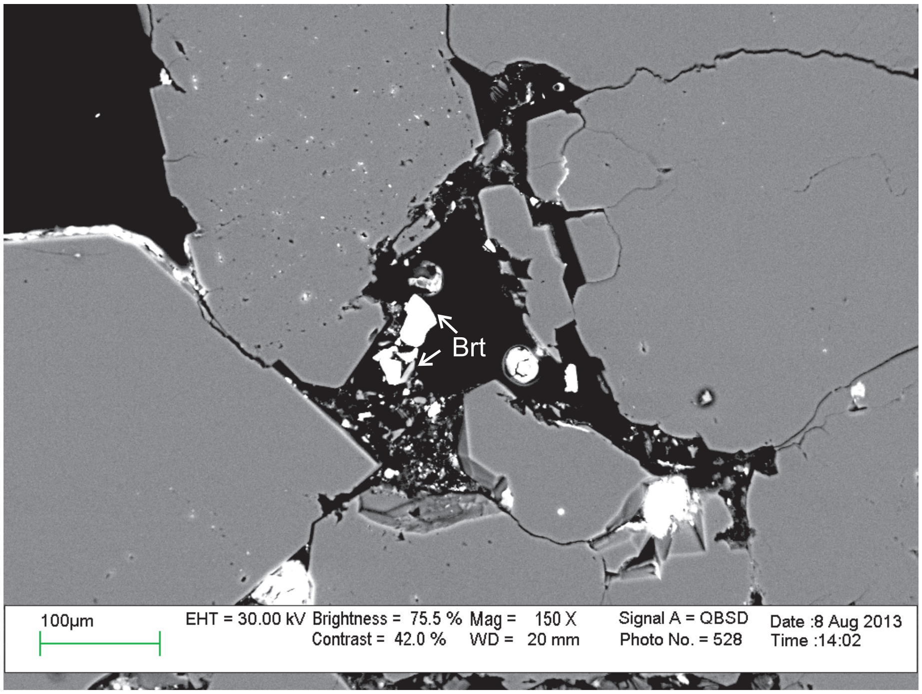


Figure 9: N-49 3667.33 m. site 1 (SEM). Drilling mud barite.

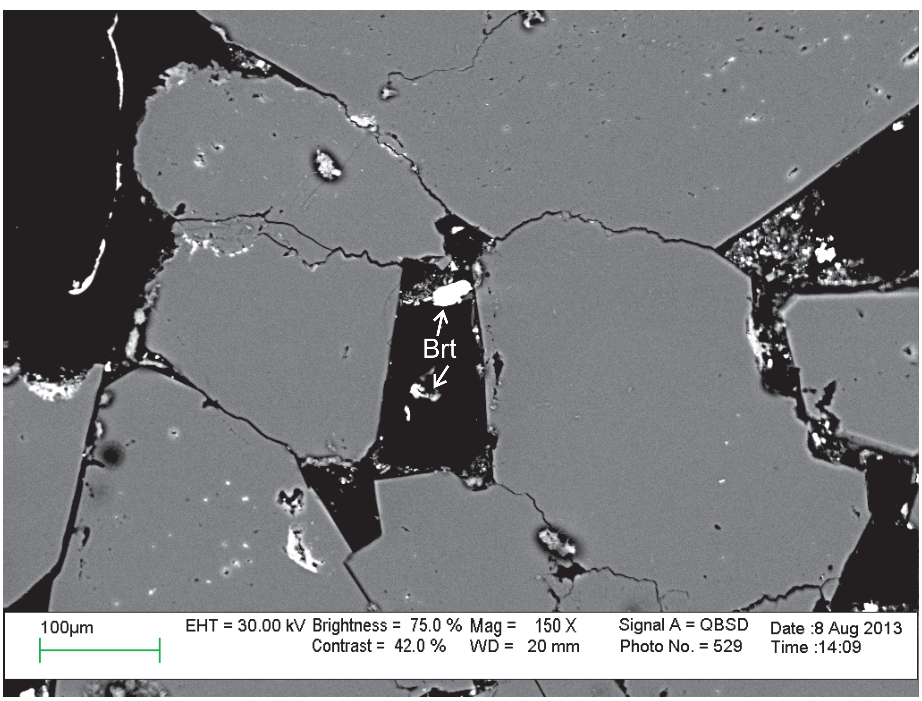


Figure 10: N-49 3667.33 m. site 2 (SEM). Drilling mud barite

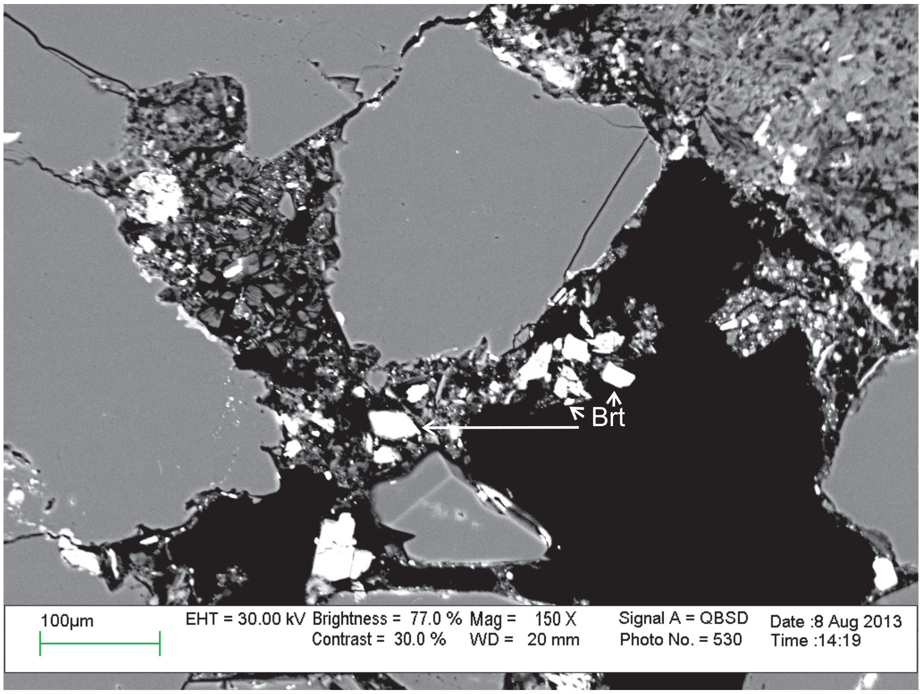


Figure 11: N-49 3667.33 m. site 3 (SEM). Drilling mud barite.

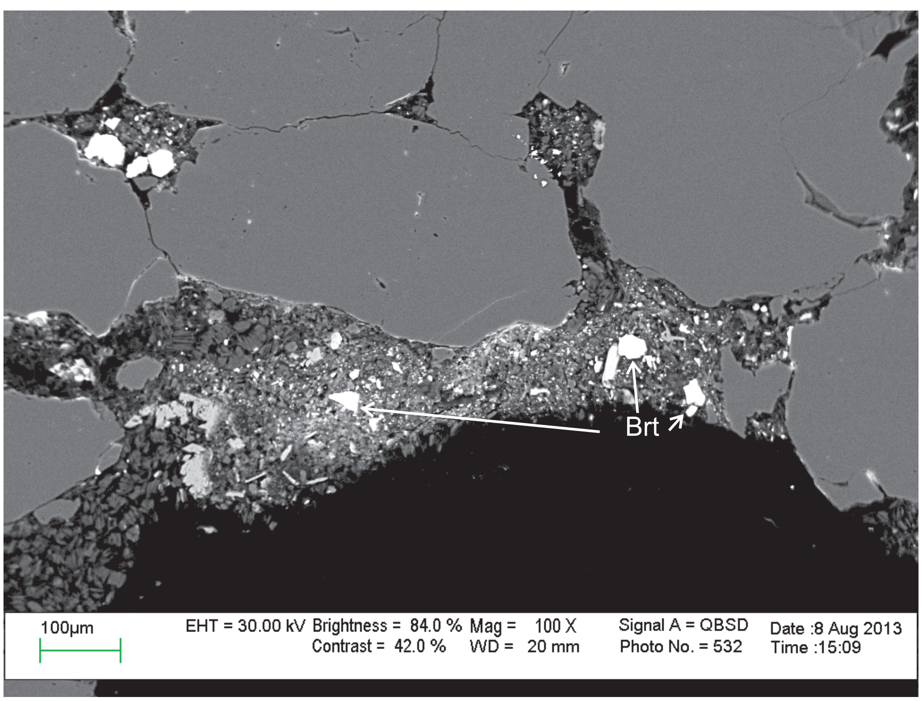


Figure 12: N-49 3667.33 m. site 5 (SEM). Drilling mud barite.

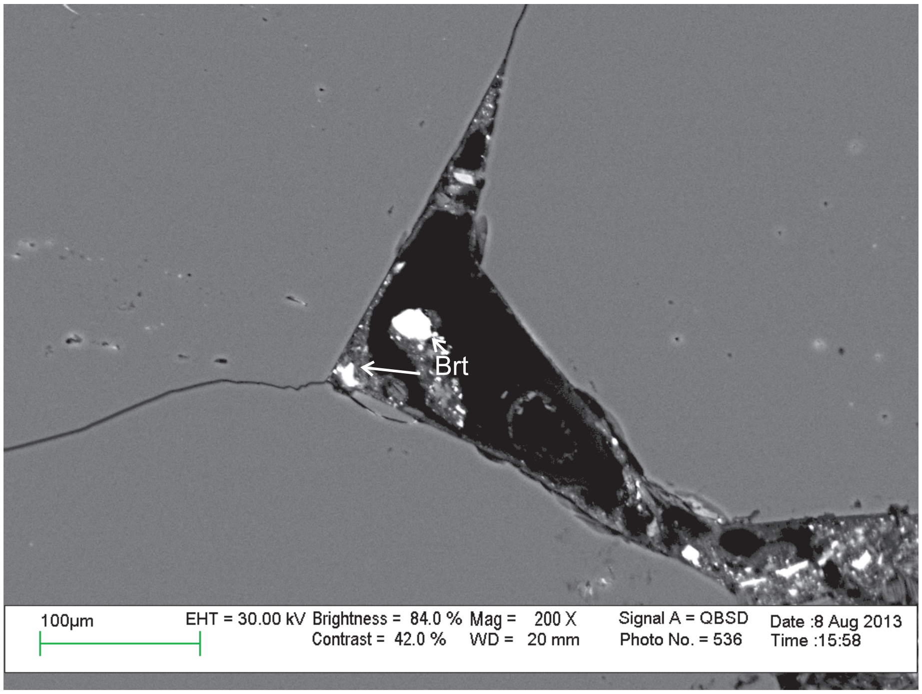


Figure 13: N-49 3667.33 m. site 9 (SEM). Drilling mud barite.

Table A: Scanning Electron Microscope chemical analyses of sample 3667.33 from the Glenelg N-49 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	As_2O_3	SrO	Sb_2O_3	BaO	PbO	Total
N-49 3667.33	4	1	Brt											38.31						61.71		100.02
N-49 3667.33	4	2	Brt											39.13						60.87		100.00
N-49 3667.33	4	3	Brt											39.35				2.87		57.78		100.00
N-49 3667.33	4	4	Brt			0.74								38.43				1.51		59.32		100.00
N-49 3667.33	4	5	Ab	60.37		16.55	2.42			2.01	11.06	0.26		2.40		0.80				4.13		100.00
N-49 3667.33	4	6	Kln	49.77		34.80	0.28			0.79						0.36						86.00
N-49 3667.33	4	7	Qz	99.99																		99.99
N-49 3667.33	4	8	Kln+Brt	55.32		37.07	0.69		0.60	2.32		0.45		0.82		0.92				1.80		99.99
N-49 3667.33	4	9	Fe-Cal+Brt+hole	56.60		10.52	2.17			7.49				2.07		18.71				2.43		99.99
N-49 3667.33	4	10	Brt+Fe-Cal	19.64			2.75			5.23				28.44		10.91				33.04		100.01
N-49 3667.33	4	11	PbO+Qz	63.17		5.44	2.10			4.44		0.46				2.76				1.23	20.39	99.99
N-49 3667.33	4	12	Qz	99.99																		99.99
N-49 3667.33	6	1	Brt											38.58						61.45		100.03
N-49 3667.33	6	2	Ab	68.88		18.67				0.24	11.97					0.23						99.99
N-49 3667.33	6	3	Mag				85.51	2.62	9.62	2.25												100.00
N-49 3667.33	6	4	Qz	94.04			5.70			0.25												99.99
N-49 3667.33	6	5	PbO+Ab	52.77		12.49	3.25				4.75										26.75	100.01
N-49 3667.33	6	6	Brt	1.07										38.18				2.11		58.64		100.00
N-49 3667.33	6	7	PbO	4.19															2.91		92.90	100.00
N-49 3667.33	6	8	Brt							0.46				39.18				1.53		58.85		100.02
N-49 3667.33	7	1	Brt											38.75				2.31		58.96		100.02
N-49 3667.33	7	2	Brt											38.48				1.31		60.21		100.00
N-49 3667.33	7	3	Brt	1.28										37.88				1.80		59.04		100.00
N-49 3667.33	7	4	Brt											38.33				1.69		60.00		100.02
N-49 3667.33	7	5	Brt											38.18						61.84		100.02
N-49 3667.33	7	6	Brt	1.88		1.04	0.37			0.71				36.81				3.73		55.47		100.01
N-49 3667.33	7	7	Qz	99.99																		99.99
N-49 3667.33	7	8	Ap							53.73			41.22		5.05							100.00
N-49 3667.33	7	9	Brt	3.04		0.94	0.41			0.39				37.68				1.74		55.83		100.03
N-49 3667.33	7	10	Kfs+Brt+Cal	55.66		10.37	6.57		2.55	10.06	0.86	1.49		4.69		2.62				5.11		99.98
N-49 3667.33	7	11	Kfs+Brt+Cal	30.21		13.30	6.39		2.32	10.96	0.82	1.02		12.06		1.61				21.28		99.97
N-49 3667.33	7	12	Hole							26.15						73.85						100.00
N-49 3667.33	7	13	Kfs+Brt+Cal	46.83		16.67	4.77		2.37	9.82	2.05	1.65		6.97		4.14				4.76		100.03
N-49 3667.33	7	14	PbO	14.95												15.24					69.81	100.00
N-49 3667.33	7	15	Qz	99.99																		99.99
N-49 3667.33	8	1	Brt	5.52		1.93					1.35			34.41						56.80		100.01
N-49 3667.33	8	2	PbO	14.57																	85.43	100.00
N-49 3667.33	8	3	PbO	38.46		3.59	0.87			0.87											56.23	100.02
N-49 3667.33	8	4	Brt											38.60						61.39		99.99
N-49 3667.33	8	5	Kln	49.24		35.69				0.29						0.78						86.00
N-49 3667.33	8	6	Hole	19.17		10.35				7.75						56.03				6.71		100.01
N-49 3667.33	8	7	Qz	99.99																		99.99

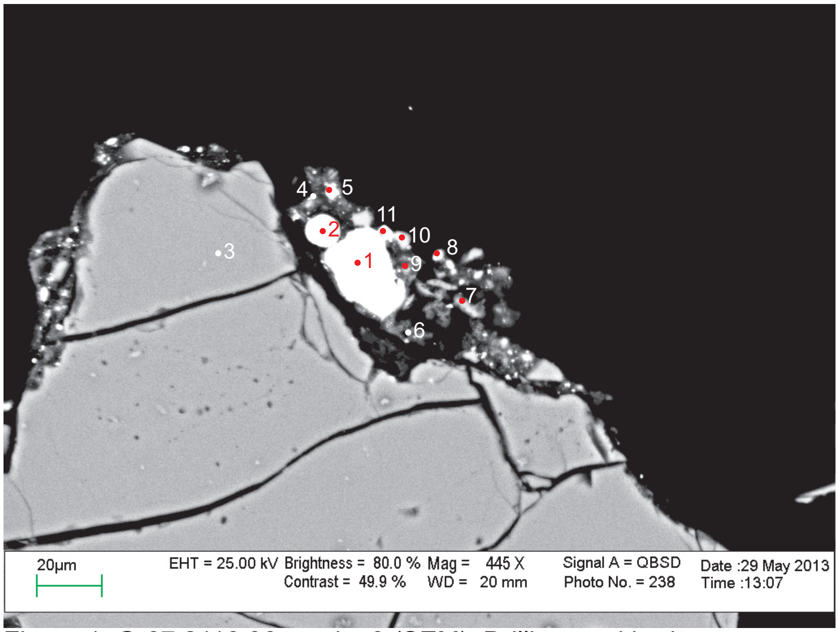
Table A: Scanning Electron Microscope chemical analyses of sample 3667.33 from the Glenelg N-49 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	As_2O_3	SrO	Sb_2O_3	BaO	PbO	Total
N-49 3667.33	10	1	Brt											39.08				1.27		59.66		100.01
N-49 3667.33	10	2	PbO	14.23			0.96												9.12		75.70	100.01
N-49 3667.33	10	3	Qz	99.99																		99.99
N-49 3667.33	10	4	Ab+Brt	56.07		15.89	2.34		0.61	1.94	8.08	0.35		6.42		0.60				7.73		100.03
N-49 3667.33	10	5	Hole (+Cal?)	8.19						9.25						82.55						99.99
N-49 3667.33	10	6	Brt+Fe-Cal+Kfs	35.92		10.56	7.38		2.17	14.54		1.79		8.19		9.84				9.61		100.00
N-49 3667.33	10	7	Hole (+Cal?)	12.92						12.76						74.31						99.99
N-49 3667.33	10	8	Kln	48.68		37.01										0.31						86.00
N-49 3667.33	11	1	Brt	1.11										27.24						71.66		100.01
N-49 3667.33	11	2	Fe-Cal	1.61		0.46	1.14	0.32		52.32		0.16										56.00
N-49 3667.33	11	3	Ab	69.03		18.80					12.19											100.02
N-49 3667.33	11	4	Qz	99.99																		99.99
N-49 3667.33	11	5	Fe-Cal+Kfs+PbO	47.40	3.05	29.72	5.06		0.85	9.16		0.66		1.42		0.61					2.05	99.98
N-49 3667.33	11	6	PbO	12.75		3.06				1.26	2.66					11.27			3.81		65.18	99.99
N-49 3667.33	11	7	Brt											38.73				1.48		59.80		100.01
N-49 3667.33	11	8	Hole	18.70		7.78	4.17			54.78						11.60					2.96	99.99
N-49 3667.33	11	9	Brt+Kfs+Cal	46.63		16.78	3.45		1.44	5.00		1.77		6.64		3.42				14.86		99.99
N-49 3667.33	11	10	Hole	46.76	1.20	17.12	5.08		3.25	3.18	4.92	0.81		4.10		13.59						100.01
N-49 3667.33	11	11	Fe-Cal+Kfs+Brt	60.03		24.90	2.24		1.43	5.50	0.84	0.47		1.85		0.87				1.86		99.99
N-49 3667.33	11	12	Hole													100.00						100.00
N-49 3667.33	12	1	Brt											38.08				1.87		60.06		100.01
N-49 3667.33	12	2	Brt											38.06				1.85		60.11		100.02
N-49 3667.33	12	3	Brt	3.19										38.55				1.80		56.48		100.02
N-49 3667.33	12	4	Brt	2.20		1.15								37.63				2.05		56.96		99.99
N-49 3667.33	12	5	Qz	99.99																		99.99
N-49 3667.33	12	6	Kln	49.27		36.14					0.34					0.25						86.00
N-49 3667.33	12	7	Brt+Fe-Cal+Kfs	30.16		7.61	4.39		1.92	10.77	0.92	0.94		14.38		2.70	1.04			25.17		100.00
N-49 3667.33	12	8	Hole	50.96		31.91				1.36						15.78						100.01
N-49 3667.33	12	9	Brt	3.08										39.00				1.48		56.45		100.01
N-49 3667.33	12	10	Fe-Cal+Kfs+Brt	78.23	0.67	3.78	3.20		0.61	6.03		0.86		2.72		1.21				2.70		100.01
N-49 3667.33	12	11	Fe-Cal+Ab+Brt	42.68		18.90	3.58		2.52	8.34	2.51	0.84		9.44		1.66				9.52		99.99
N-49 3667.33	12	12	Brt+Fe-Cal+Kfs	24.52		9.24	4.35		3.30	7.01		0.98		14.38		3.06				33.18		100.02
N-49 3667.33	12	13	Fe-Cal+Ab+Brt	68.43		13.40	1.92		1.71	5.96	0.88	0.72		1.67		2.93				2.38		100.00
N-49 3667.33	12	14	Qz	99.99																		99.99
N-49 3667.33	13	1	Brt											38.53				0.98		60.50		100.01
N-49 3667.33	13	2	Brt	2.48		1.36				0.45				33.44				2.26		60.03		100.02
N-49 3667.33	13	3	Brt	1.50										38.93				1.89		57.67		99.99
N-49 3667.33	13	4	Brt											37.71						62.30		100.01
N-49 3667.33	13	5	Kln	48.74		36.37				0.52						0.38						86.00
N-49 3667.33	13	6	Qz	99.99																		99.99
N-49 3667.33	13	7	Fe-Cal+Brt+Kfs	64.50		3.70	2.02		0.81	5.02		0.42		7.34		2.01				14.17		99.99
N-49 3667.33	13	8	Ab	68.60		18.50	0.22			0.36	11.47			0.85								100.00

Table A: Scanning Electron Microscope chemical analyses of sample 3667.33 from the Glenelg N-49 well.

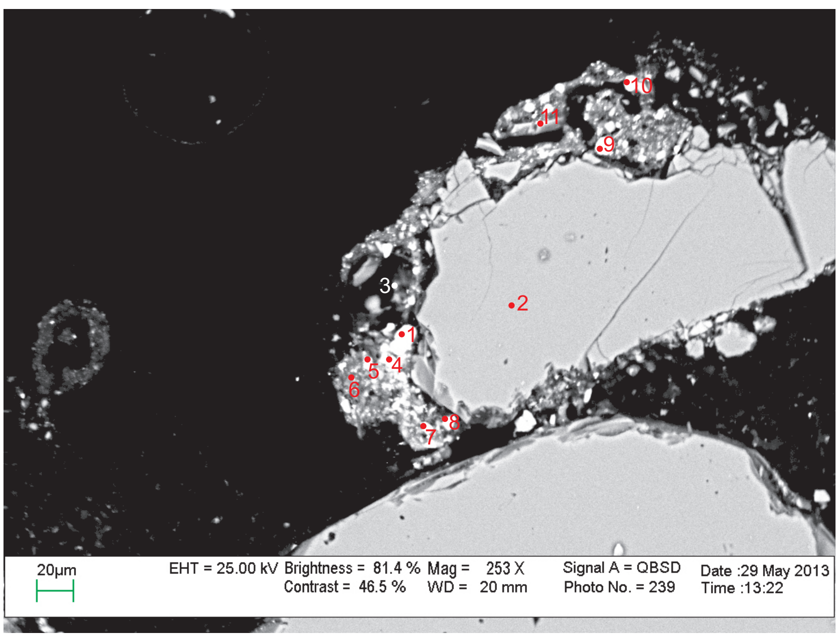
Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	As_2O_3	SrO	Sb_2O_3	BaO	PbO	Total
N-49 3667.33	13	9	Ap	2.22		0.74				52.29			39.73		4.64	0.36						99.98
N-49 3667.33	13	10	Qz	95.45	0.23	1.63	0.45			0.34		0.35		1.02		0.49						99.96
N-49 3667.33	13	11	Hole+Fe-Cal	7.72						21.94						70.33						99.99
N-49 3667.33	13	12	Hole+Fe-Cal	30.25		6.75				15.62						47.39						100.01
N-49 3667.33	13	13	Fe-Cal+Brt+Kfs	27.68		12.75	12.97		3.86	16.34		1.52		8.94		6.84				9.10		100.00
N-49 3667.33	13	14	Ap	17.13		8.94	3.28			30.73		1.23	12.42	2.85		23.42						100.00

Appendix 6: Scanning Electron Microscope Backscattered Electron Images for Kegeshook G-67 2116.36



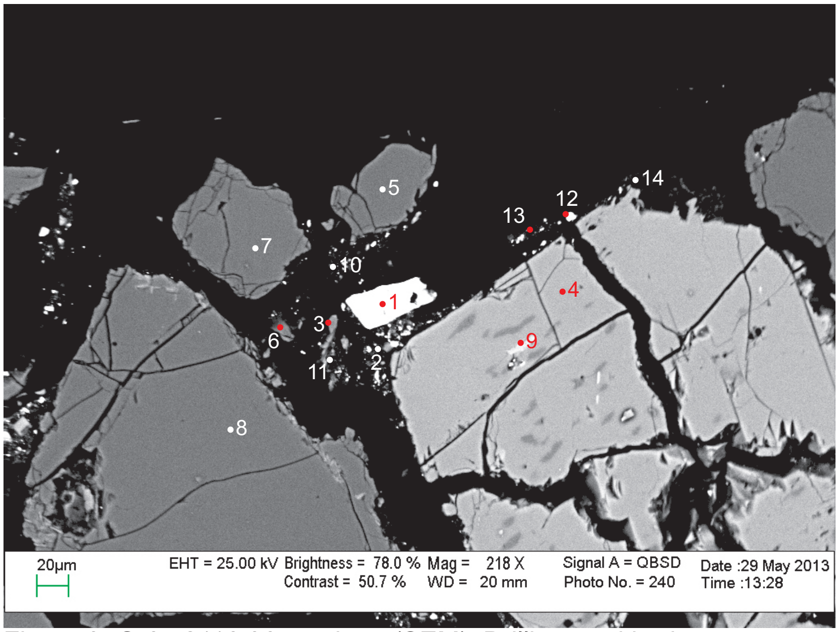
1. Barite
2. Pyrite
3. Quartz
4. Mixture
5. Barite + other
6. Mixture
7. Mixture
8. Barite + Fe-Calcite
9. Barite + Fe-Calcite
10. Quartz + other
11. Barite + other

Figure 1: G-67 2116.36 m. site 3 (SEM). Drilling mud barite.



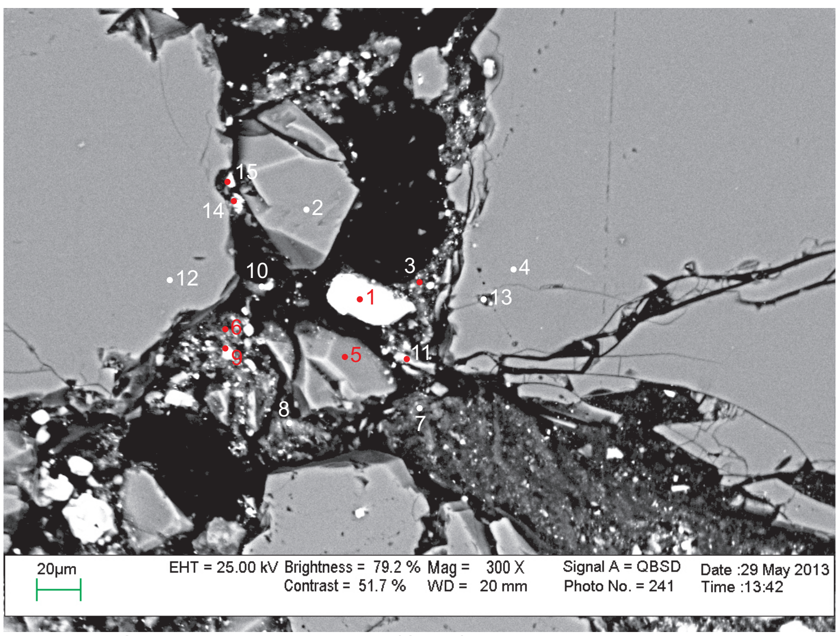
1. Barite + other
2. Quartz
3. Barite + Fe-Calcite
4. Barite + other
5. Barite + Fe-Calcite
6. Barite + Fe-Calcite
7. Barite + other
8. Barite + other
9. Pyrite
10. Barite
11. Quartz

Figure 2: G-67 2116.36 m. site 4 (SEM). Drilling mud barite.



1. Barite
2. Mixture
3. Quartz
4. K-feldspar
5. Quartz
6. Quartz
7. Quartz
8. Quartz
9. K-feldspar + other
10. Barite + other
11. Mixture
12. Barite
13. Barite + other
14. Kaolinite + other

Figure 3: G-67 2116.36 m. site 5 (SEM). Drilling mud barite.



1. Barite
2. Quartz
3. Barite + Fe-Calcite
4. Quartz
5. Quartz + other
6. Barite + Fe-Calcite
7. Mixture
8. Quartz
9. Barite + other
10. Barite + other
11. Quartz
12. Quartz
13. Quartz
14. TiO2

Figure 4: G-67 2116.36 m. site 6 (SEM). Drilling mud barite.

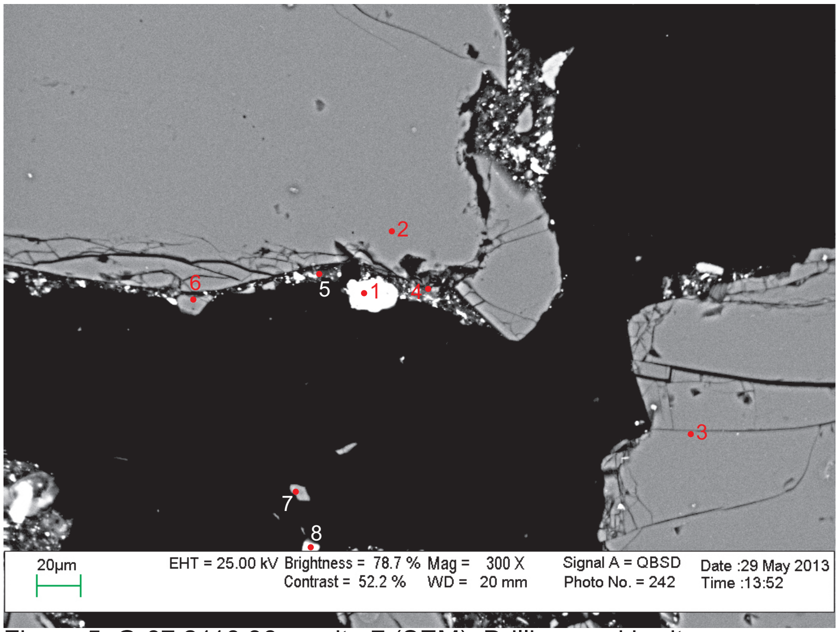


Figure 5: G-67 2116.36 m. site 7 (SEM). Drilling mud barite.

1. Barite
2. Quartz
3. Quartz
4. Barite + Quartz
5. Barite + other
6. Quartz
7. Quartz
8. Barite + other

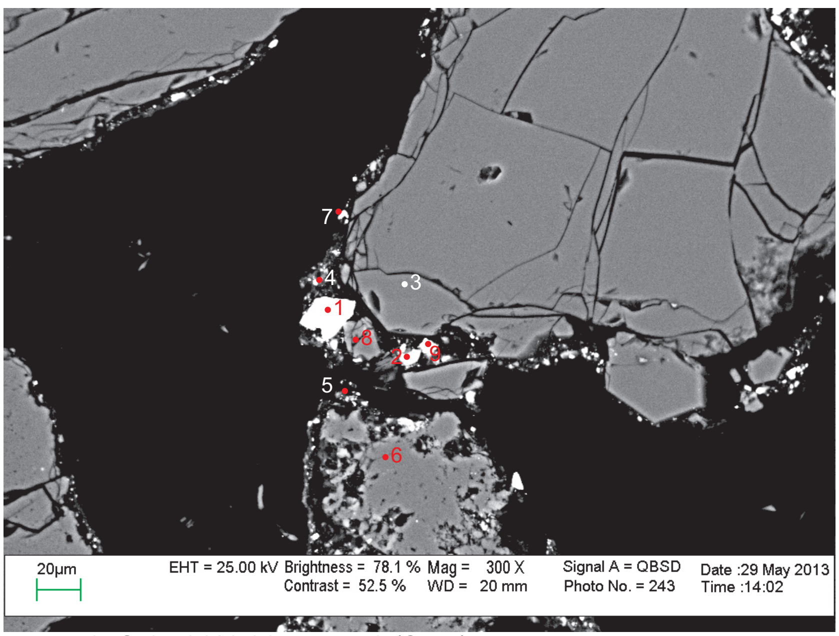


Figure 6: G-67 2116.36 m. site 8 (SEM). Drilling mud barite.

•10

•11

1. Barite
2. Barite + other
3. Quartz
4. Fe-Calcite + other
5. Fe-Calcite + other
6. Quartz
7. Barite + other
8. Quartz
9. Barite + other
10. Barite (out of field of view)
11. Barite (out of field of view)

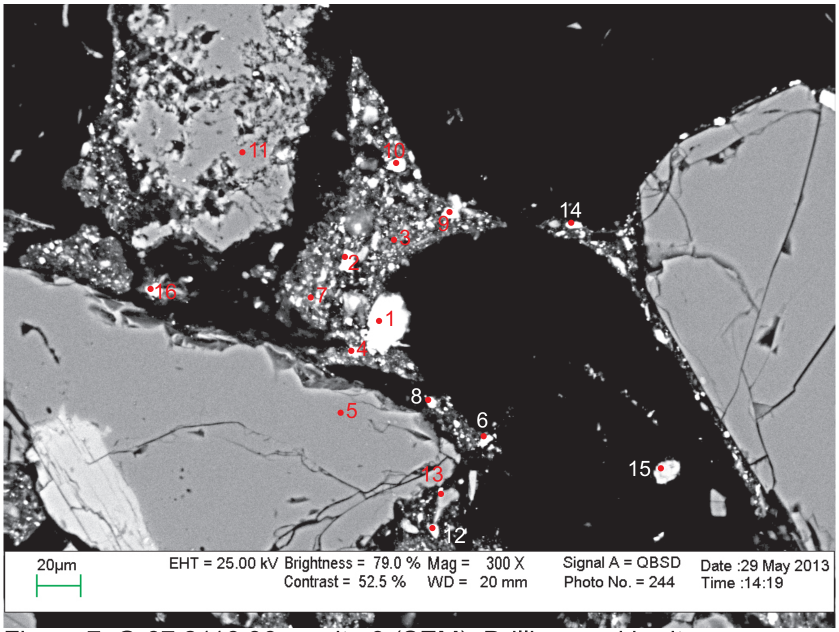


Figure 7: G-67 2116.36 m. site 9 (SEM). Drilling mud barite.

1. Barite
2. Barite
3. Barite + Fe-Calcite
4. Barite + other
5. Quartz
6. Barite + other
7. Barite + Fe-Calcite
8. Barite + other
9. Barite + other
10. Barite + other
11. Quartz
12. Barite + other
13. Quartz
14. Barite + other
15. Fe-Calcite
16. Barite + other

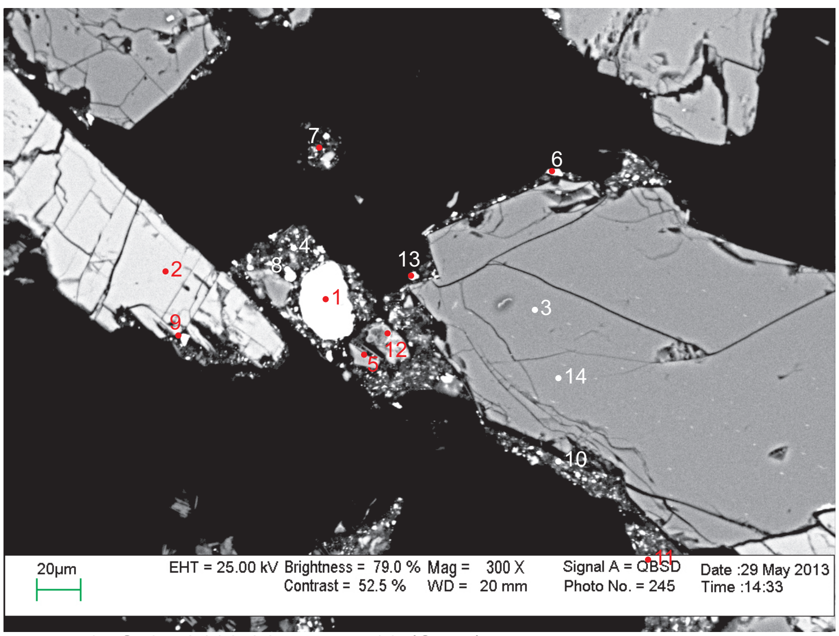
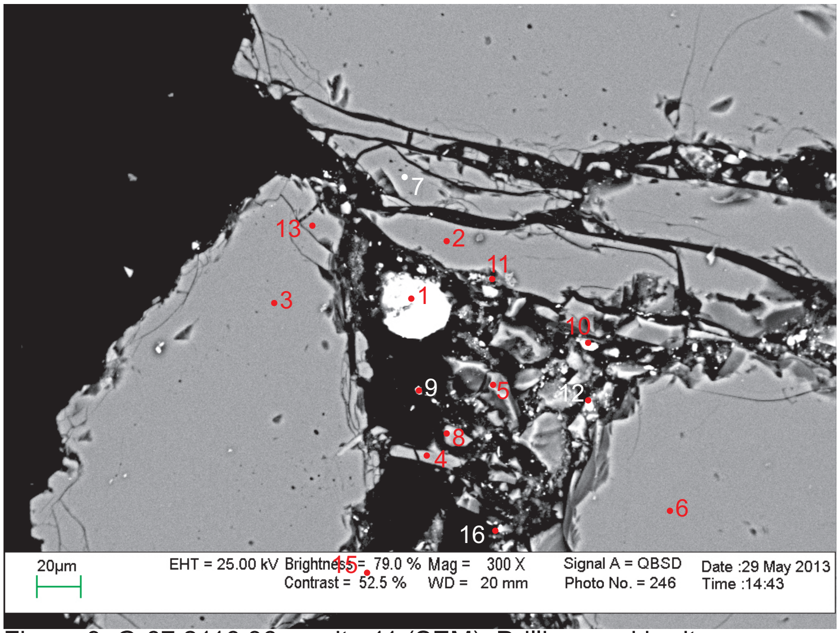


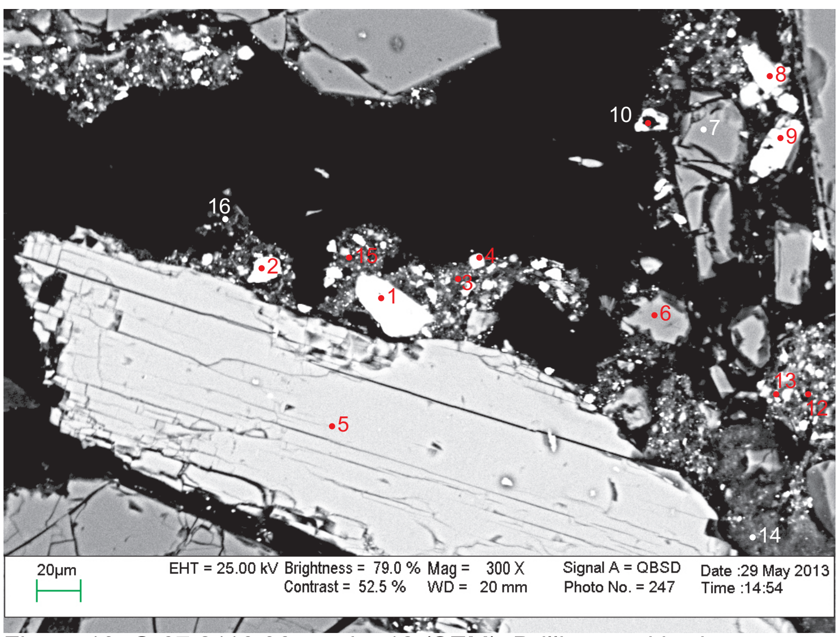
Figure 8: G-67 2116.36 m. site 10 (SEM). Drilling mud barite.

1. Barite
2. K-feldspar
3. Quartz
4. Barite + Fe-Calcite
5. Quartz + other
6. Barite
7. Barite + Fe-Calcite
8. Barite + Fe-Calcite
9. Barite + other
10. Barite + Fe-Calcite
11. Barite
12. Mixture
13. Barite + other
14. Quartz



1. Barite
2. Quartz
3. Quartz
4. Quartz
5. Quartz
6. Quartz
7. Quartz
8. Quartz
9. Barite
10. Barite
11. Quartz
12. Barite + other
13. Quartz
14. Barite (out of field of view)
15. Quartz
16. Mixture

Figure 9: G-67 2116.36 m. site 11 (SEM). Drilling mud barite.



1. Barite
2. Barite
3. Barite + other
4. Mixture
5. K-feldspar
6. Quartz
7. Quartz
8. Barite + other
9. Rutile
10. Barite + other
11. Barite + other (out of field of view)
12. Barite + other
13. Barite + other
14. Mixture
15. Barite + other
16. Mixture

Figure 10: G-67 2116.36 m. site 12 (SEM). Drilling mud barite.

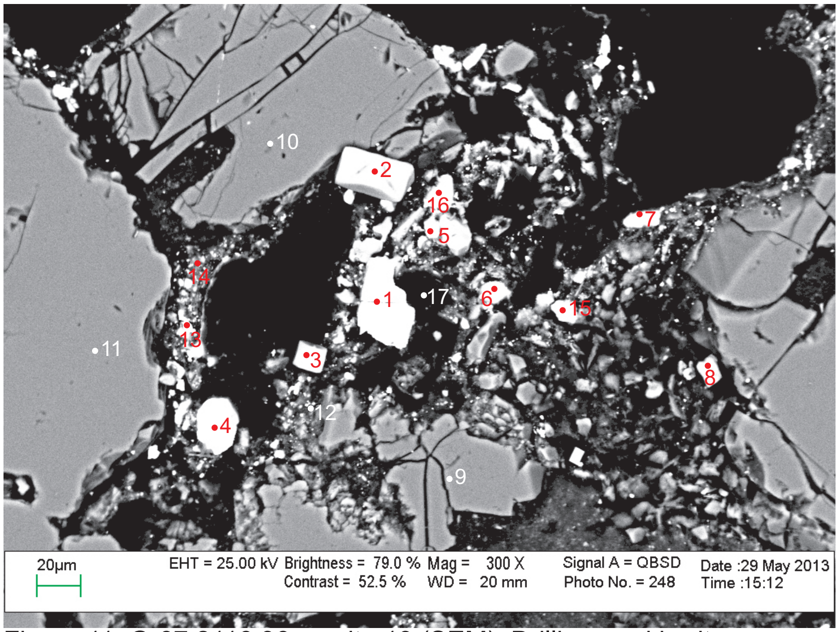


Figure 11: G-67 2116.36 m. site 13 (SEM). Drilling mud barite.

1. Barite
2.
3.
4. Barite
5. Rutile
6. Barite
7. Barite + other
8.
9. Quartz
10. Quartz
11. Quartz
12. Quartz
13. Barite + other
14. Fe-Calcite + other
15. Barite
16. TiO2
17. hole

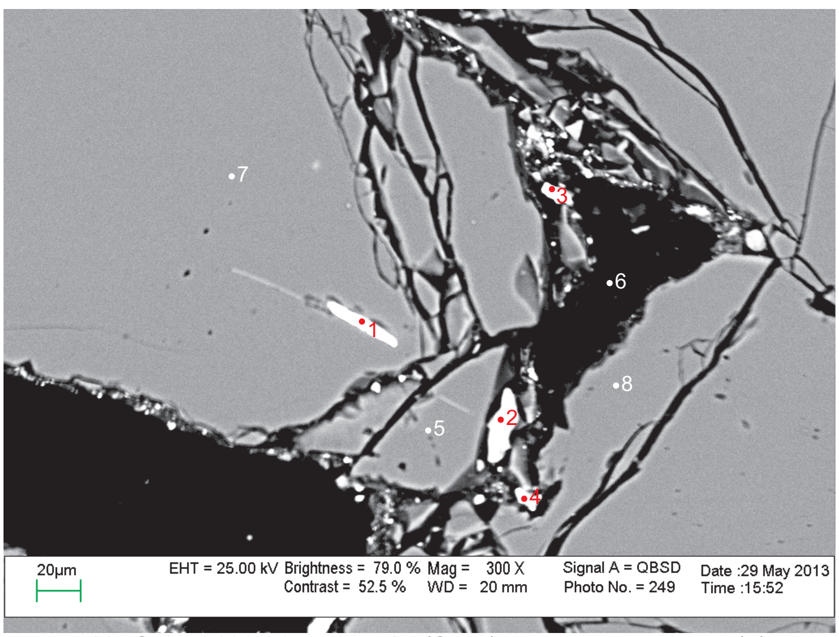


Figure 12: G-67 2116.36 m. site 14 (SEM). Drilling mud barite (4) and diagenetic barite in quartz (1) along dissolution voids.

1. Barite (D)
2. PbO + other
3. Calcite + other
4. Barite + Chlorite
5. Quartz
6. hole
7. Quartz
8. Quartz

Table A: Scanning Electron Microscope chemical analyses from sample 2116.36 from the Kegeshook G-67 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	V_2O_5	Cr_2O_3	CuO	ZnO	SrO	ZrO_2	MoO_3	BaO	WO_3	PbO	Total
G-67 2116.36	3	1	Brt											40.07										59.93			100.00
G-67 2116.36	3	2	Py	0.49			30.34		1.00	0.88				67.29													100.00
G-67 2116.36	3	3	Qz	100.00																							100.00
G-67 2116.36	3	4	Mix	56.45		8.30	1.62		0.91	8.19		0.56		4.01	15.47	1.01								3.48			100.00
G-67 2116.36	3	5	Brt+other	13.06		5.90	1.01		1.37	4.97		0.46		25.80	9.04	0.48								37.91			100.00
G-67 2116.36	3	6	Mix	38.13	0.80	25.45	3.99		1.61	12.32				3.21	12.42	2.07											100.00
G-67 2116.36	3	7	Mix	6.30		4.26				33.91				49.79	4.50	1.24											100.00
G-67 2116.36	3	8	Brt+Fe-Cal	14.70		7.53	1.28		1.41	5.13		0.60		23.85	10.94	1.15								33.41			100.00
G-67 2116.36	3	9	Brt+Fe-Cal	28.12		17.19	3.54		1.57	15.60		0.75		6.07	19.79	1.45								5.92			100.00
G-67 2116.36	3	10	Qz+other	96.94	0.67	0.87				0.87						0.65											100.00
G-67 2116.36	3	11	Brt+other	3.43		1.17				0.89				38.81										55.71			100.00
G-67 2116.36	4	1	Brt+other	7.85		1.08				1.22	0.91			34.64										54.31			100.00
G-67 2116.36	4	2	Qz	100.00																							100.00
G-67 2116.36	4	3	Brt+Fe-Cal	12.80		3.12	21.08			22.29		0.97		12.51		3.87								23.36			100.00
G-67 2116.36	4	4	Brt+other	11.49		3.23	0.58			1.56	1.43			33.28										48.44			100.00
G-67 2116.36	4	5	Brt+Fe-Cal	29.99		9.73	2.33		1.13	10.08	1.47	0.69		14.56	6.47	1.03								22.53			100.00
G-67 2116.36	4	6	Brt+Fe-Cal	38.10	2.02	18.75	3.74			12.29		0.77		7.12		1.47								15.75			100.00
G-67 2116.36	4	7	Brt+other	10.92		2.51	0.51		0.96	1.57				34.22										49.29			100.00
G-67 2116.36	4	8	Brt+other	20.32		1.21				1.62				22.49										54.36			100.00
G-67 2116.36	4	9	Py	0.34			27.38			0.67	0.45			71.15													100.00
G-67 2116.36	4	10	Brt	1.28		0.86				0.82				40.35										56.70			100.00
G-67 2116.36	4	11	Qz	96.53		0.57				0.69					2.21												100.00
G-67 2116.36	5	1	Brt											39.76										60.24			100.00
G-67 2116.36	5	2	Mix	46.59		11.43	2.84		1.95	12.26		2.66		4.91	10.41	1.48								5.47			100.00
G-67 2116.36	5	3	Qz	100.00																							100.00
G-67 2116.36	5	4	Kfs	65.76		18.03					1.11	14.11												0.99			100.00
G-67 2116.36	5	5	Qz	100.00																							100.00
G-67 2116.36	5	6	Qz	100.00																							100.00
G-67 2116.36	5	7	Qz	100.00																							100.00
G-67 2116.36	5	8	Qz	100.00																							100.00
G-67 2116.36	5	9	Kfs+other	42.62	2.58	17.19	18.59	0.39	10.99			7.65															100.00
G-67 2116.36	5	10	Brt+other	30.04	2.29	10.90	5.30		2.23	14.29		0.94		11.37	8.36	2.87								11.42			100.00
G-67 2116.36	5	11	Mix	51.20	0.70	20.33	4.03		2.27	6.12		5.84		2.40	5.81	1.29											100.00
G-67 2116.36	5	12	Brt											40.52										59.48			100.00
G-67 2116.36	5	13	Brt+other	29.56		12.29	3.32		2.32	15.00		1.20		7.68	17.83	2.18								8.62			100.00
G-67 2116.36	5	14	Kln+other	51.53		33.59	1.07			4.02		0.68		1.89	6.30	0.92											100.00
G-67 2116.36	6	1	Brt											39.19										60.81			100.00
G-67 2116.36	6	2	Qz	100.00																							100.00
G-67 2116.36	6	3	Brt+Fe-Cal	33.14		11.91	3.48		2.09	18.65		1.37		8.15	7.04	2.60								11.57			100.00
G-67 2116.36	6	4	Qz	100.00																							100.00
G-67 2116.36	6	5	Qz+other	97.84										1.03										1.13			100.00
G-67 2116.36	6	6	Brt+Fe-Cal	23.69		8.66	5.05		1.47	21.44	4.70	1.33		5.25		15.87								12.53			100.00
G-67 2116.36	6	7	Mix	51.87	0.78	6.75	4.29		16.39	5.10	1.75	1.40		3.26	7.02	1.39											100.00
G-67 2116.36	6	8	Qz	82.50		7.82	0.75		0.83	1.94		1.46			4.31	0.38											100.00
G-67 2116.36	6	9	Brt+other	8.99		2.11	0.72			2.15	1.39	0.37		30.82		0.82								52.63			100.00
G-67 2116.36	6	10	Brt+other	27.64		1.39	3.12			3.42	1.88			1.98		0.45								60.13			100.00
G-67 2116.36	6	11	Qz	92.68		2.01			0.66	2.85		0.55		0.77		0.48											100.00
G-67 2116.36	6	12	Qz	100.00																							100.00
G-67 2116.36	6	13	Qz	93.42	0.39	1.09	1.14		0.81			0.46		1.64		0.23				0.82							100.00
G-67 2116.36	6	14	TiO2	13.17	84.21	0.52	1.04			0.35								0.72									100.00

Table A: Scanning Electron Microscope chemical analyses from sample 2116.36 from the Kegeshook G-67 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	V_2O_5	Cr_2O_3	CuO	ZnO	SrO	ZrO_2	MoO_3	BaO	WO_3	PbO	Total
G-67 2116.36	6	15	Brt+other	18.44		0.73								13.02										67.81			100.00
G-67 2116.36	7	1	Brt											38.86										61.14			100.00
G-67 2116.36	7	2	Qz	100.00																							100.00
G-67 2116.36	7	3	Qz	100.00																							100.00
G-67 2116.36	7	4	Brt+Qz	87.90		1.77	0.54		0.56	3.22		0.39		2.37		0.37								2.89			100.00
G-67 2116.36	7	5	Brt+other	40.61		15.32	4.45		2.27	19.32		1.75		4.43	5.12	1.52								5.21			100.00
G-67 2116.36	7	6	Qz	100.00																							100.00
G-67 2116.36	7	7	Qz	100.00																							100.00
G-67 2116.36	7	8	Brt+other	8.75		2.16	1.06			2.58				23.50		1.06								60.87			100.00
G-67 2116.36	8	1	Brt											39.53							2.94			57.53			100.00
G-67 2116.36	8	2	Brt+other	3.99		1.85				0.81				38.57										54.78			100.00
G-67 2116.36	8	3	Qz	100.00																							100.00
G-67 2116.36	8	4	Fe-Cal+other	62.85		3.92	1.39		1.05	7.61		0.81		2.20	17.46	1.19								1.51			100.00
G-67 2116.36	8	5	Fe-Cal+other	50.62	2.20	11.83	3.87		1.95	15.81		2.06		6.93		4.72											100.00
G-67 2116.36	8	6	Qz	100.00																							100.00
G-67 2116.36	8	7	Brt+other	9.80		2.89	0.89		1.37	2.62				35.31		2.02								45.09			100.00
G-67 2116.36	8	8	Qz	98.23		1.50				0.27																	100.00
G-67 2116.36	8	9	Brt+other	11.90		3.83	0.64		1.35	2.42				26.48	3.20	0.55								49.63			100.00
G-67 2116.36	8	10	Brt											37.00										63.00			100.00
G-67 2116.36	8	11	Brt	1.00										40.38										58.62			100.00
G-67 2116.36	9	1	Brt							0.45				39.00							0.45			60.32	-0.22		100.00
G-67 2116.36	9	2	Brt							0.84				40.27										58.89			100.00
G-67 2116.36	9	3	Brt+Fe-Cal	35.36		12.51	4.28		3.22	19.87		1.26		4.44	11.01	3.86								4.19			100.00
G-67 2116.36	9	4	Brt+other	7.99		3.54	0.66		1.24	4.20				26.44	10.57	0.81								44.56			100.00
G-67 2116.36	9	5	Qz	100.00																							100.00
G-67 2116.36	9	6	Brt+other	10.37		2.57	0.73			3.09				35.04		1.01								47.19			100.00
G-67 2116.36	9	7	Brt+Fe-Cal	24.61		11.11	10.62		2.24	18.36		1.26		5.52	16.31	3.61								6.36			100.00
G-67 2116.36	9	8	Brt+other	5.09		2.41			0.93	1.81		0.34		35.81		0.49								53.13			100.00
G-67 2116.36	9	9	Brt+other	3.62		1.96	0.72			2.94				33.41		0.72								56.63			100.00
G-67 2116.36	9	10	Brt+other	10.17		5.26	0.78		1.27	2.85		0.35		25.57	4.43	0.67								48.64			100.00
G-67 2116.36	9	11	Qz	100.00																							100.00
G-67 2116.36	9	12	Brt+other	8.87		3.10	1.28		1.26	3.02				27.66		0.84								53.98			100.00
G-67 2116.36	9	13	Qz	97.59						0.51													1.31	0.60			100.00
G-67 2116.36	9	14	Brt+other	3.45		2.18				1.66				36.76		0.59								55.35			100.00
G-67 2116.36	9	15	Fe-Cal				1.38	0.84		53.48						0.30											56.00
G-67 2116.36	9	16	Brt+other	7.39						1.07				37.89										53.65			100.00
G-67 2116.36	10	1	Brt			0.91				2.20				32.28	5.27									59.34			100.00
G-67 2116.36	10	2	Kfs	65.47		17.95					0.61	14.75												1.21			100.00
G-67 2116.36	10	3	Qz	100.00																							100.00
G-67 2116.36	10	4	Brt+Fe-Cal	31.82		12.75	6.20		2.90	19.32		1.45		6.17	9.64	3.75								5.99			100.00
G-67 2116.36	10	5	Qz+other	82.59		3.65	0.82		0.90	3.31		1.11		0.77	5.80	1.06											100.00
G-67 2116.36	10	6	Brt	4.56		1.14				0.95				36.36		0.43								56.56			100.00
G-67 2116.36	10	7	Brt+Fe-Cal	30.03		12.26	2.81		1.92	13.31		1.10		12.28	5.83	3.43								17.03			100.00
G-67 2116.36	10	8	Brt+Fe-Cal	17.43		2.45	0.36		0.92	9.50	0.98	0.23		14.91	31.17	0.67								21.39			100.00
G-67 2116.36	10	9	Brt+other	20.72		9.18	0.95		1.33	2.45		2.65		25.94		0.92								35.86			100.00
G-67 2116.36	10	10	Brt+Fe-Cal	46.95		8.63	2.63		2.08	11.49		0.94		6.57	9.69	2.73								8.28			100.00
G-67 2116.36	10	11	Brt	5.75		2.23	0.64			2.92				35.36		0.62								52.47			100.00
G-67 2116.36	10	12	Mix	27.92		17.55	31.75		4.68	8.19		0.75	5.17		2.85	1.14											100.00
G-67 2116.36	10	13	Brt+other	8.92		3.53	0.83			4.04				30.99	3.35	1.26								47.09			100.00
G-67 2116.36	10	14	Qz	100.00																							100.00

Table A: Scanning Electron Microscope chemical analyses from sample 2116.36 from the Kegeshook G-67 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	V_2O_5	Cr_2O_3	CuO	ZnO	SrO	ZrO_2	MoO_3	BaO	WO_3	PbO	Total
G-67 2116.36	11	1	Brt	18.72										25.49										55.79			100.00
G-67 2116.36	11	2	Qz	100.00																							100.00
G-67 2116.36	11	3	Qz	100.00																							100.00
G-67 2116.36	11	4	Qz	100.00																							100.00
G-67 2116.36	11	5	Qz	100.00																							100.00
G-67 2116.36	11	6	Qz	100.00																							100.00
G-67 2116.36	11	7	Qz	100.00																							100.00
G-67 2116.36	11	8	Qz	99.10						0.52						0.38											100.00
G-67 2116.36	11	9	Brt	5.70		1.42				1.25				38.46		1.50								51.67			100.00
G-67 2116.36	11	10	Brt	6.03		2.82				0.44				37.52										53.19			100.00
G-67 2116.36	11	11	Qz	55.72		1.58	2.87		32.10	1.71	0.58			0.53	4.11	0.18								0.62			100.00
G-67 2116.36	11	12	Brt+other	27.50		7.48	6.90		1.82	8.21		0.78		17.07	4.46	0.80								24.97			100.00
G-67 2116.36	11	13	Qz	98.03		0.54	0.51			0.77						0.15											100.00
G-67 2116.36	11	14	Brt	8.22		1.78			0.81	1.65				32.78	4.31	0.44								50.02			100.00
G-67 2116.36	11	15	Qz	100.00																							100.00
G-67 2116.36	11	16	Mix	73.38		1.39	0.46		0.74	2.76				7.28	4.89	0.95								8.15			100.00
G-67 2116.36	12	1	Brt											36.08										63.92			100.00
G-67 2116.36	12	2	Brt											37.74										62.26			100.00
G-67 2116.36	12	3	Brt+other	28.03		11.76	6.86		2.62	22.93		1.39		7.20	6.14	4.38								8.69			100.00
G-67 2116.36	12	4	Mix	9.31		4.29	23.95		0.94	10.37		0.53		39.54	6.18	1.79								3.11			100.00
G-67 2116.36	12	5	Kfs	65.29		18.21	0.33				1.08	14.18												0.90			100.00
G-67 2116.36	12	6	Qz	65.58		21.39				2.83	10.20																100.00
G-67 2116.36	12	7	Qz	100.00																							100.00
G-67 2116.36	12	8	Brt+other	8.20		0.72				0.61				27.78	2.30									60.39			100.00
G-67 2116.36	12	9	Rt	2.57	93.98	1.47	0.76			0.29								0.94									100.00
G-67 2116.36	12	10	Brt+other	32.01			22.72		3.61	6.24	9.23			9.98		1.49			0.87					13.86			100.00
G-67 2116.36	12	11	Brt+other	13.18		2.89	0.50		1.12	1.69				22.23	3.15	0.33								54.92			100.00
G-67 2116.36	12	12	Brt+other	27.13		11.34	4.21		3.04	17.19	1.36	1.16		9.44	9.91	3.60								11.62			100.00
G-67 2116.36	12	13	Brt+other	31.48		13.65	3.18		2.46	12.53	1.19	1.72		9.76	9.08	2.24								12.71			100.00
G-67 2116.36	12	14	Mix	43.83	0.69	4.31	6.25		27.41	4.91	0.76	1.17			9.34	0.87		0.45									100.00
G-67 2116.36	12	15	Brt+other	30.64		11.19	3.20		3.37	21.24		1.15		6.17	11.97	3.95								7.13			100.00
G-67 2116.36	12	16	Mix	44.79		22.64	1.79		4.22	11.83		1.29		2.62	7.25	2.31								1.26			100.00
G-67 2116.36	13	1	Brt						0.75	0.56	1.60			30.46	2.07	0.58								63.98			100.00
~~G-67 2116.36~~	~~13~~	~~2~~		~~1.35~~							~~45.11~~				~~1.49~~	~~52.05~~											~~100.00~~
~~G-67 2116.36~~	~~13~~	~~3~~		~~0.53~~						~~0.28~~	~~49.64~~				~~2.11~~	~~47.43~~											~~100.00~~
G-67 2116.36	13	4	Brt	4.49		1.03				0.63	2.02			36.79		0.74								54.30			100.00
G-67 2116.36	13	5	Rt	0.97	92.21	0.86	0.75			0.51					4.30	0.40											100.00
G-67 2116.36	13	6	Brt	5.18		2.00			1.07	1.24				33.30										57.22			100.00
G-67 2116.36	13	7	Brt+other	6.74		2.44			0.99	3.92	1.31			30.45	9.35	0.93								43.87			100.00
~~G-67 2116.36~~	~~13~~	~~8~~		~~4.64~~		~~1.04~~				~~0.29~~	~~53.37~~	~~0.26~~			~~1.65~~	~~38.74~~											~~100.00~~
G-67 2116.36	13	9	Qz	100.00																							100.00
G-67 2116.36	13	10	Qz	100.00																							100.00
G-67 2116.36	13	11	Qz	100.00																							100.00
G-67 2116.36	13	12	Qz	86.30	0.76	1.23	0.39			2.20	0.66			1.13	6.70	0.64											100.00
G-67 2116.36	13	13	Brt+other	8.64		4.00	1.01		0.95	5.95	0.97			20.29	3.82	0.77								53.59			100.00
G-67 2116.36	13	14	Fe-Cal+other	32.80		11.53	3.59		3.02	18.71	2.86	1.37		5.31	11.54	2.98								6.29			100.00
G-67 2116.36	13	15	Brt	5.14		1.93				0.61				36.73						-0.10				55.69			100.00
G-67 2116.36	13	16	TiO2	1.86	93.32					0.48	0.87					0.58	2.90										100.00
G-67 2116.36	13	17	Cal+other							38.27				10.70		51.03											100.00
G-67 2116.36	14	1	Brt	17.57		0.81								30.22										51.40			100.00

Table A: Scanning Electron Microscope chemical analyses from sample 2116.36 from the Kegeshook G-67 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	V_2O_5	Cr_2O_3	CuO	ZnO	SrO	ZrO_2	MoO_3	BaO	WO_3	PbO	Total
G-67 2116.36	14	2	PbO+other	69.61		4.78	0.61			2.89	2.10	2.89								1.26		2.95				12.90	100.00
G-67 2116.36	14	3	hole	34.95		0.97				1.15													1.82	61.11			100.00
G-67 2116.36	14	4	Brt+Chl	31.19		19.83	1.00		1.49	1.68		3.01		14.35	2.11									25.33			100.00
G-67 2116.36	14	5	Qz	100.00																							100.00
~~G-67 2116.36~~	~~14~~	~~6~~	~~hole~~	~~11.01~~										~~11.31~~		~~77.68~~											~~100.00~~
G-67 2116.36	14	7	Qz	100.00																							100.00
G-67 2116.36	14	8	Qz	100.00																							100.00

Notes: 1. The barite is mostly from drilling mud and only one is probably diagenetic

Appendix 7A: Scanning Electron Microscope and Electron Microprobe Backscattered Electron Images for Louisbourg J-47 4076.26

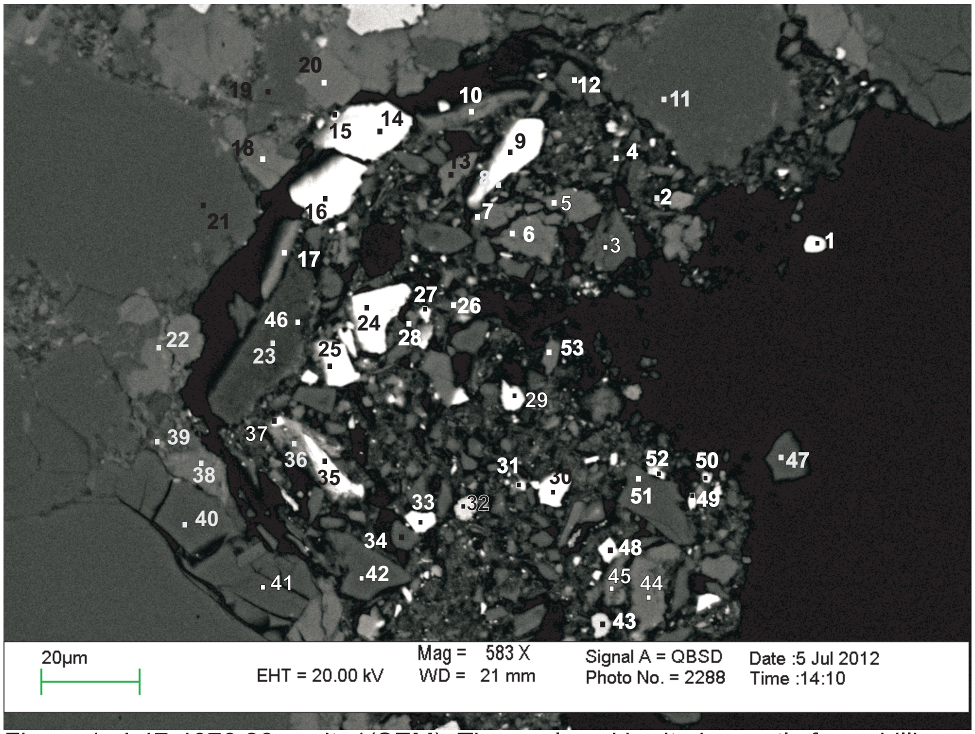


Figure 1: J-47-4076.26 m site1(SEM). The analyzed barite is mostly from drilling mud. Only few barite analyses seem to be of diagenetic origin.

1. Barite (D)
2. Ankerite + Chlorite
3. Quartz
4. Kaolinite+Quartz
5. Mg-Calcite
6. Fe-Caclite
7. Fe-Calcite+ Chlorite
8. Mixture
9. Barite (DM)
10. Chlorite+Calcite
11. Quartz
12. Quartz
13. Calcite+Chlorite
14. Barite (DM)
15. Barite (DM)
16. Barite (DM)
17. Chlorite
18. Ankerite
19. Quartz
20. Ankerite
21. Quartz
22. Fe-Calcite
23. Kaolinite
24. Barite (DM)
25. Barite (D)
26. Mixture
27. Mixture
28. Barite+ Others
29. Barite (DM)
30. Barite (DM)
31. Barite+Chlorite
32. ?Pyrite + others
33. Quartz+ Barite
34. Quartz+ Barite
35. Magnetite
36. Mixture
37. Mixture
38. Chlorite+ Calcite
39. K-feldspar + Calcite
40. Quartz
41. Quartz
42. Quartz
43. Mixture
44. Calcite+ others
45. Chlorite + others
46. Quartz
47. Quartz
48. Barite
49. Mixture
50. Mixture
51. Quartz+ Others
52. Chlorite + Others
53. Kaolinite + Others

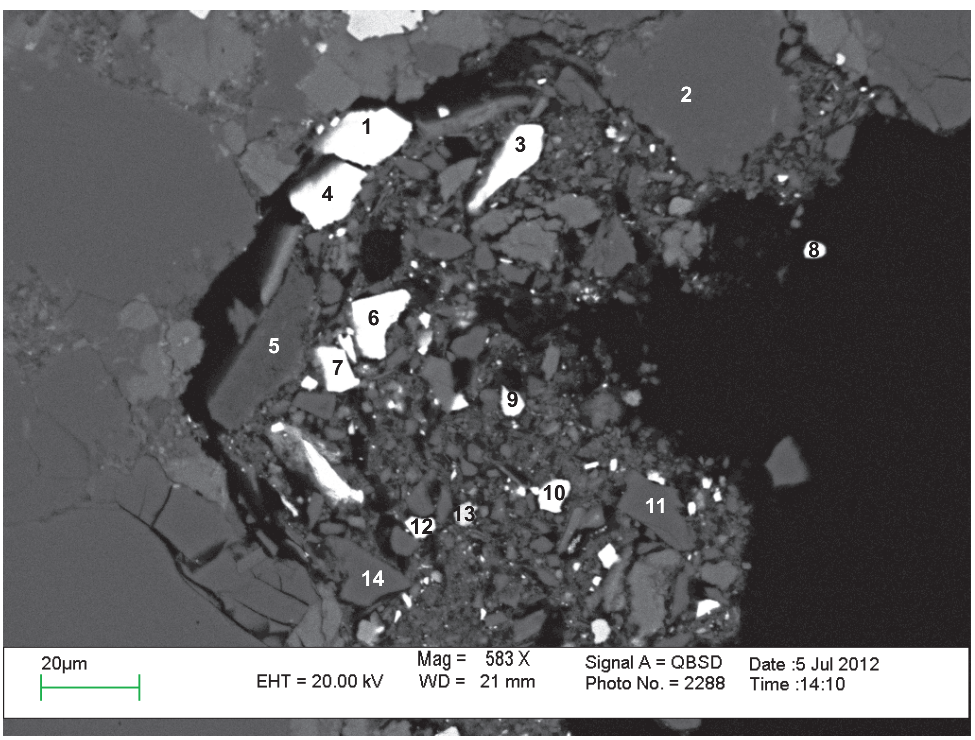
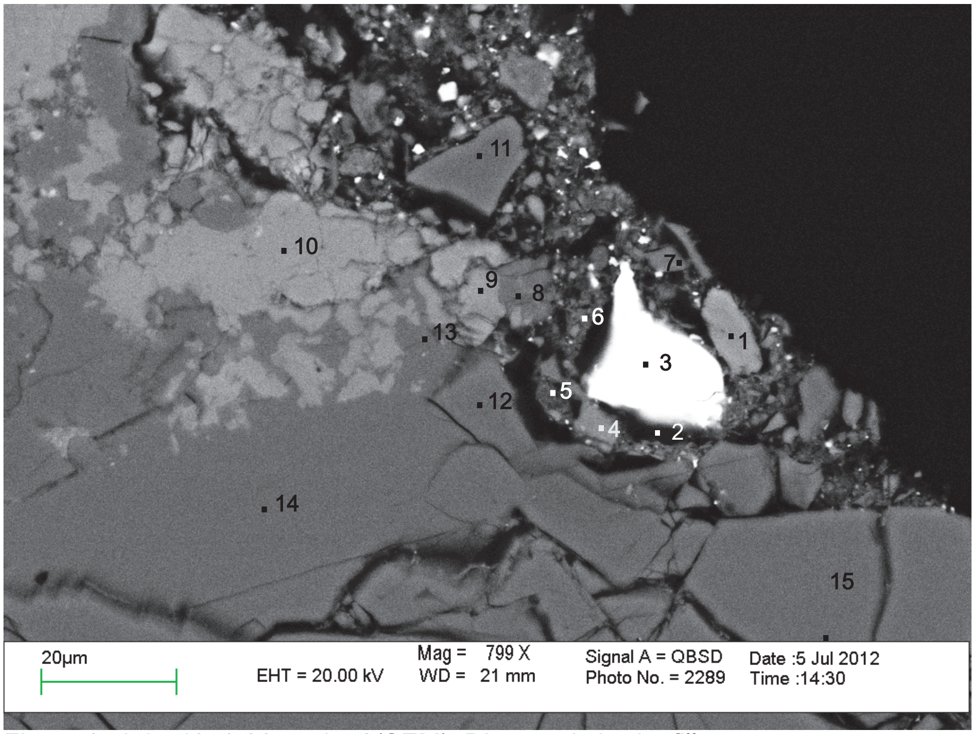


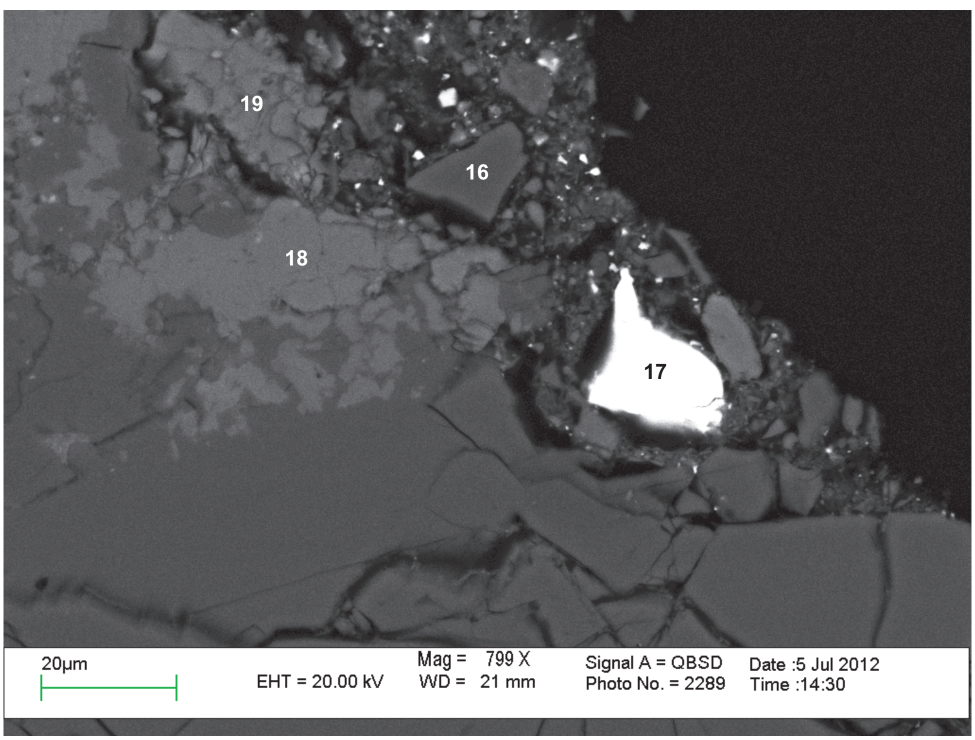
Figure 2: J-47-4076.26 m site1(Probe).

1. Barite
2. Quartz
3. Mixture
4. Barite
5. Kaolinite
6. Mixture
7. Barite + Chlorite
8. Hole
9. Hole
10. Mixture
11. Mixture
12. Mixture
13. Mixture
14. Quartz
15. Mixture



1. Calcite
2. Barite
3. Barite (D)
4. K-feldspar
5. Chlorite+ others
6. Quartz
7. Quartz
8. Quartz + Calcite
9. Fe-Calcite
10. Fe-Calcite
11. Quartz
12. Quartz
13. Quartz
14. Quartz
15. Quartz

Figure 3: J-47-4076.26 m site 2(SEM). Diagenetic barite fills pore space.



16. Quartz
17. Barite (D)
18. Ferroan Calcite
19. Mixture

Figure 4: J-47-4076.26 site 2(Probe).

Table A-2: Electron Microprobe analyses of sample 4076.26 from the Louisbourg J-47 well.

Well	Depth	Site*	No.	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SrO	BaO	SO_3	WO_3	CoO	Ce_2O_3	ZrO_2	Total
J47	4076.26	P1	47	Brt	0.16		0.13	0.31	0.01	0.05	0.67	0.19	0.09	0.04	0.35	65.16	35.03	0.03			0.06	102.28
J47	4076.26	P2	49	Qz	100.48	0.01	0.00	0.03	0.00		0.04	0.02	0.03				0.00	0.11		0.05		100.76
J47	4076.26	P3	50	Mix	17.73	0.02	9.19	15.05	0.27	3.60	8.29	0.44	1.01	0.16	0.33	12.56	8.60		0.06	0.06	0.02	77.39
J47	4076.26	P5	51	Kln	46.33	0.05	36.46	2.49	0.01	0.50	0.17	0.13	0.48			0.09	0.09	0.08			0.05	86.90
J47	4076.26	P4	52	Brt	0.93		0.68	0.19		0.07	0.29	0.23	0.15	0.02	0.44	40.88	25.48		0.02		0.01	69.38
J47	4076.26	P6	53	Mix	36.04	0.37	11.88	6.43	0.07	2.14	2.12	0.55	2.21	0.42		2.42	1.90		0.06		0.06	66.66
J47	4076.26	P7	54	Brt+Chl	16.17		6.45	2.72	0.05	1.16	2.79	0.40	0.57	0.12	2.08	33.12	19.11		0.03	0.02	0.04	84.83
J47	4076.26	P8	55	hole	1.85	0.02	1.09	1.47	0.03	0.45	3.18	0.08	0.09	0.03			0.38		0.01		0.01	8.67
J47	4076.26	P9	56	hole	3.52		1.15	0.68	0.01	0.23	0.22	0.09	0.17	0.03		0.02	0.50		0.00			6.62
J47	4076.26	P10	57	Mix	20.10	0.19	8.92	4.73	0.25	2.14	12.89	0.33	1.43	0.18	0.00	1.25	1.27		0.02			53.69
J47	4076.26	P11	58	Mix	52.72	0.10	3.80	3.60	0.17	0.93	8.79	0.20	0.54	0.06			0.27		0.04	0.04	0.02	71.28
J47	4076.26	P12	59	Mix	78.22	0.08	5.93	2.37	0.03	1.35	1.16	0.24	1.14			2.77	1.67	0.05		0.01		95.00
J47	4076.26	P13	60	Mix	42.37	0.28	12.17	4.34	0.05	1.85	1.89	0.72	1.65	0.10	0.03	3.09	2.03	0.17				70.74
J47	4076.26	P14	61	Qz	89.15	0.12	2.82	1.11	0.01	0.60	0.26	0.11	0.35			0.25	0.19			0.03		94.99
J47	4076.26	P15	62	Mix	26.54	0.44	11.30	12.52	0.20	2.66	5.36	0.56	1.62	0.31	0.08	5.53	3.26	0.10	0.03	0.04	0.04	70.57
J47	4076.26	P16	63	Qz	89.00	0.10	2.86	0.73	0.03	0.51	0.51	0.09	0.46	0.01		0.49	0.53	0.02			0.03	95.36
J47	4076.26	P17	64	Brt	0.49		0.39	0.15	0.01	0.06	0.18	0.21	0.07		2.39	64.55	33.87	0.00		0.12		102.49
J47	4076.26	P18	65	Fe-Cal	1.61		0.69	2.53	0.85	0.70	56.38	0.02	0.14	0.05	0.19		0.07		0.01	0.02		63.26
J47	4076.26	P19	66	Mix	16.21	0.00	10.59	2.87	0.34	0.92	34.61	0.13	1.50	5.01		0.03	0.11	0.01	0.03	0.07	0.01	72.44

Notes: 1. It is unclear if barite is diagenetic or from drilling mud. Barite grain (analysis 17, site2) texturally looks as diagenetic, and also contains similar SrO as the equivalent SEM analysis 3, site 2 (Table A-1).

*:These analysis are also from sites 1(P_1-P_{15}) and 2(P_{16}-P_{19}).

Appendix 7B: Scanning Electron Microscope Backscattered Electron Images for Louisbourg J-47 4081.17

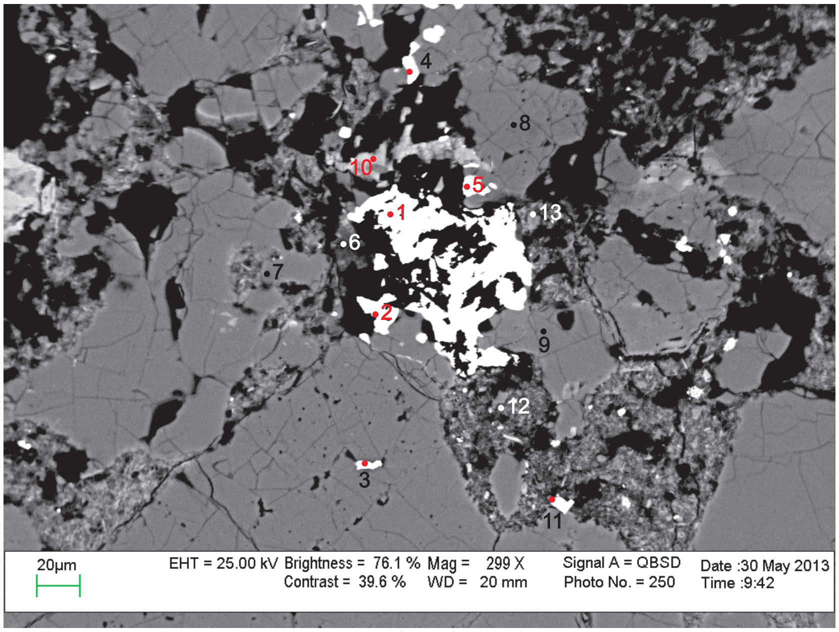


Figure 1: J-47 4081.17 m. site 3 (SEM). Diagenetic barite, often with straight crystal outlines, fills pore space.

1. Barite
2. Barite
3. Pyrite + others
4. Barite
5. Barite
6. Muscovite
7. Quartz
8. Quartz
9. Quartz
10. Fe-Calcite
11. Rutile
12. Chlorite
13. Mixture

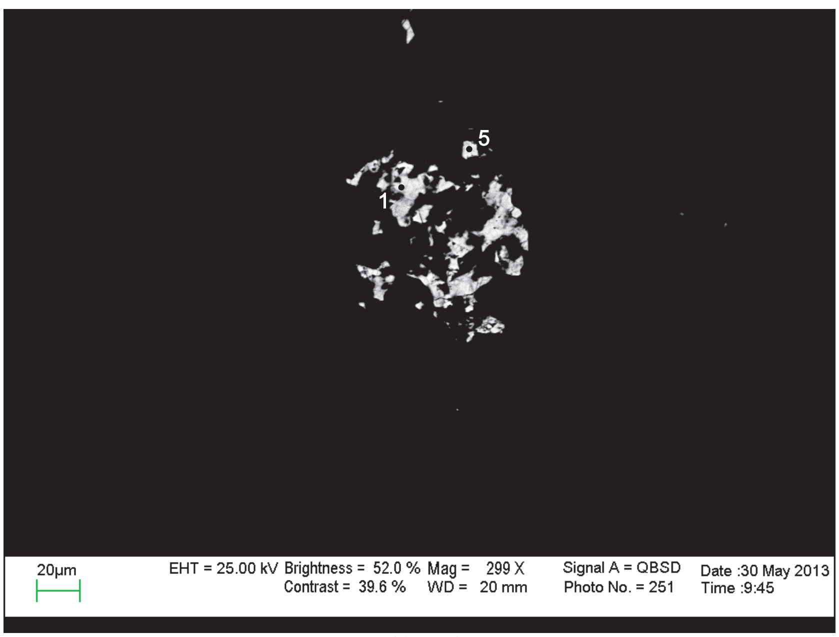


Figure 2: J-47 4081.17 m. site 3 (SEM).

1. Barite
5. Barite

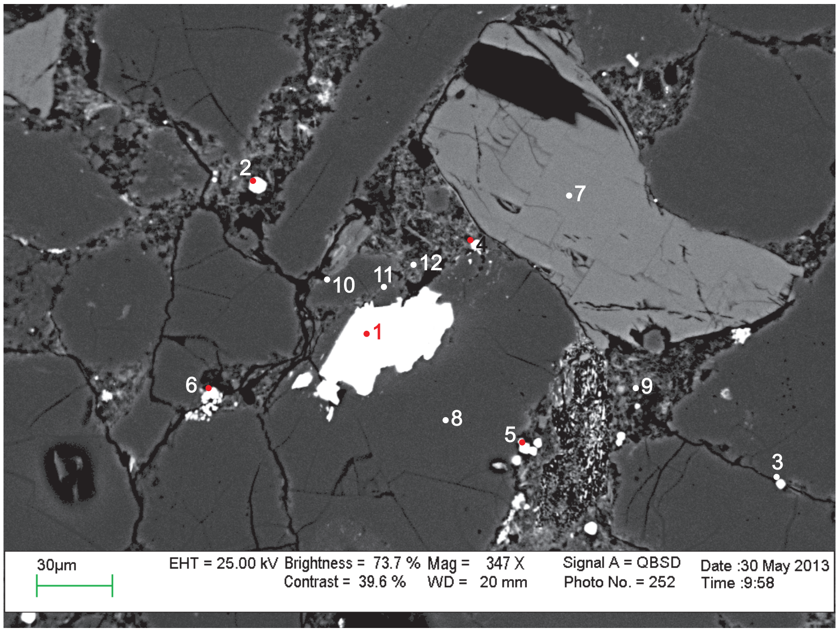


Figure 3: J-47 4081.17 m. site 4 (SEM). Diagenetic barite with straight crystal outlines.

1.Barite
2. Pyrite + others
3. Pyrite + others
4. Pyrite + others
5. Pyrite + others
6. Pyrite + others
7. K-feldspar
8. Quartz
9. Chlorite
10.Quartz
11. Quartz
12. Chlorite

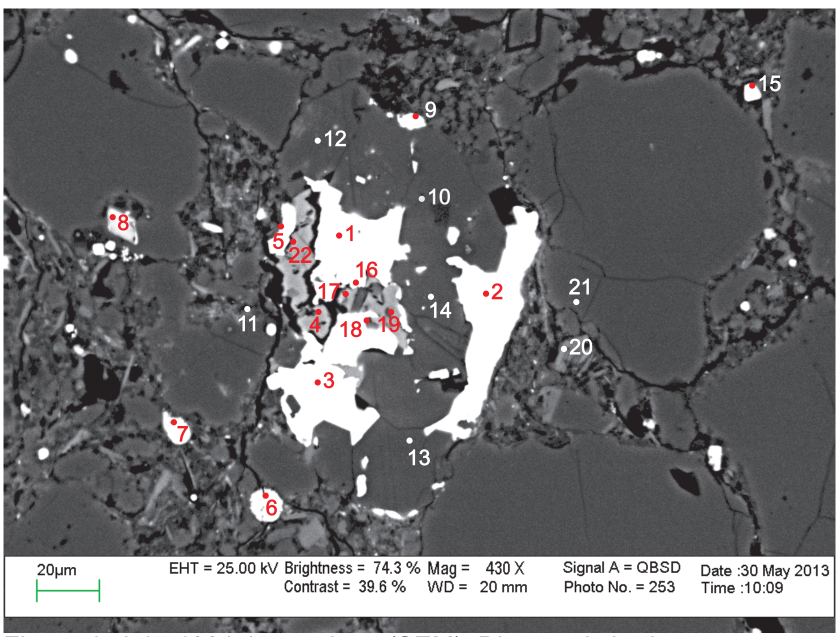


Figure 4: J-47 4081.17 m. site 5 (SEM). Diagenetic barite.

1. Barite
2. Barite
3. Barite
4. Fe-Calcite
5. Barite
6. Pyrite
7. Pyrite
8. TiO_2 + other
9. Mixture
10. Quartz
11. Quartz
12. Quartz
13.Quartz
14. Albite
15. K-feldspar + Chlorite
16. Barite
17. Barite + others
18. Barite + Ankerite
19. Barite + Ankerite
20. K-feldspar + others
21. Quartz
22. Ankerite

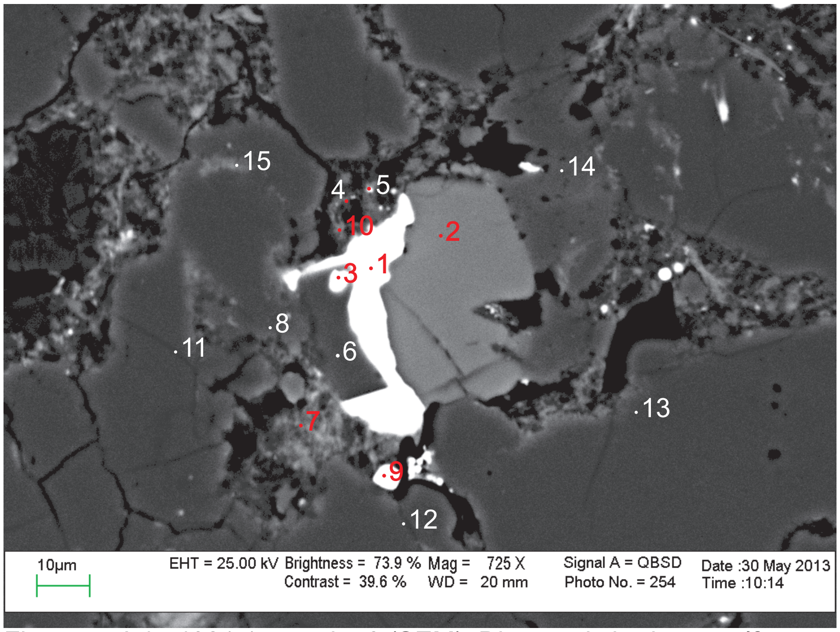


Figure 5: J-47 4081.17 m. site 6 (SEM). Diagenetic barite engulfs detrital K-feldspar.

1. Barite
2. K-feldspar
3. Barite
4. K-feldspar + others
5. K-feldspar + others
6. Quartz
7. Chlorite + Quartz
8. Quartz
9. Barite
10. Mixture
11. Quartz
12. Quartz
13. Quartz
14. Quartz + others
15. Mixture

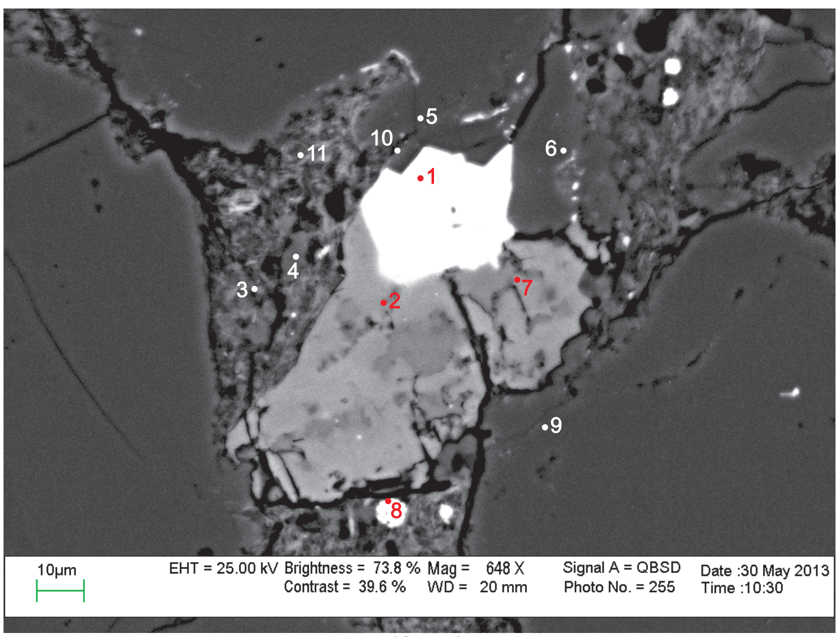
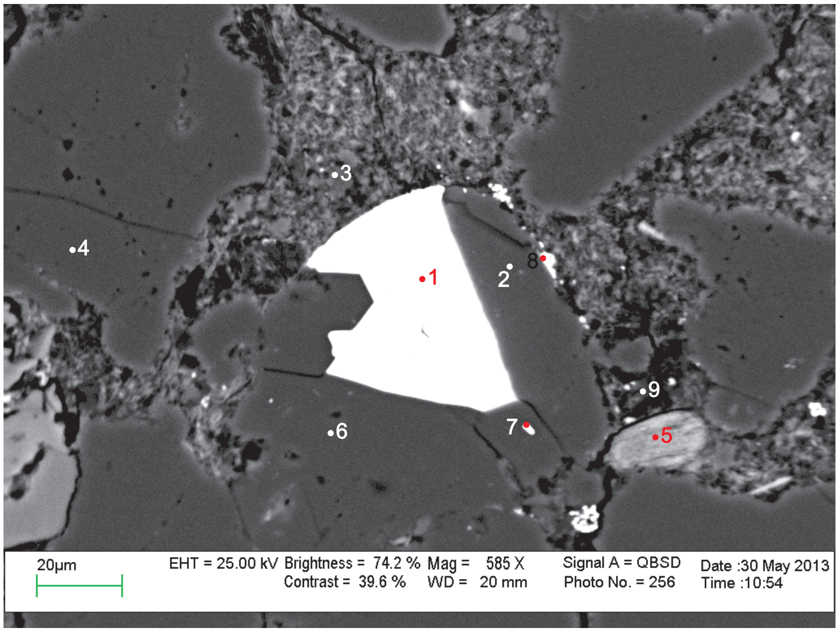


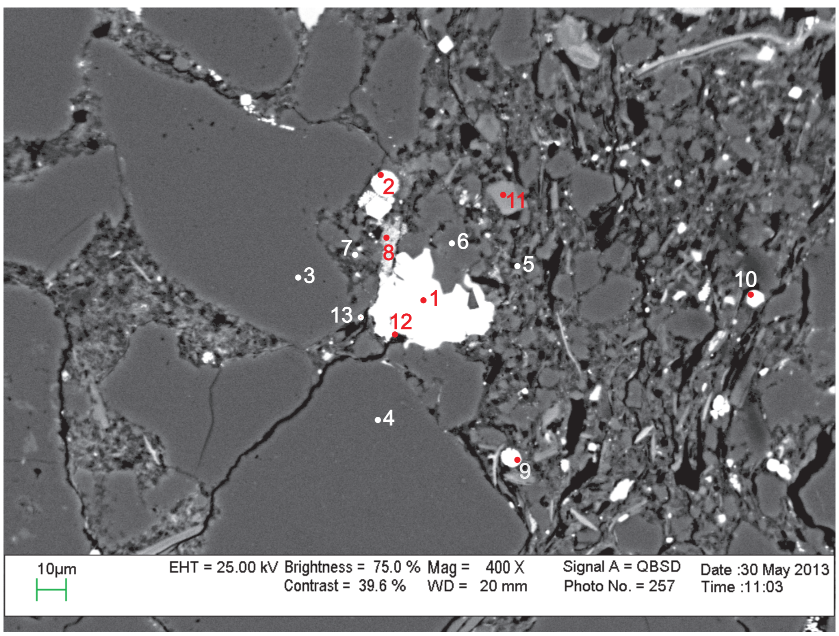
Figure 6: J-47 4081.17 m. site 7 (SEM). Diagenetic barite replaces Fe-calcite.

1. Barite
2. Fe-Calcite
3. Illite + Quartz
4. Albite + others
5. Quartz
6. Quartz
7. Fe-Calcite
8. Pyrite
9. Quartz
10. Quartz
11. Chlorite + Illite



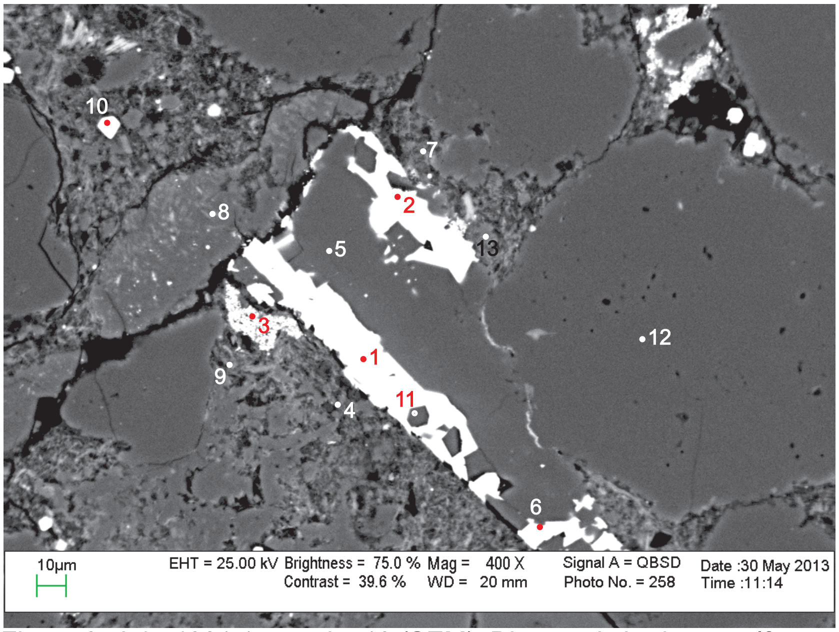
1. Barite
2. Quartz
3. Quartz
4. Quartz
5. Chlorite
6. Quartz
7. Quartz
8. Barite + other
9. Kaolinite

Figure 7: J-47 4081.17 m. site 8 (SEM). Diagenetic barite in straight crystal contacts with detrital quartz. The quartz shows dissolution voids and irregular fractures.



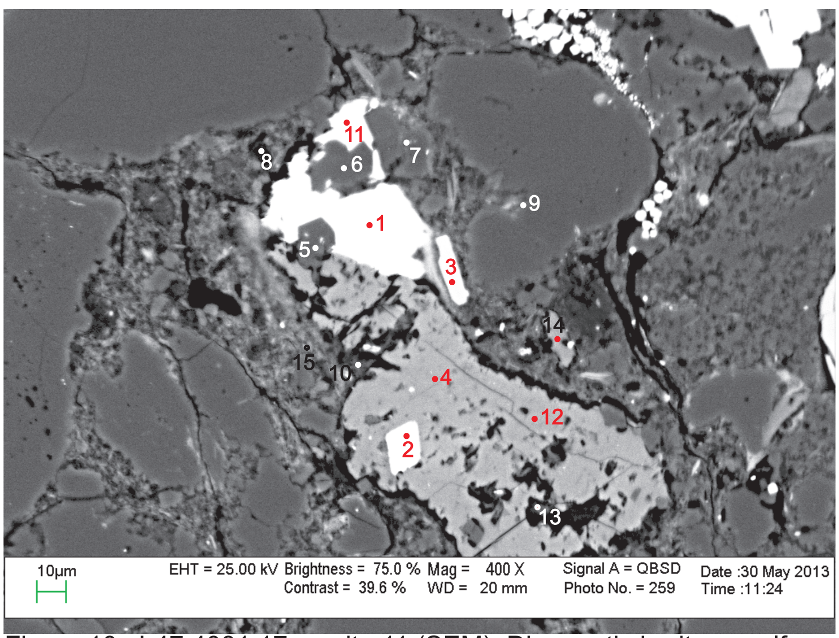
1. Barite
2. Pyrite
3. Quartz
4. Quartz
5. Mixture
6.Quartz
7. Mixture
8. Mixture
9. Mixture
10. Pyrite
11. K-feldspar
12. Mixture
13. Mixture

Figure8: J-47 4081.17 m. site 9 (SEM). Diagenetic barite.



1. Barite
2. Barite
3. Pyrite + Quartz
4. Chlorite + others
5. Albite
6. Barite
7. Chlorite
8. Albite
9. Chlorite
10. Pyrite
11. Quartz
12. Quartz
13. Quartz

Figure 9: J-47 4081.17 m. site 10 (SEM). Diagenetic barite engulfs detrital quartz (11,13) and albite (5).



1. Barite
2. Barite
3. Apatite + other
4. Fe-Calcite
5. Quartz
6. Quartz
7. Quartz
8. Kaolinite + Chlorite
9. Quartz
10. ? Muscovite
11. Barite
12. Fe-Calcite
13. Fe-Calcite + others
14. Fe-Calcite
15. Chlorite + others

Figure 10: J-47 4081.17 m. site 11 (SEM). Diagenetic barite engulfs detrital quartz (5,6) and fills dissolution void in Fe-calcite cement (2).

Table B: Scanning Electron Microscope chemical analyses of sample 4081.17 from the Louisbourg J-47 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	SrO	BaO	WO_3	Total
J-47 4081.17	3	1	Brt											41.38			11.29	47.33		100.00
J-47 4081.17	3	2	Brt											40.92			13.67	45.41		100.00
J-47 4081.17	3	3	Py+Qz	42.64			15.38							41.97						100.00
J-47 4081.17	3	4	Brt	3.34										39.19			11.79	45.68		100.00
J-47 4081.17	3	5	Brt	16.18										32.52			6.79	44.20	0.30	100.00
J-47 4081.17	3	6	Ms	53.38		25.61	3.91		3.14		1.05	5.91								93.00
J-47 4081.17	3	7	Qz	99.21		0.79														100.00
J-47 4081.17	3	8	Qz	100.00																100.00
J-47 4081.17	3	9	Qz	100.00																100.00
J-47 4081.17	3	10	Fe-Cal	2.37			2.42	0.65		50.56										56.00
J-47 4081.17	3	11	Rt	2.91	93.95	1.73	1.42													100.00
J-47 4081.17	3	12	Chl	34.35		23.77	21.75		4.19			0.95								85.00
J-47 4081.17	3	13	Mix	59.18		28.47	9.50		1.79			1.07								100.00
J-47 4081.17	4	1	Brt									0.34		39.34			8.55	51.77		100.00
J-47 4081.17	4	2	Py+others	0.38			27.68				0.40			71.53						100.00
J-47 4081.17	4	3	Py+others	9.82			25.69							64.49						100.00
J-47 4081.17	4	4	Py+others	14.06		3.40	23.97		0.53		0.44	0.48		56.54				0.58		100.00
J-47 4081.17	4	5	Py+others	7.30	0.28	4.47	26.56		0.74		0.45	0.25		59.94						100.00
J-47 4081.17	4	6	Py+others	1.17		0.59	29.01			0.20				69.03						100.00
J-47 4081.17	4	7	Kfs	66.26		17.88					0.63	15.23								100.00
J-47 4081.17	4	8	Qz	100.00																100.00
J-47 4081.17	4	9	Chl	39.46		25.55	15.74		2.93	0.41		0.92								85.00
J-47 4081.17	4	10	Qz	98.72		0.94	0.34													100.00
J-47 4081.17	4	11	Qz	95.41		2.42	0.39					1.78								100.00
J-47 4081.17	4	12	Chl	33.12	1.56	22.44	21.08		4.05			1.45		1.30						85.00
J-47 4081.17	5	1	Brt											39.44			11.74	48.82		100.00
J-47 4081.17	5	2	Brt											38.48			10.11	51.41		100.00
J-47 4081.17	5	3	Brt											38.68			10.05	51.27		100.00
J-47 4081.17	5	4	Fe-Cal	4.50		1.17	15.76	0.93	7.00	25.84		0.80								56.00
J-47 4081.17	5	5	Brt			1.52	0.64			0.48				38.76			10.09	48.50		100.00
J-47 4081.17	5	6	Py	1.65		0.51	33.55			0.22				64.06						100.00
J-47 4081.17	5	7	Py	0.49		0.33	28.44			0.23				70.52						100.00
J-47 4081.17	5	8	TiO2+other	7.81	82.74	4.02	4.51			0.41		0.51								100.00
J-47 4081.17	5	9	Mix	77.78		11.75	2.80		1.00			2.76		1.56				2.35		100.00
J-47 4081.17	5	10	Qz	94.26		3.73					2.01									100.00
J-47 4081.17	5	11	Qz	93.38	0.38	3.81	0.95		0.47			1.01								100.00

Table B: Scanning Electron Microscope chemical analyses of sample 4081.17 from the Louisbourg J-47 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	SrO	BaO	WO_3	Total
J-47 4081.17	5	12	Qz	98.29		1.12						0.59								100.00
J-47 4081.17	5	13	Qz	92.46		4.77					2.77									100.00
J-47 4081.17	5	14	Ab	69.39		18.87					11.74									100.00
J-47 4081.17	5	15	Kfs+Chl	55.30	0.67	29.34	5.10		2.12			7.47								100.00
J-47 4081.17	5	16	Brt				2.67			5.68				37.18			10.17	44.31		100.00
J-47 4081.17	5	17	Brt+other	3.55		1.16	4.28		0.76	5.62		0.95		30.93			7.69	45.06		100.00
J-47 4081.17	5	18	Brt+Ank	3.13		1.35	24.51	1.56	13.86	40.48				5.55				9.57		100.00
J-47 4081.17	5	19	Brt+Ank	6.91		2.30	18.44	1.66	11.24	40.99	1.72			7.31				9.44		100.00
J-47 4081.17	5	20	Kfs+other	69.02	0.46	20.08	4.01		1.99			4.45								100.00
J-47 4081.17	5	21	Qz	92.68	0.79	3.75	1.26					0.93		0.60						100.00
J-47 4081.17	5	22	Ank				16.15	0.80	8.15	26.74				1.55				2.60		56.00
J-47 4081.17	6	1	Brt	3.42		1.25						0.77		36.19			8.82	49.55		100.00
J-47 4081.17	6	2	Kfs	66.22		17.63						16.15								100.00
J-47 4081.17	6	3	Brt	18.61										31.48			9.11	41.36	-0.56	100.00
J-47 4081.17	6	4	Kfs+other	73.21		14.43	8.32		1.76			2.29								100.00
J-47 4081.17	6	5	Kfs+other	70.26	1.21	13.58	11.11		2.05			1.77								100.00
J-47 4081.17	6	6	Qz	90.69										3.80				5.51		100.00
J-47 4081.17	6	7	Chl+Qz	74.04		12.17	9.81		2.46			1.52								100.00
J-47 4081.17	6	8	Qz	96.69		1.73	1.23					0.34								100.00
J-47 4081.17	6	9	Brt	6.67		2.05						1.22		33.90			8.01	48.15		100.00
J-47 4081.17	6	10	Mix	64.70	0.60	17.48	12.47		2.80			1.94								100.00
J-47 4081.17	6	11	Qz	100.00																100.00
J-47 4081.17	6	12	Qz	100.00																100.00
J-47 4081.17	6	13	Qz	96.84		1.60	1.16					0.41								100.00
J-47 4081.17	6	14	Qz+other	87.72		7.09	0.83					4.36								100.00
J-47 4081.17	6	15	Mix	72.35		13.32	11.24		1.99			1.10								100.00
J-47 4081.17	7	1	Brt											38.48			9.12	52.40		100.00
J-47 4081.17	7	2	Fe-Cal	1.52		1.22	2.61	0.43	0.62	49.60										56.00
J-47 4081.17	7	3	Ill+other	70.18		17.14	6.18		2.57			3.92								100.00
J-47 4081.17	7	4	Ab+other	62.27	0.68	19.26	7.03		1.24		8.13	1.39								100.00
J-47 4081.17	7	5	Qz	97.64	0.46	0.96	0.38					0.55								100.00
J-47 4081.17	7	6	Qz	87.93	12.07															100.00
J-47 4081.17	7	7	Fe-Cal	4.40		1.25	1.36			47.92		1.07								56.00
J-47 4081.17	7	8	Py	1.19		0.60	30.23			0.33	1.02			66.62						100.00
J-47 4081.17	7	9	Qz	100.00																100.00
J-47 4081.17	7	10	Qz	93.53		3.48	1.63		0.52			0.85								100.00

Table B: Scanning Electron Microscope chemical analyses of sample 4081.17 from the Louisbourg J-47 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	SrO	BaO	WO_3	Total
J-47 4081.17	7	11	Chl+Ill	41.82		26.67	24.70		4.78			2.04								100.00
J-47 4081.17	8	1	Brt											39.33			11.72	48.95		100.00
J-47 4081.17	8	2	Qz	95.82		0.58								1.00				2.60		100.00
J-47 4081.17	8	3	Qz	92.20	0.35	4.47	1.89		0.41			0.67								100.00
J-47 4081.17	8	4	Qz	100.00																100.00
J-47 4081.17	8	5	Chl	31.43	0.94	20.13	26.28		4.04	0.39		1.80								85.00
J-47 4081.17	8	6	Qz	99.28		0.72														100.00
J-47 4081.17	8	7	Qz	77.35										10.65			2.78	9.21		100.00
J-47 4081.17	8	8	Brt+other	42.30		5.62	0.98					1.45		20.27			7.94	21.83	-0.39	100.00
J-47 4081.17	8	9	Kln	45.74	2.00	32.78	3.97		0.65	0.86										86.00
J-47 4081.17	9	1	Brt											38.25			7.27	54.49		100.00
J-47 4081.17	9	2	Py	1.12			29.86							69.02						100.00
J-47 4081.17	9	3	Qz	100.00																100.00
J-47 4081.17	9	4	Qz	100.00																100.00
J-47 4081.17	9	5	Mix	56.76	8.08	23.66	3.19		2.15		0.57	5.58								100.00
J-47 4081.17	9	6	Qz	98.56		0.83						0.62								100.00
J-47 4081.17	9	7	Mix	69.68	1.30	9.56	5.83		0.99			1.90		10.73						100.00
J-47 4081.17	9	8	Mix	13.93	78.55	4.81	1.95					0.75								100.00
J-47 4081.17	9	9	Mix	41.77	2.61	19.46	11.93		1.33			4.95		17.95						100.00
J-47 4081.17	9	10	Py	0.55		0.28	27.64							71.53						100.00
J-47 4081.17	9	11	Kfs	65.45		17.83					0.56	15.46						0.71		100.00
J-47 4081.17	9	12	Mix	41.17		18.85	1.89		1.23			6.42		12.38				18.21	-0.15	100.00
J-47 4081.17	9	13	Mix	55.82	3.48	22.86	7.02		2.57	0.65		5.14		2.46						100.00
J-47 4081.17	10	1	Brt											38.72			7.06	54.22		100.00
J-47 4081.17	10	2	Brt	4.20										38.25			13.83	43.71		100.00
J-47 4081.17	10	3	Py+Qz	9.61		7.84	27.75		0.63			0.38		53.79						100.00
J-47 4081.17	10	4	Chl+other	60.13	0.86	21.30	12.22		2.63		0.50	2.36								100.00
J-47 4081.17	10	5	Ab	69.71		18.70					11.59									100.00
J-47 4081.17	10	6	Brt			0.73								39.91			15.40	43.96		100.00
J-47 4081.17	10	7	Chl	41.12	0.42	21.91	15.28		3.48			2.79								85.00
J-47 4081.17	10	8	Ab	62.06		22.12	3.12			1.01	8.84	2.07		0.77						100.00
J-47 4081.17	10	9	Chl	39.73	0.39	22.54	16.10		3.72			2.52								85.00
J-47 4081.17	10	10	Py	0.42			28.30							71.28						100.00
J-47 4081.17	10	11	Qz	99.33										0.67						100.00
J-47 4081.17	10	12	Qz	100.00																100.00
J-47 4081.17	10	13	Qz	91.45		4.73	2.77		0.61			0.44								100.00

Table B: Scanning Electron Microscope chemical analyses of sample 4081.17 from the Louisbourg J-47 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	SrO	BaO	WO_3	Total
J-47 4081.17	11	1	Brt											38.66			10.03	51.31		100.00
J-47 4081.17	11	2	Brt							0.53				37.96			12.03	49.48		100.00
J-47 4081.17	11	3	Ap+other	4.06		1.96	3.72			46.82		0.22	43.22							100.00
J-47 4081.17	11	4	Fe-Cal	1.39		0.57	2.32	0.52	0.65	50.31		0.24								56.00
J-47 4081.17	11	5	Qz	96.50	0.38	1.87	0.33				0.55	0.37								100.00
J-47 4081.17	11	6	Qz	97.34		1.61					0.41	0.64								100.00
J-47 4081.17	11	7	Qz	94.11	1.12	1.99	1.34		0.94			0.51								100.00
J-47 4081.17	11	8	Kln+Chl	50.47		35.90	11.29		1.50			0.84								100.00
J-47 4081.17	11	9	Qz	95.02		2.61	1.17		0.72			0.48								100.00
J-47 4081.17	11	10	?Ms	52.98		23.99	3.23		2.72	3.07		7.01								93.00
J-47 4081.17	11	11	Brt	2.95		1.50								37.55			10.76	47.24		100.00
J-47 4081.17	11	12	Fe-Cal	1.39		0.51	1.84	0.54		50.68		0.25		0.78						56.00
J-47 4081.17	11	13	Fe-Cal+other	32.83		19.29	1.95		1.95	40.37		3.62								100.00
J-47 4081.17	11	14	Fe-Cal	7.87		2.32	2.73		0.50	42.33		0.25								56.00
J-47 4081.17	11	15	Chl+other	45.01		23.73	23.20		4.89	1.15		2.03								100.00

Notes: 1. Only diagenetic barite is found.

Appendix 7C: Scanning Electron Microscope and Electron Microprobe Backscattered Electron Images for Louisbourg J-47 4528.03

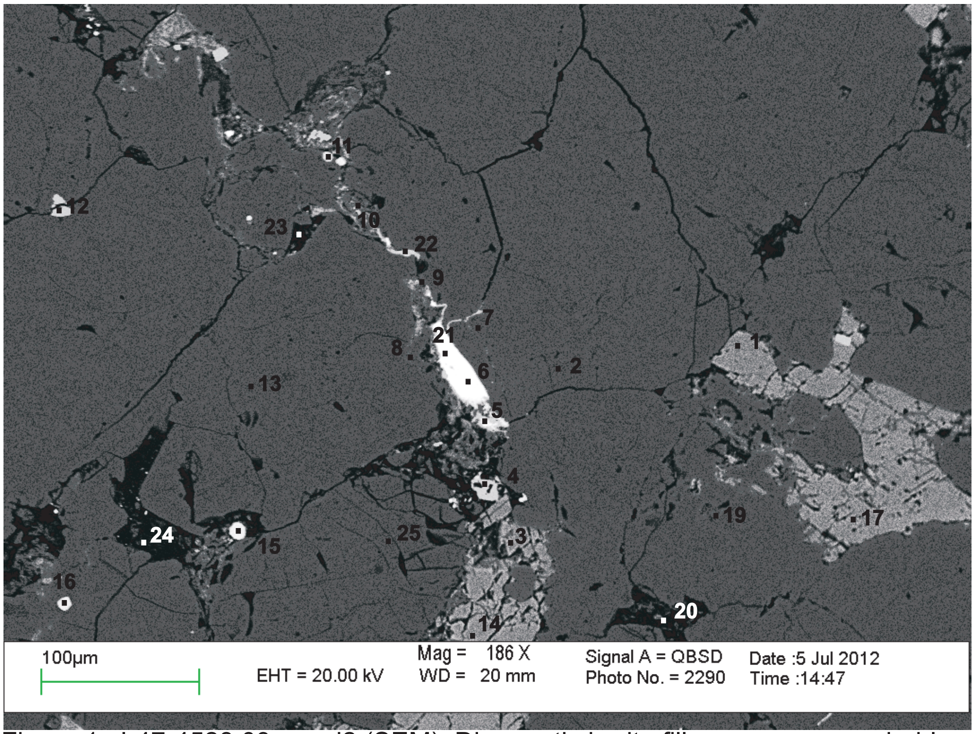


Figure 1: J-47-4528.03 m soi2 (SEM). Diagenetic barite fills pore space probably created by quartz dissolution along grain boundaries (5,6, 21). Other diagenetic minerals in such pore space include siderite, and ankerite.

1. Ankerite
2. Quartz
3. Ankerite
4. Siderite
5. Barite
6. Barite
7. Quartz
8. Quartz
9. Mixture
10. Chlorite
11. Pyrite + Quartz
12. Rutile
13. Quartz
14. Ankerite
15. Pyrite
16. Pyrite + Quartz
17. Ankerite
18. Pyrite
19. Quartz
20. Kaolinite
21. Barite
22. Mixture
23. Chlorite
24. Quartz + others
25. Quartz

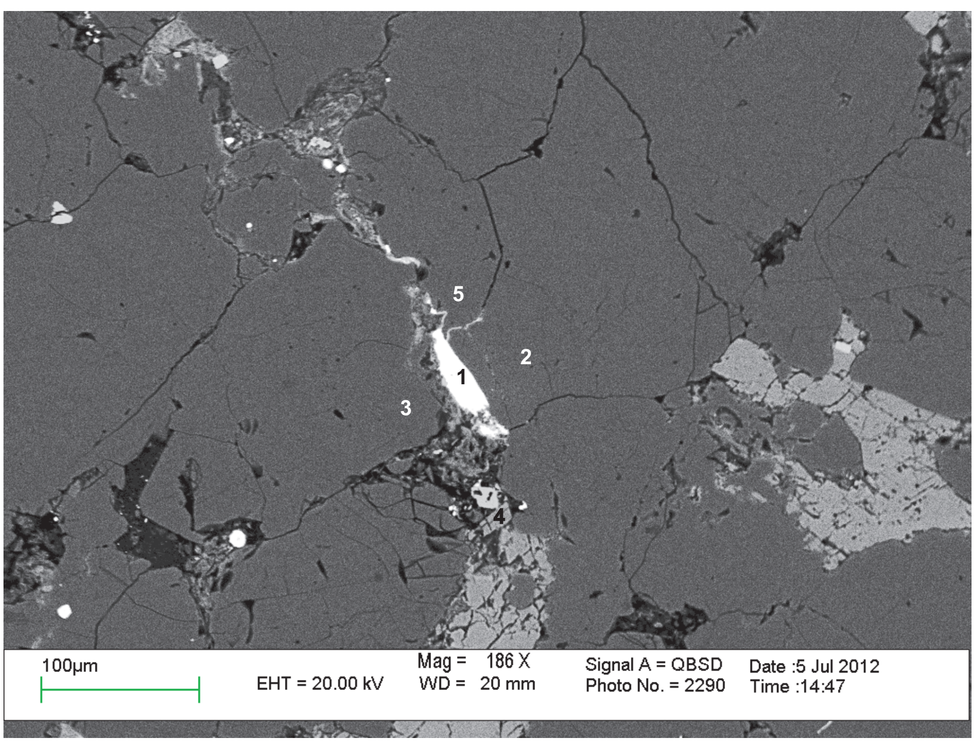
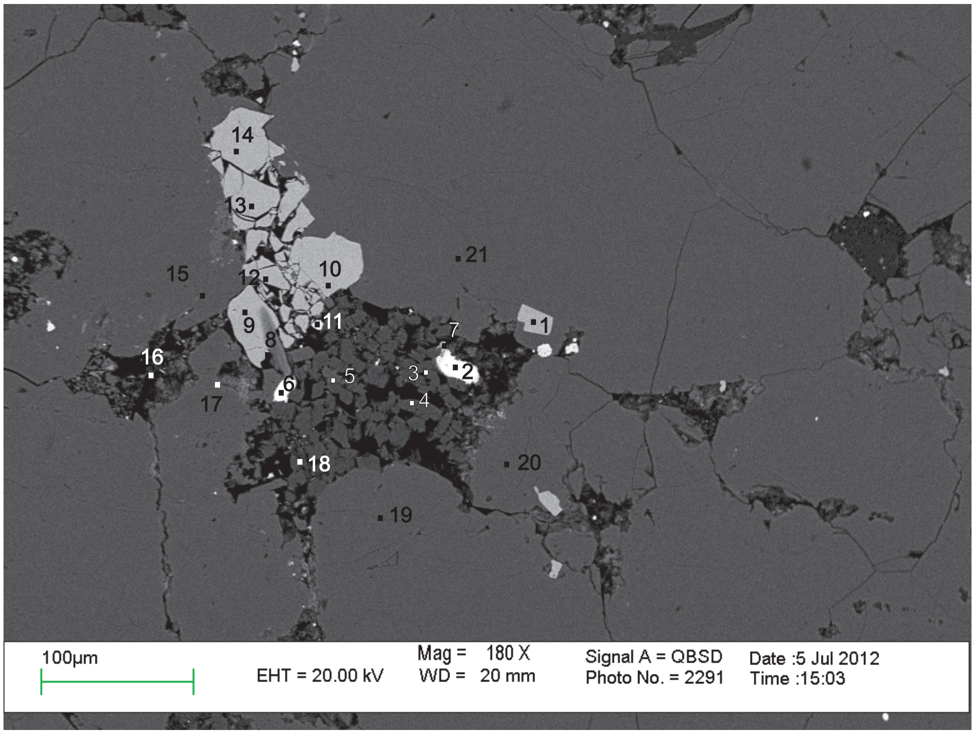


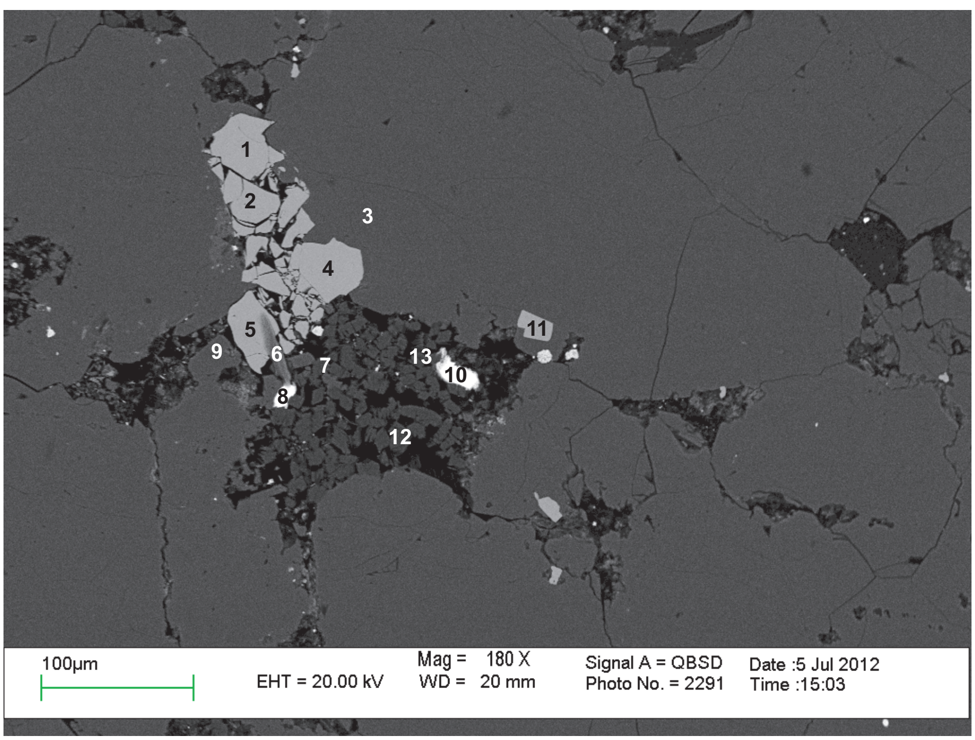
Figure 2: J-47-4528.03 m soi2(Probe).

1. Barite
2. Quartz
3. Quartz
4. Ankerite
5. Quartz



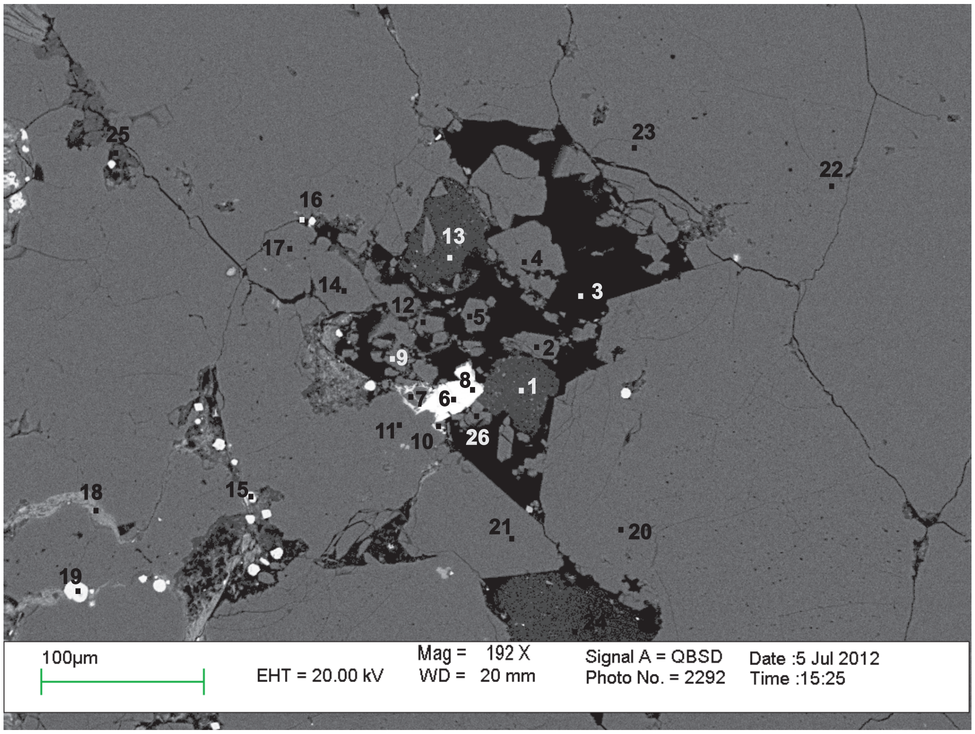
1. Rutile
2. Barite
3. Kaolinite
4. Kaolinite
5. Albite
6. Barite
7. Celestine
8. Mixture
9. Chromite
10. Chromite
11. Chromite
12. Chromite
13. Chromite
14. Chromite
15. Quartz
16. Mixture
17. Quartz
18. Kaolinite
19. Quartz
20. Quartz
21. Quartz

Figure 3: J-47-4528.03 m soi3 (SEM). Diagenetic barite fills pore space, partly replaced kaolinite (2,3) and it is associated with a very small grain of celestine (7).



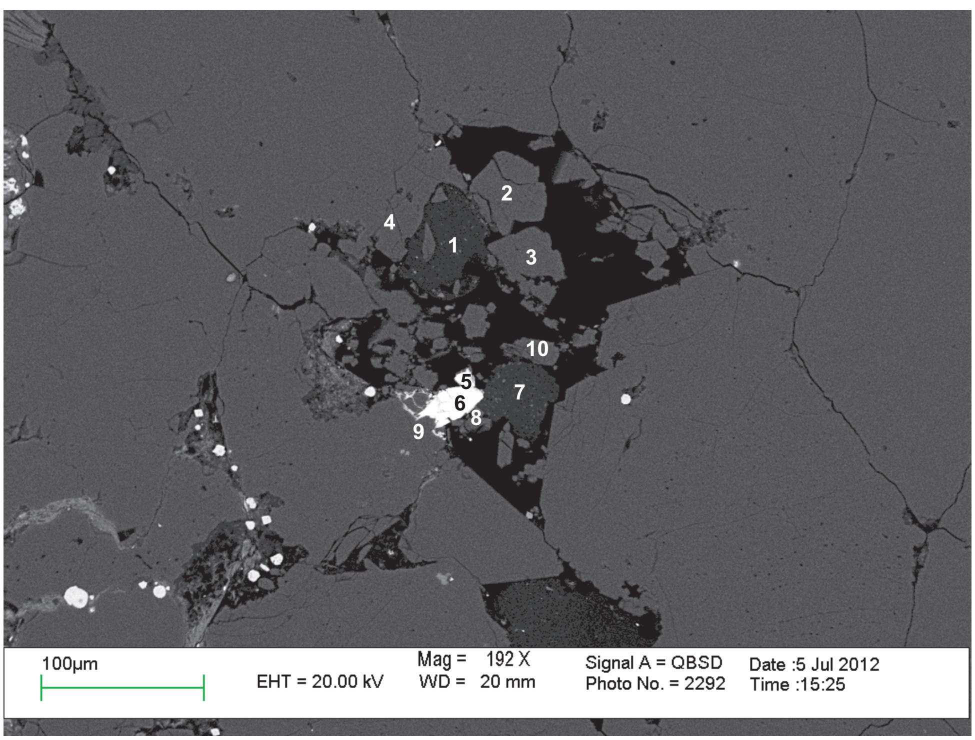
1. Chromite
2. Chromite
3. Quartz
4. Chromite
5. Chromite
6. Chromite + Albite
7. Kaolinite
8. Barite
9. Quartz
10. Barite
11. Rutile
12. Kaolinite
13. Kaolinite

Figure 4: J-47-4528.03 m soi3(Probe).



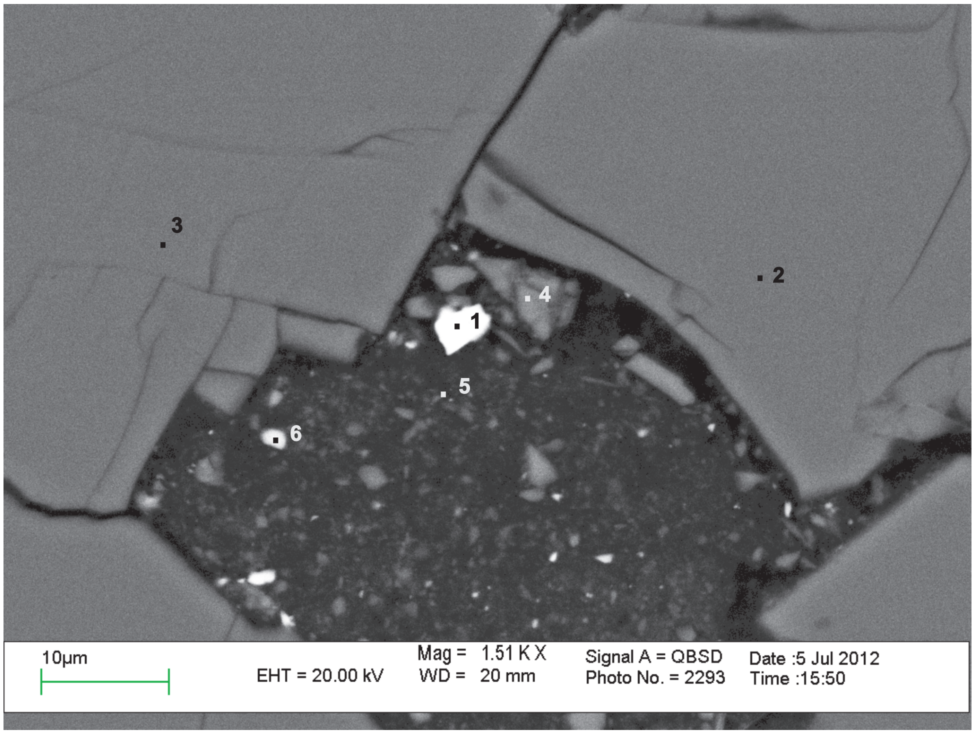
1. Mixture
2. Albite
3. Hole
4. Albite
5. Albite
6. Barite
7. Albite
8. Mixture
9. Albite
10. Celestine + others
11. Quartz
12. Albite
13. Mixture
14. Quartz
15. Pyrite + Chlorite
16. Pyrite + others
17. Quartz
18. Chlorite
19. Pyrite
20. Quartz
21. Quartz
22. Quartz
23. Quartz
24. Mixture
25. Kaolinite
26. Albite

Figure 5: J-47-4528.03 m soi7(SEM). Diagenetic barite fills pore space together with small grains of diagenetic albite. The barite is associated with a very small grain of celestine (10).



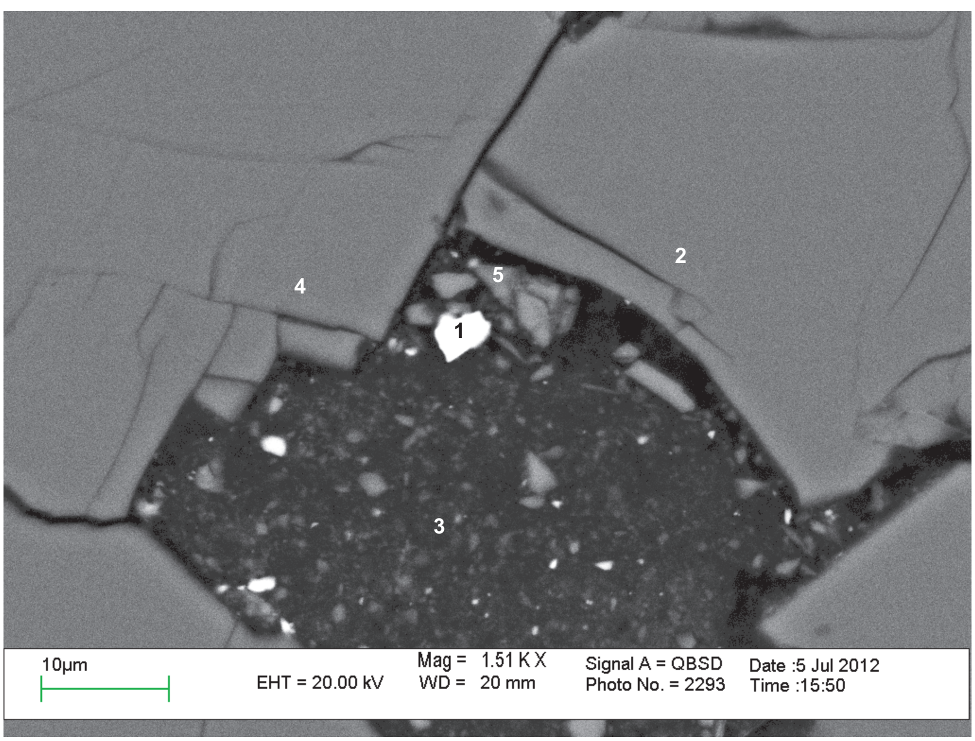
1. Mixture
2. Albite
3. Albite
4. Quartz
5. Barite
6. Barite
7. Mixture
8. Albite
9. Quartz
10. Albite

Figure 6: J-47-4528.03 m soi7 (Probe).



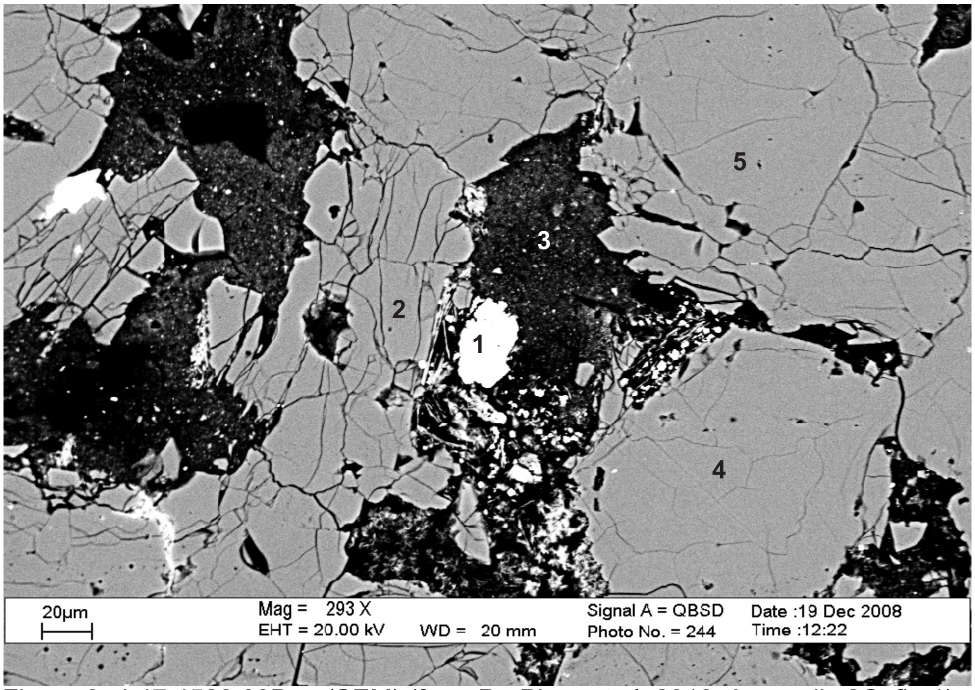
1. Barite
2. Quartz
3. Quartz
4. Quartz
5. Mixture
6. Altered Ilmenite

Figure 7: J-47-4528.03 m -soi9(SEM). Diagenetic barite fills pore space.



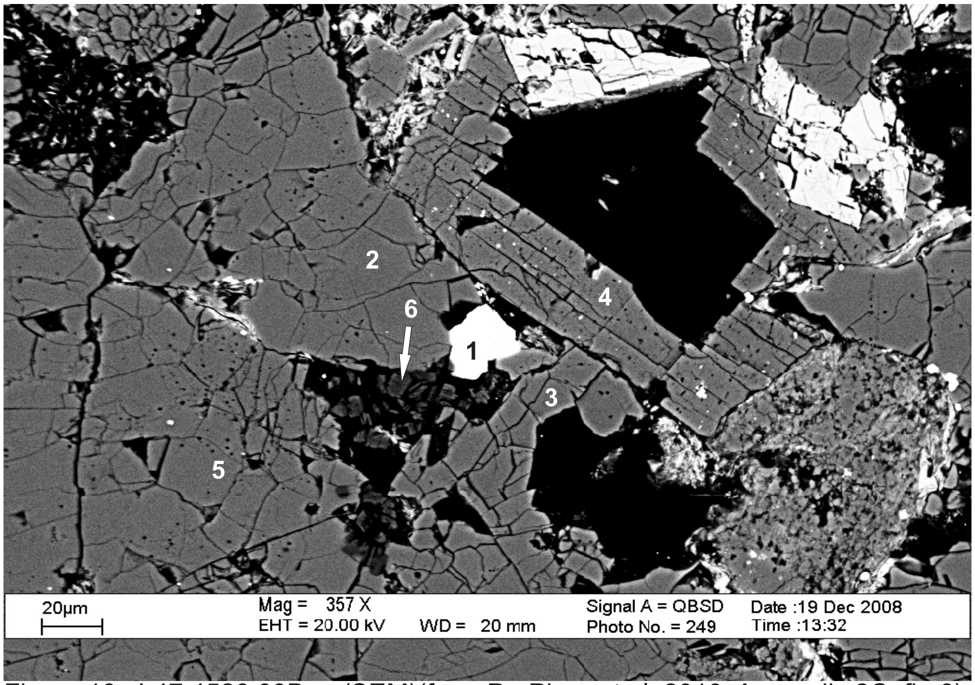
1. Barite
2. Quartz
3. Mixture
4. Quartz
5. Mixture

Figure 8: J-47-4528.03 m -soi9(Probe).



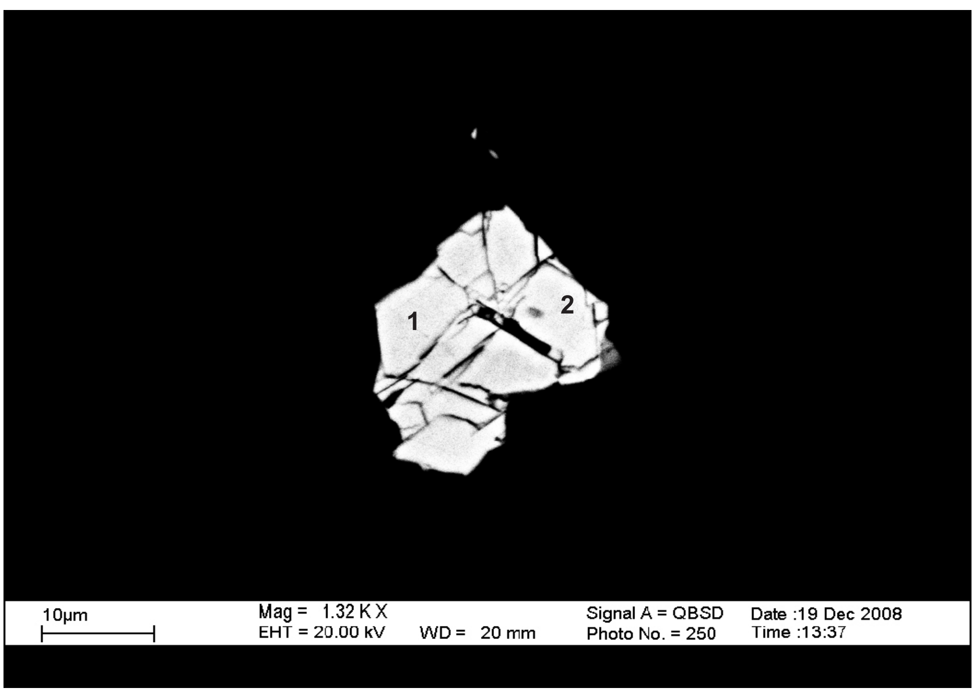
1. Sphalerite
2. Quartz
3. Mostly quartz
4. Quartz
5. Quartz

Figure 9: J-47 4528.03B m.(SEM) (from Pe-Piper et al, 2010, Appendix 2C, fig.1), Sphalerite associated with quartz (pos.2,4,5) and unknown (pos.3) .



1. Sphalerite
2. Quartz
3. Quartz
4. Albite
5. Quartz
6. Kaolinite

Figure 10: J-47 4528.03B m.(SEM)(from Pe-Piper et al, 2010, Appendix 2C, fig.6), Sphalerite (pos.1) associated with fractured quartz (pos.2,3,5), and albite (pos.4) and kaolinite (pos.6) in pore space.



1. Sphalerite
2. Sphalerite

Figure 11: J-47 4528.03B m.(from Pe-Piper et al, 2010, Appendix 2C, fig.7), Sphalerite (pos.1 & 2) from Fig.10.

Table C-1: Scanning Electron Microscope chemical analyses of sample 4528.03 from the Louisbourg J-47 well.

Well	Depth	Site	Analysis #	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	SrO	BaO	SO_3	WO_3	CoO	Total
J47	4528.03	2	1	Ank				13.63	1.22	11.55	29.60								55.99
J47	4528.03	2	2	Qz	100														100
J47	4528.03	2	3	Ank				15.37	0.69	11.81	28.14								56.01
J47	4528.03	2	4	Sd				47.05	1.60	7.35									56.00
J47	4528.03	2	5	Brt						1.29	0.94			35.18	18.99	40.77			97.17
J47	4528.03	2	6	Brt										12.21	48.29	39.49			100
J47	4528.03	2	7	Qz	100														100
J47	4528.03	2	8	Qz	98.22		1.38						0.4						100
J47	4528.03	2	9	Mix	16.3		13.69	9.81		2.87			0.71		18.05	22.7	15.89		100
J47	4528.03	2	10	Chl	33.09		24.53	21.49		4.34			1.54						85.01
J47	4528.03	2	11	Py+Qz	27.46			19.12	0.94							52.48			100
J47	4528.03	2	12	Rt	1.44	96.47	1.15	0.94											100
J47	4528.03	2	13	Qz	100														100
J47	4528.03	2	14	Ank				14.43	1.04	11.50	29.04								56.00
J47	4528.03	2	15	Py				23.77		0.5		8.53				67.21			100
J47	4528.03	2	16	Py+Qz	15.99		0.75	23.13	0.81			0.96				58.36			100
J47	4528.03	2	17	Ank				15.46	0.84	11.03	28.67								56.00
J47	4528.03	2	18	Py				26.81	0.74							72.44			100
J47	4528.03	2	19	Qz	100														100
J47	4528.03	2	20	Kln	49.83		36.17												86.00
J47	4528.03	2	21	Brt										12.21	47.8	39.98			100
J47	4528.03	2	22	Mix	68.13		1.31				0.65					12.56	17.34		100
J47	4528.03	2	23	Chl	36.28		23.20	19.22		4.95			1.35						85.01
J47	4528.03	2	24	Qz+others	73.78	0.86	3.98	3.51		9.89	3.53		1.04			2.74			99.33
J47	4528.03	2	25	Qz	100														100
J47	4528.03	3	1	Rt	1.05	96.15	1.74		1.05										100
J47	4528.03	3	2	Brt										11.94	48.48	39.58			100
J47	4528.03	3	3	Kln	48.67		37.33												86.00
J47	4528.03	3	4	Kln	52.63		33.37												86.00
J47	4528.03	3	5	Ab	63.02		30.44					6.55							100
J47	4528.03	3	6	Brt			4.55							9.73	47.55	38.17			100
J47	4528.03	3	7	Clt			4.72		5.85	1.11	1.59			44		42.73			100
J47	4528.03	3	8	Mix	71.96		4.92			3.96	4.65	14.5							100
J47	4528.03	3	9	Chr*			25.64	44.43	19.15	10.78									100
J47	4528.03	3	10	Chr*			27.42	45.8	18.76	8.02									100
J47	4528.03	3	11	Chr*			27.11	43.91	18.8	10.19									100
J47	4528.03	3	12	Chr*			25.57	45.2	18.51	10.73									100
J47	4528.03	3	13	Chr*			25.37	45.5	18.77	10.36									100

Table C-1: Scanning Electron Microscope chemical analyses of sample 4528.03 from the Louisbourg J-47 well.

Well	Depth	Site	Analysis #	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	SrO	BaO	SO_3	WO_3	CoO	Total
J47	4528.03	3	14	Chr*			26.8	44	18.66	10.54									100
J47	4528.03	3	15	Qz	100														100
J47	4528.03	3	16	Mix	25.97		22.05		16.05	4.8	1.35		1.42			13.05	15.32		100
J47	4528.03	3	17	Qz	97.9		0.99		1.11										100
J47	4528.03	3	18	Kln	49.03		36.97												86.00
J47	4528.03	3	19	Qz	100														100
J47	4528.03	3	20	Qz	100														100
J47	4528.03	3	21	Qz	100														100
J47	4528.03	7	1	Mix	66.82	1.18	5.11	4.36		12.41	4.21		0.99			3.57		1.35	100
J47	4528.03	7	2	Ab	69.13		18.38					12.48							100
J47	4528.03	7	3	hole															
J47	4528.03	7	4	Ab	73.15		18.15					7.98							99.27
J47	4528.03	7	5	Ab	69.48		18.46					12.06							100
J47	4528.03	7	6	Brt										8.16	53.59	38.25			100
J47	4528.03	7	7	Ab	67.42		17.81					12.27				2.5			100
J47	4528.03	7	8	Mix	55.89		3.88	5.61		14.85	4.48	1.12	1.19			12.97			100
J47	4528.03	7	9	Ab	69.04		18.62					12.34							100
J47	4528.03	7	10	?Clt+others	9.92		3.01				2.64	1.92	0.57	40.19	2.79	38.94			100
J47	4528.03	7	11	Qz	100														100
J47	4528.03	7	12	Ab	68.75		18.74					12.5							100
J47	4528.03	7	13	Mix	70.82		4.97	4.12		12.26	3.19		1.37			3.26			100
J47	4528.03	7	14	Qz	99.21		0.79												100
J47	4528.03	7	15	Py+Chl	31.17		20.63	30.32		4.21	1.3		2.64			8			98.27
J47	4528.03	7	16	Py+others	17.4		9.58	37.01		2.13						33.87			100
J47	4528.03	7	17	Qz	100														100
J47	4528.03	7	18	Chl	37.83		21.83	19.91		3.68			1.74						84.99
J47	4528.03	7	19	Py				28.78				0.68				70.53			100
J47	4528.03	7	20	Qz	100														100
J47	4528.03	7	21	Qz	100														100
J47	4528.03	7	22	Qz	100														100
J47	4528.03	7	23	Qz	100														100
J47	4528.03	7	24	Mix	77.75		3.25	2.91		8.81	3.89		0.95			2.44			100
J47	4528.03	7	25	Kln	48.89		37.11												86.00
J47	4528.03	7	26	Ab	70.06		18.21					11.73							100
J47	4528.03	9	1	Brt	3.18										53.95	38.59	4.29		100
J47	4528.03	9	2	Qz	100														100
J47	4528.03	9	3	Qz	100														100
J47	4528.03	9	4	Qz	100														100

Table C-1: Scanning Electron Microscope chemical analyses of sample 4528.03 from the Louisbourg J-47 well.

Well	Depth	Site	Analysis #	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	SrO	BaO	SO_3	WO_3	CoO	Total
J47	4528.03	9	5	Mix	68.74		6.35	4.14		12.12	3.79		1.1			2.64			98.88
J47	4528.03	9	6	Alt Ilm	15.37	79.51		1.36		3.28	0.49								100

*: Cr was left out

Notes: 1. Probably all analyzed barite grains are diagenetic

2. Very few small celestine crystals associated with barite.

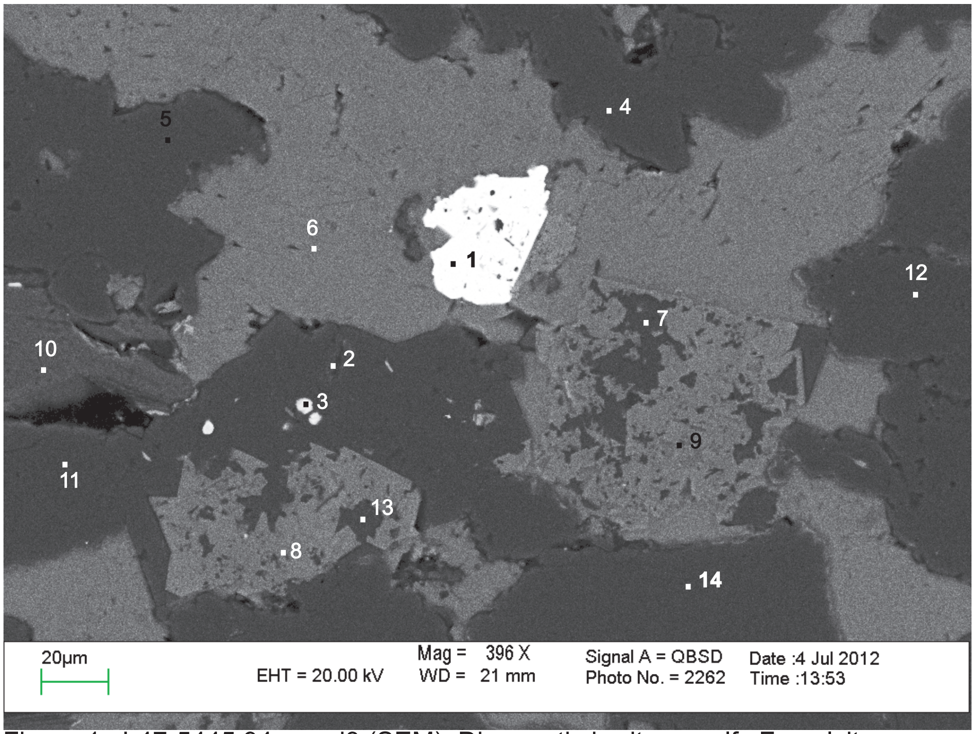
Table C-2: Electron Microprobe analyses of sample 4528.03 from the Louisbourg J-47 well.

Well	Depth	Site	No.	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SrO	BaO	SO_3	WO_3	CoO	Ce_2O_3	ZrO_2	Total
J47	4528	soi2 P1	68	Brt		0.12	0.01	0.08	0.04	0.02	0.04	0.18	0.07		12.06	52.42	36.15				0.03	101.23
J47	4528	soi2 P2	69	Qz	86.00	0.00	0.08	0.09	0.01	0.01	0.23	0.06	0.04		4.09		3.55		0.00	0.01	0.06	94.21
J47	4528	soi2 P3	70	Qz	98.62	0.01		0.05	0.02				0.01	0.01			0.01			0.03	0.04	98.80
J47	4528	soi2 P4	71	Ank	1.46	0.02	0.20	15.57	0.60	9.45	26.40	0.18	0.03		0.01		0.03		0.02	0.02		53.99
J47	4528	soi2 P5	72	Qz	96.53		0.05	0.10	0.01	0.01	0.02	0.02	0.02				0.18	0.03	0.01	0.01		96.97
J47	4528	soi3 P1	73	*Chr	0.01	0.08	23.12	19.18	0.26	8.90		0.02	0.03		0.18		0.00	0.10	0.07	0.02		51.98
J47	4528	soi3 P2	74	*Chr	0.17	0.13	22.62	19.00	0.28	9.00	0.02	0.04	0.04	0.04	0.22		0.02	0.05	0.12	0.00		51.73
J47	4528	soi3 P3	75	Qz	99.39	0.00		0.04	0.01		0.01		0.03				0.00			0.00	0.01	99.49
J47	4528	soi3 P4	76	*Chr	0.03	0.11	22.98	19.28	0.31	8.64	0.01	0.01	0.03	0.01	0.21		0.02	0.01	0.06			51.69
J47	4528	soi3 P5	77	*Chr	0.06	0.10	23.26	18.93	0.29	8.70	0.03	0.02	0.02		0.18				0.06	0.06		51.70
J47	4528	soi3 P6	78	Chr+Ab	52.12		7.47	5.75	0.13	6.22	5.27	9.86	0.46				0.11		0.03			87.41
J47	4528	soi3 P7	79	Kln	49.41	0.01	34.16	0.10	0.01	0.08	0.10	1.93	0.31	0.05			0.06					86.21
J47	4528	soi3 P8	80	Brt	7.61	0.28	2.62	0.12	0.01	0.03	0.08	2.19	0.06		8.74	50.33	32.80				0.02	104.86
J47	4528	soi3 P9	81	Qz	97.00	0.02		0.11			0.01		0.01	0.01				0.03	0.01	0.03	0.04	97.26
J47	4528	soi3 P10	82	Brt		0.35	0.02	0.25	0.01		0.04	0.17	0.04	0.03	11.59	52.42	35.93			0.27		101.12
J47	4528	soi3 P11	83	Rt	0.91	94.67	0.97	1.08	0.00	0.01	0.11	0.03	0.05	0.09	0.10			0.14			0.21	98.36
J47	4528	soi3 P12	84	Kln (lt)	40.19		32.12	0.03		0.03	0.03	0.03	0.04				0.08				0.09	72.64
J47	4528	soi3 P13	85	Kln (lt)	39.30	0.01	26.45	0.34	0.01	0.08	0.62	0.14	0.07	0.02			0.18				0.02	67.23
J47	4528	soi7 P1	86	Mix	41.98	0.26	2.57	2.87	0.04	6.71	2.32	0.29	0.66	0.23			1.44	0.03	0.01			59.42
J47	4528	soi7 P2	87	Ab	69.14	0.01	19.78	0.01		0.00	0.05	11.48	0.03									100.49
J47	4528	soi7 P3	88	Ab	69.64		19.57	0.03			0.03	11.29	0.04						0.00	0.01		100.62
J47	4528	soi7 P4	90	Qz	99.52	0.01	0.01	0.03	0.02		0.01	0.01	0.02	0.03			0.01					99.66
J47	4528	soi7 P5	91	Brt		0.31	0.04	0.08	0.01	0.01	0.09	0.18	0.05		8.47	55.16	36.26			0.21		100.88
J47	4528	soi7 P6	92	Brt		0.35		0.02	0.00		0.04	0.15	0.05		10.71	53.03	36.25		0.05	0.06	0.11	100.81
J47	4528	soi7 P7	93	Mix	41.87	0.46	2.90	4.31	0.07	7.24	2.83	0.30	0.80	0.16			2.94			0.02	0.01	63.90
J47	4528	soi7 P8	94	Ab	69.46	0.02	19.76	0.05		0.02	0.02	12.54	0.04		0.06		0.14	0.12		0.02	0.05	102.31
J47	4528	soi7 P9	95	Qz	99.37		0.36	0.07	0.01		0.03	0.02	0.01			0.03	0.06			0.05	0.05	100.05
J47	4528	soi7 P10	96	Ab	69.70		19.58	0.01	0.02	0.01	0.02	11.67	0.07	0.05		0.01	0.03		0.01	0.03		101.19
J47	4528	soi9 P1	97	Brt	8.37	0.46	0.88	0.24	0.01	0.35	0.22	0.22	0.19	0.03	2.89	46.68	28.40			0.01		88.93
J47	4528	soi9 P2	98	Qz	98.24			0.03			0.00		0.03	0.03			0.03			0.04	0.06	98.46
J47	4528	soi9 P3	99	Mix	29.23	0.73	2.34	2.53	0.03	6.61	2.50	0.25	0.83	0.11			1.51				0.03	46.69
J47	4528	soi9 P4	100	Qz	97.76			0.03			0.01		0.03					0.01	0.02	0.02		97.88
J47	4528	soi9 P5	101	Mix	48.11	0.09	0.61	1.55	0.01	1.25	2.08	0.17	0.11	0.02	0.06	2.58	3.12	0.15		0.01	0.02	59.93

*: Cr was left out

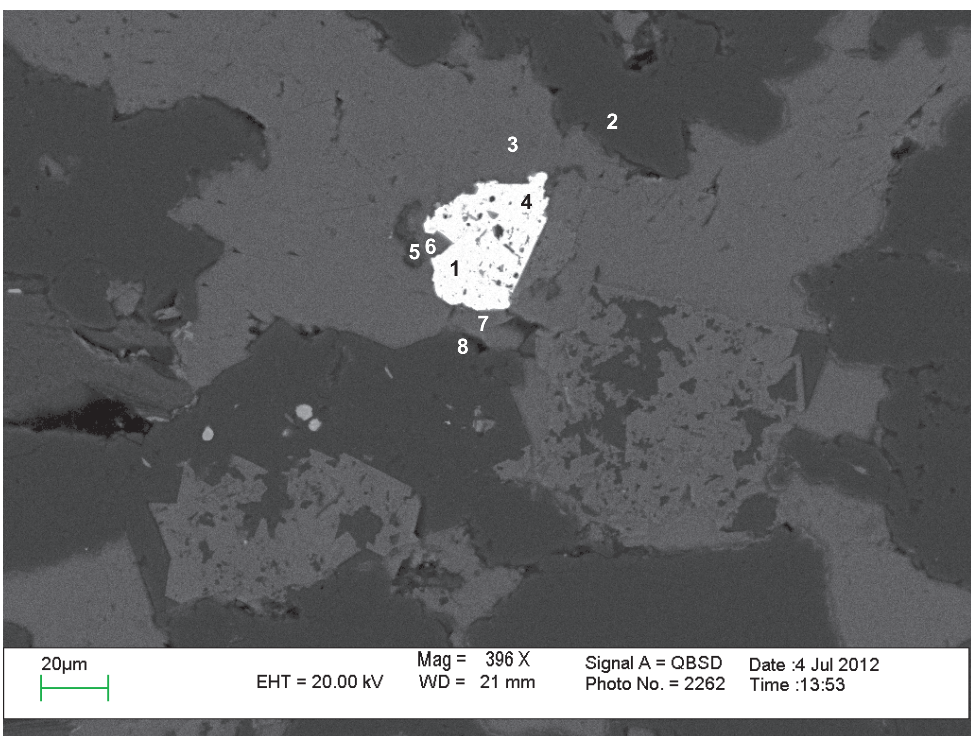
Notes: 1. Probably all analyzed barite is diagenetic.

Appendix 7D: Scanning Electron Microscope and Electron Microprobe Backscattered Electron Images for Louisbourg J-47 5445.94



1. Barite
2. Albite
3. Pyrite
4. Quartz
5. Quartz
6. Fe-Calcite
7. Albite
8. Ankerite
9. Ankerite
10. Muscovite
11. Quartz
12. Quartz
13. Albite
14. Quartz

Figure 1: J-47-5445.94 m-soi3 (SEM). Diagenetic barite engulfs Fe-calcite.



1. Barite
2. Quartz
3. Fe-Calcite
4. Barite
5. Quartz
6. Fe-Calcite
7. Fe-Calcite
8. Albite + Quartz

Figure 2: J-47-5445.94 m-soi3(Probe).

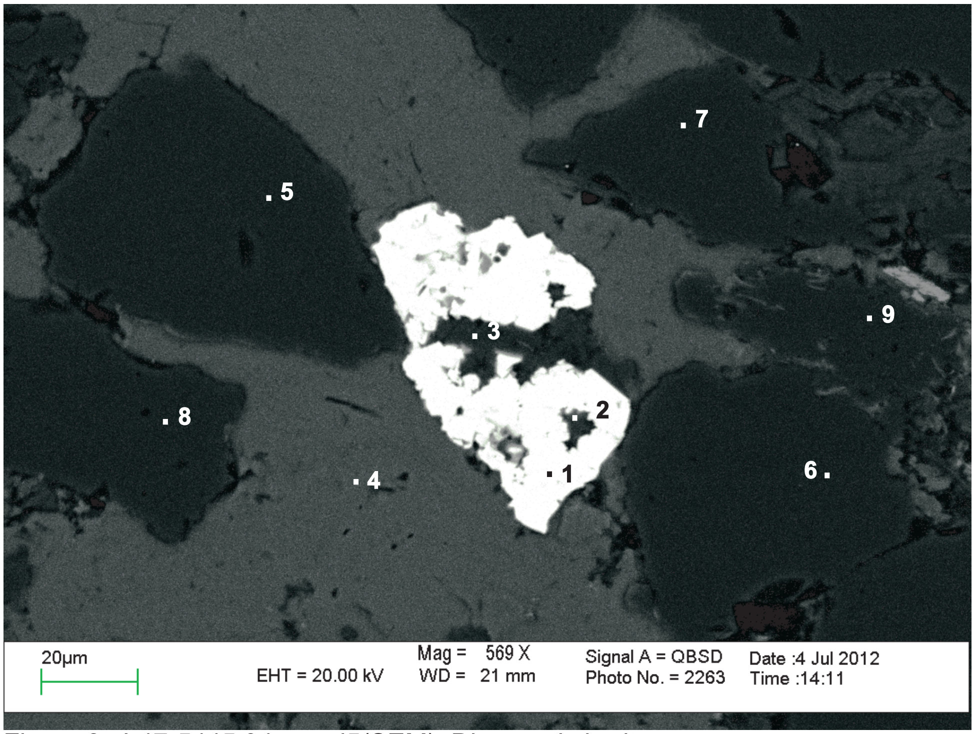


Figure 3: J-47-5445.94 m-soi5(SEM). Diagenetic barite.

1. Barite
2. Quartz + others
3. Quartz + others
4. Fe-Calcite
5. Quartz
6. Quartz
7. Quartz
8. Quartz
9. Quartz

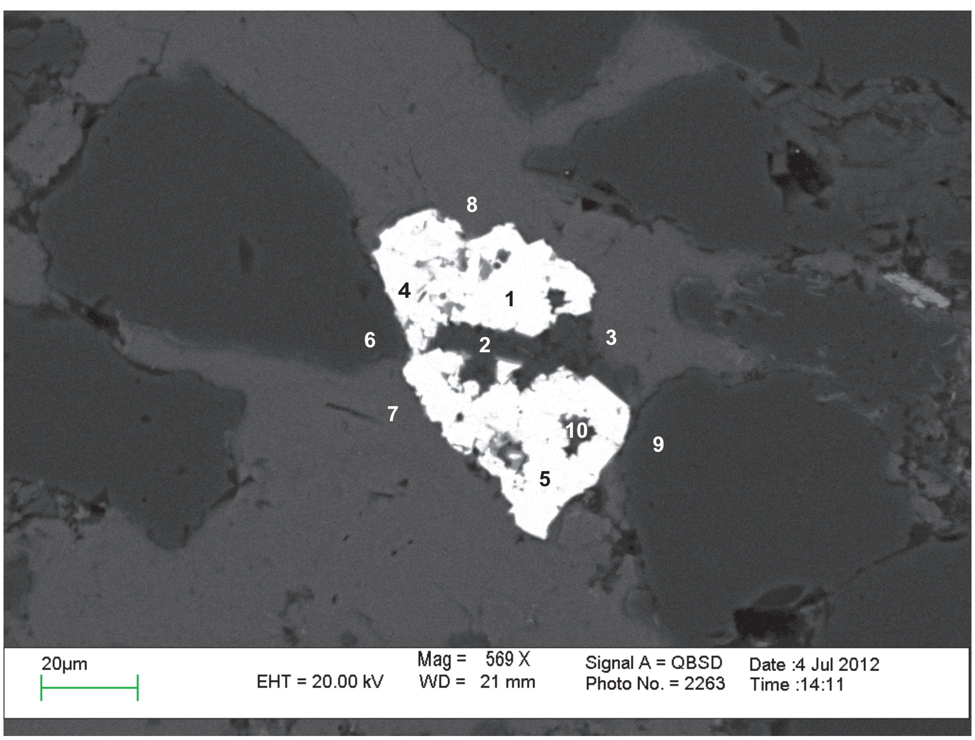
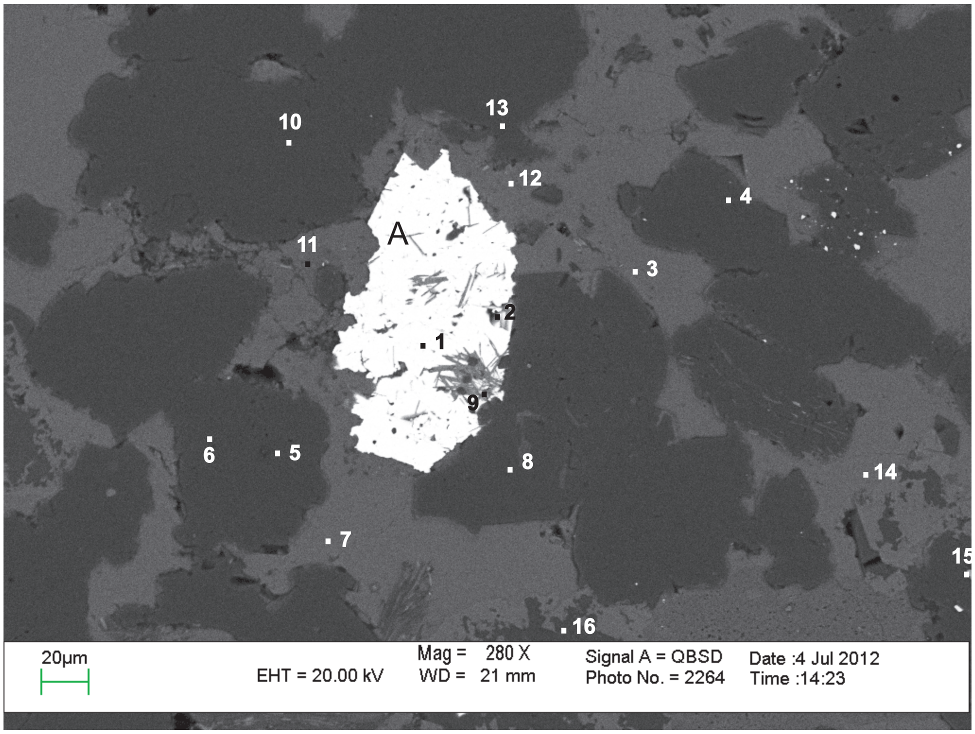


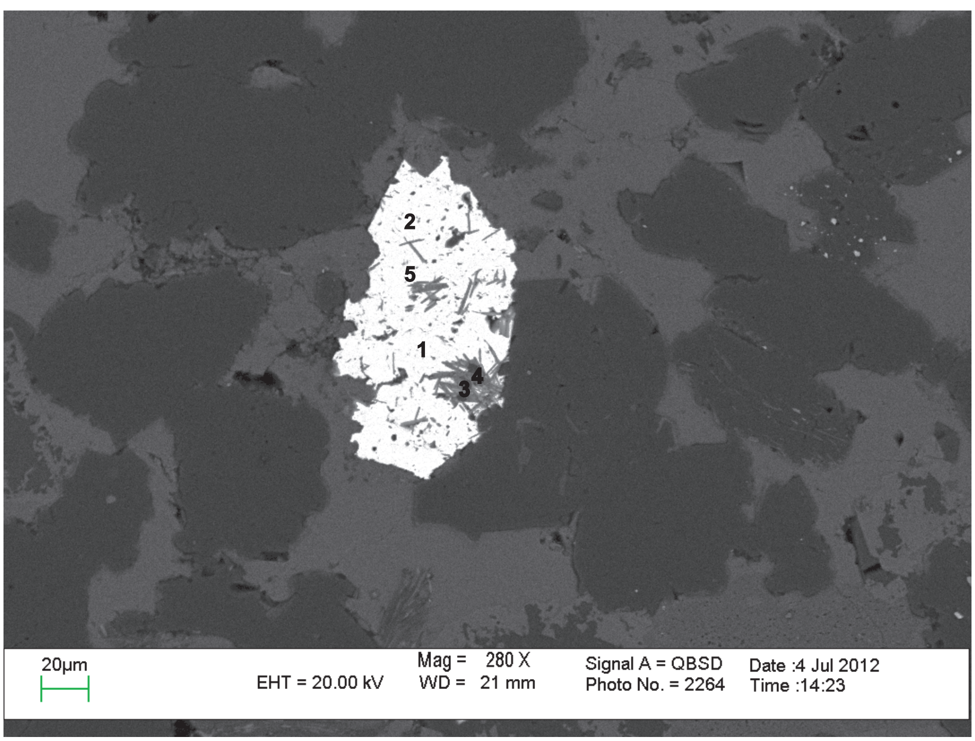
Figure 4: J-47-5445.94 m-soi5(Probe).

1. Barite
2. Quartz + K-feldspar
3. Fe-Calcite
4. Barite
5. Barite
6. Quartz
7. Fe-Calcite
8. Fe-Calcite
9. Quartz
10. Barite + Quartz



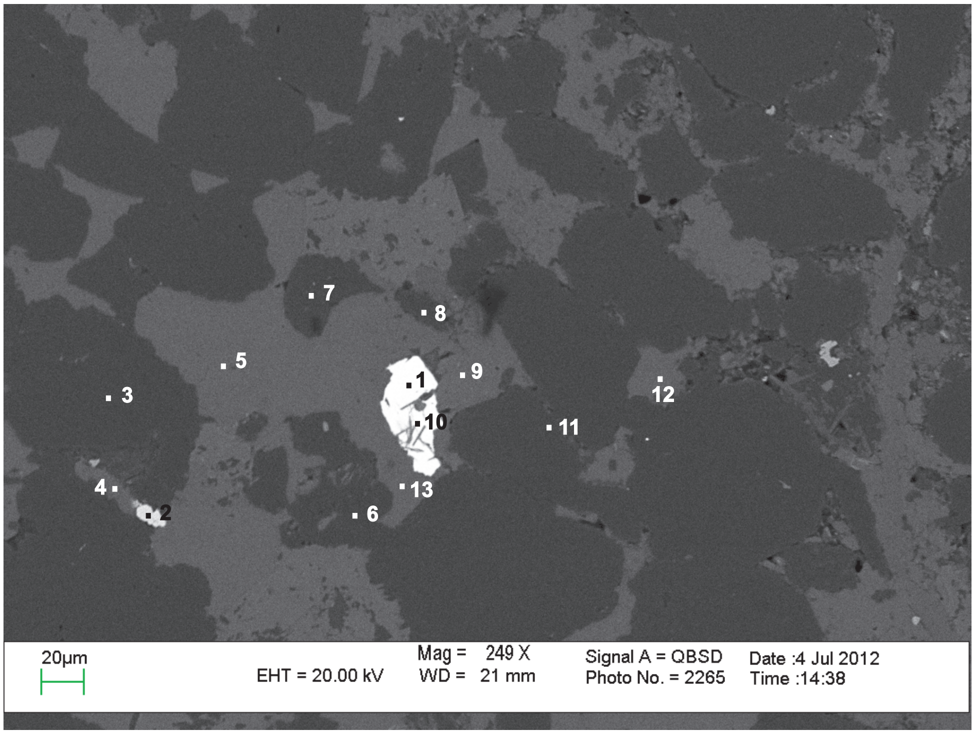
1. Barite
2. Barite+Chlorite
3. Fe-Calcite
4. Quartz
5. Quartz
6. Quartz
7. Fe-Calcite
8. Albite
9. Barite + Chlorite
10. Quartz
11. Fe-Calcite
12. Fe-Calcite
13. Quartz
14. Fe-Calcite
15. Rutile
16. Albite

Figure 5: J-47-5445.94 m-soi6(SEM). Diagenetic barite engulfs Fe-calcite (position A) and is associated with chlorite (analysis 9).



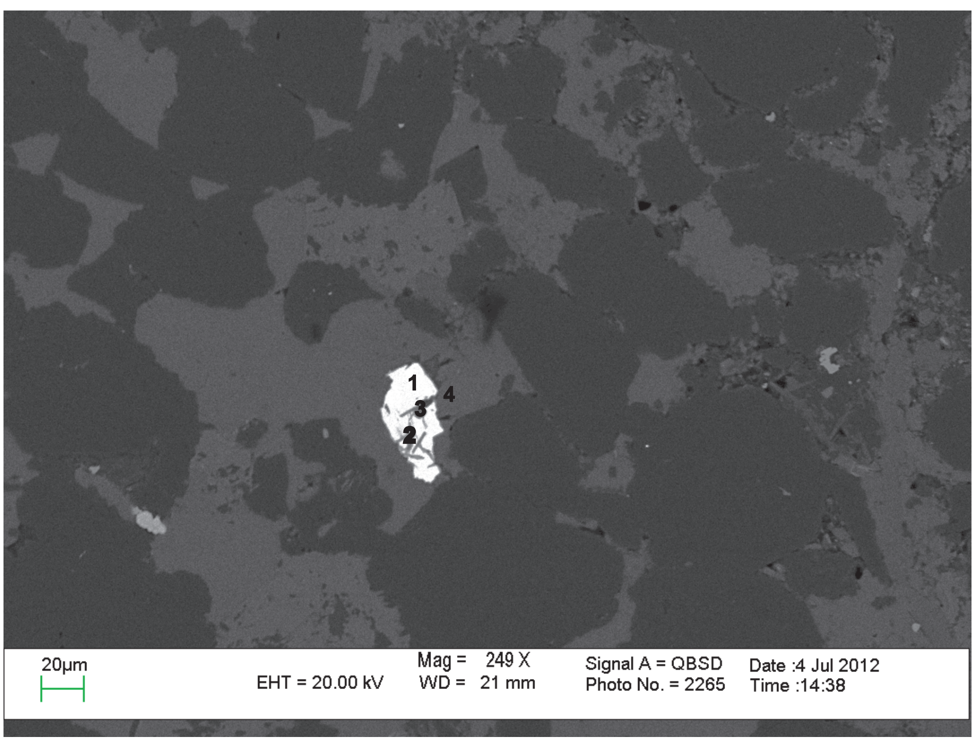
1. Barite
2. Chlorite + Barite
3. Chlorite + Quartz
4. Chlorite + Quartz
5. Barite + Others

Figure 6: J-47-5445.94 m-soi6(Probe).



1. Barite
2. Pyrite
3. Quartz
4. Fe-Calcite
5. Fe-Calcite
6. Quartz
7. Quartz
8. Quartz
9. Calcite + others
10. Barite
11. Quartz
12. Fe-Calcite
13. Fe-Calcite

Figure 7: J-47-5445.94 m-soi8(SEM). Diagenetic barite engulfs Fe-calcite.



1. Barite
2. Chlorite + Barite
3. Chlorite + Barite
4. Ferroan Calcite

Figure 8: J-47-5445.94 m-soi8(Probe).

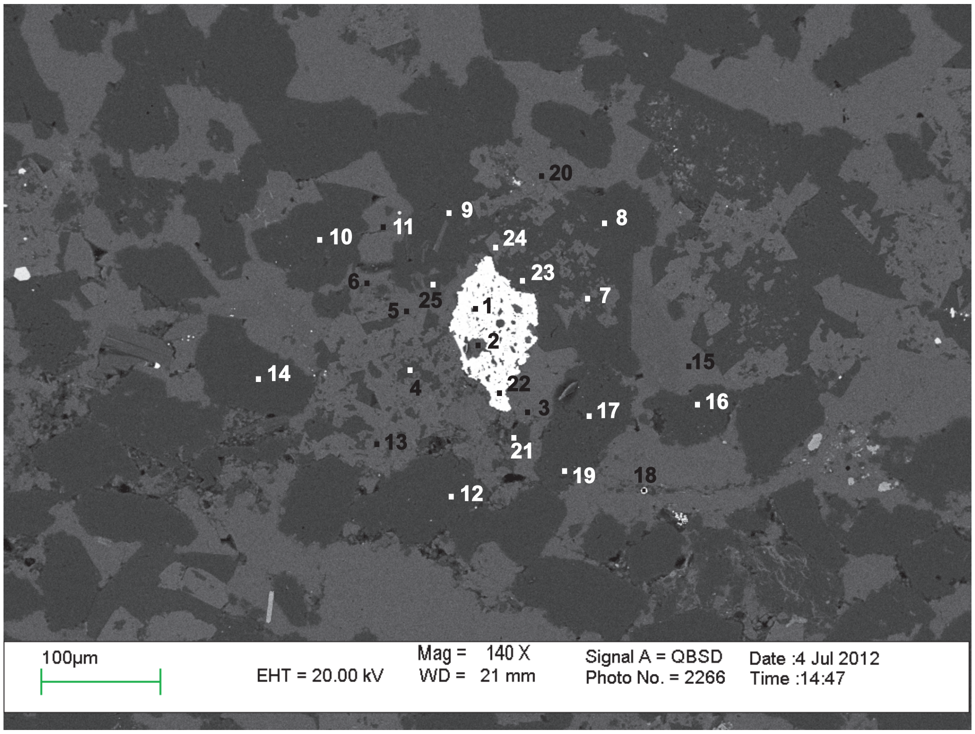


Figure 9: J-47-5445.94m-soi14(SEM). Diagenetic barite fills mineral dissolution voids. Other diagenetic minerals present include albite, Fe-calcite, and ankerite.

1. Barite
2. Calcite + others
3. Calcite + others
4. Albite
5. Fe-Calcite
6. Calcite + others
7. Calcite + Albite
8. Quartz
9. Quartz
10. Quartz
11. Fe-Calcite
12. Quartz
13. Ankerite
14. Quartz
15. Fe-Calcite
16. Quartz
17. Quartz
18. Calcite + Chlorite
19. Quartz
20. Calcite + others
21. Quartz
22. Barite
23. Albite
24. Ankerite + others
25. Calcite + others

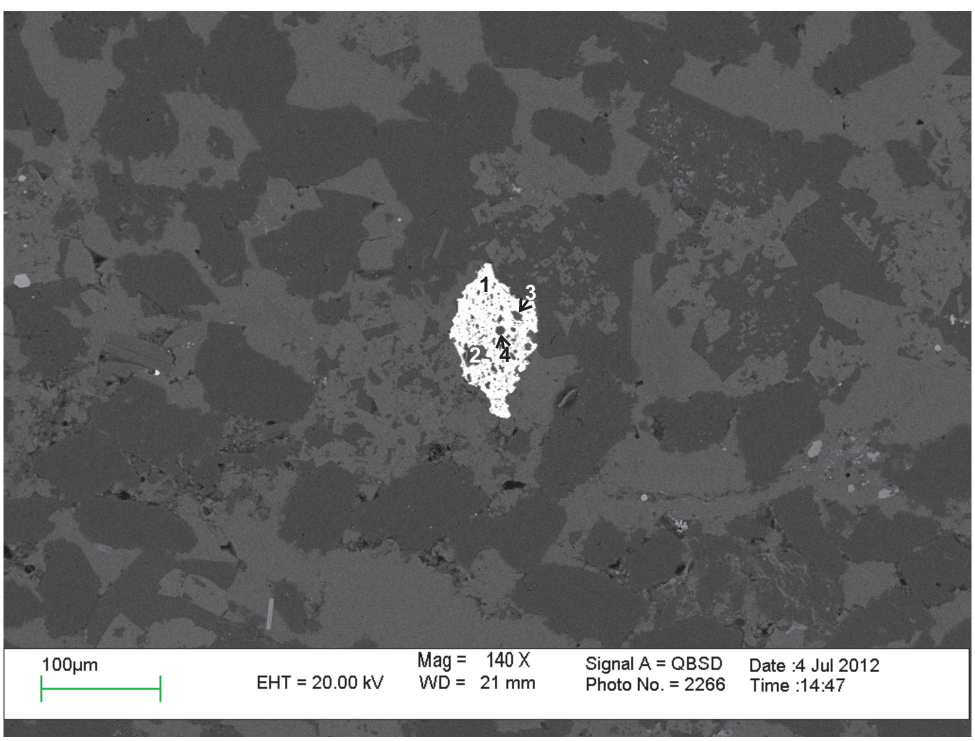


Figure 10: J-47-5445.94 m-soi14(Probe).

1. Barite + Quartz
2. Fe-Calcite
3. Muscovite
4. Quartz + Barite

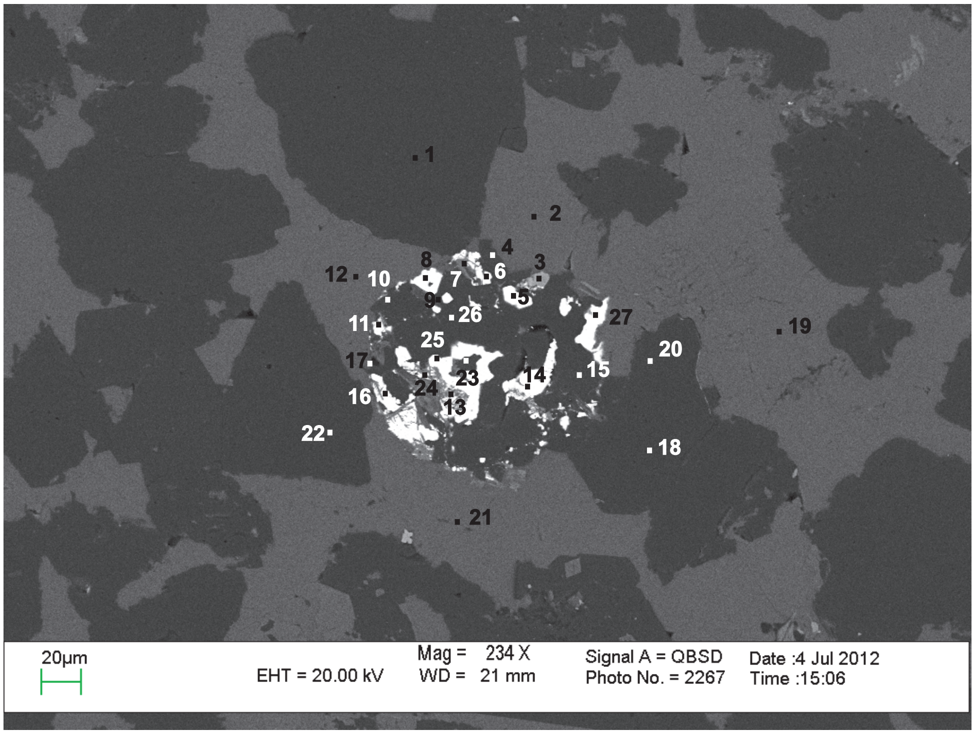


Figure 11: J-47-5445.94m-soi16(SEM). Diagenetic barite fills dissolution voids of detrital quartz (e.g. analysis 14).

1. Quartz
2. Fe-Calcite
3. Rutile
4. Quartz
5. Barite
6. Barite+Quartz
7. Mixture
8. Barite+Quartz
9. Quartz
10. Albite
11. Mixture
12. Fe-Calcite
13. Barite
14. Barite
15. Quartz
16. Barite
17. Quartz
18. Quartz
19. Fe-Calcite
20. Quartz
21. Fe-Calcite
22. Quartz
23. Quartz
24. Barite + Chlorite
25. Barite
26. Quartz
27. Barite

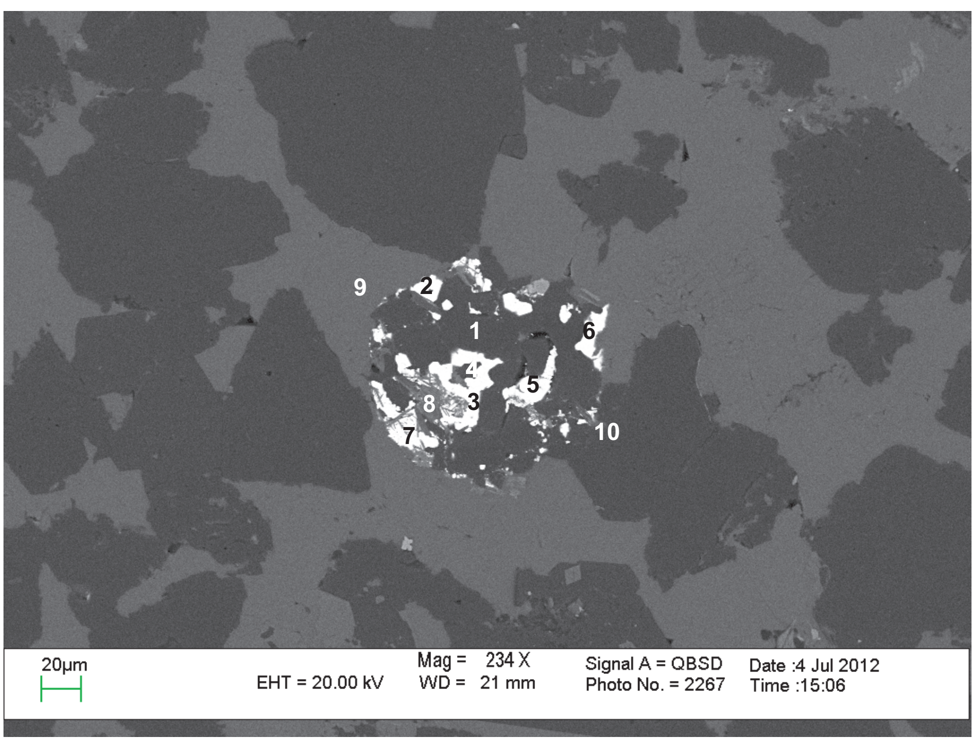
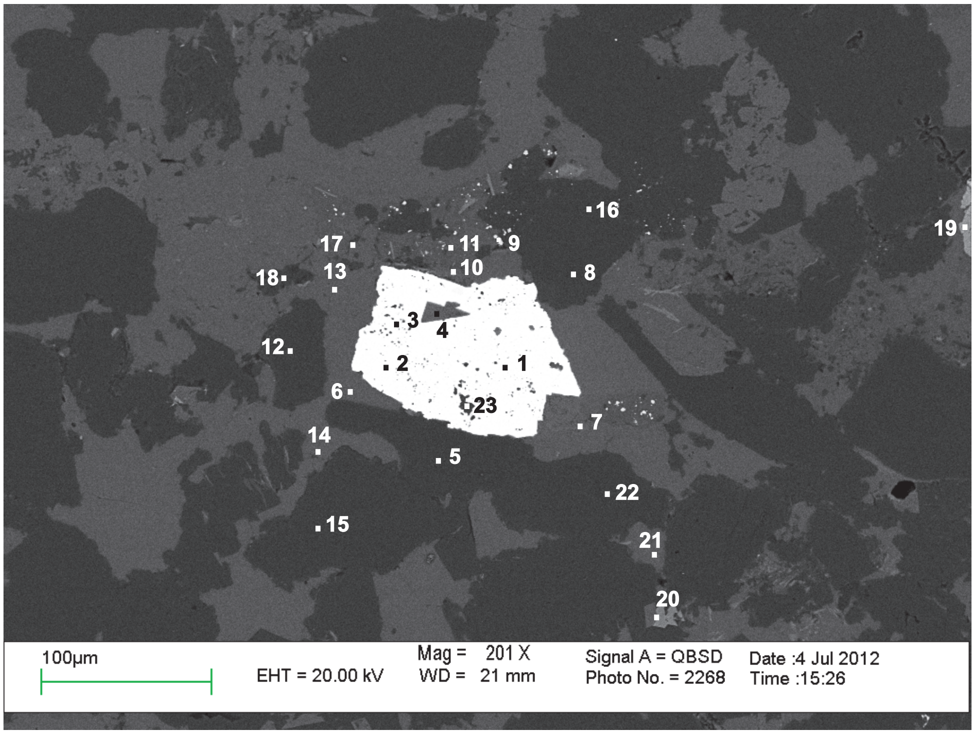


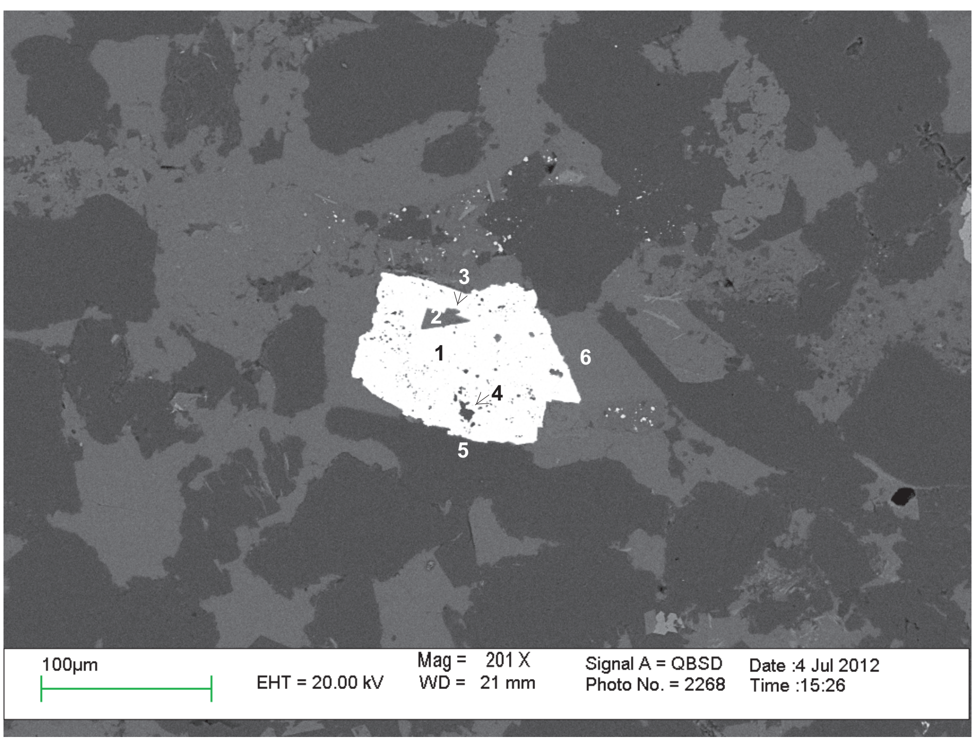
Figure 12: J-47-5445.94 m-soi16(Probe).

1. Quartz
2. Barite (lt)
3. Barite
4. Barite (lt)
5. Barite
6. Barite + Quartz
7. Barite
8. Chlorite + Barite
9. Ferroan Calcite
10. Quartz



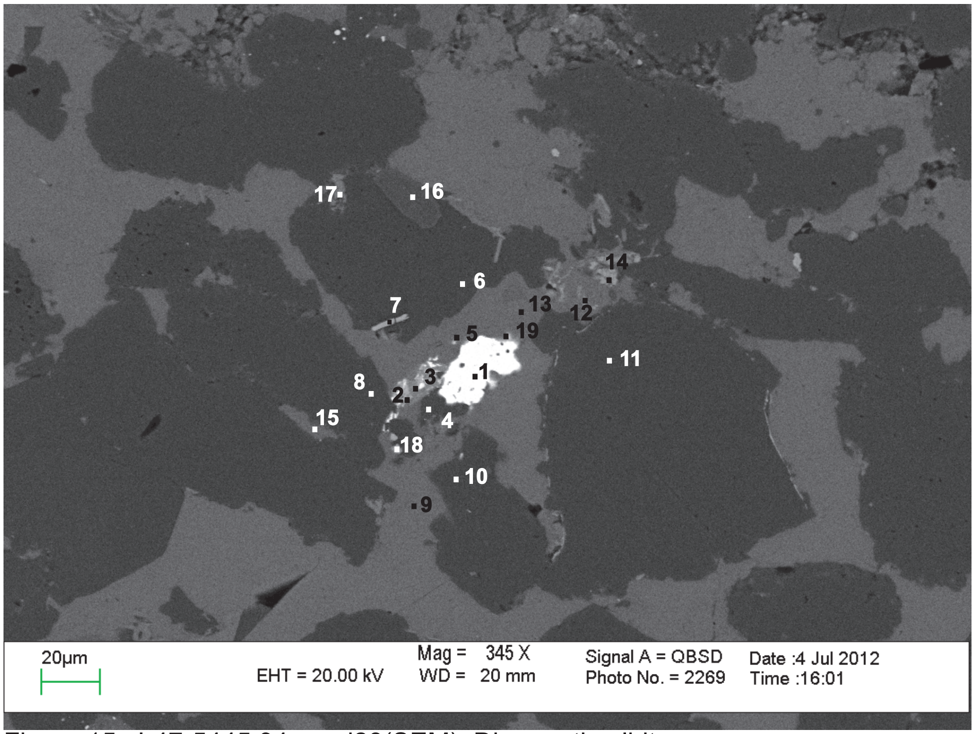
1. Barite
2. Barite
3. Barite+Quartz
4. Mixture
5. Quartz
6. Fe-Calcite
7. Quartz
8. Quartz
9. Quartz
10. Fe-Calcite
11. Calcite + others
12. Quartz
13. Calcite + others
14. Fe-Calcite
15. Quartz
16. Quartz
17. Calcite+ Others
18. Quartz
19. Rutile
20. Siderite
21. Calcite + Chlorite
22. Quartz
23. Quartz

Figure 13: J-47-5445.94m-soi19(SEM). Diagenetic barite.



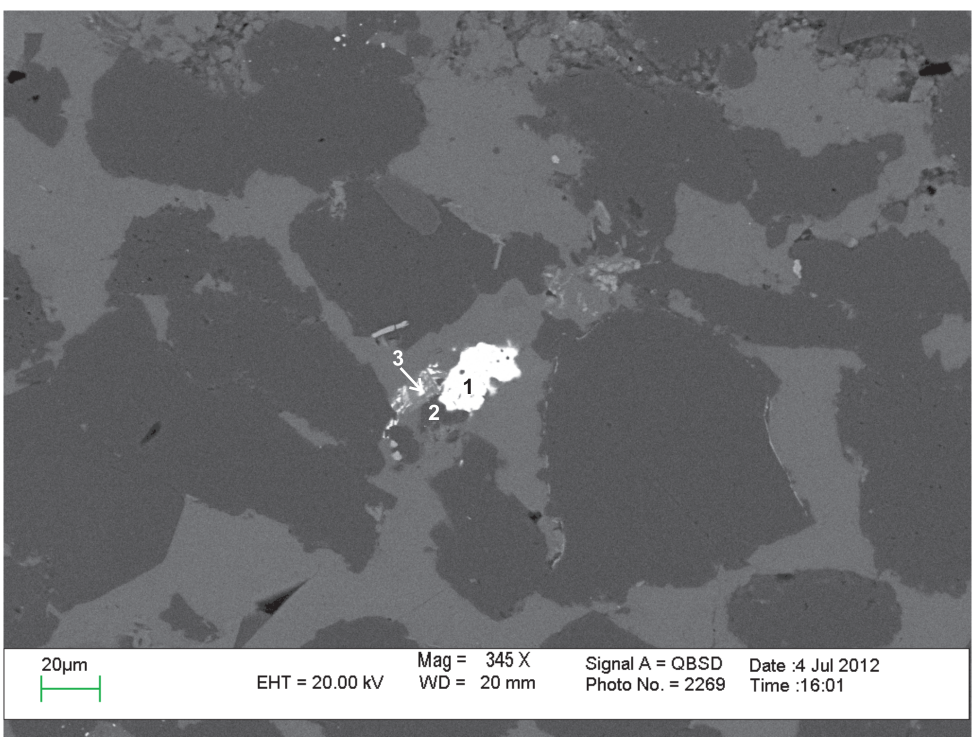
1. Barite
2. Ankerite
3. Barite + Calcite
4. Quartz
5. Quartz
6. Fe-Calcite

Figure 14: J-47-5445.94 m-soi19(Probe).



1. Barite
2. Chlorite + others
3. Chlorite + others
4. Quartz
5. Calcite + Chlorite
6. Quartz
7. Altered Ilmenite
8. Quartz
9. Fe-Calcite
10. Quartz
11. Quartz
12. Calcite + Chlorite
13. Fe-Calcite
14. Chlorite + others
15. Fe-Calcite
16. Kaolinite
17. Chlorite + Quartz
18. Mixture
19. Barite+Others

Figure 15: J-47-5445.94m-soi28(SEM). Diagenetic albite.



1. Barite
2. Quartz
3. Chlorite + Barite

Figure 16: J-47-5445.94 m-soi28(Probe).

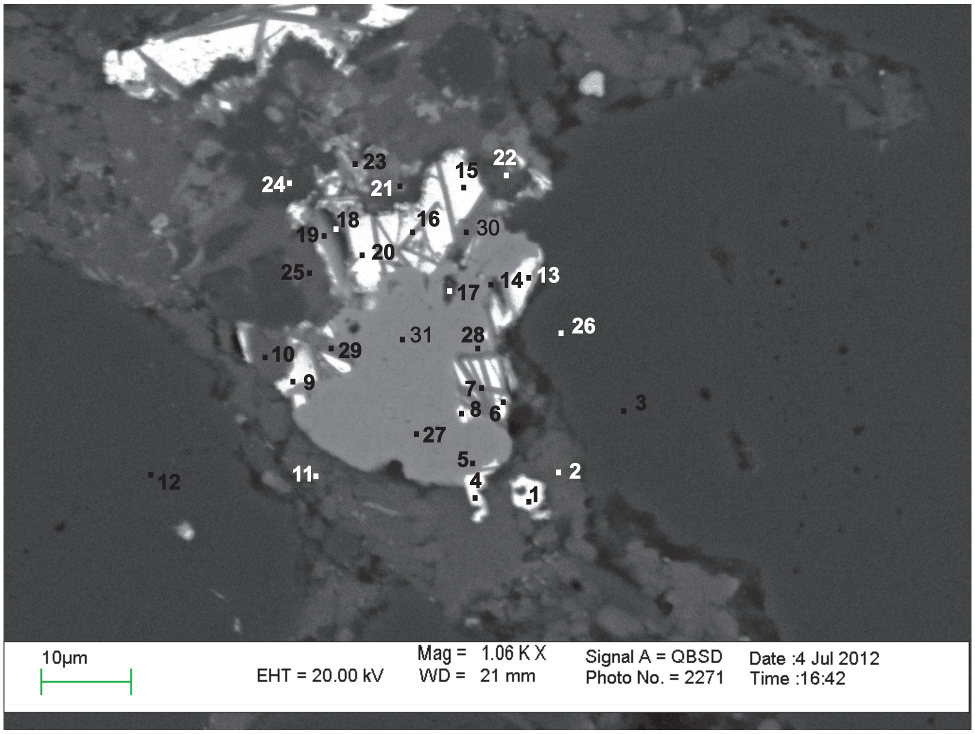


Figure 17: J-47-5445.94m-soi35(SEM). Parallel fibers of chlorite seem to cut diagenetic barite (analyses 6,7,16).

1. Barite + others
2. Fe-Calcite+ Quartz
3. Quartz
4. Barite+ Quartz
5. Rutile
6. Barite+ Chlorite
7. Chlorite+ Barite
8. Barite+ Others
9. Barite+ Others
10. Barite+ Others
11. Calcite + others
12. Quartz
13. Barite
14. Mixture
15. Barite
16. Barite+Chlorite
17. Rutile
18. Chlorite+ Barite
19. Chlorite+ Barite
20. Barite
21. Chlorite+ Barite
22. Chlorite+ Barite
23. Chlorite+ Barite
24. Chlorite
25. Calcite + Chlorite
26. Quartz
27. Rutile
28. Chlorite+ Pyrite
29. Chlorite+ TiO_2
30. Chlorite+ TiO_2
31. Rutile

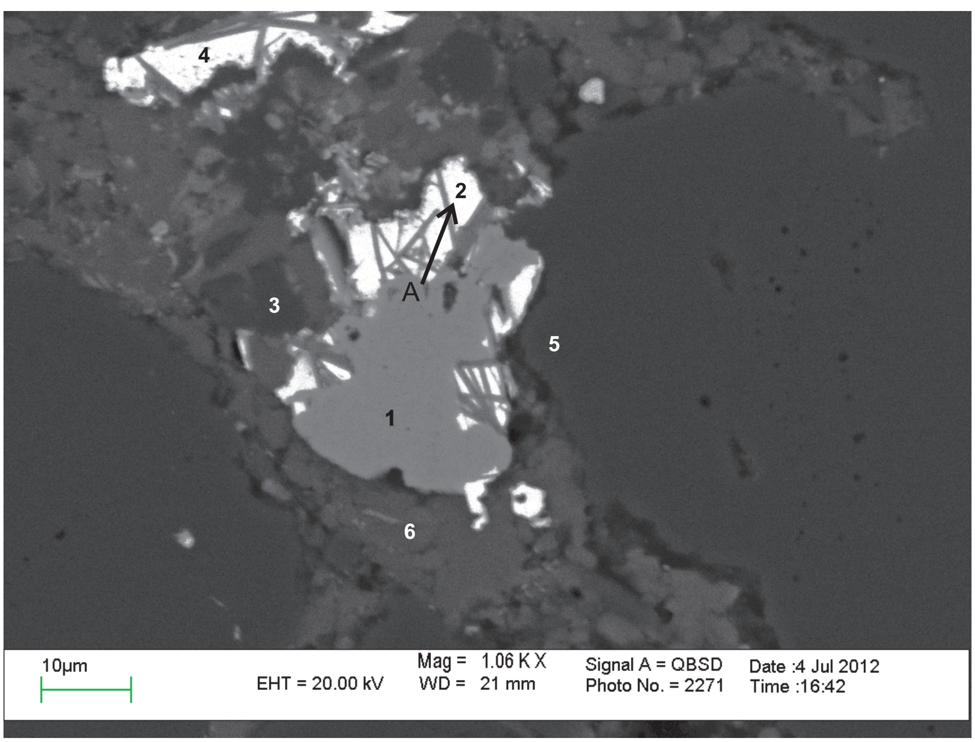
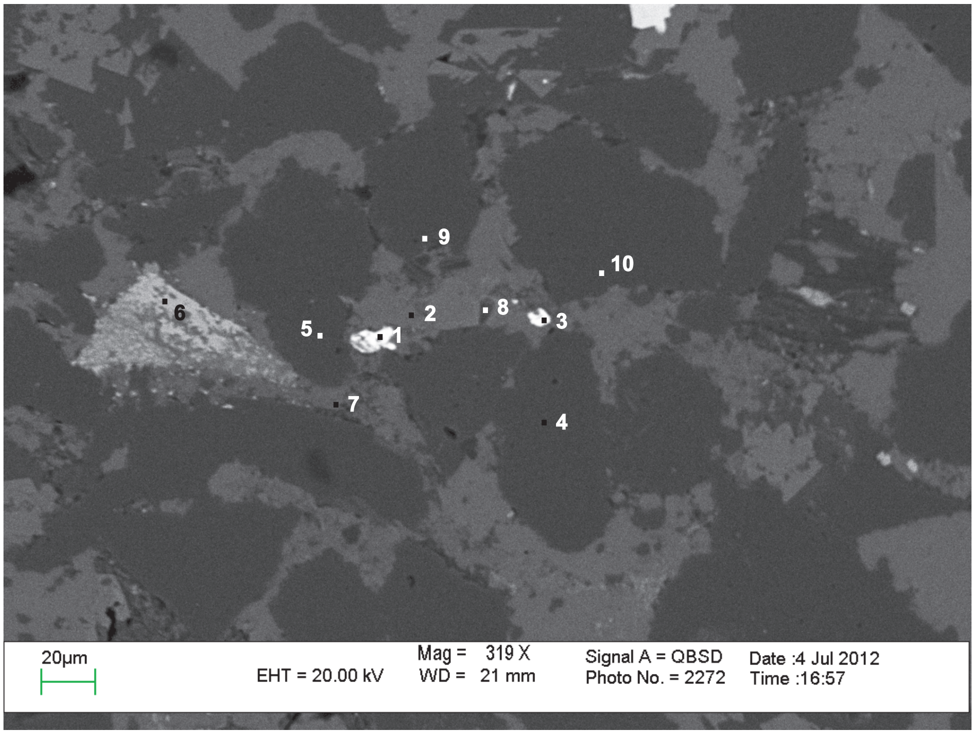


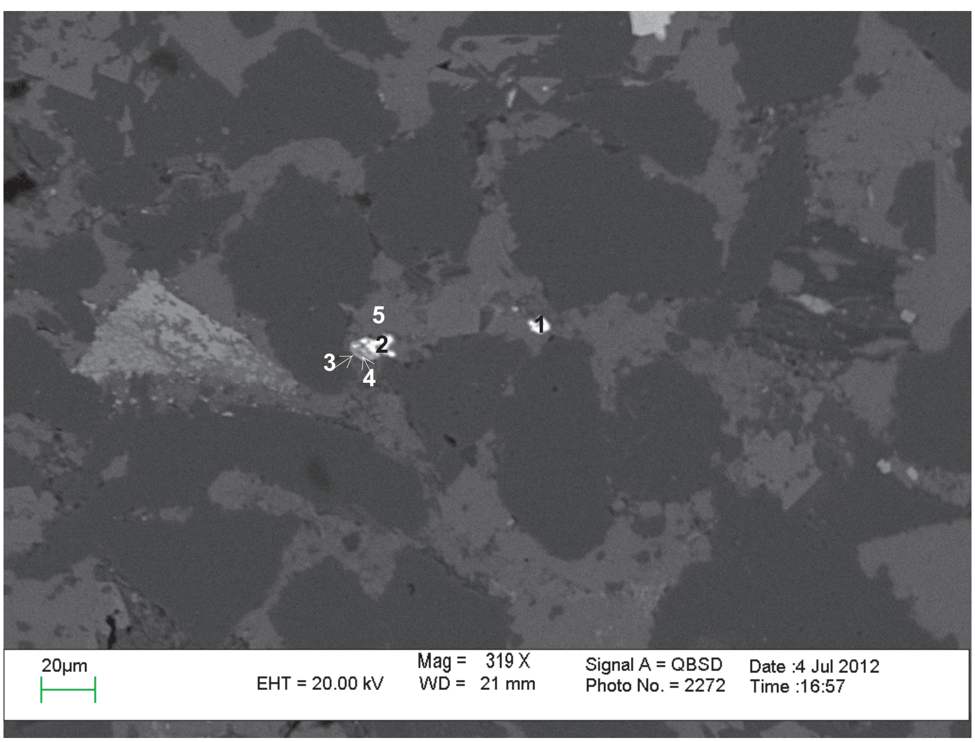
Figure 18: J-47-5445.94 m-soi35(Probe). Diagenetic barite is cut by chlorite trellis lamellae (position A).

1 - Rutile
2 - Barite
3 - Albite
4 - Barite
5 - Quartz
6 - Calcite + Quartz



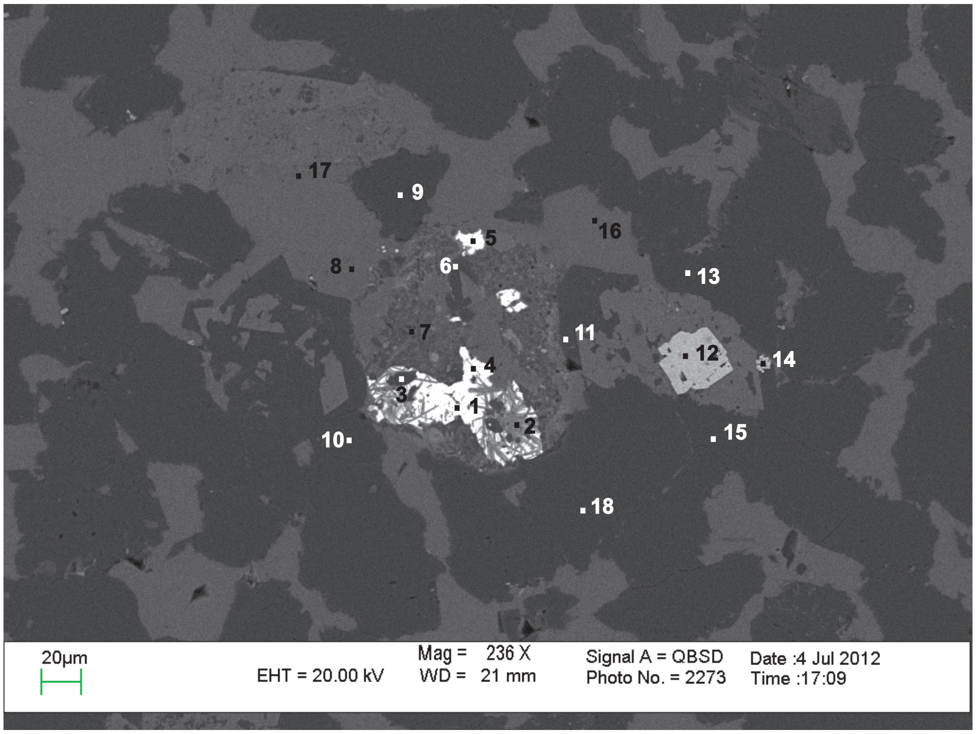
1. Barite
2. Fe-Calcite + Chlorite
3. Barite
4. Quartz
5. Quartz
6. Rutile
7. Calcite+ Chlorite
8. Calcite+Chlorite
9. Quartz
10. Quartz

Figure 19:J-47-5445.94m-soi.39 (SEM). Diagenetic barite is associated with Fe-calcite and chlorite.



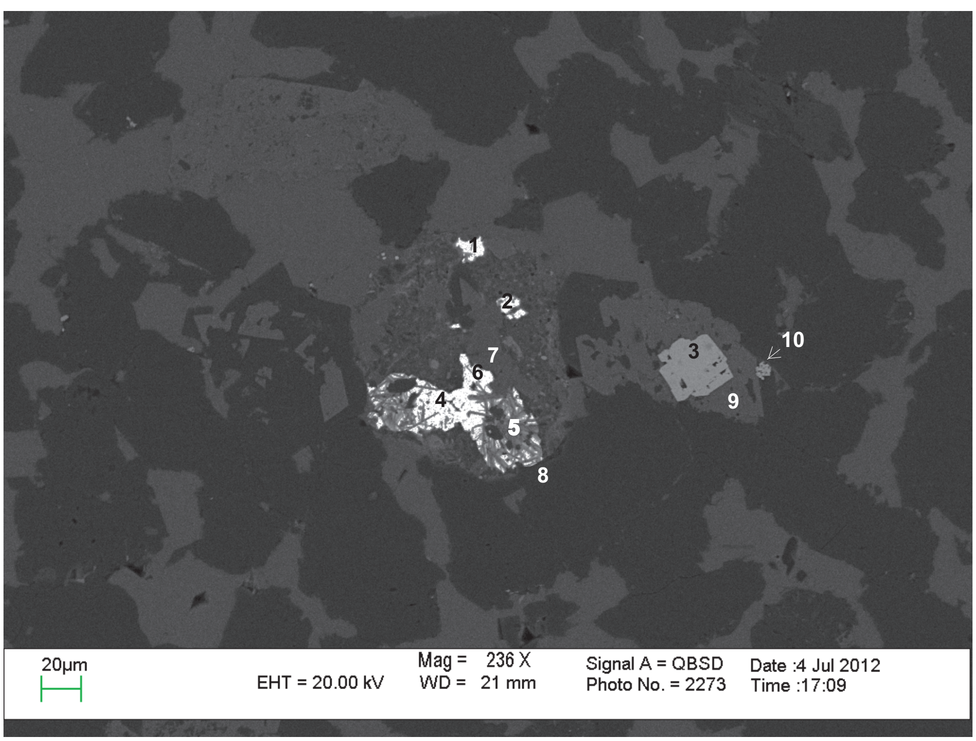
1. Barite + Chlorite + Quartz
2. Barite (ht)
3. Chlorite + Calcite
4. Chlorite + Barite
5. Fe-Calcite

Figure 20: J-47-5445.94 m-soi.39(Probe).



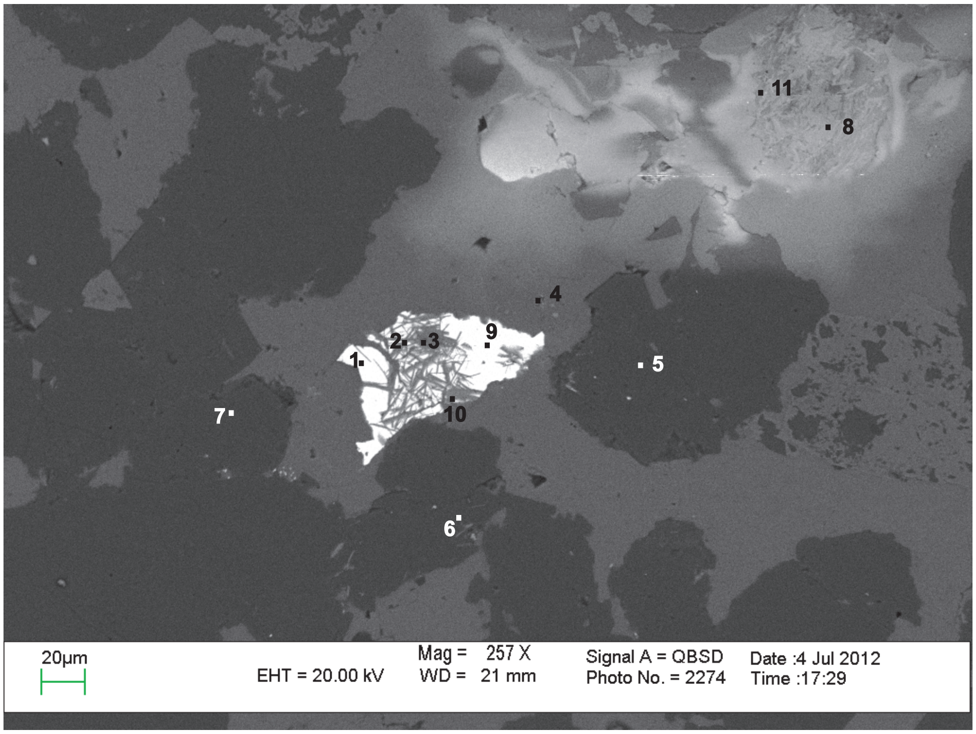
1. Barite+Chlorite
2. Chlorite+ Barite
3. Quartz
4. Barite
5. Barite
6. Chlorite+ Calcite
7. Chlorite
8. Fe-Calcite
9. Quartz
10. Quartz
11. Albite
12. Pyrite
13. Quartz
14. Albite+ Pyrite
15. Quartz
16. Fe-Calcite
17. Mixture
18. Quartz

Figure 21:J-47-5445.94 m-soi51 (SEM). Diagenetic barite is associated with chlorite in a trellis-type texture. Pyrite engulfs Fe-calcite.



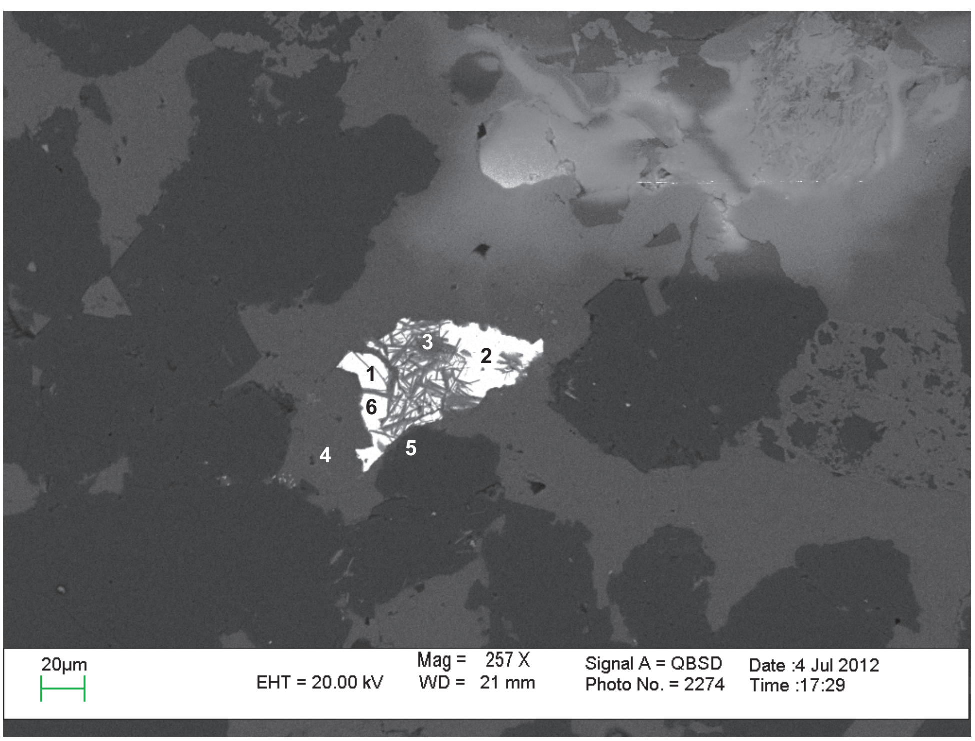
1. Barite
2. Barite
3. Pyrite
4. Barite
5. Chlorite
6. Barite
7. Calcite
8. Quartz
9. Ankerite
10. Pyrite

Figure 22: J-47-5445.94 m-soi51(Probe).



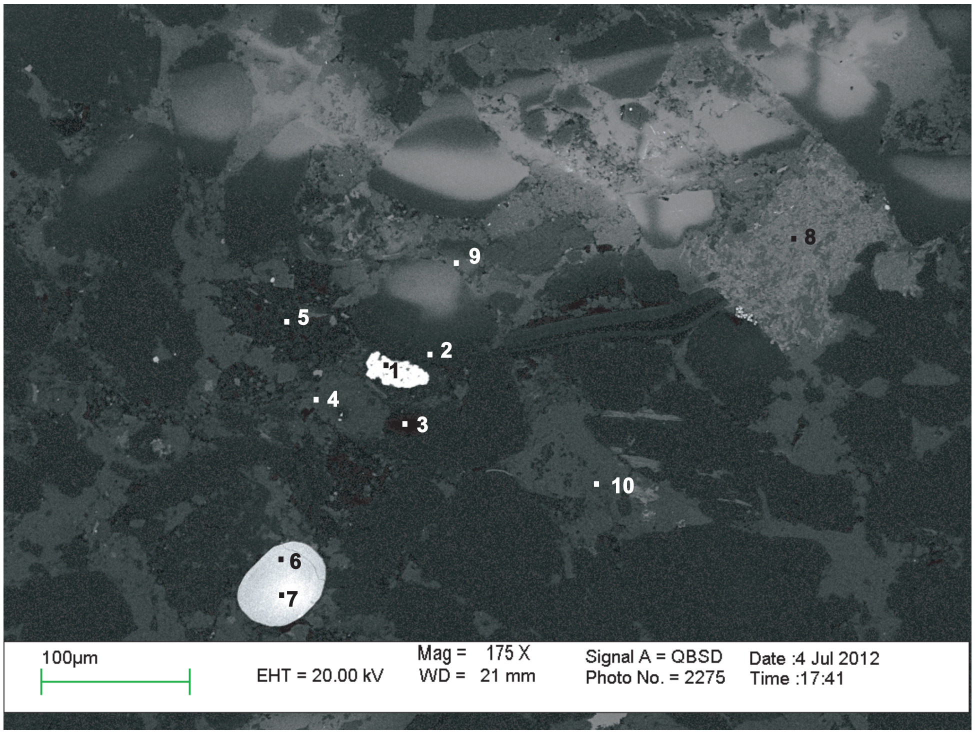
1. Barite
2. Chlorite
3. Chlorite
4. Fe-Calcite
5. Quartz
6. Quartz
7. Quartz
8. Chlorite
9. Barite
10. Chlorite+ Barite
11. Chlorite

Figure 23: J-47-5445.94 m-soi59(SEM). Diagenetic barite is cut by fibers and patches (trellis texture) of chlorite (analyses 2,3) and engulfs Fe-calcite.



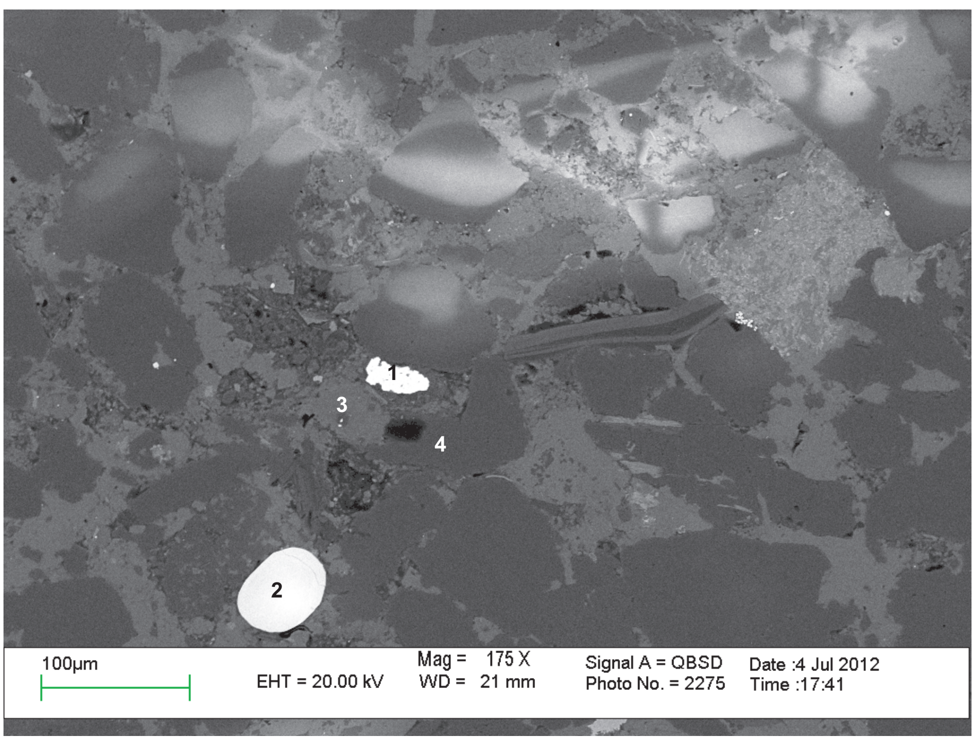
1. Barite
2. Barite
3. Chlorite
4. Calcite
5. Quartz
6. Barite

Figure 24: J-47-5445.94 m-soi59(Probe).



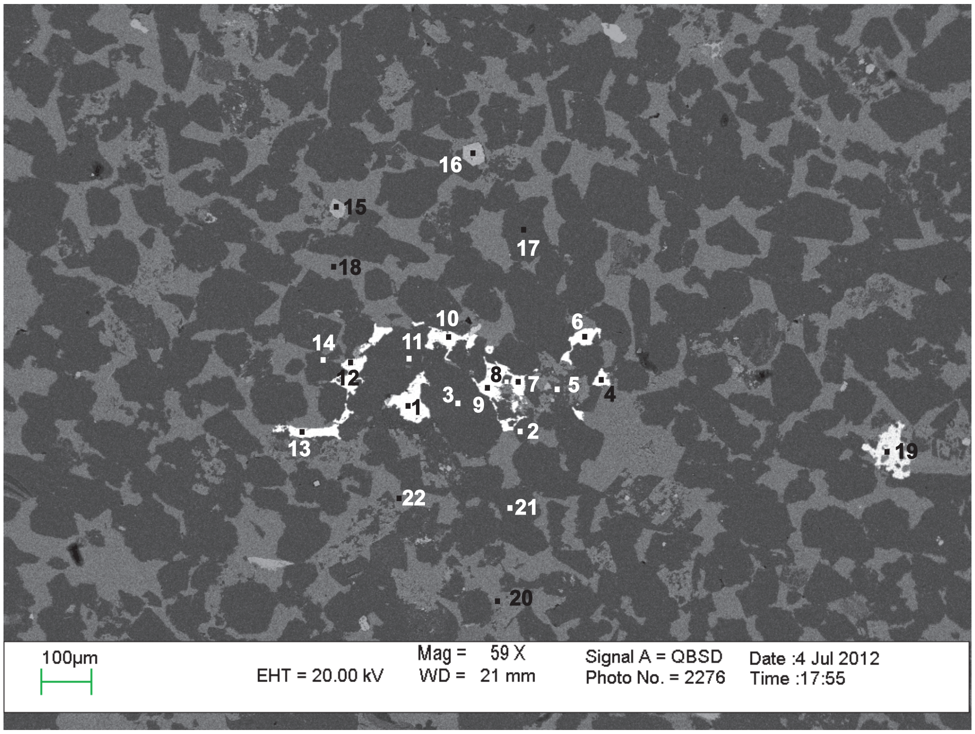
1. Barite
2. Quartz
3. ?
4. Calcite
5. Chlorite
6. Zircon
7. Zircon
8. Chlorite+ Calcite
9. Calcite+ K-feldspar
10. Fe-Calcite

Figure 25: J-47-5445.94 m-soi61(SEM). Diagenetic barite is associated with chlorite and Fe-calcite.



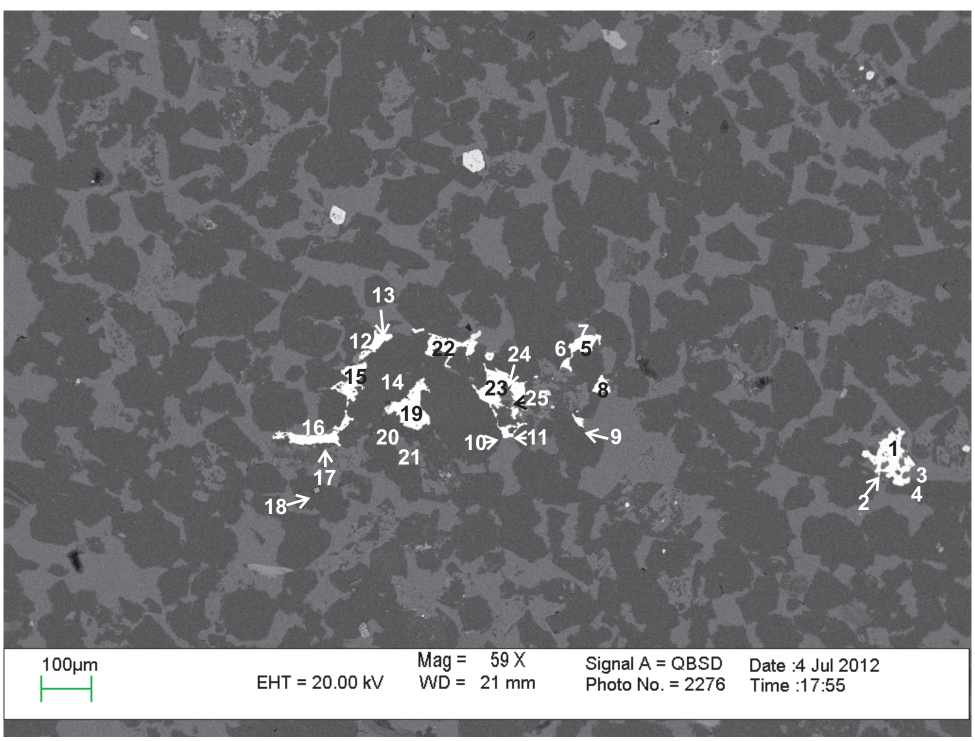
1. Barite
2. Hole
3. Calcite
4. Quartz

Figure 26: J-47-5445.94 m-soi61(Probe).



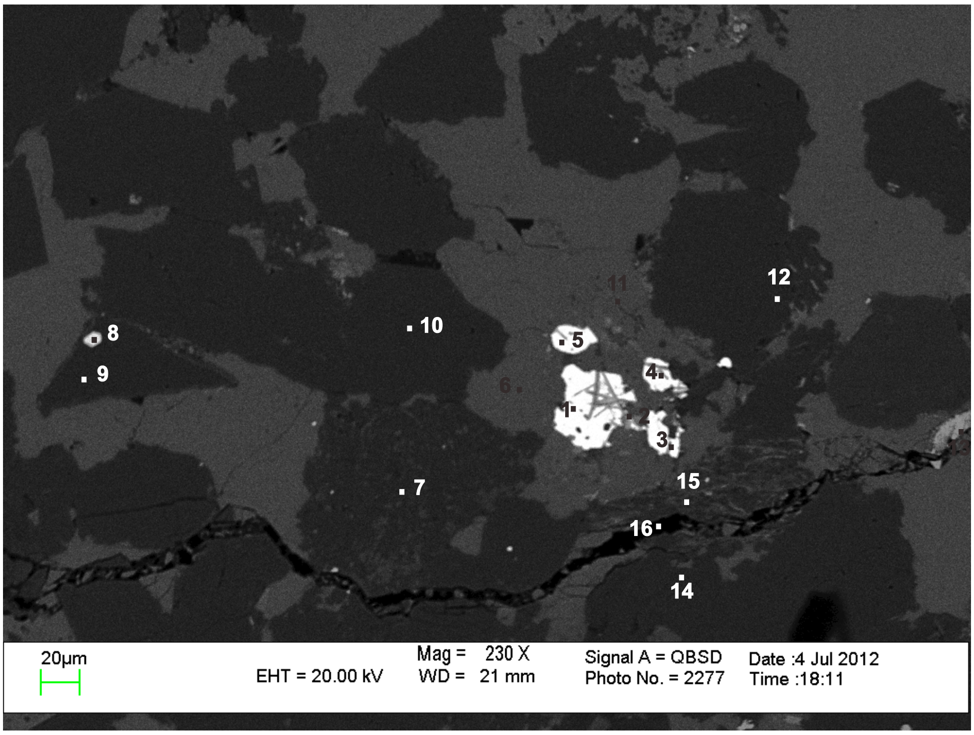
1. Barite
2. Quartz
3. Quartz
4. Barite+ Calcite
5. Albite
6. Barite
7. Barite
8. Fe-Calcite+ Barite
9. Barite+ Calcite
10. Quartz
11. Quartz+ Calcite
12. Barite
13. Barite
14. Quartz
15. Pyrite
16. Fe-Calcite
17. Quartz
18. Fe- Calcite
19. Sphalerite
20. Fe-Calcite
21. Quartz
22. Albite

Figure 27: J-47-5445.94 m-soi68(SEM). Diagenetic barite and sphalerite are associated with Fe-calcite and chlorite.



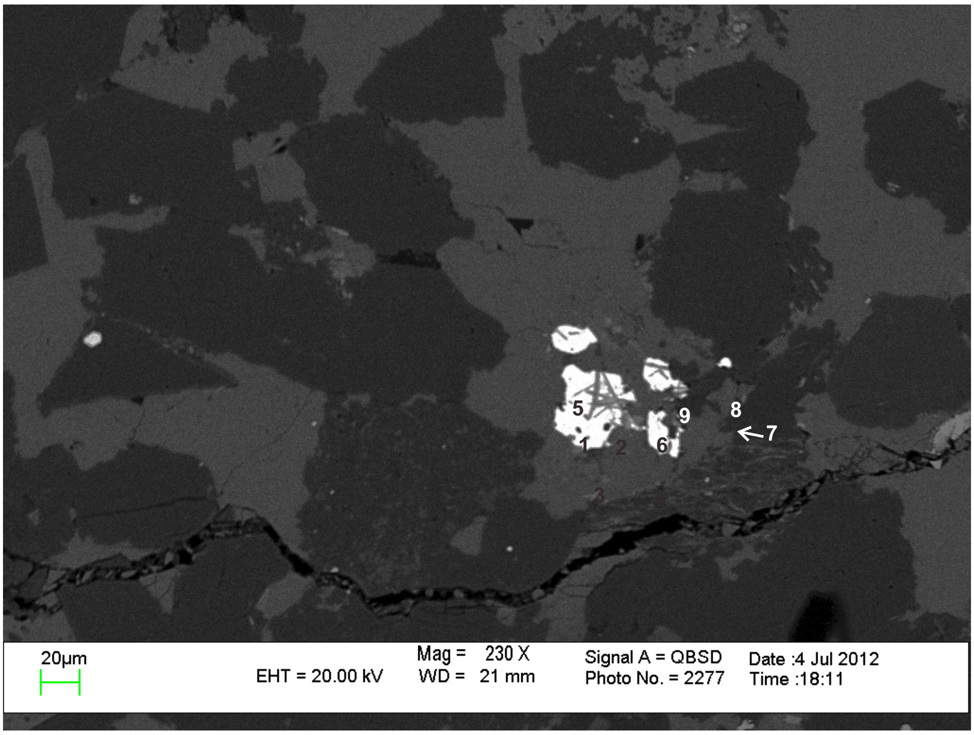
1. Sphalerite
2. Ankerite
3. Fe-Calcite
4. Quartz
5. Barite
6. Quartz
7. Fe-Calcite
8. Barite
9. Barite
10. Barite
11. Albite
12. Quartz
13. Barite
14. Quartz
15. Barite
16. Fe-Calcite
17. Barite
18. Kernite (incl. in quartz)
19. Barite
20. Quartz
21. Fe-Calcite
22. Barite
23. Barite
24. Albite
25. Ankerite
26. Barite

Figure 28: J-47-5445.94 m-soi68(Probe). Extensive presence of carbonate cement. In places there are patches of diagenetic barite apparently replacing the carbonate cement. Sphalerite (1) also seems to have partially replaced both Fe-calcite (3) and ankerite (2).



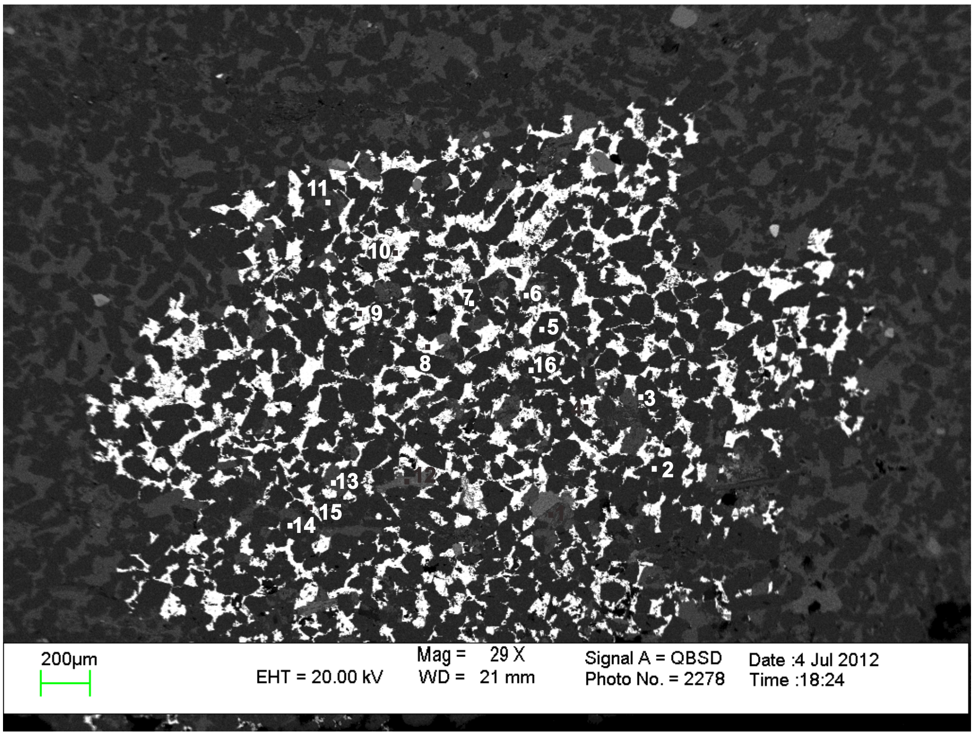
1. Barite
2. Chlorite+ Calcite
3. Barite
4. Barite+ Chlorite
5. Barite
6. Fe-Calcite
7. Quartz
8. Zircon
9. Quartz
10. Quartz
11. Fe-Calcite
12. Quartz
13. Fe-Calcite + TiO_2
14. Quartz
15. Quartz+ Chlorite
16. Quartz

Figure 29: J-47-5445.94 m-soi71(SEM). Similar to Fig. 12.



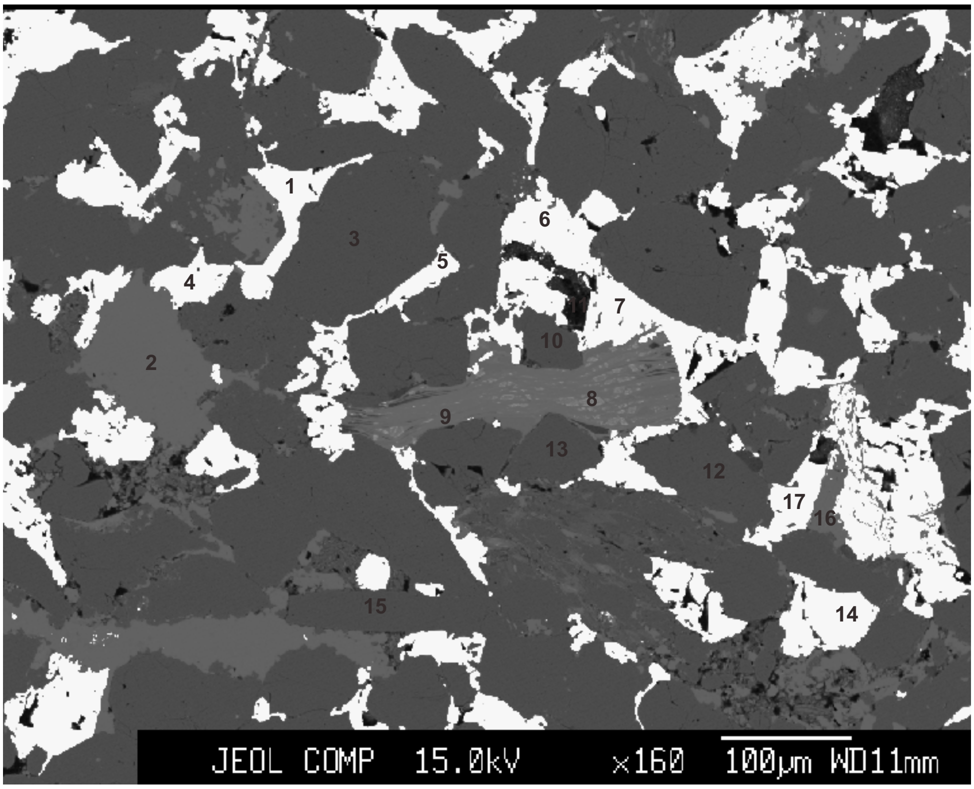
1. Barite
2. Barite
3. Barite
4. Barite
5. Barite + Chlorite
6. Barite
7. Barite
8. Quartz
9. Fe-Calcite

Figure 30: J-47-5445.94 m-soi71(Probe). Diagenetic barite replaces Fe-calcite, and is cut by trellis lamellae of chlorite that may accomodate the Fe from the replaced Fe-calcite.



1. Chlorite
2. Fe-Calcite+ Chlorite
3. Mixture
4. Barite
5. Quartz
6. Kaolinite
7. Albite
8. Barite
9. Barite
10. Barite
11. Calcite+ Chlorite
12. Chlorite
13. Fe-Calcite
14. Fe-Cacite
15. Calcite+ Barite
16. Quartz

Figure 31: J-47-5445.94 m-soi74(SEM). Diagenetic barite.



1. Barite
2. Calcite
3. Quartz
4. Barite
5. Barite
6. Barite
7. Barite
8. Siderite
9. Chlorite
10. Quartz
11. Hole
12. Quartz
13. Quartz
14. Barite
15. Quartz
16. Fe-Calcite
17. Barite

Figure 32: J-47-5445.94 m-soi74-1(Probe). Diagenetic barite fills primary or secondary porosity. In places it appears to replace diagenetic carbonates.

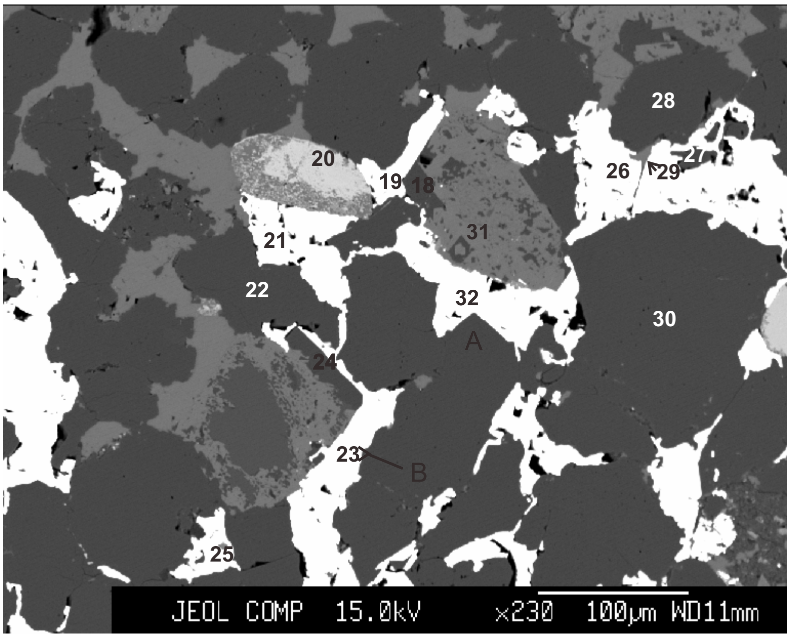


Figure 33: J-47-5445.94 m-soi74-2(Probe). Similar to Fig.32. In places, quartz grains have euhedral outlines or overgrowths (position A). In other places, quartz is partly dissolved (position B).

18. Albite
19. Barite
20. Rutile
21. Barite
22. Quartz
23. Barite
24. Albite
25. Barite
26. Barite
27. Quartz
28. Quartz
29. Fe-Calcite
30. Quartz
31. Fe-Calcite
32. Barite

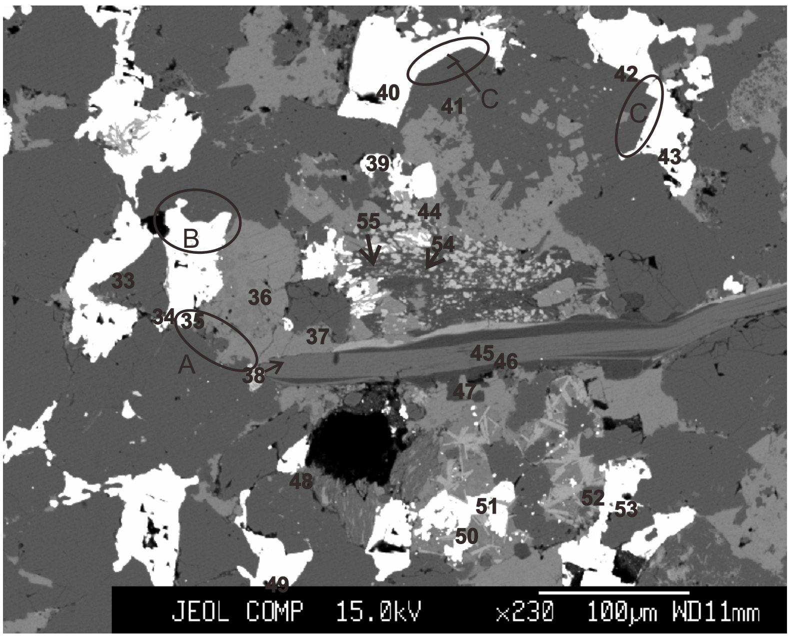
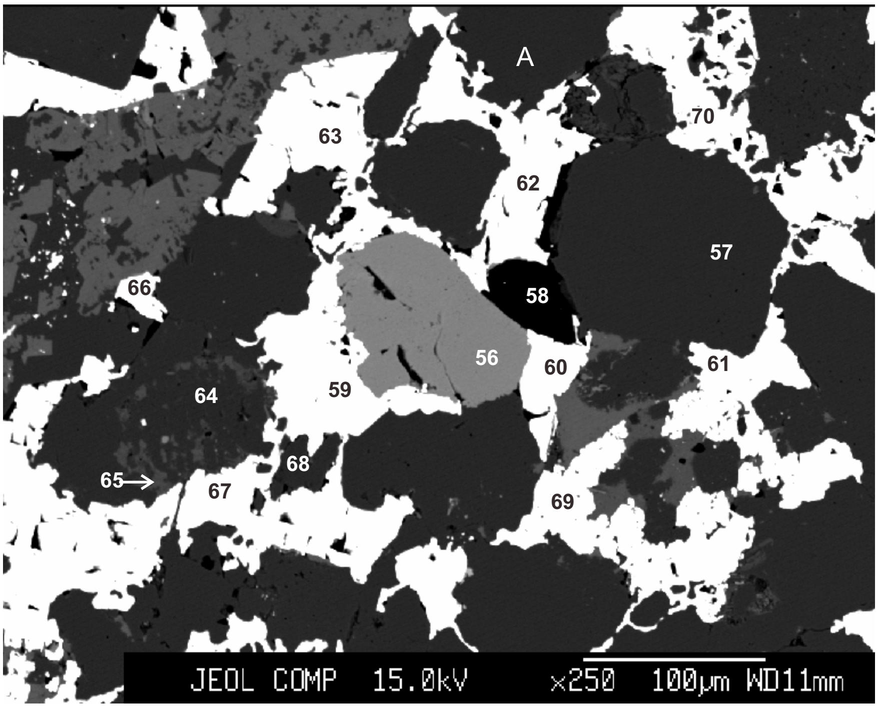


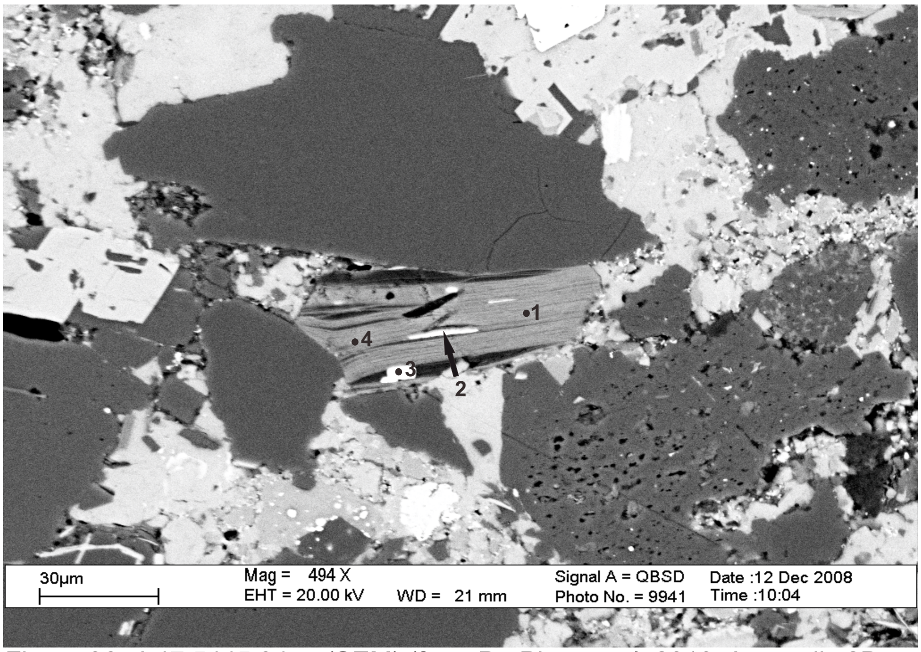
Figure 34: J-47-5445.94 m-soi74-3(Probe). Similar to Fig.32. The carbonates often show embayed contacts with quartz (position A), whereas barites may have embayed contacts with quartz (position B) or it may have euhedral contacts with quartz (position C).In the former case, barite may have replaced Fe-calcite, whereas in the latter case, barite may be filling the pore space.

33. Barite
34. Quartz
35. Barite
36. Fe-calcite
37. Quartz
38. Calcite + Barite
39. Quartz
40. Barite
41. Albite
42. Barite
43. Barite
44. Hole
45. Quartz + Calcite
46. Kaolinite
47. Altered K-feldspar
48. Barite
49. Barite
50. Barite
51. Fe-Calcite
52. Chlorite
53. Barite
54. Mixture
55. Chlorite



56. Apatite
57. Quartz
58. Hole
59. Barite
60. Barite
61. Barite
62. Barite
63. Barite
64. Quartz
65. Chlorite
66. Barite
67. Barite
68. Quartz
69. Barite
70. Barite
71. Barite

Figure 35: J-47-5445.94 m-soi74-4 (Probe). Similar to Fig. 32, but dissolution of quartz seems more pronounced (pos A). Barite also seems to have partly replaced a detrital looking apatite grain (56).



1. Muscovite
2. Sphalerite
3. Sphalerite
4. Muscovite

Figure 36: J-47 5445.94 m.(SEM) (from Pe-Piper et al, 2010, Appendix 2D, fig.6), Muscovite (pos.1,4) with diagenetic sphalerite along its cleavage (pos.2,3).

1. Sphalerite

Figure 37: J-47 5445.94 m.(SEM) (from Pe-Piper et al., 2010, Appendix 2D, fig. 69) , Sphalerite (pos.1) with straight crystal outlines fills pore space.

Table D-1: Scanning Electron Microscope chemical analyses of sample 5445.94 from the Louisbourg J-47 well.

Well	Depth	Site	No	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SrO	BaO	SO_3	WO_3	CoO	B_2O_3	Ce_2O_3	N_2O_5	ZrO_2	ZnO	Total
J47	5445.94	16	5	*Brt												40.2	22.9	1.57		35.33					100
J47	5445.94	16	14	*Brt												39.64	22.75		0.22	37.39					100
J47	5445.94	39	1	*Brt	2.64		2.02	2.9			0.85				5.54	32.87	22.64			30.54					100
J47	5445.94	59	1	*Brt			1.25	1.13			0.41				1.53	43.27	26.17		0.26	25.98					100
J47	5445.94	59	9	*Brt											3.64	42.61	27.96			25.79					100
J47	5445.94	74	8	*Brt											1.26	42.72	24.84			31.18					100
J47	5445.94	61	3	?	47.14						0.56	1.73					2.08					48.48			100
J47	5445.94	3	2	Ab	63.62		22.59	0.73				10.07	3												100
J47	5445.94	3	7	Ab	63.64		17.32	2.07		0.66	4.27	12.05													100
J47	5445.94	3	13	Ab	66.31		18.1	1.1			2.53	11.97													100
J47	5445.94	6	8	Ab	68.32		19.3				0.43	11.95													100
J47	5445.94	6	16	Ab	65.22		17.86				4.77	12.14													100
J47	5445.94	14	4	Ab	68.16		18.13	0.65			1.07	11.99													100
J47	5445.94	14	23	Ab	68.31		18.72	0.83				12.14													100
J47	5445.94	16	10	Ab	70.7		17.78					11.52													100
J47	5445.94	51	11	Ab	68.93		18.74					12.33													100
J47	5445.94	68	5	Ab	67.09		19.1	1.36			0.56	11.89													100
J47	5445.94	68	22	Ab	67.49		18.31	0.52			1.28	12.4													100
J47	5445.94	74	7	Ab	69.16		18.5					12.34													100
J47	5445.94	51	14	Ab+Py	53.53		14.46	5.29			0.42	9.35					16.95								100
J47	5445.94	28	7	Alt Ilm	30.2	69.37					0.43														100
J47	5445.94	3	8	Ank	0.91			15.26	0.76	10.94	28.13														56.00
J47	5445.94	3	9	Ank	3.69			14.16		10.17	27.98														56.00
J47	5445.94	14	13	Ank	3.06		1.16	13.87	1.06	9.03	27.04	0.77													56.00
J47	5445.94	14	24	Ank+others	7.73		2.75	26.32	0.96	16.59	43.25	2.4													100
J47	5445.94	3	1	Brt											2.84	59.73	37.44								100
J47	5445.94	5	1	Brt											3.21	58.81	37.98								100
J47	5445.94	6	1	Brt											3.38	58.05	38.58								100
J47	5445.94	8	1	Brt											9.36	51.84	38.8								100
J47	5445.94	8	10	Brt	2.51		1.84	1.89							5.92	52.08	35.76								100
J47	5445.94	14	1	Brt	4.23		2.87						0.64			51.66	35.58	5.02							100
J47	5445.94	14	22	Brt	4.18		1.25									52.18	34.67	3.99							96.27
J47	5445.94	16	13	Brt											2.03	60.71	37.26								100
J47	5445.94	16	16	Brt			1.03									58.49	37.13	3.36							100
J47	5445.94	16	25	Brt				0.74							2.16	59.21	37.9								100
J47	5445.94	16	27	Brt							0.56					61.56	37.88								100
J47	5445.94	19	1	Brt	3.76											58.74	37.5								100
J47	5445.94	19	2	Brt											2.12	59.43	38.44								100
J47	5445.94	28	1	Brt	1.44											60.39	38.18								100
J47	5445.94	35	13	Brt	6.91		1.9	1.61								26.97	16.89			45.71					100
J47	5445.94	35	15	Brt	1.65		1.01	1.76							3.55	54.79	37.25								100
J47	5445.94	35	20	Brt	3.94		2.9	2.88							8.87	45.26	36.14								100
J47	5445.94	39	3	Brt	3.65		1.79	1.17			2.17				9.61	45.07	36.52								100
J47	5445.94	51	4	Brt				0.92							6.29	54.29	38.5								100
J47	5445.94	51	5	Brt				0.76							11.04	49.51	38.7								100
J47	5445.94	61	1	Brt											2.92	58.48	38.6								100
J47	5445.94	68	1	Brt											1.94	60.83	37.23								100
J47	5445.94	68	6	Brt											2.35	59.93	37.71								100
J47	5445.94	68	7	Brt												62.25	37.75								100

Table D-1: Scanning Electron Microscope chemical analyses of sample 5445.94 from the Louisbourg J-47 well.

Well	Depth	Site	No	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SrO	BaO	SO_3	WO_3	CoO	B_2O_3	Ce_2O_3	N_2O_5	ZrO_2	ZnO	Total
J47	5445.94	68	12	Brt											1.82	59.78	38.4								100
J47	5445.94	68	13	Brt											1.87	60.13	38								100
J47	5445.94	71	1	Brt			0.76								9.23	51	39.01								100
J47	5445.94	71	3	Brt	1.38		1.17	0.92			3.54					54.12	35.02	3.85							100
J47	5445.94	71	5	Brt			1.8	1.79							7.76	50.81	37.84								100
J47	5445.94	74	4	Brt												62.76	37.24								100
J47	5445.94	74	9	Brt												62.52	37.48								100
J47	5445.94	74	10	Brt	2.73		1.27					1.09				59.16	35.74								100
J47	5445.94	35	4	Brt+Cal	2.13					2.47	47.79					30.32	17.3								100
J47	5445.94	68	4	Brt+Cal							14.01					51	32.18	2.81							100
J47	5445.94	68	9	Brt+Cal				1.47			36.84					42.18	19.51								100
J47	5445.94	6	2	Brt+Chl	21.8		18.12	17.77		3.76						23.76	14.79								100
J47	5445.94	6	9	Brt+Chl	27.48		21.31	16.47		2.92			1.1			18.88	11.84								100
J47	5445.94	16	24	Brt+Chl	18.81		17.82	17.58		3.3			0.37			25.32	16.8								100
J47	5445.94	35	6	Brt+Chl	14.77		5.3	3.72		0.98	2.84					46.52	25.87								100
J47	5445.94	35	16	Brt+Chl	17.14		15.16	14.06		1.86			1.04			30.2	20.54								100
J47	5445.94	51	1	Brt+Chl	8.21		5.72	7.03					0.54			47.49	31.01								100
J47	5445.94	71	4	Brt+Chl	18.28		16.55	20.76		3.7	0.43					23.27	17.01								100
J47	5445.94	28	19	Brt+others	8.87		1.31	1.32			27.17					39.01	22.31								100
J47	5445.94	35	1	Brt+others	1.81		1.03				13.78					51.67	31.72								100
J47	5445.94	35	8	Brt+others	1.67	19.87	3.35	2.66			0.56					40.8	27.07	4.03							100
J47	5445.94	35	9	Brt+others	1.43	21.75	3.32	6.35			1.67					32.02	25.13	8.33							100
J47	5445.94	35	10	Brt+others	17.59		14.23	19.68		2.76	26.67					10.39	8.68								100
J47	5445.94	16	6	Brt+Qz	28.46		2.51									41.89	27.14								100
J47	5445.94	16	8	Brt+Qz	40.28											38.46	21.26								100
J47	5445.94	19	3	Brt+Qz	10.13											55.05	34.82								100
J47	5445.94	61	4	Cal						3.47	51.67						0.87								55.99
J47	5445.94	14	7	Cal+Ab	32.74		9.56	14.87		9.15	26.25	7.43													100
J47	5445.94	74	15	Cal+Brt				2.08			63.22					24.39	10.31								100
J47	5445.94	14	18	Cal+Chl	10.19		2.93	11.11			47.96						27.82								100
J47	5445.94	19	21	Cal+Chl	3.88		2.26	6.03		1.69	86.14														100
J47	5445.94	28	5	Cal+Chl	14.87		10.87	4.26		1.5	68.5														100
J47	5445.94	28	12	Cal+Chl	9.71		6.36	28.78		3.47	51.68														100
J47	5445.94	35	25	Cal+Chl	6.74		3.8	4.29		1.38	83.79														100
J47	5445.94	39	7	Cal+Chl	8.61		3.64	1.43		4.28	79.21		0.7				2.13								100
J47	5445.94	39	8	Cal+Chl	31.26	1.43	10.63	5		2.1	48.21		1.38												100
J47	5445.94	74	11	Cal+Chl	22.26		6.74	19.65	1.13	11.25	33.62	5.35													100
J47	5445.94	61	9	Cal+Kfs	30.48		15.73	2.91		3.26	44.17		3.45												100
J47	5445.94	8	9	Cal+others	7.72		5.65	10.92		1.46	74.25														100
J47	5445.94	14	2	Cal+others	12.39		3.3	2.53			81.78														100
J47	5445.94	14	3	Cal+others	22.41		11.94	2.83		1.24	60.09		1.5												100
J47	5445.94	14	6	Cal+others	14.4		4.81	4.11		1.39	74.46		0.84												100
J47	5445.94	14	20	Cal+others	9.53		2.98	3.36	1.17	2.23	79.31		1.42												100
J47	5445.94	14	25	Cal+others	4.72		2.73	6.52		2.18	83.08		0.77												100
J47	5445.94	19	11	Cal+others	1.94			2		6.09	84.5						5.48								100
J47	5445.94	19	13	Cal+others	10.9	6.68	5.8	4.13		0.99	70.45		1.05												100
J47	5445.94	19	17	Cal+others	7.02		3.27	5.51		1.23	82.97														100
J47	5445.94	35	11	Cal+others	26.38	3.42	12.58	2.09		2.85	50.69		1.99												100
J47	5445.94	35	24	Chl	55.24		16.85	3.49		0.64	0.39	8.39													85.00

Table D-1: Scanning Electron Microscope chemical analyses of sample 5445.94 from the Louisbourg J-47 well.

Well	Depth	Site	No	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SrO	BaO	SO_3	WO_3	CoO	B_2O_3	Ce_2O_3	N_2O_5	ZrO_2	ZnO	Total
J47	5445.94	51	7	Chl	36.24	0.60	23.28	19.29		3.09	0.54		1.96												85.01
J47	5445.94	59	2	Chl	24.50		22.31	29.89		4.09						2.63	1.57								84.99
J47	5445.94	59	3	Chl	29.87		23.31	25.01		4.86	1.04			0.92											85.00
J47	5445.94	59	8	Chl	33.18		21.87	21.19		7.54			1.22												84.99
J47	5445.94	59	11	Chl	40.22	2.93	25.96	7.91		2.57		0.54	4.86												85.00
J47	5445.94	61	5	Chl	52.35	1.29	20.84	3.93		2.63			3.95												84.98
J47	5445.94	74	1	Chl	35.45		21.69	17.19		4.96	1.32		3.10	1.30											85.00
J47	5445.94	74	12	Chl	26.21	0.79	19.83	31.58		6.21	0.37														85.01
J47	5445.94	35	7	Chl+Brt	23.57	1.51	22.28	30.19		3.88						11.14	7.42								100
J47	5445.94	35	18	Chl+Brt	26.71		17.22	21.12		3.03	0.74		1.33			13.8	9.73								93.7
J47	5445.94	35	19	Chl+Brt	21.37		21	22.01		4.11	1.16		0.44			17.94	11.98								100
J47	5445.94	35	21	Chl+Brt	47.38		27.42	10.76		3.02			5.22			3.4	2.8								100
J47	5445.94	35	22	Chl+Brt	48.13		27.59	8.37		3.57	0.73		4.94			3.8	2.87								100
J47	5445.94	35	23	Chl+Brt	22.29		18.55	21.91		3.28	2.24					18.94	12.78								100
J47	5445.94	51	2	Chl+Brt	30.26	1	26.65	32.03		4.86						3.44	1.76								100
J47	5445.94	59	10	Chl+Brt	27.55		25.27	31.19		4.57	3.01			2.34		3.66	2.42								100
J47	5445.94	51	6	Chl+Cal	37.29		10.62	15	0.78	7.69	23.14	5.48													100
J47	5445.94	61	8	Chl+Cal	30.51		26.4	26.32		7.46	9.3														100
J47	5445.94	71	2	Chl+Cal	26.99		22.01	29.85		4.59	16.56														100
J47	5445.94	28	2	Chl+others	27.67		24.41	34.56		4.76	4.87					2.24	1.49								100
J47	5445.94	28	3	Chl+others	27.15		22.95	30.83		4.08						8.87	6.12								100
J47	5445.94	28	14	Chl+others	16		14.04	54.98	0.82	9.38	4.79														100
J47	5445.94	35	28	Chl+Pyr	21.26	19.77	19.81	25.73		3.73							7.37				2.32				100
J47	5445.94	28	17	Chl+Qz	51.48		18.75	22.49		6.46	0.82														100
J47	5445.94	35	29	Chl+TiO2	24.78	16.58	22.9	28.02		4.68	0.64						2.39								100
J47	5445.94	35	30	Chl+TiO2	29.31	5.24	25.85	32.09		5.06							2.46								100
J47	5445.94	3	6	Fe-Cal	1.36			3.18			51.46														56.00
J47	5445.94	5	4	Fe-Cal	1.94			3.77		0.88	49.40														56.00
J47	5445.94	6	3	Fe-Cal	1.07			3.65		0.81	50.47														56.00
J47	5445.94	6	7	Fe-Cal				3.56		0.86	51.59														55.99
J47	5445.94	6	11	Fe-Cal	2.55		1.59	1.24		1.91	48.41		0.30												56.00
J47	5445.94	6	12	Fe-Cal	3.36		1.83	2.46		1.48	46.43		0.44												56.01
J47	5445.94	6	14	Fe-Cal				3.68		0.72	51.59														56.00
J47	5445.94	8	4	Fe-Cal	1.44		1.00	3.30		0.83	49.43														55.99
J47	5445.94	8	5	Fe-Cal				3.80		0.91	51.28														56.01
J47	5445.94	8	12	Fe-Cal				3.63		0.83	51.54														55.99
J47	5445.94	8	13	Fe-Cal	1.22		0.95	3.04		0.84	49.96														56.00
J47	5445.94	14	5	Fe-Cal	1.24			3.01		1.01	50.74														56.00
J47	5445.94	14	11	Fe-Cal				3.67	0.76	1.21	50.35														56.01
J47	5445.94	14	15	Fe-Cal				3.35		0.90	51.74														56.01
J47	5445.94	16	2	Fe-Cal				3.41		0.88	51.71														55.99
J47	5445.94	16	12	Fe-Cal				3.87		1.06	51.07														55.99
J47	5445.94	16	19	Fe-Cal				2.84		0.89	52.27														56.00
J47	5445.94	16	21	Fe-Cal				4.15		1.13	50.72														56.00
J47	5445.94	19	6	Fe-Cal				3.52		0.73	51.74														56.00
J47	5445.94	19	10	Fe-Cal	3.25		1.41	2.00		0.90	48.45														56.00
J47	5445.94	19	14	Fe-Cal				3.51		1.08	51.42														56.00
J47	5445.94	28	9	Fe-Cal	1.22			3.24	0.74	0.99	49.82														56.01
J47	5445.94	28	13	Fe-Cal	0.83			3.43		0.93	50.81														55.99

Table D-1: Scanning Electron Microscope chemical analyses of sample 5445.94 from the Louisbourg J-47 well.

Well	Depth	Site	No	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SrO	BaO	SO_3	WO_3	CoO	B_2O_3	Ce_2O_3	N_2O_5	ZrO_2	ZnO	Total
J47	5445.94	28	15	Fe-Cal	3.68		1.22	3.33	0.57	0.92	46.02		0.27												56.00
J47	5445.94	51	8	Fe-Cal				3.28		0.74	51.98														56.00
J47	5445.94	51	16	Fe-Cal				3.42		1.15	51.43														55.99
J47	5445.94	59	4	Fe-Cal	1.69		0.73	2.50		0.66	49.46			0.96											56.00
J47	5445.94	61	10	Fe-Cal	2.17		0.88	3.09		0.86	48.99														56.00
J47	5445.94	68	16	Fe-Cal	1.11			3.29		0.87	50.73														55.99
J47	5445.94	68	18	Fe-Cal				3.18		0.82	52.00														56.00
J47	5445.94	68	20	Fe-Cal				3.06		0.76	52.18														56.00
J47	5445.94	71	6	Fe-Cal				3.71		0.95	51.34														56.00
J47	5445.94	71	11	Fe-Cal				3.48		1.08	51.44														56.00
J47	5445.94	74	13	Fe-Cal				2.57		0.70	52.73														56.00
J47	5445.94	74	14	Fe-Cal				2.55	0.76		52.69														56.00
J47	5445.94	68	8	Fe-Cal+Brt				8.4		4.16	65.92					13.55	7.97								100
J47	5445.94	39	2	Fe-Cal+Chl	5.73		2.92	5.4		1.46	84.5														100
J47	5445.94	74	2	Fe-Cal+Chl	10.41		3.14	22.86	1.35	14.53	45.73	1.99													100
J47	5445.94	35	2	Fe-Cal+Qz	10.03		5.23	2.83		2.41	78.72		0.77												100
J47	5445.94	71	13	Fe-Cal+TiO2		10.52		6.48		1.99	81.01														100
J47	5445.94	28	16	Kln	39.28		32.71	7.84		3.99	0.65	1.51													86.00
J47	5445.94	74	6	Kln	40.01		27.08	2.79		0.91	4.54		7.40	3.26											85.99
J47	5445.94	16	7	Mix	41.82		24.54	14.51		3.96			3.01			8.46	3.7								100
J47	5445.94	16	11	Mix	44.62		19.54	5.15		1.7			3.77			16.36	8.87								100
J47	5445.94	19	4	Mix	18.88			24.79	0.93	13.47	41.93														100
J47	5445.94	28	18	Mix	60.16	31.53	4.62	0.88		0.91	1.06		0.84												100
J47	5445.94	35	14	Mix	12.88	56.16	7.28	10.53		1.37	0.61	0.87					10.31								100
J47	5445.94	51	17	Mix	11.2		1.27	24.5	1.18	15.68	46.16														100
J47	5445.94	74	3	Mix	33.14		7.2	40.58	0.78	5.86	9.21		0.82	2.41											100
J47	5445.94	3	10	Ms	46.80		34.02	1.06		0.51		0.61	10.00												92.99
J47	5445.94	3	3	Py	2.11			27.96			0.23	0.5					69.21								100
J47	5445.94	8	2	Py				27.89			0.25						71.86								100
J47	5445.94	51	12	Py				27.61									72.39								100
J47	5445.94	68	15	Py	0.36			26.68			1.41						71.55								100
J47	5445.94	3	4	Qz	100																				100
J47	5445.94	3	5	Qz	100																				100
J47	5445.94	3	11	Qz	100																				100
J47	5445.94	3	12	Qz	100																				100
J47	5445.94	3	14	Qz	100																				100
J47	5445.94	5	5	Qz	100																				100
J47	5445.94	5	6	Qz	100																				100
J47	5445.94	5	7	Qz	100																				100
J47	5445.94	5	8	Qz	100																				100
J47	5445.94	5	9	Qz	100																				100
J47	5445.94	6	4	Qz	100																				100
J47	5445.94	6	5	Qz	100																				100
J47	5445.94	6	6	Qz	100																				100
J47	5445.94	6	10	Qz	100																				100
J47	5445.94	6	13	Qz	100																				100
J47	5445.94	8	3	Qz	100																				100
J47	5445.94	8	6	Qz	100																				100
J47	5445.94	8	7	Qz	100																				100

Table D-1: Scanning Electron Microscope chemical analyses of sample 5445.94 from the Louisbourg J-47 well.

Well	Depth	Site	No	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SrO	BaO	SO_3	WO_3	CoO	B_2O_3	Ce_2O_3	N_2O_5	ZrO_2	ZnO	Total
J47	5445.94	8	8	Qz	100																				100
J47	5445.94	8	11	Qz	81.92	0.53	8.69	0.73		0.59	5.42		2.11												100
J47	5445.94	14	8	Qz	100																				100
J47	5445.94	14	9	Qz	100																				100
J47	5445.94	14	10	Qz	100																				100
J47	5445.94	14	12	Qz	100																				100
J47	5445.94	14	14	Qz	100																				100
J47	5445.94	14	16	Qz	100																				100
J47	5445.94	14	17	Qz	90.62	0.63	6.18	0.95					1.61												100
J47	5445.94	14	19	Qz	99.25		0.75																		100
J47	5445.94	14	21	Qz	100																				100
J47	5445.94	16	1	Qz	100																				100
J47	5445.94	16	4	Qz	99.11						0.89														100
J47	5445.94	16	9	Qz	96.18											2.12	1.7								100
J47	5445.94	16	15	Qz	100																				100
J47	5445.94	16	17	Qz	95.65		1.82	1.26			1.27														100
J47	5445.94	16	18	Qz	100																				100
J47	5445.94	16	20	Qz	100																				100
J47	5445.94	16	22	Qz	100																				100
J47	5445.94	16	23	Qz	99.48		0.52																		100
J47	5445.94	16	26	Qz	99.2											0.8									100
J47	5445.94	19	5	Qz	100																				100
J47	5445.94	19	7	Qz	86.72		1.49	1.94		1.08	8.78														100
J47	5445.94	19	8	Qz	100																				100
J47	5445.94	19	9	Qz	91.52			1.46			0.74						6.28								100
J47	5445.94	19	12	Qz	100																				100
J47	5445.94	19	15	Qz	100																				100
J47	5445.94	19	16	Qz	100																				100
J47	5445.94	19	18	Qz	99.64						0.36														100
J47	5445.94	19	22	Qz	100																				100
J47	5445.94	19	23	Qz	100																				100
J47	5445.94	28	4	Qz	94.42		1.88	2.44			1.26														100
J47	5445.94	28	6	Qz	100																				100
J47	5445.94	28	8	Qz	100																				100
J47	5445.94	28	10	Qz	100																				100
J47	5445.94	28	11	Qz	100																				100
J47	5445.94	35	3	Qz	100																				100
J47	5445.94	35	12	Qz	100																				100
J47	5445.94	35	26	Qz	100																				100
J47	5445.94	39	4	Qz	100																				100
J47	5445.94	39	5	Qz	100																				100
J47	5445.94	39	9	Qz	85.7		11.34	0.62			0.82		1.52												100
J47	5445.94	39	10	Qz	100																				100
J47	5445.94	51	3	Qz	97.68		0.72	0.9									0.7								100
J47	5445.94	51	9	Qz	100																				100
J47	5445.94	51	10	Qz	100																				100
J47	5445.94	51	13	Qz	100																				100
J47	5445.94	51	15	Qz	100																				100
J47	5445.94	51	18	Qz	100																				100

Table D-1: Scanning Electron Microscope chemical analyses of sample 5445.94 from the Louisbourg J-47 well.

Well	Depth	Site	No	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SrO	BaO	SO_3	WO_3	CoO	B_2O_3	Ce_2O_3	N_2O_5	ZrO_2	ZnO	Total
J47	5445.94	59	5	Qz	100																				100
J47	5445.94	59	6	Qz	99.42		0.58																		100
J47	5445.94	59	7	Qz	100																				100
J47	5445.94	61	2	Qz	100																				100
J47	5445.94	68	2	Qz	100																				100
J47	5445.94	68	3	Qz	100																				100
J47	5445.94	68	10	Qz	100																				100
J47	5445.94	68	14	Qz	99.44						0.56														100
J47	5445.94	68	17	Qz	100																				100
J47	5445.94	68	21	Qz	100																				100
J47	5445.94	71	7	Qz	97.13		1.84	0.51					0.52												100
J47	5445.94	71	9	Qz	100																				100
J47	5445.94	71	10	Qz	100																				100
J47	5445.94	71	12	Qz	100																				100
J47	5445.94	71	14	Qz	100																				100
J47	5445.94	71	16	Qz	82.49		8.51			1.36	1.43		3.6				2.6								100
J47	5445.94	74	5	Qz	97.83											1.23	0.94								100
J47	5445.94	74	16	Qz	100																				100
J47	5445.94	68	11	Qz+Cal	71.98		0.67	1.58			25.78														100
J47	5445.94	71	15	Qz+Chl	79.55		9.97	5.27		3.03			2.19												100
J47	5445.94	5	2	Qz+others	86		5.64	0.62					1.47			3.4	2.87								100
J47	5445.94	5	3	Qz+others	90.3		7.86						1.84												100
J47	5445.94	6	15	Rt	4.55	94.22	1.23																		100
J47	5445.94	16	3	Rt		96.16	1.68				0.76			1.4											100
J47	5445.94	19	19	Rt		98.99					1.01														100
J47	5445.94	35	5	Rt		99.02					0.98														100
J47	5445.94	35	17	Rt	18.38	63	9.92	4.45		1.51	1		1.74												100
J47	5445.94	35	27	Rt	1.26	95.2		0.71		0.77	1.21	0.86													100
J47	5445.94	35	31	Rt	1.12	97.63					1.25														100
J47	5445.94	39	6	Rt	1.14	93.45		2.81			2.6														100
J47	5445.94	19	20	Sd				43.66	1.51	9.68	1.16														56.00
J47	5445.94	68	19	Sp				1.24									52							46.76	100
J47	5445.94	61	6	Zr	31.62																		68.38		100
J47	5445.94	61	7	Zr	31.19																		68.81		100
J47	5445.94	71	8	Zr	31.91																		68.09		100

Notes: 1. Diagenetic barite is only found and it is very abundant in some sites.
2. Sphalerite is very rare.
3. Barite fills primary or secondary porosity. In places it appears to replace diagenetic carbonates, mostly Fe-calcite with only very small amount of ankerite.
4. Carbonates often show embayed contacts with quartz. On the contrary, barites may have either embayed or euhedral contacts with the detrital quartz.

Table D-2: Electron Microprobe analyses of sample 5445.94 from the Louisbourg J-47 well.

Well	Depth	Site	No.	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SrO	BaO	SO_3	WO_3	CoO	Ce_2O_3	ZrO_2	B_2O_3	Total
J47	5445.94	68	18	+Ker	0.96	0.02		0.10			0.11	59.57	0.11	0.04			0.02			0.01		31.07	91.98
J47	5445.94	soi35 P3	155	Ab	67.54	0.07	20.35	2.12		0.30	0.32	11.49	0.15				0.00	0.02	0.01	0.02			102.38
J47	5445.94	68	11	Ab	70.65		19.99	0.01			0.01	12.08	0.04	0.05			0.04			0.04			102.90
J47	5445.94	68	24	Ab	71.13		20.06	0.01			0.04	12.14	0.02	0.03		0.13				0.01			103.57
J47	5445.94	74-2	18	Ab	73.33	0.02	20.18	0.05			0.03	12.05	0.02	0.03		0.08	0.02			0.02			105.83
J47	5445.94	74-2	24	Ab	73.51	0.01	20.19	0.07			0.05	11.63	0.03	0.04			0.02			0.03			105.56
J47	5445.94	74-3	41	Ab	73.11		20.34	0.02			0.02	11.71	0.00			0.04						3.01	108.24
J47	5445.94	soi3 P8	109	Ab+Qz	84.49		10.17	0.12		0.01	0.24	6.67	0.02			0.04	0.01	0.03	0.00	0.06	0.02		101.88
J47	5445.94	74-3	47	Alt Kfs	49.87	1.15	35.68	1.33		0.95	0.09	0.31	5.07	0.08			0.05						94.58
J47	5445.94	soi19 P2	145	Ank	1.77		0.04	16.12	0.81	7.87	29.33	0.01	0.02	0.02	0.03	0.36	0.08		0.00	0.06			56.51
J47	5445.94	51	9	Ank	0.11		0.02	17.04		9.62	28.24		0.02		0.03		0.12						55.19
J47	5445.94	68	2	Ank	4.02		0.03	16.21		9.28	27.24	0.02	0.02	0.03	0.05		0.37			0.02			57.28
J47	5445.94	68	25	Ank	0.10	0.01	0.05	16.92		9.13	28.63		0.03	0.04		0.31	0.07			0.07			55.36
J47	5445.94	74-4	56	Ap	1.30	0.00	0.01	0.06		0.08	56.15	0.11	0.01	38.50			0.33			0.13			96.67
J47	5445.94	soi3 P1	102	Brt	0.11	0.62	0.20	0.15	0.04	0.03	0.28	0.20	0.05	0.02	3.37	61.02	33.93	0.13		0.07			100.20
J47	5445.94	soi3 P4	105	Brt	0.72	0.33	0.15	0.06	0.02		0.28	0.17	0.07		2.11	63.12	34.07			0.18			101.26
J47	5445.94	soi5 P1	110	Brt	0.04	0.16	0.04	0.06	0.01	0.03	0.15	0.26	0.04		1.78	64.39	34.39			0.19			101.56
J47	5445.94	soi5 P4	113	Brt	0.19	0.15	0.20	0.07	0.04		0.24	0.21	0.05	0.01	2.61	63.37	33.75		0.02	0.01			100.91
J47	5445.94	soi5 P5	114	Brt		0.53	0.03	0.11	0.01		0.61	0.22	0.05		4.48	60.39	35.21			0.35			101.99
J47	5445.94	soi6 P1	120	Brt	0.28	0.40	0.34	0.39		0.03	0.06	0.15	0.04	0.05	2.99	62.09	34.33	0.13	0.01				101.30
J47	5445.94	soi8 P1	126	Brt		0.51	0.29	0.50		0.07	0.44	0.21	0.05	0.04	9.88	53.01	35.50	0.03		0.05			100.58
J47	5445.94	soi16 P3	136	Brt	4.23	0.46	1.55	1.42	0.03	0.38	0.20	0.25	0.07	0.14	1.30	58.26	32.36	0.08		0.16			100.89
J47	5445.94	soi16 P5	138	Brt	0.10	0.39	0.08	0.18	0.01		0.07	0.23	0.05		1.59	64.42	34.37	0.04	0.01	0.37	0.02		101.92
J47	5445.94	soi16 P7	140	Brt	1.40	0.62	1.31	0.66		0.12	0.38	0.22	0.11	0.01	5.74	56.68	33.99		0.02	0.25			101.49
J47	5445.94	soi19 P1	144	Brt		0.48	0.05		0.06		0.03	0.19	0.06	0.02	1.92	64.61	34.21			0.16	0.01		101.79
J47	5445.94	soi28 P1	150	Brt	1.19	0.29	0.59	0.17			0.22	0.18	0.08	0.01	2.26	62.38	33.15			0.02			100.54
J47	5445.94	soi35 P2	154	Brt	2.27	0.64	2.25	3.07	0.01	0.41	0.48	0.19	0.15	0.03	6.89	51.07	32.42			0.14	0.03		100.03
J47	5445.94	soi35 P4	156	Brt	2.10	0.36	1.63	0.98	0.04	0.15	0.89	0.21	0.27	0.03	4.96	56.28	33.85			0.13			101.86
J47	5445.94	51	1	Brt	0.91	0.12	1.45	2.89		0.19	0.39	0.18	0.05		10.74	50.69	34.07			0.21			101.87
J47	5445.94	51	2	Brt	1.09	0.24	0.87	1.33		0.11	0.77	0.28	0.09		1.76	61.61	32.03			0.21			100.41
J47	5445.94	51	4	Brt	0.33	0.44	0.33	0.64		0.07	0.06	0.21	0.06	0.03	3.57	60.58	32.80			0.21			99.33
J47	5445.94	51	6	Brt	7.87	0.28	8.55	12.61		1.59	0.27	0.15	0.09	0.02	3.47	39.00	24.31			0.16			98.35
J47	5445.94	59	1	Brt	2.68	0.20	3.62	4.25		0.55	0.34	0.25	0.05	0.01	3.30	54.98	30.32			0.26			100.80
J47	5445.94	59	2	Brt	0.34	0.57	0.34	0.50		0.07	0.13	0.21	0.05	0.01	4.63	60.03	33.28			0.23			100.39
J47	5445.94	59	6	Brt	0.04	0.62	0.12	0.34			0.32	0.23	0.04		5.03	59.89	32.91			0.25			99.80
J47	5445.94	61	1	Brt	3.69	0.02	3.32	5.02		0.52	0.17	0.20	0.05	0.04	3.33	52.31	29.71			0.14			98.52
J47	5445.94	68	5	Brt		0.06	0.03	0.02			0.08	0.26	0.04	0.05	1.93	64.24	33.70			0.25			100.65
J47	5445.94	68	8	Brt		0.13	0.05	0.06			0.13	0.24	0.03		2.36	63.86	32.38						99.24
J47	5445.94	68	9	Brt	0.14	0.00	0.09	0.08			0.13	0.25	0.05	0.05	1.59	64.54	32.11			0.10			99.13
J47	5445.94	68	10	Brt	0.07		0.02	0.01		0.00	0.10	0.26	0.02		1.94	63.10	32.45			0.05			98.02
J47	5445.94	68	13	Brt	0.03		0.07				0.08	0.24	0.01	0.06	2.42	63.28	33.51						99.69
J47	5445.94	68	15	Brt	0.46	0.25	0.30	0.08		0.06	0.12	0.21	0.05	0.03	1.62	57.36	30.69			0.25			91.48
J47	5445.94	68	17	Brt	0.18	0.22	0.09	0.11		0.05	0.24	0.28	0.05	0.07	2.09	63.30	33.35			0.04			100.06
J47	5445.94	68	19	Brt		0.29	0.03				0.04	0.22	0.03		2.30	63.57	33.02			0.24			99.75
J47	5445.94	68	22	Brt	0.01	0.41	0.04				0.02	0.22	0.04		1.93	63.27	33.49			0.13			99.56
J47	5445.94	68	23	Brt		0.31	0.03				0.02	0.24	0.04	0.01	2.45	62.66	32.61			0.08			98.46
J47	5445.94	68	26	Brt		0.43	0.06				0.09	0.25	0.05		1.96	63.40	33.37			0.24			99.86
J47	5445.94	71	1	Brt	1.27	0.17	1.05	0.45		0.12	0.42	0.24	0.14	0.03	8.42	54.48	33.56			0.12			100.46
J47	5445.94	71	2	Brt	2.06	0.17	1.44	0.83		0.22	0.49	0.24	0.21	0.01	8.28	53.37	33.47						100.77
J47	5445.94	71	3	Brt	2.52	0.30	1.64	0.49		0.12	0.24	0.20	0.16		5.48	55.58	32.12			0.10			98.96
J47	5445.94	71	4	Brt	1.24	0.33	0.85	0.17		0.05	0.78	0.26	0.19		3.65	59.79	32.96			0.15			100.42
J47	5445.94	71	6	Brt	0.27	0.28	0.23	0.29		0.02	0.55	0.19	0.08		4.25	59.17	34.20			0.12			99.65
J47	5445.94	71	7	Brt	1.32	0.11	0.22	0.23		0.03	0.37	0.27	0.14	0.03	1.26	61.25	32.36						97.60
J47	5445.94	74-1	1	Brt		0.37	0.02	0.03		0.00	0.13	0.22	0.05	0.02	2.08	62.99	33.42			0.22			99.55
J47	5445.94	74-1	4	Brt		0.32	0.05	0.03			0.04	0.25	0.03	0.04	1.87	63.34	32.84			0.17			98.98
J47	5445.94	74-1	5	Brt	0.15	0.23	0.06			0.01	0.03	0.21	0.05	0.01	1.57	63.76	33.69			0.16			99.93
J47	5445.94	74-1	6	Brt	0.90	0.40	0.50	0.06		0.05	0.06	0.18	0.13		1.86	61.92	32.80			0.22			99.08

Table D-2: Electron Microprobe analyses of sample 5445.94 from the Louisbourg J-47 well.

Well	Depth	Site	No.	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SrO	BaO	SO_3	WO_3	CoO	Ce_2O_3	ZrO_2	B_2O_3	Total
J47	5445.94	74-1	7	Brt	0.03	0.36	0.11	0.05		0.06	0.24	0.24	0.06	0.04	1.86	64.10	33.36			0.22			100.72
J47	5445.94	74-1	14	Brt			0.04	0.02			0.07	0.19	0.04	0.10	1.79	64.40	33.10						99.74
J47	5445.94	74-1	17	Brt			0.05				0.05	0.20	0.06		2.07	63.88	32.79						99.10
J47	5445.94	74-2	19	Brt		0.27	0.06	0.02			0.06	0.27	0.04	0.08	1.95	65.11	33.21						101.08
J47	5445.94	74-2	21	Brt	0.65		0.11	0.04		0.03	0.12	0.26	0.04	0.09	1.91	62.67	32.61			0.05			98.58
J47	5445.94	74-2	23	Brt			0.08	0.07		0.02	0.09	0.22	0.05		1.78	65.51	32.83						100.65
J47	5445.94	74-2	25	Brt	0.07		0.06				0.03	0.23	0.05	0.06	0.80	66.13	32.92						100.35
J47	5445.94	74-2	26	Brt			0.07	0.04		0.01	0.02	0.17	0.04	0.01	1.85	64.61	33.05			0.02			99.89
J47	5445.94	74-2	32	Brt			0.05	0.00		0.00	0.03	0.24	0.03	0.05	0.73	64.97	32.77			0.06			98.93
J47	5445.94	74-3	33	Brt	0.41	0.02	0.14	0.05			0.04	0.26	0.04	0.07	1.82	62.73	33.99						99.56
J47	5445.94	74-3	35	Brt	0.06		0.07	0.01			0.09	0.22	0.04	0.08	0.76	65.14	32.18			0.11			98.76
J47	5445.94	74-3	40	Brt	0.14		0.14				0.08	0.28	0.05	0.11	0.59	65.61	32.94			0.01			99.94
J47	5445.94	74-3	42	Brt			0.08	0.01		0.00	0.06	0.20	0.05	0.01	1.86	64.58	33.26						100.10
J47	5445.94	74-3	43	Brt			0.08	0.04			0.06	0.26	0.04		1.90	64.29	33.03			0.09			99.79
J47	5445.94	74-3	48	Brt	0.39		0.14	0.01			0.11	0.26	0.05	0.02	1.79	63.38	32.10			0.04			98.29
J47	5445.94	74-3	49	Brt	1.35		0.29	0.09		0.10	0.14	0.33	0.09	0.06	1.88	61.58	33.33						99.23
J47	5445.94	74-3	50	Brt	4.05		2.82	1.78		0.53	0.77	0.27	0.23		1.24	58.60	32.29			0.08			102.65
J47	5445.94	74-3	53	Brt	1.16		0.34	0.23		0.19	0.23	0.28	0.06	0.04	1.79	60.19	30.89			0.00			95.41
J47	5445.94	74-4	59	Brt							0.03	0.23	0.04	0.04	2.44	63.92	32.67						99.37
J47	5445.94	74-4	60	Brt			0.01				0.30	0.23	0.06	0.05	1.84	64.47	33.22						100.19
J47	5445.94	74-4	61	Brt	0.02		0.08	0.04			0.03	0.25	0.05		1.58	65.50	32.79						100.32
J47	5445.94	74-4	62	Brt	1.02		0.18	0.05		0.05	0.09	0.34	0.07	0.10	2.45	61.03	33.28			0.04			98.70
J47	5445.94	74-4	63	Brt			0.06	0.03		0.01	0.07	0.26	0.03		1.94	65.15	33.22			0.03			100.80
J47	5445.94	74-4	66	Brt	0.02		0.05	0.20			0.41	0.29	0.05	0.09	0.68	66.18	32.63						100.59
J47	5445.94	74-4	67	Brt	0.43		0.33	0.03			0.03	0.23	0.08	0.04	1.10	64.55	32.25			0.08			99.13
J47	5445.94	74-4	69	Brt	2.60		2.12	0.14		0.12	0.08	0.31	0.18	0.05	3.57	58.40	32.03			0.12			99.71
J47	5445.94	74-4	70	Brt			0.05	0.02			0.02	0.23	0.04		2.34	63.53	33.47						99.70
J47	5445.94	74-4	71	Brt	0.04		0.06				0.03	0.25	0.06	0.06	0.94	66.03	32.53						99.97
J47	5445.94	soi16 P2	135	Brt (lt)	0.71	0.51	0.48	0.88	0.05	0.17	8.40	0.13	0.07	0.09	1.78	54.01	29.39		0.04	0.15			96.83
J47	5445.94	soi16 P4	137	Brt (lt)	57.61	0.35	2.83	2.97	0.03	0.71	0.23	0.38	0.14	0.17	0.07	16.79	9.45	0.08		0.08	0.04		91.91
J47	5445.94	soi39 P2	160	Brt(ht)	3.98	1.38	2.71	1.66	0.01	0.39	1.18	0.77	0.11		8.97	48.86	34.20		0.04	0.26			104.49
J47	5445.94	soi19 P3	146	Brt+Cal		2.50	0.06	0.71	0.14	0.19	22.59	0.06	0.03	0.01	0.54	19.35	20.45	0.09		0.44			67.16
J47	5445.94	71	5	Brt+Chl	3.48	0.26	4.78	6.28		0.60	0.43	0.23	0.14		8.26	44.51	29.61			0.17			98.74
J47	5445.94	soi39 P1	159	3rt+Chl+Q	31.23	0.37	2.29	2.67	0.04	0.46	0.96	0.15	0.18	0.02	6.16	36.50	24.56	0.06	0.05	0.12	0.06		105.87
J47	5445.94	soi6 P5	124	Brt+others	8.03	0.14	3.20	3.69	0.04	0.73	0.35	0.41	0.13	0.22	0.56	16.62	9.95	0.02					44.09
J47	5445.94	soi5 P10	119	Brt+Qz	21.35	0.36	5.74	0.32	0.03	0.33	0.23	0.30	0.96	0.06	1.86	47.27	26.13			0.06	0.03		105.01
J47	5445.94	soi14 P1	130	Brt+Qz	8.13	0.24	0.11	0.12	0.01		0.20	0.15	0.06	0.04	4.80	55.97	33.23	0.01	0.02	0.06	0.03		103.16
J47	5445.94	soi16 P6	139	Brt+Qz	46.81	0.38	0.04	0.08	0.01		0.17	0.13	0.04	0.04	0.55	40.07	20.31			0.12	0.06		108.80
J47	5445.94	51	7	Cal	2.80	0.08	2.06	4.81		0.82	48.49	0.02	0.10	0.02	0.07		0.07			0.06			59.41
J47	5445.94	59	4	Cal	0.61	3.30	0.37	1.59		0.37	51.83	0.01	0.05	0.04	0.03		0.03			0.02			58.24
J47	5445.94	61	3	Cal	0.56	0.01	0.44	1.96		1.08	55.44	0.10	0.07	0.07	0.13		0.14			0.01			60.00
J47	5445.94	74-1	2	Cal	0.11		0.05	1.37		0.33	54.80	0.01	0.02	0.02	0.22		0.07			0.01			57.01
J47	5445.94	74-3	38	Cal+Brt	1.11		0.55	1.32		0.39	42.28	0.09	0.16	0.04	0.48	13.85	5.43			0.01			65.70
J47	5445.94	soi35 P6	158	Cal+Qz	5.56	0.66	3.54	1.56	0.28	1.51	46.54	0.11	0.38	0.09	0.06		0.31						60.61
J47	5445.94	51	5	Chl	25.09	0.21	25.05	33.71		4.51	0.11	0.03	0.10	0.01	0.02	1.44	0.81					0.24	91.33
J47	5445.94	59	3	Chl	28.44	0.06	22.55	29.55		5.04	2.13	0.10	0.11	1.58		0.28	0.11			0.03			89.98
J47	5445.94	74-1	9	Chl	28.33	1.39	21.66	29.16		7.95	0.06	0.09	0.23				0.00			0.02		2.41	91.29
J47	5445.94	74-3	52	Chl	24.52	0.00	24.42	33.91		4.89	0.30	0.03	0.02				0.06			0.01			88.16
J47	5445.94	74-3	55	Chl	24.70	0.00	19.83	28.47		2.69	1.02	0.06	0.04	0.01			0.04			0.03		1.06	77.95
J47	5445.94	74-4	65	Chl	68.78	0.13	19.35	3.75		2.08	0.01	0.06	3.85			0.17	0.03						98.22
J47	5445.94	soi6 P2	121	Chl+Brt	21.04	0.16	21.20	28.50		3.57	0.03	0.09	0.38		0.45	9.82	6.08	0.14	0.06	0.06	0.01		91.60
J47	5445.94	soi8 P2	127	Chl+Brt	21.12	0.22	21.98	31.59		3.95	0.22	0.12	0.07	0.01	0.59	6.52	4.10		0.04				90.51
J47	5445.94	soi8 P3	128	Chl+Brt	26.96	0.14	23.03	29.99	0.01	3.62	0.26	0.17	0.72	0.04	0.36	3.03	1.83	0.02	0.06	0.07	0.04		90.34
J47	5445.94	soi16 P8	141	Chl+Brt	31.92	0.14	22.38	21.00	0.01	3.07	0.12	0.16	2.11	0.01	0.29	6.03	3.30		0.03		0.06		90.61
J47	5445.94	soi28 P3	152	Chl+Brt	24.04	0.03	21.98	30.71	0.00	4.14	0.25	0.09	0.07		0.67	5.73	3.56		0.04	0.03			91.33
J47	5445.94	soi39 P4	162	Chl+Brt	18.98	0.40	18.42	23.91	0.08	3.08	8.24	0.09	0.31	0.03	0.40	8.41	4.91		0.05	0.07	0.02		87.40
J47	5445.94	soi39 P3	161	Chl+Cal	34.58	0.26	6.25	5.42	0.17	1.32	25.22	0.09	0.65	0.07	0.04	1.10	0.89			0.01	0.06		76.10

Table D-2: Electron Microprobe analyses of sample 5445.94 from the Louisbourg J-47 well.

Well	Depth	Site	No.	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SrO	BaO	SO_3	WO_3	CoO	Ce_2O_3	ZrO_2	B_2O_3	Total
J47	5445.94	soi6 P3	122	Chl+Qz	68.14	0.46	11.53	14.52		2.03	0.06	0.03	0.09	0.01	0.09	1.45	0.94	0.01	0.02	0.03			99.40
J47	5445.94	soi6 P4	123	Chl+Qz	79.88	0.68	5.54	7.36	0.00	1.03	0.04	0.04	0.11	0.04		0.49	0.36			0.03	0.13		95.73
J47	5445.94	74-3	36	Fe+Cal	1.02		0.51	3.74		0.84	55.19	0.01	0.04	0.15	0.12		0.03			0.02		0.28	61.93
J47	5445.94	soi3 P3	104	Fe-Cal			0.07	4.96	0.48	0.79	56.58	0.04	0.03	0.13	0.09		0.04	0.05	0.02		0.04		63.29
J47	5445.94	soi3 P6	107	Fe-Cal	1.64	0.60	0.52	2.74	0.35	0.61	52.00	0.03	0.09	0.12	0.04		0.10		0.01				58.85
J47	5445.94	soi3 P7	108	Fe-Cal		0.02	0.01	4.80	0.45	0.83	55.97	0.05	0.02	0.10	0.11	0.05	0.11		0.00		0.03		62.55
J47	5445.94	soi5 P3	112	Fe-Cal	0.59	0.01	0.41	4.52	0.47	0.85	55.20	0.05	0.04	0.13	0.09	0.02	0.04	0.07		0.10	0.00		62.57
J47	5445.94	soi5 P7	116	Fe-Cal			0.00	4.75	0.48	0.79	55.12	0.03	0.01	0.12	0.11	0.03	0.03		0.00	0.02			61.50
J47	5445.94	soi5 P8	117	Fe-Cal			0.01	5.02	0.48	0.75	55.73	0.03	0.02	0.12	0.10		0.08			0.06	0.01		62.40
J47	5445.94	soi8 P4	129	Fe-Cal	2.85	0.32	2.15	3.61	0.31	0.63	48.72	0.02	0.13	0.07	0.03	0.09	0.12				0.04		59.08
J47	5445.94	soi14 P2	131	Fe-Cal	2.71	0.02	0.22	1.40	0.34	0.30	54.96	0.04	0.05	0.03	0.03	0.13	0.16	0.03	0.03	0.05	0.02		60.51
J47	5445.94	soi16 P9	142	Fe-Cal		0.05	0.02	5.08	0.42	0.82	55.80	0.02	0.03	0.13	0.10		0.02	0.03			0.00		62.52
J47	5445.94	soi19 P6	149	Fe-Cal				5.67	0.45	0.85	56.51	0.03	0.03	0.15	0.15		0.02		0.02				63.87
J47	5445.94	soi39 P5	163	Fe-Cal	0.74	0.05	0.38	3.78	0.42	0.75	55.50	0.02	0.11	0.09	0.09		0.09	0.03	0.01	0.02			62.09
J47	5445.94	68	3	Fe-Cal	0.04	0.00	0.01	3.84		0.65	56.22	0.05	0.02	0.13	0.12		0.05						61.13
J47	5445.94	68	7	Fe-Cal	0.05		0.00	4.39		0.73	56.20	0.05	0.02	0.12	0.11		0.04			0.01			61.71
J47	5445.94	68	16	Fe-Cal	0.03			3.43		0.69	56.85		0.02	0.07	0.14		0.04			0.08			61.34
J47	5445.94	68	21	Fe-Cal	0.92	0.01	0.46	3.93		0.82	54.27	0.04	0.03	0.13	0.09		0.04			0.03			60.77
J47	5445.94	71	9	Fe-Cal	1.20		0.41	3.98		0.97	54.28	0.02	0.15	0.10	0.15		0.00			0.02			61.29
J47	5445.94	74-1	16	Fe-Cal	0.27	0.14	0.16	1.75		0.32	55.76	0.01	0.04	0.24	0.06		0.02			0.04			58.82
J47	5445.94	74-2	29	Fe-Cal	4.58		0.04	4.07		0.80	54.21	0.03	0.02	0.10	0.21	0.16	0.26			0.05			64.52
J47	5445.94	74-2	31	Fe-Cal	0.60	0.01	0.16	17.02		9.53	28.65	0.08	0.02	0.03	0.00	0.04	0.01			0.03			56.18
J47	5445.94	74-3	51	Fe-Cal	0.68		0.34	2.50		1.44	55.78	0.05	0.08	0.10	0.14		0.35			0.07			61.52
J47	5445.94	61	2	hole	7.52		0.02	0.01		0.01	0.02	0.01	0.01		0.13	0.17							7.89
J47	5445.94	74-1	11	hole	22.94	0.14	1.89	1.20		1.20	4.17	0.60	0.64	0.32		0.32	1.00			0.00			34.43
J47	5445.94	74-3	44	hole	28.37	0.14	1.70	0.35		0.06	1.05	0.03	0.02	3.52			0.12			0.12			35.49
J47	5445.94	74-4	58	hole	12.45	0.05	1.35	0.55		0.34	0.69	0.57	0.16	0.44		0.12	0.52			0.02			17.26
J47	5445.94	74-3	46	Kln	49.13	0.03	38.73	0.20		0.07	0.03	0.02	0.29	0.01			0.01					0.39	88.91
J47	5445.94	74-3	54	Mix	11.14	0.00	11.79	17.27		2.24	1.73	0.19	0.05	1.19	1.58	33.00	18.61						98.79
J47	5445.94	soi14 P3	132	Ms	50.00	0.29	27.96	3.15	0.02	2.34	0.00	0.12	5.51			1.70	1.30		0.02	0.06	0.00		92.47
J47	5445.94	51	3	Py			0.02	62.38		0.03	0.14	0.07	0.02				116.89			0.01			179.57
J47	5445.94	51	10	Py	3.07		1.99	57.34		0.19	1.35	1.23	0.13	0.01	0.05		105.38			0.03			170.74
J47	5445.94	51	8	Qtz	100.29	0.00		0.08			0.02	0.00	0.00							0.02		3.25	103.66
J47	5445.94	soi3 P2	103	Qz	97.83	0.04	0.24	0.09	0.00	0.00	0.13	0.02	0.05				0.02	0.08	0.02	0.05			98.56
J47	5445.94	soi3 P5	106	Qz	85.94	0.56	3.44	1.50	0.04	1.00	2.26	0.11	0.52	0.04			0.05	0.03	0.01		0.07		95.55
J47	5445.94	soi5 P6	115	Qz	95.90			0.04	0.00	0.00	0.16	0.01	0.02	0.01		0.06	0.03	0.06	0.03	0.02	0.09		96.43
J47	5445.94	soi5 P9	118	Qz	98.03			0.08			0.07		0.02	0.08		0.07	0.04		0.00		0.02		98.41
J47	5445.94	soi16 P1	134	Qz	96.92		0.23	0.13		0.02	0.02	0.00	0.06			0.07	0.02	0.03	0.01		0.00		97.51
J47	5445.94	soi16 P10	143	Qz	98.73			0.06	0.01		0.06		0.01			0.00	0.03	0.01		0.01	0.06		98.98
J47	5445.94	soi19 P4	147	Qz	97.40		0.11		0.01	0.01	0.33	0.02	0.04			0.46	0.30		0.01	0.02			98.71
J47	5445.94	soi19 P5	148	Qz	98.81	0.00		0.03			0.05		0.01	0.01		0.11	0.03	0.13	0.01	0.03	0.02		99.25
J47	5445.94	soi28 P2	151	Qz	98.37	0.09	0.48	0.54	0.00	0.11	0.08	0.02	0.04	0.01		0.04		0.01	0.02		0.00		99.80
J47	5445.94	soi35 P5	157	Qz	98.64	0.06	0.28	0.06	0.00		0.06	0.00	0.02						0.00	0.02			99.15
J47	5445.94	59	5	Qz	100.60		0.01	0.08			0.08		0.02							0.02		3.86	104.67
J47	5445.94	61	4	Qz	99.43	0.04	0.01	0.03			0.01	0.00	0.01							0.05			99.58
J47	5445.94	68	4	Qz	100.86	0.01		0.05			0.17	0.00	0.01	0.03		0.04				0.03			101.21
J47	5445.94	68	6	Qz	100.97			0.01			0.01		0.03				0.00			0.05			101.07
J47	5445.94	68	12	Qz	101.49	0.01		0.02			0.02		0.02	0.02			0.01			0.01			101.59
J47	5445.94	68	14	Qz	100.49	0.01	0.03						0.02							0.05		0.56	101.16
J47	5445.94	68	20	Qz	99.31	0.01	0.04	0.04			0.02	0.00	0.03				0.03					2.94	102.42
J47	5445.94	71	8	Qz	100.74		0.01	0.05			0.03	0.02	0.02				0.02						100.88
J47	5445.94	74-1	3	Qz	99.58	0.01		0.01			0.01		0.03				0.00						99.64
J47	5445.94	74-1	10	Qz	99.89	0.02	0.00	0.08			0.02		0.04	0.07			0.02			0.05		4.82	105.00
J47	5445.94	74-1	12	Qz	99.48		0.01	0.02			0.01		0.02	0.05								0.16	99.73
J47	5445.94	74-1	13	Qz	100.86		0.00	0.05		0.01	0.04	0.00	0.02	0.06			0.05						101.10
J47	5445.94	74-1	15	Qz	99.72	0.03	0.01	0.04			0.05		0.03				0.01			0.02			99.92
J47	5445.94	74-2	22	Qz	100.57	0.01	0.00	0.01			0.03		0.01							0.06			100.68

Table D-2: Electron Microprobe analyses of sample 5445.94 from the Louisbourg J-47 well.

Well	Depth	Site	No.	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SrO	BaO	SO_3	WO_3	CoO	Ce_2O_3	ZrO_2	B_2O_3	Total
J47	5445.94	74-2	27	Qz	98.91		0.42	0.02			0.00	0.01	0.03	0.01		0.07	0.06						99.52
J47	5445.94	74-2	28	Qz	100.13			0.03			0.05	0.01	0.02			0.04				0.05		2.95	103.27
J47	5445.94	74-2	30	Qz	100.28	0.01					0.02		0.02				0.00			0.02		3.00	103.36
J47	5445.94	74-3	34	Qz	100.33			0.02					0.02			0.03				0.01		12.76	113.17
J47	5445.94	74-3	37	Qz	98.89	0.10	0.55	0.03		0.02	0.08	0.02	0.09				0.01					3.37	103.15
J47	5445.94	74-3	39	Qz	99.59	0.02	0.01	0.01			0.03	0.02	0.03	0.05		0.02	0.01			0.02			99.81
J47	5445.94	74-4	57	Qz	100.63	0.07		0.03			0.00		0.02				0.03					3.13	103.91
J47	5445.94	74-4	64	Qz	99.67		0.40	0.05			0.00		0.04										100.15
J47	5445.94	74-4	68	Qz	100.36			0.01				0.01	0.03				0.03			0.02		9.36	109.80
J47	5445.94	soi14 P4	133	Qz+Brt	88.92		2.07	0.20		0.33	0.04	0.05	0.66	0.01	0.17	5.92	3.53	0.09	0.01	0.03	0.08		102.11
J47	5445.94	74-3	45	Qz+Cal	23.95	0.06	17.73	7.66		3.65	23.62	0.17	0.40	0.13			0.23			0.03			77.65
J47	5445.94	soi5 P2	111	Qz+Kfs	85.55	0.20	11.34	0.24		0.35	0.11	0.19	2.32			0.36	0.15			0.03	0.04		100.87
J47	5445.94	soi35 P1	153	Rt	0.96	90.42	0.20	0.46	0.01	0.15	2.74	0.38	0.16	1.73			0.02	0.05	0.01		0.14		97.44
J47	5445.94	74-2	20	Rt	0.38	95.32	0.33	2.68		0.01	0.59	0.03	0.03	0.01	0.02								99.38
J47	5445.94	74-1	8	Sd	0.08	0.02	0.04	44.68		6.67	4.30	0.09	0.04	0.01	0.00	0.00	0.01						55.95
J47	5445.94	68	1	Sp			0.03	2.16			0.07	4.66	0.04	0.02			63.92			0.07			70.97

+Ker= Kernite= Evaporitic mineral

Alt Kfs= altered Kfs

Notes: 1. Only diagenetic barite is found.

2. The barite contains exsolution lamellae of chlorite.

Appendix 8: Scanning Electron Microscope Backscattered Electron Images for Mic Mac J-77 2815.22

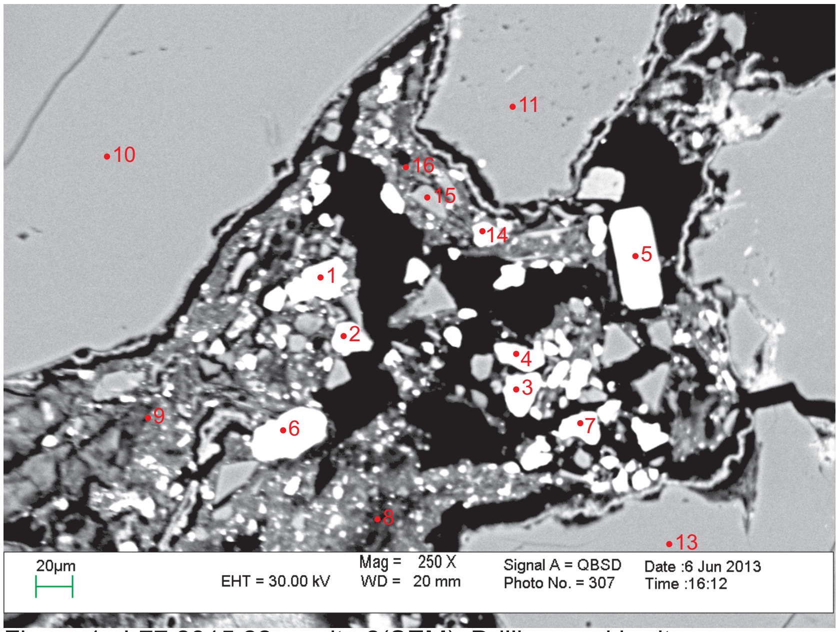


Figure 1: J-77 2815.22 m. site 2(SEM). Drilling mud barite.

1. Barite
2. Barite
3. Barite
4. Barite
5. Rutile
6. Barite
7. Barite
8. Barite + others
9. Barite + others
10. Quartz
11. Quartz
12. Quartz
13. Quartz
14. Barite
15. Quartz
16. Chlorite + others

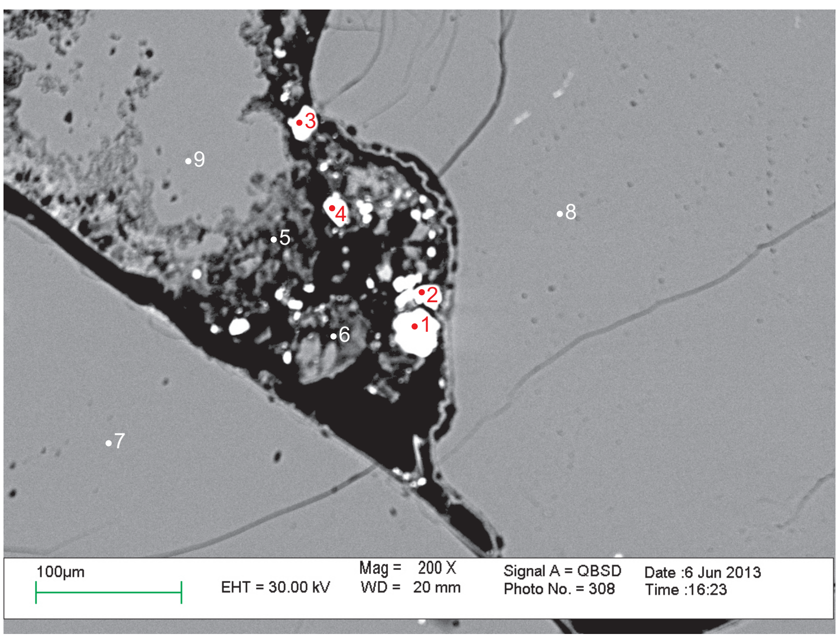
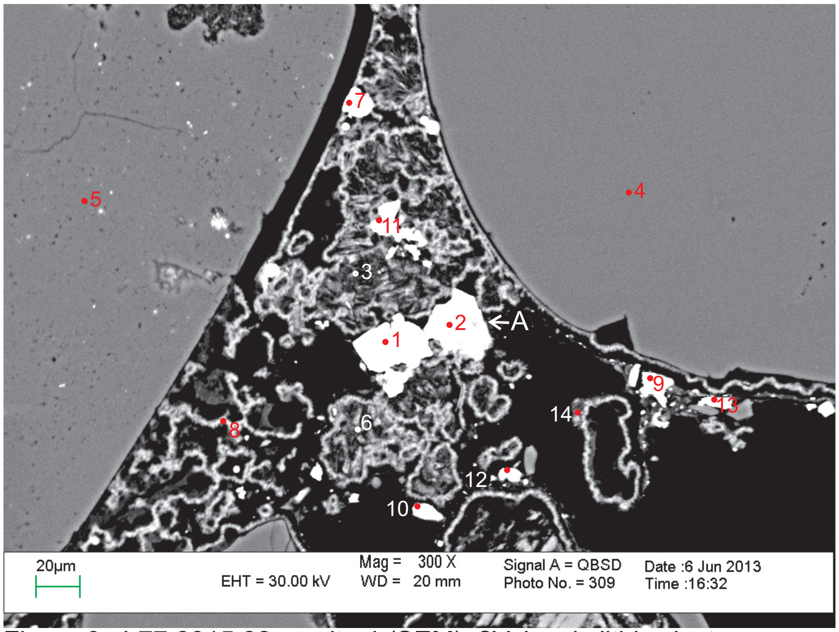


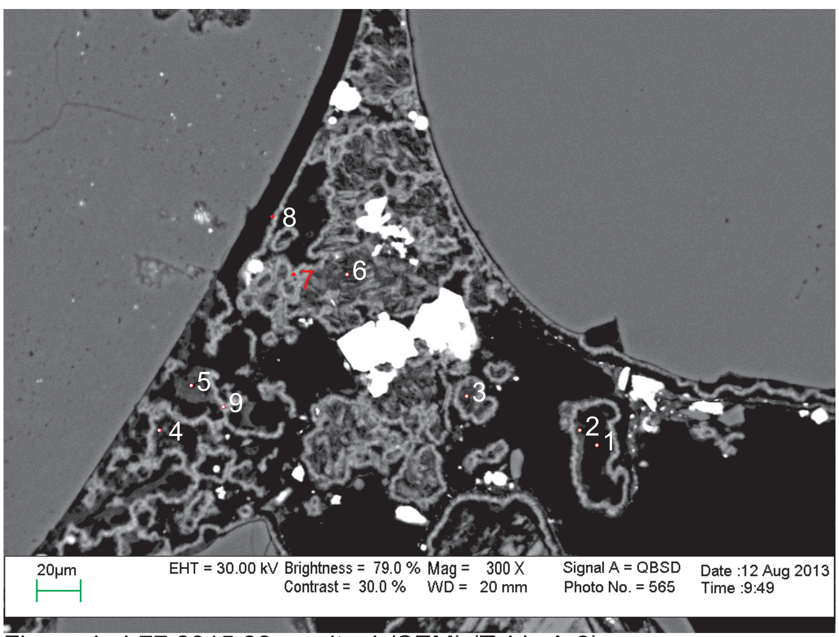
Figure 2: J-77 2815.22 m. site 3 (SEM). Drilling mud barite.

1. Barite
2. Barite
3. Barite
4. Barite
5. Chlorite
6. Quartz
7. Quartz
8. Quartz
9. Quartz



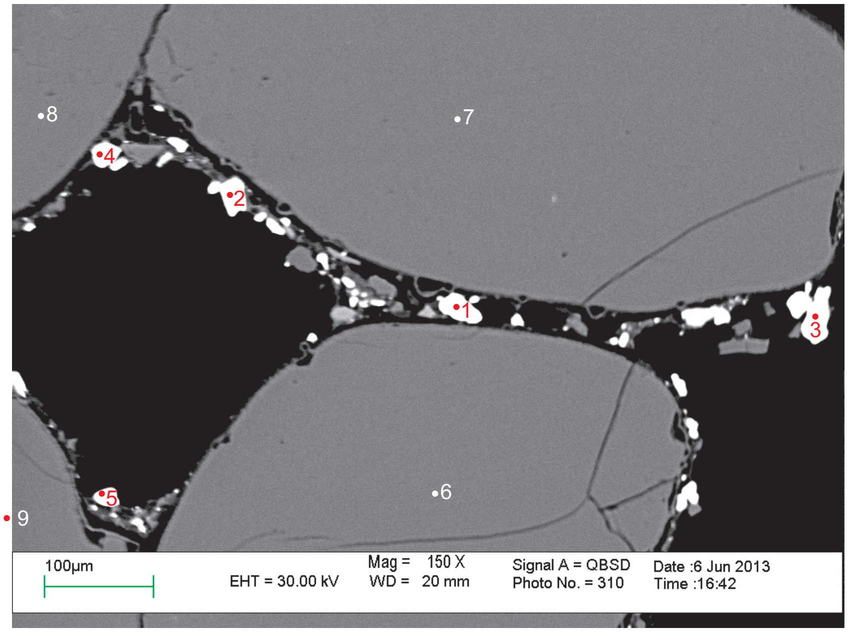
1. Sphalerite
2. Sphalerite
3. Chlorite + other
4. Quartz
5. Quartz
6. Chlorite + other
7. Pyrite
8. Chlorite
9. Barite
10. Barite
11. Sphalerite
12. Barite
13. Barite
14. Chlorite

Figure 3: J-77 2815.22 m. site 4 (SEM). ?Volcanic lithic clast. Sphalerite is not rimmed by chlorite; on the contrary, it seems to invade chlorite rims- therefore, it must have formed after chl. Sphalerite seems to have straight edges (position A) when it grows in pore space.



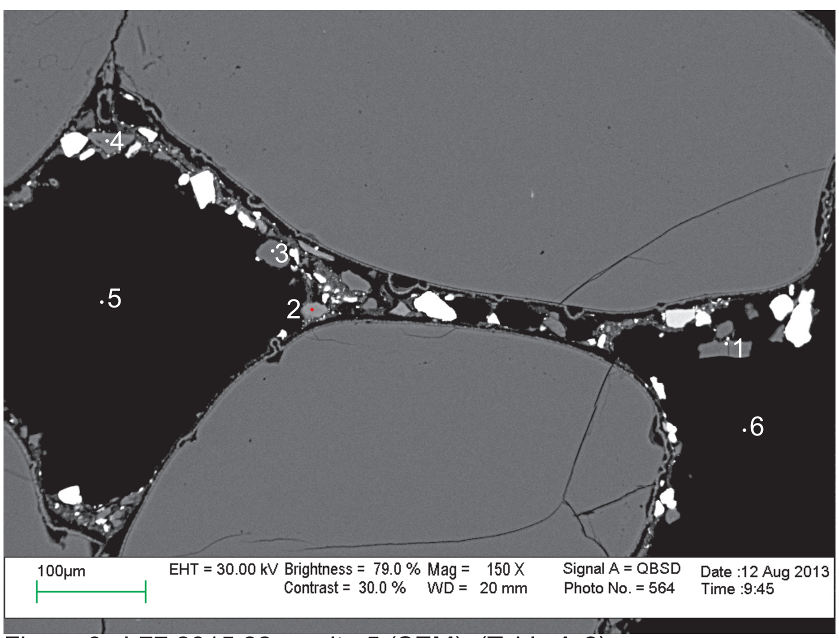
1. Chlorite
2. Chlorite
3. Chlorite
4. Chlorite + Albite? + Pyrite
5. Chlorite
6. Chlorite
7. Chlorite + Pyrite
8. Chlorite
9. Chlorite

Figure 4: J-77 2815.22 m. site 4 (SEM).(Table A-2).



1. Barite
2. Barite
3. Barite
4. Barite
5. Barite
6. Quartz
7. Quartz
8. Quartz
9. Quartz

Figure 5: J-77 2815.22 m. site 5 (SEM). ?Drilling mud barite.



1. Quartz
2. K-feldspar
3. Quartz
4. Quartz
5. Hole
6. Hole

Figure 6: J-77 2815.22 m. site 5 (SEM). (Table A-2).

Table A-1: Scanning Electron Microscope chemical analyses of sample 2815.22 from the Mic Mac J-77 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	Cl	Cr_2O_3	ZnO	SrO	Nb_2O_5	BaO	Total
J-77 2815.22	2	1	Brt										39.6						60.41	100.01
J-77 2815.22	2	2	Brt										39.98						60.03	100.01
J-77 2815.22	2	3	Brt										39.28						60.75	100.03
J-77 2815.22	2	4	Brt										38.95						61.05	100
J-77 2815.22	2	5	Rt	0.6	94.73	1.17	0.95											2.55		100
J-77 2815.22	2	6	Brt										39.55						60.47	100.02
J-77 2815.22	2	7	Brt										38.38						61.64	100.02
J-77 2815.22	2	8	Brt+others	62.46		19.29	5.75	2.97	0.7	1.2	1.57		2.3	0.99	0.64				2.13	100
J-77 2815.22	2	9	Brt+others	73.72		12.92	5.43	2.09		1.46	0.93		1.3	0.56	0.38				1.22	100.01
J-77 2815.22	2	10	Qz	99.99																99.99
J-77 2815.22	2	11	Qz	99.99																99.99
J-77 2815.22	2	12	Qz	99.99																99.99
J-77 2815.22	2	13	Qz	99.99																99.99
J-77 2815.22	2	14	Brt			0.79							38.65						60.56	100
J-77 2815.22	2	15	Qz	99.99																99.99
J-77 2815.22	2	16	Chl+other	51.53		20.26	16.36	8.37			0.39		0.97	0.86					1.25	99.99
J-77 2815.22	3	1	Brt										39						61.01	100.01
J-77 2815.22	3	2	Brt	4.94		1.51							38.5						55.06	100.01
J-77 2815.22	3	3	Brt										39.85						60.15	100
J-77 2815.22	3	4	Brt										39.48				2.46		58.07	100.01
J-77 2815.22	3	5	Chl	54.73		13.34	11.21	4.27			0.31			1.14						85.00
J-77 2815.22	3	6	Qz	87.79		4.7	5	1.81						0.68						99.98
J-77 2815.22	3	7	Qz	99.99																99.99
J-77 2815.22	3	8	Qz	99.99																99.99
J-77 2815.22	3	9	Qz	99.99																99.99
J-77 2815.22	4	1	Sph				2.62						52.81			44.58				100.01
J-77 2815.22	4	2	Sph				2.06						53.29			44.67				100.02
J-77 2815.22	4	3	Chl+other	40.2		24.66	20.89	9	0.87		2.04			2.37						100.03
J-77 2815.22	4	4	Qz	99.99																99.99
J-77 2815.22	4	5	Qz	99.99																99.99
J-77 2815.22	4	6	Chl+other	36.77		23.07	22.96	9.04	1.87		1.66	2.25		2.37						99.99
J-77 2815.22	4	7	Py	0.3			27.17			2.18			70.34							99.99
J-77 2815.22	4	8	Chl	32.64		21.90	19.01	10.22		0.71				0.51						85.00
J-77 2815.22	4	9	Brt				0.42						40.15						59.42	99.99
J-77 2815.22	4	10	Brt	1.22		1.47	0.68						38.35						58.29	100.01
J-77 2815.22	4	11	Sph	0.81		0.83	3.82	0.66					52.91			40.98				100.01
J-77 2815.22	4	12	Brt	3.68		1.98	0.53						37.76						56.06	100.01
J-77 2815.22	4	13	Brt	3.57		1.44							37.76						57.26	100.03

Table A-1: Scanning Electron Microscope chemical analyses of sample 2815.22 from the Mic Mac J-77 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	Cl	Cr_2O_3	ZnO	SrO	Nb_2O_5	BaO	Total
J-77 2815.22	4	14	Chl	33.36		21.99	18.94	9.55			0.28			0.88						85.00
J-77 2815.22	5	1	Brt										39.55						60.47	100.02
J-77 2815.22	5	2	Brt										38.93						61.08	100.01
J-77 2815.22	5	3	Brt										39.08						60.94	100.02
J-77 2815.22	5	4	Brt										39.58						60.43	100.01
J-77 2815.22	5	5	Brt										39.4						60.6	100
J-77 2815.22	5	6	Qz	99.99																99.99
J-77 2815.22	5	7	Qz	99.99																99.99
J-77 2815.22	5	8	Qz	99.69			0.32													100.01
J-77 2815.22	5	9	Qz	99.99																99.99

Notes: 1. Sites 2,3= drilling mud barite

2. Site 4= diagenetic sphalerite and barite

3. Site 5= ?diagenetic barite

Appendix 9A: Scanning Electron Microscope Backscattered Electron Images for Onondaga O-95 3266.71

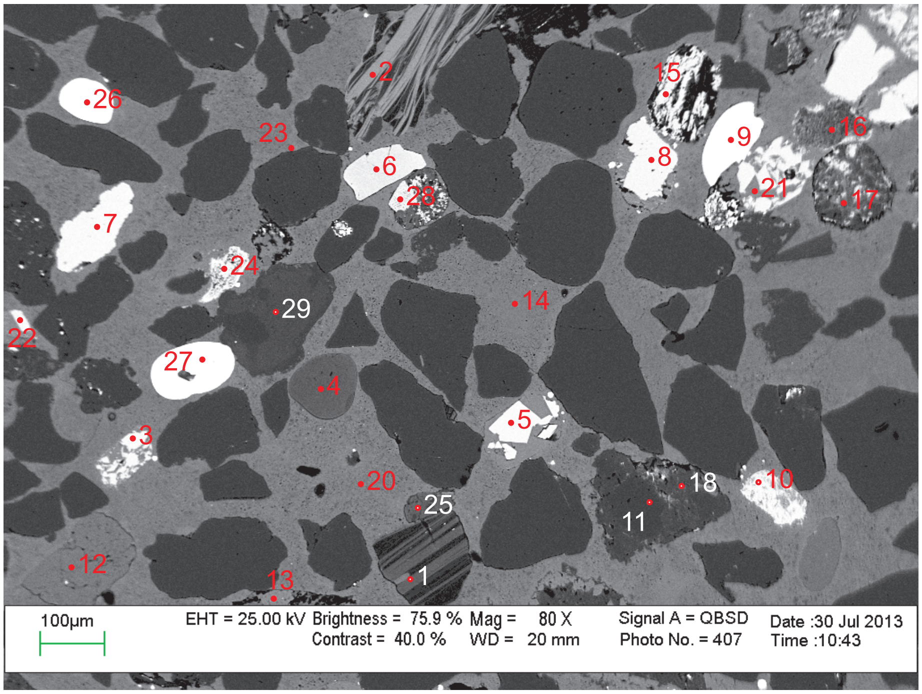


Figure 1: O-95 3266.71 m. site 1 (SEM).

1. Muscovite
2. Chlorite
3. Rutile
4. Tourmaline
5. Rutile
6. Chromite
7. Rutile
8. Rutile
9. Chromite
10. Ilmenite
11. Quartz
12. K-feldspar
13. Ankerite + K-feldspar
14. Mg-Calcite
15. Rutile
16. Ilmenite
17. Albite + Apatite
18. Albite
19. Quartz (out of field of view)
20. Mg-Calcite
21. Fe-Calcite
22. Rutile
23. Fe-Calcite
24. Rutile
25. Muscovite
26. Zircon
27. Zircon
28. TiO_2
29. Albite

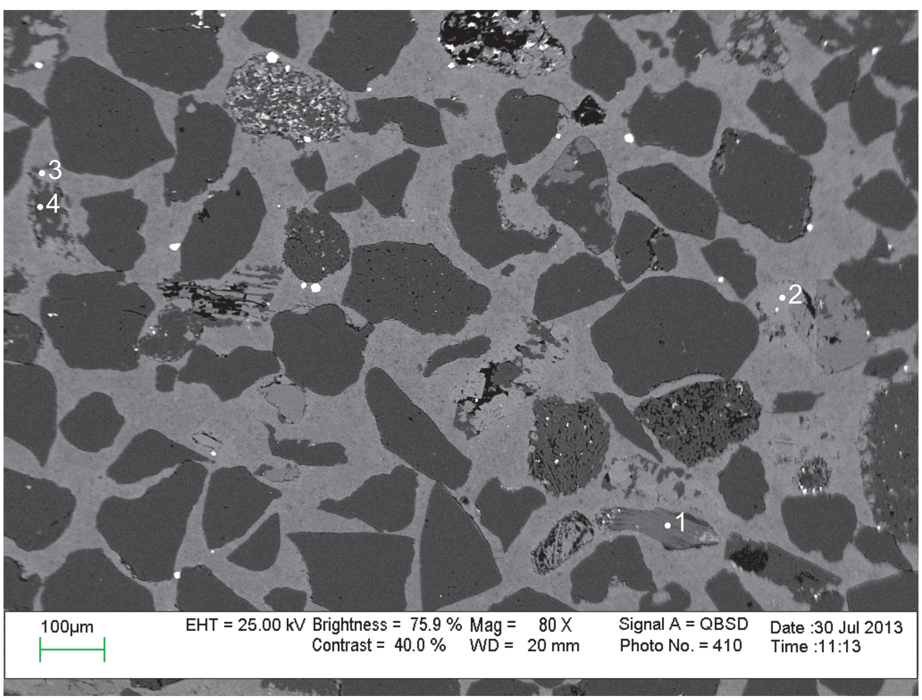


Figure 2: O-95 3266.71 m. site 2 (SEM).

1. Muscovite
2. Ankerite
3. Ankerite + Albite
4. Albite

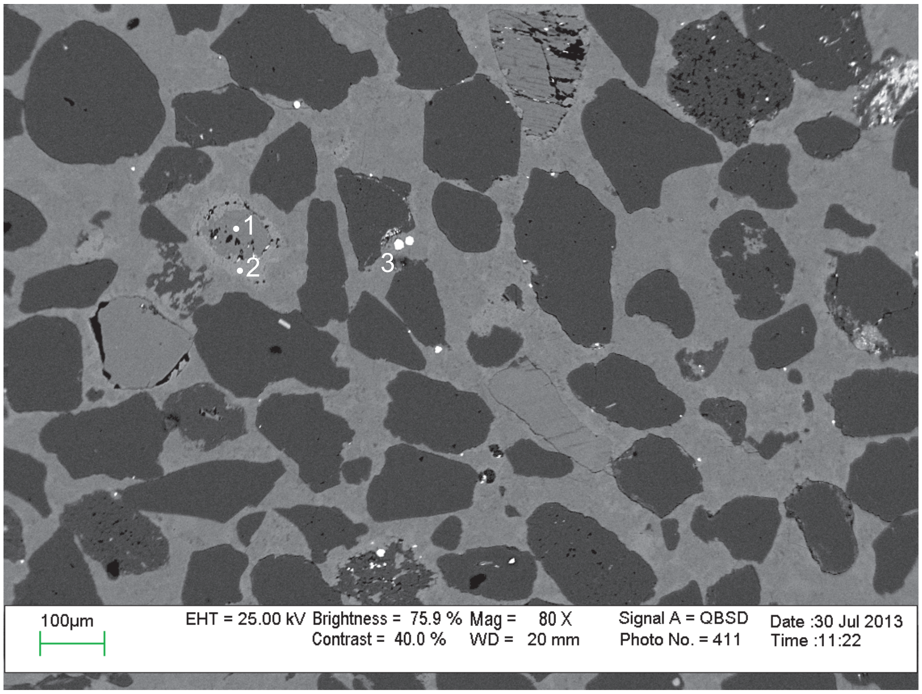


Figure 3: O-95 3266.71 m. site 3 (SEM).

1. K-feldspar
2. Ankerite
3. Pyrite

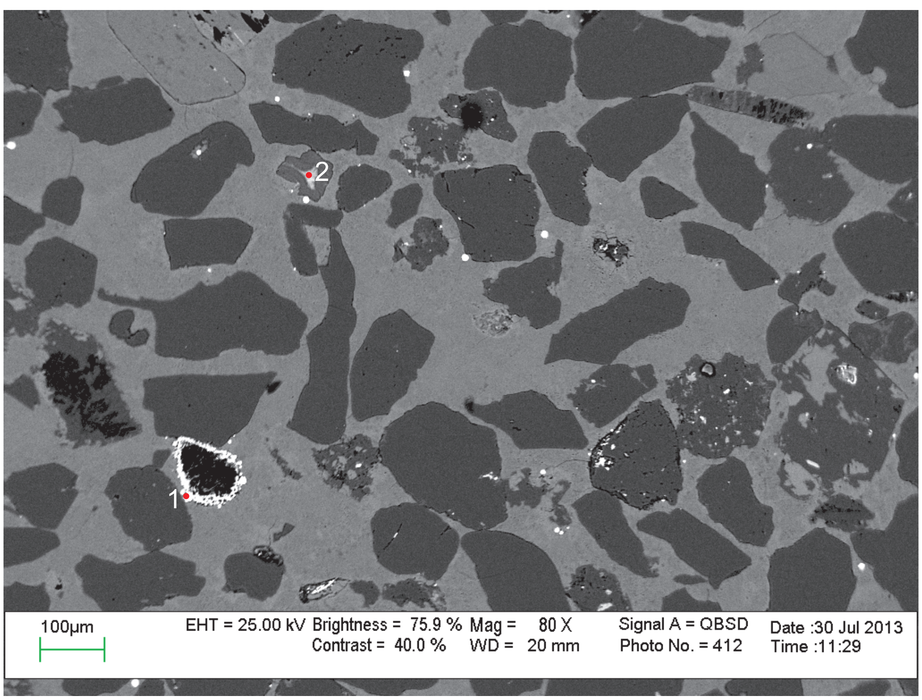


Figure 4: O-95 3266.71 m. site 4 (SEM).

1. Pyrite
2. Chlorite

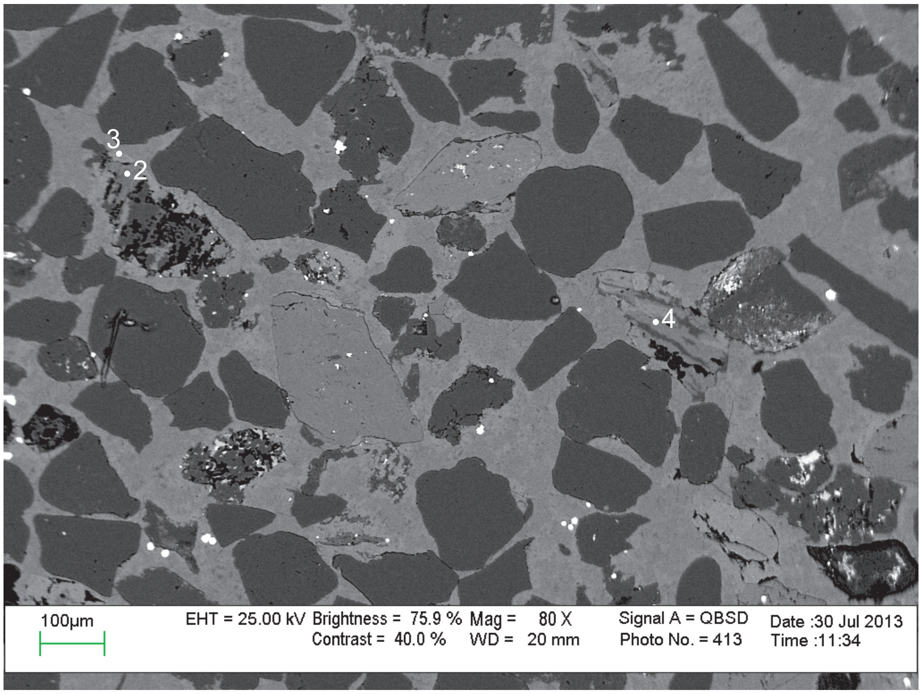


Figure 5: O-95 3266.71 m. site 5 (SEM).

2. K-feldspar + Albite
3. Fe-Calcite
4. K-feldspar

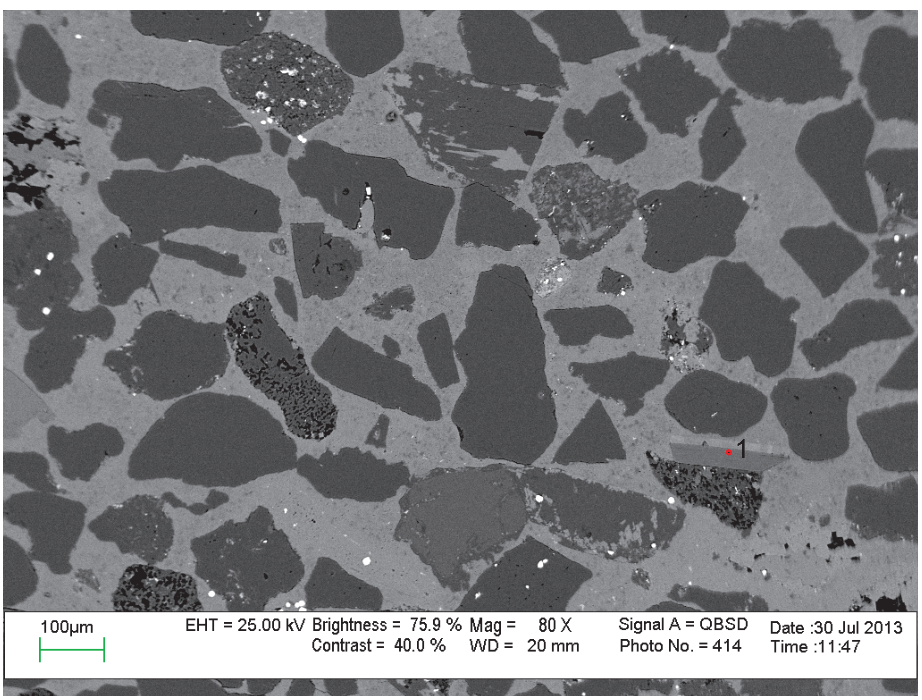


Figure 6: O-95 3266.71 m. site 6 (SEM).

1. K-feldspar + other

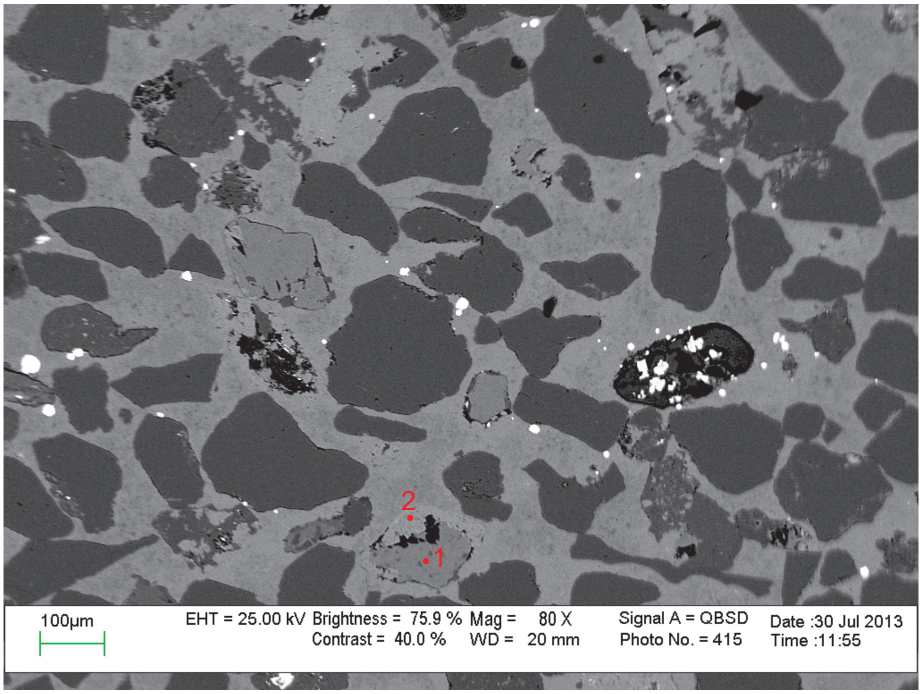


Figure 7: O-95 3266.71 m. site 7 (SEM).

1. K-feldspar
2. Ankerite + K-feldspar

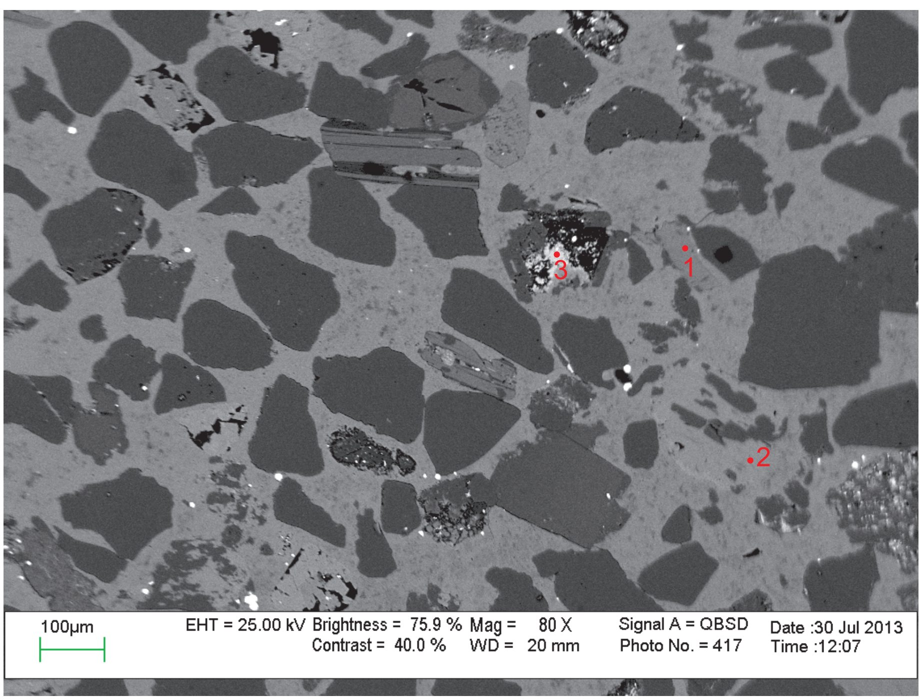


Figure 8: O-95 3266.71 m. site 8 (SEM).

1. K-feldspar
2. Calcite
3. Apatite

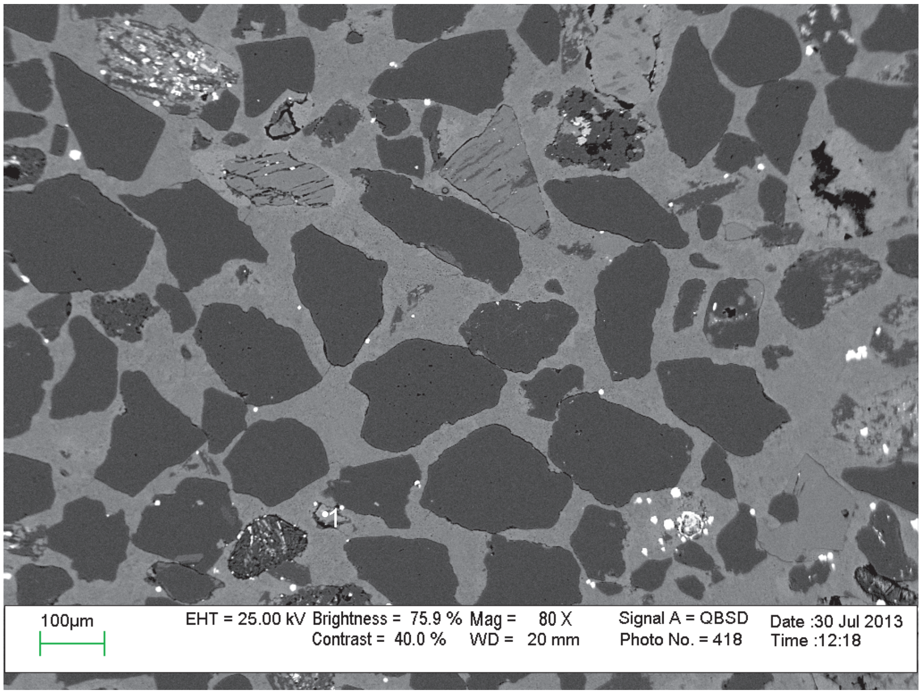


Figure 9: O-95 3266.71 m. site 9 (SEM).

1. Ankerite

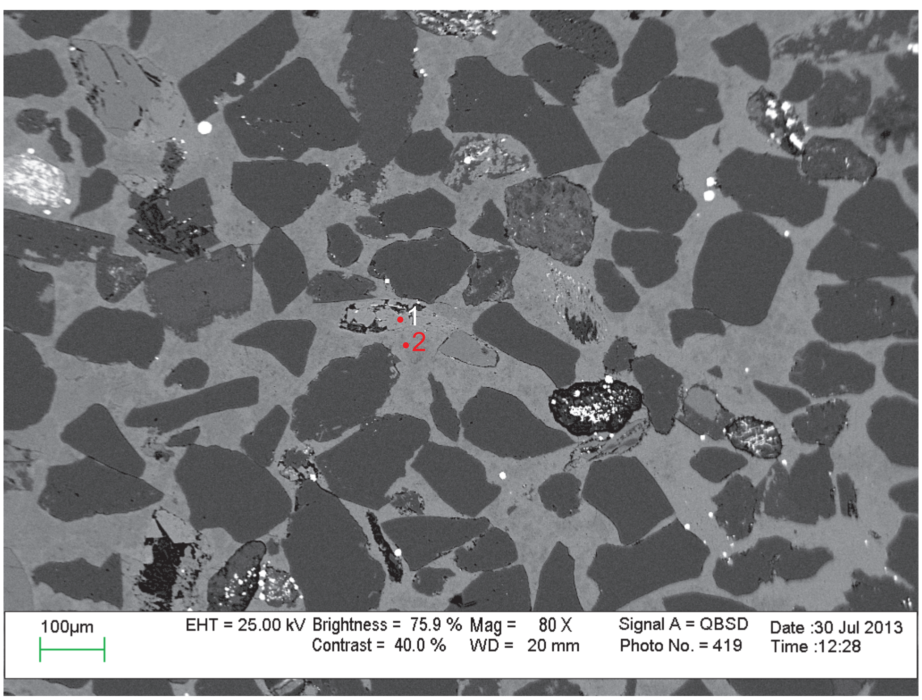


Figure 10: O-95 3266.71 m. site 10 (SEM).

1. Fe-Calcite+ K-feldspar + Pyrite
2. Mg-Calcite

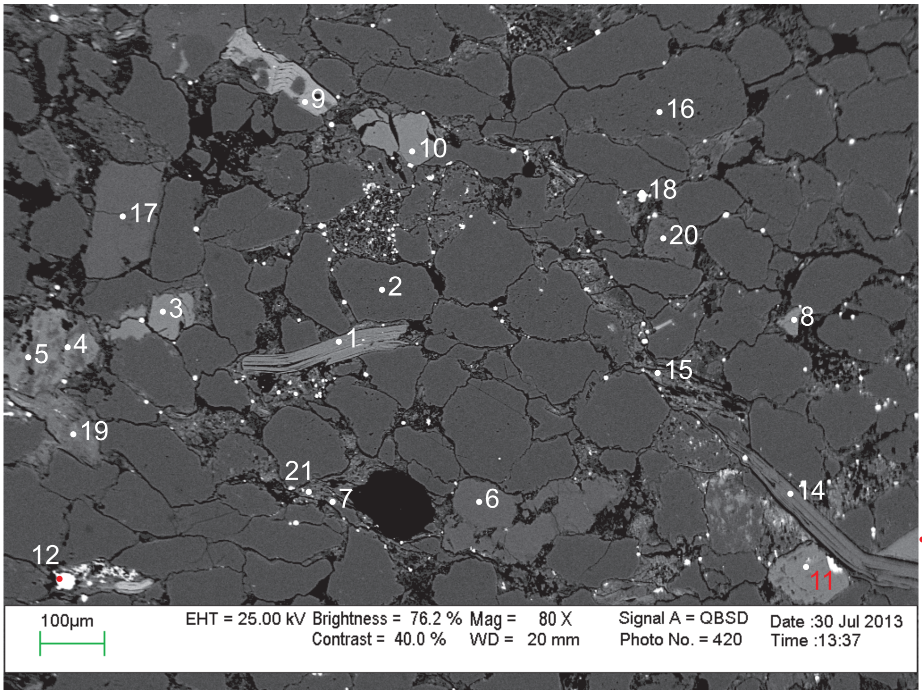
Table A: Scanning Electron Microscope chemical analyses of sample 3266.71 from the Onondaga O-95 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	V_2O_5	Cr_2O_3	ZrO_2	BaO	HfO_2	WO_3	Total	Actual Total
O-95 3266.71	1	1	Ms	45.23	0.59	33.41	0.56		0.32		1.40	8.50											90.00	110.88
O-95 3266.71	1	2	Chl	26.25		23.24	23.39		12.12														85.00	99.82
O-95 3266.71	1	3	Rt	0.39	97.70	0.47	0.59			0.87													100.02	97.4
O-95 3266.71	1	4	Tur	38.25	0.58	31.65	8.11		4.95		2.47												86.00	99.73
O-95 3266.71	1	5	Rt		98.62	0.38	0.64			0.38													100.02	107.11
O-95 3266.71	1	6	Chr			35.54	13.84		11.62								0.27	38.72					99.99	106.08
O-95 3266.71	1	7	Rt		98.50		1.51																100.01	94.44
O-95 3266.71	1	8	Rt		99.77					0.22													99.99	111.06
O-95 3266.71	1	9	Chr			8.81	21.34	0.98	9.39									59.49					100.01	115.16
O-95 3266.71	1	10	Ilm+other	7.14	65.45	5.69	19.44	0.75	0.96	0.56													99.99	104.84
O-95 3266.71	1	11	Qz	99.99																			99.99	128.35
O-95 3266.71	1	12	Kfs	66.17		17.72						15.56								0.57			100.02	106.3
O-95 3266.71	1	13	Ank+Kfs	13.58		5.22	20.71	1.05	14.81	42.23		2.42											100.02	65.88
O-95 3266.71	1	14	Mg-Cal						4.88	51.12													56.00	59.28
O-95 3266.71	1	15	Rt	0.39	97.75		1.51			0.35													100.00	102.05
O-95 3266.71	1	16	Ilm+other	2.82	81.67	1.72	11.09			1.30						0.36		1.02					99.98	66.77
O-95 3266.71	1	17	Ab+ap	52.95	4.04	15.83	5.67		0.30	6.35	9.25	0.52	5.09										100.00	125.73
O-95 3266.71	1	18	Ab	65.57		18.37	4.46				10.99	0.63											100.02	125.69
O-95 3266.71	1	19	Qz	99.99																			99.99	137.87
O-95 3266.71	1	20	Mg-Cal						2.78	53.22													56.00	56.24
O-95 3266.71	1	21	Fe-Cal		2.18		1.33		0.88	51.60													56.00	61.36
O-95 3266.71	1	22	Rt		98.33		0.53			1.15													100.01	95.64
O-95 3266.71	1	23	Fe-Cal				1.81	0.33	0.74	53.12													56.00	53.81
O-95 3266.71	1	24	Rt	0.68	96.25	0.45	2.17			0.43													99.98	98.2
O-95 3266.71	1	25	Ms	48.59		29.84	2.22		1.30		0.27	7.78											90.00	110.38
O-95 3266.71	1	26	Zrn	31.17															67.62		1.20		99.99	113.86
O-95 3266.71	1	27	Zrn	31.15															67.74		1.11		100.00	119.11
O-95 3266.71	1	28	TiO_2	10.29	80.43	6.16	1.03		0.48	0.24		1.37											100.00	107.13
O-95 3266.71	1	29	Ab	65.48		21.67	0.23			1.62	9.95	1.05											100.00	117.25
O-95 3266.71	2	1	Ms	45.46	0.27	32.50	1.77		0.41		0.94	8.66											90.00	118.36
O-95 3266.71	2	2	Ank				13.40	0.72	10.57	31.31													56.00	66.84
O-95 3266.71	2	3	Ank+Ab	8.21		2.51	20.22	1.46	15.14	50.81	1.29	0.35											99.99	59.26
O-95 3266.71	2	4	Ab	69.12		18.56				0.21	12.13												100.02	111.17
O-95 3266.71	3	1	Kfs	65.78		17.69				0.48	0.82	15.23											100.00	118.34
O-95 3266.71	3	2	Ank	0.46		0.27	12.89	0.85	10.23	31.29													56.00	60.44
O-95 3266.71	3	3	Py				27.52			1.89	0.36			70.24									100.01	219.17
O-95 3266.71	4	1	Py				27.81			0.24				71.97									100.02	214.18
O-95 3266.71	4	2	Chl	26.73		18.29	25.72	6.40	7.03	0.29		0.54											85.00	96.39
O-95 3266.71	5	2	Kfs	66.17		17.74					3.17	12.91											99.99	112.91

Table A: Scanning Electron Microscope chemical analyses of sample 3266.71 from the Onondaga O-95 well.

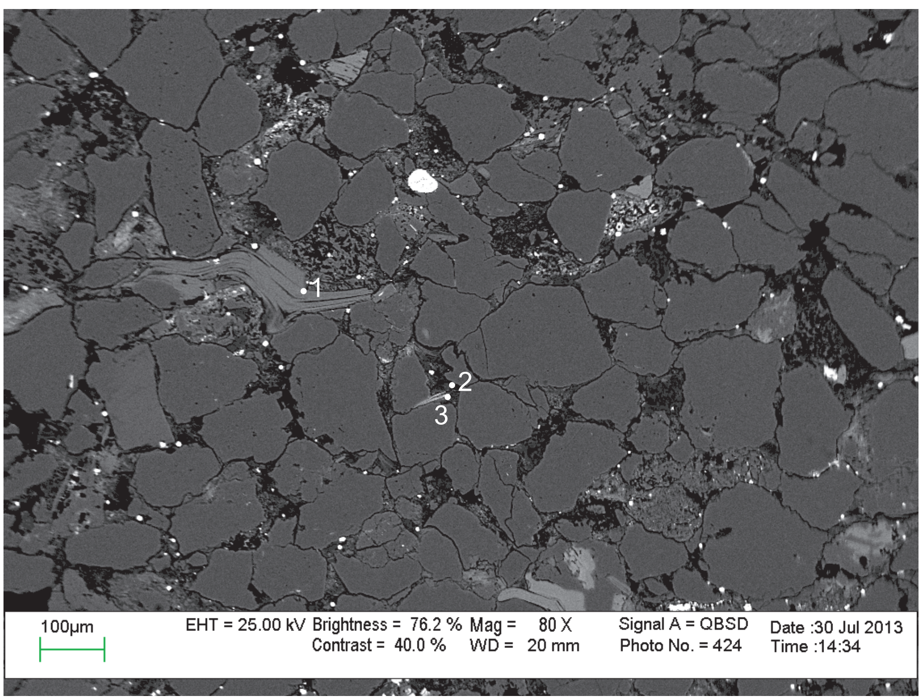
Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	V_2O_5	Cr_2O_3	ZrO_2	BaO	HfO_2	WO_3	Total	Actual Total
O-95 3266.71	5	3	Fe-Cal	2.31		0.82	2.77	0.23	4.09	45.44		0.32											56.00	56.99
O-95 3266.71	5	4	Kfs	66.44		17.84					0.97	14.74											99.99	127.94
O-95 3266.71	6	1	Kfs+other	50.40	1.18	35.50	0.50		1.18		0.77	10.46											99.99	124.27
O-95 3266.71	7	1	Kfs	66.32		17.72					0.39	15.57											100.00	118.59
O-95 3266.71	7	2	Ank+Kfs	9.80		3.29	21.73	1.07	14.94	47.91		1.29											100.03	66.82
O-95 3266.71	8	1	Kfs	66.02		18.06					1.55	13.94								0.45			100.02	126.71
O-95 3266.71	8	2	Cal	0.73			0.95	0.27		53.92		0.13											56.00	60.89
O-95 3266.71	8	3	Ap		0.38		1.51			47.17	0.35		39.84	0.55	10.11							0.09	100.00	115.62
O-95 3266.71	9	1	Ank	1.38		0.45	12.75	0.73	10.51	29.43				0.74									56.00	62.43
O-95 3266.71	10	1	Fe-Cal+Kfs+Py	14.14		3.67	20.12	1.08	14.49	41.84		3.32		1.35									100.01	70.39
O-95 3266.71	10	2	Mg-Cal				0.50		1.23	54.28													56.00	57.5

Appendix 9B: Scanning Electron Microscope Backscattered Electron Images for Onondaga O-95 3268.67



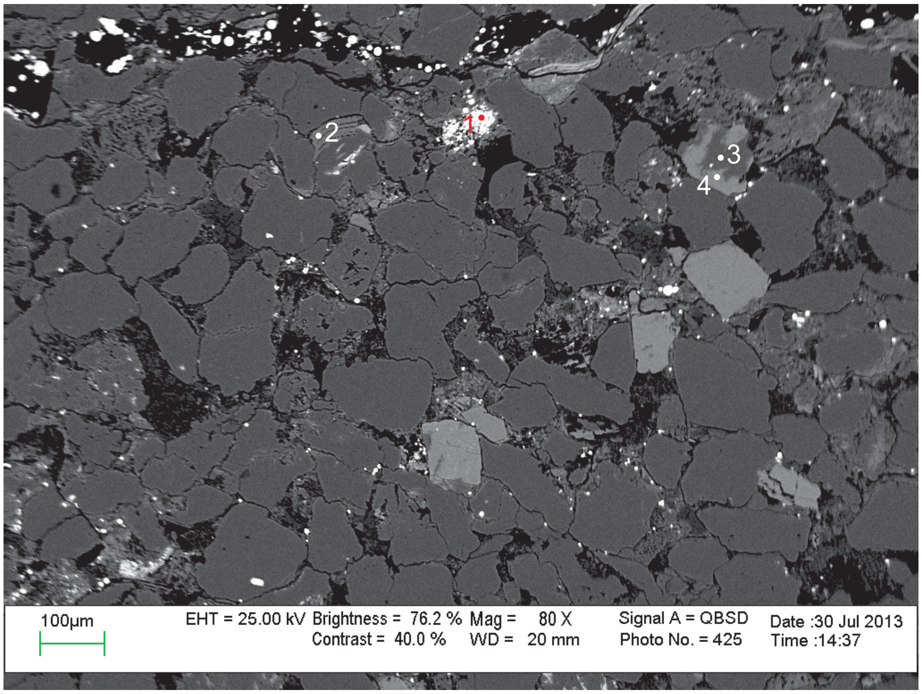
1. Muscovite
2. Quartz
3. K-feldspar
4. K-feldspar
5. Albite
6. Albite
7. Quartz
8. K-feldspar
9. Chlorite
10. K-feldspar
11. K-feldspar
12. Pyrite
13. K-feldspar (out of field of view)
14. Muscovite
15. Illite
16. Quartz
17. Albite
18. Pyrite
19. Chlorite
20. Albite
21. Illite

Figure 1: O-95 3268.67 m. site 1 (SEM).



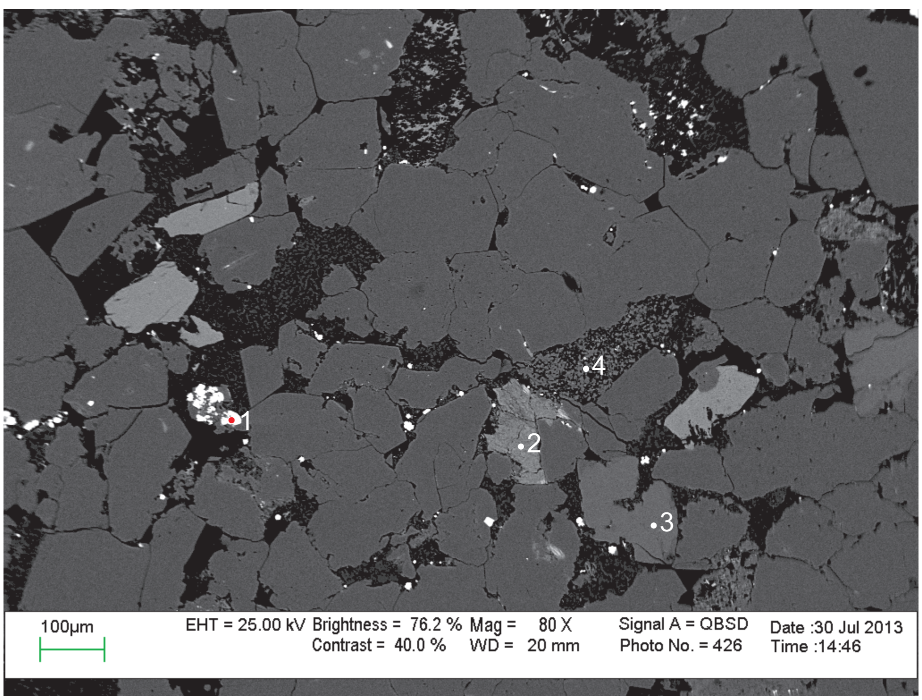
1. K-feldspar
2. Mixture
3. Illite

Figure 2: O-95 3268.67 m. site 2 (SEM).



1. Ilmenite + other
2. K-feldspar
3. Albite
4. K-feldspar

Figure 3: O-95 3268.67 m. site 3 (SEM).



1. Zircon
2. K-feldspar
3. Albite
4. Albite

Figure 4: O-95 3268.67 m. site 4 (SEM).

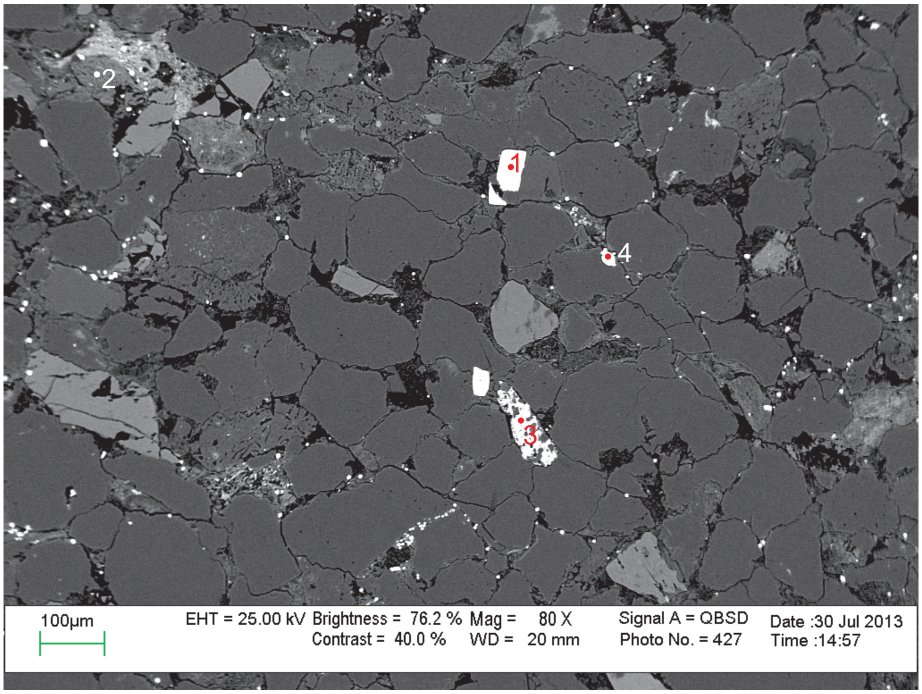


Figure 5: O-95 3268.67 m. site 5 (SEM).

1. Zircon
2. K-feldspar + Pyrite
3. Rutile
4. Pyrite

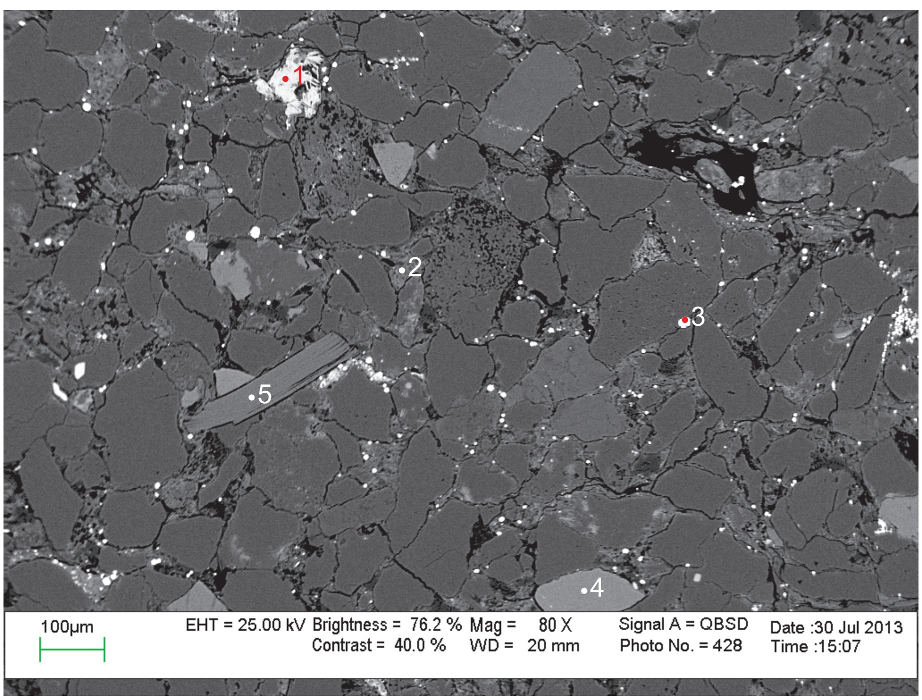


Figure 6: O-95 3268.67 m. site 6 (SEM).

1. Fe-Calcite + Apatite
2. Chlorite + other
3. Pyrite
4. K-feldspar
5. K-feldspar

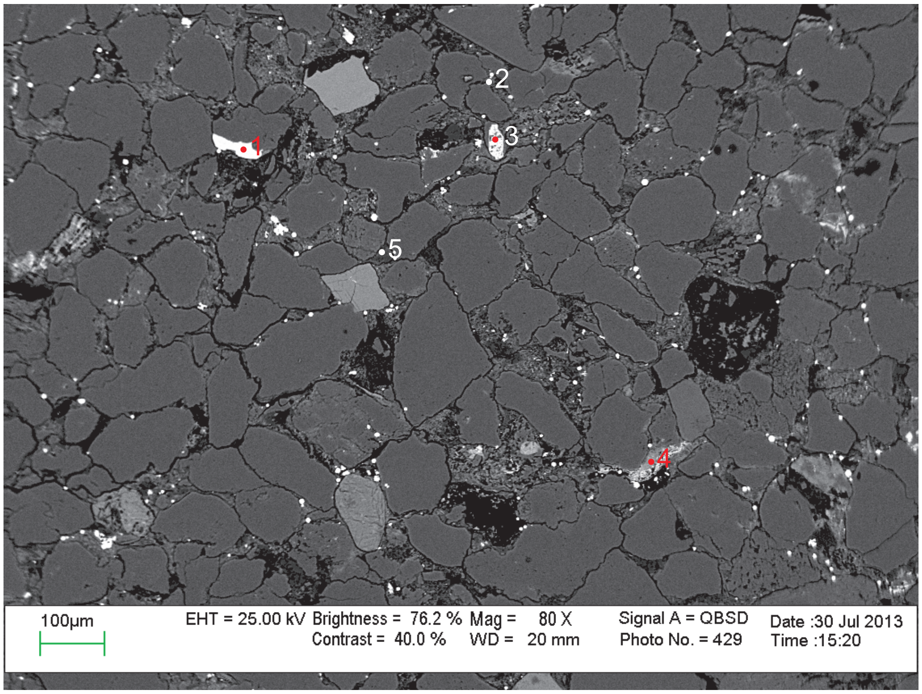


Figure 7: O-95 3268.67 m. site 7 (SEM).

1. Rutile
2. Pyrite + K-feldspar
3. Rutile
4. TiO_2
5. Kaolinite+ K-feldspar

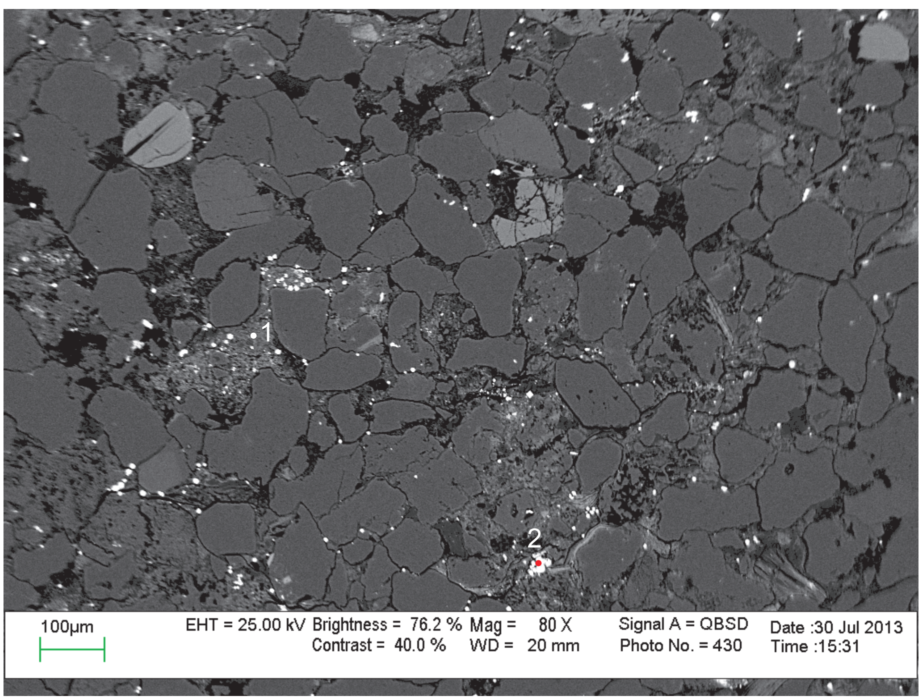
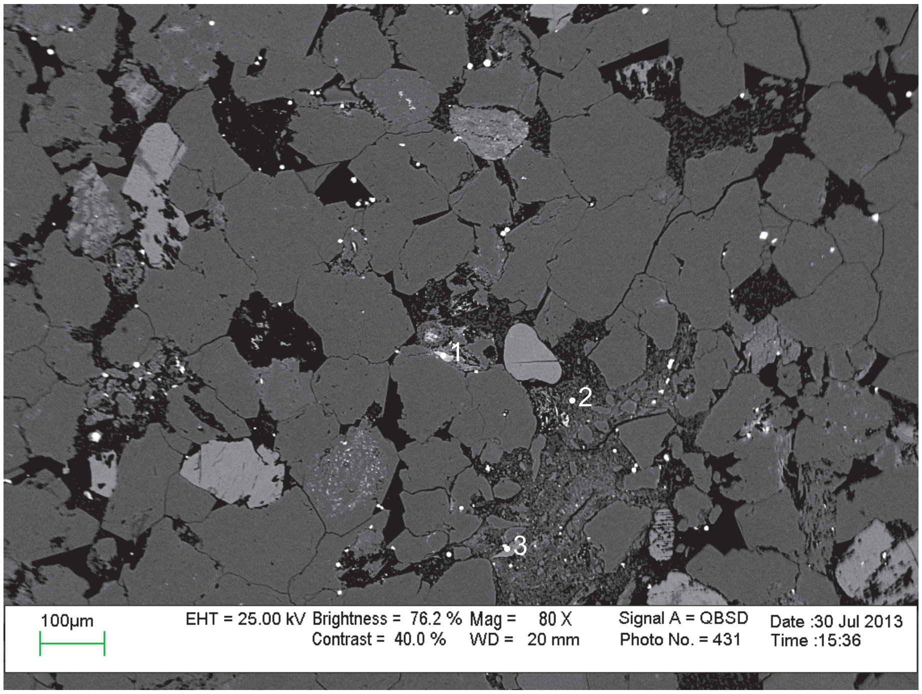


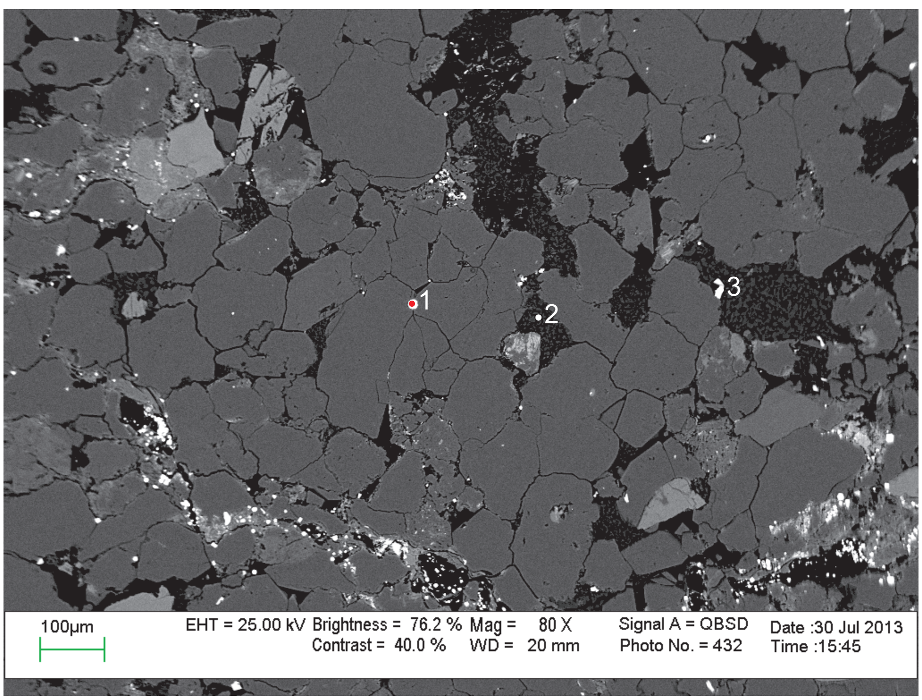
Figure 8: O-95 3268.67 m. site 8 (SEM).

1. Chlorite + other
2. Pyrite



1. Chlorite
2. Pyrite + K-feldspar
3. K-feldspar

Figure 9: O-95 3268.67 m. site 9 (SEM).



1. Pyrite
2. Kaolinite
3. Kaolinite

Figure 10: O-95 3268.67 m. site 10 (SEM).

Table B: Scanning Electron Microscope chemical analyses of sample 3268.67 from the Onondaga O-95 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	Sc_2O_3	Y_2O_3	ZrO_2	BaO	HfO_2	WO_3	Total	Actual Total
O-95 3268.67	1	1	Ms	47.06	0.54	29.25	4.44		1.19		0.35	10.18											93.00	109.49
O-95 3268.67	1	2	Qz	99.58		0.43																	100	120.37
O-95 3268.67	1	3	Kfs	66.29		18.06					0.96	14.67											99.98	111.21
O-95 3268.67	1	4	Kfs	66.44		17.27	0.19				0.74	14.97		0.4									99.98	107.8
O-95 3268.67	1	5	Ab	67.96		18.61	0.37				10.96	1.26		0.9									100	110.92
O-95 3268.67	1	6	Ab	65.05		21.62				3.36	9.8	0.19											100	123.01
O-95 3268.67	1	7	Qz	87.45	0.23	6.93	1.74		0.55			2.58		0.5									99.98	116.31
O-95 3268.67	1	8	Kfs	64.33		18.25	0.89				0.57	14.78		1.2									99.99	117.78
O-95 3268.67	1	9	Chl	26.00		22.84	21.74	0.18	14.24														85.00	97.31
O-95 3268.67	1	10	Kfs	66.21		17.84					0.34	15.62											100	119.34
O-95 3268.67	1	11	Kfs	65.65		17.69	0.35				0.78	15.2		0.4									100	128.75
O-95 3268.67	1	12	Py				31.21				1.35	0.23		67									100	160.39
O-95 3268.67	1	13	Kfs	66.46		17.69					0.49	15.36											100	133.48
O-95 3268.67	1	14	Ms	46.76	0.86	34.05	0.78		0.49		1.39	8.67											93.00	122.66
O-95 3268.67	1	15	Ilt	49.57	2.87	22.55	5.02		2.04	0.40	0.63	4.62		2.29									90.00	109.39
O-95 3268.67	1	16	Qz	99.99																			99.99	129.44
O-95 3268.67	1	17	Ab	64.99		21.77				2.97	10.06	0.2											99.99	111.92
O-95 3268.67	1	18	Py	5.22		1	26.84			0.24	0.38	0.19		66									99.99	200.9
O-95 3268.67	1	19	Chl	28.48		20.38	12.93		21.22					2.00									85.00	93.96
O-95 3268.67	1	20	Ab	67.49		21.11				0.8	10.44	0.16											100	123.51
O-95 3268.67	1	21	Ilt	42.98	3.10	24.62	7.68		1.33	0.26	1.22	2.65		6.00		0.15							90.00	97.5
O-95 3268.67	2	1	Kfs	50.29	1.08	36.32	0.85		0.48		1.2	9.78											100	108.76
O-95 3268.67	2	2	Mix	43.98	0.48	23.05	11.5		1.58	0.5	1.24	2.99		10	4	0.4							100	96.85
O-95 3268.67	2	3	Ilt	39.59	3.62	20.82	13.15	0.17	5.61		0.36	5.23		1.44									90.00	101.51
O-95 3268.67	3	1	Ilm+other	0.81	39.5	1.13	21.81				1.43	0.2		35		0.3							100	116.69
O-95 3268.67	3	2	Kfs	50.74		37.96	0.77				0.81	9.71											99.99	101.81
O-95 3268.67	3	3	Ab	68.99		18.86					12.01	0.13											99.99	128.83
O-95 3268.67	3	4	Kfs	66.12		18.01					1.52	14.33											99.98	127.26
O-95 3268.67	4	1	Zrn	30.48		1.02	0.73			0.7							0.86	1.21	63.9		1.12		99.97	103.58
O-95 3268.67	4	2	Kfs	51.58		32.59	2.89		1.91			10.46								0.57			100	111.31
O-95 3268.67	4	3	Ab	64.54		21.82				3.5	10.02	0.13											100	129.09
O-95 3268.67	4	4	Ab	67.9		18.57	1			0.2	10.7	1.46				0.2							100	103.64
O-95 3268.67	5	1	Zrn	31.49															68.5				99.99	126.93
O-95 3268.67	5	2	Kfs+Py	41.01	0.52	23.85	13.52		1.53		2.02	4.66		13									99.99	95.92

Table B: Scanning Electron Microscope chemical analyses of sample 3268.67 from the Onondaga O-95 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	Sc_2O_3	Y_2O_3	ZrO_2	BaO	HfO_2	WO_3	Total	Actual Total
O-95 3268.67	5	3	Rt	1.2	98	0.49	0.27																99.99	110.3
O-95 3268.67	5	4	Py	0.3			28.14				0.24			71									100	240.16
O-95 3268.67	6	1	Fe-Cal+Ap			0.26	3.95			43	0.66		38.6	6.1	7.4							0.04	99.98	121.9
O-95 3268.67	6	2	Chl+other	50.89	0.82	28.29	7.15		1.94	0.49	1.55	3.84		5									99.99	112.07
O-95 3268.67	6	3	Py	5.65		0.87	28.16				1.38	0.11		64									100	189.76
O-95 3268.67	6	4	Kfs	66.29		17.95					0.63	15.12											99.99	127.32
O-95 3268.67	6	5	Kfs	50.27		37.19	0.82		0.41		0.94	10.36											99.99	111.61
O-95 3268.67	7	1	Rt	0.39	99.4		0.21																100	102.14
O-95 3268.67	7	2	Py+Kfs	46.01	0.2	25.92	11.51		2.57		1.58	4.23		7.7		0.3							100	98.98
O-95 3268.67	7	3	Rt	4.24	92.7	1.89	0.69					0.49											100	108.61
O-95 3268.67	7	4	TiO_2	5.88	82.7	4.02	5.4		0.58					1.1		0.3							99.96	84.33
O-95 3268.67	7	5	Kln+Kfs	54.23		39.81	0.59		0.33		0.28	2.17			2.6								99.99	106.63
O-95 3268.67	8	1	Chl+other	46.36	0.62	26.4	9.61		1.72		1.78	3.67		9.8									100	98.72
O-95 3268.67	8	2	Py	0.45		0.74	31.83			0.18	3.03	0.2		64									100	161.05
O-95 3268.67	9	1	Chl	26.45		21.17	26.51	0.33	9.86			0.19		0.48									85.00	97.99
O-95 3268.67	9	2	Py+Kfs	49.54	0.73	21.9	10.61		1.79		1.51	2.99	0.53	10		0.3							99.98	97.94
O-95 3268.67	9	3	Kfs	66.14		17.78	0.21				0.38	15.49											100	120.48
O-95 3268.67	10	1	Py	1.3			28.06				0.43			70									100	224.65
O-95 3268.67	10	2	Kln	49.01		34.45									2.55								86.00	94.32
O-95 3268.67	10	3	Kln	50.94	1.61	29.39	0.21				0.96	1.38		0.47	1.03								86.00	88.09

Appendix 9C: Scanning Electron Microscope Backscattered Electron Images for Onondaga O-95 3268.73

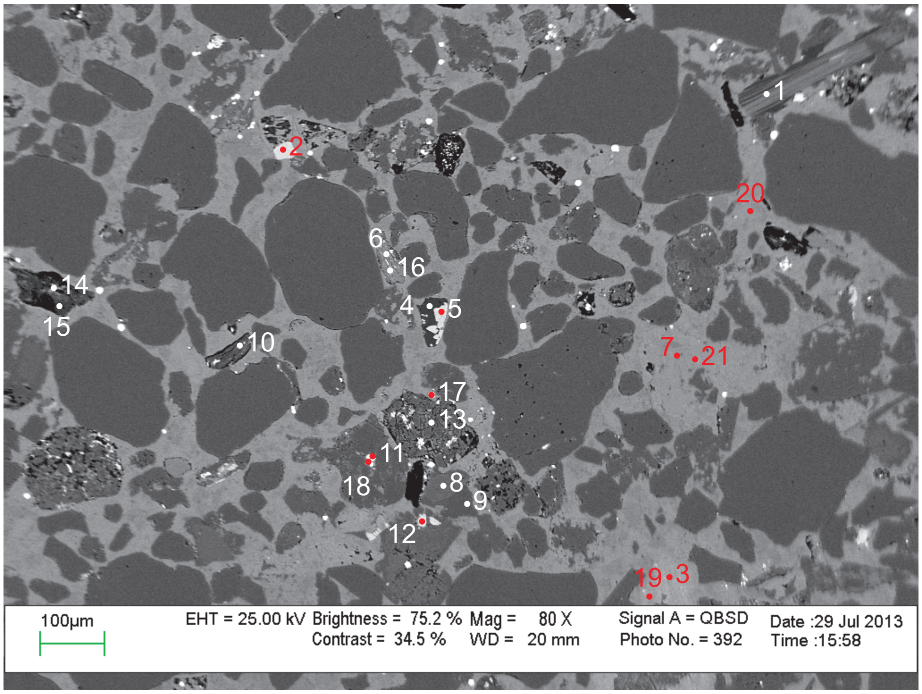


Figure 1: O-95 3268.73 m. site1 (SEM).

1. Muscovite
2. Apatite
3. Ankerite
4. Kaolinite
5. Siderite
6. Illite
7. Fe- Calcite
8. Albite
9. Quartz
10. Illite
11. Quartz
12. Apatite + Albite
13. Albite
14. Mixture
15. Illite
16. Kaolinite + Chlorite
17. Fe-Calcite
18. Pyrite + Calcite
19. Ankerite
20. Mg-Calcite
21. Calcite

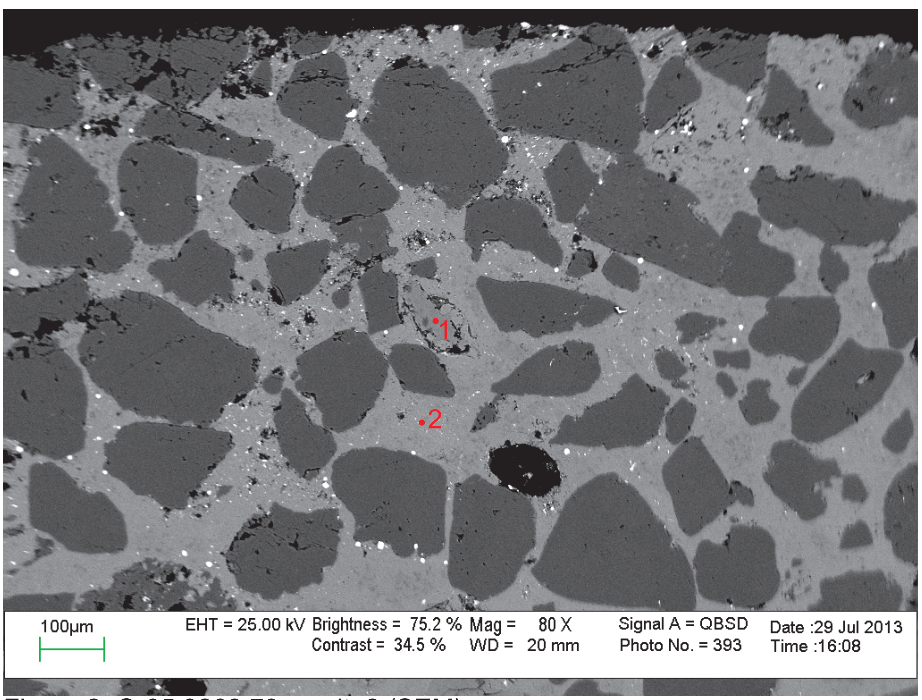


Figure 2: O-95 3268.73 m. site2 (SEM).

1. K-feldspar
2. Fe-Calcite

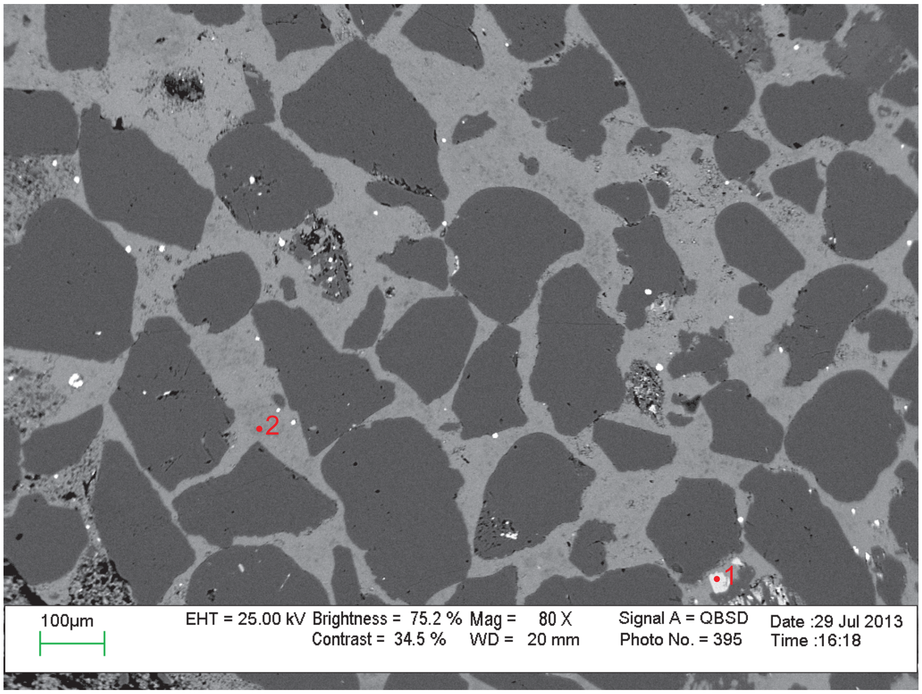


Figure 3: O-95 3268.73 m. site3 (SEM).

1. Apatite
2. Mg-Calcite

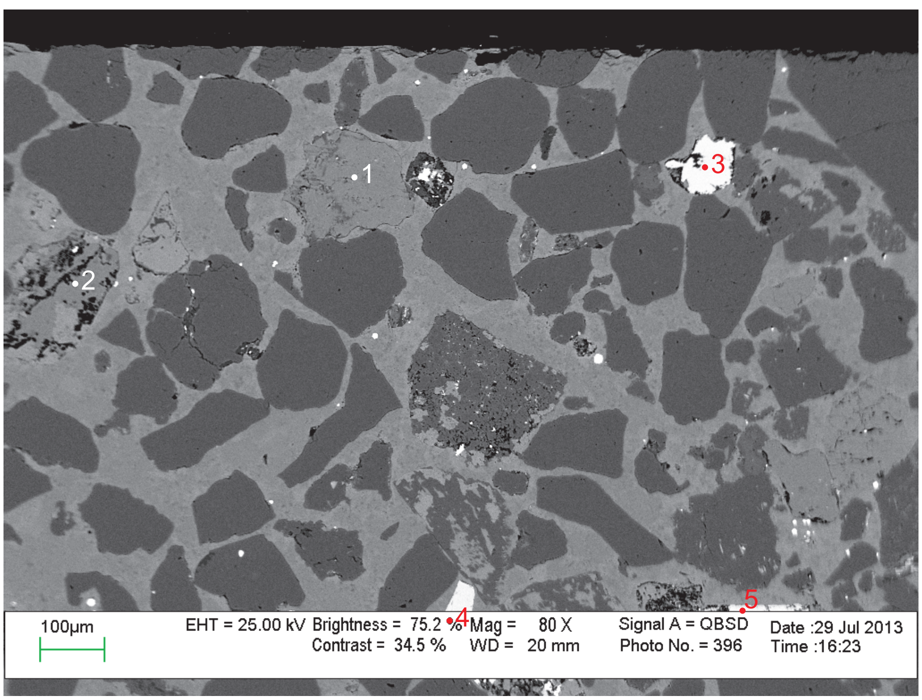
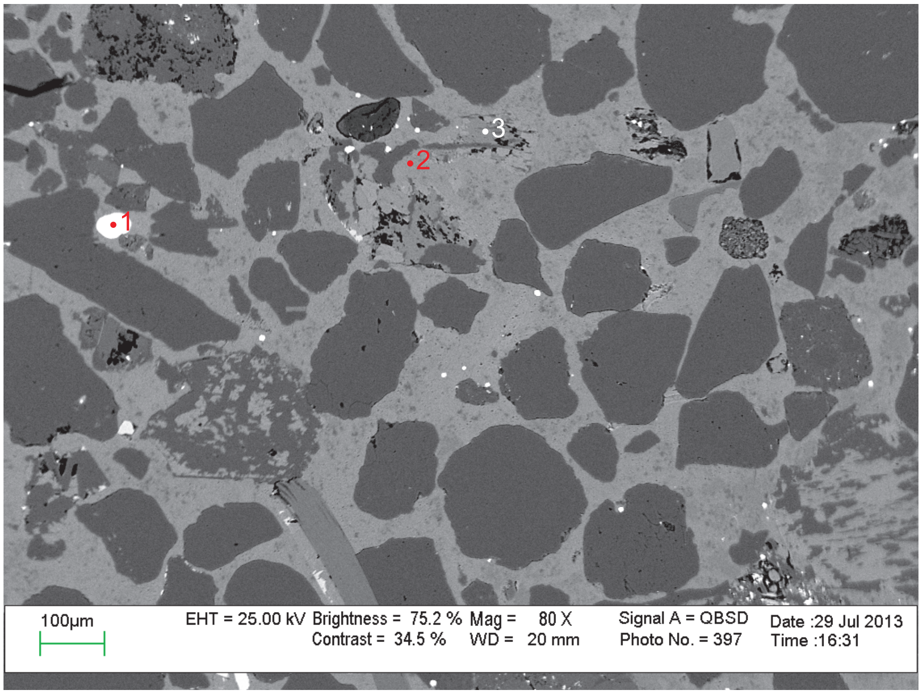


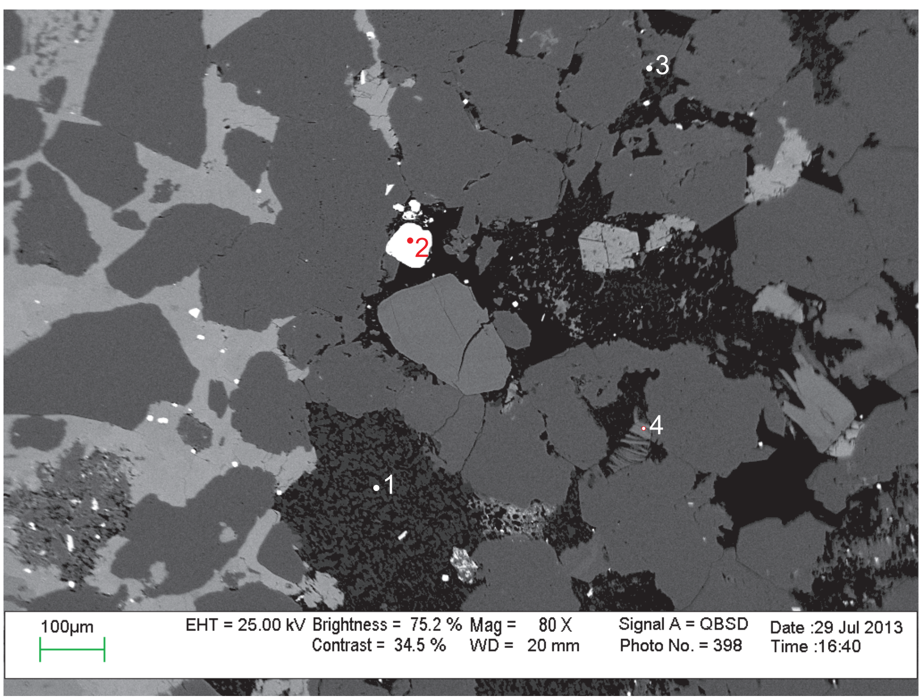
Figure 4: O-95 3268.73 m. site4 (SEM).

1. K-feldspar
2. K-feldspar
3. Rutile
4. Chromite
5. Rutile



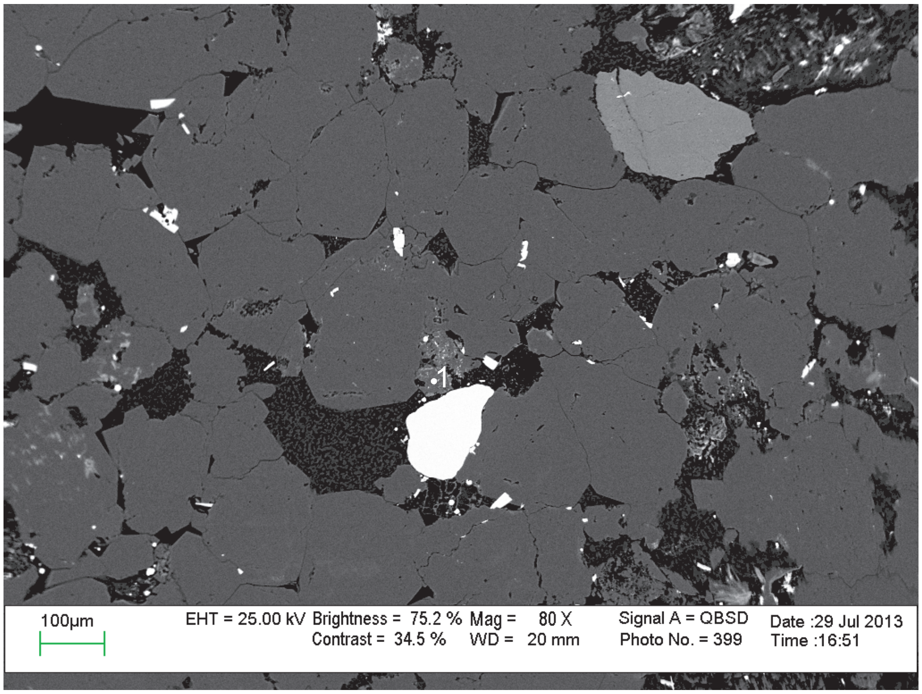
1. Zircon
2. Mg-Calcite
3. K-feldspar + Pyrite

Figure 5: O-95 3268.73 m. site5(SEM).



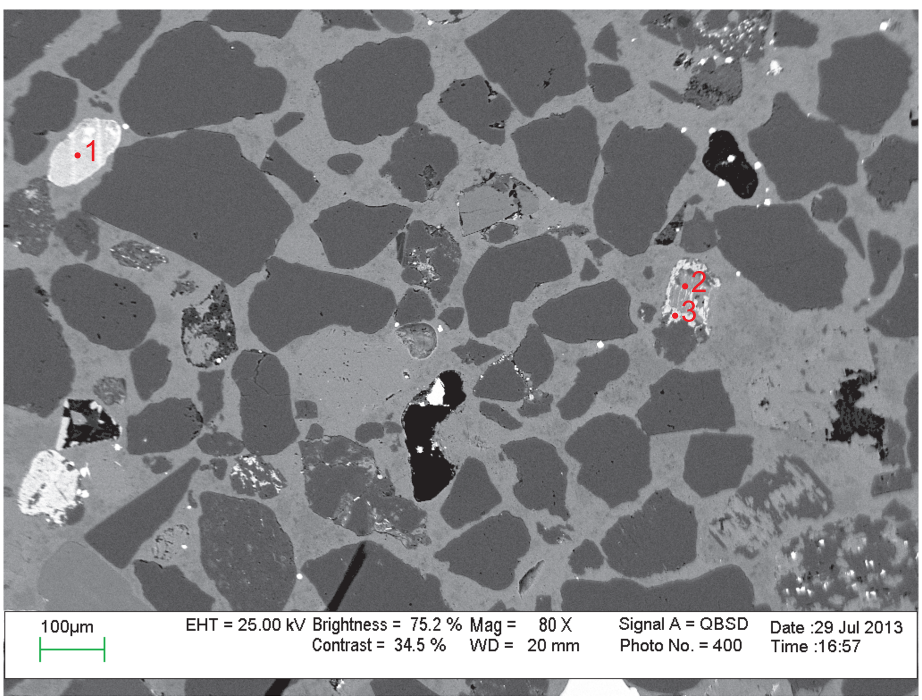
1. Kaolinite
2. Zircon
3. Kaolinite
4. Muscovite

Figure 6: O-95 3268.73 m. site6 (SEM).



1. Albite

Figure 7: O-95 3268.73 m. site7 (SEM).



1. Ilmenite
2. Fe-Calcite
3. Albite + Siderite

Figure 8: O-95 3268.73 m. site8 (SEM).

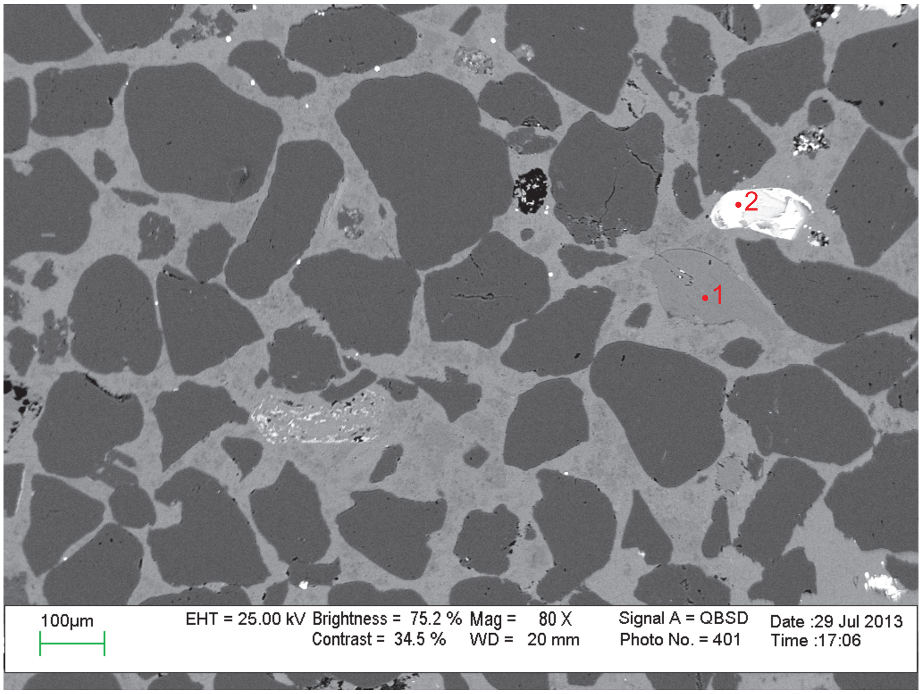


Figure 9: O-95 3268.73 m. site9 (SEM).

1. K-feldspar
2. Ilmenite

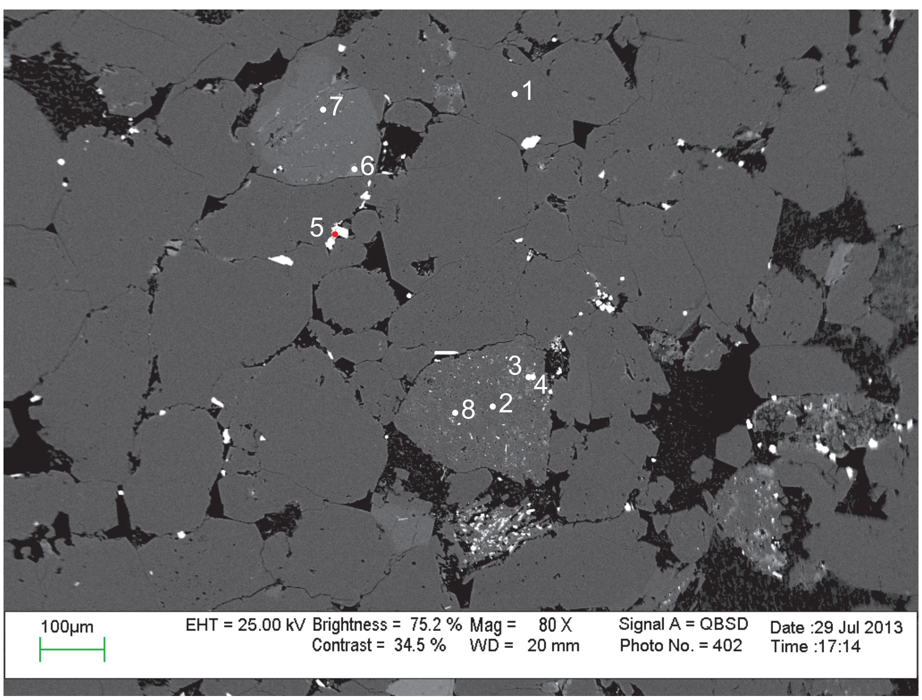
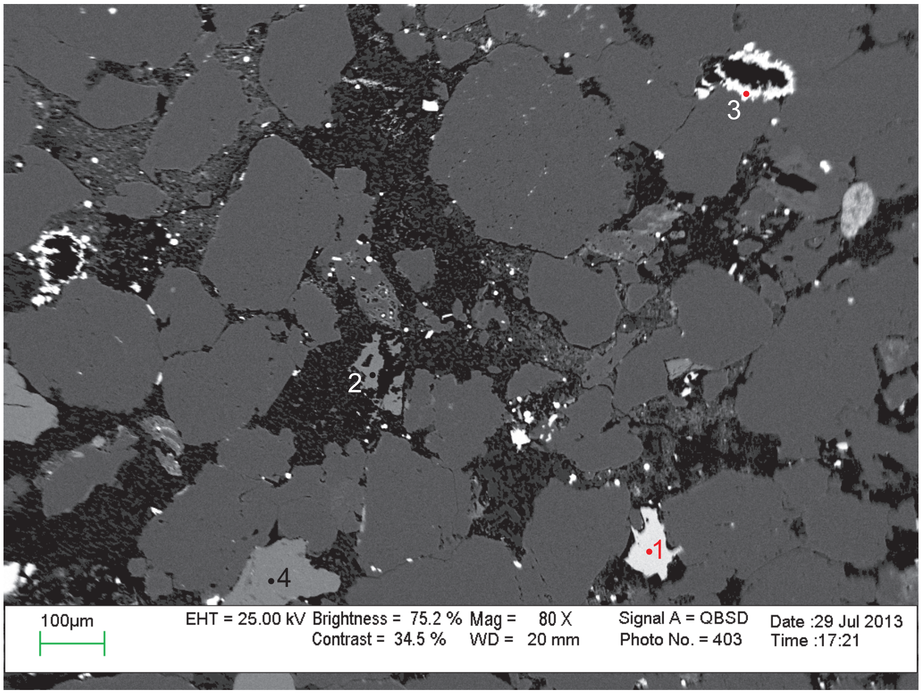


Figure 10: O-95 3268.73 m. site10 (SEM).

1. Quartz
2. Quartz
3. Quartz
4. Quartz
5. Rutile
6. Albite
7. Albite
8. Quartz



1. Chlorite + Calcite
2. K-feldspar
3. Pyrite
4. K-feldspar

Figure 11: O-95 3268.73 m. site11 (SEM).

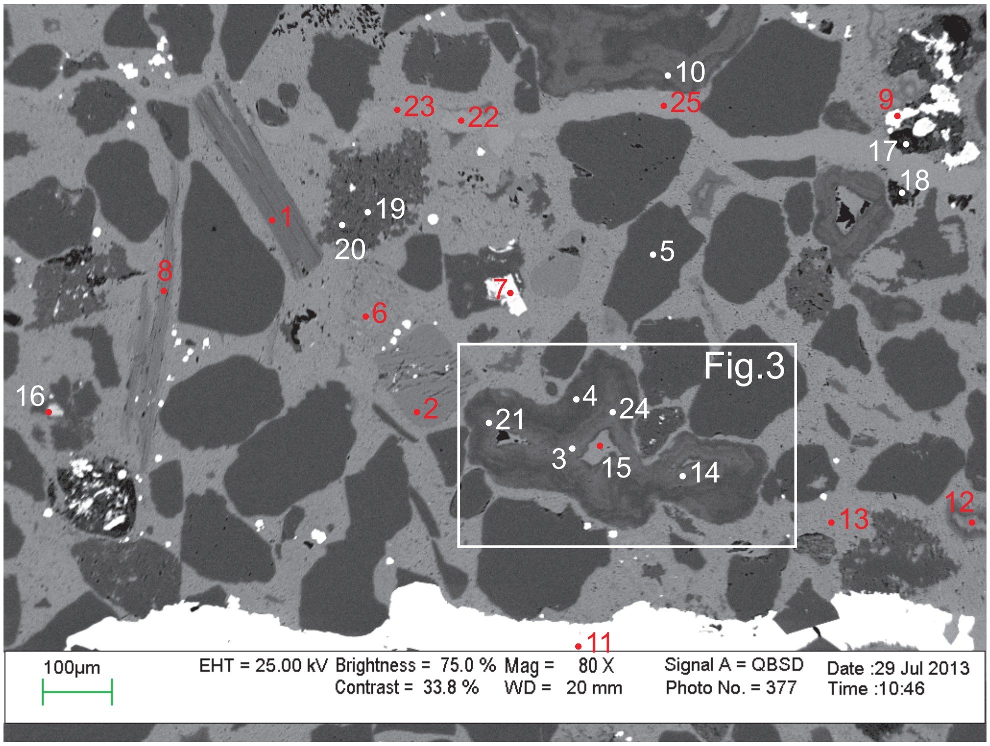
Table C: Scanning Electron Microscope chemical analyses of sample 3268.73 from the Onondaga O-95 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	V_2O_5	Cr_2O_3	ZrO_2	HfO_2	WO_3	Total	Actual Total
O-95-3268.73	1	1	Ms	46.90	0.62	34.27	0.76		0.59		0.97	8.89										93.00	111.71
O-95-3268.73	1	2	Ap							47.47			46.13		6.46						-0.06	100.00	104.22
O-95-3268.73	1	3	Ank	0.65	0.48	0.29	11.09	0.69	9.70	28.44			4.67									56.00	60.62
O-95-3268.73	1	4	Kln	48.49		36.74	0.64			0.13												86.00	92.4
O-95-3268.73	1	5	Sd	0.95		0.77	38.28	0.43	11.26	4.31												56.00	54.42
O-95-3268.73	1	6	Ilt	50.22		15.54	10.05		3.94	2.84		6.04		0.78		0.58						90.00	92.37
O-95-3268.73	1	7	Cal	7.07		2.14	0.58	0.19		44.16	1.48	0.39										56.00	60.03
O-95-3268.73	1	8	Ab	63.49		22.79				3.90	9.60	0.23										100.01	114
O-95-3268.73	1	9	Qz	97.44		0.47				2.08												99.99	108.39
O-95-3268.73	1	10	Ilt	50.65	0.79	22.69	2.57		3.31	0.57		5.71		0.72	2.56	0.43						90.00	99.4
O-95-3268.73	1	11	Qz	96.18			0.63			0.64				2.55								100.00	98.55
O-95-3268.73	1	12	Ap+Ab	38.63	0.47	12.24	1.76			16.82	8.49		19.96		1.59							99.96	106.33
O-95-3268.73	1	13	Ab	65.52		19.37	2.30		0.46		11.32	0.69				0.33						99.99	113.65
O-95-3268.73	1	14	Mix	36.54	0.45	18.57	2.51		2.16	35.74	0.49	3.28				0.27						100.01	60.99
O-95-3268.73	1	15	Ilt	50.16	0.78	25.39	1.94		2.45	3.03		4.60		0.47		1.18						90.00	68.84
O-95-3268.73	1	16	Kfs+Chl	58.85		16.78	12.41		4.21			7.31				0.44						100.00	96.73
O-95-3268.73	1	17	Fe-Cal	1.15		0.51	1.64		1.17	50.37				1.16								56.00	47.64
O-95-3268.73	1	18	Py+Cal	1.41		0.60	25.01			12.02				60.95								99.99	134.98
O-95-3268.73	1	19	Ank	0.54			12.73	0.72	11.55	28.45			2.02									56.00	58.04
O-95-3268.73	1	20	Mg-Cal				1.16		2.17	52.66												56.00	53.22
O-95-3268.73	1	21	Cal				0.73	0.20		55.06												56.00	50.84
O-95-3268.73	2	1	Kfs	66.66		18.18					0.58	14.59										100.01	111.28
O-95-3268.73	2	2	Fe-Cal				1.35	0.23	0.83	53.59												56.00	48.11
O-95-3268.73	3	1	Ap							45.89			44.55		9.51						0.06	100.01	122.68
O-95-3268.73	3	2	Mg-Cal						4.88	51.12												56.00	49.11
O-95-3268.73	4	1	Kfs	66.59		18.33					0.44	14.62										99.98	110.23
O-95-3268.73	4	2	Kfs	66.94		18.05					1.29	13.72										100.00	103.43
O-95-3268.73	4	3	Rt		100.00																	100.00	96.85
O-95-3268.73	4	4	Chr			32.82	12.36		17.20								0.30	37.32				100.00	100.97
O-95-3268.73	4	5	Rt	2.03	94.91	1.10	1.36			0.60												100.00	95.54
O-95-3268.73	5	1	Zrn	31.38															67.30	1.32		100.00	111.2
O-95-3268.73	5	2	Mg-Cal				0.34		1.70	53.97												56.00	50.88
O-95-3268.73	5	3	Kfs+Py	63.62		17.23	1.16				3.40	11.60		3.00								100.01	121.89
O-95-3268.73	6	1	Kln	49.38		36.62																86.00	87.23
O-95-3268.73	6	2	Zrn	31.40															67.81	0.79		100.00	115.54
O-95-3268.73	6	3	Kln	57.09		28.91																86.00	89.27
O-95-3268.73	6	4	Ms	48.69		34.41	1.66		0.80		0.53	6.91										93.00	108.99
O-95-3268.73	7	1	Ab	64.75	0.17	18.73	1.11			0.35	11.68	0.29		2.95								100.03	120.3
O-95-3268.73	8	1	Ilm	1.90	83.14	1.38	12.58			0.60						0.39						99.99	66.46
O-95-3268.73	8	2	Fe-Cal+QZ	8.90			7.00	0.57	0.85	80.65	2.05											100.02	59.96

Table C: Scanning Electron Microscope chemical analyses of sample 3268.73 from the Onondaga O-95 well.

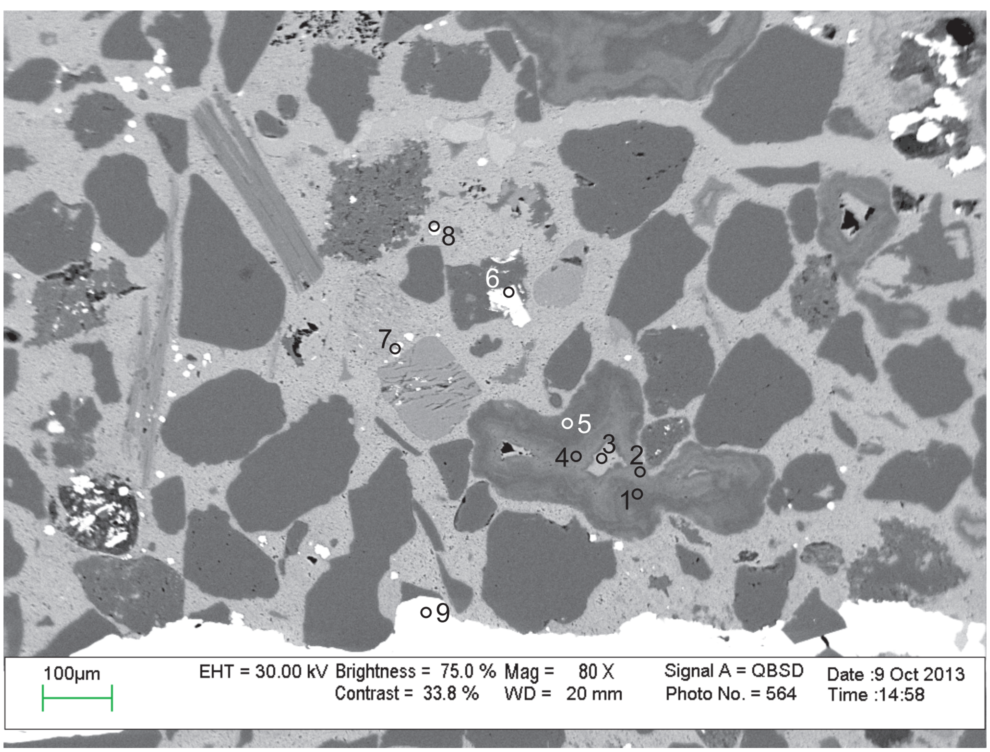
Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	V_2O_5	Cr_2O_3	ZrO_2	HfO_2	WO_3	Total	Actual Total
O-95-3268.73	8	3	Ab+Sd	14.97		5.01	53.02	1.88	11.82	8.12	5.18											100.00	70.78
O-95-3268.73	9	1	Kfs	66.68		18.25					1.00	14.07										100.00	124.31
O-95-3268.73	9	2	Ilm		53.84		42.53	0.63	2.98													99.98	100.67
O-95-3268.73	10	1	Qz	99.99																		99.99	132.33
O-95-3268.73	10	2	Qz	98.98		0.53					0.50											100.01	117.34
O-95-3268.73	10	3	Qz	93.42		3.76	0.49				1.81	0.52										100.00	123.37
O-95-3268.73	10	4	Qz	91.49		2.74					2.08								3.69			100.00	118.35
O-95-3268.73	10	5	Rt	3.14	95.60	0.40	0.87															100.01	77.73
O-95-3268.73	10	6	Ab	64.05		22.83				2.70	9.77	0.64										99.99	113.35
O-95-3268.73	10	7	Ab	64.43		21.94				2.97	10.66											100.00	116.23
O-95-3268.73	10	8	Qz	95.43		2.36					2.21											100.00	128.01
O-95-3268.73	11	1	Chl+Cal	42.31		22.09	25.00	1.39	3.53	5.69												100.01	109.42
O-95-3268.73	11	2	Kfs	66.66		17.80	0.23				0.75	14.53										99.97	98.24
O-95-3268.73	11	3	Py	3.27	1.80		28.24	0.23			0.51	0.59		65.05		0.31						100.00	172.57
O-95-3268.73	11	4	Kfs	67.00		17.95					0.88	14.17										100.00	106.99

Appendix 9D: Scanning Electron Microscope Backscattered Electron Images for Onondaga O-95 3269.82



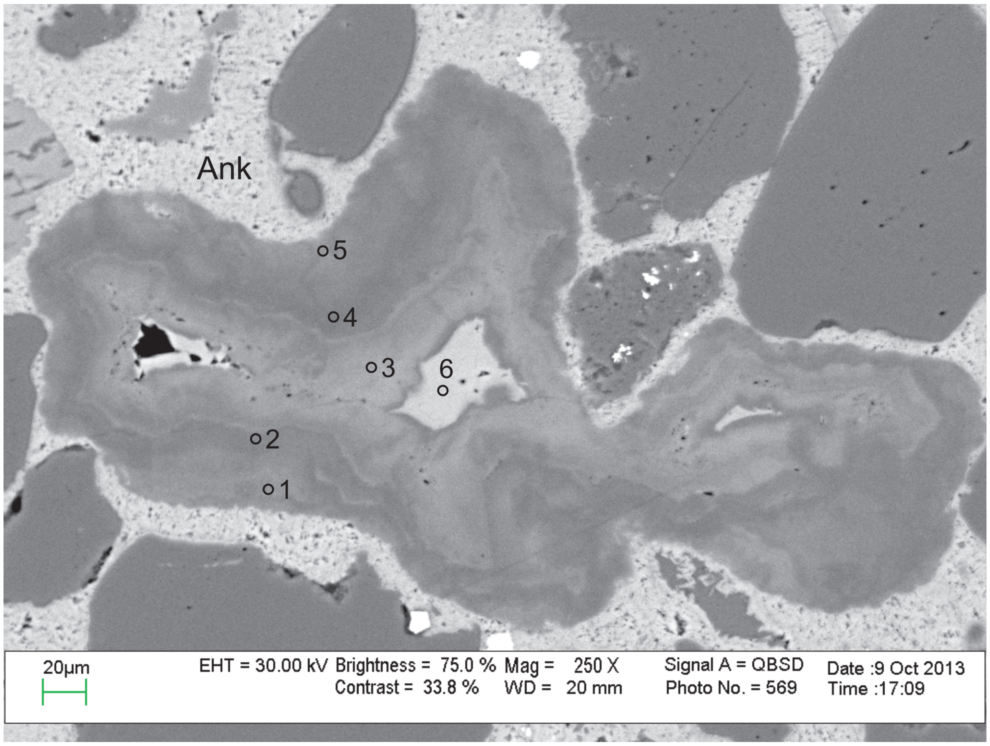
1. Muscovite
2. K-feldspar
3. Dolomite
4. Dolomite
5. Quartz
6. Ankerite
7. Rutile
8. Muscovite + Calcite
9. Pyrite
10. Dolomite
11. Barite
12. Ankerite
13. Ankerite
14. Dolomite
15. Ankerite
16. Apatite
17. Illite
18. Illite
19. Quartz
20. Quartz + Albite
21. Dolomite
22. Ankerite
23. Fe-Calcite
24. Dolomite
25. Fe-Calcite

Figure 1: O-95 3269.82 m site 1 (SEM, Table A-1).



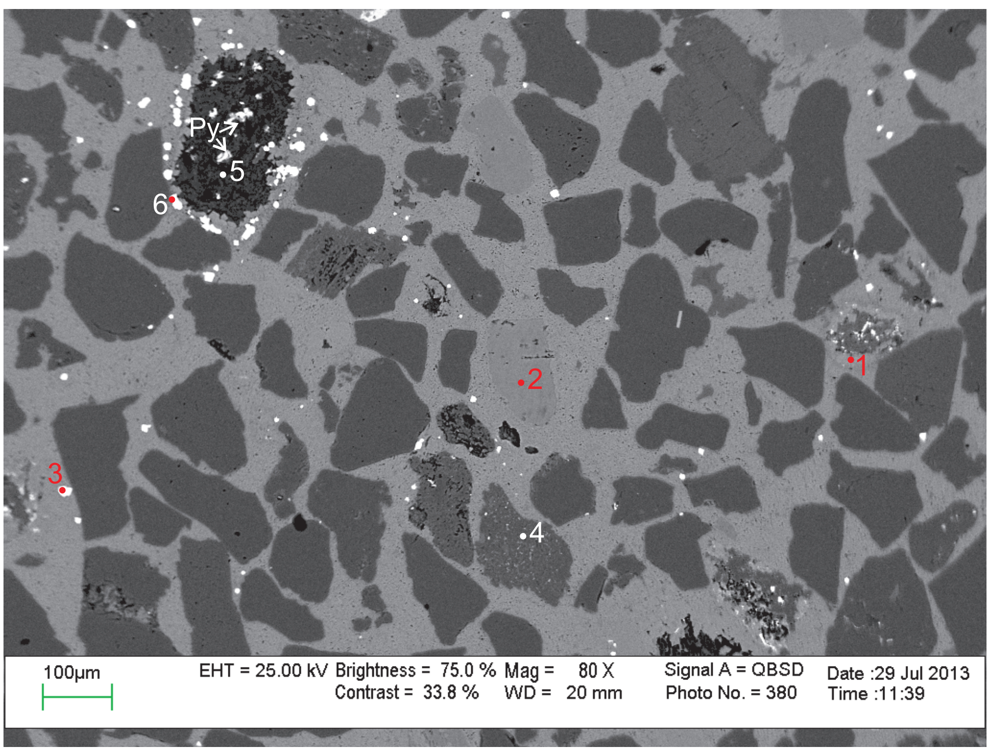
1 Dolomite
2 Dolomite
3 Ankerite
4 Dolomite
5 Dolomite
6 Rutile
7 Pyrite
8 Pyrite
9 Barite

Figure 2: O-95 3269.82 m site 1, same location as Fig.1 (re-analysed) (SEM, Table A-2)



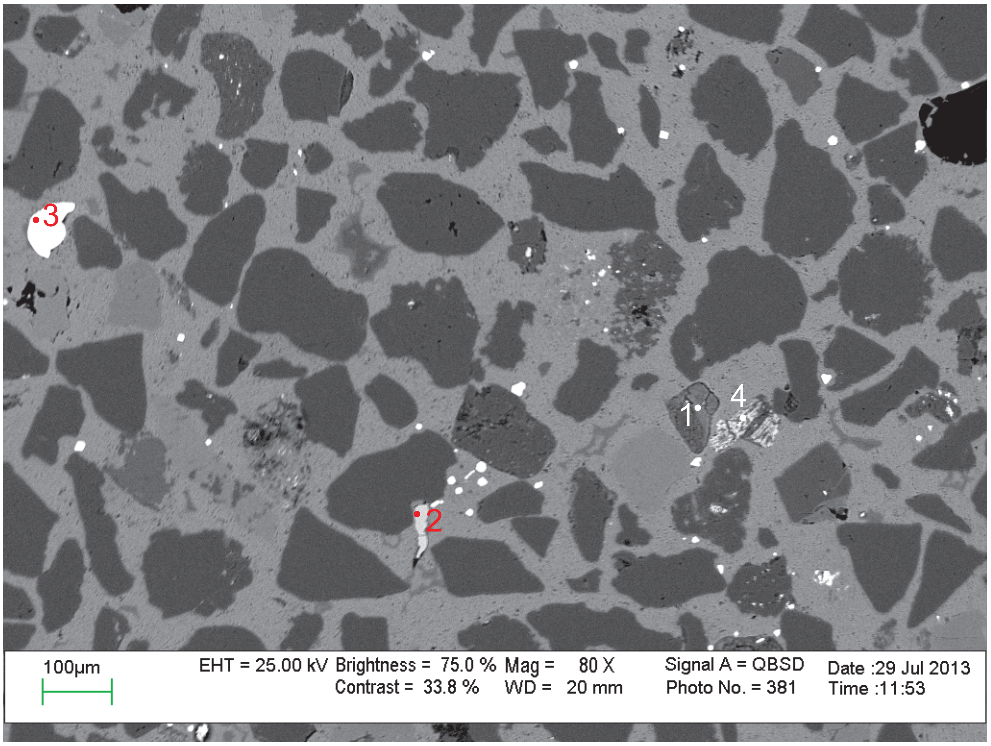
1. Dolomite
2. Dolomite
3. Dolomite
4. Dolomite
5. Ferroan Dolomite
6. Ankerite

Figure 3: O-95 3269.82 m site 7 (enlarged part of Fig. 1) (SEM, Table A-2). Pores from secondary porosity filled finally by late ankerite (6).



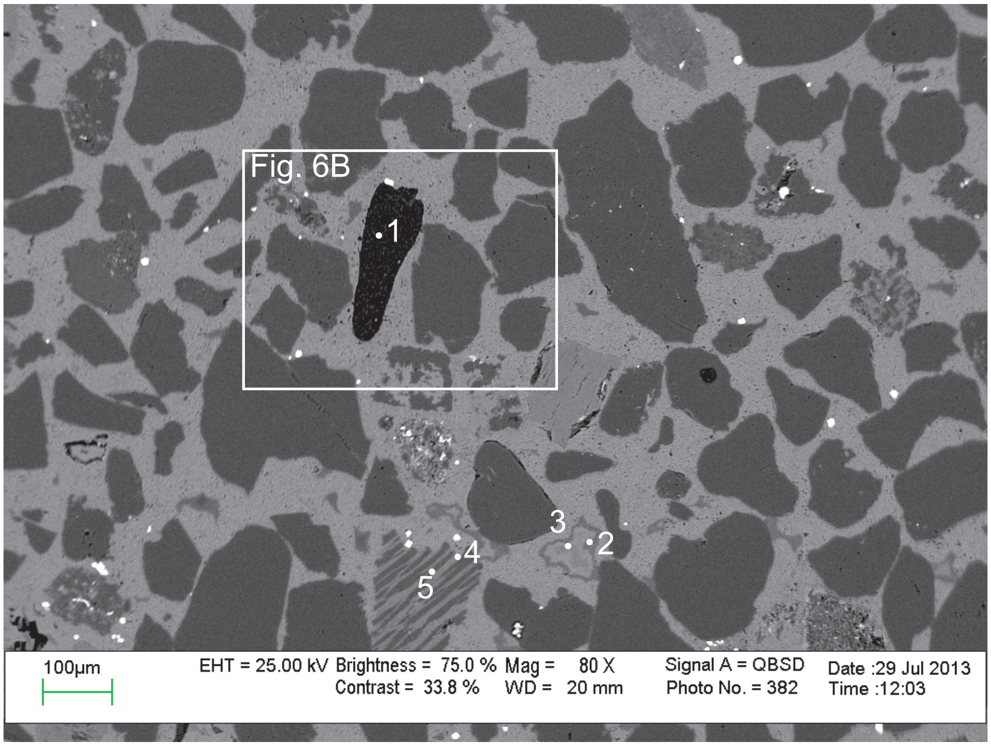
1. Mixture
2. K-feldspar
3. Pyrite
4. Albite
5. Albite
6. Pyrite

Figure 4: O-95 3269.82 m site 2 (SEM, Table A-1).



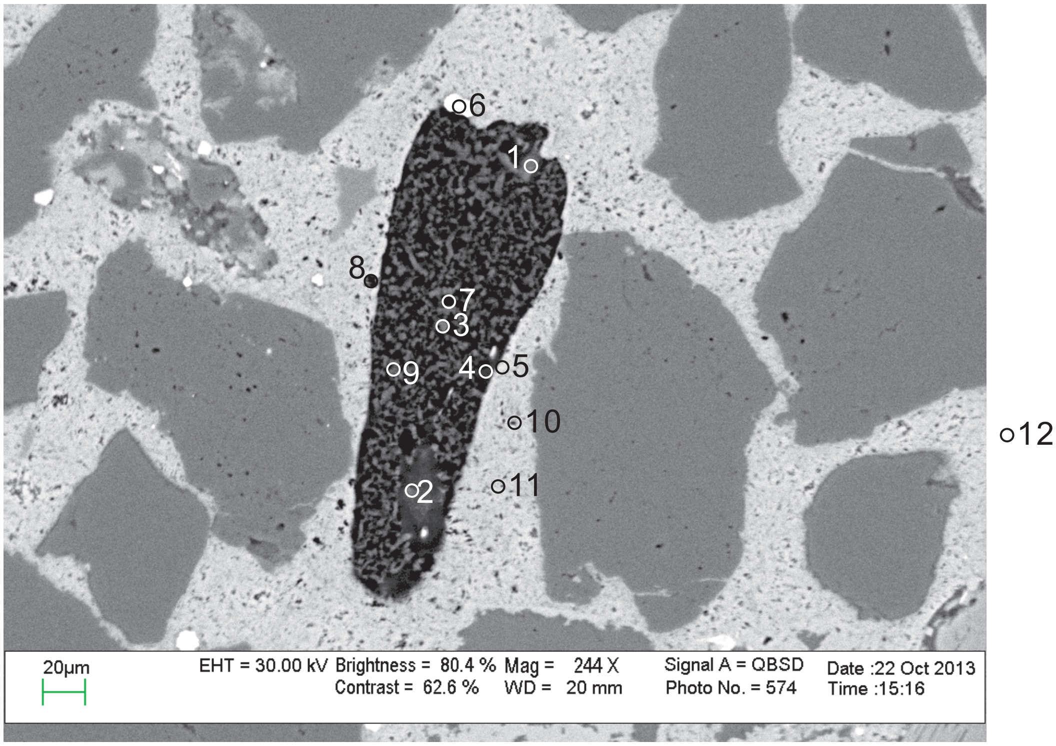
1. Muscovite
2. Chlorite + Calcite
3. Zircon
4. TiO_2

Figure 5: O-95 3269.82 m. site 3 (SEM, Table A-1).



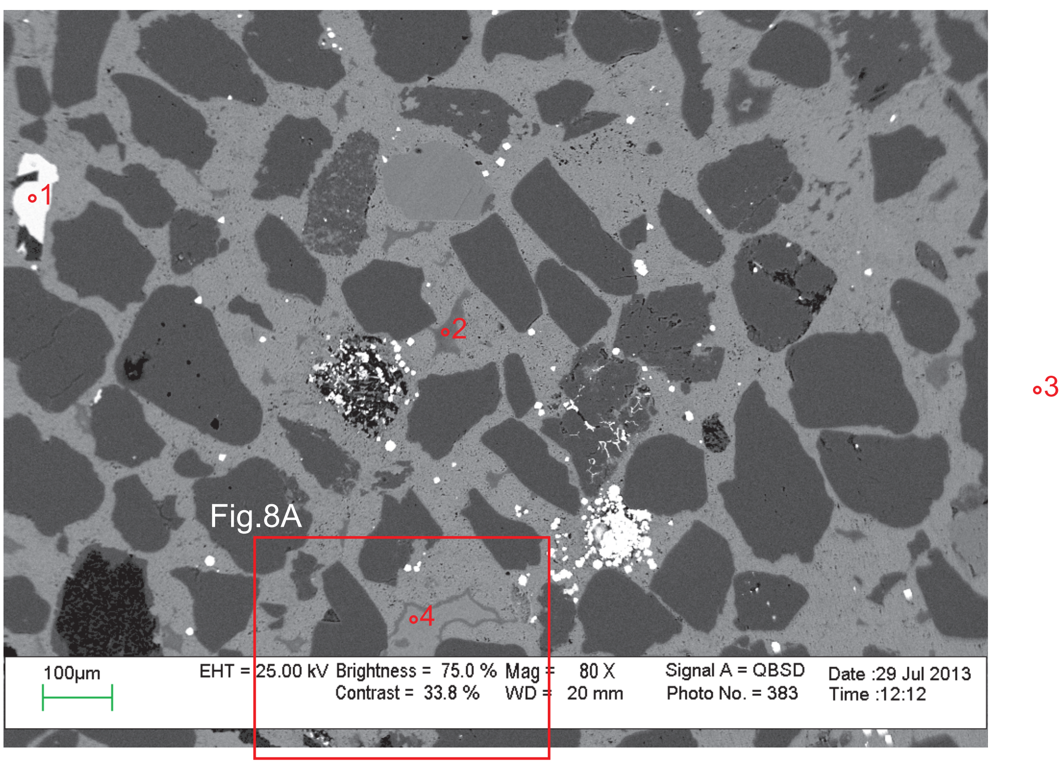
1. Kaolinite
2. Dolomite
3. Ankerite
4. Albite
5. K-feldspar

Figure 6A: O-95 3269.82 m. site 4 (SEM, Table A-1).



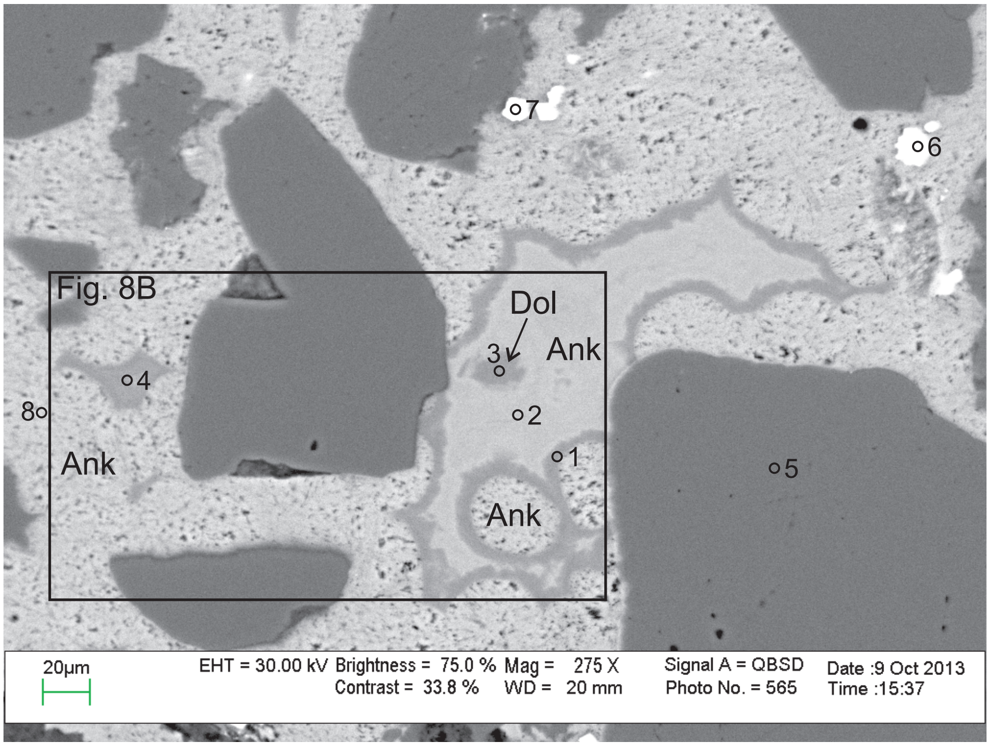
1. Fluorapatite
2. Fluorapatite + Kaolinite
3. Kaolinite
4. Fluorapatite +Kaolinite
5. Ankerite+Apatite
6. Pyrite
7. Kaolinite
8. Fe-calcite + Kaolinite
9. Kaolinite
10. Ankerite
11. Ankerite
12. Ankerite

Figure 6B: O-95 3269.82 m site 1 (SEM, Table A-5). Enlarged area of Fig. 6A. The association of kaolinite (3, 9) and fluorapatite (1, 2, 4) seems to suggest this detrital grain is probably a lithic or a volcanic clast.



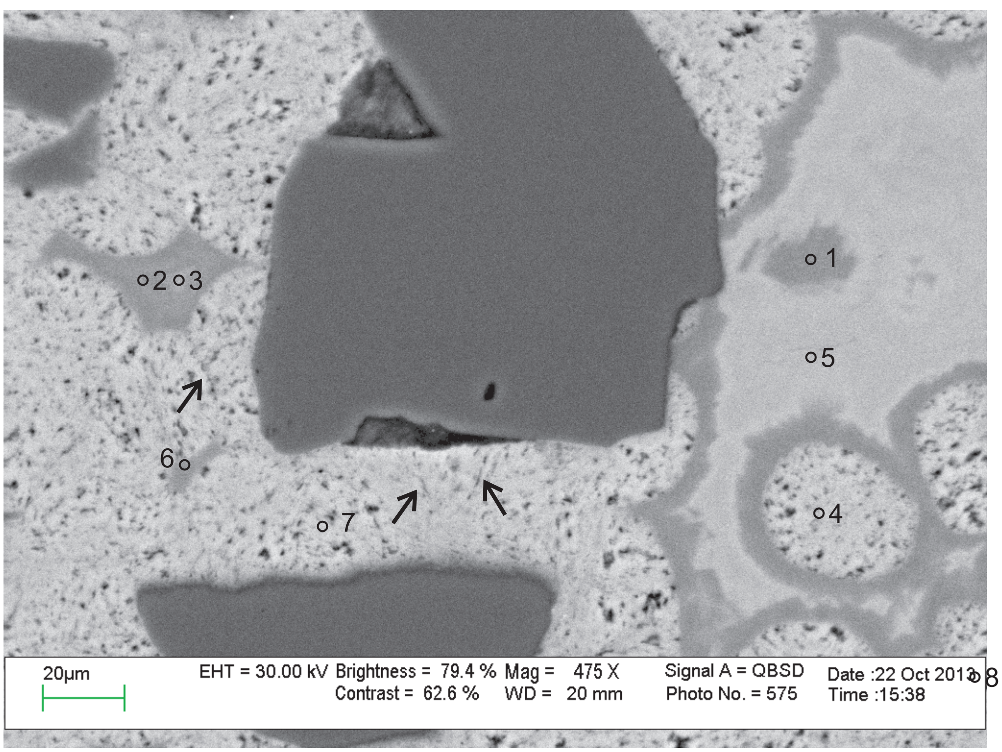
1. Rutile
2. Dolomite
3. Quartz (our of field of view)
4. Ankerite

Figure 7: O-95 3269.82 m. site 5 (SEM, Table A-1).



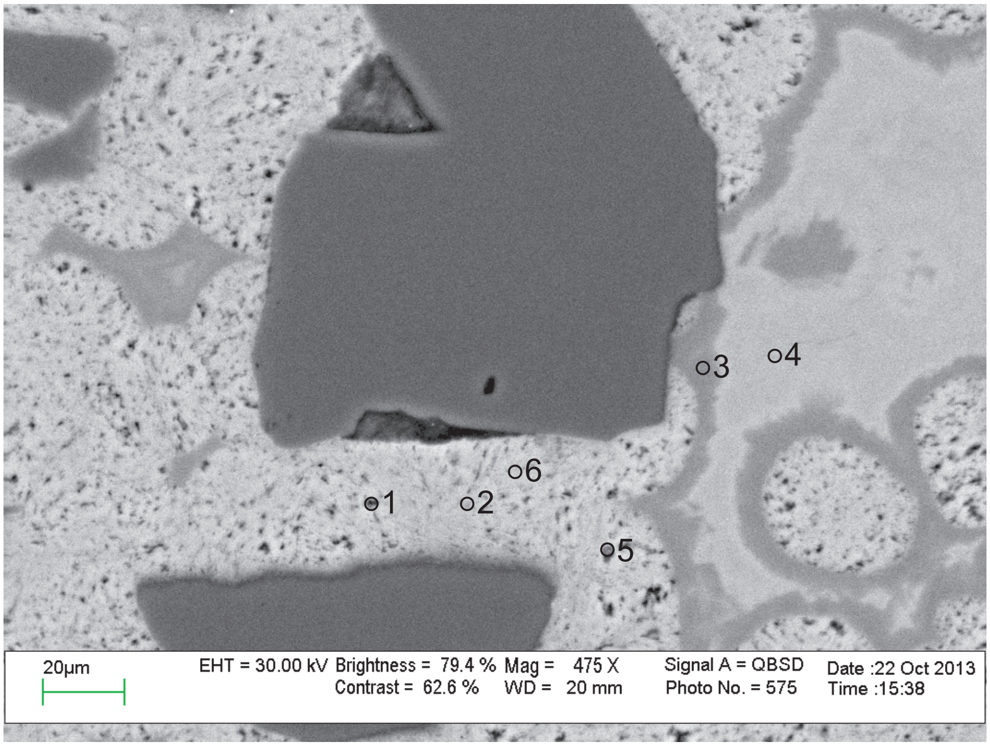
1. Ferroan Dolomite
2. Ankerite
3. Ferroan Dolomite
4. Mg-Cal
5. Quartz
6. Pyrite
7. Pyrite
8. Ankerite

Figure 8A: O-95 3269.82 m. site 3 (SEM, Table A-2). The ankerite (8) is riddled with grey spots.



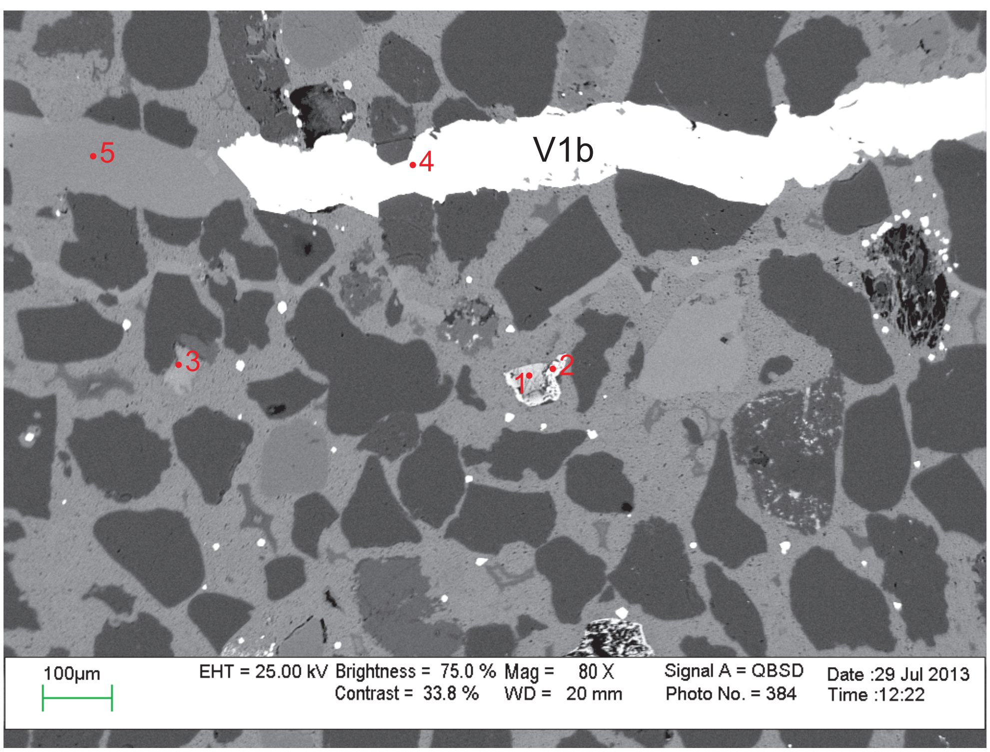
1. Fe-dolomite (3 in Fig. 8A)
2. Fe-dolomite
3. Mg-Calcite (4 in Fig. 8A)
4. Ankerite
5. Ankerite (2 in Fig. 8A)
6. Mixture
7. Ankerite
8. Ankerite

Figure 8B: O-95 3269.82 m site 1(SEM, Table A-3), see location in Fig.8A. Ankerite (4, 5) have been partly replaced by dolomite (1, 2). The grey spots of Fig. 8A seem, when enlarged, to be stringers (arrow) with the same brightness as dolomite.



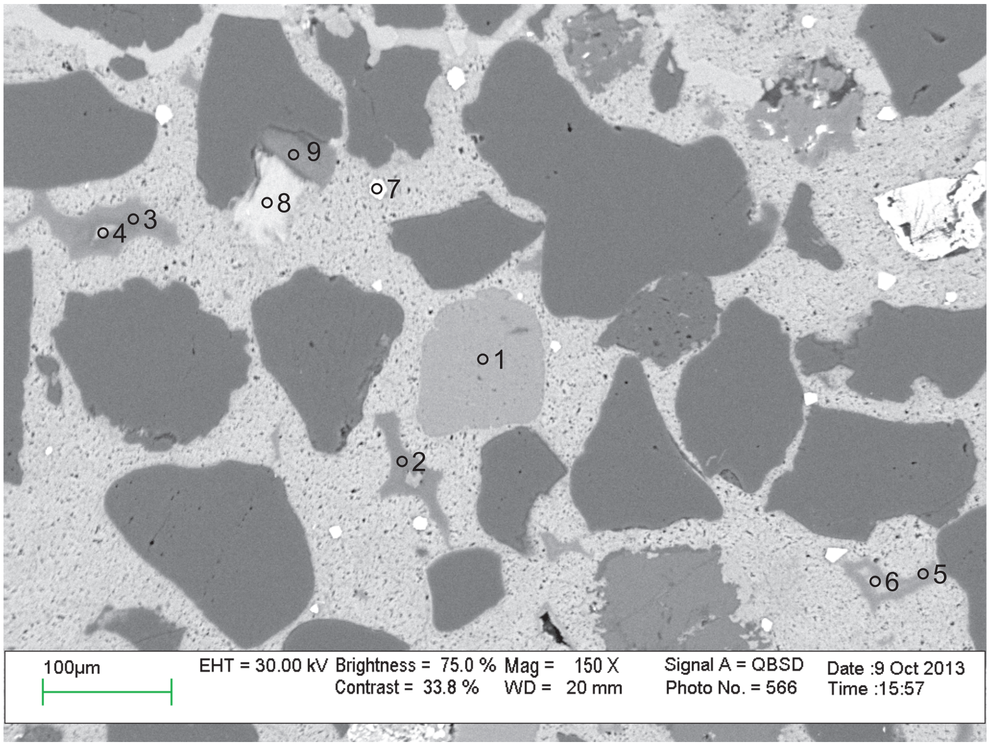
1. Ankerite
2. Ankerite
3. Fe-dolomite
4. Ankerite
5. Ankerite
6. Ankerite

Figure 8C : O-95 3269.82 m site 2, same location (SEM, Table A-5). Same location as Fig. 8B (re-anlaysed).



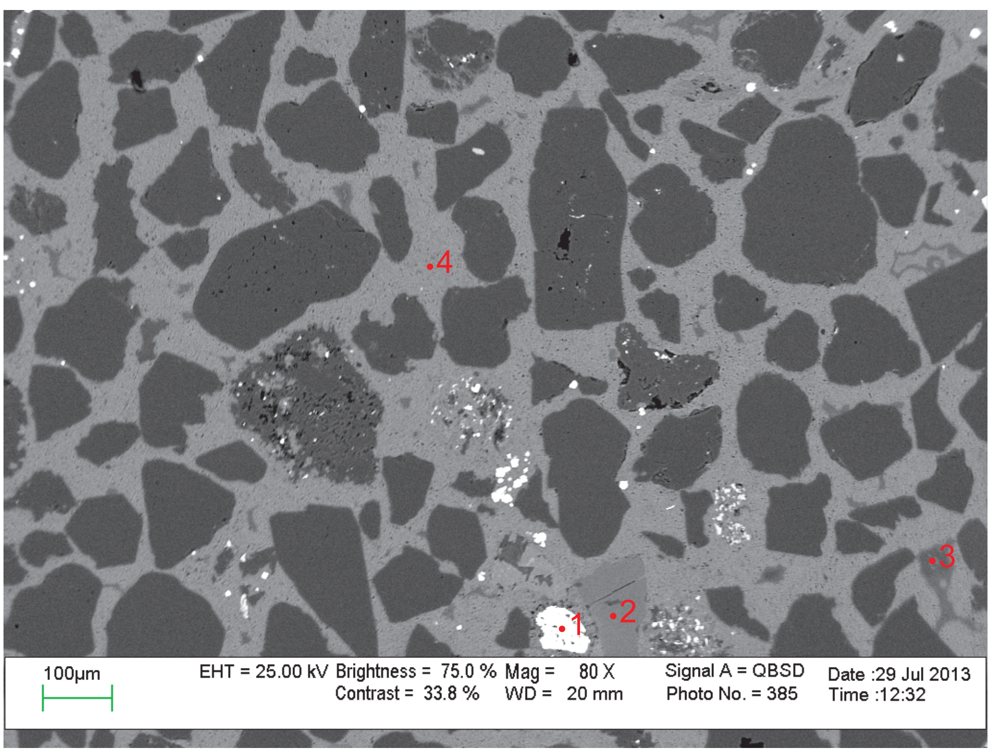
1. Chromite
2. Chromite
3. Chlorite
4. Barite
5. Fe-Calcite

Figure 9: O-95 3269.82 m. site 6 (SEM, Table A-1). Composite vein (V1b) of barite (4) and Fe-calcite (5), see location in Fig. 17.



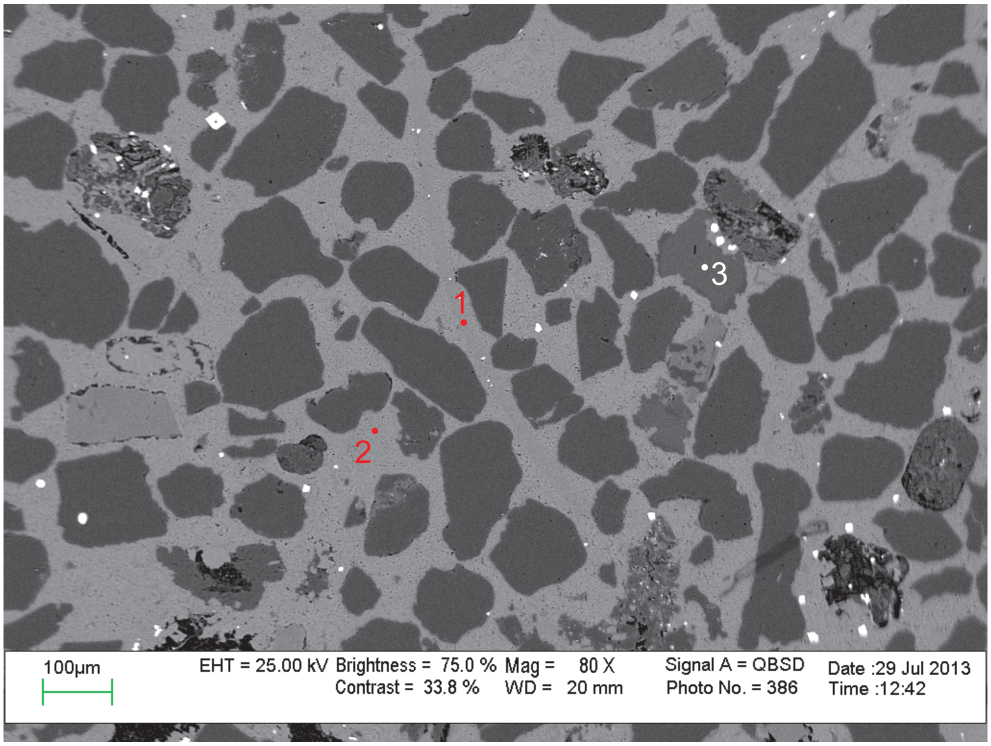
1. K-feldspar
2. Dolomite
3. Ferroan Dolomite
4. Ankerite
5. Ferroan Dolomite
6. Ankerite
7. Pyrite
8. Chlorite
9. K-feldspar

Figure 10: O-95 3269.82 m. site 4 (SEM, Table A-2). Ankerite cement riddled with grey spots (dolomite).



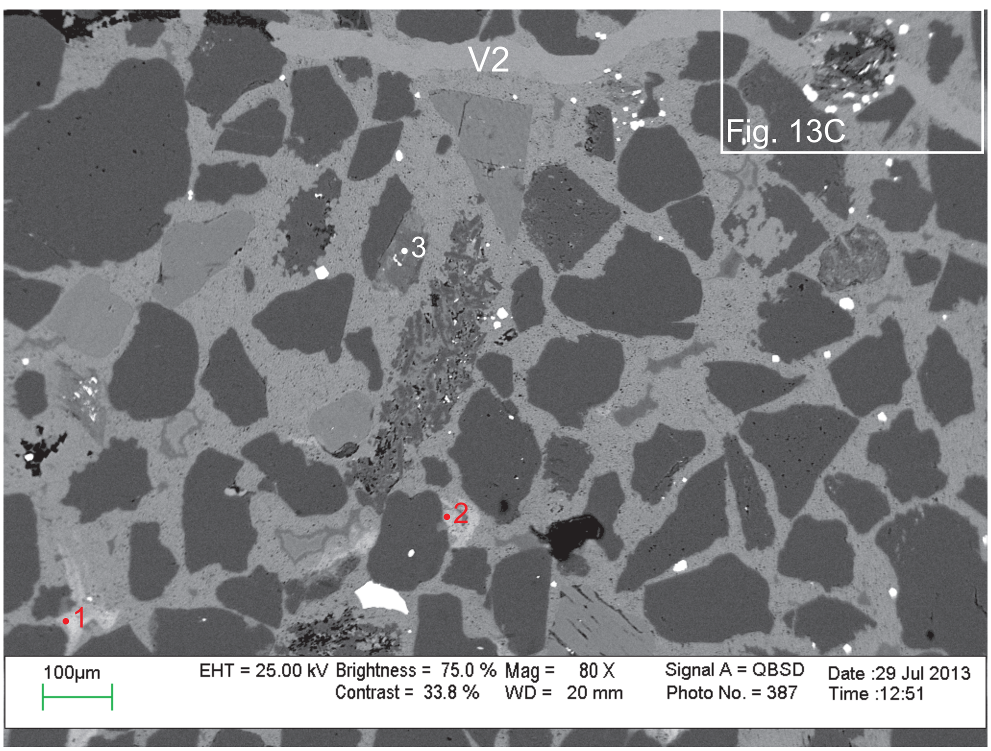
1. Monazite
2. K-feldspar
3. Dolomite
4. Ankerite

Figure 11: O-95 3269.82 m. site 7 (SEM, Table A-1).



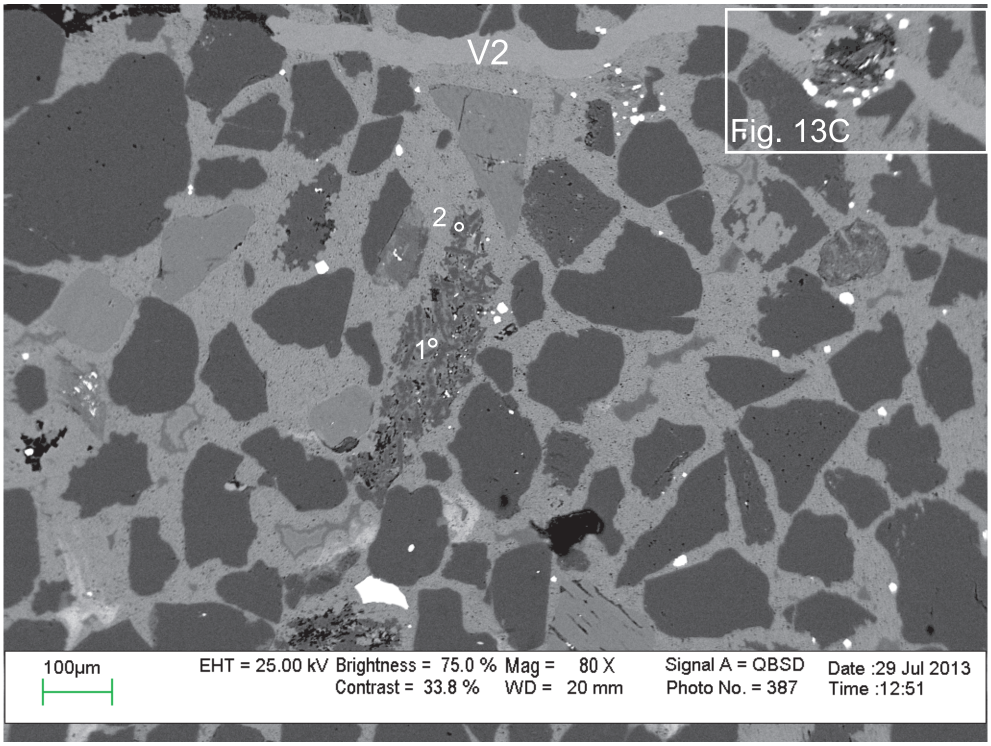
1. Ankerite
2. Ankerite
3. Albite

Figure 12: O-95 3269.82 m. site 8 (SEM, Table A-1).



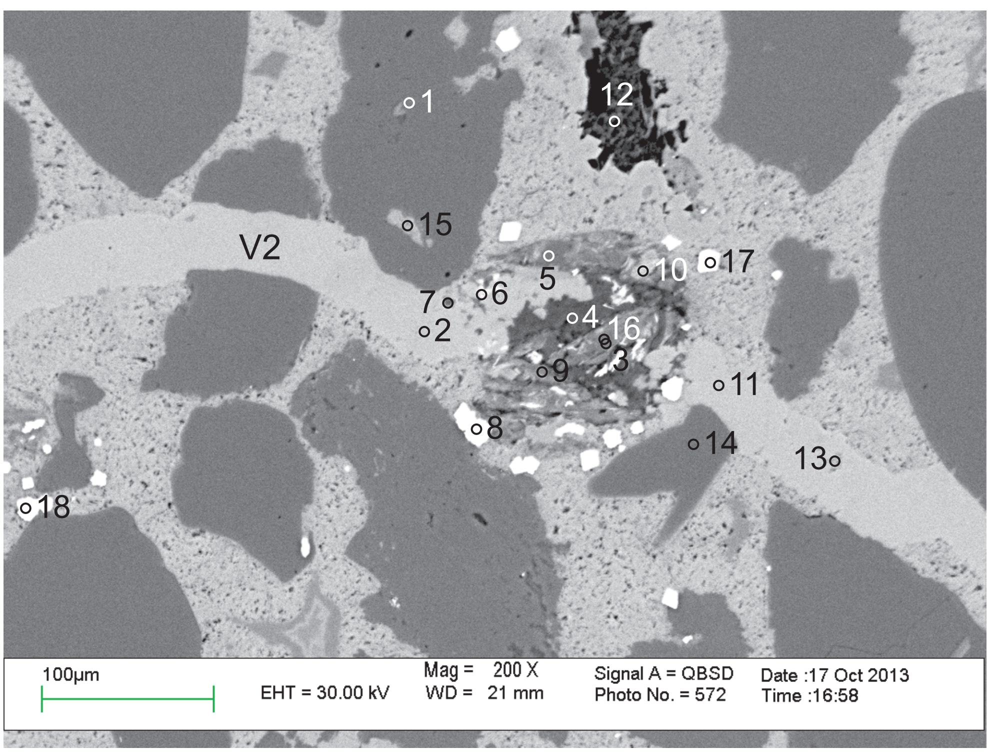
1. Ankerite
2. Ankerite
3. Muscovite

Figure 13A: O-95 3269.82 m. site 9 (SEM, Table A-1). Composite vein (V2) of ankerite and barite (See Fig. 17).



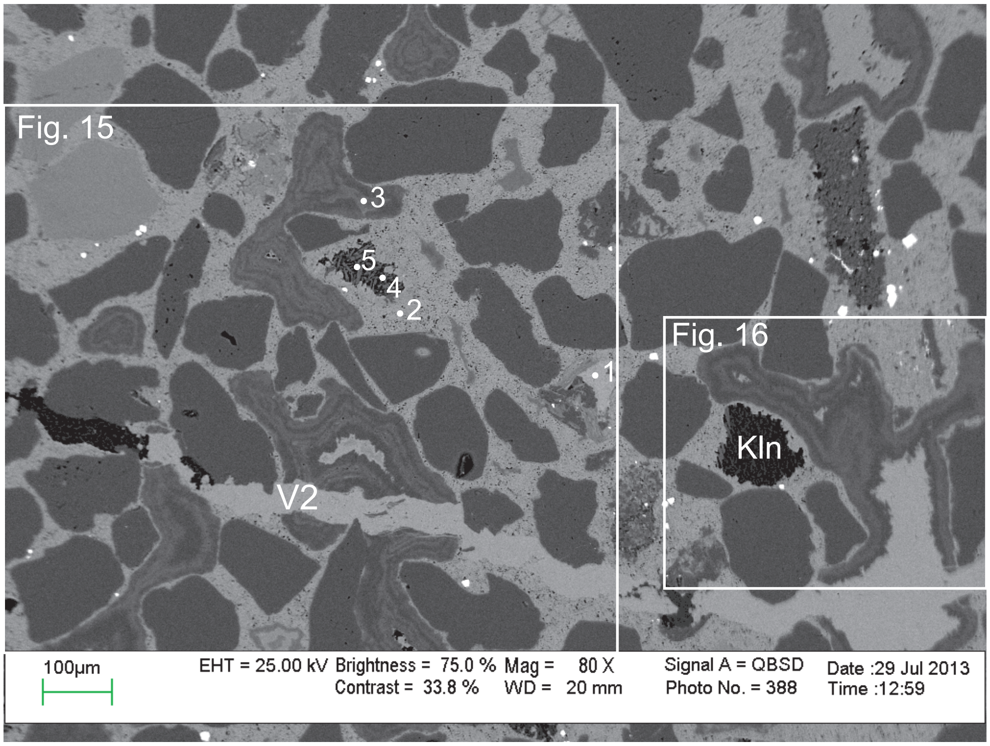
1. K-feldspar
2. Albite

Figure 13B: O-95 3269.82 m. site 1 (SEM, Table A-4), same location as Fig. 13A (re-analysed). Detrital K-feldspar (1) has been partly replaced by albite (2).



1. Quartz
2. Ankerite
3. Quartz
4. Kaolinite
5. Quartz
6. Apatite
7. Mixture
8. Pyrite
9. Illite
10. Chl+Apatite
11. Ankerite
12. Kaolinite
13. Ankerite
14. Quartz
15. Mixture
16. Quartz
17. Pyrite
18. Pyrite

Figure 13C: O-95 3269.82 m. site 2 (SEM, Table A-4), see location in Fig. 17. Lithic clast partly altered to kaolinite (4), illite (9) and chlorite (10).



1. Chlorite
2. Ankerite
3. Dolomite
4. Albite
5. Albite

Figure 14: O-95 3269.82 m. site 10 (SEM, Table A-1). Secondary pores filled with concentric layers of dolomite.

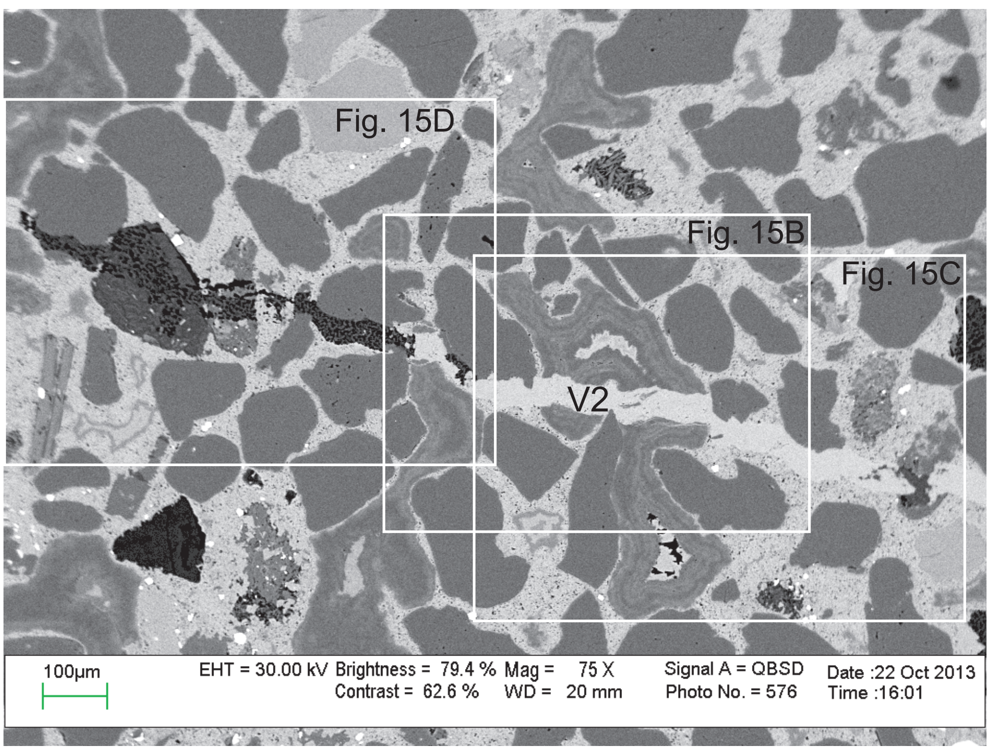
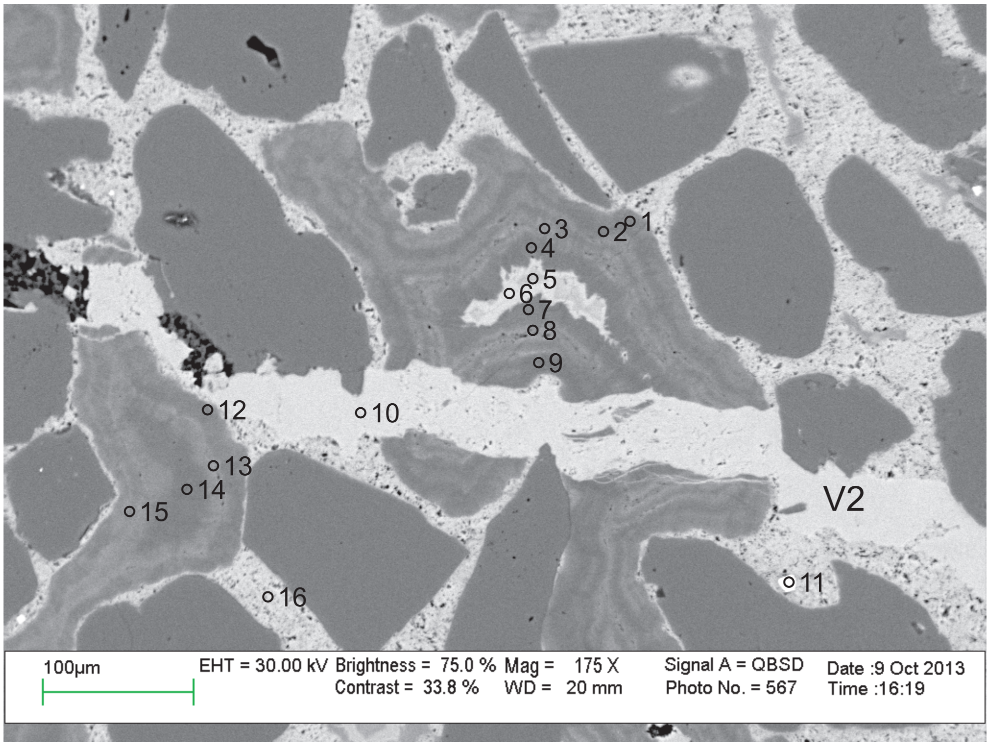
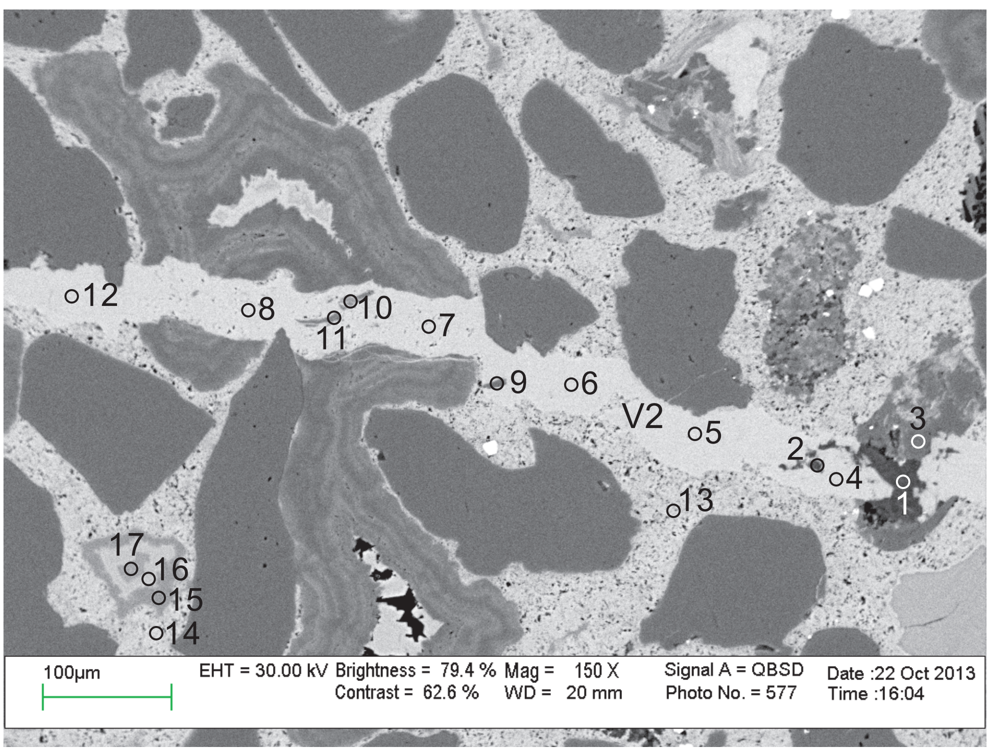


Figure 15A: O-95 3269.82 m site 1 (SEM, Table A-5). Composite vein (V2) of ankerite and kaolinite (see location in Fig. 17).



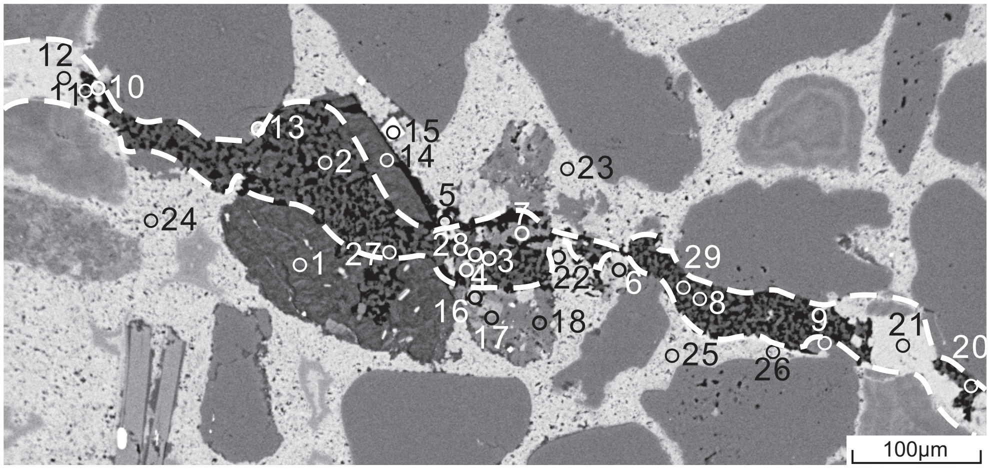
1. Dolomite
2. Dolomite
3. Ferroan Dolomite
4. Dolomite
5. Ankerite
6. Ankerite
7. Dolomite
8. Dolomite
9. Dolomite
10. Ankerite
11. Pyrite
12. Dolomite
13. Ferroan Dolomite
14. Dolomite
15. Dolomite
16. Ankerite

Figure 15B: O-95 3269.82 m site 5 (SEM, Table A-2), see location in Fig. 15A.



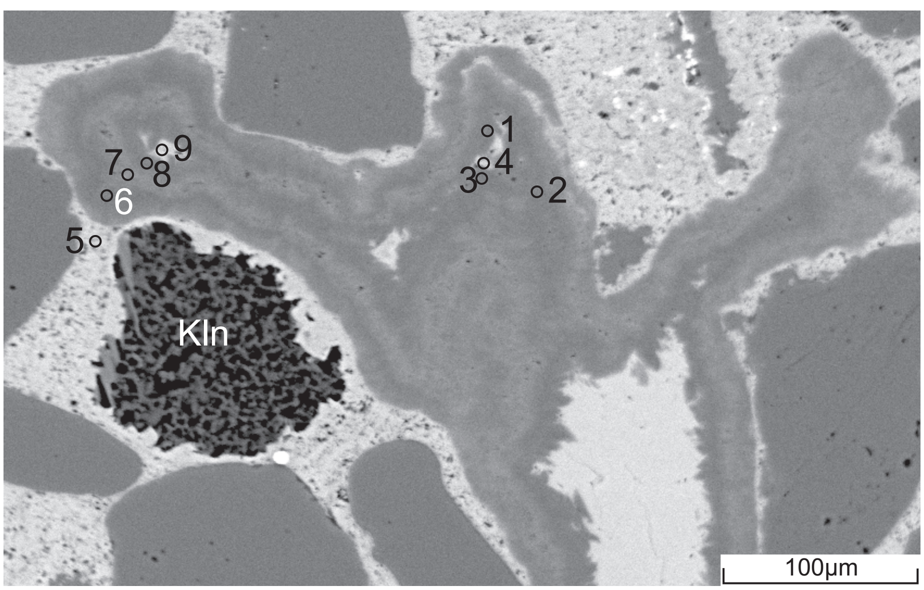
1. Kaolinite
2. Kaolinite + other
3. Quartz
4. Ankerite
5. Ankerite
6. Ankerite
7. Ankerite
8. Ankerite
9. Quartz
10. Dolomite + Ankerite
11. Dolomite + Ankerite
12. Ankerite
13. Ankerite
14. Ankerite
15. Mixture
16. Ankerite
17. Mixture

Figure15C: O-95 3269.82 m site 3 (SEM, Table A-5). See location in Fig. 15A. The composite vein (V2) in this position is made entirely of ankerite (4-8, 12).



1. Kaolinite
2. Kaolinite
3. Kaolinite
4. Quartz
5. Ankerite
6. Ankerite
7. Albite
8. Kaolinite
9. Quartz
10. Quartz + Ankerite
11. Kaolinite + Ankerite
12. Ankerite
13. Ankerite + Albite
14. Kaolinite
15. Pyrite
16. Quartz + Ankerite + K-feldspar
17. Quartz + K-feldspar
18. K-feldspar
19. Ankerite
20. Kaolinite
21. Ankerite
22. Ankerite+other
23. Ankerite
24. Ankerite
25. Ankerite
26. Ankerite
27. Kaolinite
28. Kaolinite
29. Kaolinite

Figure 15D : O-95 3269.82 m site 4 (SEM, Table A-5). See location in Fig. 15A. The location of the kaolinite (2, 3, 8, 9, 20, 29) filling the vein may be related to an early kaolinite now cut by the vein and with different texture (1, 14). The ankerite (21) in the same vein seems to postdate the kaolinite.



1. Dolomite
2. Dolomite
3. Dolomite
4. Ankerite
5. Ankerite
6. Dolomite
7. Dolomite
8. Dolomite
9. Ankerite

Figure 16: O-95 3269.82 m site 6 (SEM, Table A-2). Pore filled with early kaolinite (Kln) that is engulfed by ankerite (5). Concentric layers of dolomite (2, 7, 8) fill secondary porosity.

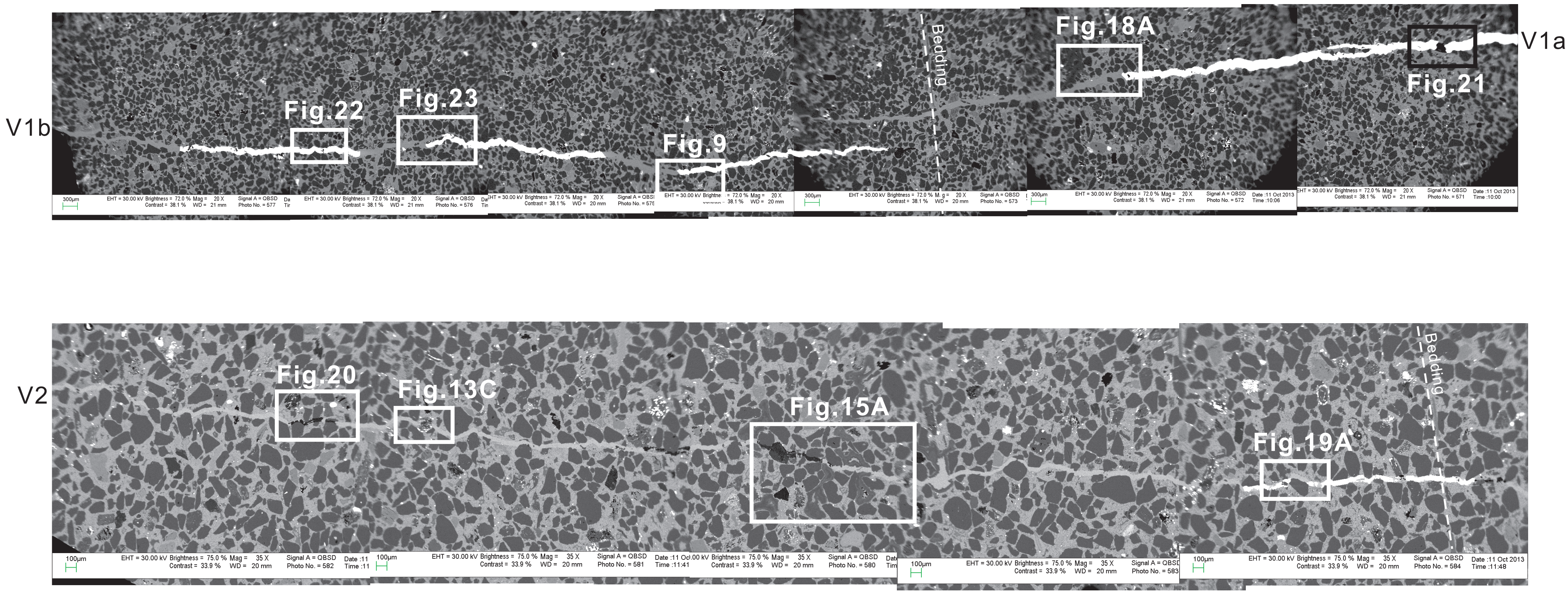
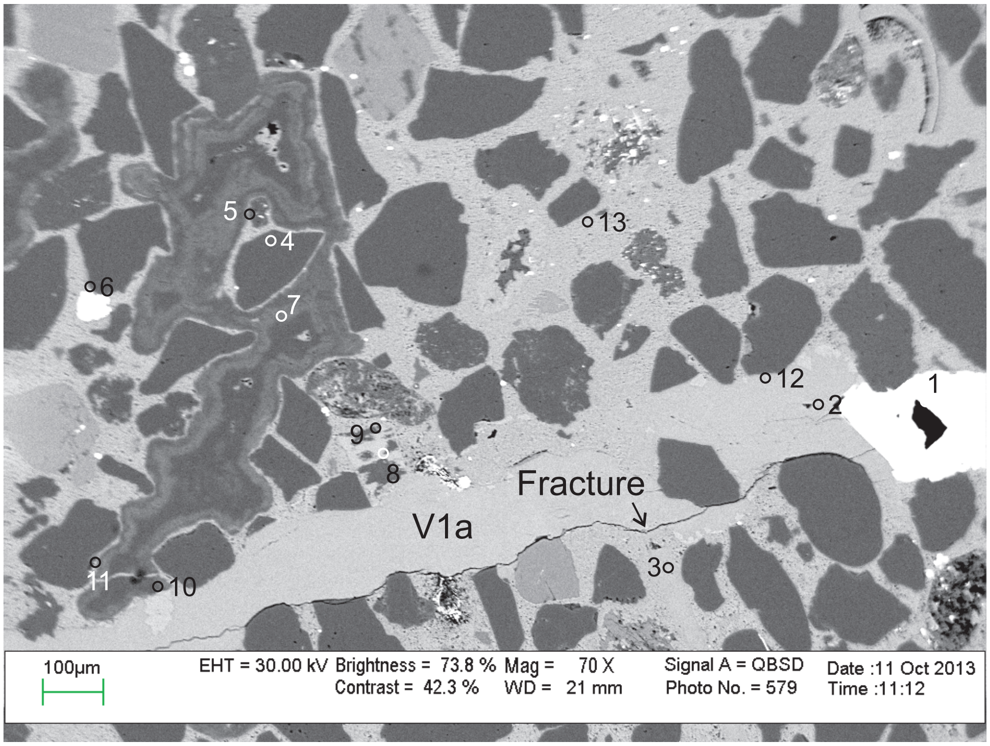
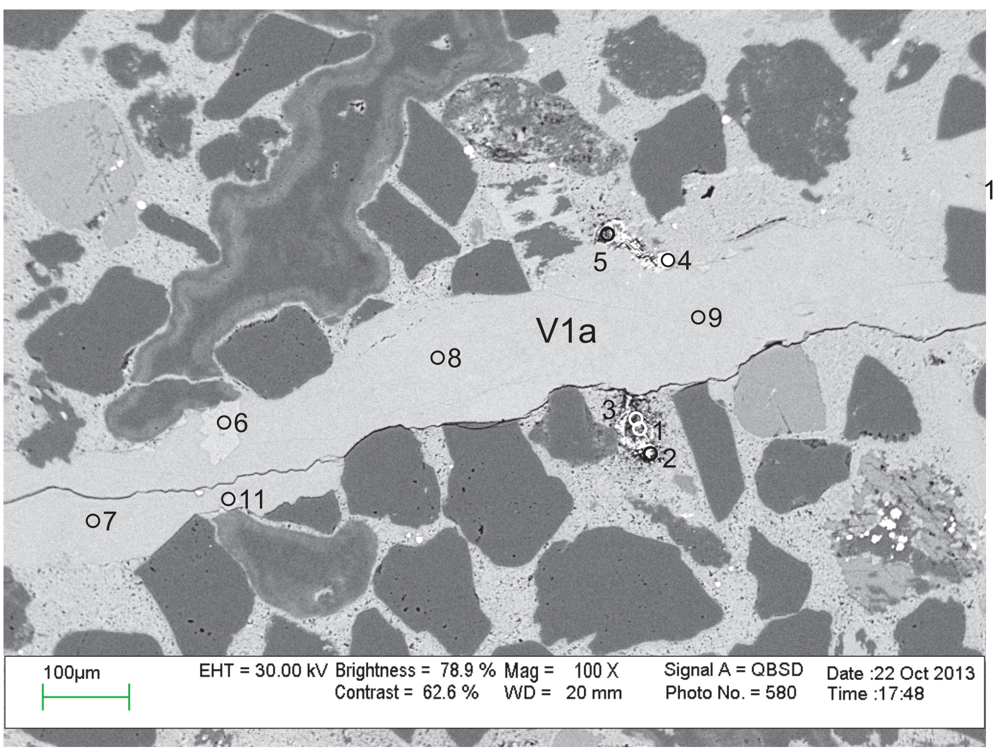


Figure 17: Morphology and mineralogical composition of veins V1a, V1b and V2 that vertically cut the bedding (dashed lines). For details see indicated figures.



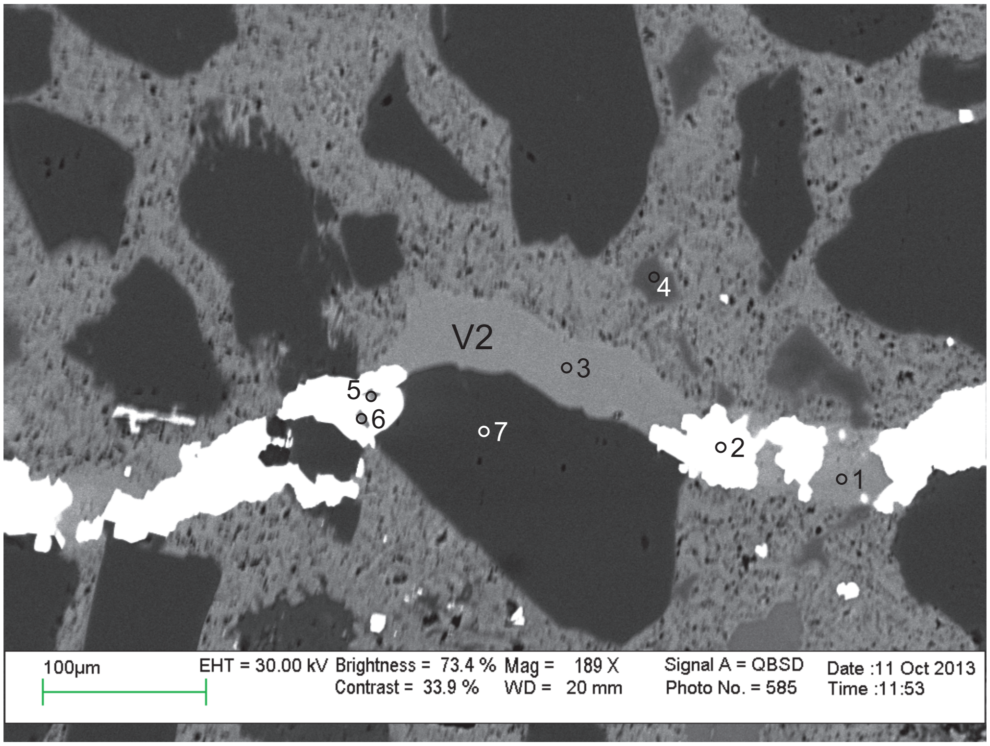
1. hole
2. Fe-calcite
3. Fe-calcite
4. Quartz
5. Ankerite
6. Pyrite
7. Dolomitel
8. Albite
9. Ankerite
10. Ankerite
11. Fe-dolomite
12. Fe-calcite
13. Ankerite

Figure 18A: O-95 3269.82 m site 2 (SEM, Table A-3). Part of composite vein (V1a) made up of Fe-calcite, barite and small patch of ankerite (see location in Fig. 17).



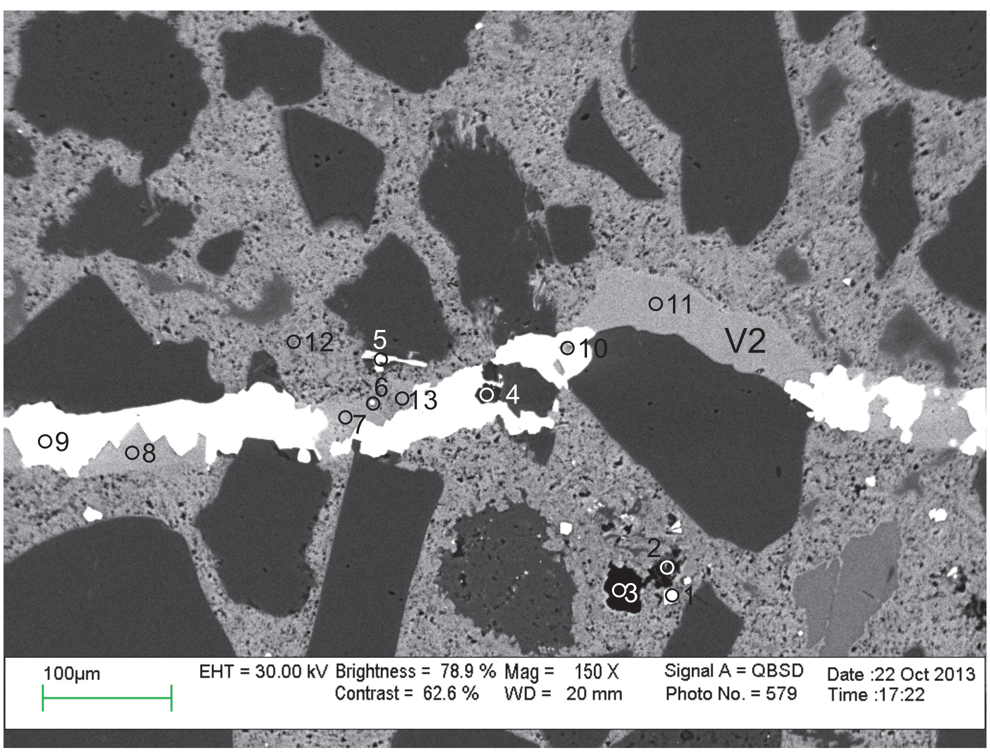
1. Rutile + Pyrite + Kaolinite +other
2. Rutile + Pyrite + other
3. Rutile + Pyrite + Kaolinite + other
4. Pyrite
5. Pyrite + Rutile + Kaolinite
6. Ankerite
7. Fe-calcite
8. Fe-calcite
9. Fe-calcite
10. Fe-calcite
11. Ankerite

Figure 18B : O-95 3269.82 m site 6 (SEM, Table A-5). Approximately the same location as Fig. 18A but enlarged. The minerals present in this part of the vein are Fe-calcite (7-10) and ankerite (6, 11).



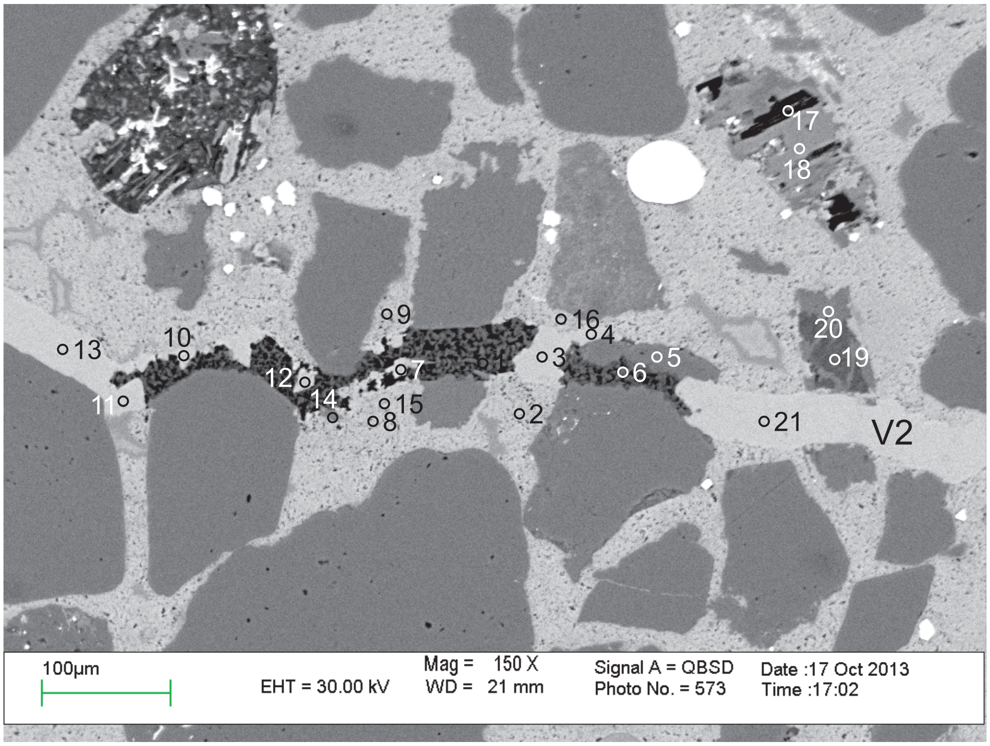
1. Ankerite
2. Barite
3. Ankerite
4. Dolomite
5. Ankerite
6. Ankerite
7. Quartz

Figure 19A: O-95 3269.82 m site 3 (SEM, Table A-3). Part of composite vein (V2) showing patches of ankerite (1, 3) and barite (2) (see location in Fig. 17). The ankerite patches seem to predate the barite.



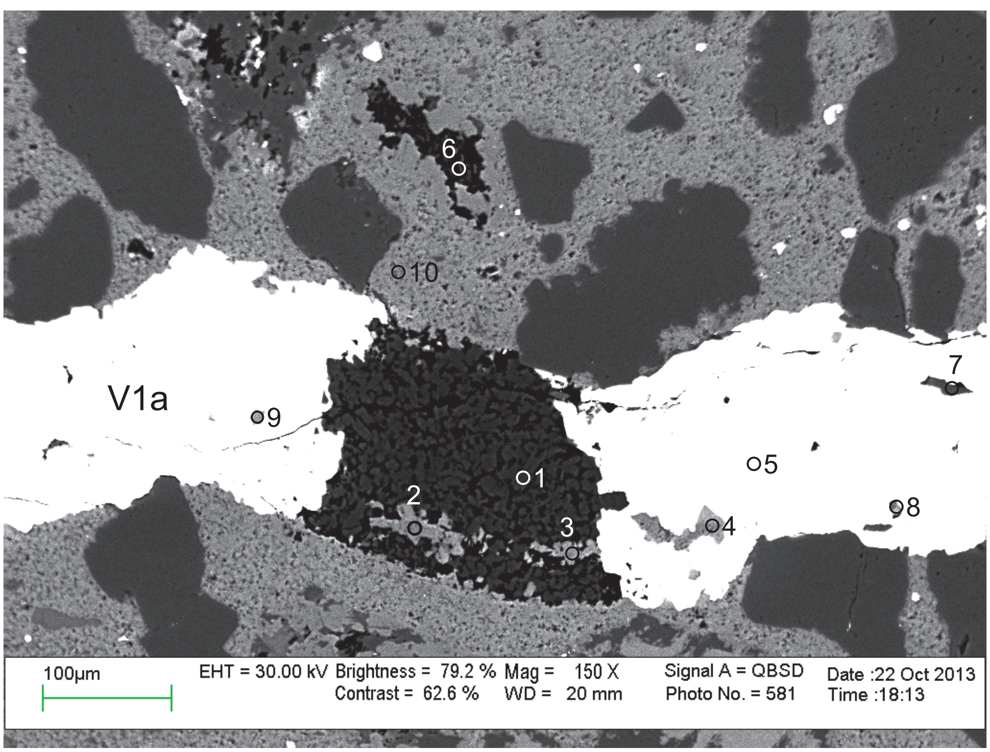
1. Pyrite
2. Illite
3. hole
4. Kaolinite
5. Rutile
6. Pyrite+Ankerite
7. Ankerite
8. Ankerite
9. Barite
10. Ankerite
11. Ankerite
12. Ankerite
13. Ankerite

Figure 19B: O-95 3269.82 m site 5 (SEM, Table A-5). Same location as Fig. 19A (re-anlalysed). Barite with kaolinite inclusion (4).



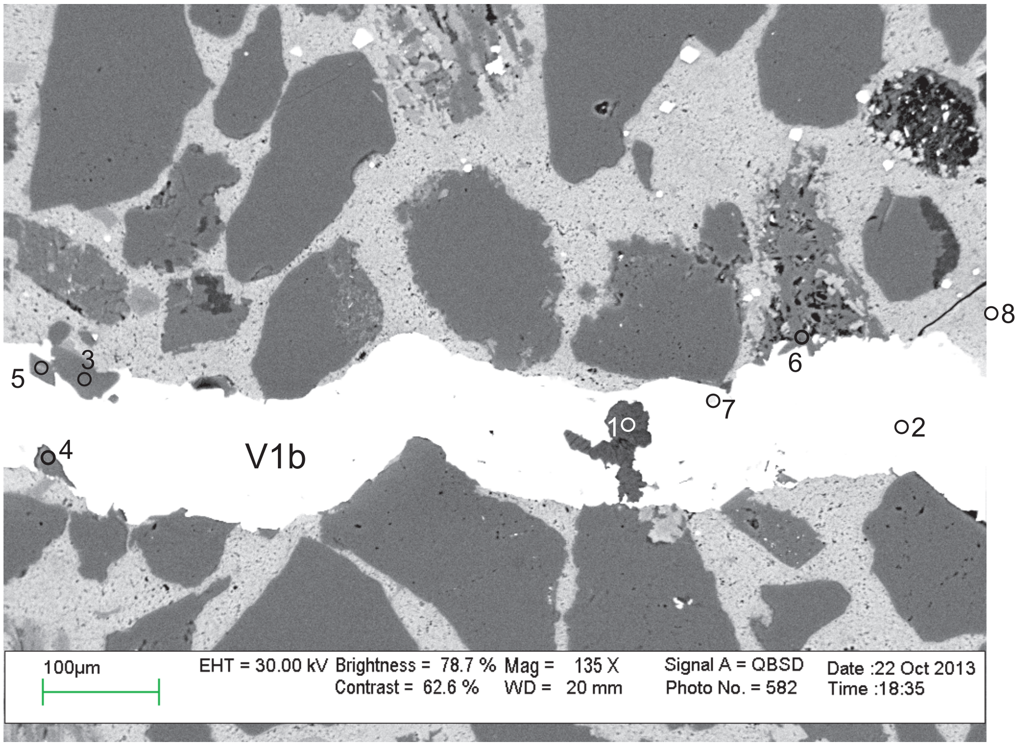
1. Kaolinite
2. Ankerite
3. Ankerite
4. Ankerite
5. Quartz
6. Kaolinite
7. Ankerite
8. Ankerite
9. Ankerite
10. Ankerite
11. Ankerite
12. Ankerite
13. Ankerite
14. Quartz
15. Ankerite
16. Ankerite
17. Albite
18. Plagioclase
19. Kaolinite
20. Albite
21. Ankerite

Figure 20: O-95 3269.82 m site 3 (SEM, Table A-4). Composite vein (V2) of ankerite, barite and kaolinite (see location in Fig. 17).



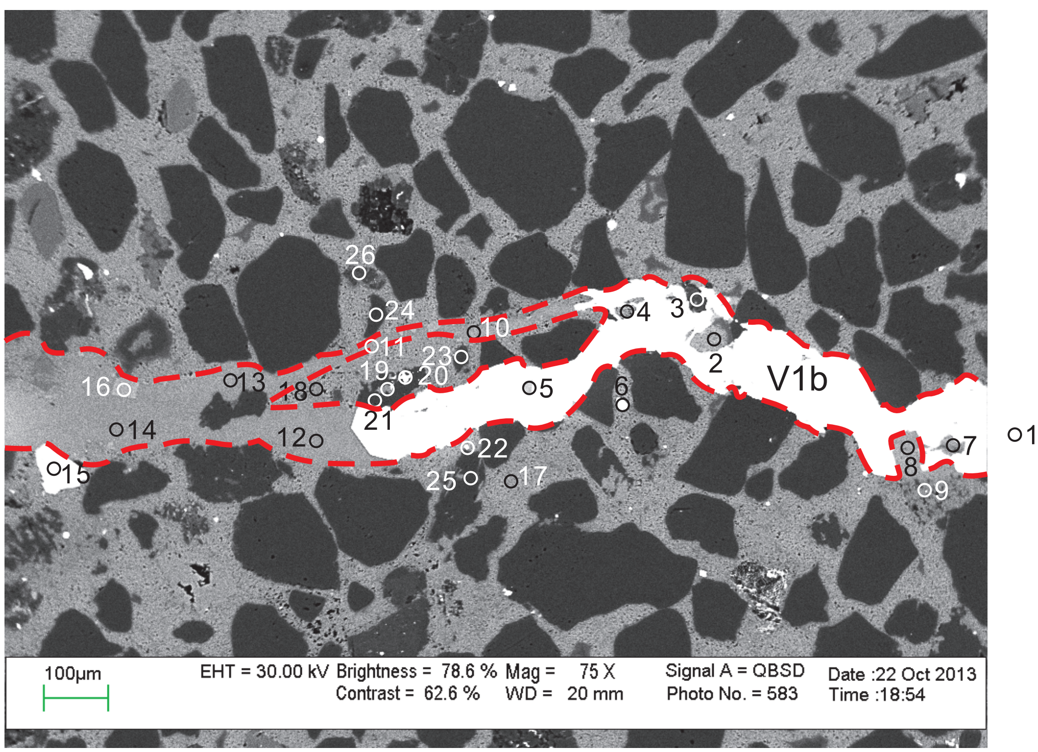
1. Kaolinite
2. Ankerite
3. Ankerite
4. Ankerite
5. Barite
6. Albite
7. Quartz
8. Ankerite + Barite
9. Ankerite
10. Ankerite

Figure 21: O-95 3269.82 m site 7 (SEM, Table A-5). Part of composite vein (V1a) made up of barite, kaolinite and small patches of ankerite (4) in the barite (see location in Fig. 17).



1. Kaolinite
2. Barite
3. Albite
4. Albite
5. K-feldspar
6. Albite
7. Ankerite
8. Ankerite

Figure 22: O-95 3269.82 m site 8 (SEM, Table A-5). Part of composite vein (V1b) made up of barite with kaolinite (1) inclusion (see location in Fig. 17).



1. Barite
2. Ankerite
3. Quartz
4. Ankerite
5. Ankerite
6. Zircon
7. Fe-calcite
8. Fe-calcite
9. Fe-cal+other
10. Fe-calcite
11. Fe-calcite
12. Fe-calcite
13. Fe-calcite
14. Fe-calcite
15. Rutile
16. Ankerite
17. Ankerite
18. Ankerite
19. Ankerite
20. Barite
21. Albite
22. Pyrite
23. Quartz
24. Quartz
25. Quartz
26. Illite

Figure 23: O-95 3269.82 m site 9 (SEM, Table A-5). Part of composite vein (V1b) made up of barite, Fe-calcite and small patches of ankerite (see location in Fig. 17). The relationship between Fe-calcite and early ankerite is unclear.

Table D-1: Scanning Electron Microscope chemical analyses of sample 3269.82 from the Onondaga O-95 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	V_2O_5	Cr_2O_3	ZnO	SrO	ZrO_2	Ag_2O	BaO	La_2O_3	Ce_2O_3	Nd_2O_3	Sm_2O_3	Yb_2O_3	HfO_2	WO_3	B_2O_3	Total
O95-3269.82	1	1	Ms	47.34	0.45	35.06	0.42				1.54	8.19																						93.00
O95-3269.82	1	2	Kfs	66.94		18.2					0.8	14.07																						100.01
O95-3269.82	1	3	Dol				1.26		18.27	32.47																						52.00
O95-3269.82	1	4	Dol						23.73	28.27																						52.00
O95-3269.82	1	5	Qz	99.99																												99.99
O95-3269.82	1	6	Ank	2.32		1.62	6.53	0.40	9.42	35.71																						56.00
O95-3269.82	1	7	Rt	0.56	97.28		1.84			0.31																						99.99
O95-3269.82	1	8	Ms+Cal	41.12	0.62	27.17	5.51	0.22	5.06	12.77	0.59	6.95																				100.01
O95-3269.82	1	9	Py	0.92		0.43	25.46	0.15	0.85	2.35				69.84																		100
O95-3269.82	1	10	Dol				0.92		21.25	29.84																						52.00
O95-3269.82	1	11	Brt											39.23					1.22			59.56										100.01
O95-3269.82	1	12	Ank				7.49	0.47	15.39	32.66																						56.00
O95-3269.82	1	13	Ank				11.26	0.82	11.49	32.42																						56.00
O95-3269.82	1	14	Dol				0.61		20.38	31.01																						52.00
O95-3269.82	1	15	Ank				11.96	0.72	11.91	31.40																						56.00
O95-3269.82	1	16	Ap							45.89			45.19		8.95															-0.03		100
O95-3269.82	1	17	Ilt	50.79		26.79	3.03		2.27	1.93		3.78		1.10		0.32																90.00
O95-3269.82	1	18	Ilt+Cal	54.68	0.45	28.51	2.61		2.57	6.07		4.79				0.31																99.99
O95-3269.82	1	19	Qz	88.71		7.03					3.77	0.49																				100
O95-3269.82	1	20	Qz+Ab	76.63		13.38	0.26				7.95	1.77																				99.99
O95-3269.82	1	21	Dol				1.66		18.52	31.82																						52.00
O95-3269.82	1	22	Ank				13.66	1.31	9.23	31.80																						56.00
O95-3269.82	1	23	Fe-Cal				2.54	0.55	0.89	52.01																						56.00
O95-3269.82	1	24	Dol				0.47		19.80	31.73																						52.00
O95-3269.82	1	25	Fe-Cal				1.79	0.49	0.68	52.34																0.69				56.00
O95-3269.82	2	1	Mix	7.72	1.67	2.34	20.84	1.47	16.22	41.95	0.81	0.55		6.42																		99.99
O95-3269.82	2	2	Kfs	66.08		18.25					1.64	13.6											0.45									100.02
O95-3269.82	2	3	Py	0.17			25.91	0.13		0.36				73.44																		100.01
O95-3269.82	2	4	Ab	62.85		23.6	1.47				7.91	2.94		1.25																		100.02
O95-3269.82	2	5	Ab	65.37		21.84	0.67		0.48		8.59	2.76				0.29																100
O95-3269.82	2	6	Py	0.17			25.42	0.3		0.2				73.91																		100
O95-3269.82	3	1	Ms	52.13	0.28	20.08	9.83		3.45	0.58	0.49	6.03				0.13																93.00
O95-3269.82	3	2	Chl+Cal	42.51		22.66	24.82	0.93	6.82	2.29																						100.03
O95-3269.82	3	3	Zrn	31.45																	67.61								0.96			100.02
O95-3269.82	3	4	Mix	56.99	33.23	6.76	1.24		0.36			1.41																				99.99
O95-3269.82	4	1	Kln	49.76		36.24																										86.00
O95-3269.82	4	2	Dol				5.51		16.85	29.65																						52.00
O95-3269.82	4	3	Ank				7.89	0.22	14.91	32.97																						56.00
O95-3269.82	4	4	Ab	67.43		19.58	0.15			0.98	11.86																					100
O95-3269.82	4	5	Kfs	66.74		18.16					0.49	14.62																				100.01
O95-3269.82	5	1	Rt		98.12		0.27			0.28							1.34															100.01
O95-3269.82	5	2	Dol				3.11		18.65	30.24																						52.00
O95-3269.82	5	3	Qz	99.99																												99.99
O95-3269.82	5	4	Ank				9.77	0.33	12.93	32.98																						56.00
O95-3269.82	6	1	Chr			46.5	20.78		14.18								0.39	18.14														99.99
O95-3269.82	6	2	Chr	4.86		28.89	27.58	0.62	10.83	0.39							0.5	25.71	0.61													99.99
O95-3269.82	6	3	Chl	30.95		23.35	21.65		8.71		0.34																					85.00
O95-3269.82	6	4	Brt											24.4									40.49								35.14	100.03
O95-3269.82	6	5	Fe-Cal				2.43	0.60	0.72	52.24																						56.00
O95-3269.82	7	1	Mnz	1.63		0.87				0.57			38.38		-0.86							2.19		14.75	28.32	12.49	1.64					99.98
O95-3269.82	7	2	Kfs	66.79		18.05					1.07	14.12																				100.03
O95-3269.82	7	3	Dol				4.64	0.20	16.46	30.70																						52.00
O95-3269.82	7	4	Ank	1.61			11.07	0.80	11.05	31.47																						56.00
O95-3269.82	8	1	Ank				10.16	0.37	13.15	32.32																						56.00
O95-3269.82	8	2	Ank				11.25	0.84	11.46	32.46																						56.00
O95-3269.82	8	3	Ab	63.9		22.58				3.6	9.94																					100.02
O95-3269.82	9	1	Ank				11.25	0.71	12.02	32.02																						56.00

Table D-1: Scanning Electron Microscope chemical analyses of sample 3269.82 from the Onondaga O-95 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	V_2O_5	Cr_2O_3	ZnO	SrO	ZrO_2	Ag_2O	BaO	La_2O_3	Ce_2O_3	Nd_2O_3	Sm_2O_3	Yb_2O_3	HfO_2	WO_3	B_2O_3	Total
O95-3269.82	9	2	Ank	0.54			11.07	0.77	11.53	32.09																						56.00
O95-3269.82	9	3	Ms	50.92	0.81	30.57	1.28		0.57		0.43	8.42																				93.00
O95-3269.82	10	1	Chl	28.83		20.81	20.84		14.51																							85.00
O95-3269.82	10	2	Ank				11.82	0.88	10.72	32.57																						56.00
O95-3269.82	10	3	Dol				0.39		20.84	30.77																						52.00
O95-3269.82	10	4	Ab	68.65	0.3	18.74	0.23			0.41	10.8	0.87																				100
O95-3269.82	10	5	Ab	67.45	0.42	19.24	0.21			0.46	11.73	0.51																				100.02

Table D-2: Scanning Electron Microscope chemical analyses of sample 3269.82 from the Onondaga O-95 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	SO_3	Cl	NiO	BaO	Total
O-95 3269.82	1	1	Dol				0.37		20.67	30.96							52.00
O-95 3269.82	1	2	Dol				1.58		16.12	34.30							52.00
O-95 3269.82	1	3	Ank				13.05	0.80	10.58	31.58							56.00
O-95 3269.82	1	4	Dol				0.44		17.79	33.77							52.00
O-95 3269.82	1	5	Dol				0.16		21.56	30.28							52.00
O-95 3269.82	1	6	Rt	0.79	96.7	0.4	1.96			0.18							100.00
O-95 3269.82	1	7	Py	0.26			27.07	0.28	0.38	0.8			71.22				100.00
O-95 3269.82	1	8	Py				27.69			0.38			71.94				100.00
O-95 3269.82	1	9	Brt										38.03			61.98	100.00
O-95 3269.82	2	1	Py	0.21			27.3	0.43		0.32			71.74				100.00
O-95 3269.82	2	2	Py+other	8.92		2.85	31.85	0.28		0.62	0.93	0.65	53.44	0.21	0.24		100.00
O-95 3269.82	3	1	Fe-Dol				4.33	0.19	16.10	31.38							52.00
O-95 3269.82	3	2	Ank				11.07	0.40	11.36	33.18							56.00
O-95 3269.82	3	3	Fe-Dol				4.48	0.16	16.31	31.05							52.00
O-95 3269.82	3	4	Mg-Cal				3.09	0.00	11.82	41.09							56.00
O-95 3269.82	3	5	Qz	99.99													100.00
O-95 3269.82	3	6	Py	0.13			27.43	0.26		0.49	0.24		71.47				100.00
O-95 3269.82	3	7	Py	0.36			27.34	0.41		1.13			70.74				100.00
O-95 3269.82	3	8	Ank				12.57	0.92	9.58	32.93							56.00
O-95 3269.82	4	1	Kfs	65.91		17.88					0.4	15.8					100.00
O-95 3269.82	4	2	Dol				0.47		18.80	32.74							52.00
O-95 3269.82	4	3	Fe-Dol				2.22		17.79	31.99							52.00
O-95 3269.82	4	4	Ank				10.01	0.43	12.16	33.40							56.00
O-95 3269.82	4	5	Fe-Dol				4.76	0.17	15.40	31.67							52.00
O-95 3269.82	4	6	Ank				10.43	0.31	12.25	33.01							56.00
O-95 3269.82	4	7	Py	0.15			27.35	0.27		0.42			71.82				100.00
O-95 3269.82	4	8	Chl	29.37	0.20	22.17	24.09	0.15	8.29	0.23	0.33	0.16					85.00
O-95 3269.82	4	9	Kfs	50.36	0.63	37.09	0.86		0.45		1.42	9.21					100.00
O-95 3269.82	5	1	Dol				0.19		20.73	31.09							52.00
O-95 3269.82	5	2	Dol				0.15		21.36	30.50							52.00
O-95 3269.82	5	3	Fe-Dol				1.20		18.05	32.75							52.00
O-95 3269.82	5	4	Dol				0.31		21.14	30.55							52.00
O-95 3269.82	5	5	Ank				10.05	0.83	12.13	32.99							56.00
O-95 3269.82	5	6	Ank				13.30	1.58	8.69	32.43							56.00
O-95 3269.82	5	7	Dol				0.28		20.99	30.73							52.00
O-95 3269.82	5	8	Dol				0.68		19.06	32.26							52.00
O-95 3269.82	5	9	Dol				0.19		21.66	30.15							52.00
O-95 3269.82	5	10	Ank				13.91	1.39	8.41	32.29							56.00
O-95 3269.82	5	11	Py	0.17			27.43	0.36		0.43			71.59				100.00
O-95 3269.82	5	12	Dol				0.39		20.19	31.42							52.00
O-95 3269.82	5	13	Fe-Dol				2.25		17.35	32.41							52.00
O-95 3269.82	5	14	Dol				0.28		22.03	29.69							52.00

Table D-2: Scanning Electron Microscope chemical analyses of sample 3269.82 from the Onondaga O-95 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	SO_3	Cl	NiO	BaO	Total
O-95 3269.82	5	15	Dol				0.39		18.91	32.70							52.00
O-95 3269.82	5	16	Ank				12.40	0.87	9.78	32.95							56.00
O-95 3269.82	6	1	Dol				0.34		21.37	30.29							52.00
O-95 3269.82	6	2	Dol				0.25		21.62	30.12							52.00
O-95 3269.82	6	3	Dol				0.17		21.71	30.12							52.00
O-95 3269.82	6	4	Ank				9.54	1.29	13.78	31.40							56.00
O-95 3269.82	6	5	Ank				12.43	0.90	10.24	32.43							56.00
O-95 3269.82	6	6	Dol				0.22		21.07	30.71							52.00
O-95 3269.82	6	7	Dol				0.38		18.53	33.09							52.00
O-95 3269.82	6	8	Dol				0.36		21.42	30.22							52.00
O-95 3269.82	6	9	Ank				10.63	1.17	11.58	32.62							56.00
O-95 3269.82	7	1	Dol				0.33		19.43	32.24							52.00
O-95 3269.82	7	2	Dol				0.19		21.23	30.58							52.00
O-95 3269.82	7	3	Dol				0.58		17.52	33.90							52.00
O-95 3269.82	7	4	Dol						22.52	29.48							52.00
O-95 3269.82	7	5	Fe-Dol				1.02		19.36	31.62							52.00
O-95 3269.82	7	6	Ank				13.03	0.82	10.53	31.62							56.00

Table D-3: Scanning Electron Microscope chemical analyses of sample 3269.82 from the Onondaga O-95 well.

Sample	Site	Position	Mineral	SiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	SO_3	Cl	SrO	BaO	Total
O-95 3269.82	1	1	Fe-dol			4.50	0.23	16.35	30.92						52
O-95 3269.82	1	2	Fe-dol			4.07		16.38	31.55						52
O-95 3269.82	1	3	Mg-Cal			2.50	0.15	12.29	41.06						56
O-95 3269.82	1	4	Ank			11.94	0.85	10.51	32.70						56
O-95 3269.82	1	5	Ank			11.39	0.39	11.75	32.47						56
O-95 3269.82	1	6	mix			6.48	0.40	16.17	32.95						56
O-95 3269.82	1	7	Ank	0.79		11.85	0.85	10.23	32.28						56
O-95 3269.82	1	8	Ank			12.28	0.87	10.05	32.64			0.16			56
O-95 3269.82	2	1	hole	29.11								70.89			100
O-95 3269.82	2	2	Fe-cal			2.13	0.52	0.63	52.72						56
O-95 3269.82	2	3	Fe-cal			2.24	0.30	1.03	52.43						56
O-95 3269.82	2	4	Qz	99.99											100
O-95 3269.82	2	5	Ank			12.11	0.85	10.65	32.39						56
O-95 3269.82	2	6	Py	0.15		27.49	0.32				72.04				100
O-95 3269.82	2	7	Dol			0.16		22.71	29.13						52
O-95 3269.82	2	8	Ab	68.56	18.86	0.12			0.14	12.34					100
O-95 3269.82	2	9	Ank			14.00	1.04	8.66	32.30						56
O-95 3269.82	2	10	Ank			14.71	1.47	8.49	31.33						56
O-95 3269.82	2	11	Fe-dol	0.63		5.04	0.36	14.77	31.20						52
O-95 3269.82	2	12	Fe-cal			2.41	0.57	0.75	52.27						56
O-95 3269.82	2	13	Ank			11.92	0.87	10.43	32.78						56
O-95 3269.82	3	1	Ank			14.06	1.52	8.71	31.70						56
O-95 3269.82	3	2	Brt								38.6		1.03	60.39	100
O-95 3269.82	3	3	Ank			13.90	1.44	8.56	32.09						56
O-95 3269.82	3	4	Dol			0.73		18.83	32.44						52
O-95 3269.82	3	5	Ank			11.63	1.12	8.59	28.95		1.88			3.84	56
O-95 3269.82	3	6	Ank			13.36	1.30	8.44	30.21		0.81			1.88	56
O-95 3269.82	3	7	Qz	99.99											100

Table D-4: Scanning Electron Microscope chemical analyses of sample 3269.82 from the Onondaga O-95 well.

Sample	Site	Position	Mineral	SiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	Cl	Total
O-95 3269.82	1	1	Kfs	66.53	17.36	0.23				0.44	15.43				100.00
O-95 3269.82	1	2	Ab	68.20	18.59					11.58	1.64				100.00
O-95 3269.82	2	1	Qz	99.99											100.00
O-95 3269.82	2	2	Ank			13.93	1.24	8.74	32.09						56.00
O-95 3269.82	2	3	Qz	98.64	0.79	0.42					0.13				100.00
O-95 3269.82	2	4	Kln	57.14	42.17	0.50					0.18				100.00
O-95 3269.82	2	5	Qz	98.42	0.83	0.30			0.15		0.29				100.00
O-95 3269.82	2	6	Ap	2.76	2.63	12.18	1.10	6.88	51.56			22.89			100.00
O-95 3269.82	2	7	mix	35.04	29.46	8.95	0.88	2.49	23.17						100.00
O-95 3269.82	2	8	Py	0.19		27.21	0.30		0.15				72.17		100.00
O-95 3269.82	2	9	Ilt	57.93	32.22	3.60		1.56	1.08		2.89	0.73			100.00
O-95 3269.82	2	10	Chl+Ap	32.58	21.35	21.25		9.92	6.14		1.01	7.01	0.75		100.00
O-95 3269.82	2	11	Ank			13.83	1.39	8.52	32.26						56.00
O-95 3269.82	2	12	Kln	57.42	41.82	0.53			0.25						100.00
O-95 3269.82	2	13	Ank	0.69	0.44	12.07	0.94	10.08	31.77						56.00
O-95 3269.82	2	14	QZ	99.84		0.17									100.00
O-95 3269.82	2	15	mix	23.55	13.43	14.33	0.89	8.64	39.15						100.00
O-95 3269.82	2	16	QZ	96.88	1.53	0.81			0.35		0.43				100.00
O-95 3269.82	2	17	Py			26.85	0.56		0.42				72.17		100.00
O-95 3269.82	2	18	Py	1.71	1.38	26.57			0.50		0.24		69.59		100.00
O-95 3269.82	3	1	Kln	57.99	42.00										100.00
O-95 3269.82	3	2	Ank			12.37	0.90	10.01	32.72						56.00
O-95 3269.82	3	3	Ank			14.04	1.33	8.85	31.78						56.00
O-95 3269.82	3	4	Ank	0.50		13.57	1.37	9.10	31.45						56.00
O-95 3269.82	3	5	Qz	99.99											100.00
O-95 3269.82	3	6	Kln	57.97	42.02										100.00
O-95 3269.82	3	7	Ank	0.54		13.86	1.34	9.02	31.25						100.00
O-95 3269.82	3	8	Ank	0.66		12.20	0.82	10.13	32.18						56.00
O-95 3269.82	3	9	Ank	0.45		12.23	0.88	9.93	32.51						56.00
O-95 3269.82	3	10	Ank			13.55	1.31	8.99	32.15						56.00
O-95 3269.82	3	11	Ank			13.64	1.29	8.82	32.25						56.00
O-95 3269.82	3	12	Ank		0.36	13.70	1.36	8.97	31.61						56.00
O-95 3269.82	3	13	Ank			13.68	1.39	8.84	32.09						56.00

Table D-4: Scanning Electron Microscope chemical analyses of sample 3269.82 from the Onondaga O-95 well.

Sample	Site	Position	Mineral	SiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	Cl	Total
O-95 3269.82	3	14	Qz	94.81	0.38	1.12		0.63	3.05						100.00
O-95 3269.82	3	15	Ank			12.40	0.87	9.88	32.70					0.15	56.00
O-95 3269.82	3	16	Ank			12.25	0.88	10.32	32.55						56.00
O-95 3269.82	3	17	Ab	65.80	20.18	0.69			2.11	10.62	0.30			0.29	100.00
O-95 3269.82	3	18	Pl	59.77	25.23	0.30			6.97	7.24	0.49				100.00
O-95 3269.82	3	19	Kln	56.82	42.99	0.19									100.00
O-95 3269.82	3	20	Ab	64.77	22.94	0.35			1.55	10.19	0.17				100.00
O-95 3269.82	3	21	Ank			13.69	1.26	8.46	32.59						56.00

Table D-5: Scanning Electron Microscope chemical analyses of sample 3269.82 from the Onadaga O-95 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	SrO	ZrO_2	BaO	Ce_2O_3	HfO_2	B_2O_3	Total
O-95 3269.82	1	1	Fap	1.73		1.27	0.24			44.47	0.90		41.70	1.25	6.99	0.74				0.73			100.00
O-95 3269.82	1	2	Fap+Kln	10.70		8.26				33.57	0.55		36.62	1.92	7.97	0.44							100.00
O-95 3269.82	1	3	Kln	49.54		36.46																	86.00
O-95 3269.82	1	4	Fap+Kln	9.86		8.18	0.69		0.66	35.01	0.81		35.40	1.95	6.85	0.59							100.00
O-95 3269.82	1	5	Ank+Ap	0.78		0.48	9.57	0.70	9.71	29.90			4.72			0.15							56.00
O-95 3269.82	1	6	Py	0.34			27.04	0.36	0.27	0.69				71.32									100.00
O-95 3269.82	1	7	Kln	48.66		34.66									2.39	0.29							86.00
O-95 3269.82	1	8	Fe-cal+Kln	9.99		6.71	19.77	1.41	5.60	55.87						0.67							100.00
O-95 3269.82	1	9	Kln	50.04		35.96																	86.00
O-95 3269.82	1	10	Ank	0.83			12.10	0.84	9.66	32.34						0.23							56.00
O-95 3269.82	1	11	Ank				11.79	0.87	10.39	32.95													56.00
O-95 3269.82	1	12	Ank				12.02	0.85	10.37	32.75													56.00
O-95 3269.82	2	1	Ank	1.47			12.50	0.88	8.09	33.06													56.00
O-95 3269.82	2	2	Ank	1.27			11.52	0.87	10.39	31.95													56.00
O-95 3269.82	2	3	Fe-dol	0.43			4.70		16.06	30.80													52.00
O-95 3269.82	2	4	Ank				11.26	0.40	11.51	32.83													56.00
O-95 3269.82	2	5	Ank	1.26			11.77	0.87	8.06	31.00													52.97
O-95 3269.82	2	6	Ank				12.47	0.82	9.83	32.88													56.00
O-95 3269.82	3	1	Kln	49.16		36.70	0.15																86.00
O-95 3269.82	3	2	Kln+other	49.69		38.77	2.88	0.21	0.95	7.50													100.00
O-95 3269.82	3	3	Qz	96.46		1.00	1.71		0.27	0.27		0.30											100.00
O-95 3269.82	3	4	Ank				13.90	1.42	8.58	32.10													56.00
O-95 3269.82	3	5	Ank				13.84	1.49	8.53	32.14													56.00
O-95 3269.82	3	6	Ank				14.06	1.30	8.55	32.09													56.00
O-95 3269.82	3	7	Ank				14.26	1.42	8.79	31.53													56.00
O-95 3269.82	3	8	Ank				14.42	1.36	8.53	31.69													56.00
O-95 3269.82	3	9	Qz	86.74			3.16	0.32	0.75	9.01													100.00
O-95 3269.82	3	10	Dol+Ank				5.50	0.69	16.04	33.76													56.00
O-95 3269.82	3	11	Dol+Ank				3.64	0.38	19.31	32.67													56.00
O-95 3269.82	3	12	Ank				13.91	1.34	8.55	32.20													56.00
O-95 3269.82	3	13	Ank				12.58	0.85	9.65	32.92													56.00
O-95 3269.82	3	14	Ank				13.15	0.88	9.27	32.70													56.00
O-95 3269.82	3	15	mix				4.08		18.33	33.59													56.00
O-95 3269.82	3	16	Ank				11.07	0.44	11.67	32.82													56.00
O-95 3269.82	3	17	mix				5.58	0.17	15.44	34.81													56.00
O-95 3269.82	4	1	Kln	47.56		34.47	0.42		0.41	0.35		1.11			1.68								86.00
O-95 3269.82	4	2	Kln	48.59		37.26	0.15																86.00
O-95 3269.82	4	3	Kln	49.34		36.66																	86.00
O-95 3269.82	4	4	Qz	92.33		3.87	0.60			0.31	1.89	1.01											100.00
O-95 3269.82	4	5	Ank	1.38		0.67	12.21	0.87	10.45	30.42													56.00
O-95 3269.82	4	6	Ank	4.85		2.36	11.69	0.92	10.30	25.48	0.39												56.00
O-95 3269.82	4	7	Ab	72.63		17.48	0.17				9.11	0.61											100.00
O-95 3269.82	4	8	Kln	49.30		36.70																	86.00
O-95 3269.82	4	9	Qz	98.96		0.89				0.14													100.00
O-95 3269.82	4	10	Qz+Ank	43.58		2.57	12.70	1.01	10.41	29.73													100.00

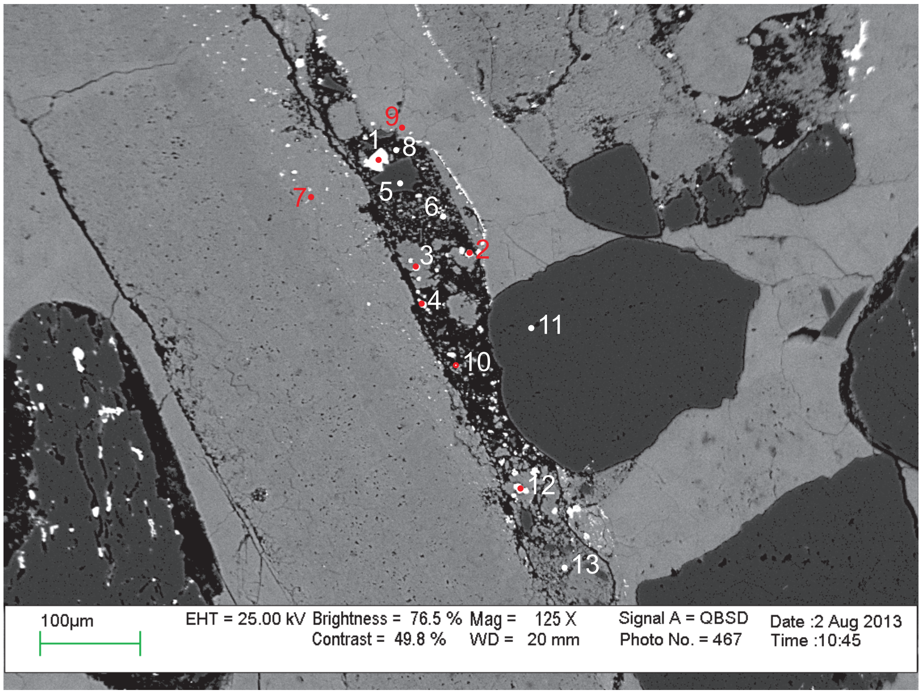
Table D-5: Scanning Electron Microscope chemical analyses of sample 3269.82 from the Onadaga O-95 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	SrO	ZrO_2	BaO	Ce_2O_3	HfO_2	B_2O_3	Total
O-95 3269.82	4	11	Kln+Ank	44.44		30.30	2.30		2.18	6.41						0.35							86.00
O-95 3269.82	4	12	Ank				14.13	1.27	9.37	31.23													56.00
O-95 3269.82	4	13	Ank+Ab	16.84		7.72	7.18	0.50	3.80	16.37	3.58												56.00
O-95 3269.82	4	14	Kln	49.23		33.98	0.47		0.43	0.36		1.53											86.00
O-95 3269.82	4	15	Py				28.01			0.18				71.82									100.00
O-95 3269.82	4	16	Qz+Ank+Kfs	30.46		2.51	15.31	0.85	13.51	34.85	0.50	2.00											100.00
O-95 3269.82	4	17	Qz+Kfs	81.03		9.09	0.18				0.59	9.09											100.00
O-95 3269.82	4	18	Kfs	69.35	2.50	15.53	0.37			0.53	7.33	4.36											100.00
O-95 3269.82	4	19	Ank				13.70	1.37	8.49	32.43													56.00
O-95 3269.82	4	20	Kln	49.80		35.89	0.16			0.15													86.00
O-95 3269.82	4	21	Ank				14.01	1.32	8.71	31.96													56.00
O-95 3269.82	4	22	Ank+other	2.53		1.01	13.07	1.14	9.30	28.41	0.54												56.00
O-95 3269.82	4	23	Ank				12.86	0.95	9.65	32.55													56.00
O-95 3269.82	4	24	Ank				12.35	0.95	9.96	32.60						0.13							56.00
O-95 3269.82	4	25	Ank				12.80	0.85	9.78	32.57													56.00
O-95 3269.82	4	26	Ank	0.48			12.17	0.86	10.30	32.19													56.00
O-95 3269.82	4	27	Kln	48.97		37.03																	86.00
O-95 3269.82	4	28	Kln	49.34		36.03	0.15			0.48													86.00
O-95 3269.82	4	29	Kln	49.43		36.41				0.15													86.00
O-95 3269.82	5	1	Py				27.00	0.52		0.32				72.17									100.00
O-95 3269.82	5	2	Ilt	45.21		14.24	4.04	0.28	1.30	16.97	3.16	4.53				0.29							90.00
O-95 3269.82	5	3	hole				17.55			38.17						44.28							100.00
O-95 3269.82	5	4	Kln	48.82		37.05	0.13																86.00
O-95 3269.82	5	5	Rt	11.66	84.45	1.80	0.85			1.23													100.00
O-95 3269.82	5	6	Py+Ank				26.39	0.52	2.67	10.82				59.61									100.00
O-95 3269.82	5	7	Ank				13.83	1.94	8.66	31.58													56.00
O-95 3269.82	5	8	Ank				13.81	1.28	8.85	32.06													56.00
O-95 3269.82	5	9	Brt											38.58			1.60		59.83				100.00
O-95 3269.82	5	10	Ank				11.90	1.19	8.75	30.06				1.40					2.70				56.00
O-95 3269.82	5	11	Ank				13.99	1.35	8.59	32.07													56.00
O-95 3269.82	5	12	Ank				12.85	0.86	9.53	32.77													56.00
O-95 3269.82	5	13	Ank				13.68	1.38	8.75	32.19													56.00
O-95 3269.82	6	1	Rt+Py+Kln+other	12.96	29.71	10.28	9.47		2.17	12.56	0.44	0.16		21.62		0.60							100.00
O-95 3269.82	6	2	Rt+Py+other	2.89	55.71	2.12	14.50	0.23	0.80	5.85				17.38		0.53							100.00
O-95 3269.82	6	3	Rt+Py+Kln+other	19.02	32.86	14.93	15.04		3.27	2.77		0.30		10.69		1.14							100.00
O-95 3269.82	6	4	Py	0.13			27.67			0.46				71.74									100.00
O-95 3269.82	6	5	Py+Rt+Kln	5.50	20.00	4.88	24.88	0.32	0.48	2.20				40.90		0.85							100.00
O-95 3269.82	6	6	Ank				15.11	1.51	8.32	31.06													56.00
O-95 3269.82	6	7	Fe-cal				2.36	0.58	0.67	52.40													56.00
O-95 3269.82	6	8	Fe-cal				2.34	0.66	0.72	52.28													56.00
O-95 3269.82	6	9	Fe-cal				2.13	0.62	0.58	52.10							0.57						56.00
O-95 3269.82	6	10	Fe-cal				2.37	0.69	0.69	52.25													56.00
O-95 3269.82	6	11	Ank				13.81	1.30	8.66	32.23													56.00
O-95 3269.82	7	1	Kln	48.92		37.08																	86.00
O-95 3269.82	7	2	Ank	1.21		0.36	12.12	0.87	9.60	31.61						0.22							56.00

Table D-5: Scanning Electron Microscope chemical analyses of sample 3269.82 from the Onadaga O-95 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	SrO	ZrO_2	BaO	Ce_2O_3	HfO_2	B_2O_3	Total
O-95 3269.82	7	3	Ank	0.90		0.46	12.90	0.90	8.76	32.09													56.00
O-95 3269.82	7	4	Ank				11.44	0.92	11.00	32.64													56.00
O-95 3269.82	7	5	Brt											38.53			0.93		60.54				100.00
O-95 3269.82	7	6	Ab	66.87		22.28	0.36			0.24	9.90	0.36											100.00
O-95 3269.82	7	7	Qz	96.29										1.30					2.41				100.00
O-95 3269.82	7	8	Ank+Brt	1.90		1.77	11.03	0.95	7.73	25.47				2.36					4.78				56.00
O-95 3269.82	7	9	Ank				13.66	1.32	8.68	31.15				0.38					0.82				56.00
O-95 3269.82	7	10	Ank				11.87	0.87	9.64	33.62													56.00
O-95 3269.82	8	1	Kln	49.16		36.84																	86.00
O-95 3269.82	8	2	Brt											38.45					61.57				100.00
O-95 3269.82	8	3	Ab	68.84		18.97					12.20												100.00
O-95 3269.82	8	4	Ab	69.35		18.73					11.92												100.00
O-95 3269.82	8	5	Kfs	66.17		18.01	0.17				9.10	6.25							0.31				100.00
O-95 3269.82	8	6	Ab	69.29		18.71					11.62	0.39											100.00
O-95 3269.82	8	7	Ank				11.27	1.07	7.38	25.80				3.57					6.92				56.00
O-95 3269.82	8	8	Ank	0.84		0.32	12.02	0.84	9.51	32.47													56.00
O-95 3269.82	9	1	Brt											38.28			1.48		60.27				100.00
O-95 3269.82	9	2	Ank				12.01	0.85	10.29	32.86													56.00
O-95 3269.82	9	3	Qz	98.42		0.59	0.57		0.32			0.11											100.00
O-95 3269.82	9	4	Ank				12.57	1.02	9.75	32.66													56.00
O-95 3269.82	9	5	Ank				13.24	1.28	8.04	30.10				1.06					2.27				56.00
O-95 3269.82	9	6	Zrn	31.66			0.23											67.07			1.04		100.00
O-95 3269.82	9	7	Fe-cal				2.01	0.54	0.60	52.84													56.00
O-95 3269.82	9	8	Fe-cal				1.69	0.58	0.45	53.28													56.00
O-95 3269.82	9	9	Fe-cal+other	10.23			4.14	0.31	1.44	79.82				4.07									100.00
O-95 3269.82	9	10	Fe-cal				2.04	0.60	0.50	52.85													56.00
O-95 3269.82	9	11	Fe-cal				2.25	0.68	0.55	52.52													56.00
O-95 3269.82	9	12	Fe-cal				2.30	0.59	0.74	52.37													56.00
O-95 3269.82	9	13	Fe-cal				2.26	0.53	0.78	52.44													56.00
O-95 3269.82	9	14	Fe-cal				2.26	0.57	0.69	52.48													56.00
O-95 3269.82	9	15	Rt	0.39	99.02		0.23			0.36													100.00
O-95 3269.82	9	16	Ank				13.89	1.44	8.84	31.83													56.00
O-95 3269.82	9	17	Ank				12.29	0.80	10.22	32.69													56.00
O-95 3269.82	9	18	Ank	1.56	0.49	0.88	10.72	0.74	10.74	30.76		0.12											56.00
O-95 3269.82	9	19	Ank	1.23		0.41	12.30	0.86	10.29	30.91													56.00
O-95 3269.82	9	20	Brt	3.94		0.89					0.43			22.60			0.95		35.39			35.82	100.00
O-95 3269.82	9	21	Ab	69.05		18.80					12.13												100.00
O-95 3269.82	9	22	Py	0.62			28.92	0.49	2.24	5.47				62.25									100.00
O-95 3269.82	9	23	Qz	99.99																			100.00
O-95 3269.82	9	24	Qz	99.99																			100.00
O-95 3269.82	9	25	Qz	99.99																			100.00
O-95 3269.82	9	26	Ilt	46.68	0.47	24.69	3.93	0.00	4.65	1.46	0.00	5.65			2.47								90.00

Appendix 10B: Scanning Electron Microscope Backscattered Electron Images for Panuke B-90 2434.33



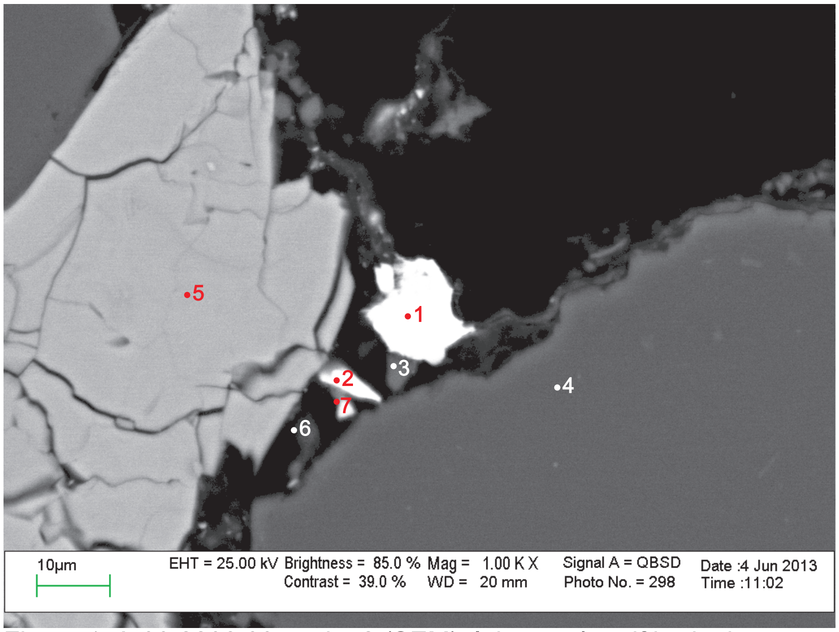
1. Sphalerite
2. Pyrite + Calcite
3. Pyrite + Calcite
4. Pyrite + Calcite
5. Quartz
6. Fe-calcite + K-feldspar
7. Mg-Calcite
8. Fe-calcite + K-feldspar
9. Calcite
10. Fe-calcite + other
11. Quartz
12. Pyrite+ Calcite
13. Fe-calcite+ K-feldspar

Figure 1: B-90 2434.33 m. site 1 (SEM). Pore filling sphalerite (1) and pyrite (2) have partially replaced Fe-calcite that probably has replaced detrital K-feldspar (8). They also seem to have partially replaced Mg-calcite (7).

Table A: Scanning Electron Microscope chemical analyses of sample 2434.33 from the Panuke B-90 well.

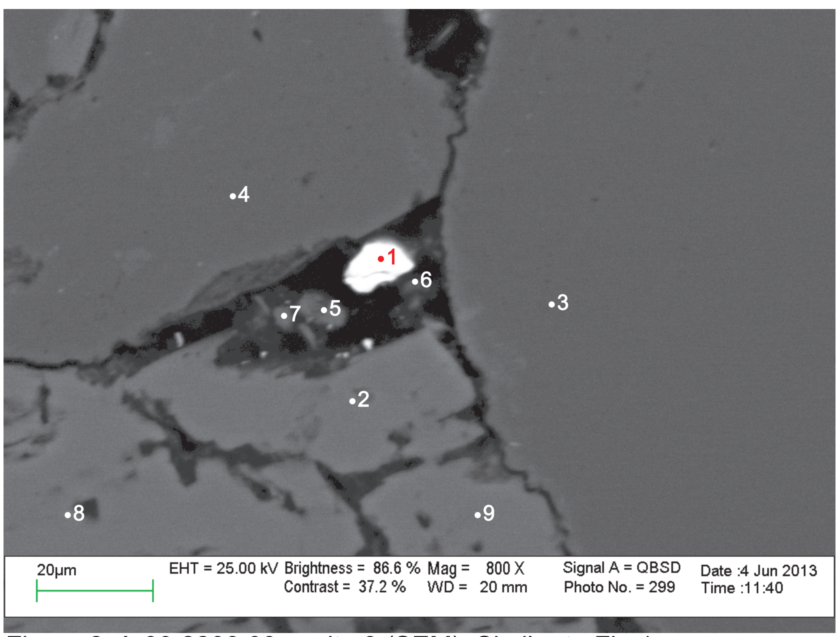
Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	Cl	ZnO	Total	Actual Total
B-90 2434.33	1	1	Sph	0.88			0.42			0.36				51.04		47.22	99.92	167.04
B-90 2434.33	1	2	Py+Cal+Chl	13.80		8.90	29.06	0.28	0.96	4.97		1.28		40.55	0.20		100.00	99.38
B-90 2434.33	1	3	Py+Cal	0.88		0.42	23.75		0.58	33.92				40.45			100.00	91.64
B-90 2434.33	1	4	Py+Cal	2.18		1.40	38.32	0.40	0.32	2.55		0.19		54.64			100.00	104.1
B-90 2434.33	1	5	Qz	99.99													99.99	112.61
B-90 2434.33	1	6	Fe-Cal+Kfs	13.28	2.00	8.99	2.52		1.03	67.71		1.07		3.10	0.28		99.98	53.7
B-90 2434.33	1	7	Cal				0.48		0.68	54.84							56.00	49.11
B-90 2434.33	1	8	Fe-Cal+Kfs	16.90		9.26	1.94		1.46	67.93		1.55		0.95			99.99	55.48
B-90 2434.33	1	9	Cal				0.97		0.51	54.52							56.00	48.78
B-90 2434.33	1	10	Fe-Cal+other	11.19		6.31	1.72		1.26	78.68		0.84					100.00	54.81
B-90 2434.33	1	11	Qz	99.99													99.99	112.65
B-90 2434.33	1	12	Py+Cal	0.32			29.00	0.25		3.48	0.38			66.60			100.03	180.24
B-90 2434.33	1	13	Fe-Cal+Kfs	15.49		10.00	2.26		1.36	65.57		1.17	0.96	2.92	0.28		100.01	53.86

Appendix 11A: Scanning Electron Microscope Backscattered Electron Images for Peskowesk A-99 2208.09



1. [1]PbO
2. Barite
3. Quartz
4. Quartz
5. Chromite
6. Mixture
7. Pyrite + other

Figure 1: A-99 2208.09 m site 2 (SEM). It is not clear if barite is diagenetic or detrital.



1. Barite
2. K-feldspar
3. Quartz
4. Albite
5. Quartz
6. Kaolinite + other
7. Quartz
8. K-feldspar
9. K-feldspar

Figure 2: A-99 2208.09 m site 3 (SEM). Similar to Fig.1.

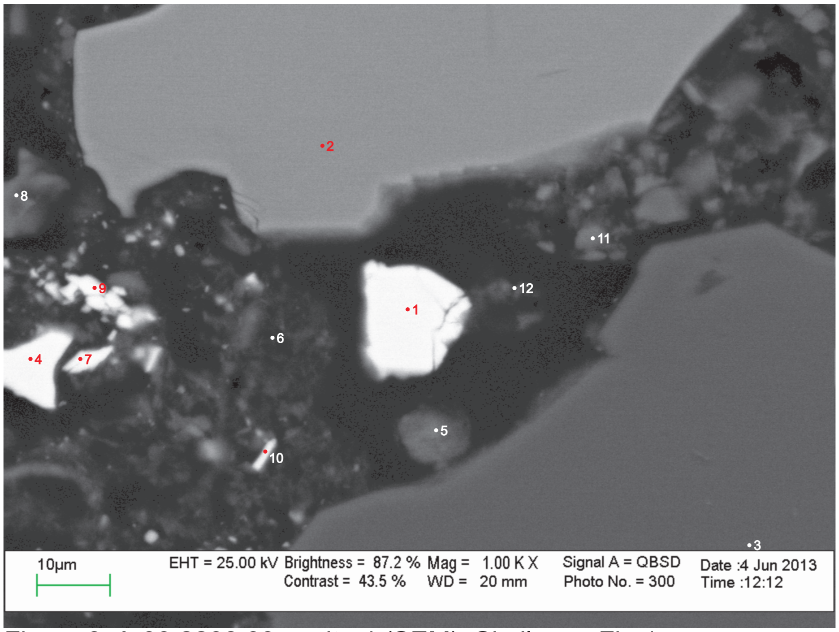


Figure 3: A-99 2208.09 m site 4 (SEM). Similar as Fig.1.

1. Barite
2. Chromite
3. Quartz
4. Barite
5. Quartz
6. Quartz
7. Barite
8. Quartz
9. Barite
10. Barite+Kaolinite
11. Quartz
12. Quartz + others

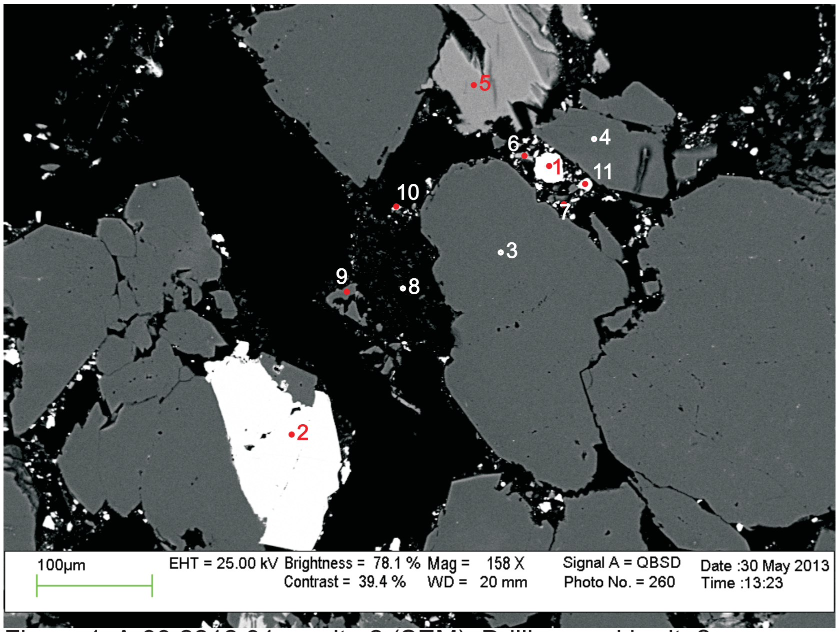
Table A: Scanning Electron Microscope chemical analyses of sample 2208.09 from the Peskowesk A-99 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MgO	CaO	Na_2O	K_2O	SO_3	Cl	Cr_2O_3	As_2O_3	SrO	MoO_3	BaO	PbO[1]	Total
A-99 2208.09	2	1	[1]PbO							1.82			8.7						89.5	100.01
A-99 2208.09	2	2	Brt						0.6	1.42		40.1						57.8		100.02
A-99 2208.09	2	3	Qz	93.23			1.57						0.8						4.41	100.03
A-99 2208.09	2	4	Qz	99.99																99.99
A-99 2208.09	2	5	Chr			28.59	21.5	9.62						40.34						100.01
A-99 2208.09	2	6	Mix	58.7		5.39	2.35			9.29			4.3	4.27					15.7	100.01
A-99 2208.09	2	7	Py+others	3.57			24		1	2.7		65.7	0.5					2.51		100.00
A-99 2208.09	3	1	Brt									38.3						61.7		100.01
A-99 2208.09	3	2	Kfs	66.66		18.57					14.8									100.01
A-99 2208.09	3	3	Qz	99.99																99.99
A-99 2208.09	3	4	Ab	68.58		19.01				12.42										100.01
A-99 2208.09	3	5	Qz	99.45									0.6							100.00
A-99 2208.09	3	6	Kln+other	55.83		35.98							1				3.99	3.22		100.00
A-99 2208.09	3	7	Qz	93.72		5.25							1							99.99
A-99 2208.09	3	8	Kfs	66.81		18.42	0.72				14.1									100.01
A-99 2208.09	3	9	Kfs	66.61		18.86					14.5									100.00
A-99 2208.09	4	1	Brt									58.32				1.84		39.85		100.00
A-99 2208.09	4	2	Chr			27.97	10.67	16.39						44.96						100.00
A-99 2208.09	4	3	Qz	100.00																100.00
A-99 2208.09	4	4	Brt									60.34						39.66		100.00
A-99 2208.09	4	5	Qz	75.95		4.97	2.68								-0.48				16.87	100.00
A-99 2208.09	4	6	Qz	57.56		32.66	6.35	2.22			1.21									100.00
A-99 2208.09	4	7	Brt			3.40						59.04						37.56		100.00
A-99 2208.09	4	8	Qz	100.00																100.00
A-99 2208.09	4	9	Brt	10.12		2.94						52.32						34.62		100.00
A-99 2208.09	4	10	Brt+Kln	14.19		8.42	4.88					51.31						21.20		100.00
A-99 2208.09	4	11	Qz	98.52					0.66	0.82										100.00
A-99 2208.09	4	12	Qz+others	42.41	1.74	16.50	4.23	11.01	4.41		1.11	18.58								100.00

*Notes: ¹ = contaminant for making the polished thin section

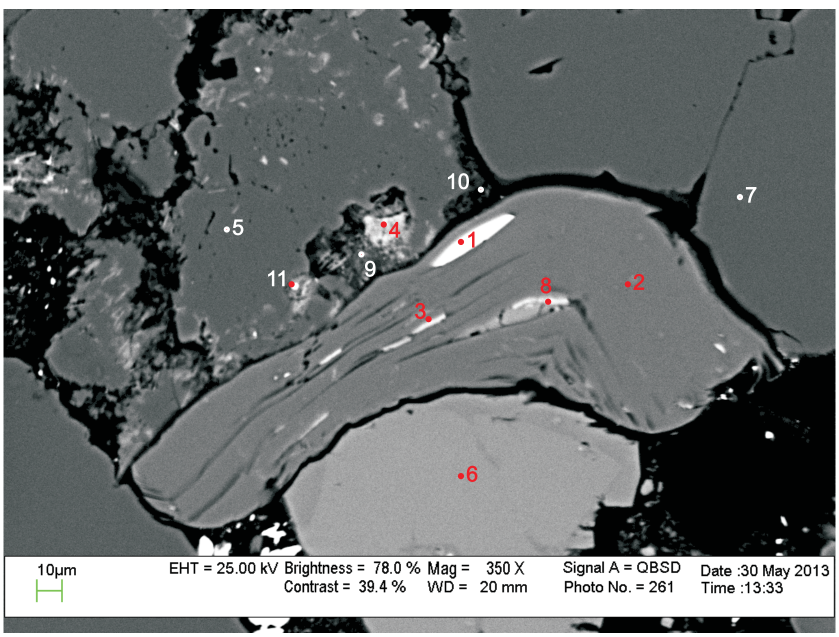
Notes: 1. Not clear if the barite is from drilling mud or diagenetic.

Appendix 11B: Scanning Electron Microscope Backscattered Electron Images for Peskowesk A-99 2212.91



1. Barite (?drilling mud)
2. Rutile
3. Quartz
4. Quartz
5. K-feldspar
6. Calcite
7. Barite
8. Kaolinite
9. Albite
10. Barite + others
11. Magnetite

Figure 1: A-99 2212.91 m. site 2 (SEM). Drilling mud barite?



1. Sphalerite
2. Chloritized biotite
3. Apatite
4. TiO_2 + others
5. Quartz
6. K-feldspar
7. Quartz
8. Apatite
9. Mixture
10. Kaolinite
11. Mixture

Figure 2: A-99 2212.91 m. site 3 (SEM). Diagenetic sphalerite and apatite form along fractures of chloritized biotite.

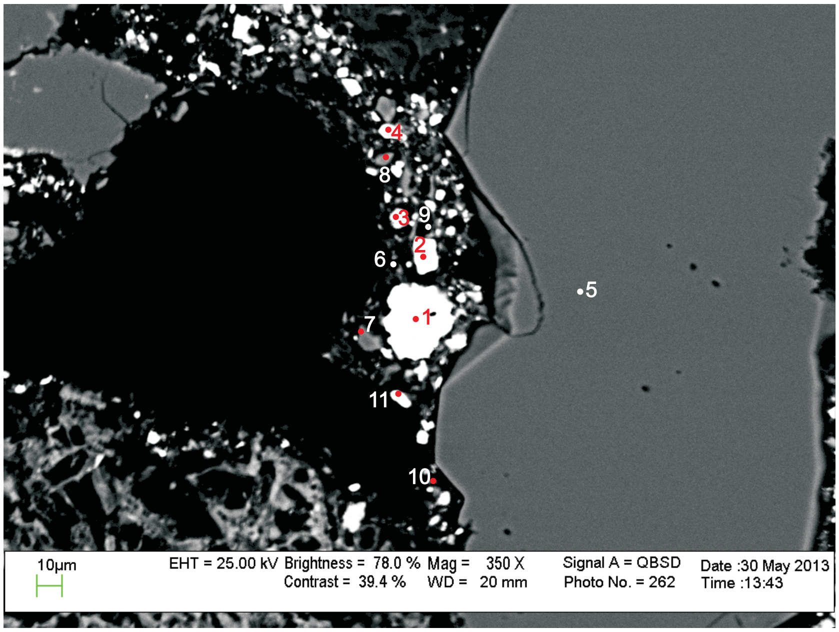


Figure 3: A-99 2212.91 m. site 4 (SEM). Barite from drilling mud.

1. Barite
2. Barite
3. Pyrite
4. Barite
5. Quartz
6. Pyrite + Quartz
7. Quartz
8. Quartz
9. Barite + others
10. Barite + others
11. Barite + others

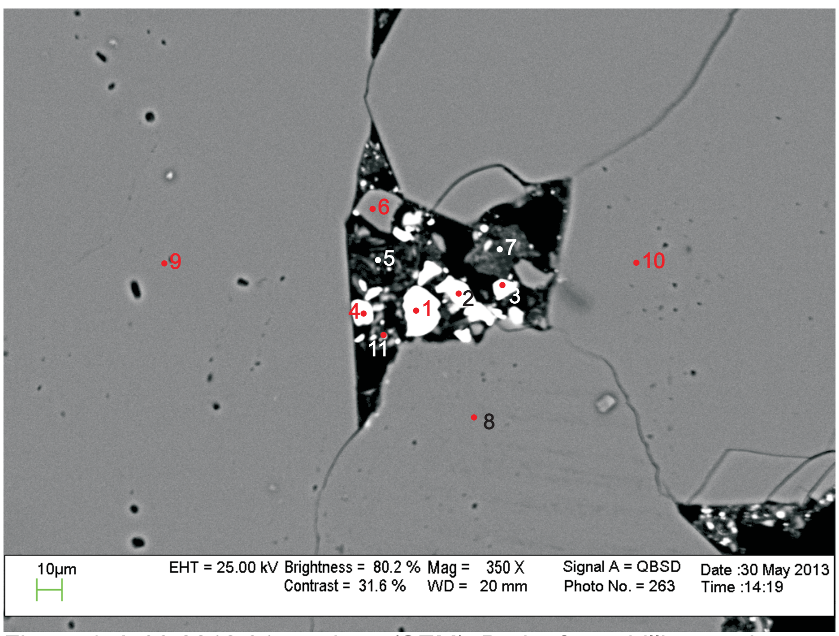


Figure 4: A-99 2212.91 m. site 5 (SEM). Barite from drilling mud.

1. Barite
2. Barite
3. Barite
4. Barite
5. Kaolinite + others
6. Quartz
7. Mixture
8. Quartz
9. Quartz
10. Quartz
11. Barite + others

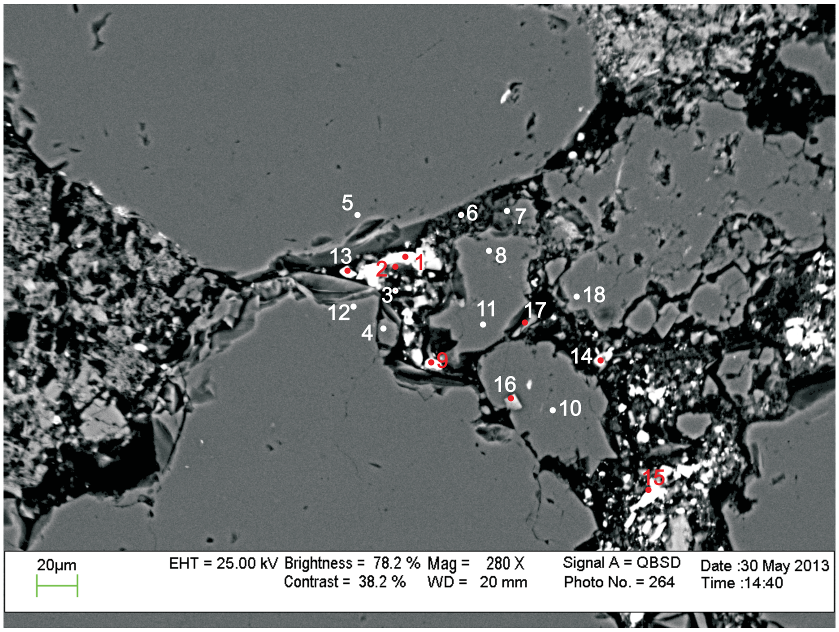


Figure 5: A-99 2212.91 m. site 6 (SEM). Diagenetic barite.

1. Barite
2. Barite + others
3.
4. Quartz
5. Quartz
6. Kaolinite
7. Kaolinite + others
8. Quartz
9. Barite
10. Quartz
11. Quartz
12. Quartz
13. Barite + others
14. Barite + others
15. Barite + others
16.
17. Quartz
18. Quartz

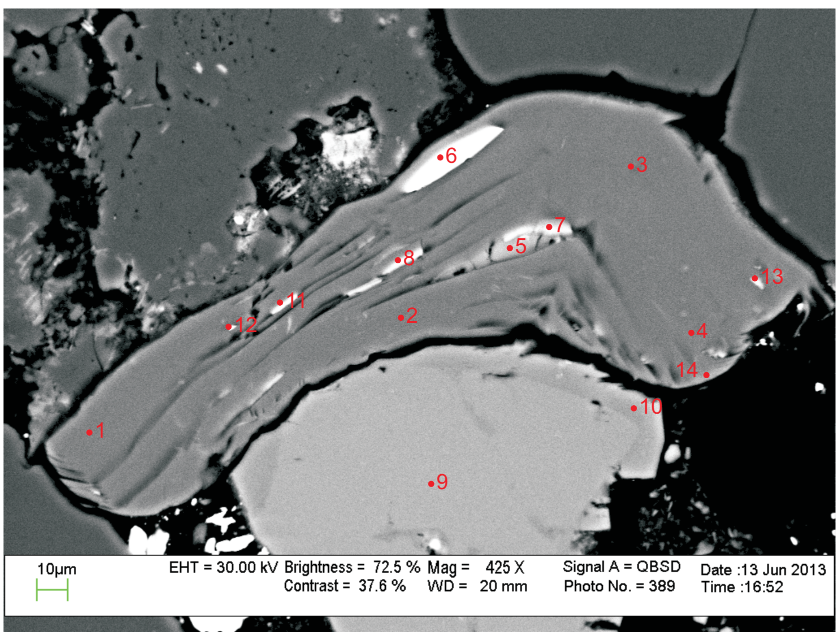


Figure 6: A-99 2212.91m site 3 (SEM). Diagenetic sphalerite, apatite, chlorite, and ankerite form along the fractures of chloritized biotite that also contains inclusions of pyrite.

1. Chloritized biotite
2. Chloritized biotite
3. Chloritized biotite
4. Chloritized biotite
5. Ankerite + other
6. Sphalerite
7. Apatite + other
8. Apatite + other
9. K-feldspar
10. K-feldspar
11. Chloritized biotite
12. Pyrite + Chlorite
13. Pyrite + Chlorite
14. Chlorite

Table B-1: Scanning Electron Microscope chemical analyses of sample 2212.91 from the Peskowesk A-99 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	ZnO	As_2O_3	SrO	BaO	Ce_2O_3	Nd_2O_3	WO_3	Total
A-99 2212.91	2	1	Brt											38.41					1.98	59.61				100.00
A-99 2212.91	2	2	Rt		100.00																			100.00
A-99 2212.91	2	3	Qz	100.00																				100.00
A-99 2212.91	2	4	Qz	100.00																				100.00
A-99 2212.91	2	5	Kfs	66.29		18.02					0.66	15.03												100.00
A-99 2212.91	2	6	Cal	2.57		0.86				51.64		0.14		0.79										56.00
A-99 2212.91	2	7	Brt	11.93		3.40	0.60			2.74				34.16						47.18				100.00
A-99 2212.91	2	8	Kln	52.26		33.74																		86.00
A-99 2212.91	2	9	Ab	59.23		16.09					10.67													86.00
A-99 2212.91	2	10	Brt+other	26.47		18.49	2.46		1.31	1.99	0.96	1.32		16.50						30.49				100.00
A-99 2212.91	2	11	Mag	5.42			93.57			1.01														100.00
A-99 2212.91	3	1	Sp	2.93		3.08	1.87		5.23					46.55			40.33							100.00
A-99 2212.91	3	2	Grt	34.63		24.99	10.87		29.51															100.00
A-99 2212.91	3	3	Ap	10.49		8.72	3.65		11.32	35.25			30.57											100.00
A-99 2212.91	3	4	TiO2+other	18.44	53.46	11.16	9.54		5.28	0.85	1.28													100.00
A-99 2212.91	3	5	Qz	100.00																				100.00
A-99 2212.91	3	6	Kfs	66.10		17.96					1.02	14.92												100.00
A-99 2212.91	3	7	Qz	100.00																				100.00
A-99 2212.91	3	8	Ap	7.33		5.39	3.39		6.05	46.27			31.55											100.00
A-99 2212.91	3	9	Mix	34.57	32.06	25.63	4.38		0.92	1.23	1.22													100.00
A-99 2212.91	3	10	Kln	49.57	0.55	33.19	1.14		1.53															86.00
A-99 2212.91	3	11	Mix	27.51	31.89	5.97	2.48			0.67		0.81	16.47								11.59	2.60		100.00
A-99 2212.91	4	1	Brt											37.96						62.04				100.00
A-99 2212.91	4	2	Brt	1.26										34.85						63.89				100.00
A-99 2212.91	4	3	Py	2.11		0.72	30.23			1.14				64.25				0.76		0.81				100.00
A-99 2212.91	4	4	Brt	8.77		2.56				0.75	0.71			27.31						59.91				100.00
A-99 2212.91	4	5	Qz	100.00																				100.00
A-99 2212.91	4	6	Py+Qz	41.70		4.42	10.69			5.70	1.51	0.49		30.40						5.10				100.00
A-99 2212.91	4	7	Qz	100.00																				100.00
A-99 2212.91	4	8	Qz	94.55		1.60	0.38			1.08				1.37						1.03				100.00
A-99 2212.91	4	9	Brt+other	42.89		17.80	4.49		2.86	7.37		2.13		9.05						13.40				100.00
A-99 2212.91	4	10	Brt+other	52.20		8.49	4.65		1.29	11.29	1.85	0.76		8.30						11.16				100.00
A-99 2212.91	4	11	Brt+other	12.77		5.95	1.03			1.79	1.44			19.90						57.12				100.00
A-99 2212.91	5	1	Brt											38.40						61.60				100.00
A-99 2212.91	5	2	Brt											38.71					1.88	59.41				100.00
A-99 2212.91	5	3	Brt	3.63		1.95								37.29						57.13				100.00
A-99 2212.91	5	4	Brt	1.83										37.75						60.42				100.00
A-99 2212.91	5	5	Kln+other	69.14	0.72	22.99	1.42			3.33		1.02		1.39										100.00
A-99 2212.91	5	6	Qz	100.00																				100.00
A-99 2212.91	5	7	Mix	36.00	27.41	21.20	6.94		1.94	3.62		1.69		1.20										100.00
A-99 2212.91	5	8	Qz	100.00																				100.00
A-99 2212.91	5	9	Qz	100.00																				100.00
A-99 2212.91	5	10	Qz	100.00																				100.00

Table B-1: Scanning Electron Microscope chemical analyses of sample 2212.91 from the Peskowesk A-99 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	ZnO	As_2O_3	SrO	BaO	Ce_2O_3	Nd_2O_3	WO_3	Total
A-99 2212.91	5	11	Brt+other	42.00		21.88	3.79		2.63	10.60		0.84		8.31						9.94				100.00
A-99 2212.91	6	1	Brt	14.78		1.63	0.80			0.89	0.94			23.17						57.79				100.00
A-99 2212.91	6	2	Brt+other	37.17		20.09	5.47		1.23	8.47	0.93	2.69		6.17						17.78				100.00
~~A-99 2212.91~~	~~6~~	~~3~~	-	~~13.92~~			~~22.36~~			~~21.31~~										~~42.41~~				~~100.00~~
A-99 2212.91	6	4	Qz	100.00																				100.00
A-99 2212.91	6	5	Qz	100.00																				100.00
A-99 2212.91	6	6	Kln	51.87		31.69	0.43			0.45	1.57													86.00
A-99 2212.91	6	7	Kln+other	65.87	2.41	29.35	0.64			0.77	0.64	0.31												100.00
A-99 2212.91	6	8	Qz	99.07		0.93																		100.00
A-99 2212.91	6	9	Brt	15.32		1.80								32.73						50.15				100.00
A-99 2212.91	6	10	Qz	100.00																				100.00
A-99 2212.91	6	11	Qz	100.00																				100.00
A-99 2212.91	6	12	Qz	100.00																				100.00
A-99 2212.91	6	13	Brt+other	27.16		4.40	1.24			3.87				14.50						48.83				100.00
A-99 2212.91	6	14	Brt+other	24.07		13.07	4.96		0.95	3.72	2.68	0.98		15.49						34.07				100.00
A-99 2212.91	6	15	Brt+other	3.67		2.22				0.57	3.01			32.99						57.54				100.00
~~A-99 2212.91~~	~~6~~	~~16~~	-	~~64.52~~							~~35.48~~													~~100.00~~
A-99 2212.91	6	17	Qz	98.64		1.36																		100.00
A-99 2212.91	6	18	Qz	100.00																				100.00

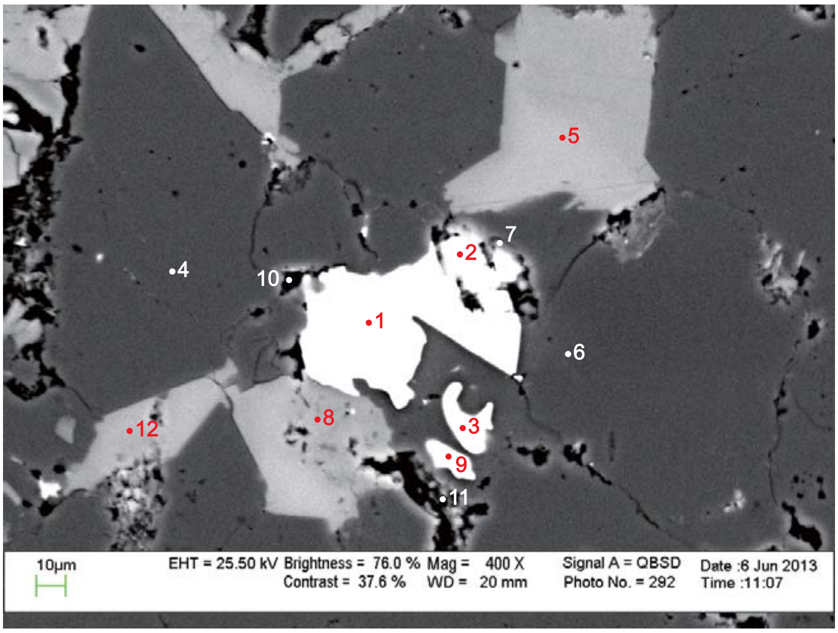
Notes: 1. Analysis 1 from site 2 and site 4 are barites from drilling mud.
2. Site 6 and part of site 2 are diagenetic barites.

Table B-2: Scanning Electron Microscope chemical analyses of site 3 from sample 2212.91 from the Peskowesk A-99 well.

Sample	Site	Position	Mineral	SiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	Cr_2O_3	ZnO	BaO	Total
A-99 2212.91	1	1	Grt	34.55	25.19	10.6		29.66											100
A-99 2212.91	1	2	Grt	34.29	25.72	10.74		29.08								0.18			100.01
A-99 2212.91	1	3	Grt	34.68	24.94	10.68		29.48								0.22			100
A-99 2212.91	1	4	Grt	34.8	24.9	10.66		29.43								0.2			99.99
A-99 2212.91	1	5	Ank+other	12.34	7.52	6.6		8.01	64.48			1.08							100.03
A-99 2212.91	1	6	Sp	6.78	6.58	2.37		11.18					39.53				33.58		100.02
A-99 2212.91	1	7	Ap+other	11.7	8.67	5.02		10.89	31.93			28.67		2.88	0.27				100.03
A-99 2212.91	1	8	Ap+other	11.94	8.96	5.06		11.87	27.59	0.53		27.13		6.94					100.02
A-99 2212.91	1	9	Kfs	65.61	17.99					0.97	14.9							0.54	100.01
A-99 2212.91	1	10	Kfs	66.96	18.08						14.96								100
A-99 2212.91	1	11	Chl+Grt	24.45	18.48	31.2	0.99	22.9	1.23			0.76							100.01
A-99 2212.91	1	12	Py+Grt	20.73	15.87	14.79		20.08					28.34		0.17				99.98
A-99 2212.91	1	13	Grt+Py	29.37	21.31	9.62		26.55					7.92				5.24		100.01
A-99 2212.91	1	14	Grt	34.95	25.07	11.76		27.31	0.27						0.47	0.18			100.01

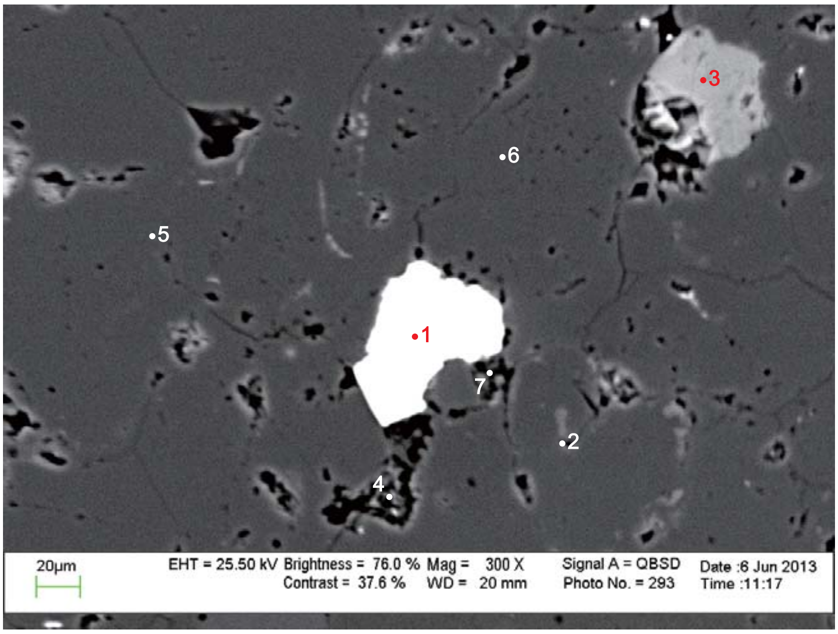
Notes: 1. Diagenetic sphalerite.

Appendix 11D: Scanning Electron Microscope Backscattered Electron Images for Peskowesk A-99 3796.33



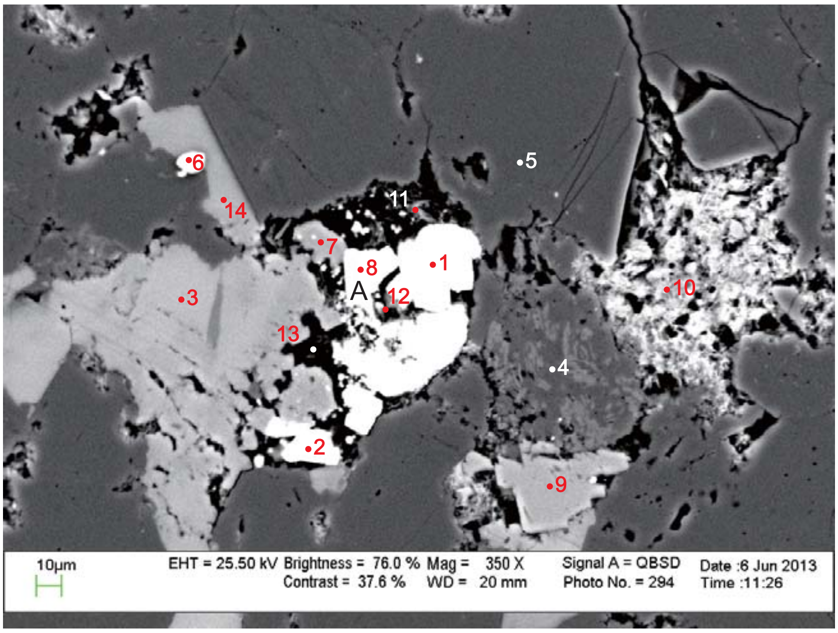
1. Barite
2. Barite
3. Barite
4. Quartz
5. Fe-Calcite
6. Quartz
7. Quartz
8. Fe-Calcite
9. Barite + other
10. Chlorite + other
11. Quartz + Illite
12. Fe-Calcite

Figure 1: A-99 3796.33 m. site 2 (SEM). Diagenetic barite has partly replaced in places quartz overgrowths.



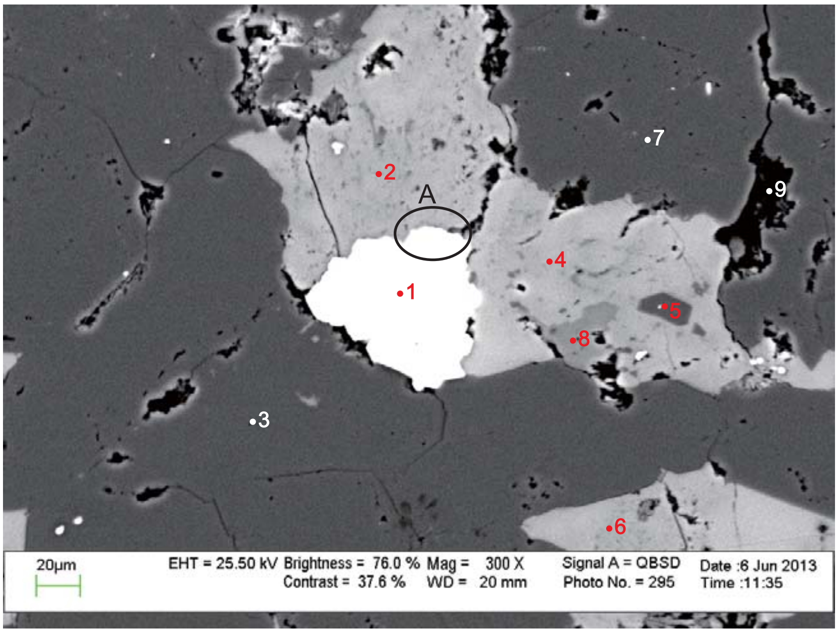
1. Sphalerite
2. Quartz + Illite
3. Fe-Calcite
4. Chlorite + other
5. Quartz
6. Quartz
7. Chlorite + other

Figure 2: A-99 3796.33 m. site 3 (SEM). Diagenetic sphalerite in contact with quartz with dissolution voids.



1. Sphalerite
2. Sphalerite
3. Fe-Calcite
4. Albite
5. Quartz
6. Rutile
7. Fe-Calcite
8. Sphalerite
9. Siderite
10. Chlorite + K_2O
11. Chlorite + other
12. Sphalerite + other
13. Mixture
14. Fe-Calcite

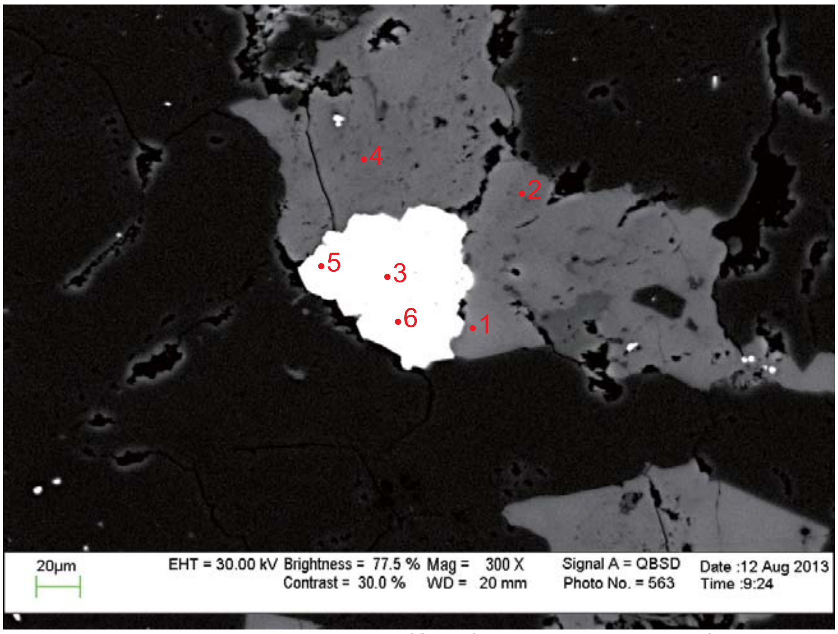
Figure 3: A-99 3796.33 m. site 4 (SEM). Diagenetic sphalerite fills pores (position A). It seems that sphalerite is later than Fe-calcite.



•10

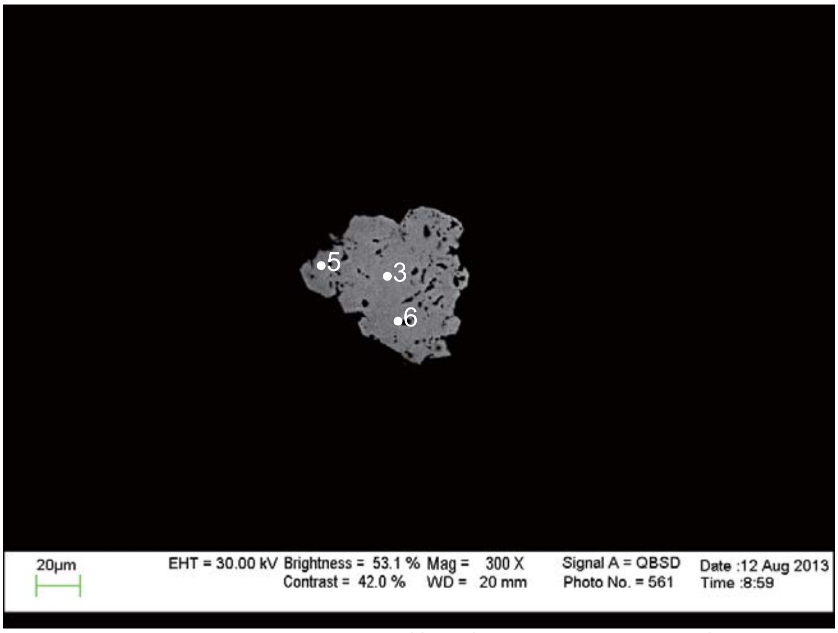
1. Barite
2. Fe-Calcite
3. Quartz
4. Fe-Calcite
5. Albite
6. Fe-Calcite
7. Quartz
8. K-feldspar
9. Chlorite + other
10. Quartz

Figure 4: A-99 3796.33 m. site 5 (SEM). Diagenetic barite (analysis 1) fills pore. It seems to be later than Fe-calcite (position A).



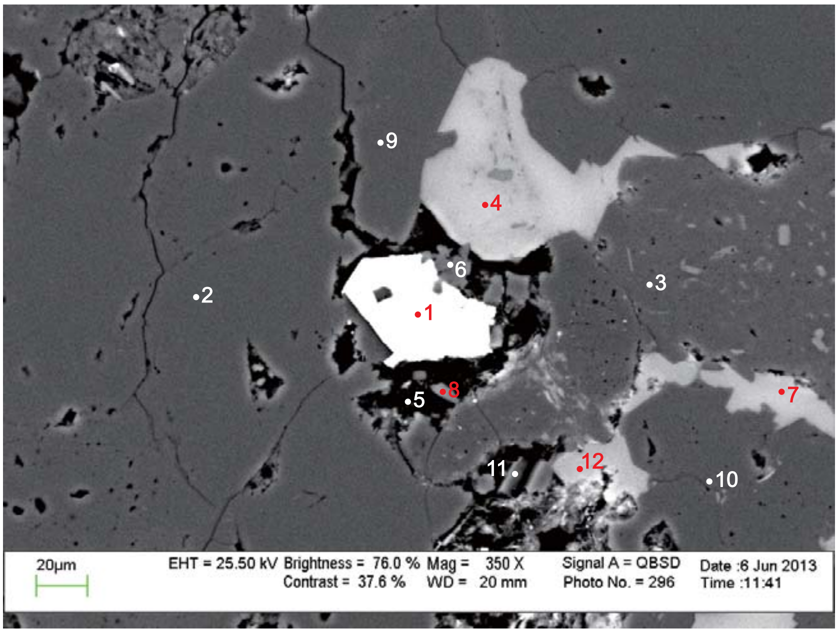
1. Fe-Calcite
2. Fe-Calcite +K-feldspar
3. Barite
4. Fe-Calcite
5. Barite
6. Barite

Figure 4a: A-99 3796.33 m. site 5 (SEM). Diagenetic barite (Table D-2).



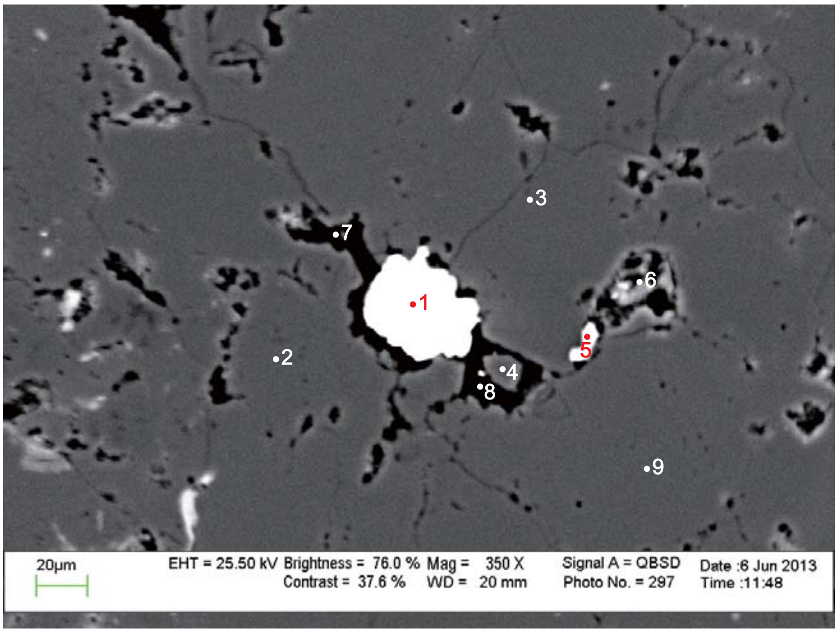
3. Barite
5. Barite
6. Barite

Figure 4b: A-99 3796.33 m. site 5 (SEM). Diagenetic barite (Table D-2).



1. Barite
2. Quartz
3. Albite
4. Fe-Calcite
5. Mixture
6. Albite
7. Fe-Calcite
8. Quartz
9. Quartz
10. Quartz
11. Quartz
12. Fe-Calcite

Figure 5: A-99 3796.33 m. site 6 (SEM). Diagenetic barite engulfs albite (1,6). Both barite and albite fill pore space, probably created by quartz dissolution.



1. Barite
2. Quartz
3. Quartz
4. Quartz
5. TiO_2 + other
6. Chlorite + other
7. Chlorite + other
8. Mixture
9. Quartz

Figure 6: A-99 3796.33 m. site 7 (SEM). Diagenetic barite fills pore space, probably created by quartz dissolution.

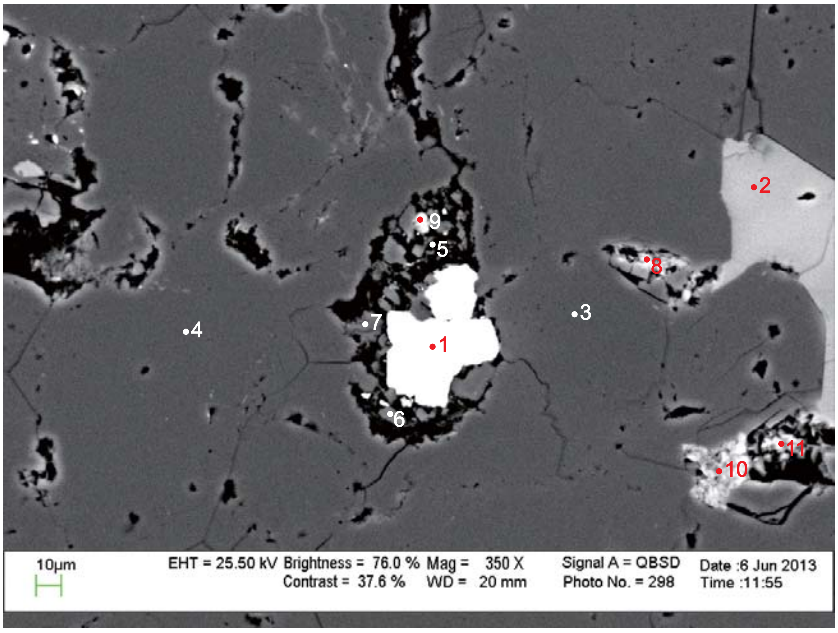


Figure 7: A-99 3796.33 m. site 8 (SEM). Fluvial sandstone, 10m above limestone. Hot saline fluid probably dissolved feldspar (5) and precipitated albite (6). Sphalerite with straight crystal outlines seems to have precipitated later.

1. Sphalerite
2. Fe-Calcite
3. Quartz
4. Quartz
5. K-felspar
6. Albite
7. Quartz
8. Chlorite
9. Sphalerite + other
10. Chlorite
11. Fe-Calcite

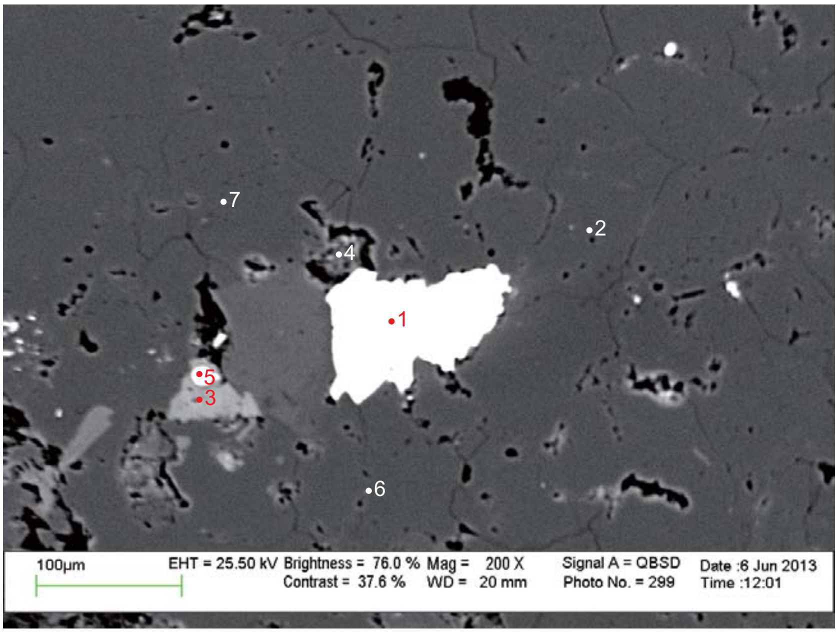


Figure 8: A-99 3796.33 m. site 9 (SEM). Diagenetic barite in contact with detrital quartz showing dissolution voids.

1. Barite
2. Quartz
3. Fe-Calcite
4. Muscovite
5. Pyrite
6. Quartz
7. Quartz

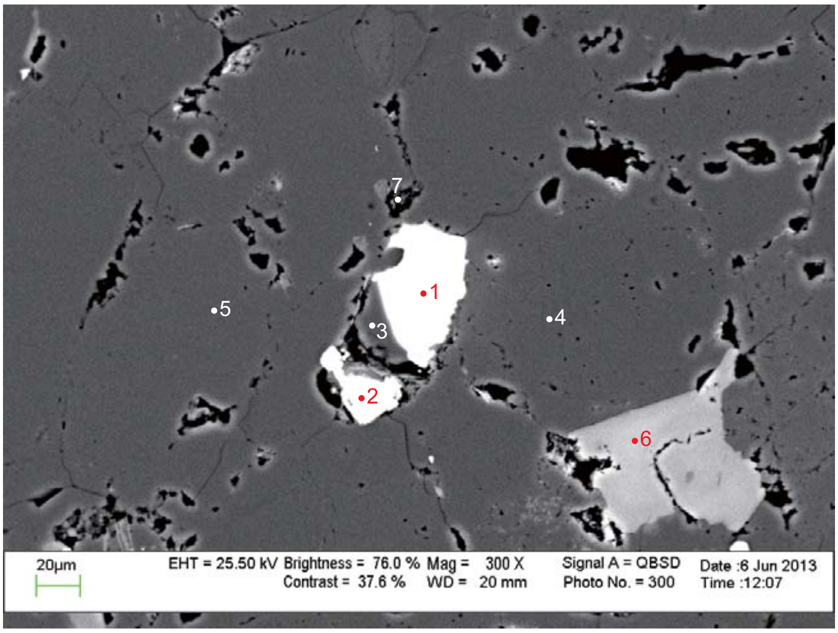


Figure 9: A-99 3796.33 m. site 10 (SEM). Diagenetic sphalerite. Quartz with dissolution voids.

1. Sphalerite
2. Rutile
3. Quartz
4. Quartz
5. Quartz
6. Fe-Calcite
7. Mixture

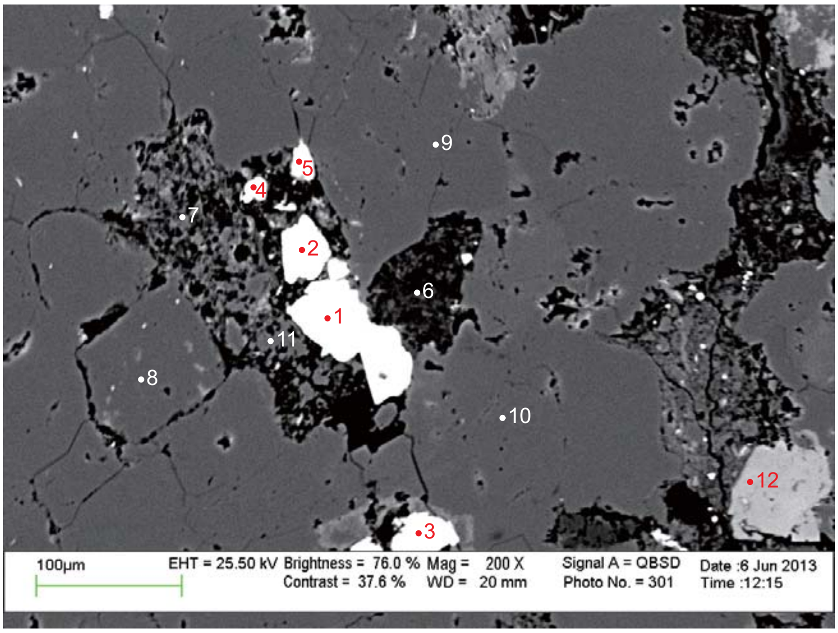
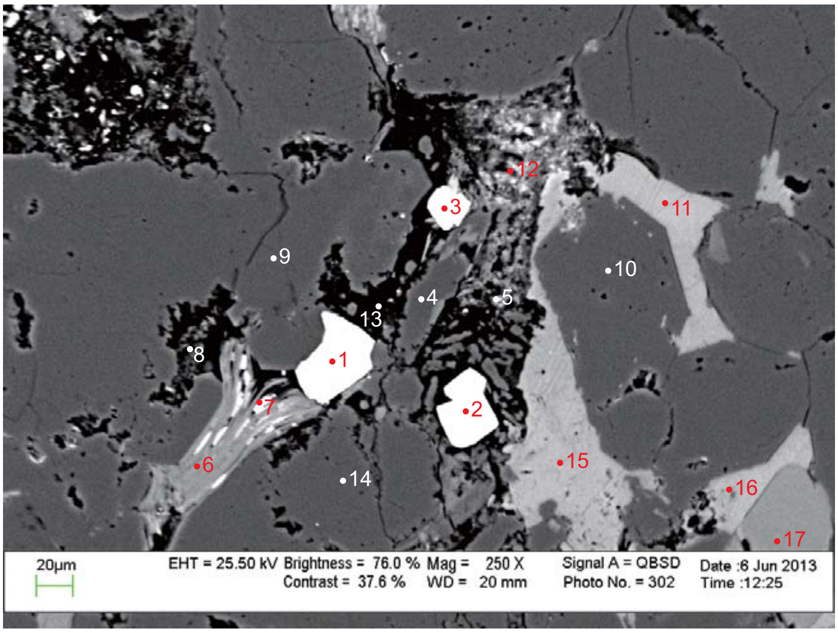


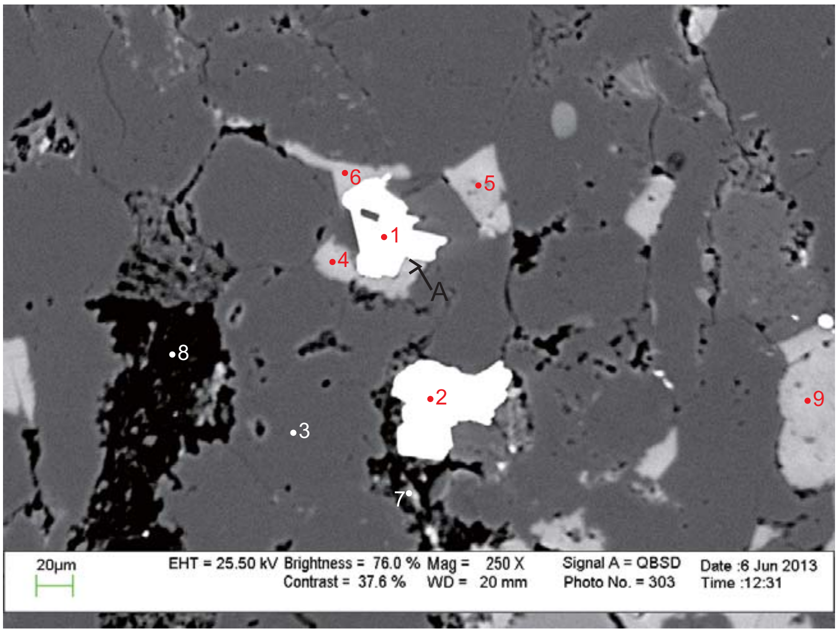
Figure 10: A-99 3796.33 m. site 11 (SEM). Diagenetic sphalerite fills pore space together with chlorite (6), albite (11) and Fe-calcite.

1. Sphalerite
2. Sphalerite
3. Rutile
4. Sphalerite
5. Sphalerite + other
6. Chlorite
7. Quartz + other
8. Quartz
9. Quartz
10. Quartz
11. Albite
12. Fe-Calcite



1. Sphalerite
2. Pyrite
3. Pyrite
4. Quartz
5. Mixture
6. Muscovite
7. Sphalerite + Muscovite
8. Chlorite
9. Quartz
10. Quartz
11. Fe-Calcite
12. Mixture
13. K-feldspar + Quartz
14. Quartz
15. Fe-Calcite
16. Fe-Calcite + other
17. K-feldspar

Figure 11: A-99 3796.33 m. site 12 (SEM). Diagenetic sphalerite (1) forms along the cleavage of muscovite (6, 7). It also fills pore space, probably created by K-feldspar dissolution (1,13). Diagenetic pyrite also fills pore space (2,3).



1. Barite
2. Barite
3. Quartz
4. Fe-Calcite
5. Fe-Calcite + other
6. Fe-Calcite
7. Chlorite + other
8. Chlorite
9. Fe-Calcite

Figure 12: A-99 3796.33 m. site 13 (SEM). Diagenetic barite has partly replaced Fe-calcite (position A).

Table D-1: Scanning Electron Microscope chemical analyses of sample 3796.33 from the Peskowesk A-99 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	Cl	ZnO	SrO	BaO	WO_3	Total
A-99 3796.33	2	1	Brt	5.45		1.44						1.00		31.69			3.28	56.76	0.38	100.00
A-99 3796.33	2	2	Brt	8.77		2.55				0.39		0.35		32.64			1.93	53.39		100.02
A-99 3796.33	2	3	Brt	1.22										34.53			2.71	61.55		100.01
A-99 3796.33	2	4	Qz	99.99																99.99
A-99 3796.33	2	5	Fe-Cal				1.29	1.17		53.54										56.00
A-99 3796.33	2	6	Qz	99.99																99.99
A-99 3796.33	2	7	Qz	91.64		2.38	1.03			0.29		0.72		1.75				2.17		99.98
A-99 3796.33	2	8	Fe-Cal				1.69	0.87	0.50	52.94										56.00
A-99 3796.33	2	9	Brt+other	7.74		1.08	0.58					0.94		30.99			2.13	56.52		99.98
A-99 3796.33	2	10	Chl+other	49.07	0.67	15.40	28.51		2.47	0.97	0.63	1.52		0.77						100.01
A-99 3796.33	2	11	Qz+ Ilt	77.59		12.79	4.71		1.99	0.31	0.44	2.16								99.99
A-99 3796.33	2	12	Fe-Cal	0.42			1.30	0.77		53.51										56.00
A-99 3796.33	3	1	Sph				0.63							44.07		55.31				100.01
A-99 3796.33	3	2	Qz+ Ilt	82.19	0.47	9.54	4.59		0.83			2.38								100.00
A-99 3796.33	3	3	Fe-Cal	4.68		1.43	1.19	0.31		47.59		0.80								56.00
A-99 3796.33	3	4	Chl+other	42.89	0.43	23.83	24.75		3.91	0.57		2.22			1.41					100.01
A-99 3796.33	3	5	Qz	92.61	0.38		3.37							3.65						100.01
A-99 3796.33	3	6	Qz	99.99																99.99
A-99 3796.33	3	7	Chl+other	58.34		17.89	16.03		2.45			3.20			1.17	0.91				99.99
A-99 3796.33	4	1	Sph				0.72							44.67		54.61				100.00
A-99 3796.33	4	2	Sph				0.67			0.22				44.80		54.32				100.01
A-99 3796.33	4	3	Fe-Cal				2.18	1.15	0.55	52.12										56.00
A-99 3796.33	4	4	Ab	68.54		19.33	0.55			0.50	10.34	0.73								99.99
A-99 3796.33	4	5	Qz	99.99																99.99
A-99 3796.33	4	6	Rt	0.56	96.53		1.22			1.69										100.00
A-99 3796.33	4	7	Fe-Cal				1.31	0.40		53.65						0.64				56.00
A-99 3796.33	4	8	Sph				0.63			2.59			2.86	43.50		50.41				99.99
A-99 3796.33	4	9	Sd	0.53			15.40	1.14	7.16	31.78										56.00
A-99 3796.33	4	10	Chl+K2O	31.48		20.78	26.04		3.81		0.72	2.17								85.00
A-99 3796.33	4	11	Chl+other	37.63	0.52	24.07	20.39		3.65	4.13		4.20	3.99		0.82	0.62				100.02
A-99 3796.33	4	12	Sph+other	8.71		7.43	5.94		2.06	7.72		0.35	6.37	25.59	0.68	35.16				100.01
A-99 3796.33	4	13	Mix	28.41	1.98	19.35	29.22		5.12	5.92		0.67	2.64	2.02	2.80	1.84				99.97
A-99 3796.33	4	14	Fe-Cal	0.62			1.10	0.52		53.76										56.00
A-99 3796.33	5	1	Brt											34.58				65.36	0.08	100.02
A-99 3796.33	5	2	Fe-Cal	1.45		0.39	0.96	0.64		52.18		0.38								56.00
A-99 3796.33	5	3	Qz	99.99																99.99
A-99 3796.33	5	4	Fe-Cal	1.39		0.39	0.93	0.37		52.49		0.43								56.00
A-99 3796.33	5	5	Ab	69.65		18.35				1.25	10.75									100.00
A-99 3796.33	5	6	Fe-Cal	2.26		0.56	1.33	1.02		50.19		0.63								56.00

Table D-1: Scanning Electron Microscope chemical analyses of sample 3796.33 from the Peskowesk A-99 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	Cl	ZnO	SrO	BaO	WO_3	Total
A-99 3796.33	5	7	Qz	99.99																99.99
A-99 3796.33	5	8	Kfs	64.60		17.31					0.78	17.30								99.99
A-99 3796.33	5	9	Chl+other	54.74		12.46	10.70		2.27	0.75		1.42			2.66					85.00
A-99 3796.33	5	10	Qz	98.32		0.74	0.69					0.25								100.00
A-99 3796.33	6	1	Brt											35.21				64.81		100.02
A-99 3796.33	6	2	Qz	99.99																99.99
A-99 3796.33	6	3	Ab	68.11		20.03	0.37			0.42	9.88	1.18								99.99
A-99 3796.33	6	4	Fe-Cal				1.71	0.72		53.57										56.00
A-99 3796.33	6	5	Mix	55.19	5.35	18.80	10.23		2.21	1.12	1.50	2.47			3.15					100.02
A-99 3796.33	6	6	Ab	68.54	0.80	18.93	0.46			0.60	10.65									99.98
A-99 3796.33	6	7	Fe-Cal				1.71	0.87	0.40	53.02										56.00
A-99 3796.33	6	8	Qz	94.06		2.65	1.99			0.71					0.59					100.00
A-99 3796.33	6	9	Qz	99.56		0.43														99.99
A-99 3796.33	6	10	Qz	98.25		1.02	0.46					0.26								99.99
A-99 3796.33	6	11	Qz	99.54		0.47														100.01
A-99 3796.33	6	12	Fe-Cal	0.83		0.62	1.35	0.84		52.36										56.00
A-99 3796.33	7	1	Brt			2.17								34.06			0.52	63.27		100.02
A-99 3796.33	7	2	Qz	99.99																99.99
A-99 3796.33	7	3	Qz	99.99																99.99
A-99 3796.33	7	4	Qz	98.92		0.83						0.25								100.00
A-99 3796.33	7	5	TiO2+other	12.19	82.55	2.04	2.69					0.52								99.99
A-99 3796.33	7	6	Chl+other	46.42	0.45	24.55	20.00		3.10		1.04	3.82			0.64					100.02
A-99 3796.33	7	7	Chl+other	47.98		20.50	24.16		3.71			1.48			2.14					99.97
A-99 3796.33	7	8	Mixture	71.86		12.91	1.60			1.41	0.74	4.70	2.82	1.95	2.03					100.02
A-99 3796.33	7	9	Qz	99.99																99.99
A-99 3796.33	8	1	Sph				0.24							44.22		55.55				100.01
A-99 3796.33	8	2	Fe-Cal	1.20			1.38	0.96		52.46										56.00
A-99 3796.33	8	3	Qz	99.99																99.99
A-99 3796.33	8	4	Qz	99.99																99.99
A-99 3796.33	8	5	Kfs	63.62		23.30	0.51			0.81	6.01	4.61			1.14					100.00
A-99 3796.33	8	6	Ab	66.96		18.50	1.03			1.12	10.34	0.72	1.05		0.27					99.99
A-99 3796.33	8	7	Qz	88.03		4.02	4.36		0.50	0.88		1.10			0.44	0.68				100.01
A-99 3796.33	8	8	Chl	34.70		17.10	26.27		3.27	0.54	0.86	1.16		0.74	0.36					85.00
A-99 3796.33	8	9	Sph+other	34.76		11.70	0.39			0.32		0.26		22.05		30.51				99.99
A-99 3796.33	8	10	Chl	30.44	0.45	20.77	26.46		3.85	0.51	0.75	1.57			0.20					85.00
A-99 3796.33	8	11	Fe-Cal	4.85		0.82	2.46	0.64		47.22										56.00
A-99 3796.33	9	1	Brt											34.53				65.48		100.01
A-99 3796.33	9	2	Qz	99.99																99.99
A-99 3796.33	9	3	Fe-Cal	1.30		1.18	1.41	0.86		51.25										56.00

Table D-1: Scanning Electron Microscope chemical analyses of sample 3796.33 from the Peskowesk A-99 well.

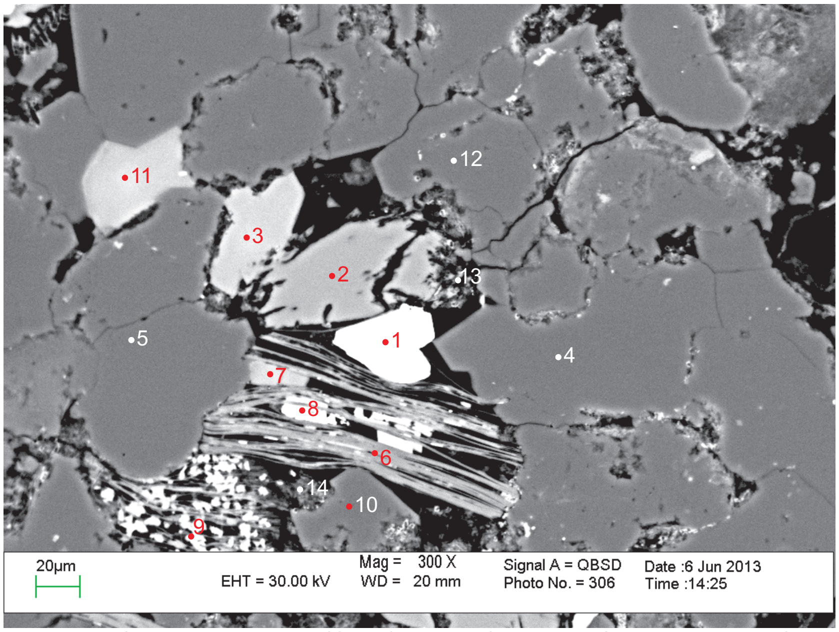
Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	Cl	ZnO	SrO	BaO	WO_3	Total
A-99 3796.33	9	4	Kfs	48.71	0.55	30.52	8.27		1.63		0.63	9.68								99.99
A-99 3796.33	9	5	Py				32.15			0.34				67.52						100.01
A-99 3796.33	9	6	Qz	99.99																99.99
A-99 3796.33	9	7	Qz	99.99																99.99
A-99 3796.33	10	1	Sph				0.48							44.20		55.35				100.03
A-99 3796.33	10	2	Rt		99.50		0.51													100.01
A-99 3796.33	10	3	Qz	97.61										0.62		1.77				100.00
A-99 3796.33	10	4	Qz	99.99																99.99
A-99 3796.33	10	5	Qz	99.99																99.99
A-99 3796.33	10	6	Fe-Cal				1.13	1.07		53.81										56.00
A-99 3796.33	10	7	Mix	74.98		12.09	8.37		1.82			1.58			0.56	0.59				99.99
A-99 3796.33	11	1	Sph				0.81							43.80		55.40				100.01
A-99 3796.33	11	2	Sph				1.07							44.47		54.46				100.00
A-99 3796.33	11	3	Rt		98.85	0.68	0.48													100.01
A-99 3796.33	11	4	Sph				0.98							44.40		54.63				100.01
A-99 3796.33	11	5	Sph+other	7.14			0.84			1.22			0.94	39.95		50.05				100.14
A-99 3796.33	11	6	Chl	29.00		21.09	27.83		4.28	0.37	0.79	0.79			0.85					85.00
A-99 3796.33	11	7	Qz+other	76.88	0.75	8.79	10.36		0.93			1.90			0.39					100.00
A-99 3796.33	11	8	Qz	99.99																99.99
A-99 3796.33	11	9	Qz	99.99																99.99
A-99 3796.33	11	10	Qz	99.99																99.99
A-99 3796.33	11	11	Ab	70.40		18.63					10.96									99.99
A-99 3796.33	11	12	Fe-Cal	1.93		0.76	1.77	0.63	0.52	50.09		0.31								56.00
A-99 3796.33	12	1	Sph				0.49							44.52		55.01				100.02
A-99 3796.33	12	2	Py				31.58				0.84			67.57						99.99
A-99 3796.33	12	3	Py	1.80		1.59	31.60		0.93					64.10						100.02
A-99 3796.33	12	4	Qz	99.99																99.99
A-99 3796.33	12	5	Mix	31.81	27.12	18.40	16.26		2.93	0.53		2.34			0.61					100.00
A-99 3796.33	12	6	Kfs	48.32	1.47	30.33	6.16		0.99		0.62	12.12								100.01
A-99 3796.33	12	7	Sph+Kfs	11.32	0.38	8.52	1.78					2.64		33.79		41.58				100.01
A-99 3796.33	12	8	Chl	36.06		21.85	21.10		3.34			1.96			0.70					85.00
A-99 3796.33	12	9	Qz	99.99																99.99
A-99 3796.33	12	10	Qz	99.99																99.99
A-99 3796.33	12	11	Fe-Cal				1.69	0.91		53.40										56.00
A-99 3796.33	12	12	Mix	33.80	7.39	22.88	23.93		4.13	1.48	1.35	3.54		1.17	0.33					100.00
A-99 3796.33	12	13	Kfs+Qz	77.48		10.15				2.03		8.66			1.68					100.00
A-99 3796.33	12	14	Qz	99.99																99.99
A-99 3796.33	12	15	Fe-Cal				2.18	0.95	0.63	52.24										56.00
A-99 3796.33	12	16	Fe-Cal+other	45.22		1.10	3.04	0.61		49.81		0.23								100.01

Table D-1: Scanning Electron Microscope chemical analyses of sample 3796.33 from the Peskowesk A-99 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	Cl	ZnO	SrO	BaO	WO_3	Total
A-99 3796.33	12	17	Kfs	64.88		17.44					0.62	17.06								100.00
A-99 3796.33	13	1	Brt											35.01				65.01		100.02
A-99 3796.33	13	2	Brt											35.03				64.97		100.00
A-99 3796.33	13	3	Qz	99.99																99.99
A-99 3796.33	13	4	Fe-Cal				1.39	0.91		53.70										56.00
A-99 3796.33	13	5	Fe-Cal+other	4.75		3.42	2.82	1.81		87.21										100.01
A-99 3796.33	13	6	Fe-Cal	1.04			1.24	0.74		52.98										56.00
A-99 3796.33	13	7	Chl+other	37.89	3.17	21.81	30.39		4.76	0.36		0.65			1.00					100.03
A-99 3796.33	13	8	Chl	32.82		21.41	23.94		3.00			0.97			2.86					85.00
A-99 3796.33	13	9	Fe-Cal	0.67			1.39	0.69		53.24										56.00

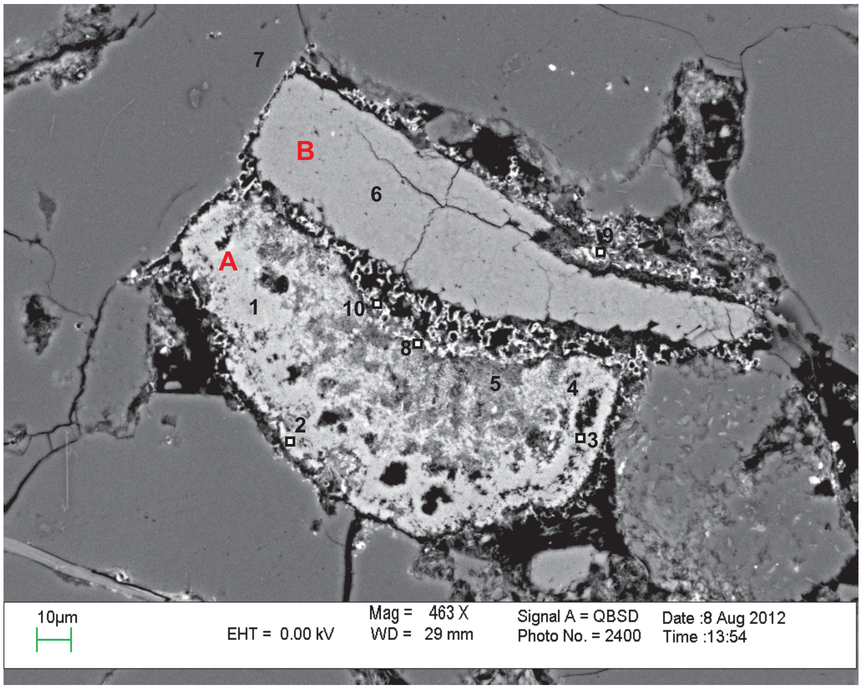
Notes: 1. Diagenetic sphalerite and barite.

Appendix 12A: Scanning Electron Microscope Backscattered Electron Images for Sable Island C-67 2834.91



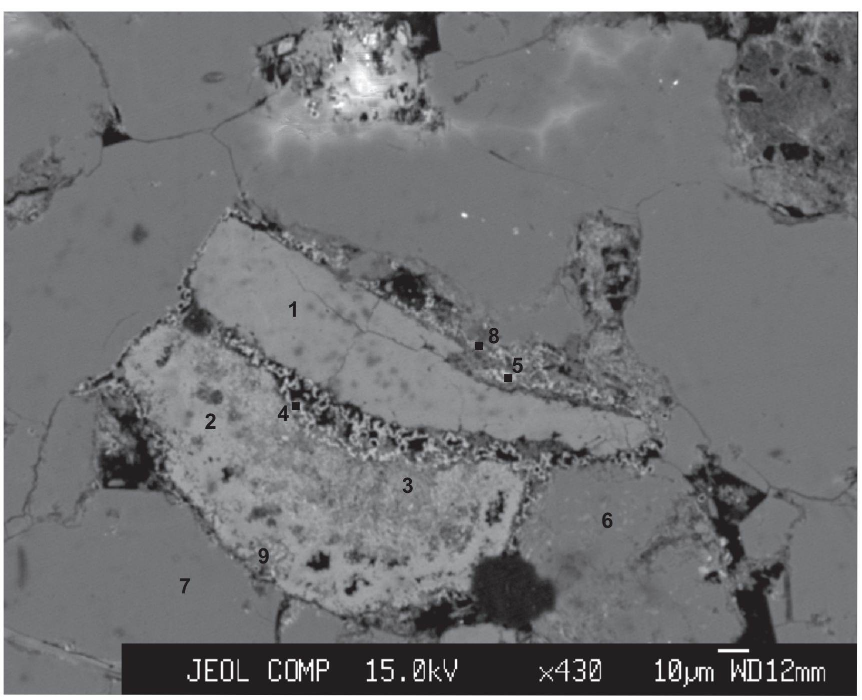
1. Sphalerite
2. K-feldspar
3. Fe-Calcite
4. Quartz
5. Quartz
6. Muscovite
7. Fe-Calcite + other
8. Sphalerite + other
9. Siderite + other
10. Quartz
11. Fe-Calcite
12. Quartz
13. Chlorite+ K-feldspar
14. Chlorite

Figure 1: C-67 2834.91 m. (SEM). site 2 (Table A-1). Dissolution of detrital K-feldspar (2) creates pore where Fe-calcite (3) and sphalerite (1) precipitate. Sphalerite (8) and Fe-calcite (7) also precipitate along the cleavages of muscovite (6). There is also some replacement of muscovite by Mn-siderite (9).



1. Kutnohorite
2. Kutnohorite
3. Carbonate Mixture
4. Carbonate Mixture + some Chlorite
5. Mixture (Chlorite + Carbonate + some Pyrite)
6. Fe-Calcite
7. Quartz
8. Siderite (+Chlorite & Illite)
9. Siderite (+Chlorite & Illite)
10. Siderite (+Chlorite & Illite)

Figure 2: Sable Island C-67-2834.91 (SEM). site 5 (Table A-2) ; carbonate- clay-rich muddy pellet or intraclast (A) and calcite bioclast(B). Both A and B are partly dissolved and they are rimmed by a mixture of chlorite, illite and Mn-rich siderite(analysis 8,9,10).



1. Fe-Calcite
2. Kutnohorite
3. Mixture (Chlorite + Carbonates)
4. Siderite
5. Siderite
6. Quartz + Chlorite
7. Quartz
8. Chlorite + Calcite
9. Kutnorite + Chlorite

Figure 3: Sable Island C-67-2834.91 (EMPA). site 5 (Table A-3).

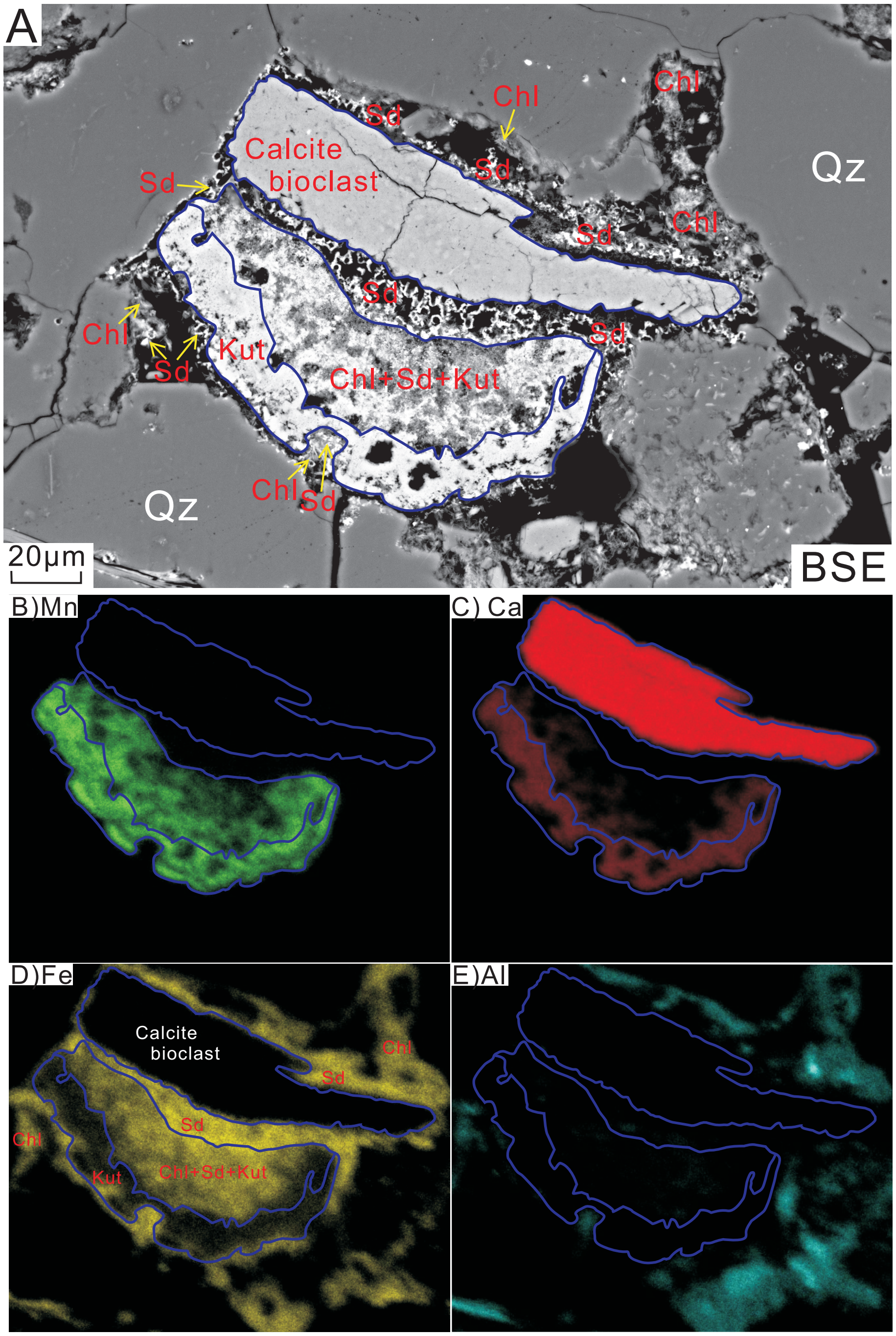


Figure 4: Sable Island C-67 2834.91. X-Ray maps of Fig. 2.

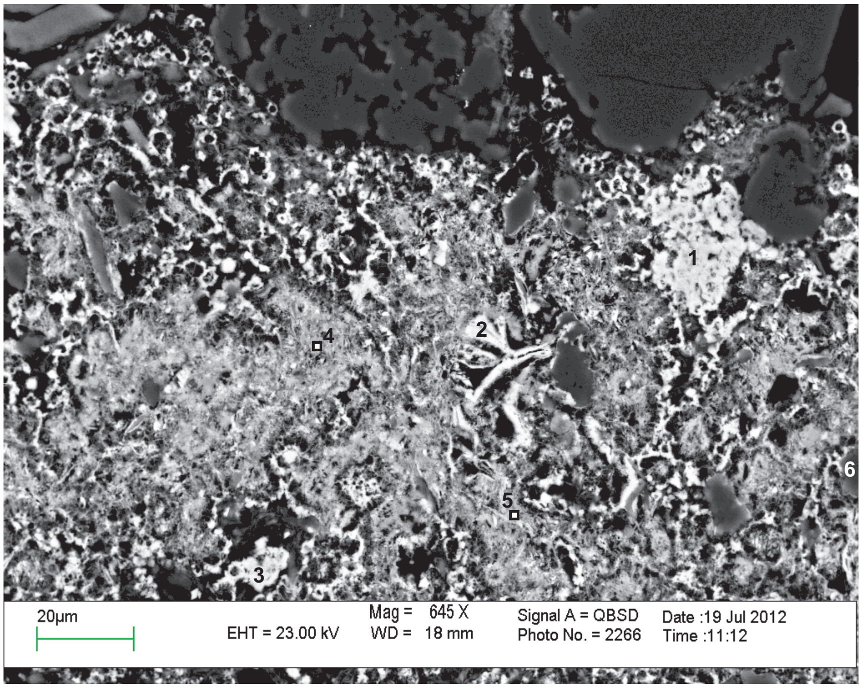


Figure 5: Sable Island C-67-2834.91m SEM. site 6 (Table A-2). Mn-siderite (up to 5.5% MnO) from a bioclast in a bedded fine grained sandstone cut by vertical fractures filled with Mn-siderite.

1. Siderite (+some Apatite & Chlorite)
2. Siderite
3. Siderite (+ some Quartz)
4. Mixture (Chlorite +Carbonate+some Pyrite)
5. Siderite (+Chlorite & Feldspar?)
6. Quartz

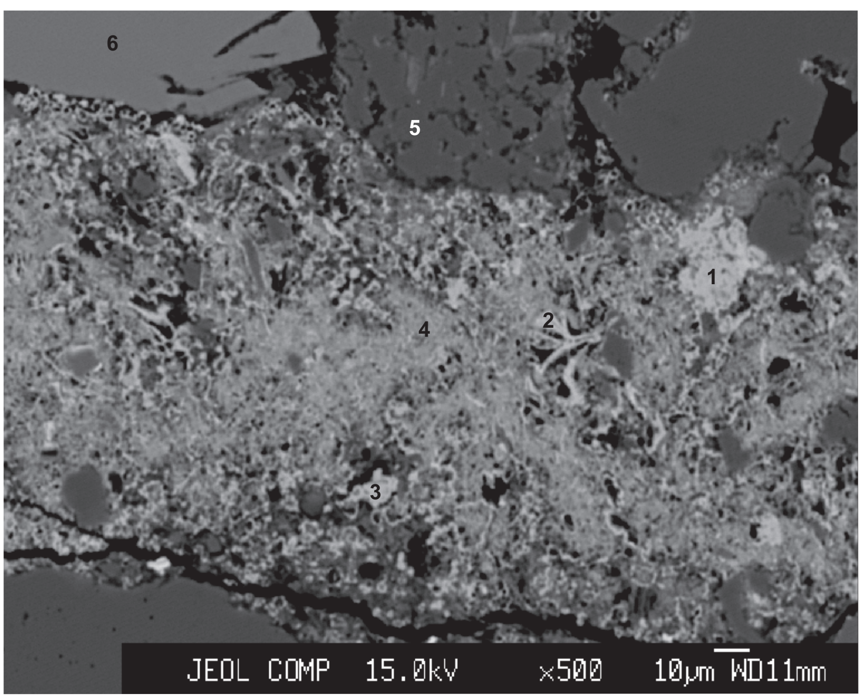


Figure 5A: Sable Island C-67 2834.91m EMPA. site 6 (Table A-3).

1. Siderite +Chlorite +Apatite
2. Siderite
3. Siderite
4. Siderite +Chlorite
5. Quartz
6. K-feldspar

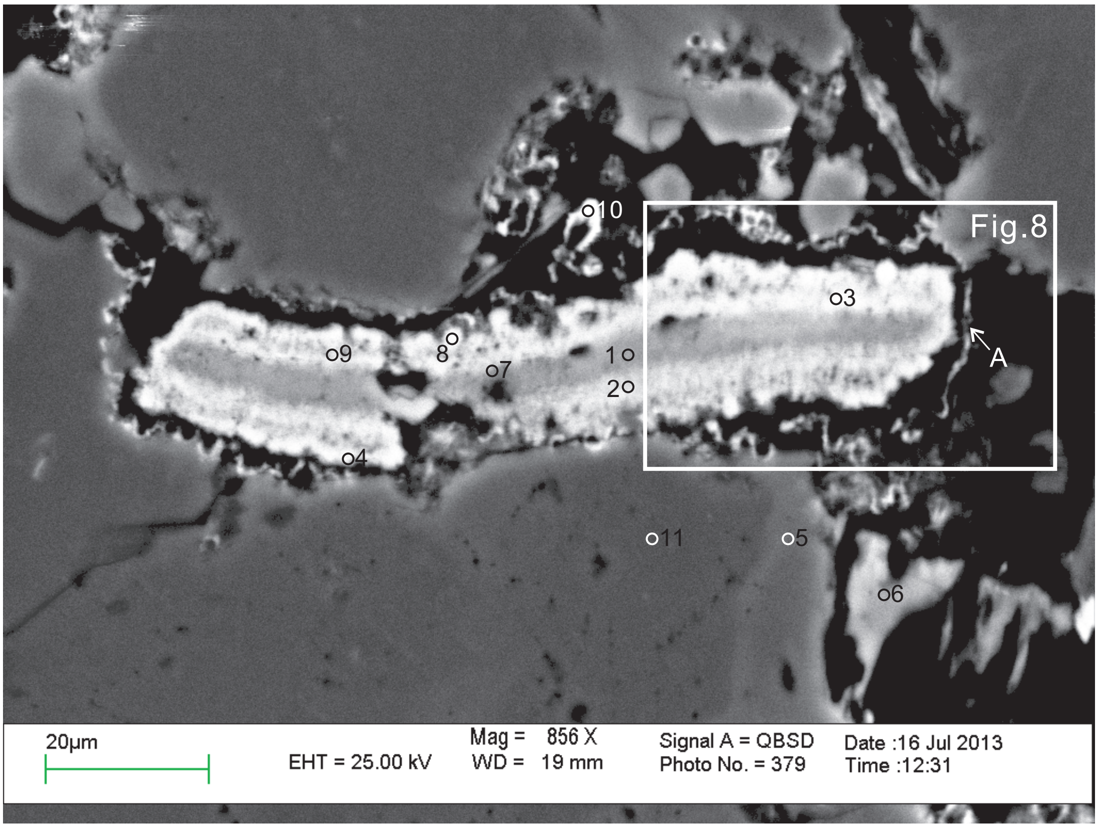


Figure 6: C-67 2834.91 m (SEM), site 1 (Table A-4). The zoned carbonate bioclast with an outer siderite rim (position A) contains calcite in the core (analyses 1,2) and kutnohorite in the rim (analyses 3,4). Both calcite and kutnohorite have been partly dissolved.

1. Kutnohorite + Calcite
2. Kutnohorite + Calcite
3. Kutnohorite
4. Kutnohorite
5. Quartz
6. Quartz
7. Kutnohorite
8. Mixture
9. Kutnohorite
10. Chlorite + K-feldspar
11. Quartz

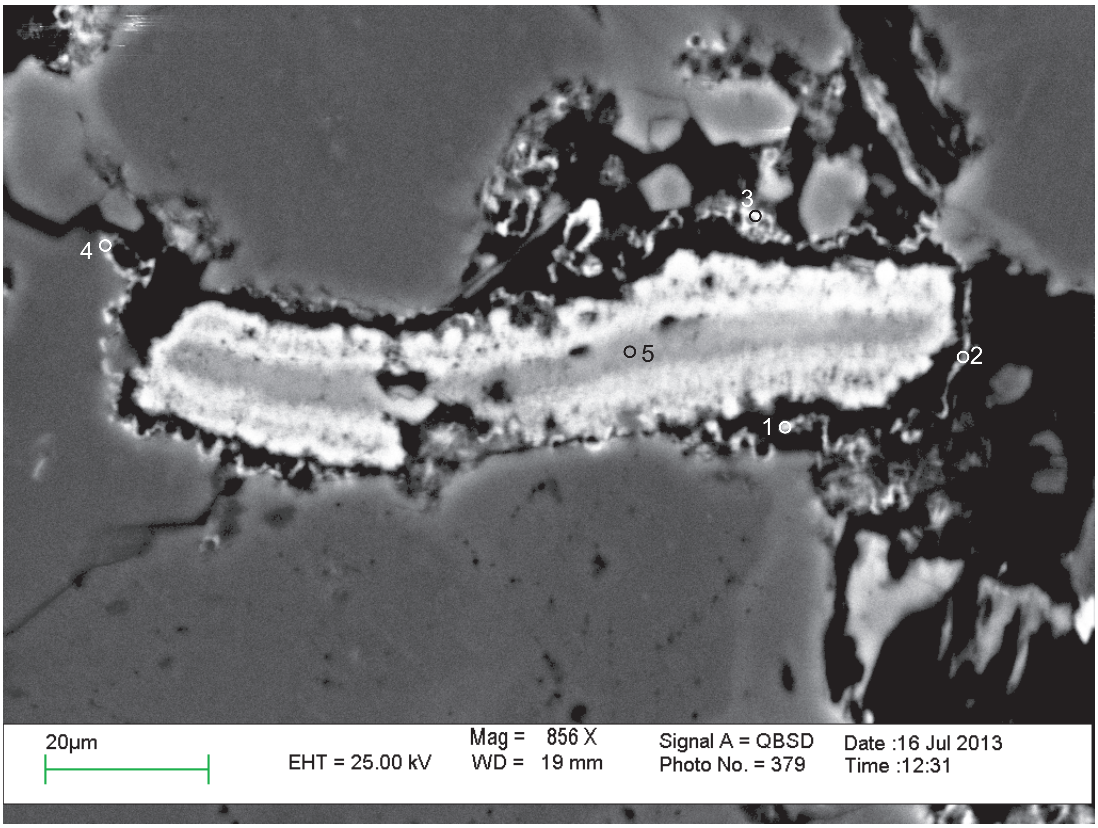
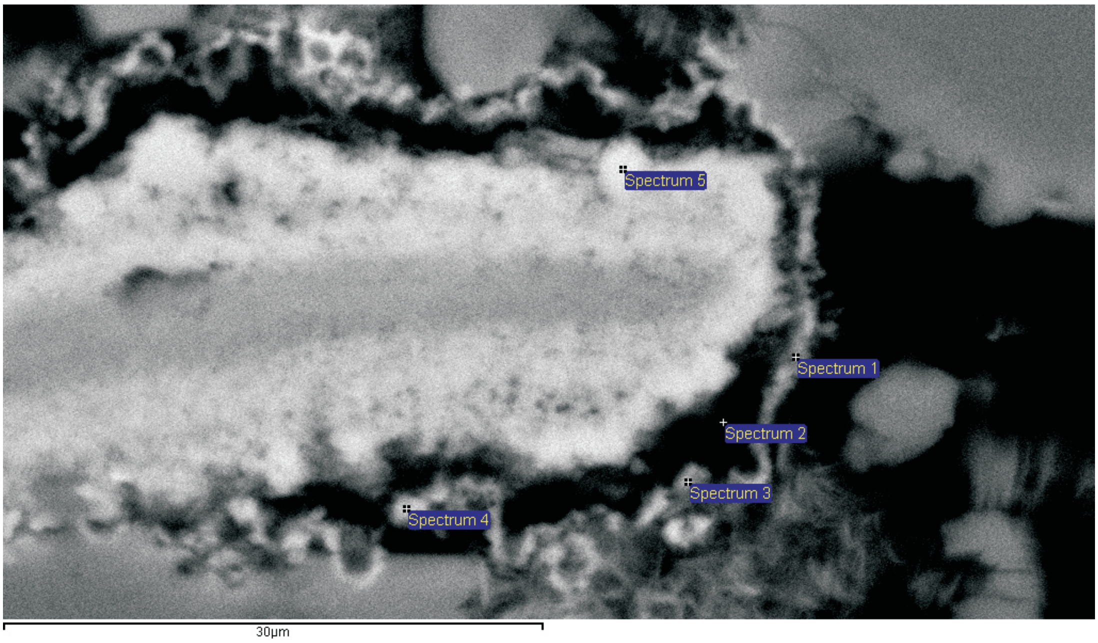


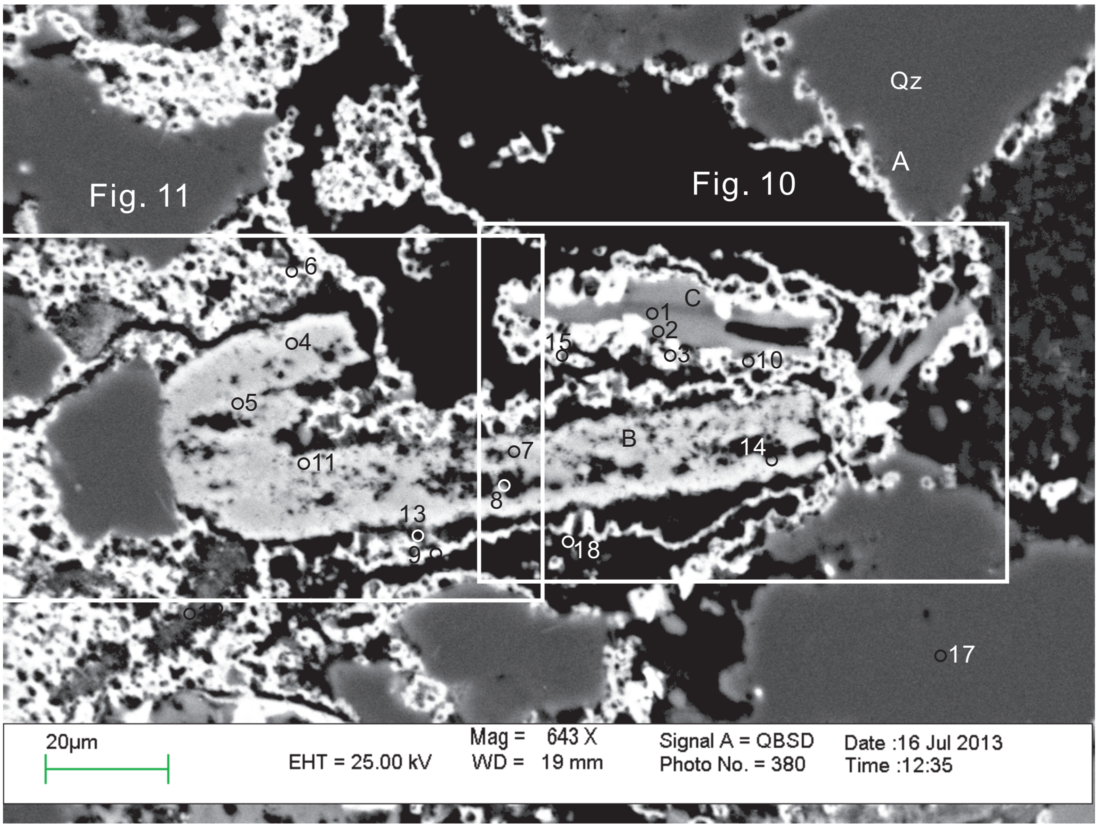
Figure 7: C-67 2834.91 m (SEM), site 1 (Table A-4), similar to Figure 6. The outer rim of the carbonate clast is mainly siderite (analyses 1,2).

1. Kutnohorite +Siderite +other
2: Kutnohorite + Siderite
3. Siderite+other
4. Quartz +Siderite
5. Calcite



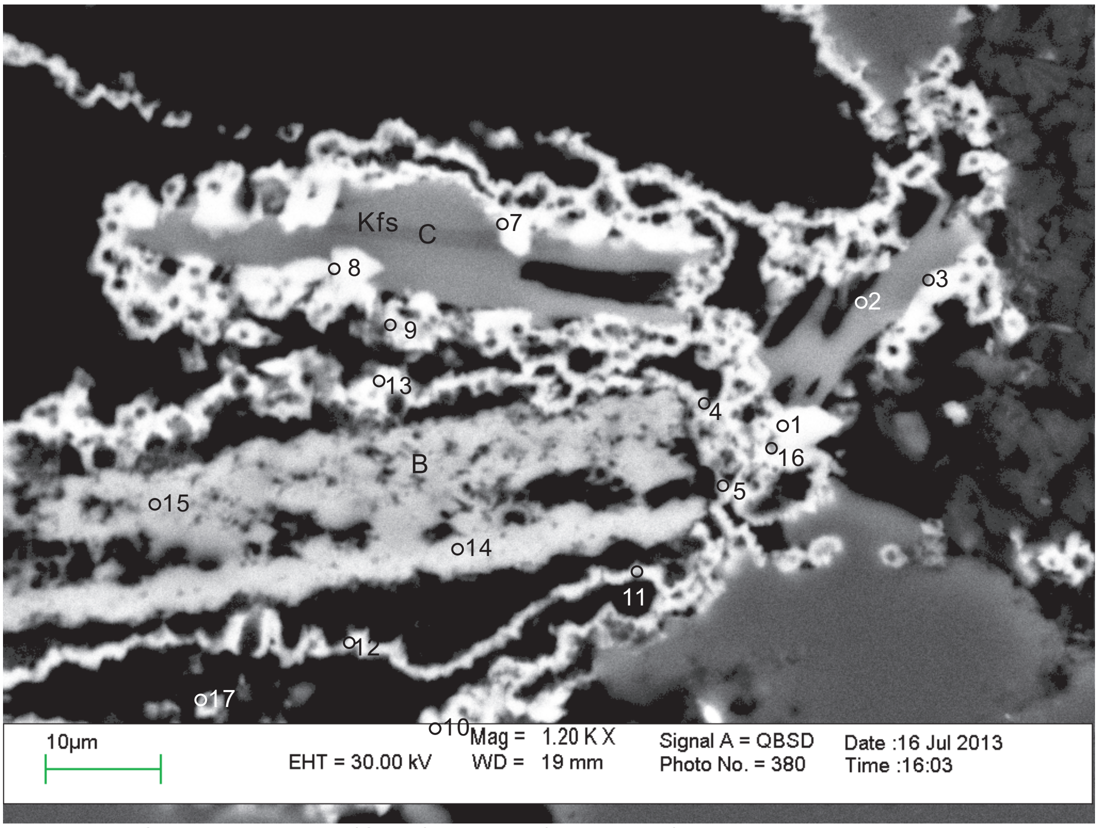
1. Siderite+Chlorite
2. Siderite + Kutnohorite
3. Siderite+ Chlorite
4. Siderite+Quartz
5. Kutnohorite

Figure 8: C-67 2834.91 m (SEM), site 12 (Table A-4), see location in Fig. 6. The outer rim is well shown and is mainly composed of siderite.



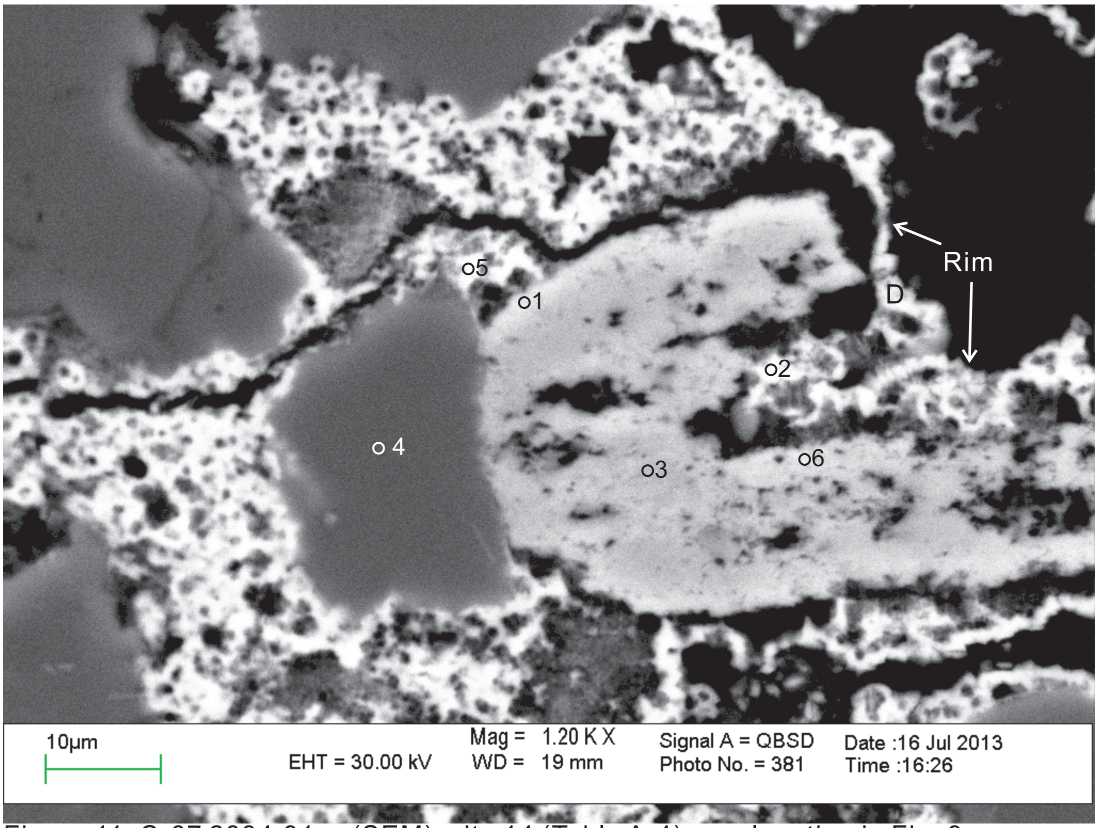
1. K-feldspar
2. K-feldspar
3. K-feldspar
4. Kutnohorite + Chlorite
5. Kutnohorite + Ankerite
6. Siderite
7. Chlorite+Siderite
8. Kutnohorite + Ankerite
9. Siderite+Chlorite
10. K-feldspar
11. Chlorite+Siderite
12. Chlorite +Siderite
13. Kutnohorite
14. Kutnohorite + Ankerite
15. Siderite + K-feldspar
16. Kaolinite
17: Quartz
18. Siderite

Figure 9: C-67 2834.91 m (SEM), site 2 (Table A-4). Two grains in the frame of Fig.10, a detrital K-feldspar (position C) and a carbonate bioclast (B), have been partially dissolved and are surrounded by siderite rims (analysis 18). The detrital quartz grains in this image are also rimmed by siderite (position A). Enlarged images of this figure are shown in Figs. 10,11.



1. Siderite + K-feldspar
2. K-feldspar
3. K-feldspar + Siderite
4. Siderite
5. Siderite + K-feldspar
6. Siderite + K-feldspar
7. K-feldspar + Siderite
8. Siderite + K-feldspar
9. Siderite + K-feldspar
10. Siderite + other
11. Siderite +other
12. Siderite+other
13. Siderite
14. Kutnohorite + Ankerite
15. Kutnohorite + Ankerite
16. Siderite + K-feldspar
17. Siderite + other

Figure 10: C-67 2834.91 m (SEM), site 13 (Table A-4), see location in Fig. 9. K-feldspar (position C) has been greatly dissolved and is rimmed with a later siderite rim (2,3, 8, 9) in the same way as the associated carbonate bioclast (B).



1. Kutnohorite + Ankerite
2. Siderite + other
3. Kutnohorite + Ankerite
4. Quartz
5. Siderite + other
6. Kutnohorite

Figure 11: C-67 2834.91 m (SEM), site 14 (Table A-4), see location in Fig. 9. Kutnohorite has partially replaced and filled in dissolution voids of preexisting ankerite (1,3) and is found on the rim (1) of the bioclast. Finally both, ankerite and kutnohorite have siderite rims (position D, 2).

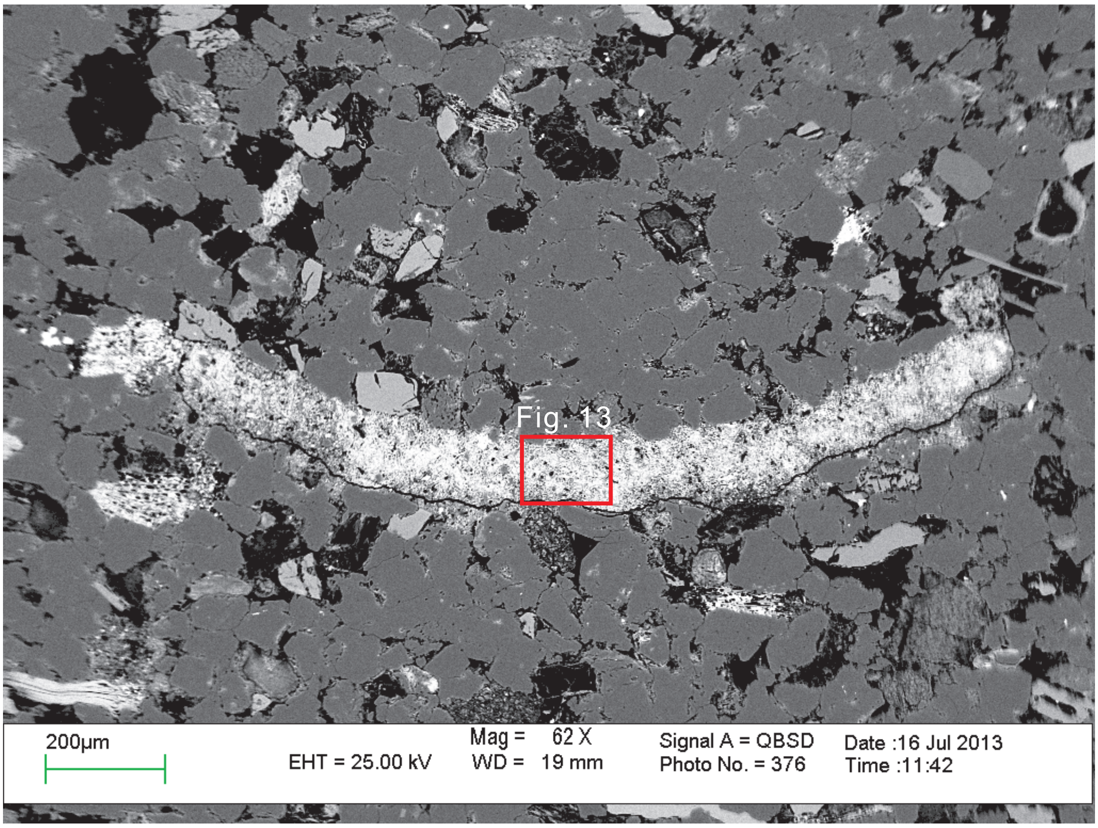
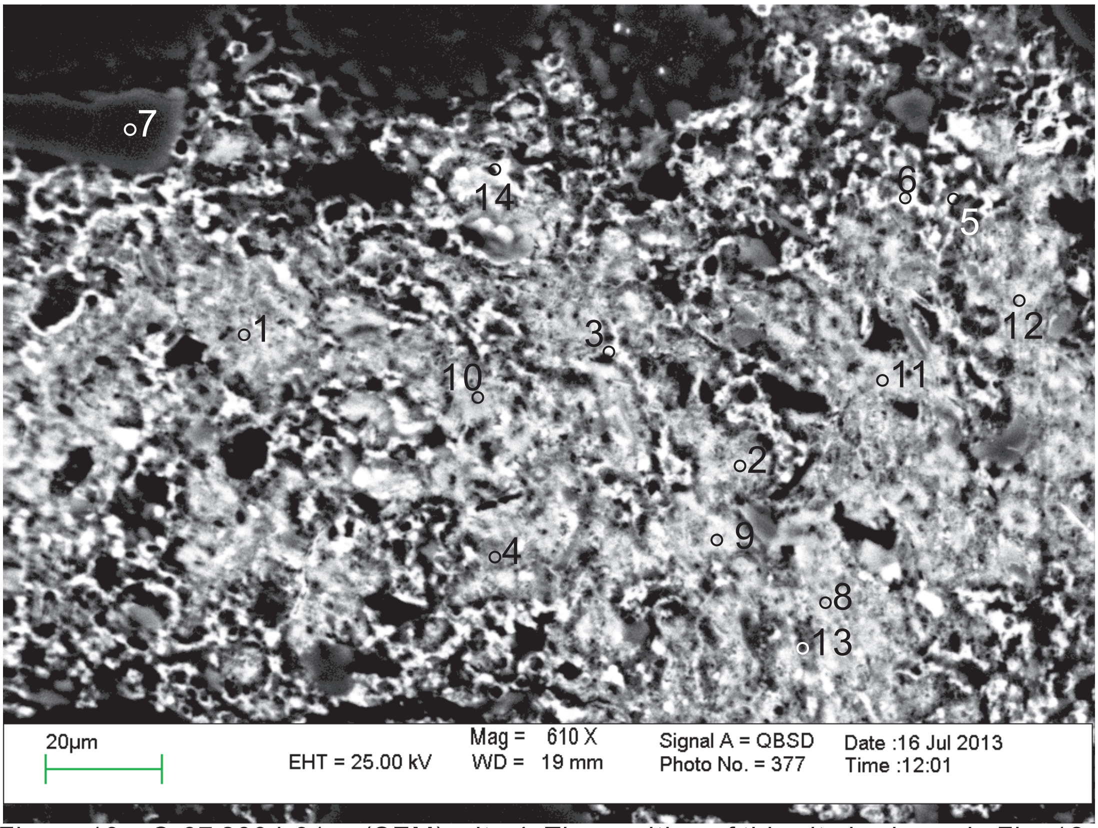
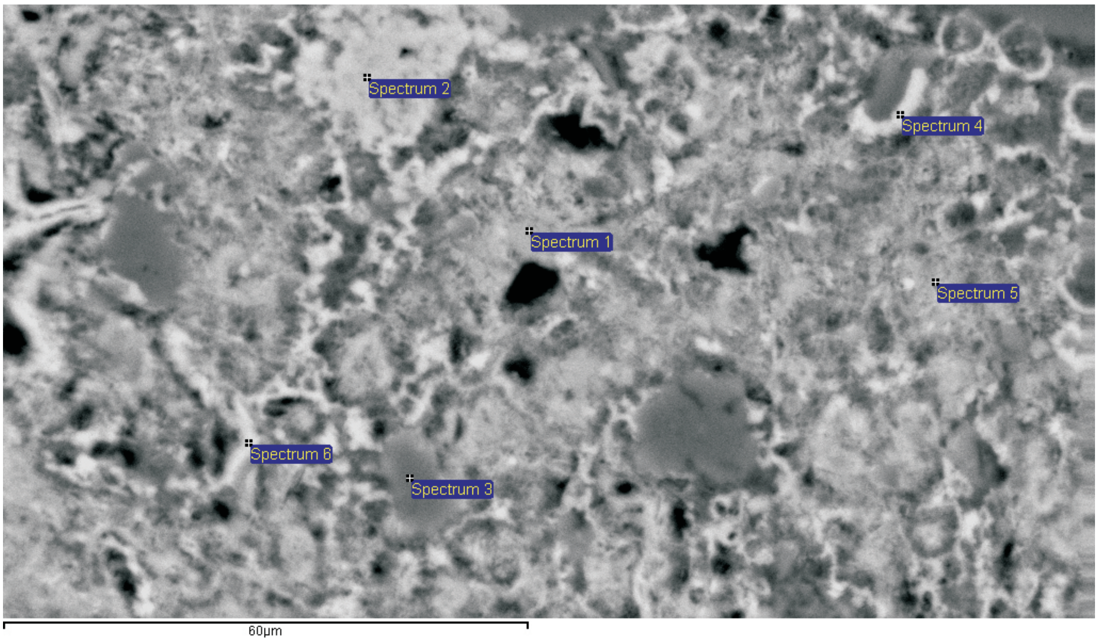


Figure 12: C-67 2834.91 m (SEM). Curved bioclast is located along a fracture. The fracture does not cut any detrital minerals.



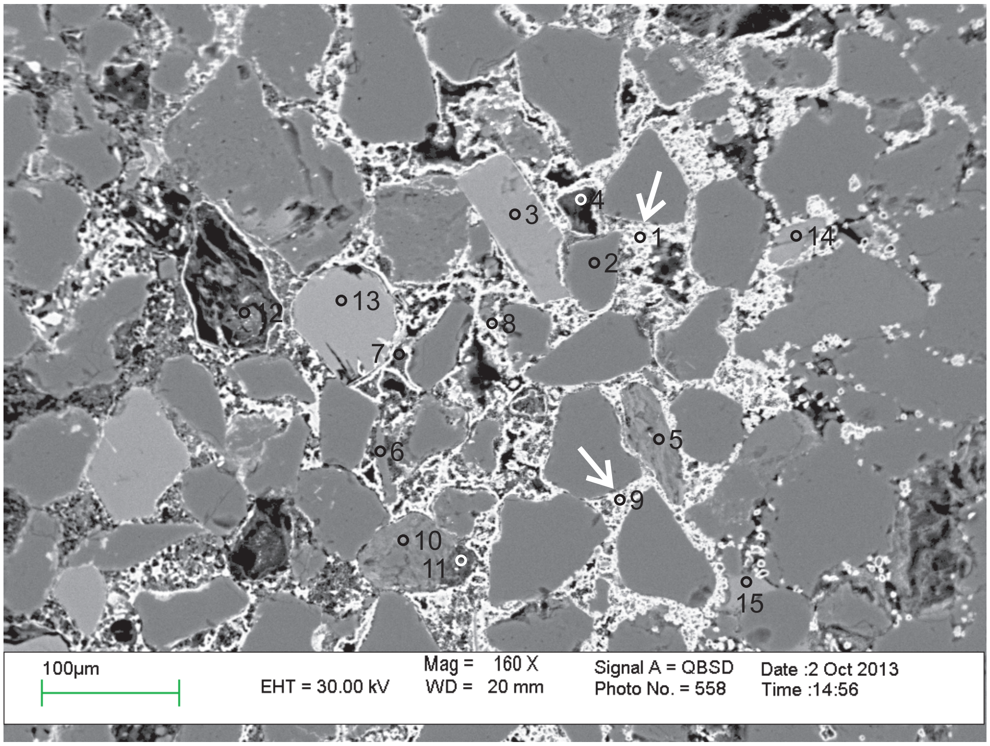
1. Siderite
2. Kutnohorite + Chlorite + Siderite
3. Siderite + Illite
4. Siderite + other
5. Siderite + other
6. Siderite + other
7. Quartz
8. Siderite + Kutnohorite
9. Siderite + other
10. Kutnohorite + Siderite
11. Kutnohorite + Siderite
12. Kutnohorite + Siderite
13. Siderite + other
14. Siderite

Figure 13: C-67 2834.91 m (SEM), site 4. The position of this site is shown in Fig. 12 (Table A-4). This bioclast contains a mixture of siderite, kutnohorite, chlorite and illite. The bright rims, developed around dissolution voids, are made of mainly of Mn-siderite (3, 5, 6 and 14).



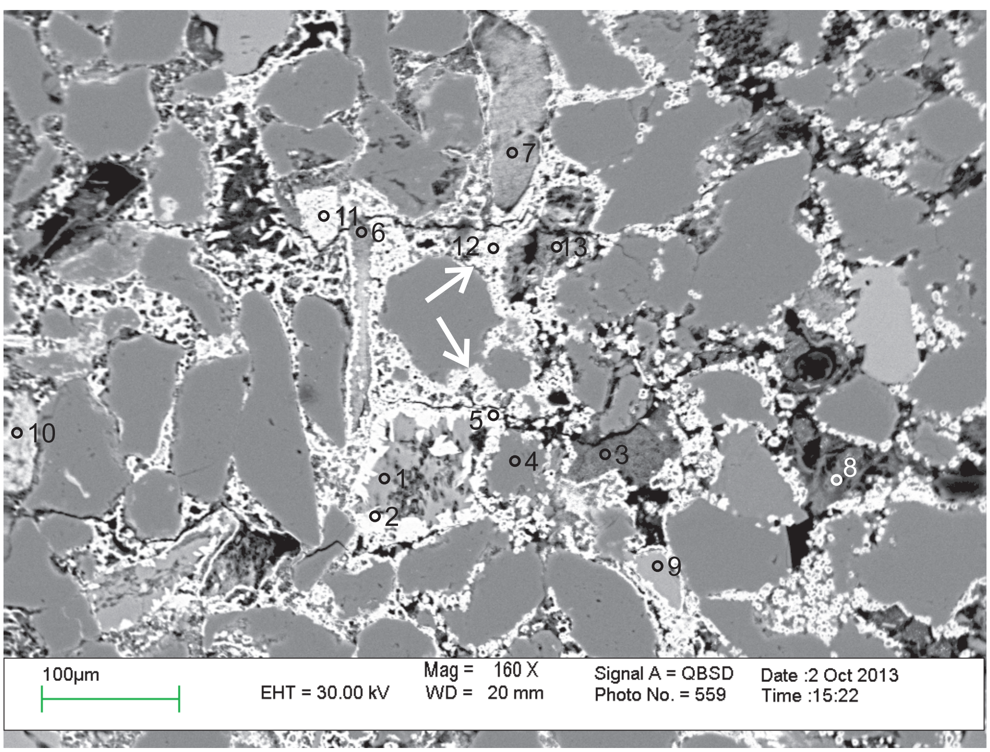
1. Kutnohorite + Chlorite + Siderite
2. Siderite
3. Quartz+Chlorite
4. Siderite
5. Siderite
6. Siderite

Figure 14: C-67 2834.91 m (SEM). The diagenetic mineral mixture in the bioclast of Fig. 12.



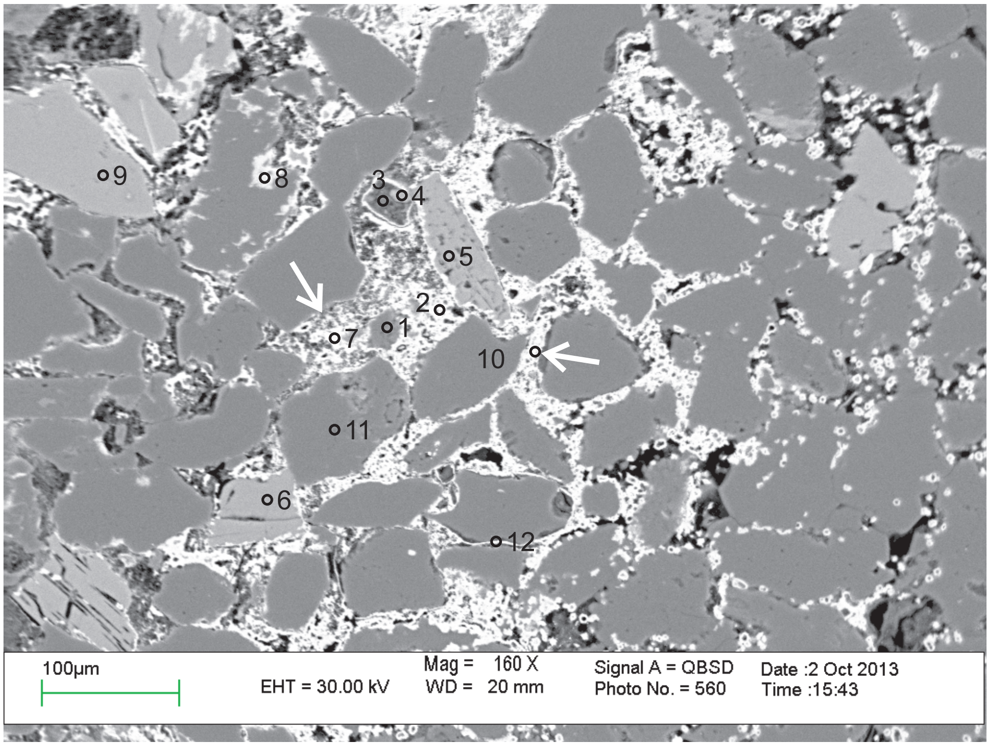
1. Siderite
2. Quartz
3. K-feldspar
4. Fe-chlorite + Apatite
5. Illite
6. Quartz
7. Siderite + Quartz
8. Siderite + Quartz
9. Siderite
10. Illite
11. Quartz + other
12. Siderite + Quartz
13. K-feldspar
14. K-feldspar
15. K-feldspar

Figure 15: C-67 2834.91 m. site 1 (SEM). Mn-siderite filling all the pores between the detrital grains, mostly quartz and K-feldspar, together with some illite and Fe-rich chlorite.



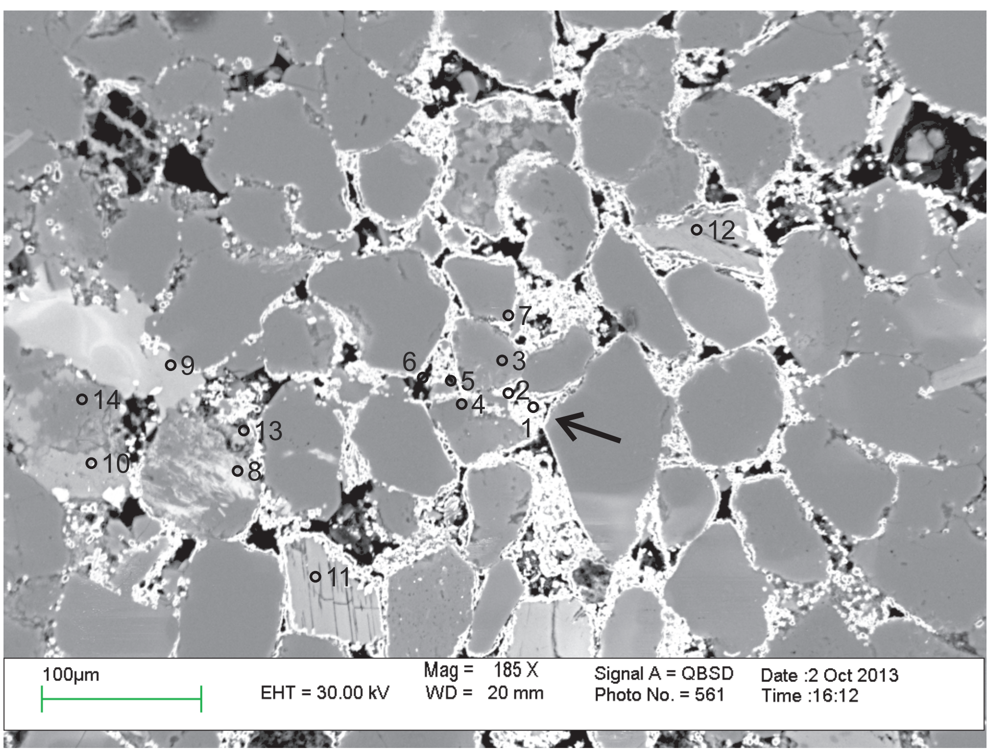
1. K-feldspar
2. Siderite
3. Fe-chlorite
4. Quartz
5. Siderite
6. Fe-chlorite+ Apatite
7. Fe-chlorite
8. Fe-chlorite
9. K-feldspar
10. Fe-chlorite
11. Apatite
12. Siderite
13. Fe-chlorite

Figure 16: C-67 2834.91 m. site 2 (SEM). Similar to Fig. 15.



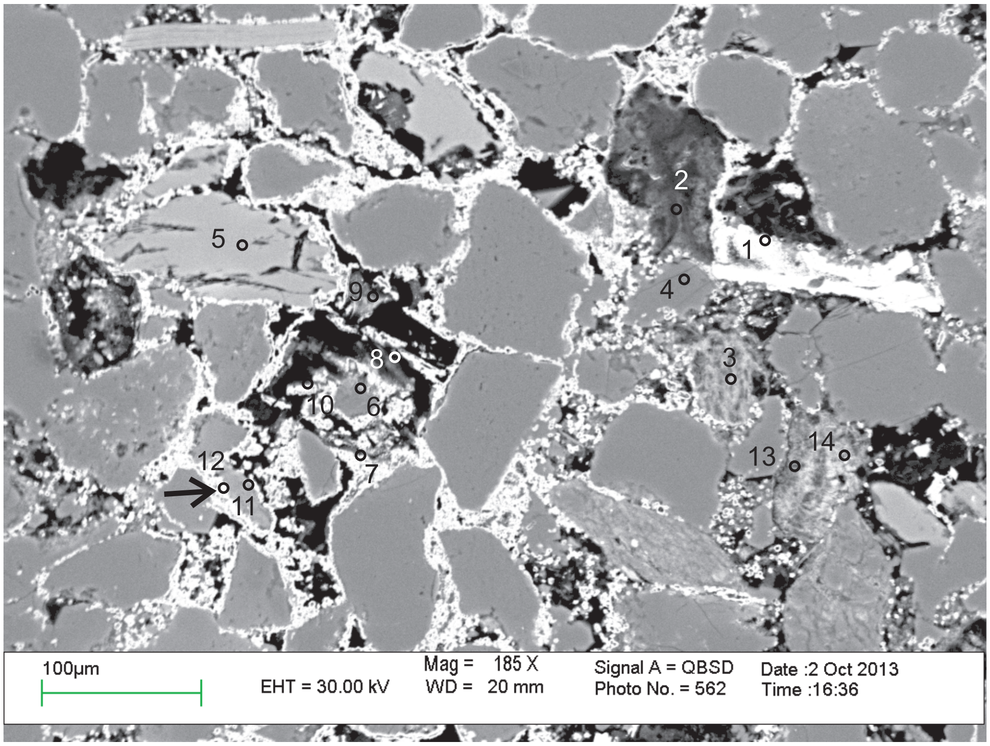
1. Quartz
2. Siderite
3. Illite
4. K-feldspar
5. K-feldspar
6. K-feldspar
7. Siderite
8. Apatite+Siderite+Quartz
9. K-feldspar
10. Siderite
11. Quartz
12. Siderite+Quartz+Illite

Figure 17: C-67 2834.91 m. site 3 (SEM). Similar to Fig. 15.



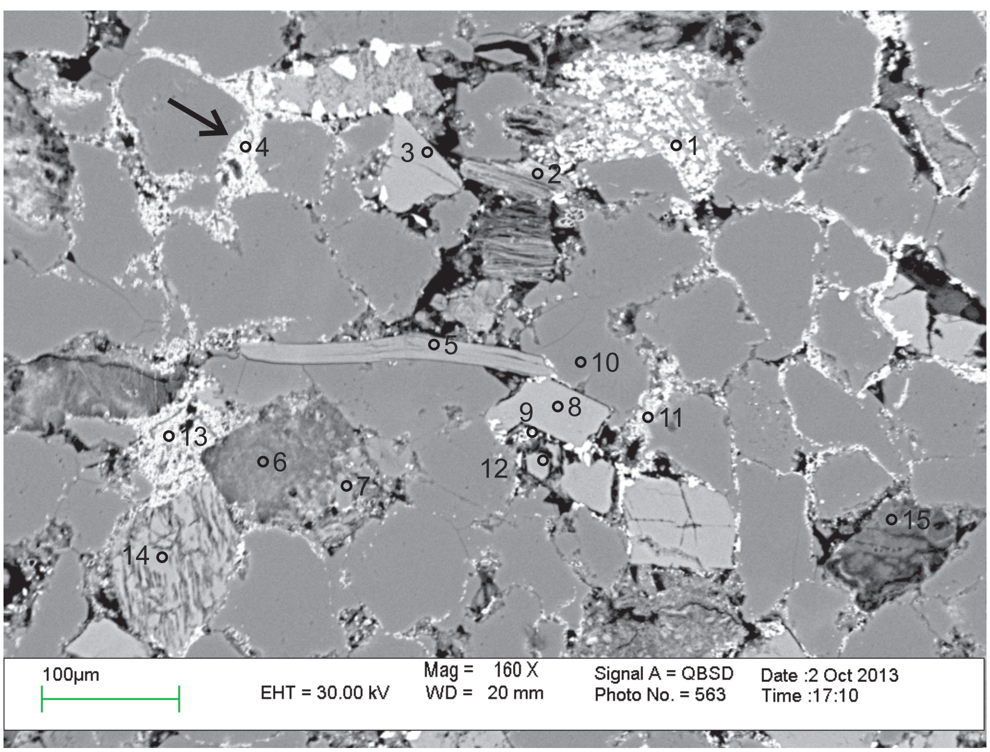
1. Siderite
2. Siderite
3. Quartz
4. Quartz
5. Siderite+Quartz
6. Siderite+Quartz+Apatite
7. Quartz
8. Quartz+Fe-chlorite
9. Calcite
10. K-feldspar
11. K-feldspar
12. K-feldspar
13. Fe-chlorite
+Siderite+Quartz
14. Quartz

Figure 18: C-67 2834.91 m. site 4 (SEM). Similar to Fig. 15.



1. Rutile
2. Fe-chlorite
3. Fe-chlorite
4. Quartz
5. K-feldspar
6. Quartz
7. Siderite + other
8. Siderite+Quartz
9. Quartz + Siderite
10. Siderite + Quartz
11. Illite
12. Siderite
13. Fe-chlorite
14. Fe-chlorite + Apatite

Figure 19: C-67 2834.91 m. site 5 (SEM). Similar to Fig. 15.



1. Fe-chlorite + Illite
2. Fe-chlorite + K-feldspar
3. K-feldspar
4. Siderite
5. Muscavite
6. Fe-chlorite
7. Plagioclase
8. K-feldspar
9. Siderite + K-feldspar
10. Quartz
11. Quartz+other
12. K-feldspar
13. Siderite + other
14. K-feldspar
15. Fe-chlorite

Figure 20: C-67 2834.91 m. site 6 (SEM). Similar to Fig. 15.

Table A-1: Scanning Electron Microscope chemical analyses of sample 2834.91 from the Sable Island C-67 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	Cl	CuO	ZnO	Total
C-67 2834.91	2	1	Sph				0.62							51.36			48.03	100.01
C-67 2834.91	2	2	Kfs	66.19		17.93					0.61	15.27						100.00
C-67 2834.91	2	3	Fe-Cal				1.35	0.94		53.71								56.00
C-67 2834.91	2	4	Qz	99.99														99.99
C-67 2834.91	2	5	Qz	99.99														99.99
C-67 2834.91	2	6	Ms	46.74	0.35	30.19	4.50		1.34		1.33	8.55						93.00
C-67 2834.91	2	7	Fe-Cal+other	1.78		1.44	2.19	1.55		92.46		0.59						100.01
C-67 2834.91	2	8	Sph+other	5.48		4.59	4.39					0.73		47.02		0.40	37.40	100.01
C-67 2834.91	2	9	Sd+other	6.05		3.59	65.80	2.45	10.21	9.42		0.41	2.04					99.97
C-67 2834.91	2	10	Qz	99.99														99.99
C-67 2834.91	2	11	Fe-Cal				1.43	0.84		53.73								56.00
C-67 2834.91	2	12	Qz	99.99														99.99
C-67 2834.91	2	13	Chl+Kfs	59.38	0.48	18.16	5.87		1.43		0.71	12.85			1.10			99.98
C-67 2834.91	2	14	Chl	31.10		21.74	24.80		4.33	0.74	1.02	0.39			0.88			85.00

Notes: 1. Diagenetic sphalerite only found.

Table A-2: Scanning Electron Microscope chemical analyses of sample 2834.91 from the Sable Island C-67 well.

Sample ID	Site	Pos.	Mineral Identification	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	Cr_2O_3	ZrO_2	ZnO	BaO	La_2O_3	Ce_2O_3	SnO_2	WO_3	Ag_2O	In_2O_3	F	Cl	Total
C-67_2834.91	5	1	Kut				4.70	23.08	2.93	27.29																	58.00
C-67_2834.91	5	2	Kut	0.89			3.16	23.57	2.22	27.35				0.81													58.00
C-67_2834.91	5	3	Carbonate Mix				9.42	12.21	5.34	28.03																	55.00
C-67_2834.91	5	4	Carbonate Mix + Chl	0.84		0.73	9.01	15.59	4.14	24.69																	55.00
C-67_2834.91	5	5	Mix(Chl+Carbonate+ some Py)	21.60		12.78	32.39	5.51	2.52	5.41	1.12	1.95		1.00												0*	84.29
C-67_2834.91	5	6	Fe-Cal				1.81	1.04	0.63	53.51																	57.00
C-67_2834.91	5	7	Qz	100.00																							100.00
C-67_2834.91	5	8	Sd(+Chl & Ilt)	9.74		6.85	30.81	2.41	3.03	2.17	1.07	0.31														0*	56.38
C-67_2834.91	5	9	Sd(+Chl & Ilt)	6.87		4.00	34.88	2.29	2.77	3.66	1.00	0.27		0.64													56.40
C-67_2834.91	5	10	Sd(+Chl & Ilt)	6.59		4.48	35.29	2.64	3.07	3.02	1.19	0.24														0*	56.52
C-67_2834.91	6	1	Sd(+some Ap&Chl)	1.03		0.69	41.06	1.11	5.65	6.00			1.45														57.00
C-67_2834.91	6	2	Sd				42.86	2.87	6.71	4.56																	57.00
C-67_2834.91	6	3	Sd(+ some Qz)	1.57			43.56	1.53	6.70	3.36																0*	56.72
C-67_2834.91	6	4	Mix(Chl+Carbonate+some Py)	4.37	0.61	2.07	34.22	14.31	4.11	22.49	1.05	0.37		0.99												0*	84.58
C-67_2834.91	6	5	Sd(+Pl altering to Chl)	8.27		2.11	32.80	4.65	1.52	5.96	0.61	0.61														0*	56.53
C-67_2834.91	6	6	Qz	98.76			0.89			0.35																	100.00

Table A-3: Electron Microprobe analyses of sample 2834.91 from the Sable Island C-67 well.

Well	Depth(m)	Site	Pos.	Mineral ID	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	Cr_2O_3	BaO	SrO	NiO	Total
Sable Island C-67	2834.91	5	1	Fe-Cal		0.01	0.01	2.54	1.27	0.58	52.36	0.09	0.02	0.01			0.26		57.15
Sable Island C-67	2834.91	5	2	Kut	0.03	0.01	0.03	4.49	19.68	2.48	25.09	0.24	0.02	0.08			0.05		52.18
Sable Island C-67	2834.91	5	3	Mix(Chl+Carbonates)	9.68	0.12	7.14	31.05	4.76	2.06	4.24	1.25	0.55	0.10	0.01	0.03	0.14		61.14
Sable Island C-67	2834.91	5	4	Sd	1.09		0.65	38.61	2.74	2.59	2.71	1.36	0.08	0.47		0.02	0.01		50.34
Sable Island C-67	2834.91	5	5	Sd	7.51	0.14	5.20	39.91	2.36	2.76	3.15	1.06	0.51	0.44	0.01	0.03	0.04	0.03	63.14
Sable Island C-67	2834.91	5	6	Qz+Chl	67.53		10.08	8.64	0.05	1.81	0.17	2.72	0.19				0.50		91.69
Sable Island C-67	2834.91	5	7	Qz	95.28		0.06	0.05	0.02		0.01	0.04	0.00				0.74		96.19
Sable Island C-67	2834.91	5	8	Chl+Cal	3.14	0.03	2.24	10.06	0.73	0.54	22.10	0.30	0.11	0.03					39.28
Sable Island C-67	2834.91	5	9	Mix(Kut+Chl)	1.34	0.04	0.93	6.98	20.08	1.73	18.21	0.49	0.09	0.13	0.03	0.01	0.05	0.02	50.11
Sable Island C-67	2834.91	6	1	Sd+Chl+Ap	3.52	0.00	2.50	36.20	1.08	4.23	10.61	0.64	0.06	6.10	0.04	0.02	0.04	0.01	65.05
Sable Island C-67	2834.91	6	2	Sd	0.70	0.04	0.38	38.31	5.53	4.47	8.27	0.57	0.12	0.17	0.04		0.02	0.03	58.66
Sable Island C-67	2834.91	6	3	Sd	0.98	0.04	0.53	46.40	1.52	4.70	4.06	0.62	0.13	0.50	0.05	0.02	0.01	0.02	59.56
Sable Island C-67	2834.91	6	4	Sd+Chl	12.22	0.06	7.43	33.15	4.88	2.32	6.87	0.78	1.71	0.21	0.00		0.04	0.01	69.67
Sable Island C-67	2834.91	6	5	Qz	95.66		0.08	0.26			0.01	0.02	0.02	0.01			0.74		96.80
Sable Island C-67	2834.91	6	6	Kfs	61.64		17.82	0.11				0.89	15.21			0.53	0.15		96.35

Table A-4: Scanning Electron Microscope chemical analyses of sample C-67 2834.91 from the Sable Island C-67 well (Figures 6-14).

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	NiO	ZnO	As_2O_3	SrO	SnO_2	BaO	La_2O_3	Ce_2O_3	Nd_2O_3	Total
C-67 2834.91	1	1	Kut+Cal	0.36			4.13	13.96	4.18	75.25	1.39			0.57		0.17										100.01
C-67 2834.91	1	2	Kut+Cal	0.41		0.4	6.15	16.55	3.81	66.24	1.07			0.72	4.43	0.2										99.98
C-67 2834.91	1	3	Kut	1.24		0.43	4.86	34.55	4.33	43.88	1.01			2.87	6.81											99.98
C-67 2834.91	1	4	Kut	6.14		1.49	12.35	32.07	4.89	39.53	2.13			0.95		0.45										100
C-67 2834.91	1	5	Qz	99.99																						99.99
C-67 2834.91	1	6	Qz	98		1.1	0.21					0.46		0.25												100.02
C-67 2834.91	1	7	Kut	4.6		2.38	13.83	23.54	8.84	44.31	1.19		0.3	0.55		0.45										99.99
C-67 2834.91	1	8	Mix	29.84		2.95	18.98	16.64	2.79	23.2	2.14	0.53		1.37		1.58										100.02
C-67 2834.91	1	9	Kut	1.18		0.47	5.69	36.27	4.73	45.11			0.21	1.1	5.25											100.01
C-67 2834.91	1	10	Chl+Kfs	39.81		17.88	28.55	0.79	4	4.72	1.69	1.25		0.55		0.76										100
C-67 2834.91	1	11	Qz	100.11										-0.12												99.99
C-67 2834.91	2	1	Kfs	63.47		18.05	3.59		0.2		1.25	12.72										0.71				99.99
C-67 2834.91	2	2	Kfs	65.42		19.67	0.4			1.54	7.79	5.18														100
C-67 2834.91	2	3	Kfs	65.63		18.05	0.5				1.29	13.51										1.02				100
C-67 2834.91	2	4	Kut+Chl	3.38		2.15	12.41	25.68	7.2	39.14	1.04			0.67	8.03	0.28										99.98
C-67 2834.91	2	5	Kut+Ank	0.51			17.69	15.36	13.98	51.99				0.35		0.13										100.01
C-67 2834.91	2	6	Sd	1.24		0.52	39.27	1.66	6.42	4.72	1.02	0.07	0.82			0.26										56.00
C-67 2834.91	2	7	Chl+Sd	14.44		11.85	45.54	5.36	5.47	14.37	1.46	0.33		0.72		0.47										100.01
C-67 2834.91	2	8	Kut+Ank	0.39			14.99	21.75	11.29	51.01				0.4		0.16										99.99
C-67 2834.91	2	9	Sd+Chl	15.47		10.3	47	7.01	3.85	10.9	2.31	0.67		1.17		1.32										100
C-67 2834.91	2	10	Kfs	58.23	0.3	21.01	6.3		1.43		1.32	11.18				0.23										100
C-67 2834.91	2	11	Chl+Sd	24.47		14.04	36.74	5.56	3.38	10.07	4.02	0.52		0.47		0.74										100.01
C-67 2834.91	2	12	Chl+Sd	19.04		13.85	48.67	4.13	3.95	4.24	2.59	0.52	0.89	0.87		1.29										100.04
C-67 2834.91	2	13	Kut	2.61		1.51	12.61	29.37	6.91	45.5	0.9		-0.21	0.45		0.32										99.97
C-67 2834.91	2	14	Kut+Ank				16.49	20.02	11.71	51.78																100
C-67 2834.91	2	15	Sd+Kfs	26.55		7.92	46.74	2.85	5.87	4.04	1.42	4.58														99.97
C-67 2834.91	2	16	Kln	48.88		36.37	0.49				0.27															86.00
C-67 2834.91	2	17	Qz	99.99																						99.99
C-67 2834.91	2	18	Sd	2.03		1.04	35.75	1.87	6.91	5.05	1.97		0.76	0.21		0.44										56.00
C-67 2834.91	3	1	Kut+Chl+Sd	3.57		1.4	19.57	26.97	4.69	41.39	1.08			1.05		0.29										100.01
C-67 2834.91	3	2	Sd	1.39		0.71	40.87	1.19	5.27	4.98	0.68		0.91													56.00
C-67 2834.91	3	3	Qz+Chl	81.08	0.4	6.95	7.74	0.45	0.61	0.83	0.35	1.58														99.99
C-67 2834.91	3	4	Sd	11.31		3.72	28.52	2.57	4.30	2.20	3.28					0.11										56.00
C-67 2834.91	3	5	Sd	4.99		2.38	37.06	3.11	2.89	3.22	0.94	0.48		0.42		0.50										56.00
C-67 2834.91	3	6	Sd	4.82		2.74	34.66	1.64	6.77	3.85	0.64	0.59				0.29										56.00
C-67 2834.91	4	1	Sd	5.49	0.36	2.90	35.06	3.47	2.44	3.85	0.96	0.46		0.53		0.48										56.00
C-67 2834.91	4	2	Kut+Chl+Sd	7.66		3.93	33.41	17.62	4.59	29.3	1.32	0.63		1.05		0.46										99.97
C-67 2834.91	4	3	Sd+Ilt	13.13	0.48	6.93	56.93	4.34	6.15	6.51	1.7	1.01	1.54	0.62		0.65										99.99
C-67 2834.91	4	4	Sd+other	12.04	0.37	4.97	63.89	4.94	3.85	4.66	1.44	1.06	0.53	1.07		1.16										99.98
C-67 2834.91	4	5	Sd+Chl	13.95		9.22	55.5	5.02	4.64	7.57	1.28	0.88		0.85		1.07										99.98
C-67 2834.91	4	6	Sd+other	16.19		9.03	56.03	2.44	7.3	4.95	1.35	0.94	0.78	0.67		0.32										100
C-67 2834.91	4	7	Qz	99.99																						99.99
C-67 2834.91	4	8	Sd+Kut	6.76	0.62	2.83	41.73	15.32	4.73	24.61	1.25	0.53		1.22		0.36										99.96
C-67 2834.91	4	9	Sd+other	10.42		5.63	55.68	7.73	5.29	11.18	1.44	0.82		1		0.8										99.99
C-67 2834.91	4	10	Kut+Sd	8.06		4.76	25.83	19.95	5.7	31.92	1.12	1.04		1.1		0.51										99.99
C-67 2834.91	4	11	Kut+Sd	6.01		3	32.07	20.15	4.84	30.88	1.04	0.58		1.1		0.32										99.99
C-67 2834.91	4	12	Kut+Sd	7.74		3.65	32.96	17.98	4.76	29.78	1.08	0.59		1.05		0.43										100.02
C-67 2834.91	4	13	Sd+other	16.24	0.42	8.77	53.03	5.85	4.1	7.08	1.69	1.32		0.92		0.59										100.01
C-67 2834.91	4	14	Sd	5.57		3.26	34.82	1.40	5.45	3.39	0.88	0.24	0.50	0.32		0.17										56.00
C-67 2834.91	11	1	Kut+Sd+other	25.82		4.63	28.37	11.22	2.7	23.07	1.93					2.25										99.99

Table A-4: Scanning Electron Microscope chemical analyses of sample C-67 2834.91 from the Sable Island C-67 well (Figures 6-14).

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	NiO	ZnO	As_2O_3	SrO	SnO_2	BaO	La_2O_3	Ce_2O_3	Nd_2O_3	Total
C-67 2834.91	11	2	Kut+Sd	7.68		4.59	24.74	22.71	3.76	32.42	1.81			1.2		1.07										99.98
C-67 2834.91	11	3	Sd+other	30.46		15.14	39.98	1.61	5.11	3.04	2.79	0.45				1.45										100.03
C-67 2834.91	11	4	Qz+Sd	84.95			11.73	0.7	0.96	1.32						0.33										99.99
C-67 2834.91	11	5	Cal				1.75	5.51	2.14	45.99	0.60															56.00
C-67 2834.91	12	1	Sd+Chl	27.64		17.02	35.79	3.77	3.98	6.37	3.79					1.66										100.02
C-67 2834.91	12	2	Sd+Kut	12.04		8.31	38.75	10.97	2.3	20.6	3.11			1.3		2.6										99.98
C-67 2834.91	12	3	Sd+Chl	14.63		10.62	44.92	6.02	5.17	12.66	3.05	0.47				2.46										100
C-67 2834.91	12	4	Sd+Qz	30.76		3.36	39.6	6.07	4.43	11.33	2.79					1.64										99.98
C-67 2834.91	12	5	Kut	6.23		3.06	14.9	27.96	4.24	34.32	1.25			0.87	6.46	0.69										99.98
C-67 2834.91	13	1	Sd+Kfs	19.1		5.48	53.92	4.03	10.03	2.25	0.96	4.23														100
C-67 2834.91	13	2	Kfs	67.92	0.28	15.76	3.95	0.21			0.67	11.2														99.99
C-67 2834.91	13	3	Kfs+Sd	47.55		14.13	22	1.63	3.71	1.4	0.61	8.97														100
C-67 2834.91	13	4	Sd	4.49		2.81	32.96	1.92	5.27	5.91	1.25	0.43		0.60		0.37										56.00
C-67 2834.91	13	5	Sd+Kfs	12.45		3.55	57.07	3.25	10.86	8.38	1.97	1.82				0.65										100
C-67 2834.91	13	6	Sd+Kfs	28.77		13.4	41.89	3.21	8.16	1.9		2.3				0.38										100.01
C-67 2834.91	13	7	Kfs+Sd	40.62		14.08	29.23	2.22	4.36	2.07	2.94	4.47														99.99
C-67 2834.91	13	8	Sd+Kfs	38.14		11.36	32.1	2.57	5.6	1.01	1.2	8.02														100
C-67 2834.91	13	9	Sd+Kfs	9.43		2.74	60.95	3.59	10.43	6.8	2	2.25	1.26			0.58										100.03
C-67 2834.91	13	10	Sd+other	15.55		3.99	58.08	4.92	10.23	4.66	1.56	1														99.99
C-67 2834.91	13	11	Sd+other	7.92		4.89	55.85	4.22	10.5	11.64	3.01		1.26			0.69										99.98
C-67 2834.91	13	12	Sd+other	12.36		6.44	56.19	3.69	7.26	8.44	3.28			1.25		1.11										100.02
C-67 2834.91	13	13	Sd	1.61		1.00	37.69	1.94	7.29	5.06	1.19					0.23										56.00
C-67 2834.91	13	14	Kut+Ank	1.52		1.23	13.51	22.93	11.11	49.7																100
C-67 2834.91	13	15	Kut+Ank	1.16		0.93	16.42	19.87	10.83	50.81																100.02
C-67 2834.91	13	16	Sd+Kfs	20.69		4.88	53.22	2.79	9.34	4.06		4.59				0.41										99.98
C-67 2834.91	13	17	Sd+other	50.38		3.74	33.42	1.51	3.28	5.54	1.63					0.49										99.99
C-67 2834.91	14	1	Kut+Ank	4.34		1.68	15.91	26.38	8.71	42.96																99.98
C-67 2834.91	14	2	Sd+Chl	14.53		8.67	55.09	2.81	8.29	6.52	1.82	0.59	1.15			0.54										100.01
C-67 2834.91	14	3	Kut+Ank				16.58	19.12	12.82	51.46																99.98
C-67 2834.91	14	4	Qz	99.73			0.27																			100
C-67 2834.91	14	5	Sd+other	14.82		2.46	58.75	4.34	5.46	9.05	2.29		1.08	0.92		0.82										99.99
C-67 2834.91	14	6	Kut	1.82		1.63	12.67	25.38	7.15	46.66					4.71											100.02

Table A-5: Scanning Electron Microscope chemical analyses of minerals filling vertical fractures in sample C-67- 2834.91 from the Sable Island C-67 well (Figures15-20).

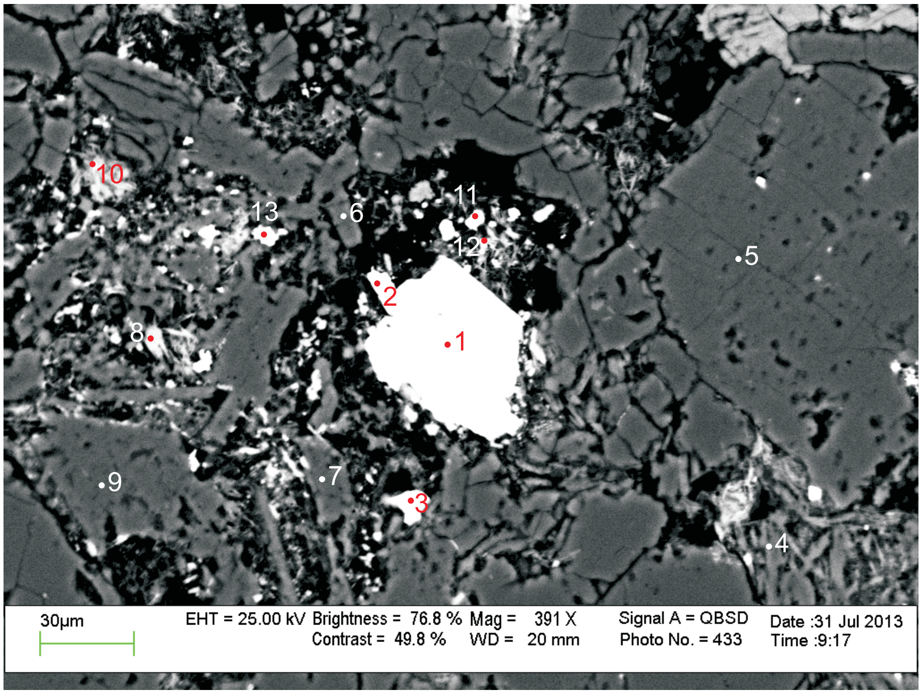
Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	ZnO	BaO	Nd_2O_3	WO_3	Total
C-67 2834.91	1	1	Sd	1.22			71.01	1.64	9.09	11.5	2.6		2.57			0.39					100.02
C-67 2834.91	1	2	Qz	99.64			0.35														99.99
C-67 2834.91	1	3	Kfs	65.33		17.88	0.3				1.4	14.72						0.38			100.01
C-67 2834.91	1	4	Fe-chl+Ap	31.68		21.11	26.32		4.99	4.8	1.95	0.66	5.59	0.6		2.3					100
C-67 2834.91	1	5	Ilt	50.61	0.45	30.02	4.72		4.08		1.04	9.08									100
C-67 2834.91	1	6	Qz	98.32			1.43			0.25											100
C-67 2834.91	1	7	Sd+Qz	34.7		2.74	45.39	1.39	4.38	6.16	3.59	0.4				1.26					100.01
C-67 2834.91	1	8	Sd+Qz	50.7			33.45	1.43	5.04	6.11	1.39		1.58			0.3					100
C-67 2834.91	1	9	Sd	2.72		0.87	69.93	1.76	7.21	12.02	2.83		2.27			0.41					100.02
C-67 2834.91	1	10	Ilt	56.26	0.25	27.68	3.16		1.49	0.81	0.85	8.85	0.5			0.13					99.98
C-67 2834.91	1	11	Qz+other	69.31	0.33	13.57	5.31		1.24	0.9	2.35	3.14			2.87	0.97					99.99
C-67 2834.91	1	12	Sd+Qz	50.49		3.53	30.5	0.49	2.74	4.87	3.55	0.63		1.4		1.51	0.3				100.01
C-67 2834.91	1	13	Kfs	65.25		18.12	0.26				1.19	14.32						0.88			100.02
C-67 2834.91	1	14	Kfs	65.5		17.88	0.55				0.35	15.35						0.37			100
C-67 2834.91	1	15	Kfs	65.65		17.89	0.4				1.32	14.25						0.48			99.99
C-67 2834.91	2	1	Kfs	65.82		17.69	0.41				0.46	15.61									99.99
C-67 2834.91	2	2	Sd	4.19		2.44	65.29	5.42	12.67	6.45	1	0.55	1.99								100
C-67 2834.91	2	3	Fe-chl	33.63		25.28	32.41		5.47		2.7					0.51					100
C-67 2834.91	2	4	Qz	99.15		0.51	0.32														99.98
C-67 2834.91	2	5	Sd	2.89		0.93	69.8	3.52	9.52	9.14	1.32	0.41	2.47								100
C-67 2834.91	2	6	Fe-chl+ap	25.26	0.57	17.01	18.56		4.44	15.71	1.27	1.14	15.6			0.42					99.98
C-67 2834.91	2	7	Fe-chl	32.17		24.32	35.08		5.85	0.35	1.51					0.71					99.99
C-67 2834.91	2	8	Fe-chl	35.4		25.06	31.51		5.11	0.34	0.98	0.47				1.13					100
C-67 2834.91	2	9	Kfs	65.54		17.84	0.55				0.98	14.6						0.48			99.99
C-67 2834.91	2	10	Fe-chl	30.55		22.26	35.93		4.97	0.67	0.96	0.29			3.88	0.49					100
C-67 2834.91	2	11	Ap				0.85			46.8	0.81		42.48		8.61				0.5	-0.05	100
C-67 2834.91	2	12	Sd	2.4		1.36	68.14	2.56	7.93	13.08	2.1		2.43								100
C-67 2834.91	2	13	Fe-chl	33.18		25.6	33.76		5.42	0.53	0.94					0.55					99.98
C-67 2834.91	3	1	Qz	96.67		1.55	1.04			0.17		0.58									100.01
C-67 2834.91	3	2	Sd	2.5		1.17	67.37	2.23	8.82	13.1	1.46		3.07			0.28					100
C-67 2834.91	3	3	Ilt	57.52	1.05	24.58	3.4		3.33	0.74	0.8	7.47	0.6			0.5					99.99
C-67 2834.91	3	4	Kfs	65.54		17.88	0.69				0.62	14.9						0.36			99.99
C-67 2834.91	3	5	Kfs	65.57		17.89	0.33				0.28	15.39						0.51			99.97
C-67 2834.91	3	6	Kfs	65.91		17.84	0.24				0.71	14.92						0.37			99.99
C-67 2834.91	3	7	Sd	0.79			73.97	2.78	10.78	9.82			1.88								100.02
C-67 2834.91	3	8	Ap+Sd+Qz	7.4		2.72	9.13	0.21	0.53	36.32	1.07	0.51	35.45		6.69						100.03
C-67 2834.91	3	9	Kfs	65.61		17.95	0.18				0.39	15.47						0.41			100.01
C-67 2834.91	3	10	Sd	2.1			71.04	1.73	9.52	12.03	1.01		2.57								100
C-67 2834.91	3	11	Qz	94.36		1.55	0.58		0.27			0.45			2.81						100.02
C-67 2834.91	3	12	Sd+Qz+Ilt	44.5		8.67	32.74	1.38	4.49	4.48	0.92	1.35	1.21			0.26					100
C-67 2834.91	4	1	Sd	3.79			69.14	2.05	7.98	10.55	4.42		1.56			0.45					99.94
C-67 2834.91	4	2	Sd	9.86	1.25	0.77	64.14	1.95	7.28	9.44	2.86		1.56			0.87					99.98
C-67 2834.91	4	3	Qz	99.71			0.28														99.99

1/2

Table A-5: Scanning Electron Microscope chemical analyses of minerals filling vertical fractures in sample C-67- 2834.91 from the Sable Island C-67 well (Figures15-20).

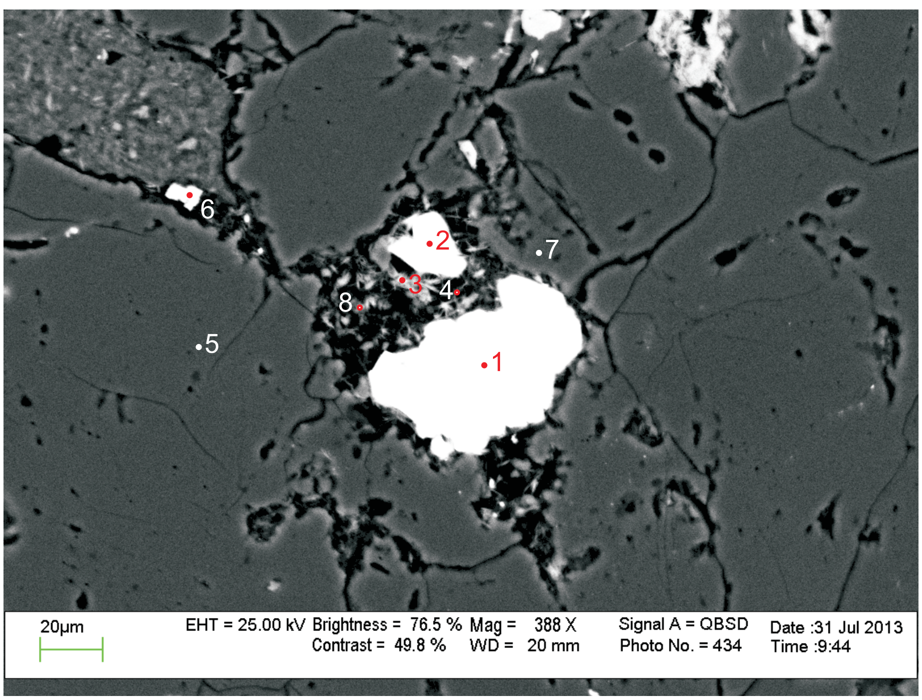
Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	ZnO	BaO	Nd_2O_3	WO_3	Total
C-67 2834.91	4	4	Qz	96.61		1.25	1.61			0.21		0.34									100.02
C-67 2834.91	4	5	Sd+Qz	17.56		0.57	60.19	2.62	4.63	7.71	2.84		0.78			3.09					99.99
C-67 2834.91	4	6	Sd+Qz+Ap	30.76		1.8	45.71	1.91	6.02	6.13	4.88		1.19			1.59					99.99
C-67 2834.91	4	7	Qz	94.49			4.35	0.18	0.23	0.76											100.01
C-67 2834.91	4	8	QZ+Fe-chl	71.62		9.22	14.61	0.35	3.15	0.38	0.66										99.99
C-67 2834.91	4	9	Cal	7.85			2.32	1.19	0.58	88.08											100.02
C-67 2834.91	4	10	Kfs	63.23		17.23	0.71				0.44	15.13		1.5	1.76						100
C-67 2834.91	4	11	Kfs	65.99		17.86	0.28				0.97	14.89									99.99
C-67 2834.91	4	12	Kfs	66.1		17.82	0.41				1.42	14.24									99.99
C-67 2834.91	4	13	Fe-chl+Sd+Qz	49.07		10.28	29.95	0.9	2.82	3.32	1.91	0.64				1.12					100.01
C-67 2834.91	4	14	Qz	99.17			0.36		0.3	0.17											100
C-67 2834.91	5	1	Rt	2.46	84.3	2.63	4.52		0.56	0.73	0.81		0.89		2.8	0.31					100.01
C-67 2834.91	5	2	Fe-chl	35.08		25.38	29.06		6.33	0.48	1.02	0.23				2.41					99.99
C-67 2834.91	5	3	Fe-chl	41.78	0.22	24.15	25.91		4.63	0.56	0.94	1.29				0.54					100.02
C-67 2834.91	5	4	Qz	99.79			0.21														100
C-67 2834.91	5	5	Kfs	66.04		18.1	0.13				1.2	14.53									100
C-67 2834.91	5	6	Qz	90.74			6.91	0.41	0.81	0.6	0.5										99.97
C-67 2834.91	5	7	Sd+other	17.52		2.4	59.94	2.71	4.68	7.47	2.31	0.33		0.97		1.67					100
C-67 2834.91	5	8	Sd+Qz	41.95		2.4	36.07	1.32	4.44	7.53	3.72			0.92		1.64					99.99
C-67 2834.91	5	9	Qz+Sd	51.64		6.95	25.99	0.26	1.69	3.76	2.35	4.12		0.82		2.42					100
C-67 2834.91	5	10	Sd+Qz	16.45		2.61	58.39	2.22	5.69	8.07	2.66			2.12		1.77					99.98
C-67 2834.91	5	11	Ilt	49.89	1.38	26.72	8.75	0.28	2.92	0.84	0.49	8.59				0.16					100.02
C-67 2834.91	5	12	Sd	9.05		4.01	64.8	2.08	7.43	8.49	2.28	0.43	1.42								99.99
C-67 2834.91	5	13	Fe-chl	34.72		23.68	32.73		6.17	0.59	0.73					1.38					100
C-67 2834.91	5	14	Fe-chl+ap	30.91		23.66	32.75		4.88	3.11	0.82		2.73			1.16					100.02
C-67 2834.91	6	1	Fe-chl+Ilt	39.51		23.64	21.63	0.67	6.47	2.03	0.55	4.65	0.69			0.15					99.99
C-67 2834.91	6	2	Fe-chl+Kfs	42.72		32.14	16.96		2.45		0.57	5.01				0.15					100
C-67 2834.91	6	3	Kfs	65.63		17.8	0.31				0.88	15.39									100.01
C-67 2834.91	6	4	Sd	5.09		2.57	68.89	3.27	7.08	7.95	2.53	0.28	1.15	0.67		0.52					100
C-67 2834.91	6	5	Ms	50.27	0.67	35.09	1.92		0.83		0.7	10.52									100
C-67 2834.91	6	6	Fe-chl	35.75	0.62	24.66	30.95		5.17	0.56	0.69	0.63				0.99					100.02
C-67 2834.91	6	7	Pl	62.81		22.73	0.69			4.31	9.22	0.22									99.98
C-67 2834.91	6	8	Kfs	66.25		17.8					0.63	15.32									100
C-67 2834.91	6	9	Sd+Kfs	21.97		9.86	48.82	3.02	6.86	4.49	1.75	2.52				0.71					100
C-67 2834.91	6	10	Qz	99.99																	99.99
C-67 2834.91	6	11	Qz+other	56.99		2.14	32.97	1.34	2.5	3.68		0.16				0.21					99.99
C-67 2834.91	6	12	Kfs	66.25		17.84	0.14				0.73	15.03									99.99
C-67 2834.91	6	13	Sd+other	11.21		5.88	62.86	2.47	7.46	6.73	1.48	0.48	1.12			0.32					100.01
C-67 2834.91	6	14	Kfs	65.33		18.06	1.33				1.2	13.94				0.14					100
C-67 2834.91	6	15	Fe-chl	33.65	2.6	24.75	30.39		5.07	0.56	0.62	0.39				1.96					99.99

Appendix 12B: Scanning Electron Microscope Backscattered Electron Images for Sable Island C-67 4085.83



1. Sphalerite
2. Sphalerite
3. Pyrite
4. Albite
5. Albite
6. Albite
7. Albite
8. Chlorite
9. Albite
10. Chlorite
11. Sphalerite + other
12. Mixture
13. Pyrite

Figure 1: C-67 4085.83 m. site1 (SEM).Sphalerite (1,2) and late pyrite (3) fill pores. It seems that they, together with chlorite (8,10) have partially replaced albite. The albite grains also seem to be diagenetic because of their straight crystal outlines. They also seem to have partially dissolved because of the presence of dissolution voids in the larger grains (5). These voids are partially filled with barite and pyrite.



1. Sphalerite
2. Sphalerite
3. Chlorite + other
4. Chlorite + other
5. Quartz
6. Rutile
7. Quartz
8. Albite

Figure 2: C-67 4085.83 m. site2 (SEM). Similar to Fig.1. Sphalerite (2) seems to engulf chlorite (4).

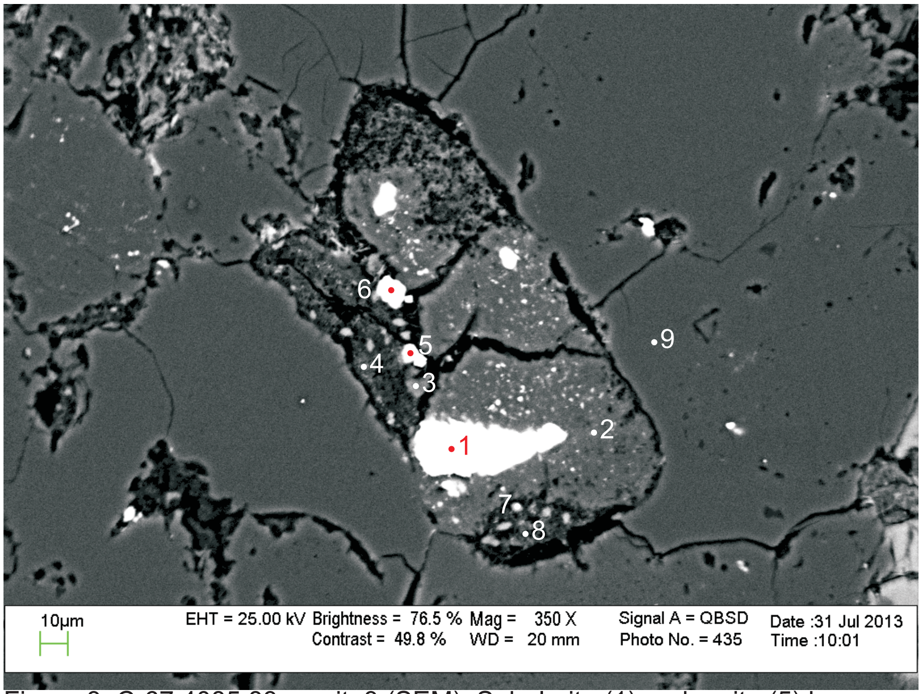


Figure 3: C-67 4085.83 m. site3 (SEM). Sphalerite (1) and pyrite (5) have partially replaced albite (2,3).

1. Sphalerite
2. Albite
3. Albite
4. Muscovite
5. Pyrite
6. Pyrite
7. Quartz + other
8. Muscovite
9. Quartz

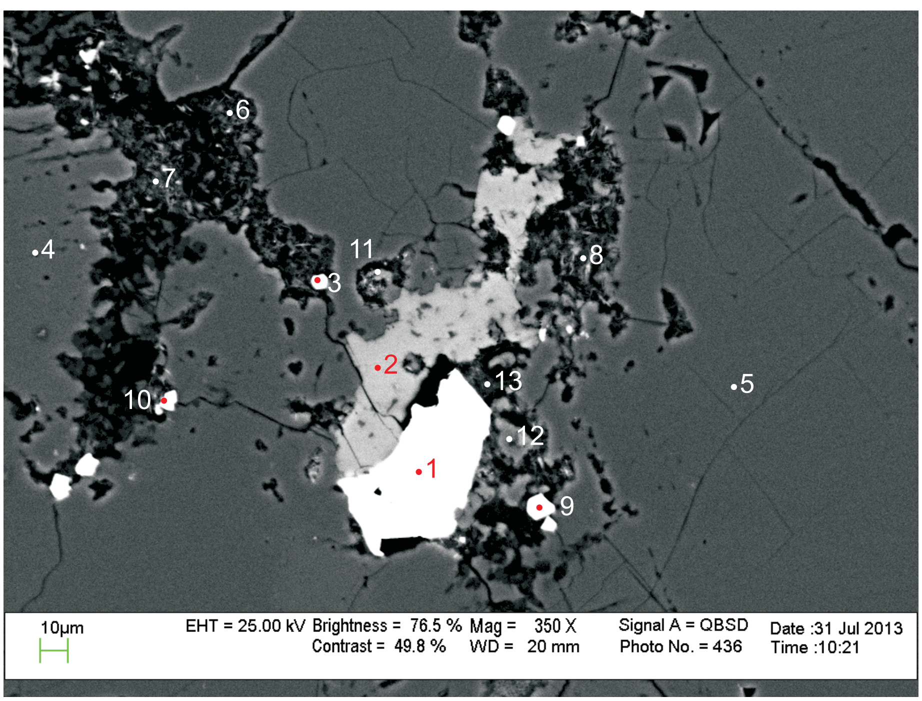
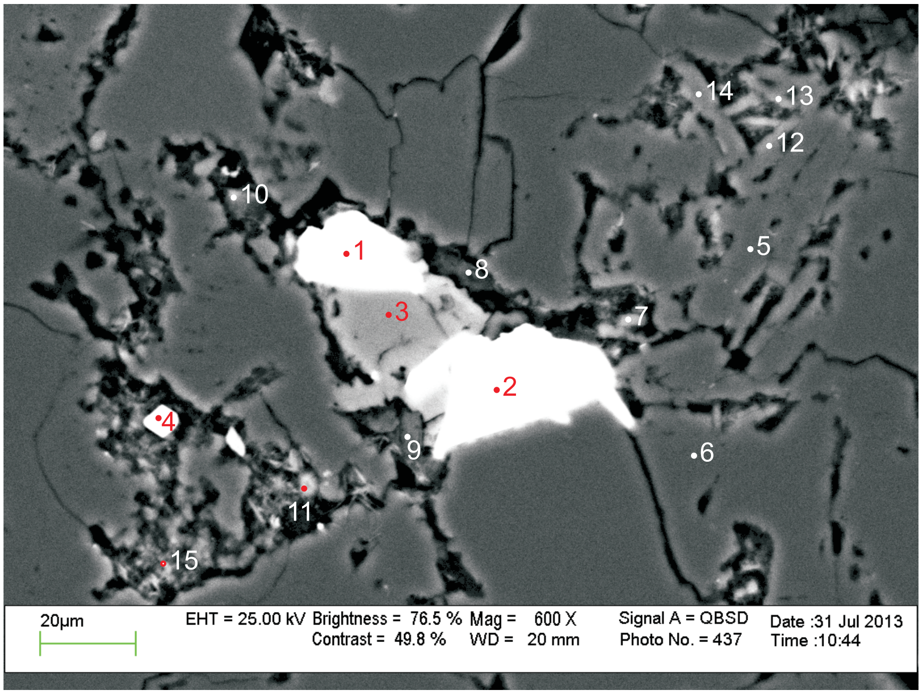


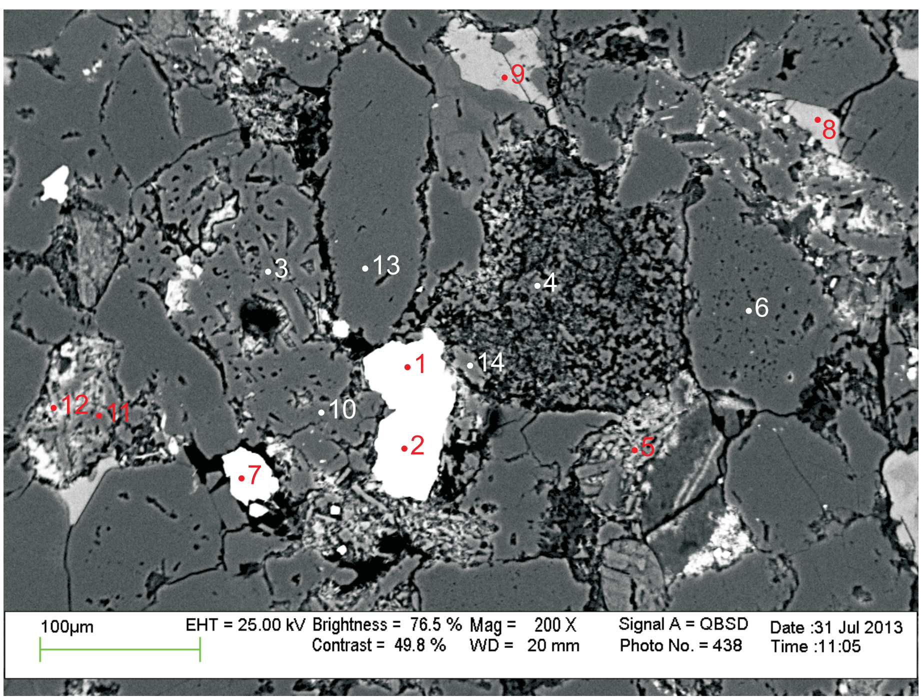
Figure 4: C-67 4085.83 m. site4 (SEM). Sphalerite (1) engulfs Fe-calcite (2), that probably has partially replaced K-feldspar (13).

1. Sphalerite
2. Fe-Calcite
3. Pyrite
4. Albite
5. Quartz
6. Illite + Ilmenite
7. Illite + Ilmenite
8. Illite + Ilmenite
9. Pyrite
10. Pyrite
11. Quartz + K-feldspar
12. Quartz
13. K-feldspar



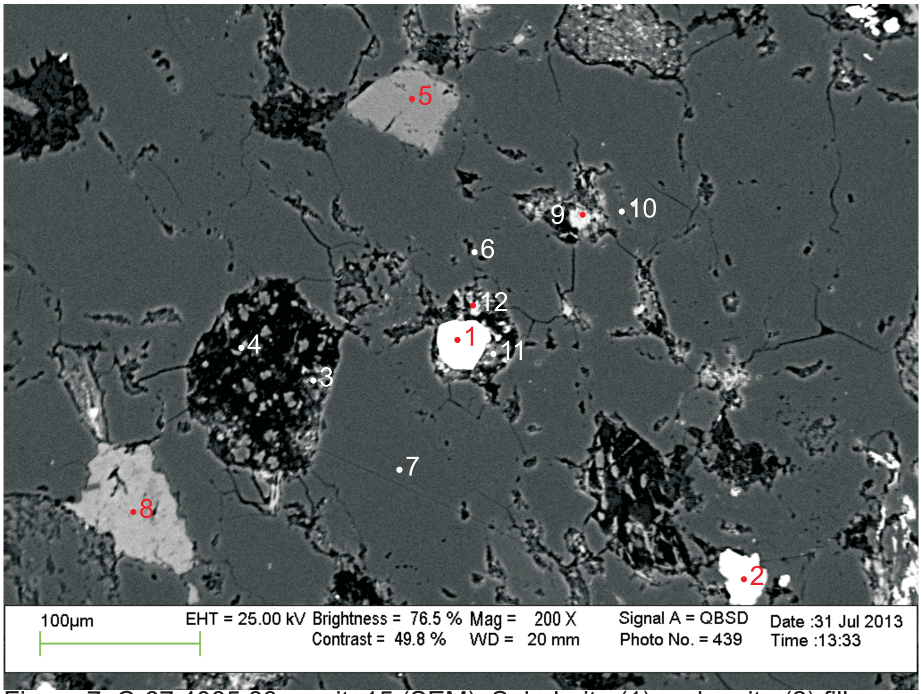
1. Sphalerite
2. Sphalerite
3. K-feldspar
4. Pyrite
5. Albite
6. Quartz
7. Albite
8. Illite + Calcite
9. Illite + Calcite + Sphalerite
10. Chlorite + K-feldspar
11. Chlorite
12. Albite
13. Albite
14. Albite
15. Chlorite + K-feldspar

Figure 5: C-67 4085.83 m. site5 (SEM). Sphalerite (1,2) engulfs K-feldspar (3).



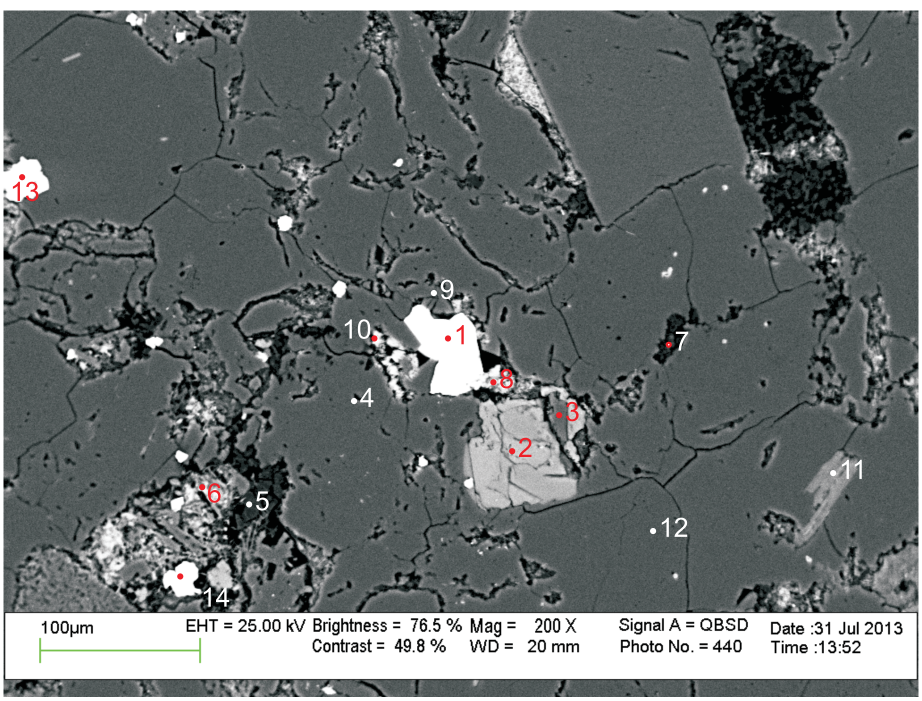
1. Sphalerite
2. Sphalerite
3. Albite
4. Albite
5. Albite
6. Quartz
7. Pyrite
8. Fe-Calcite
9. Fe-Calcite
10. Albite
11. Albite
12. Chlorite + Albite
13. Albite
14. Albite

Figure 6: C-67 4085.83 m. site6 (SEM). Sphalerite (1,2) engulfs albite (10). Both albite (3,10) and quartz (6) are within many dissolution voids. Chlorite has partially replaced albite (12). Pyrite fills pores. Many dissolution voids are present in quartz (6).



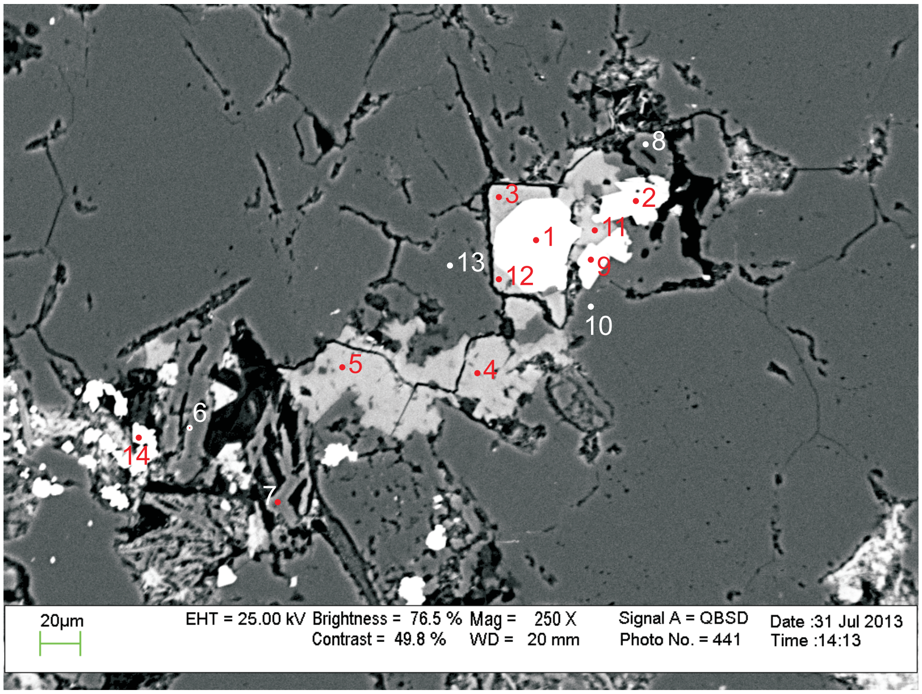
1. Sphalerite
2. Pyrite
3. Illite
4. Illite
5. K-feldspar
6. Quartz
7. Quartz
8. Fe-Calcite + K-feldspar
9. Chlorite
10. Quartz
11. K-feldspar
12. Chlorite

Figure 7: C-67 4085.83 m. site15 (SEM). Sphalerite (1) and pyrite (2) fill pores probably created by K-feldspar (11) dissolution. Fe-calcite has partially replaced K-feldspar (8). Illite (4) and chlorite (12) also fill pores probably created by K-feldspar dissolution.



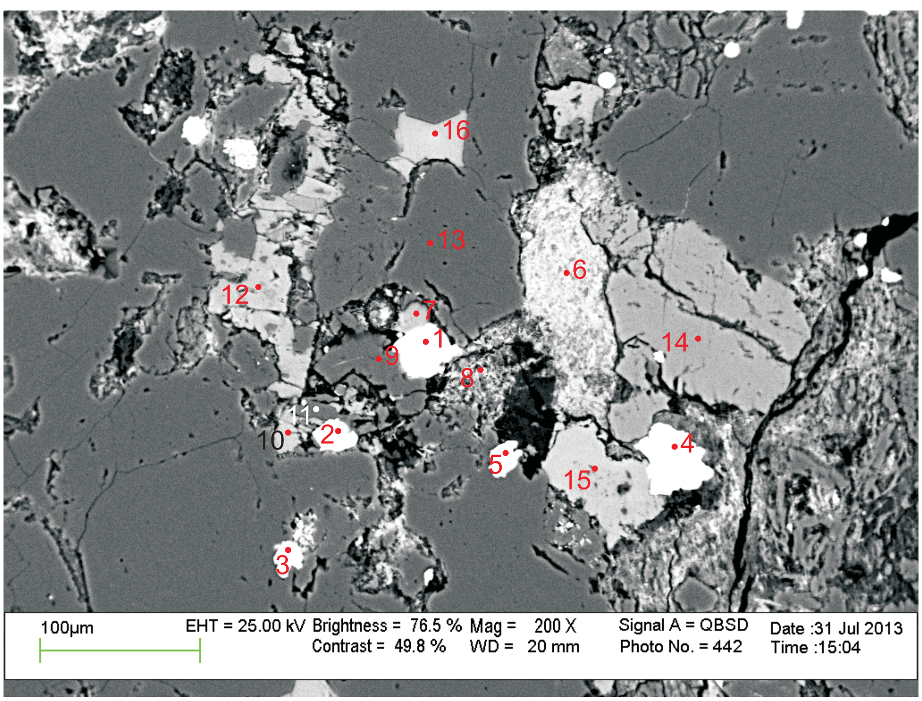
1. Sphalerite
2. Fe-Calcite
3. Albite
4. Quartz
5. Kaolinite
6. Chlorite
7. Kaolinite
8. Chlorite + other
9. Quartz
10. Chlorite + other
11. Illite
12. Quartz
13. Pyrite
14. Pyrite

Figure 8: C-67 4085.83 m. site16 (SEM). Sphalerite (1) and pyrite (14) fill pores that partially have been filled by kaolinite (5) and probably chlorite (6). There is also diagenetic illite (11).



1. Barite
2. Rutile
3. Fe-Calcite + K-feldspar
4. Fe-Calcite + K-feldspar
5. Calcite
6. Quartz
7. Quartz
8. Albite
9. Rutile
10. Quartz
11. Fe-Calcite
12. Fe-Calcite
13. Quartz
14. Pyrite

Figure 9: C-67 4085.83 m. site17 (SEM). Fe-calcite has partially replaced K-feldspar (4,5). Diagenetic barite (1) is in contact (straight crystal outlines) with mixtures of K-feldspar and Fe-calcite (3).



1. Sphalerite
2. Sphalerite
3. Pyrite
4. Pyrite
5. Pyrite + other
6. Chlorite
7. Fe-Calcite
8. Chlorite
9. Albite
10. Fe-Calcite + Albite
11. Quartz
12. Fe-Calcite + K-feldspar
13. Quartz
14. K-feldspar
15. Fe-Calcite
16. Fe-Calcite

Figure 10: C-67 4085.83 m. site19 (SEM). Sphalerite (2), pyrite and chlorite (8) fill pores. Fe-calcite seems to have partially replaced feldspars (12,10).

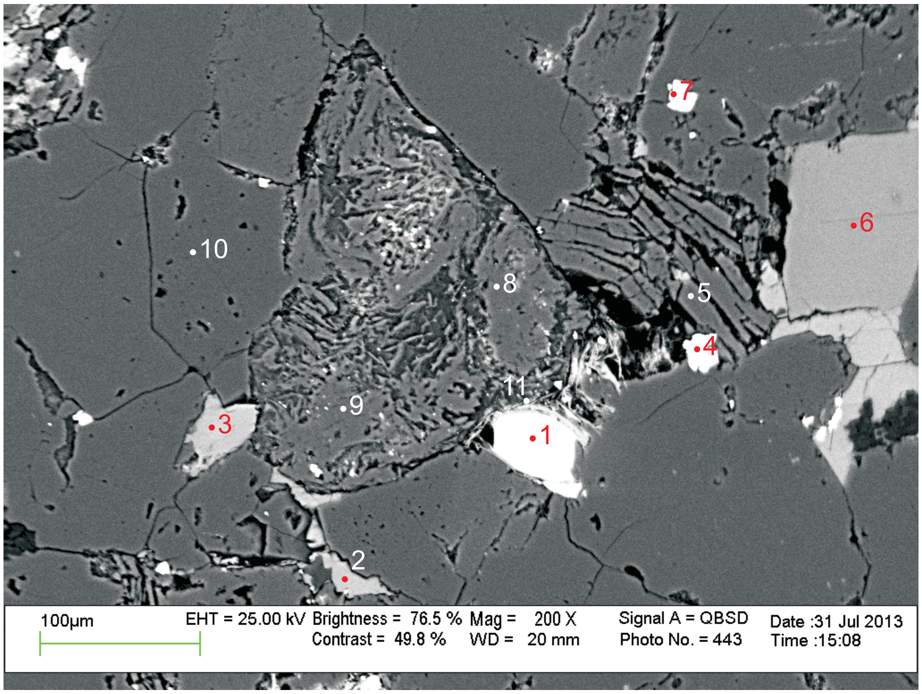


Figure 11: C-67 4085.83 m. site20 (SEM).Partly dissolved albite (8,9) has been replaced by Fe-calcite (3), and sphalerite (1). Dissolution voids present in the detrital quartz (10).

1. Sphalerite
2. Fe-Calcite
3. Fe-Calcite
4. Pyrite
5. Albite
6. K-feldspar
7. Pyrite
8. Albite
9. Albite
10. Quartz
11. Chlorite + other

Table B: Scanning Electron Microscope chemical analyses of sample 4085.83 from the Sable Island C-67 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	NiO	ZnO	Nb_2O_5	In_2O_3	BaO	Yb_2O_3	Total	Actual Total
C-67 4085.83	1	1	Sph				0.37							51.91				47.71					99.99	175.78
C-67 4085.83	1	2	Sph	0.92	0.25	0.38	2.47			0.59		0.16		52.46				42.78					100.01	158.58
C-67 4085.83	1	3	Py	0.28			26.86	0.21		0.21				72.46									100.02	218.79
C-67 4085.83	1	4	Ab	67.71		19.14	1.26				11.50	0.39											100.00	123.33
C-67 4085.83	1	5	Ab	68.69		19.97					11.32												99.98	116.48
C-67 4085.83	1	6	Ab	68.84		19.71				0.45	10.87	0.16											100.03	108.53
C-67 4085.83	1	7	Ab	69.20		18.73					12.07												100.00	118.64
C-67 4085.83	1	8	Chl	26.96		23.69	29.95		4.13	0.27													85.00	91.75
C-67 4085.83	1	9	Ab	68.37		19.31				0.34	11.70	0.29											100.01	113.08
C-67 4085.83	1	10	Chl	28.62		24.27	27.63		4.20	0.29													85.00	95.47
C-67 4085.83	1	11	Sph+other	5.05		3.78	3.54		0.63	0.63		0.13		45.75				40.48					99.99	144.32
C-67 4085.83	1	12	Mix	26.27		18.23	35.28	0.54	3.07	5.40	1.35	0.36	4.49	3.85		0.82		0.37					100.03	77.26
C-67 4085.83	1	13	Py	1.67		0.62	30.04	0.72		0.20	0.35	0.18		66.22									100.00	179.97
C-67 4085.83	2	1	Sph				0.53							51.36				48.12					100.01	177.16
C-67 4085.83	2	2	Sph	0.28			0.53							51.84				47.37					100.02	176.2
C-67 4085.83	2	3	Chl+other	36.67		25.51	28.70		4.54	0.36	0.98	1.12		1.15		0.21		0.75					99.99	89.85
C-67 4085.83	2	4	Chl+other	43.79		26.42	20.97		3.23	0.42		3.17		0.70		0.42		0.88					100.00	72.63
C-67 4085.83	2	5	Qz	99.99																			99.99	114.53
C-67 4085.83	2	6	Rt	4.39	91.21	2.83	1.22					0.34											99.99	94.13
C-67 4085.83	2	7	Qz	99.99																			99.99	117.4
C-67 4085.83	2	8	Ab	56.97		20.73	10.90		1.48	0.20	8.49	1.24											100.01	101.4
C-67 4085.83	3	1	Sph	0.53			0.40							51.79				47.29					100.01	174.51
C-67 4085.83	3	2	Ab	68.33	0.90	18.48	0.31				11.70	0.29											100.01	117.22
C-67 4085.83	3	3	Ab	67.94	0.32	19.12	0.39				11.34	0.61						0.29					100.01	117.55
C-67 4085.83	3	4	Ms	54.56	1.69	26.41	2.22		1.19	0.53		6.12				0.27							93.00	93.22
C-67 4085.83	3	5	Py	0.73		0.25	25.85	0.40						72.76									99.99	224.06
C-67 4085.83	3	6	Py	0.24			27.27							72.49									100.00	219.71
C-67 4085.83	3	7	Qz+other	77.44	1.55	14.11	0.91		0.40	0.38	1.71	2.45	1.05										100.00	100.52
C-67 4085.83	3	8	Ms+other	50.63	0.34	26.81	5.67	0.25	1.47	0.68	1.66	5.20				0.28							93.00	86.96
C-67 4085.83	3	9	Qz	99.99																			99.99	118.77
C-67 4085.83	4	1	Sph	0.21			0.40							52.21				47.18					100.00	176.45
C-67 4085.83	4	2	Fe-Cal				1.36	0.41		54.22													56.00	50.6
C-67 4085.83	4	3	Py	1.01		0.23	27.11							71.67									100.02	211.8
C-67 4085.83	4	4	Ab	68.75		19.27				0.67	11.31												100.00	111.87
C-67 4085.83	4	5	Qz	99.99																			99.99	119.43
C-67 4085.83	4	6	Ilt+TiO_2	45.78	8.54	26.59	9.48		2.44	0.52	0.58	4.77				1.30							100.00	69.73

Table B: Scanning Electron Microscope chemical analyses of sample 4085.83 from the Sable Island C-67 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	NiO	ZnO	Nb_2O_5	In_2O_3	BaO	Yb_2O_3	Total	Actual Total
C-67 4085.83	4	7	Ilt+TiO_2	46.61	10.91	24.81	8.65		2.21	0.70	0.81	4.66				0.67							100.03	78.98
C-67 4085.83	4	8	Ilt+TiO_2	47.51	6.76	24.89	13.29		3.18	0.41		3.18				0.78							100.00	81.4
C-67 4085.83	4	9	Py	0.49			27.04			0.13	0.26			72.09									100.01	220.74
C-67 4085.83	4	10	Py	1.84		0.40	26.57	0.18						71.02									100.01	211.8
C-67 4085.83	4	11	Qz+Kfs	87.26	4.62	5.35	1.12		0.36			1.12				0.16							99.99	111.15
C-67 4085.83	4	12	Qz	97.48						2.50													99.98	109.13
C-67 4085.83	4	13	Kfs+other	56.18	0.27	28.61	3.58		1.77	1.16	0.65	6.71				1.08							100.01	75.51
C-67 4085.83	5	1	Sph	0.28			0.45							51.44				47.83					100.00	179.55
C-67 4085.83	5	2	Sph	0.92		0.23	0.37							44.92				53.56					100.00	150.99
C-67 4085.83	5	3	Kfs	65.61		17.69					0.54	15.10						1.06					100.00	116.22
C-67 4085.83	5	4	Py	1.03		0.38	26.91							71.69									100.01	213.84
C-67 4085.83	5	5	Ab	68.97		18.84	0.30				11.90												100.01	120.28
C-67 4085.83	5	6	Qz	99.99																			99.99	118.28
C-67 4085.83	5	7	Ab	63.68		19.73	4.12		0.70		11.26	0.30				0.21							100.00	122.42
C-67 4085.83	5	8	Ilt+other	54.27	2.10	26.93	3.40		1.53	2.78	0.54	6.07		1.32		0.53		0.54					100.01	88.66
C-67 4085.83	5	9	Ilt+Sph	50.27		25.79	1.26		1.48	2.27	0.55	6.46		7.89		0.19		3.85					100.01	114.96
C-67 4085.83	5	10	Chl+Kfs	53.03		27.46	12.23		2.24		2.16	2.28				0.22		0.39					100.01	92.54
C-67 4085.83	5	11	Chl	48.85		16.11	16.21		3.10			0.50				0.23							85.00	93.87
C-67 4085.83	5	12	Ab	68.67		18.88	0.60				11.84												99.99	126.95
C-67 4085.83	5	13	Ab	64.99		19.63	3.73		0.48		11.16												99.99	120.49
C-67 4085.83	5	14	Ab	66.25	0.55	19.33	2.12				11.23	0.52											100.00	124.69
C-67 4085.83	5	15	Chl+Kfs	49.65	2.10	25.06	16.60		3.22	0.45		2.20				0.71							99.99	91.13
C-67 4085.83	6	1	Sph	0.21			0.40							51.14				48.24					99.99	181.69
C-67 4085.83	6	2	Sph				0.37							51.51				48.14					100.02	179.65
C-67 4085.83	6	3	Ab	69.52		18.80					11.69												100.01	113.7
C-67 4085.83	6	4	Ab	67.38		19.76	0.30			0.17	11.31	1.08											100.00	115.52
C-67 4085.83	6	5	Ab	53.93		22.43	14.43		2.27		6.34	0.37				0.25							100.02	103.87
C-67 4085.83	6	6	Qz	99.13		0.60	0.26																99.99	121.64
C-67 4085.83	6	7	Py	0.15			27.66	0.26			0.36			71.59									100.02	212.38
C-67 4085.83	6	8	Fe-Cal				1.49	0.52		54.00													56.00	53.45
C-67 4085.83	6	9	Fe-Cal	2.57		0.71	1.15	0.40		50.88		0.29											56.00	55.31
C-67 4085.83	6	10	Ab	68.58		18.88	0.57				11.99												100.02	116.43
C-67 4085.83	6	11	Ab	66.02		19.03	1.65			1.12	11.69		0.50										100.01	113.96
C-67 4085.83	6	12	Chl+Ab	37.71		25.51	27.09		4.78	0.77	3.10		0.87			0.16							99.99	105.1
C-67 4085.83	6	13	Ab	69.52		18.67					11.81												100.00	118.07
C-67 4085.83	6	14	Ab	69.48		18.74					11.51							0.25					99.98	116.32

Table B: Scanning Electron Microscope chemical analyses of sample 4085.83 from the Sable Island C-67 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	NiO	ZnO	Nb_2O_5	In_2O_3	BaO	Yb_2O_3	Total	Actual Total
C-67 4085.83	15	1	Sph	0.28			0.60							51.41				47.73					100.02	186.16
C-67 4085.83	15	2	Py	0.15			27.03	0.66						72.17									100.01	232.86
C-67 4085.83	15	3	Ilt	53.93	0.96	20.17	7.96		2.12	0.60	0.32	3.24				0.69							90.00	95.18
C-67 4085.83	15	4	Ilt	67.07	0.30	12.62	5.89		1.22	0.35		2.27				0.29							90.00	87.19
C-67 4085.83	15	5	Kfs	65.97		18.03					0.43	15.56											99.99	117.6
C-67 4085.83	15	6	Qz	97.35		1.61	0.73					0.31											100.00	117.66
C-67 4085.83	15	7	Qz	99.99																			99.99	121.4
C-67 4085.83	15	8	Fe-Cal+Kfs	17.73		4.89	1.40	0.49		70.58		4.90											99.99	62.97
C-67 4085.83	15	9	Chl	28.13		22.57	30.31		3.77	0.21													85.00	94.33
C-67 4085.83	15	10	Qz	97.16	0.20	1.53	0.69													0.42			100.00	121.92
C-67 4085.83	15	11	Qz	44.09		27.12	13.84		2.97	0.49	0.50	4.59			5.91	0.51							100.02	89.08
C-67 4085.83	15	12	Chl	28.57		22.31	28.32		3.73	0.75		0.71				0.27		0.34					85.00	84.13
C-67 4085.83	16	1	Sph	0.26			0.44							51.56				47.74					100.00	181.72
C-67 4085.83	16	2	Fe-Cal	0.73			0.90	0.41		53.66		0.30											56.00	52.52
C-67 4085.83	16	3	Ab	68.67		18.76				0.60	11.96												99.99	116.84
C-67 4085.83	16	4	Qz	99.30		0.49														0.21			100.00	116.13
C-67 4085.83	16	5	Kln	48.88		37.12																	86.00	96.76
C-67 4085.83	16	6	Chl	34.51	5.19	21.07	16.76		3.40	0.77	1.22	1.44	0.39			0.24							85.00	99.13
C-67 4085.83	16	7	Kln	51.25		34.50					0.26												86.00	96.4
C-67 4085.83	16	8	Chl+other	35.08	0.30	24.83	31.49		4.66	0.97	1.50	0.41				0.76							100.00	88.9
C-67 4085.83	16	9	Qz	99.99																			99.99	117.51
C-67 4085.83	16	10	Chl+other	33.09		25.94	34.64		4.71	0.41	0.42					0.33		0.45					99.99	91.21
C-67 4085.83	16	11	Ms	43.64	0.53	30.23	3.92		1.31	1.73	0.33	9.23	2.06										93.00	106.73
C-67 4085.83	16	12	Qz	99.99																			99.99	120.33
C-67 4085.83	16	13	Py	0.19			27.85							71.97									100.01	206.23
C-67 4085.83	16	14	Py	0.15			27.53				0.31			71.99									99.98	210.66
C-67 4085.83	17	1	Brt											37.88							62.14		100.02	113.75
C-67 4085.83	17	2	Rt	1.09	94.45	0.72	1.38			0.31									2.07				100.02	103.36
C-67 4085.83	17	3	Fe-Cal+Kfs	13.11		3.57	1.51	0.70		78.40		2.71											100.00	61.64
C-67 4085.83	17	4	Fe-Cal+Kfs	14.50	1.02	9.13	2.91	0.48	0.93	69.67		1.36											100.00	65.35
C-67 4085.83	17	5	Cal	3.38		2.41	0.71	0.36		49.13													56.00	55.05
C-67 4085.83	17	6	Ab	69.10		18.86	0.17				11.89												100.02	122.31
C-67 4085.83	17	7	Ab	68.28		18.90	1.00				11.63	0.20											100.01	120.27
C-67 4085.83	17	8	Ab	69.14		18.86					12.01												100.01	122.65
C-67 4085.83	17	9	Rt	0.77	96.86	0.83	1.17			0.36													99.99	103.61
C-67 4085.83	17	10	Qz	99.99																			99.99	121.57

Table B: Scanning Electron Microscope chemical analyses of sample 4085.83 from the Sable Island C-67 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	NiO	ZnO	Nb_2O_5	In_2O_3	BaO	Yb_2O_3	Total	Actual Total
C-67 4085.83	17	11	Fe-Cal				1.33	0.43		54.24													56.00	52.8
C-67 4085.83	17	12	Fe-Cal	1.45		0.81	1.30	0.38		51.91		0.16											56.00	53.83
C-67 4085.83	17	13	Qz	99.99																			99.99	119.67
C-67 4085.83	17	14	Py	0.32			26.96	0.30			0.43			72.02									100.03	211.65
C-67 4085.83	19	1	Sph	1.22		0.40	0.48			0.22				52.21				45.49					100.02	183.5
C-67 4085.83	19	2	Sph	0.43			0.40							51.76				47.41					100.00	178.96
C-67 4085.83	19	3	Py	0.19			27.39	0.39						72.04									100.01	219.69
C-67 4085.83	19	4	Py				28.16				0.26			71.59									100.01	224.69
C-67 4085.83	19	5	Py+other	1.69			26.44	0.32		0.18				71.27			0.11						100.01	215.5
C-67 4085.83	19	6	Chl	27.91		21.99	28.14		4.51	0.54		0.59		0.82		0.50							85.00	93.88
C-67 4085.83	19	7	Fe-Cal	1.98		0.45	1.10	0.37		51.40		0.36						0.34					56.00	52.59
C-67 4085.83	19	8	Chl	34.22	0.53	21.65	21.46		3.09	0.39	0.47	2.37				0.82							85.00	84.87
C-67 4085.83	19	9	Ab	69.27		18.63					11.90	0.19											99.99	119.86
C-67 4085.83	19	10	Fe-Cal+Ab	21.22		4.40	1.69	0.45		71.44	0.80												100.00	57.16
C-67 4085.83	19	11	Ab	68.52		18.61				1.06	11.81												100.00	116.54
C-67 4085.83	19	12	Fe-Cal+Kfs	11.85		3.85	1.24	0.56		80.50		2.01											100.01	60.1
C-67 4085.83	19	13	Qz	99.99																			99.99	120.82
C-67 4085.83	19	14	Kfs	66.23		17.80					0.46	15.53											100.02	122.29
C-67 4085.83	19	15	Fe-Cal	2.17		1.52	1.38	0.36		49.49		0.20		0.71		0.16							56.00	54.8
C-67 4085.83	19	16	Fe-Cal				1.26	0.62		54.12													56.00	52.55
C-67 4085.83	20	1	Sph				0.24							51.44				48.33					100.01	183.94
C-67 4085.83	20	2	Fe-Cal				1.46	0.50		53.61				0.43									56.00	51.93
C-67 4085.83	20	3	Fe-Cal				1.53	0.57	0.42	53.47													56.00	50.76
C-67 4085.83	20	4	Py	0.17			27.49	0.34						71.99									99.99	226.61
C-67 4085.83	20	5	Ab	69.20		18.73	0.18				11.89												100.00	121.68
C-67 4085.83	20	6	Kfs	66.34		17.78					0.53	15.35											100.00	121.16
C-67 4085.83	20	7	Py	0.21			27.11	0.49						72.19									100.00	226.44
C-67 4085.83	20	8	Ab	68.90		19.12				0.21	11.77												100.00	119.5
C-67 4085.83	20	9	Ab	68.86		19.03				0.18	11.74	0.18											99.99	118.02
C-67 4085.83	20	10	Qz	99.99																			99.99	115.99
C-67 4085.83	20	11	Chl+other	33.05	8.84	24.53	22.47	0.23	7.25	0.42	0.50	1.18		0.67		0.42		0.45					100.01	89.54

Appendix 13A: Scanning Electron Microscope Backscattered Electron Images for South Desbarres O-76 3809.66

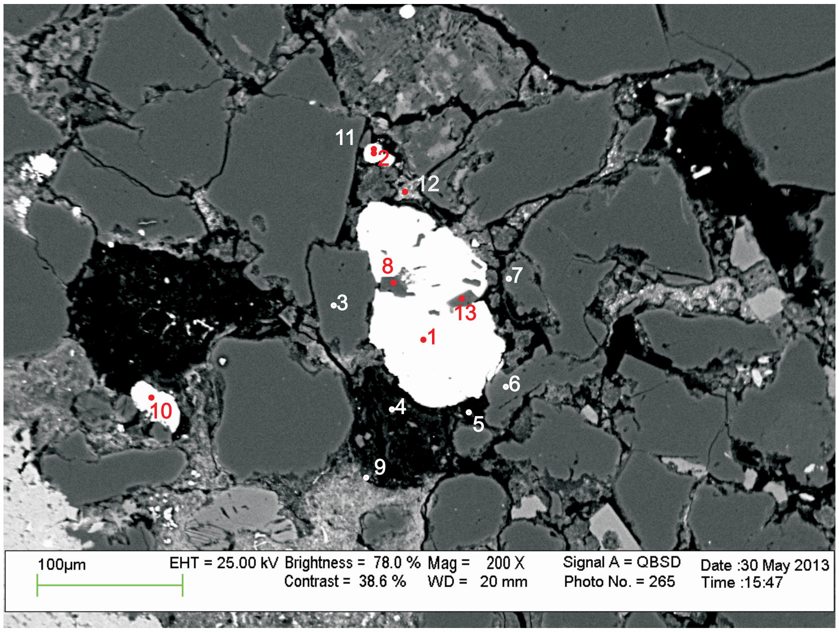
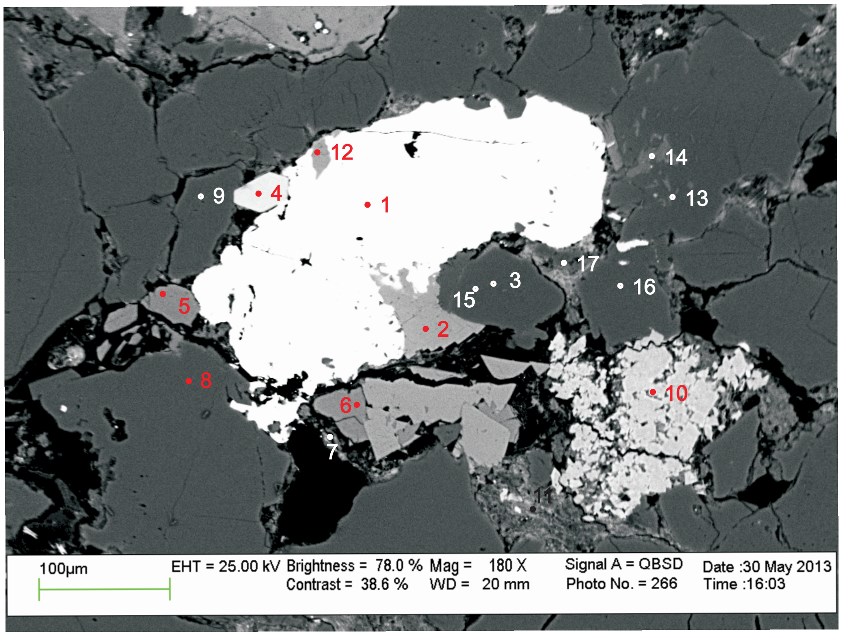


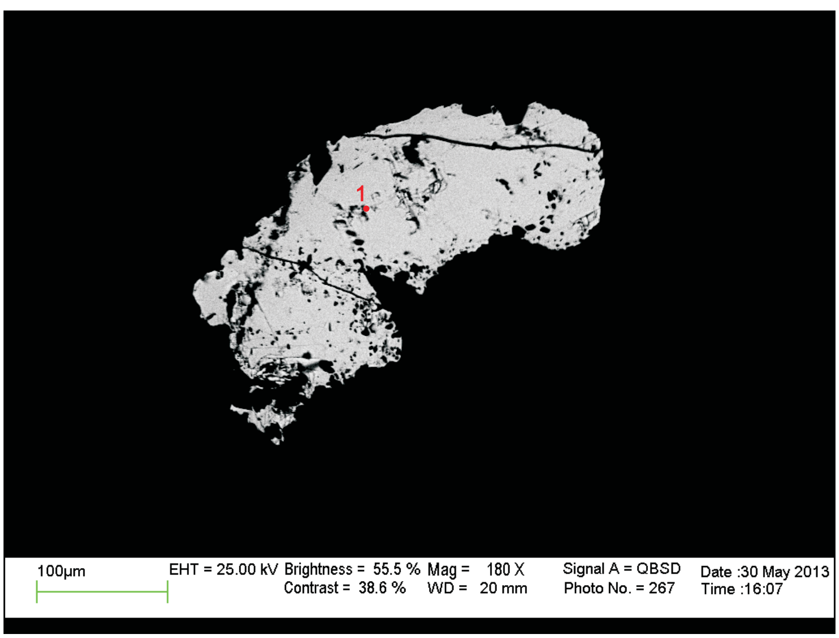
Figure 1: O-76 3809.66 m. site 2 (Table A-1) (SEM). Diagenetic barite fills pore space with relics of K-feldspar (4). It also engulfs albites (8,13), probably diagenetic, left from dissolved K-feldspar.

1. Barite
2. Pyrite
3. Quartz
4. Altered feldspar
5.Altered feldspar
6. Quartz
7.Quartz
8. Albite
9. Chlorite + Apatite
10. Rutile
11. Pyrite
12. Mixture
13. Albite



1. Barite
2. Fe-Calcite
3. Quartz
4. Apatite
5. K-feldspar
6. K-feldspar
7. Chlorite
8. Quartz
9. Quartz
10. Siderite
11. Illite + others
12. Ankerite
13. Quartz
14. K-feldspar
15. Quartz
16. Quartz
17. Quartz

Figure 2: O-76 3809.66 m. site 3 (Table A-1) (SEM). Diagenetic barite engulfs ankerite (12) and Fe-calcite (2).



1. Barite

Figure 3: O-76 3809.66 m. site 3 (SEM).

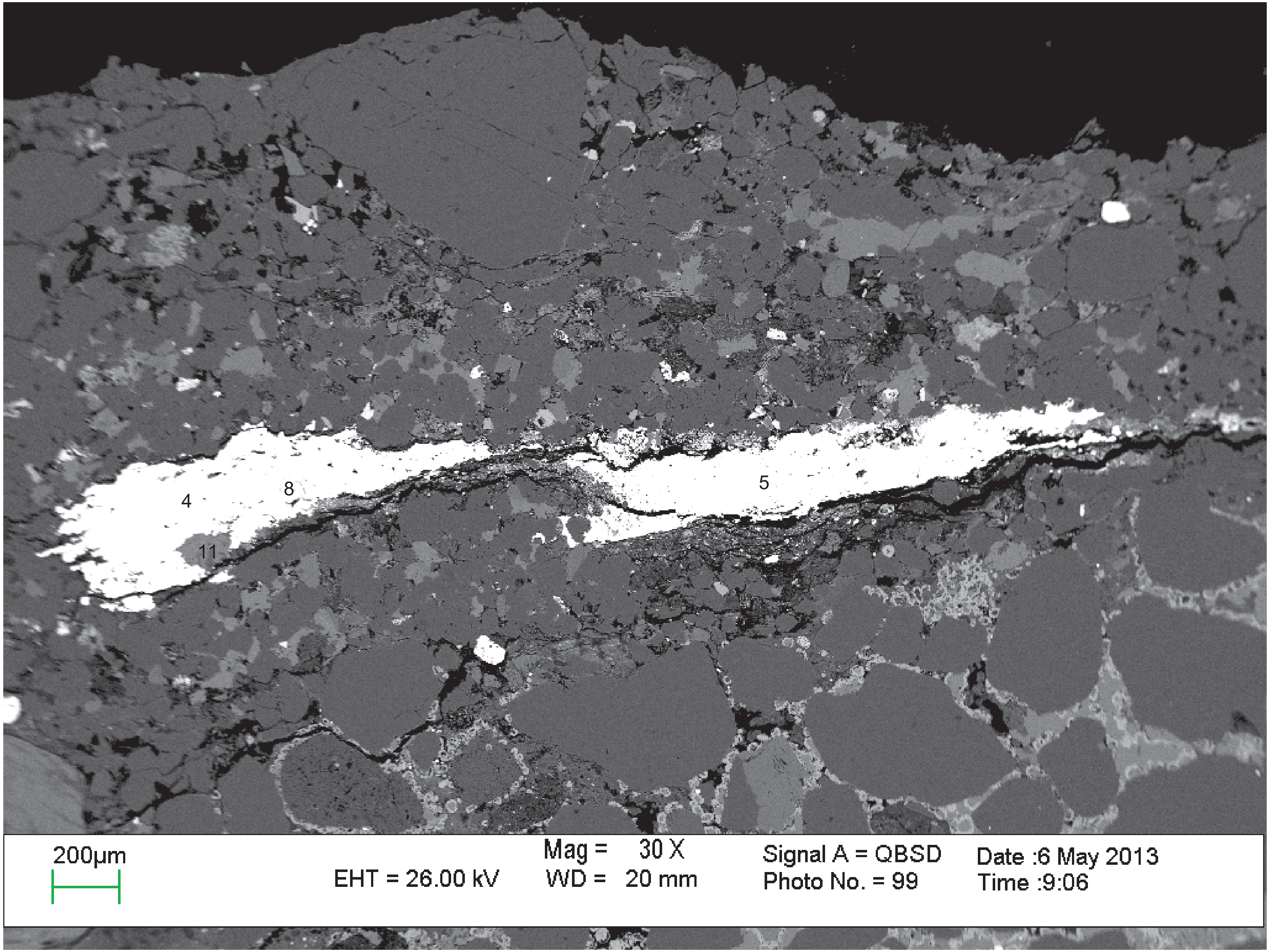
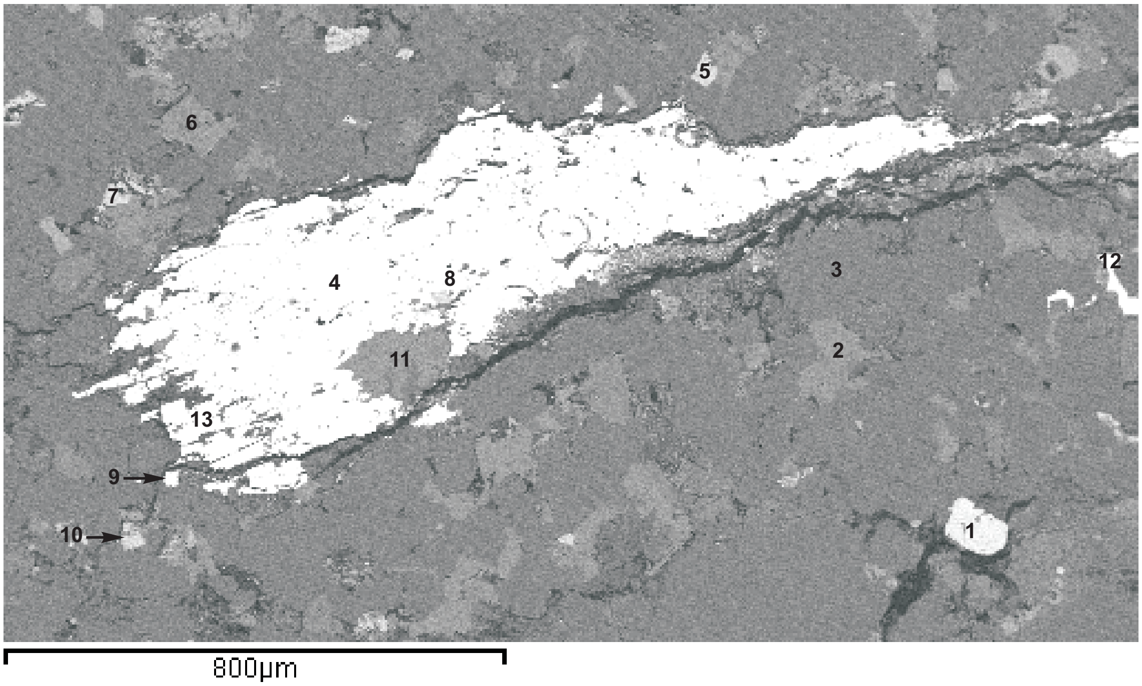
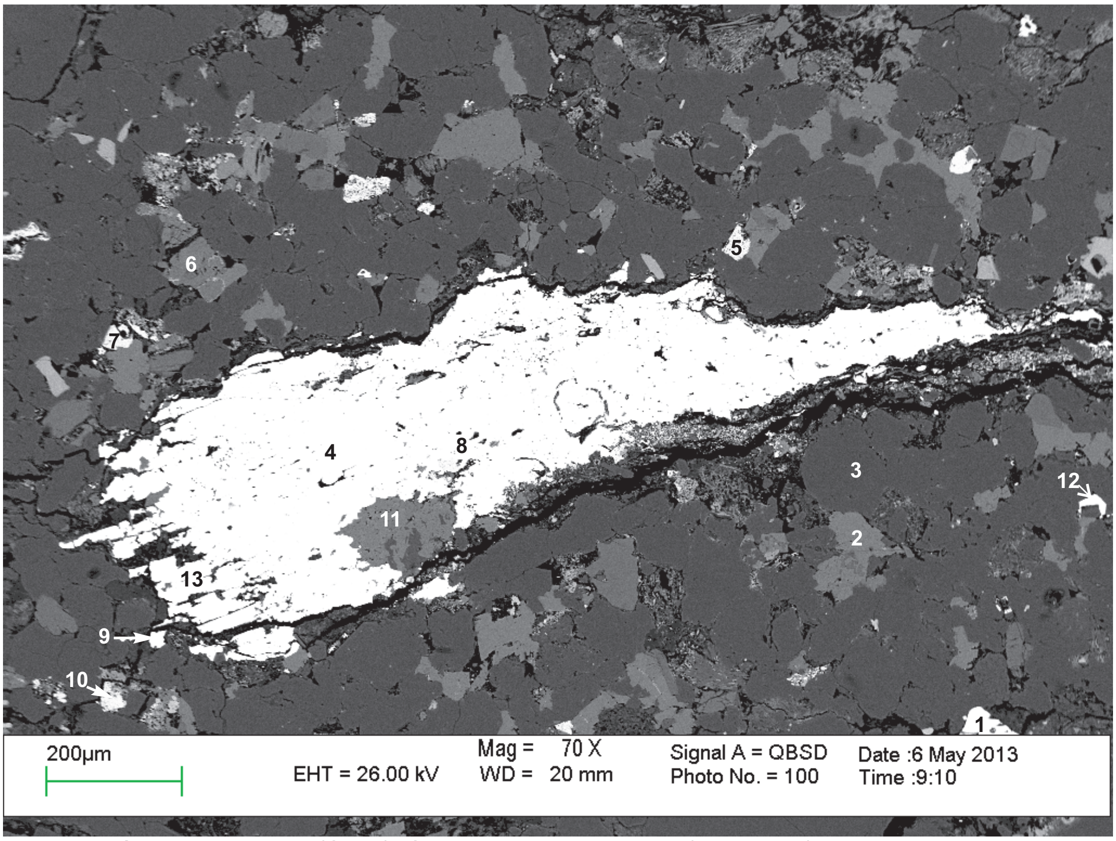


Figure 4: O-76 3809.66 m. site 25 and 26 in table A-2 and table A-3 (SEM). Barite (analyses 4, 8, 5) vein or pod that has been cut by a shear fault. The barite engulfs ankerite (analysis 11).



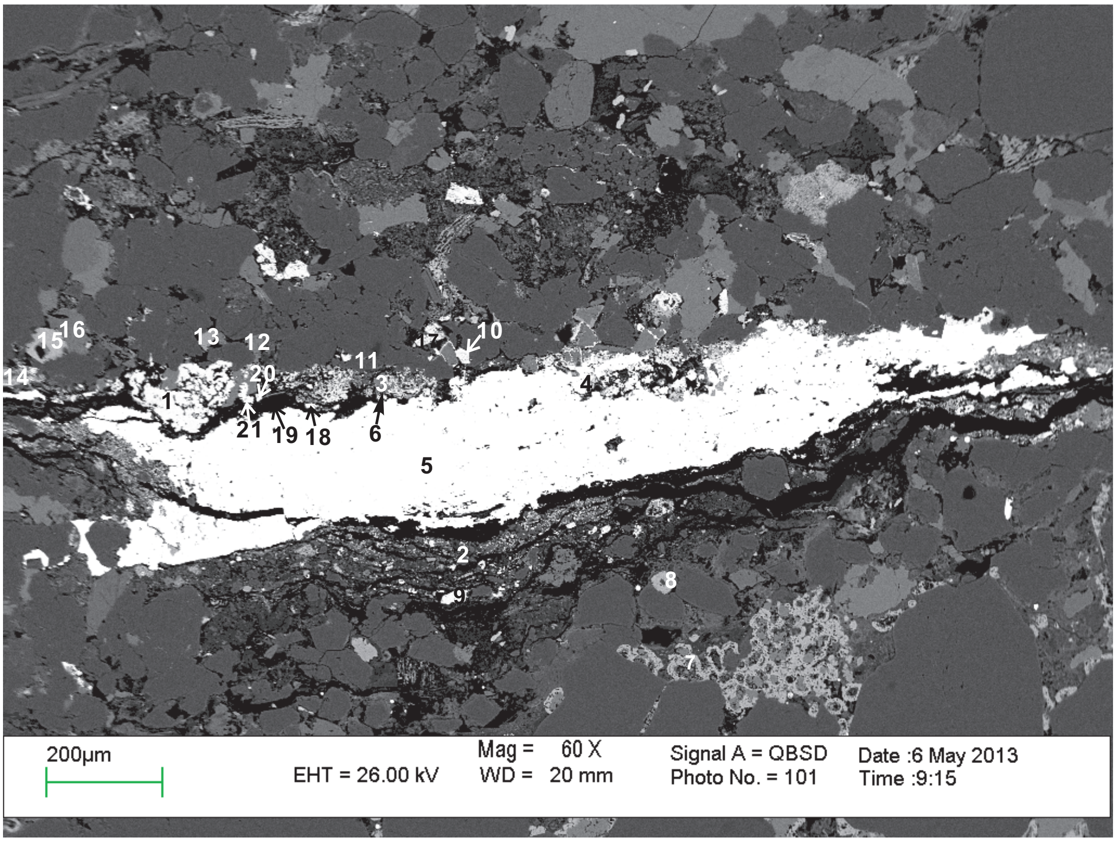
1. Zircon
2. Ankerite
3. Quartz
4. Barite
5. Pyrite
6. Mn-Calcite
7. Pyrite(+some Albite)
8. Pyrite(+some Albite)
9. Barite
10. Pyrite
11. Ankerite
12. Barite
13. Barite

Figure 5: 0-76 South Desbarres 3809.66 m (SEM). Site 25 (Table A-2). Barite engulfs ankerite (analysis 11) and contains inclusions of pyrite (Table A-2). The association of barite with ankerite and pyrite may indicate hydrothermal assemblage.



1. Zircon
2. Ankerite
3. Quartz
4. Barite
5. Pyrite
6. Mn-Calcite
7. Pyrite(+some Albite)
8. Pyrite (+some Albite)
9. Barite
10. Pyrite
11. Ankerite
12. Barite
13. Barite

Figure 6: O-76 3809.66 m (SEM). Site 25 similar to Fig. 5 (Table A-2).



1. Pyrite
2. Mixture
3. Ankerite
4. Pyrite
5. Barite
6. Ankerite
7. Siderite
8. Siderite
9. Pyrite
10. Pyrite
11. Quartz
12. Ankerite
13. Apatite
14. Al-phosphate
15. Siderite
16. Calcite + Illite?
17. Pyrite
18. Pyrite
19. Hole
20. Siderite
21. Pyrite

Figure 7: O-76 3809.66 m (SEM). Site 26 (Table A-3). Barite in a sandstone with a variety of cements. These cements include: pyrite, ankerite, siderite, calcite and Al-phosphate.

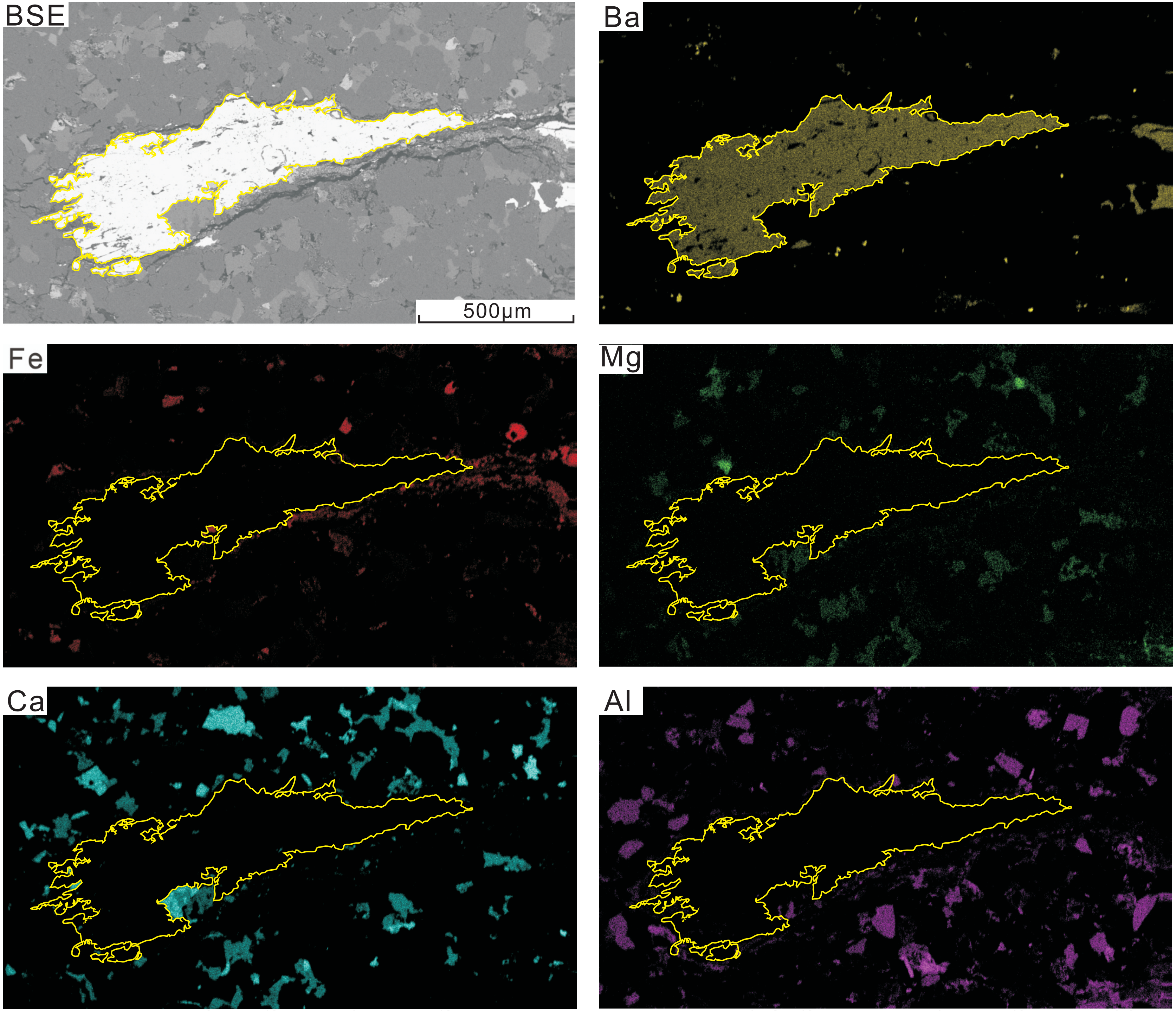


Figure 8: X-Ray maps for Ba (for barite), Fe, Mg (for pyrite, carbonates and chlorite), Ca (for carbonates) and Al (for chlorite) for the barite grain of figure 6. It seems that the barite is almost pure barite.

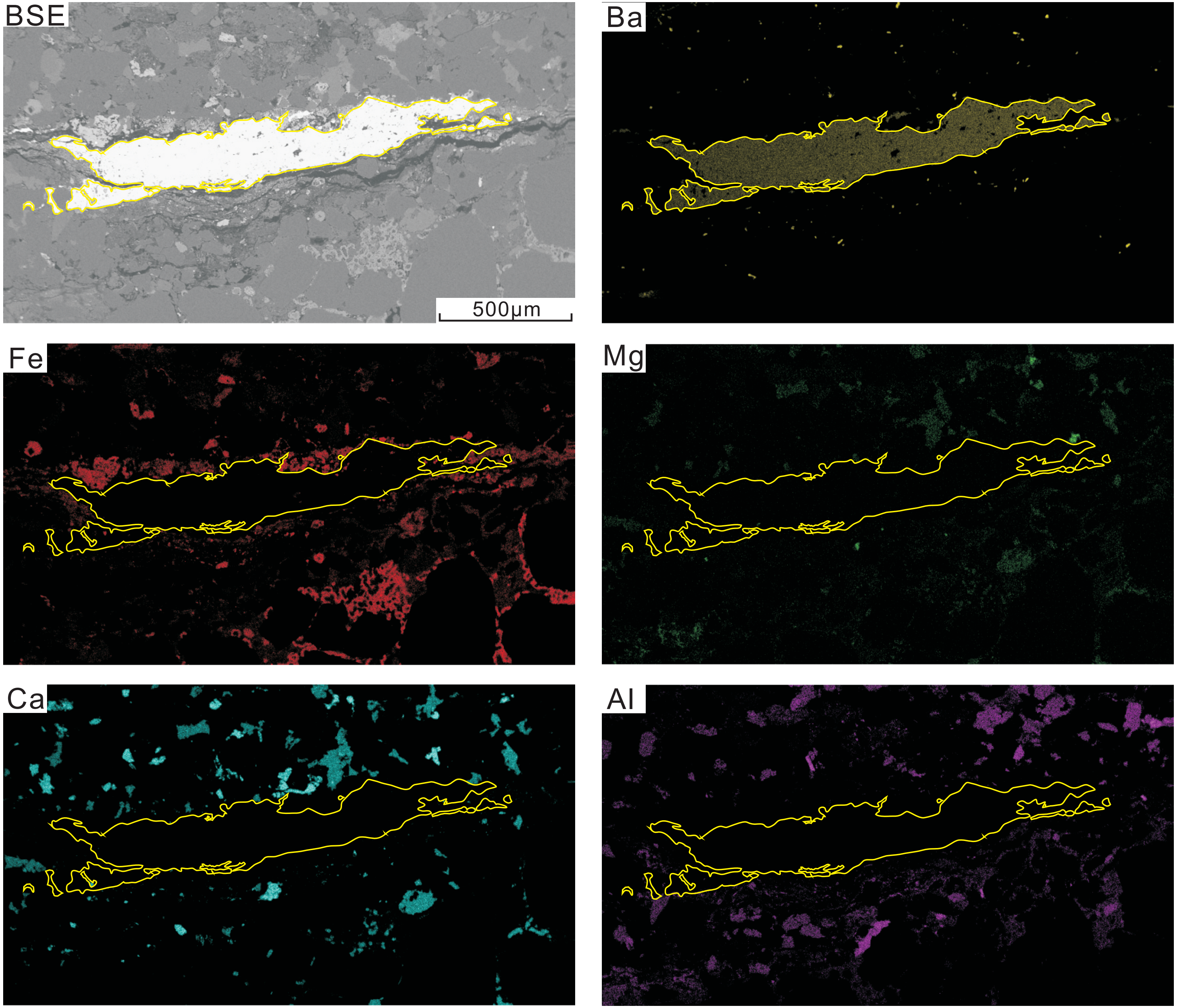


Figure 9: X-Ray maps for Ba , Fe, Mg, Ca, and Al for the barite grain of figure 7.

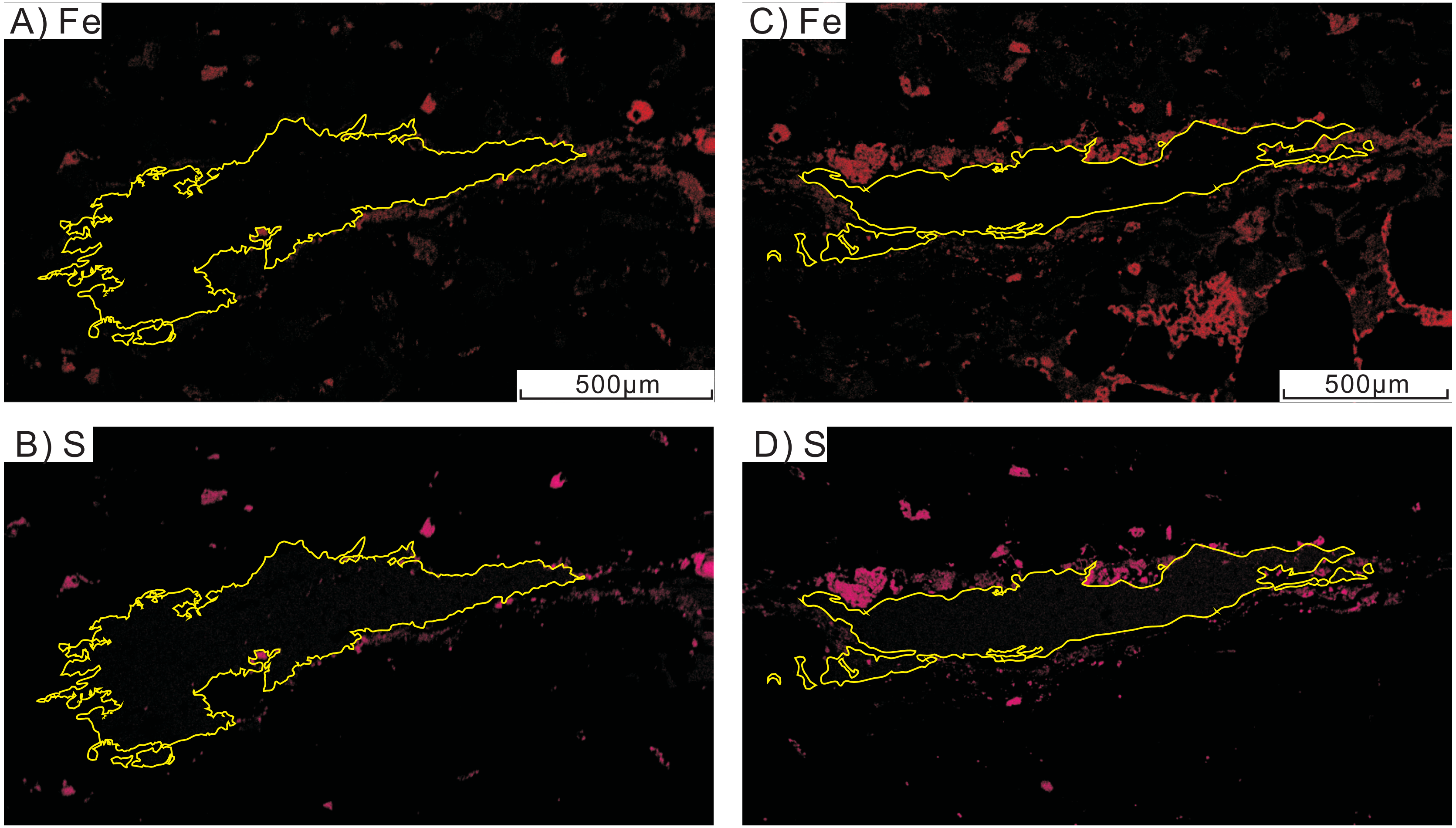


Figure 10: X-Ray maps for Fe and S for the barite grain of figure 6 (A, B) and figure 7 (C, D).

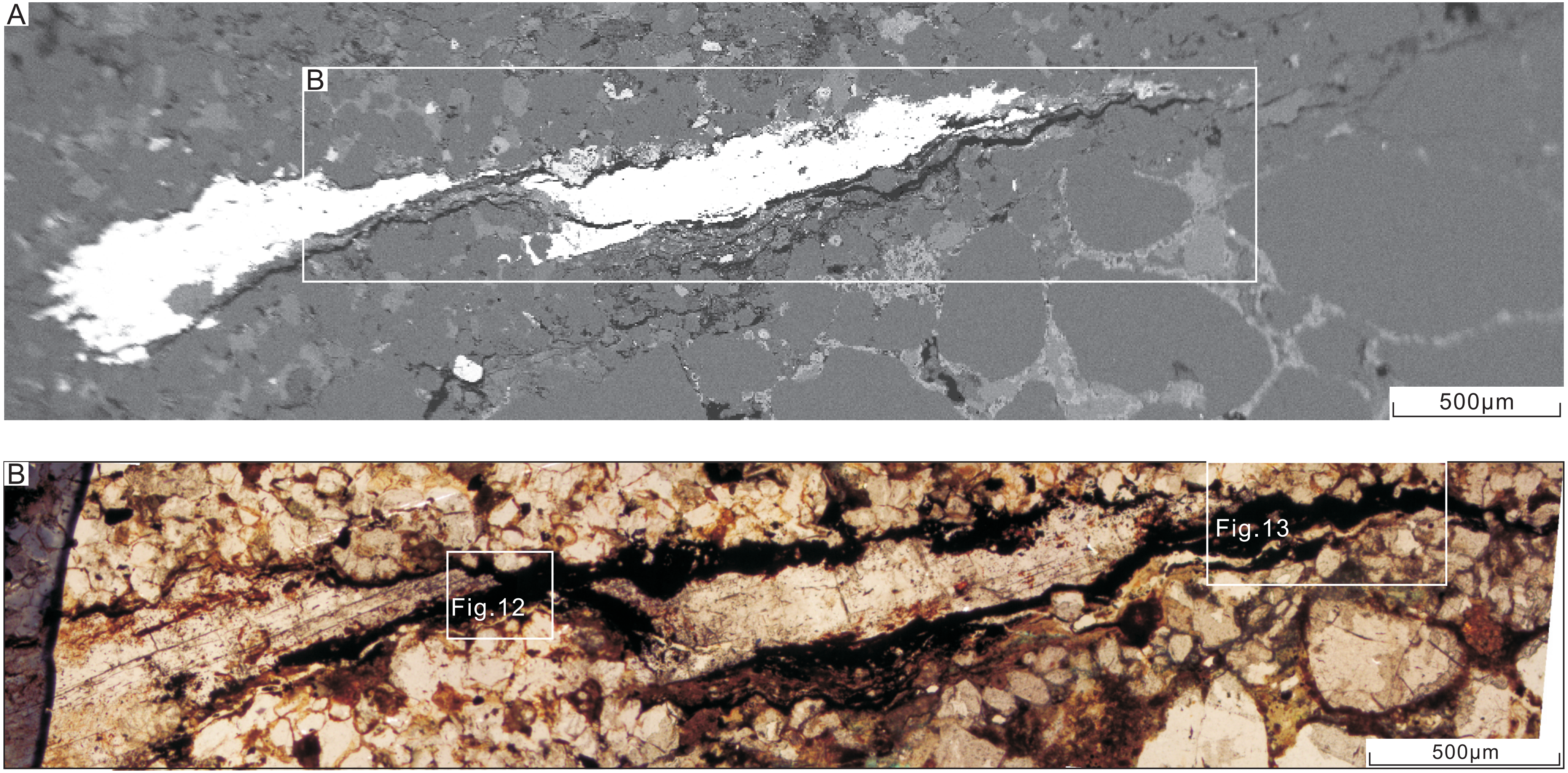
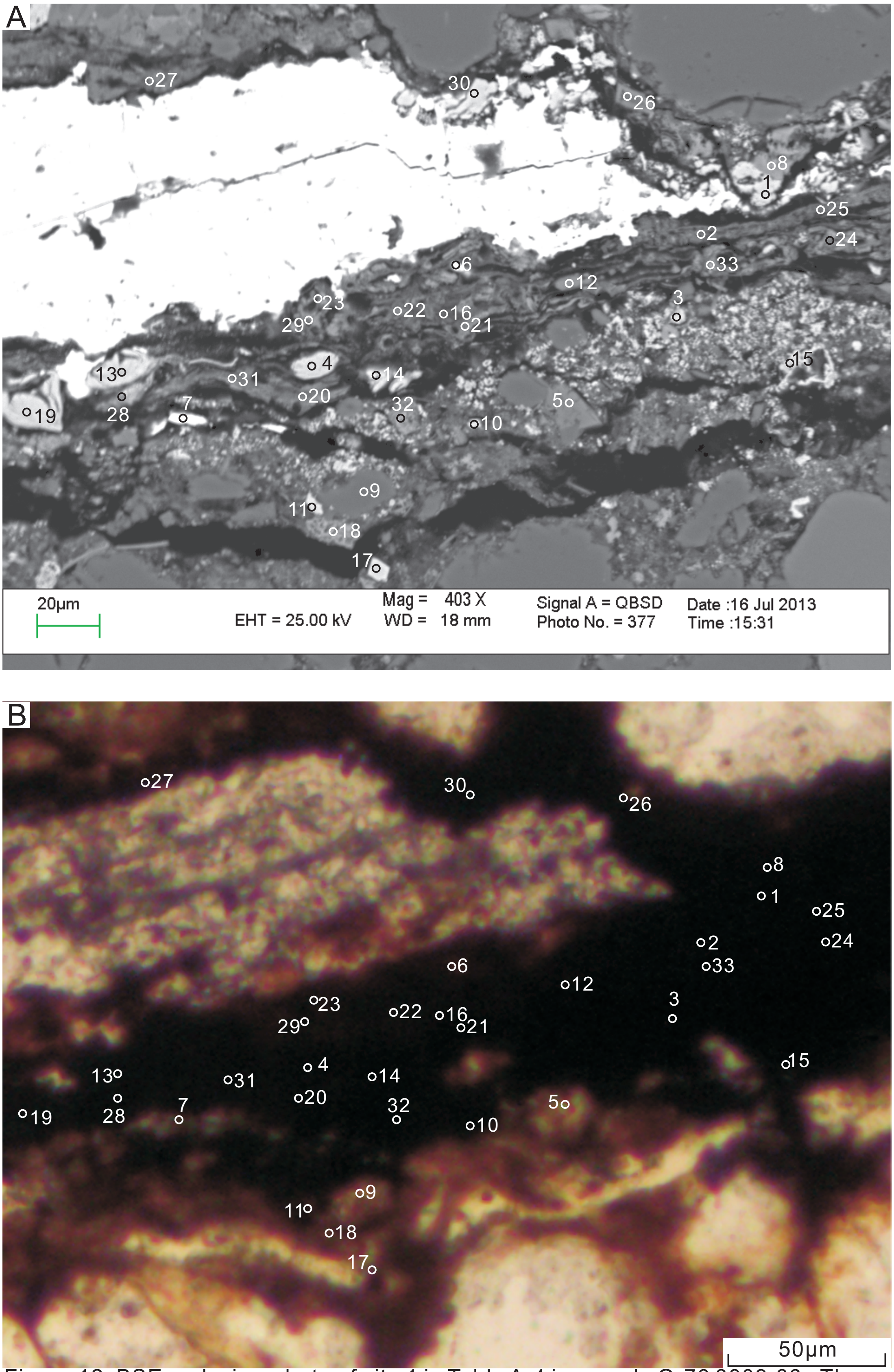
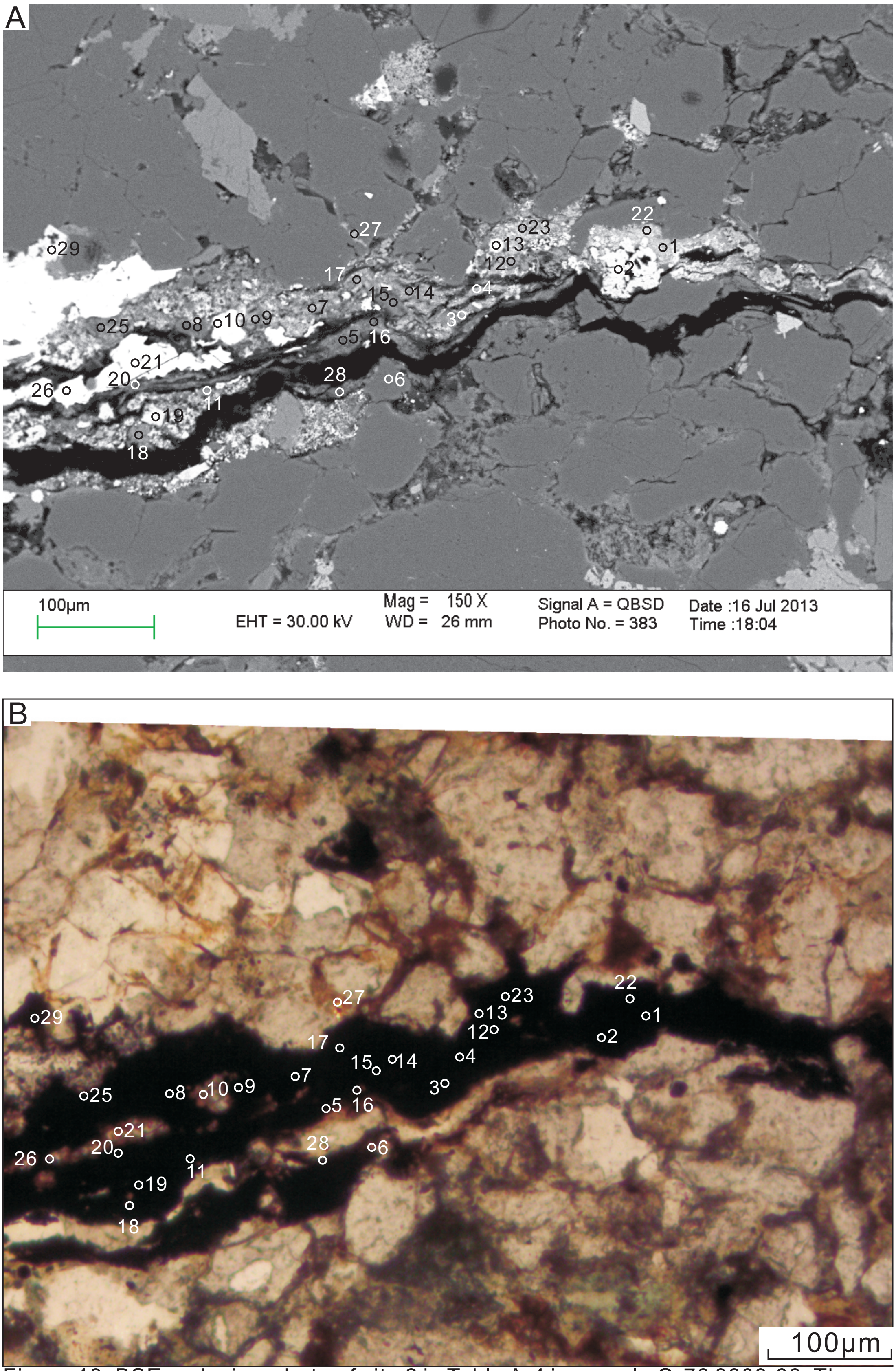


Figure 11: BSE (A) and microphotograph (B) under PPL of barite in O-76 3809.66 m. Similar to Fig.4. Dark-brown to black (Mn-siderite, pyrite, and chlorite) minerals fill in the fracture.



1. Pyrite
2. Siderite + Pyrite
3. Pyrite
4. Pyrite
5. Ankerite
6. Barite + Pyrite
7. Barite + Pyrite
8. Siderite
9. Quartz
10. Pyrite
11. Pyrite
12. Fe-cal
13. Pyrite
14. Pyrite
15. Pyrite
16. Siderite + other
17. Pyrite
18. Al-phosphate
19. Pyrite
20. Siderite
21. Siderite
22. Siderite
23. Barite + Siderite
24. Siderite
25. Siderite + Pyrite
26. Ankerite + Chlorite
27. Chlorite
28. Pyrite
29. Siderite
30. Barite + Pyrite
31. Siderite + Pyrite
32. Rutite + Pyrite + Al-phosphate
33. Siderite
34. Illite

Figure 12: BSE and microphoto of site 1 in Table A-4 in sample O-76 3809.66. The fractures on both sides of barite are filled with dark brown to black minerals (Fig. 12B). In the BSE (Fig. 12A), however, banding or shearing of siderite (analyses 2, 20, 21, 22, 24, 25, 28 and 31) is seen and pyrite (e.g. analyses 3, 10, 13, 15, 19), Al-phosphate (analysis 18) and chlorite (analyses 26 and 27) are also present in the fracture. Fragments of detrital minerals like quartz (analysis 9) and ankerite (analyses 5 and 26) are also present in the fracture.



1. Pyrite
2. Pyrite
3. Pyrite + Al-phosphate + other
4. Pyrite + Al-phosphate
5. Chlorite
6. Quartz
7. Pyrite + Siderite + Chlorite
8. Pyrite + Quartz
9. Pyrite + Al-phosphate + other
10. Barite
11. Calcite
12. Ankerite
13. Pyrite
14. Apatite + Chlorite + Pyrite
15. Chlorite + Illite
16. Chlorite
17. Pyrite + Al-phosphate+other
18. Ankerite
19. Pyrite
20. Siderite + Barite
21. Barite
22. Pyrite + Siderite +Illite
23. Pyrite + Siderite+Illite
24. Pyrite+Illite
25. Pyrite+Illite
26. Barite
27. Siderite+Quartz
28. Chlorite
29. Pyrite

Figure 13: BSE and microphoto of site 2 in Table A-4 in sample O-76 3809.66. The fractures that cut the barite grain are filled in dark brown to black minerals. These minerals include a mixture of pyrite, chlorite, siderite, Al-phosphate, illite, ankerite and quartz.

Table A-1: Scanning Electron Microscope chemical analyses of sample 3809.66 from the South Desbarres O-76 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	SrO	BaO	WO_3	Total
O-76 3809.66	2	1	Brt											38.68				61.32		100.00
O-76 3809.66	2	2	Py				27.84							72.16						100.00
O-76 3809.66	2	3	Qz	100.00																100.00
O-76 3809.66	2	4	Alt fs	53.23		23.67	7.59		5.70	1.18	1.54	4.18				2.91				100.00
O-76 3809.66	2	5	Alt fs	51.78	1.51	11.44	13.61		4.02	6.05	6.17	0.83		2.80		1.78				100.00
O-76 3809.66	2	6	Qz	100.00																100.00
O-76 3809.66	2	7	Qz	100.00																100.00
O-76 3809.66	2	8	Ab	69.30		18.45					12.25									100.00
O-76 3809.66	2	9	Chl+Ap	34.24		6.34	4.80		2.90	23.31	0.86	0.50	24.68			2.37				100.00
O-76 3809.66	2	10	Rt		96.94	1.65	1.41													100.00
O-76 3809.66	2	11	Py				27.98							72.02						100.00
O-76 3809.66	2	12	Mix	50.43		3.87	26.97		2.84	4.75	5.71	0.40		0.95		4.09				100.00
O-76 3809.66	2	13	Ab	68.09		18.65					12.14	0.38						0.73		100.00
O-76 3809.66	3	1	Brt											38.34			3.23	58.43		100.00
O-76 3809.66	3	2	Fe-Cal	3.66		0.89	12.41	1.34	9.18	28.52										56.00
O-76 3809.66	3	3	Qz	100.00																100.00
O-76 3809.66	3	4	Ap							49.82			45.43		5.07				-0.32	100.00
O-76 3809.66	3	5	Kfs	66.86		17.82						15.32								100.00
O-76 3809.66	3	6	Kfs	66.02		17.78					0.79	14.76						0.65		100.00
O-76 3809.66	3	7	Chl	33.63	0.42	19.92	21.34		4.77	0.58	1.91	0.72				1.72				85.00
O-76 3809.66	3	8	Qz	100.00																100.00
O-76 3809.66	3	9	Qz	100.00																100.00
O-76 3809.66	3	10	Sd	1.88		1.06	36.00	1.70	9.61	4.58	1.16									56.00
O-76 3809.66	3	11	Ilt+others	62.11		21.27	6.71		2.78		0.79	5.83				0.51				100.00
O-76 3809.66	3	12	Ank				14.04	1.07	9.61	31.28										56.00
O-76 3809.66	3	13	Qz	99.24		0.76														100.00
O-76 3809.66	3	14	Kfs	55.48		32.30	1.00		0.79		0.74	9.69								100.00
O-76 3809.66	3	15	Qz	100.00																100.00
O-76 3809.66	3	16	Qz	100.00																100.00
O-76 3809.66	3	17	Qz	94.22	0.81	2.21	1.92		0.56							0.29				100.00

Notes: 1. Only diagenetic barite found.

Table A-2: Scanning Electron Microscope chemical analyses of sample 3809.66 from the South Desbarres O-76 well (Figures: 4-6).

Sample ID	Site	Pos.	Min. ID	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	SrO	Na_2O	K_2O	P_2O_5	SO_3	Cr_2O_3	ZrO_2	ZnO	BaO	Ce_2O_3	SnO_2	WO_3	Ag_2O	F	Cl	Total
0-76_3809.66	25	1	Zrn	32.20													67.80									100.00
0-76_3809.66	25	2	Ank				15.40		8.88	31.72																56.00
0-76_3809.66	25	3	Qz	100.00																						100.00
0-76_3809.66	25	4	Brt								4.23				38.41				57.35							100.00
0-76_3809.66	25	5	Py	1.15		1.01	27.33								70.50											100.00
0-76_3809.66	25	6	Mn-Cal					1.99		54.01																56.00
0-76_3809.66	25	7	Py(+some Ab)	3.23		2.37	26.77					1.26			66.36											100.00
0-76_3809.66	25	8	Py(+some Ab)	3.68		1.98	25.14					1.49			67.71											100.00
0-76_3809.66	25	9	Brt												37.95				62.05							100.00
0-76_3809.66	25	10	Py	2.41		1.45	25.96								70.17											100.00
0-76_3809.66	25	11	Ank				12.30	2.17	8.99	32.53																56.00
0-76_3809.66	25	12	Brt								3.25				38.21				58.54							100.00
0-76_3809.66	25	13	Brt												36.90				63.10							100.00

Table A-3: Scanning Electron Microscope chemical analyses of sample 3809.66 from the South Desbarres O-76 well (Figure 7).

Sample	Site	Position	Mineral	SiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	Cl	SrO	MoO_3	BaO	Ce_2O_3	Total
O-76 3809.66	26	1	Py			27.29							72.71						100.00
O-76 3809.66	26	2	Mix	39.17	19.08	21.73		4.23	3.37		4.36	2.84	3.40	1.80					100.00
O-76 3809.66	26	3	Ank			15.35	0.87	8.90	27.70							3.18			56.00
O-76 3809.66	26	4	Py			30.01							69.99						100.00
O-76 3809.66	26	5	Brt										39.03		3.37		57.61		100.00
O-76 3809.66	26	6	Ank			15.25	1.73	8.61	30.42										56.00
O-76 3809.66	26	7	Sd			49.82	0.73		5.45										56.00
O-76 3809.66	26	8	Sd			47.82	1.82	3.62	2.73										56.00
O-76 3809.66	26	9	Py	0.92		27.49				1.44			70.14						100.00
O-76 3809.66	26	10	Py	1.07		26.44				1.36			71.14						100.00
O-76 3809.66	26	11	Qz	99.99															100.00
O-76 3809.66	26	12	Ank			13.88	1.10	9.55	31.48										56.00
O-76 3809.66	26	13	Ap	2.03					52.50			45.49							100.00
O-76 3809.66	26	14	Al-phosphate		34.05	3.41			4.72			34.39	4.57		10.93			7.93	100.00
O-76 3809.66	26	15	Sd			54.91			1.09										56.00
O-76 3809.66	26	16	Cal+Ilt?	14.10	5.37				78.57		1.98								100.00
O-76 3809.66	26	17	Py	1.73	1.15	29.05			1.65		0.34		66.07						100.00
O-76 3809.66	26	18	Py			27.14				1.79			71.07						100.00
O-76 3809.66	26	19	hole			49.39			6.58				25.72	18.33					100.00
O-76 3809.66	26	20	Sd			39.64		8.81	2.85				2.33	2.36					56.00
O-76 3809.66	26	21	Py	1.05		31.16			0.88				66.92						100.00

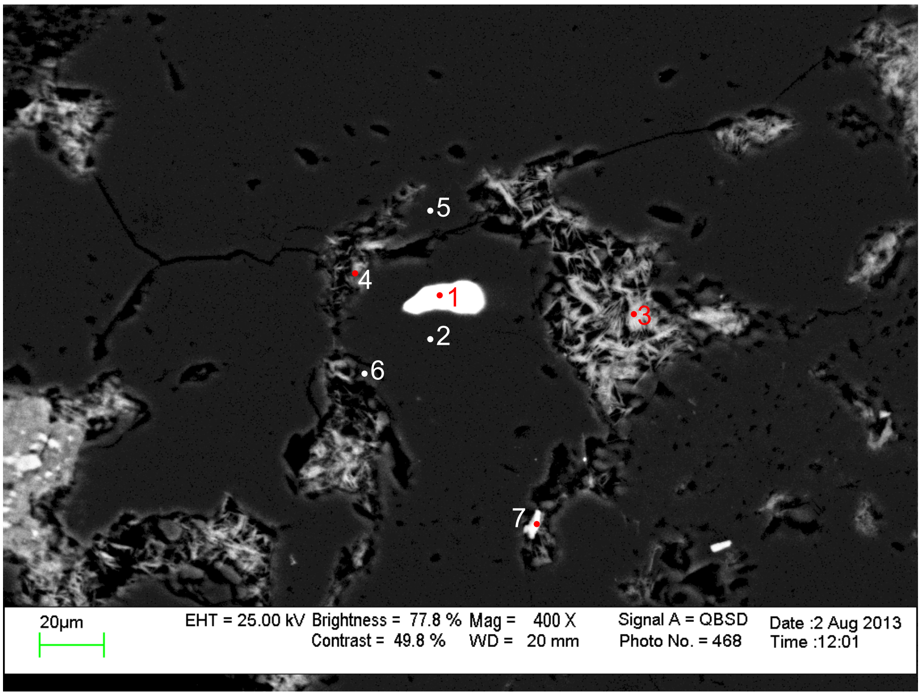
Table A-4: Scanning Electron Microscope chemical analyses of sample O-76 3809.66 from the South Desbarres O-76 well (Figures 12 and 13).

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	NiO	ZnO	As_2O_3	SrO	SnO_2	BaO	La_2O_3	Ce_2O_3	Nd_2O_3	Total
O-76 3809.66	1	1	Py	0.26			25.6			0.5	0.75			72.7			0.1						0.13			100
O-76 3809.66	1	2	Sd+Py	2.72			66.5	2.92	10.4	4.91	2.76			4.72		5.1										99.98
O-76 3809.66	1	3	Py	3.42		1.4	28.1		0.41	1.9	0.77	0.2	1.08	62.4		0.3										99.98
O-76 3809.66	1	4	Py	0.13			26.3			0.1	0.42			72.6			0.5									99.99
O-76 3809.66	1	5	Ank	4.10		1.23	14.10	0.94	10.11	23.92	1.06			0.53												56.00
O-76 3809.66	1	6	Brt+Py				24.5	1.15	4.13	1.82				28.7		2.2						37.6				100
O-76 3809.66	1	7	Brt+Py	0.9		0.74	1.24				0.35			39.5								57.3				100.1
O-76 3809.66	1	8	Sd	1.24		0.40	38.66	2.99	6.78	3.28	0.81			1.44		0.41										56.00
O-76 3809.66	1	9	Qz	99.8			0.23																			100
O-76 3809.66	1	10	Py	7.42		3.46	26.1		0.43	1.11	1.39	0.5	0.48	58.7		0.4										100
O-76 3809.66	1	11	Py	8.39		3.65	22.2		0.53	1.27	1.17	0.5	0.8	61		0.5										100
O-76 3809.66	1	12	Fe-cal				2.99	0.71	1.03	50.44				0.57		0.26										56.00
O-76 3809.66	1	13	Py	0.17			26.8			0.32	0.9			70.9			0.5		0.45							100
O-76 3809.66	1	14	Py	0.24			26.6			0.24	0.81			71.3			0.4		0.36							100
O-76 3809.66	1	15	Py	5.01		2.85	24.7			1.62	0.98	0.5		63.9		0.4										99.99
O-76 3809.66	1	16	Sd+other				65.3	3.36	10.7	4.53	2.91			7.34		5.9										100
O-76 3809.66	1	17	Py	0.26			26.7			0.18				72.9												100
O-76 3809.66	1	18	Al-phosphate	5.58		30.63	3.37		0.66	1.99	0.53	0.4	30.6	2.32		0.9				10.3			4.16	7.34	1.31	100
O-76 3809.66	1	19	Py				26.4			0.22	0.75			72			0.6									99.99
O-76 3809.66	1	20	Sd	2.35		0.59	36.87	1.62	6.15	2.30	1.72			2.25		2.15										56.00
O-76 3809.66	1	21	Sd	0.85			36.06	1.73	7.51	2.31	1.36			3.43		2.75										56.00
O-76 3809.66	1	22	Sd				36.70	1.79	8.87	3.02	1.41			1.88		2.34										56.00
O-76 3809.66	1	23	Brt+Sd				38.1	1.87	8.57	4.51	1.4			17.5		3.1						25				100
O-76 3809.66	1	24	Sd				40.18	1.78	7.61	2.53	1.08			1.06		1.76										56.00
O-76 3809.66	1	25	Sd+Py	1.37		0.89	58.8	2.56	8.41	4.38	2.26			17.8		3.6										100
O-76 3809.66	1	26	Ank+Chl	6.72		3.46	14.3	1.01	26.4	44.6		0.7		2.45		0.4										99.99
O-76 3809.66	1	27	Chl	28.32		19.62	25.65		4.04	1.64	0.95	0.60	0.65	1.36		2.17										85.00
O-76 3809.66	1	28	Py	0.64			24.3			0.39	1.31			71		1.1	0.7		0.59							100
O-76 3809.66	1	29	Sd				36.78	1.81	10.41	3.59	0.78			0.95		1.68										56.00
O-76 3809.66	1	30	Brt+Py	2.22		0.74	18.6			1.06	0.98			63.6		0.4						12.3				100
O-76 3809.66	1	31	Sd+Py	1.95			63.7	2.88	14.2	4.62	2.47			7.14		3.1										100
O-76 3809.66	1	32	Rt+py+Al-phosphate	2.46	64.2	3.06	8.43			1.37	0.73		2.61	16.2		0.9										100
O-76 3809.66	1	33	Sd				40.15	1.91	5.67	2.34	1.25			1.75		2.92										56.00
O-76 3809.66	1	34	Ilt	51	1.8	23.9	9.3		2.19	0.88	0.78	5.2		3.9		1										100
O-76 3809.66	2	1	Py	5.45		3.14	33.9	0.48	2.35	2.85	0.82	0.7		49.4		0.9										99.97
O-76 3809.66	2	2	Py				29.3			0.18				70.3			0.2									100
O-76 3809.66	2	3	Py+Al-phosphate	11.7	0.43	6.8	33.4	0.31	1.23	8.63		1.3	7.79	26.6		1.8										100
O-76 3809.66	2	4	Py+Sd	8.75		4.04	43.6	0.53	2.14	3.23	1.5	0.8	1.1	32		2.4										100
O-76 3809.66	2	5	Chl	27.47		22.21	27.03		4.85	1.52						1.92										85.00
O-76 3809.66	2	6	Qz	100																						99.99
O-76 3809.66	2	7	Py+Sd+Chl	15.1		8.47	45.4	0.74	2.39	4.21		1.8	2.02	17.7		2.3										100
O-76 3809.66	2	8	Py+Qz	73.9			10.7			0.45				14.7		0.2										99.99
O-76 3809.66	2	9	Py+Al-phosphate+othe	20.8		7.54	26.5		1.01	7.4	3.52	0.7	4.61	22.8		1.7						3.42				99.98
O-76 3809.66	2	10	Brt				0.48							39.1						1.96		58.5				100
O-76 3809.66	2	11	Cal	1.74		0.90	2.08	0.50	0.44	37.55		0.14	1.71	2.98	###	0.22										56.00
O-76 3809.66	2	12	Ank	2.35			14.26	1.19	8.88	25.04		0.41		3.71		0.18										56.00
O-76 3809.66	2	13	Py	2.29		0.81	26.6				0.55			69.5			0.3									99.99
O-76 3809.66	2	14	Al-phosphate+chl+py	19.6	2.29	10.28	24.5	0.35	1.54	14.6	0.8	1.9	13.6	8.86		1.6										100
O-76 3809.66	2	15	Chl+Ilt	37.3		27.55	14.7		1.34	4.48	0.84	5.3	0.76	7.09		0.6										100

Table A-4: Scanning Electron Microscope chemical analyses of sample O-76 3809.66 from the South Desbarres O-76 well (Figures 12 and 13).

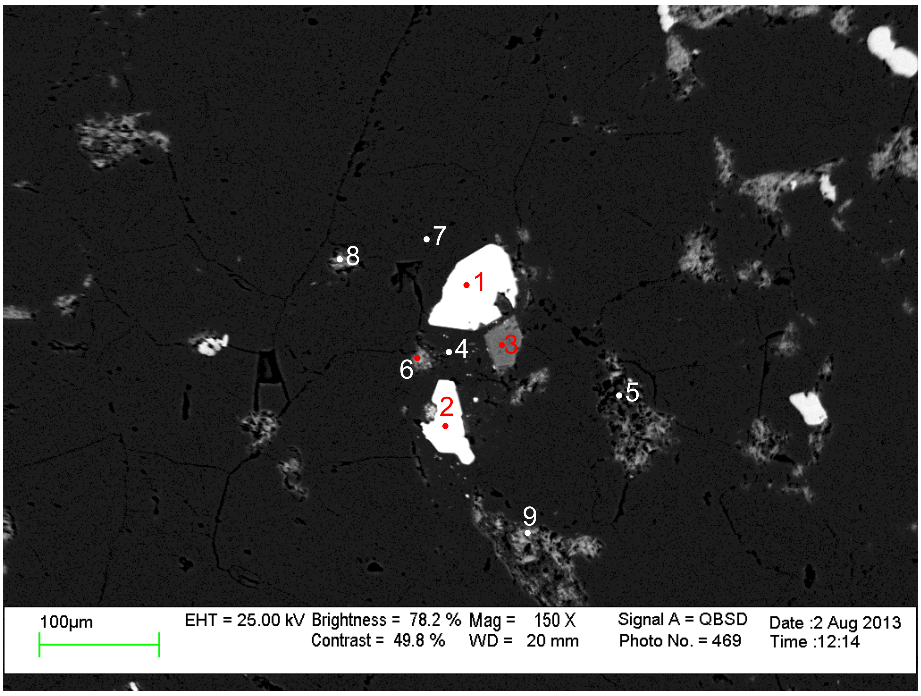
Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	NiO	ZnO	As_2O_3	SrO	SnO_2	BaO	La_2O_3	Ce_2O_3	Nd_2O_3	Total
O-76 3809.66	2	16	Chl	27.59		22.35	27.45		4.73	0.39				0.93		1.55										85.00
O-76 3809.66	2	17	Py+Al-phosphate+other	20.5		9.54	38.7	0.61	3.45	4.69		2.2	2.91	15.9		1.4										99.97
O-76 3809.66	2	18	Ank				13.76	1.66	9.10	31.48																56.00
O-76 3809.66	2	19	Py	1.22	0.8	0.51	26.3			0.53	2.09			68.4			0.2									100
O-76 3809.66	2	20	Sd+Brt				62.2	4.4	11.9	4.88				6.72		4.6						5.24				99.98
O-76 3809.66	2	21	Brt	1.28			0.41							38.2						2.42		57.7				99.99
O-76 3809.66	2	22	Py+Sd+Ilt	6.67		3.38	33.8	0.4	1.14	2.85	1	0.8		49.4		0.6										100
O-76 3809.66	2	23	Py+Sd+Ilt	12.5		6.33	38.9	0.48	1.38	2.22		1.3		35.6		1.2										99.99
O-76 3809.66	2	24	Py+Ilt	2.22		1.28	26.8		0.53		1.29			67.9												99.97
O-76 3809.66	2	25	Py+Ilt	45.8		10.51	22.4		1.79	2.7	0.75	2.2	1.05	11.6		1.2										99.98
O-76 3809.66	2	26	Brt				0.81							35.5						1.7		62				100
O-76 3809.66	2	27	Sd+Qz	30.6			51.1	1.24	13.1	3.95																99.99
O-76 3809.66	2	28	Chl	25.84		20.51	23.46		4.56	5.31				2.74		2.58										85.00
O-76 3809.66	2	29	Py	2.46		1.57	26.4				0.84			68.7												100

Appendix 13B: Scanning Electron Microscope Backscattered Electron Images for South Debarres O-76 5952.65



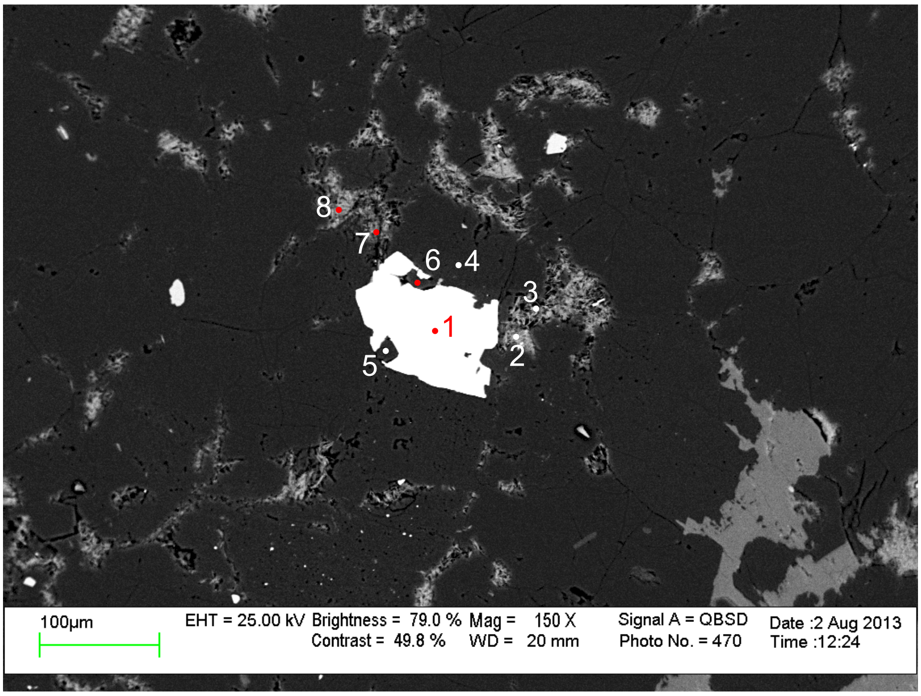
1. Barite
2. Quartz
3. Chlorite
4. Chlorite + Quartz
5. Quartz
6. Quartz
7. Ilmenite + Chlorite

Figure 1: O-76 5952.65 m. site 1 (SEM). Diagenetic barite (1) fills dissolution voids in detrital quartz (2).



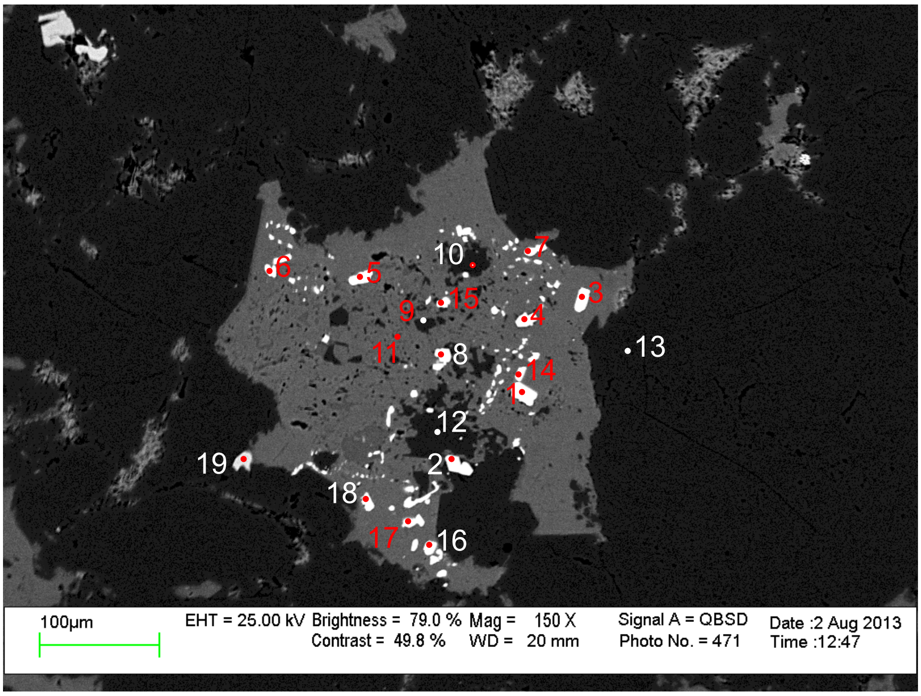
1. Sphalerite
2. Sphalerite
3. Ankerite
4. Quartz
5. Chlorite + Quartz
6. Chlorite
7. Quartz
8. Chlorite +other
9. Chlorite

Figure 2: O-76 5952.65 m. site 2 (SEM). Sphalerite (1,2) fills dissolution voids created along detrital quartz grain boundaries. Ankerite (3) and chlorite also show the same mode of occurrence.



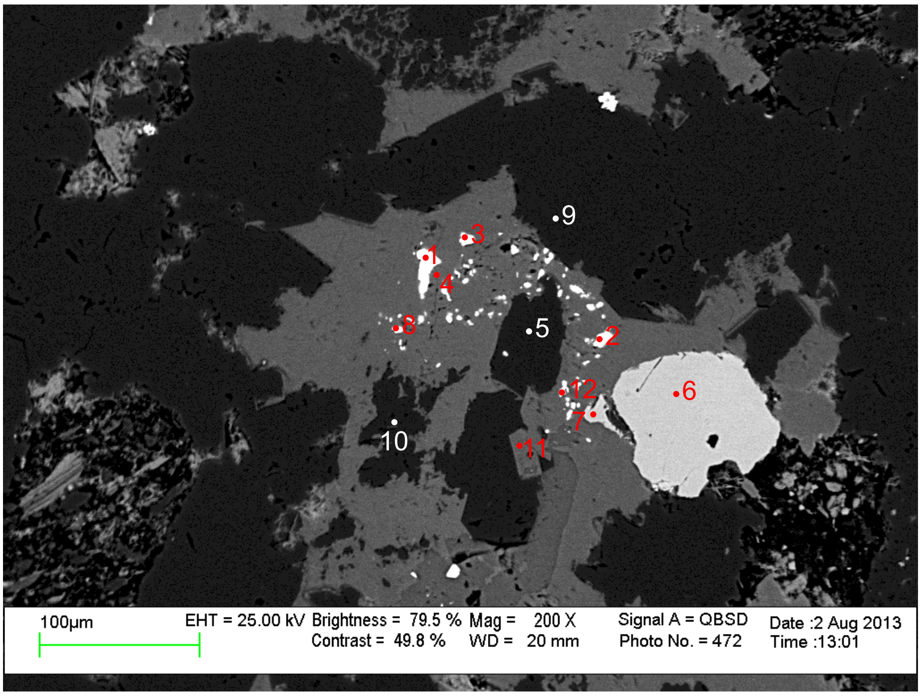
1. Sphalerite
2. Chlorite
3. Chlorite
4. Albite
5. Quartz
6. Quartz
7. Chlorite
8. Chlorite

Figure 3: O-76 5952.65 m. site 3 (SEM). Sphalerite (1) engulfs quartz (5). Chlorite fills intergranular voids.



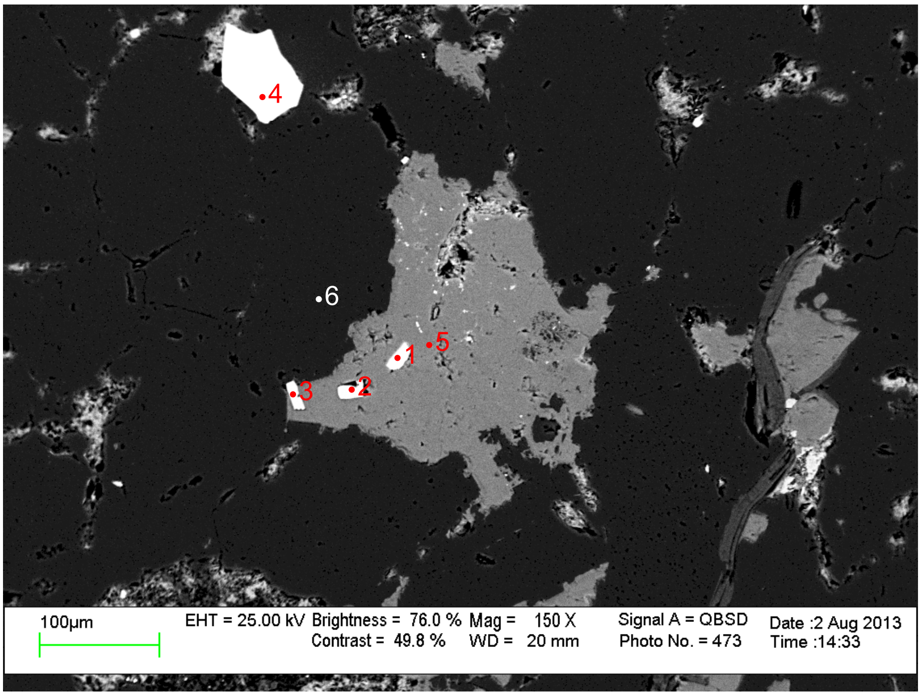
1. Barite
2. Pyrite
3. Barite
4. Pyrite
5. Barite
6. Barite
7. Barite
8. Pyrite
9. Albite
10. Albite
11. Ankerite
12. Albite
13. Quartz
14. Barite
15. Barite
16. Barite
17. Barite
18. Barite
19. Rutile

Figure 4: O-76 5952.65 m. site 4(SEM). Diagenetic barite (14-17) together with pyrite (2,4) have partially replaced ankerite (11) that has partially replaced albite (10,12).



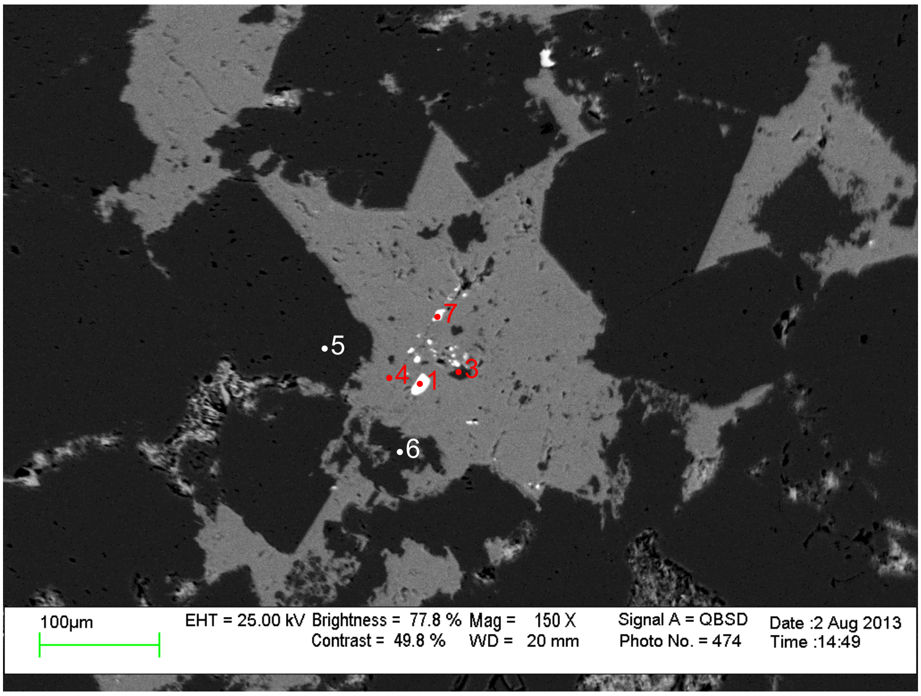
1. Barite
2. Barite
3. Barite
4. Ankerite + Barite
5. Quartz
6. Rutile
7. Rutile
8. Barite
9. Quartz
10. Albite
11. Ankerite
12. Ankerite + Barite

Figure 5: O-76 5952.65 m. site 5(SEM). Diagenetic barite (1,2,3) has partially replaced ankerite (4,11,12) and ankerite has probably partially replaced albite (10).



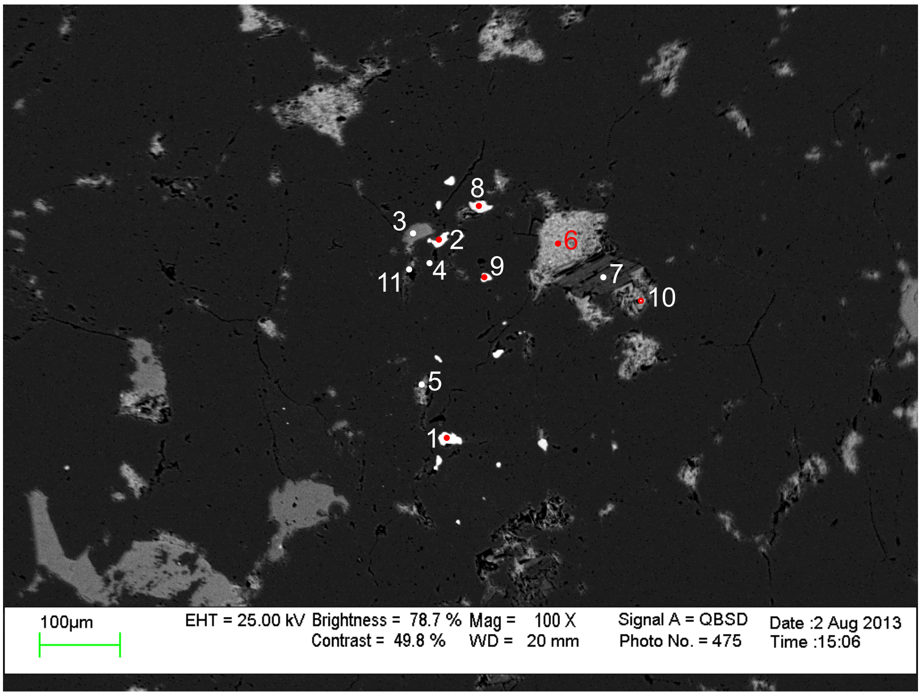
1. Barite
2. Rutile
3. TiO_2 +other
4. Zircon
5. Ankerite
6. Quartz

Figure 6: O-76 5952.65 m. site6(SEM). Diagenetic barite (1) together with TiO_2 minerals (2,3) have partially replaced ankerite (5).



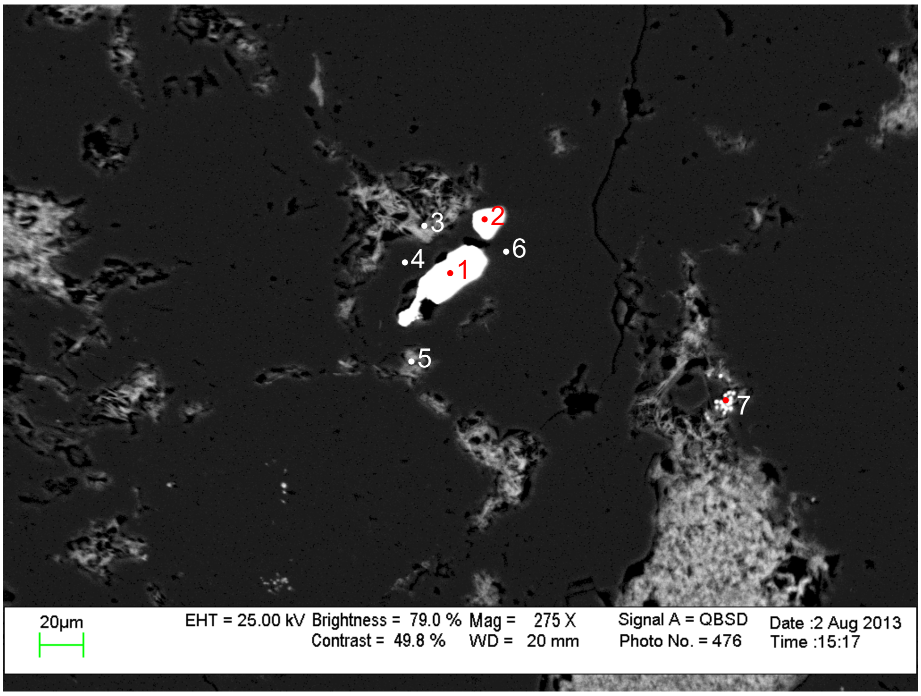
1. Barite
3. Albite
4. Ankerite
5. Quartz
6. Quartz
7. Ankerite + Barite

Figure 7: O-76 5952.65 m. site 7(SEM). Diagenetic barite (1) has partly replaced ankerite (4,7).



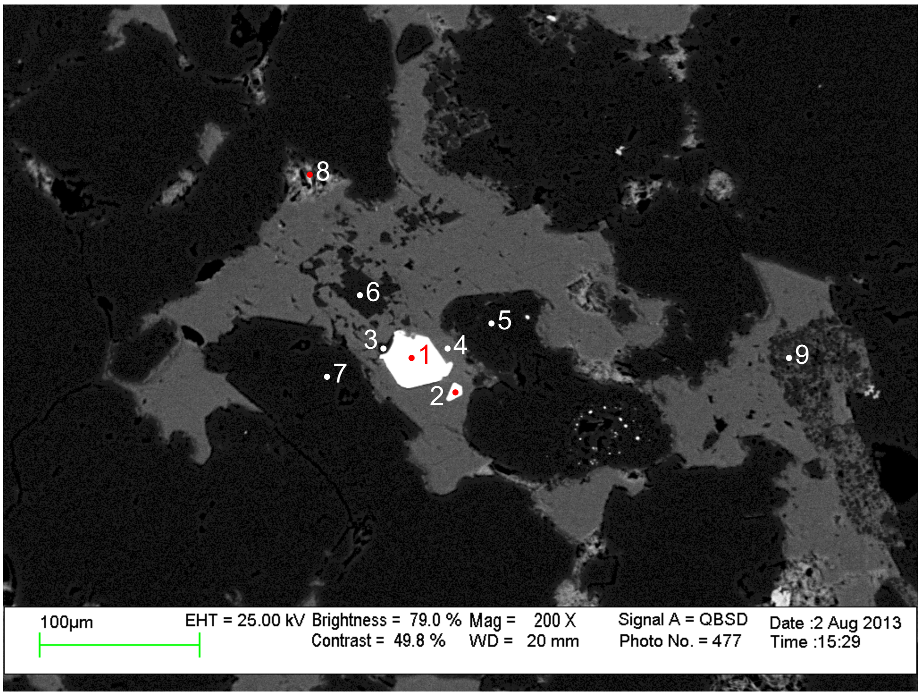
1. Barite
2. Barite
3. Ankerite
4. Quartz
5. Chlorite
6. Chlorite
7. Muscovite
8. Rutile
9. Barite
10. Chlorite
11. Mixture

Figure 8: O-76 5952.65 m. site 8(SEM). Barite (1,2,9), chlorite (6,10) and ankerite (3) fill dissolution voids in quartz or pores along intergranular boundaries.



1. Barite
2. Barite
3. Chlorite
4. Quartz
5. Chlorite
6. Quartz
7. Pyrite

Figure 9: O-76 5952.65 m. site 9(SEM). Diagenetic barite fills dissolution voids in detrital quartz. Chlorite precipitates along intergranular boundaries (3,7).



1. Barite
2. Barite
3. Barite + Albite
4. Ankerite
5. Quartz
6. Albite
7. Quartz
8. Chlorite + Ankerite
9. Ankerite + Quartz

Figure 10: O-76 5952.65 m. site 10(SEM). Diagenetic barite (1) has partly replaced ankerite and ankerite has probably replaced albite (3,6).

Table A: Scanning Electron Microscope chemical analyses of sample 5952.65 from the South Desbarres O-76 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	SO_3	Cl	Cr_2O_3	ZnO	SrO	ZrO_2	BaO	HfO_2	WO_3	Total
O-76 5952.65	1	1	Brt	1.63									38.50				5.76		54.12			100.01
O-76 5952.65	1	2	Qz	99.99																		99.99
O-76 5952.65	1	3	Chl+Qz	26.70		24.20	29.29		4.82													85.00
O-76 5952.65	1	4	Chl	51.67		14.12	15.83		3.00		0.37											85.00
O-76 5952.65	1	5	Qz	99.99																		99.99
O-76 5952.65	1	6	Qz	99.52		0.47																99.99
O-76 5952.65	1	7	Ilm+Chl	24.73	39.32	12.91	20.79		2.01			0.26										100.02
O-76 5952.65	2	1	Sph	0.24			1.22						51.91			46.63						100.00
O-76 5952.65	2	2	Sph	0.30			1.17						51.79			46.75						100.01
O-76 5952.65	2	3	Ank				16.04	1.11	9.26	29.11			0.48									56.00
O-76 5952.65	2	4	Qz	99.75												0.25						100.00
O-76 5952.65	2	5	Chl+Qz	55.54		12.40	14.72		1.67			0.65										85.00
O-76 5952.65	2	6	Chl	31.31		22.06	26.79		4.24			0.29				0.31						85.00
O-76 5952.65	2	7	Qz	99.99																		99.99
O-76 5952.65	2	8	Chl+other	36.17		27.32	30.28		5.19			1.04										100.00
O-76 5952.65	2	9	Chl	33.33		20.72	26.48		4.05			0.25		0.18								85.00
O-76 5952.65	3	1	Sph				0.99						51.94			47.10						100.03
O-76 5952.65	3	2	Chl	28.76	0.62	23.48	26.45		4.05	0.33	0.42	0.74		0.15								85.00
O-76 5952.65	3	3	Chl	27.21		23.60	29.47		4.11			0.37		0.25								85.00
O-76 5952.65	3	4	Ab	69.27		18.54	0.23				11.99											100.03
O-76 5952.65	3	5	Qz	97.89		1.04					0.65					0.44						100.02
O-76 5952.65	3	6	Qz	99.60												0.40						100.00
O-76 5952.65	3	7	Chl	28.55		23.24	27.73		4.52		0.56			0.40								85.00
O-76 5952.65	3	8	Chl	27.20		23.34	30.08		4.17					0.20								85.00
O-76 5952.65	4	1	Brt				0.44			0.66			37.63				3.75		57.54			100.02
O-76 5952.65	4	2	Py	0.30			27.61			0.13			71.99									100.03
O-76 5952.65	4	3	Brt				1.16		0.53	2.57			37.31				4.57		53.88			100.02
O-76 5952.65	4	4	Py				27.66			0.81			71.54									100.01
O-76 5952.65	4	5	Brt				0.42			0.81			38.06				2.83		57.90			100.02
O-76 5952.65	4	6	Brt				0.68			1.60			37.51				3.31		56.93			100.03
O-76 5952.65	4	7	Brt				0.76			1.78			37.11						60.34			99.99
O-76 5952.65	4	8	Py				27.50			0.64			71.87									100.01
O-76 5952.65	4	9	Ab	68.41		18.67	0.35			0.71	11.86											100.00
O-76 5952.65	4	10	Ab	68.84		18.71	0.19			0.35	11.92											100.01
O-76 5952.65	4	11	Ank				16.62	0.99	9.83	28.56												56.00
O-76 5952.65	4	12	Ab	68.92		18.57	0.19			0.17	12.13											99.98
O-76 5952.65	4	13	Qz	99.99																		99.99

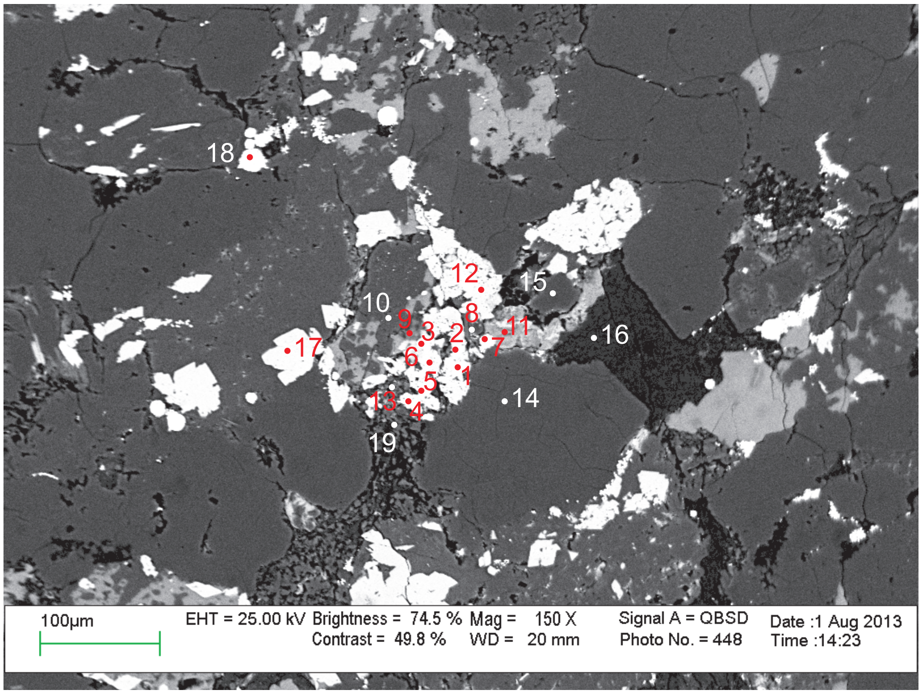
Table A: Scanning Electron Microscope chemical analyses of sample 5952.65 from the South Desbarres O-76 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	SO_3	Cl	Cr_2O_3	ZnO	SrO	ZrO_2	BaO	HfO_2	WO_3	Total
O-76 5952.65	4	14	Brt				7.82		8.87	14.83			22.50				1.80		44.21			100.03
O-76 5952.65	4	15	Brt	1.09		0.68	0.77			1.26	0.66		36.28						59.26			100.00
O-76 5952.65	4	16	Brt				1.16		1.33	2.50			35.18				2.32		57.52			100.01
O-76 5952.65	4	17	Brt				1.53			1.62			38.95				4.59		53.33			100.02
O-76 5952.65	4	18	Brt				5.39		1.09	3.53			40.05				1.75		48.17			99.98
O-76 5952.65	4	19	Rt	0.73	97.26		1.71			0.32												100.02
O-76 5952.65	5	1	Brt				0.67			1.08			37.46						60.80			100.01
O-76 5952.65	5	2	Brt				1.14		0.93	2.03			34.76						61.15			100.01
O-76 5952.65	5	3	Brt				0.98			2.10			37.61				4.02		55.31			100.02
O-76 5952.65	5	4	Ank+Brt				26.48	2.09	14.87	51.59			1.70						3.26			99.99
O-76 5952.65	5	5	Qz	99.99																		99.99
O-76 5952.65	5	6	Rt		100.00																	100.00
O-76 5952.65	5	7	Rt		98.32		0.51			1.18												100.01
O-76 5952.65	5	8	Brt				2.77		1.54	6.04			33.76						55.88			99.99
O-76 5952.65	5	9	Qz	99.99																		99.99
O-76 5952.65	5	10	Ab	67.32		19.33	0.84		0.36	0.77	11.03	0.34										99.99
O-76 5952.65	5	11	Ank	5.09		0.92	16.21	0.70	8.41	24.67												56.00
O-76 5952.65	5	12	Ank+Brt				23.58	1.50	12.55	46.52			5.97						9.87			99.99
O-76 5952.65	6	1	Brt				0.75			0.99			36.48				4.06		57.73			100.01
O-76 5952.65	6	2	Rt		96.13	0.68	1.25			1.62					0.32							100.00
O-76 5952.65	6	3	TiO_2+other	3.27	87.36	2.53	2.43		0.66	3.53		0.20										99.98
O-76 5952.65	6	4	Zrn	31.28														67.32		1.40		100.00
O-76 5952.65	6	5	Ank	0.63		0.40	14.43	0.96	8.81	30.76												56.00
O-76 5952.65	6	6	Qz	99.99																		99.99
O-76 5952.65	7	1	Brt				1.57		0.66	3.02			36.13				4.33		54.30			100.01
O-76 5952.65	7	3	Ab	63.73		17.31	1.97		0.36	4.73	11.92											100.02
O-76 5952.65	7	4	Ank	0.57			15.28	1.16	8.61	30.38												56.00
O-76 5952.65	7	5	Qz	99.99																		99.99
O-76 5952.65	7	6	Qz	99.99																		99.99
O-76 5952.65	7	7	Ank+Brt				22.00	1.56	11.84	41.96			7.84						14.78			99.98
O-76 5952.65	8	1	Brt	0.98									38.11				1.99		58.91			99.99
O-76 5952.65	8	2	Brt	7.89									37.36						54.77			100.02
O-76 5952.65	8	3	Ank				16.66	0.99	8.84	29.51												56.00
O-76 5952.65	8	4	Qz	97.80		1.06	1.14															100.00
O-76 5952.65	8	5	Chl	33.23	0.28	21.43	25.13		3.86	0.25		0.82										85.00
O-76 5952.65	8	6	Chl	23.13		20.01	36.30		4.80	0.75												85.00
O-76 5952.65	8	7	Ms	47.77		32.67	1.10		1.13		0.49	9.84										93.00

Table A: Scanning Electron Microscope chemical analyses of sample 5952.65 from the South Desbarres O-76 well.

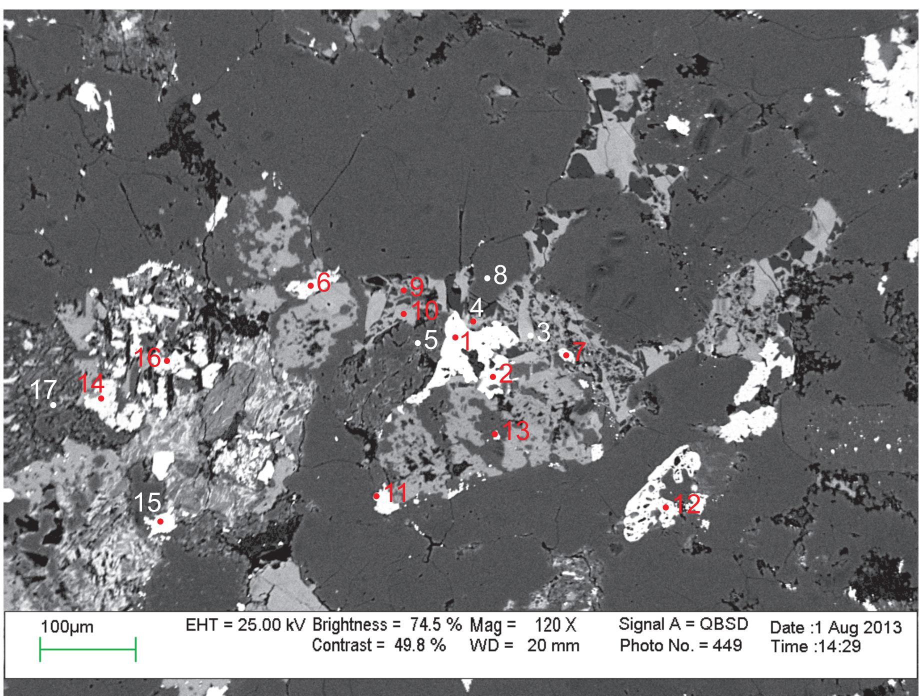
Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	SO_3	Cl	Cr_2O_3	ZnO	SrO	ZrO_2	BaO	HfO_2	WO_3	Total
O-76 5952.65	8	8	Rt	3.85	93.04	1.30	1.81															100.00
O-76 5952.65	8	9	Brt	7.66									35.68				4.27		52.21		0.18	100.00
O-76 5952.65	8	10	Chl	37.04		18.76	25.45		3.75													85.00
O-76 5952.65	8	11	Mix	80.48	0.30	10.37	2.24		1.21	0.91	1.09	3.19		0.20								99.99
O-76 5952.65	9	1	Brt	0.96									37.66				2.45		58.94			100.01
O-76 5952.65	9	2	Brt										38.80				3.71		57.50			100.01
O-76 5952.65	9	3	Chl	27.24		22.95	30.23		4.58													85.00
O-76 5952.65	9	4	Qz	99.99																		99.99
O-76 5952.65	9	5	Chl	29.83		21.47	29.03		3.93		0.46	0.28										85.00
O-76 5952.65	9	6	Qz	99.99																		99.99
O-76 5952.65	9	7	Py	4.26		1.98	27.36		0.43	0.20			65.77									100.00
O-76 5952.65	10	1	Brt										37.86				3.19		58.96			100.01
O-76 5952.65	10	2	Brt				2.06		1.36	4.70			35.38				4.10		52.43			100.03
O-76 5952.65	10	3	Brt+Ab	54.70		15.76					10.81		6.77						11.97			100.01
O-76 5952.65	10	4	Ank	0.79	0.66	0.49	14.34	0.81	9.26	29.65												56.00
O-76 5952.65	10	5	Qz	99.99																		99.99
O-76 5952.65	10	6	Ab	69.18		18.61	0.30				11.92											100.01
O-76 5952.65	10	7	Qz	99.99																		99.99
O-76 5952.65	10	8	Chl+Ank	43.32		21.2	25.88		5.17	3.95	0.47											99.99
O-76 5952.65	10	9	Ank+Qz	24.98			9.56	0.60	4.66	16.20												56.00

Appendix 14: Scanning Electron Microscope Backscattered Electron Images for Tantallon M-41 5928.37



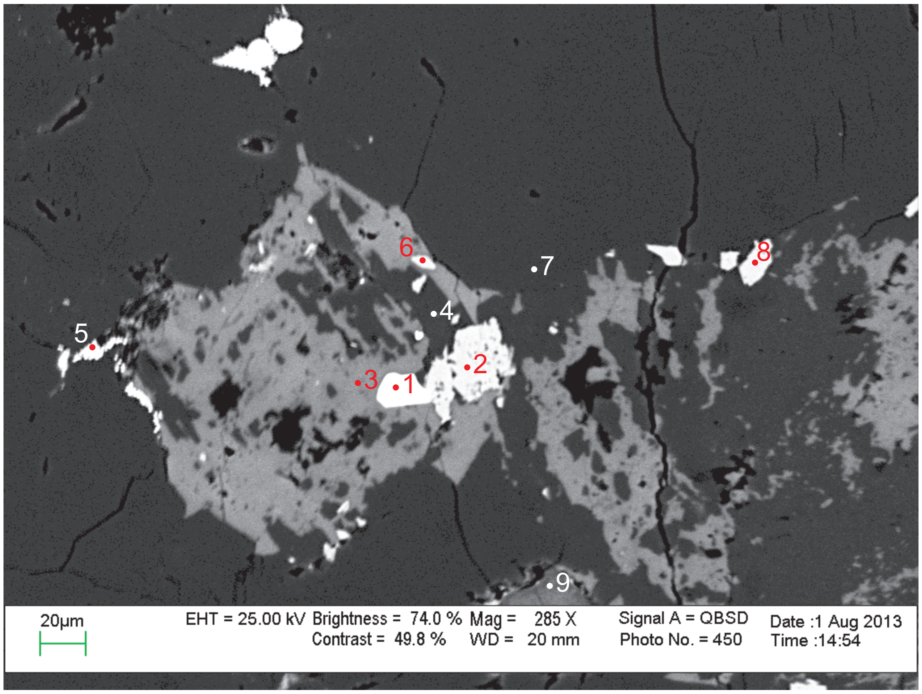
1. Sphalerite
2. Sphalerite
3. Sphalerite
4. Sphalerite
5. Sphalerite
6. Siderite
7. Pyrite
8. Quartz
9. Calcite+ Barite + K-feldspar
10. Albite
11. Chlorite
12. Siderite
13. Chlorite
14. Quartz
15. Quartz
16. Kaolinite
17. Siderite
18. Pyrite
19. Albite

Figure 1: M-41 5296.24 m. site 1 (SEM). Sphalerite (1,2,3,4), pyrite (7,18) and chlorite have partly replaced feldspars or fill dissolution voids.



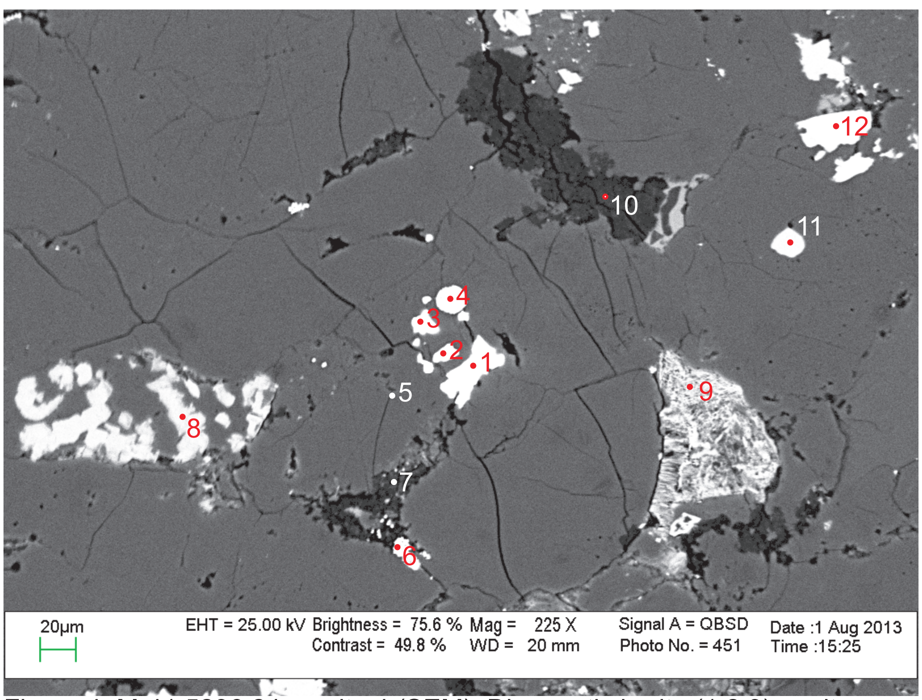
1. Barite
2. Barite
3. Fe-Calcite
4. Fe-Calcite
5. Quartz
6. Siderite
7. Siderite
8. Quartz
9. Quartz
10. Fe-Calcite
11. Pyrite
12. TiO_2
13. Pyrite + Albite
14. Siderite
15. Pyrite
16. Siderite + Apatite
17. Quartz

Figure 2: M-41 5296.24 m. site 2 (SEM). Diagenetic barite (1,2), pyrite (13) have partly replaced Fe-calcite (3,4) and Fe-calcite has probably partly replaced albite.



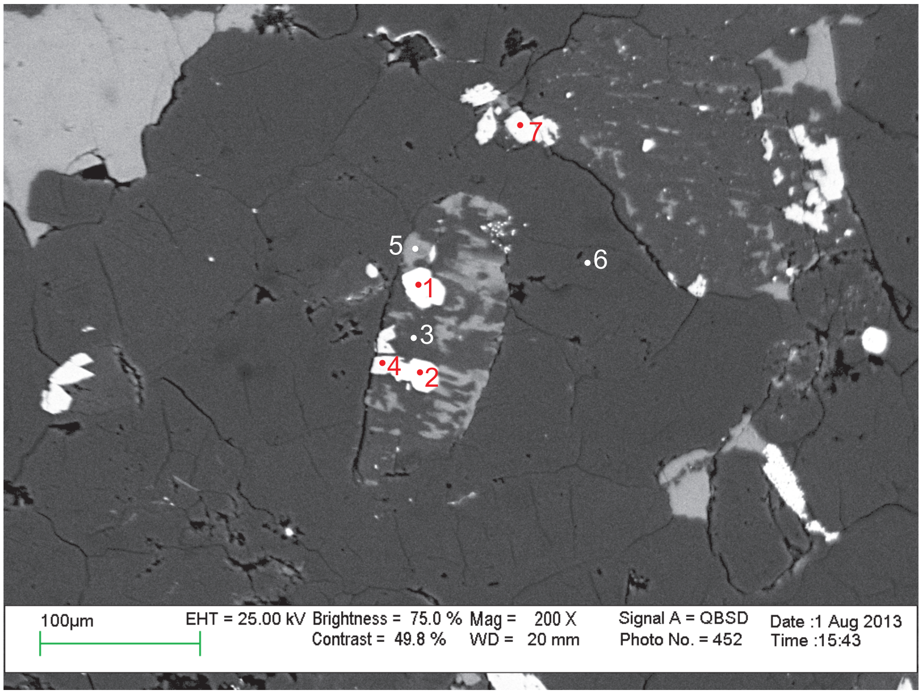
1. Sphalerite
2. Siderite
3. Fe-Calcite
4. Albite
5. Pyrite
6. Siderite
7. Quartz
8. Siderite
9. Chlorite

Figure 3: M-41 5296.24 m. site 3 (SEM). Sphalerite (1) and late siderite (2,6) have partly replaced Fe-calcite (3) and Fe-calcite has probably partly replaced albite or K-feldspar (4).



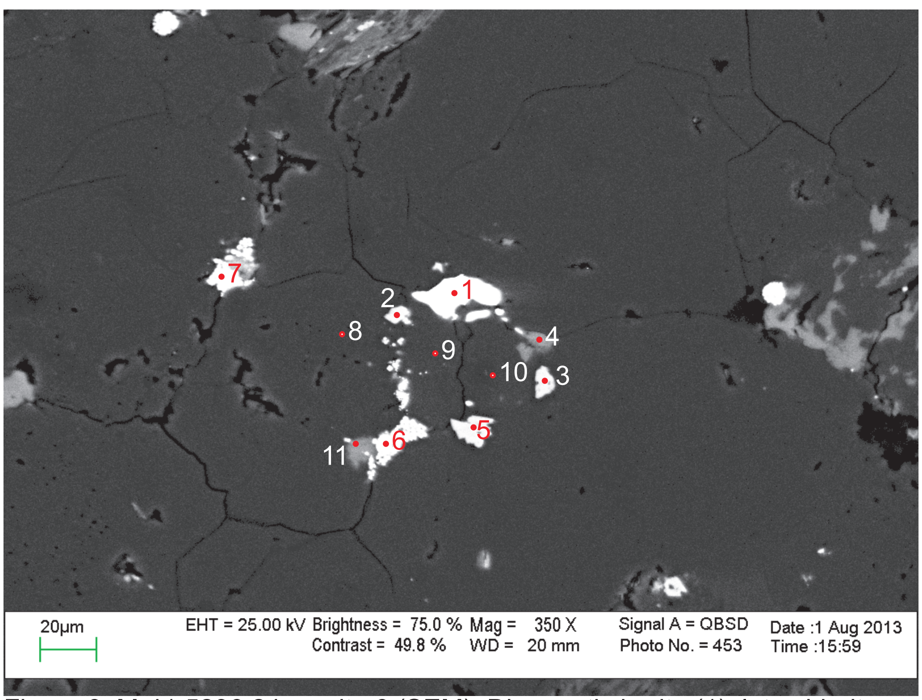
1. Barite
2. Barite
3. Barite
4. Pyrite
5. Quartz
6, Pyrite
7. Kaolinite
8. Chlorite
9. Rutile
10. Kaolinite
11. Apatite
12. Rutile

Figure 4: M-41 5296.24 m. site 4 (SEM). Diagenetic barite (1,2,3), pyrite (4,6), and chlorite (8) fill voids along intergranular boundaries.



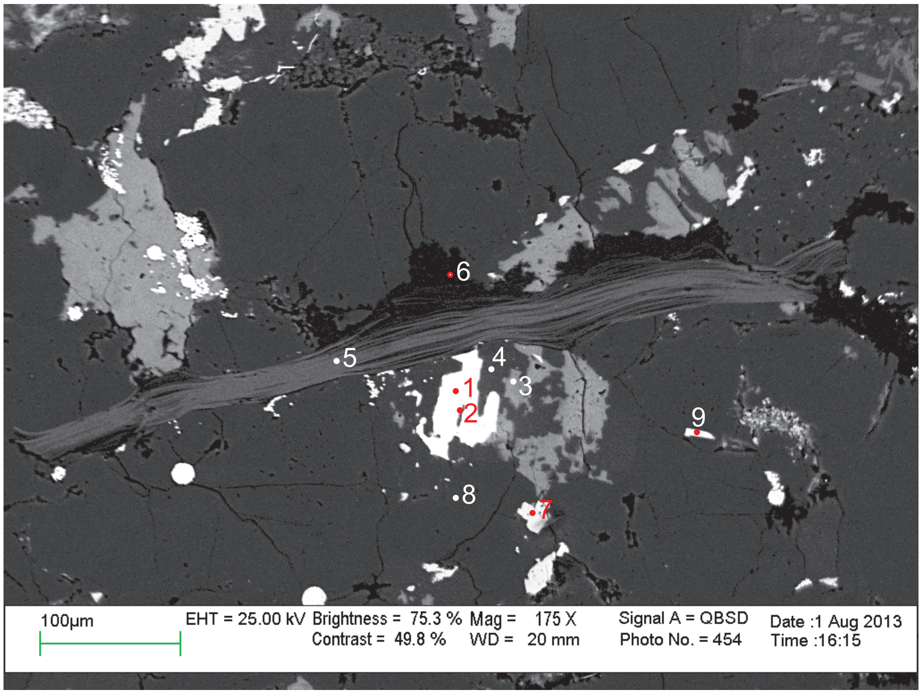
1. Sphalerite
2. Sphalerite
3. Albite
4. Siderite
5. Calcite + K-feldspar
6. Quartz
7. Siderite

Figure 5: M-41 5296.24 m. site 5 (SEM). Sphalerite, and late siderite have partly replaced feldspar and Fe-calcite (3,5).



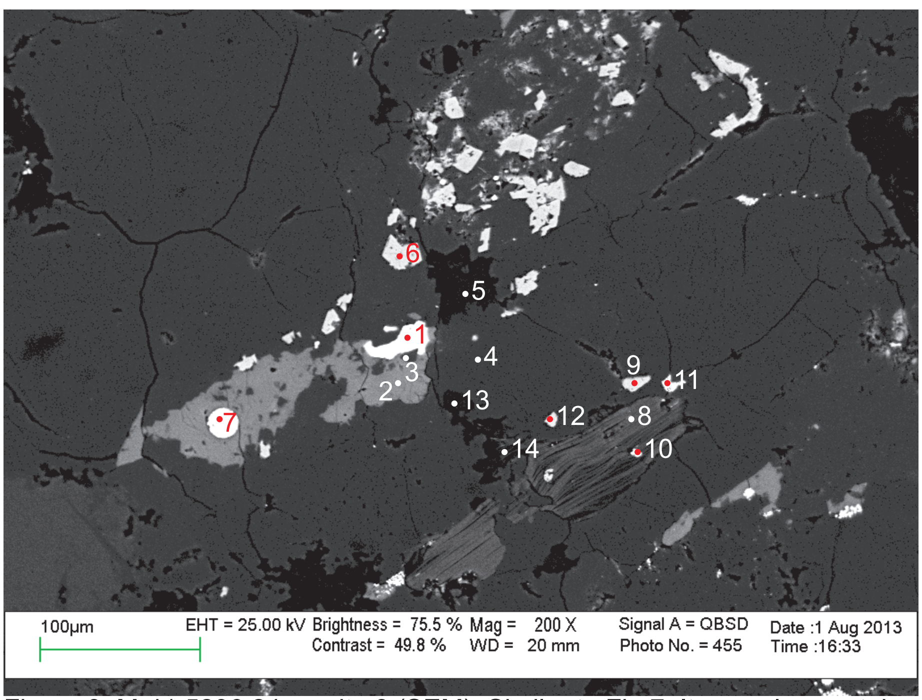
1. Barite
2. Siderite + Pyrite
3. Siderite + K-feldspar
4. Fe-Calcite
5. Siderite
6. Pyrite
7. Pyrite
8. Quartz
9. Albite
10. Albite
11. Fe-Calcite

Figure 6: M-41 5296.24 m. site 6 (SEM). Diagenetic barite (1), late siderite (2,3) and pyrite (6,7) have precipitated in voids along intergranular grain boundaries.



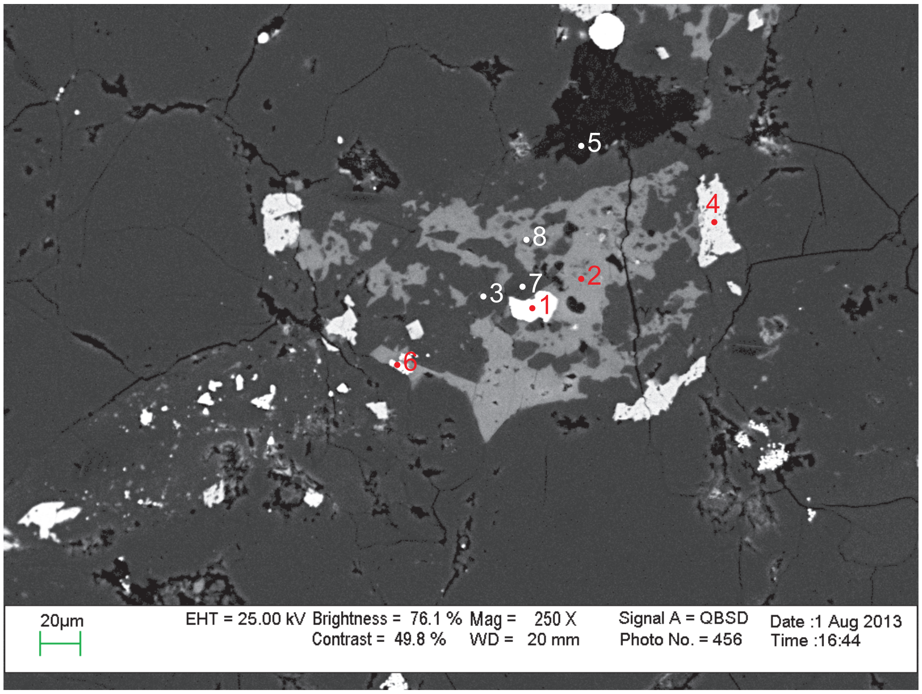
1. Barite
2. Barite + Albite
3. Fe-Calcite + Albite
4. Albite
5. Muscovite
6. Kaolinite
7. Siderite
8. Quartz
9. TiO_2

Figure 7: M-41 5296.24 m. site 7(SEM). Diagenetic barite (1,2) engulfs albite (4) that have been partly replaced by Fe-calcite (3).



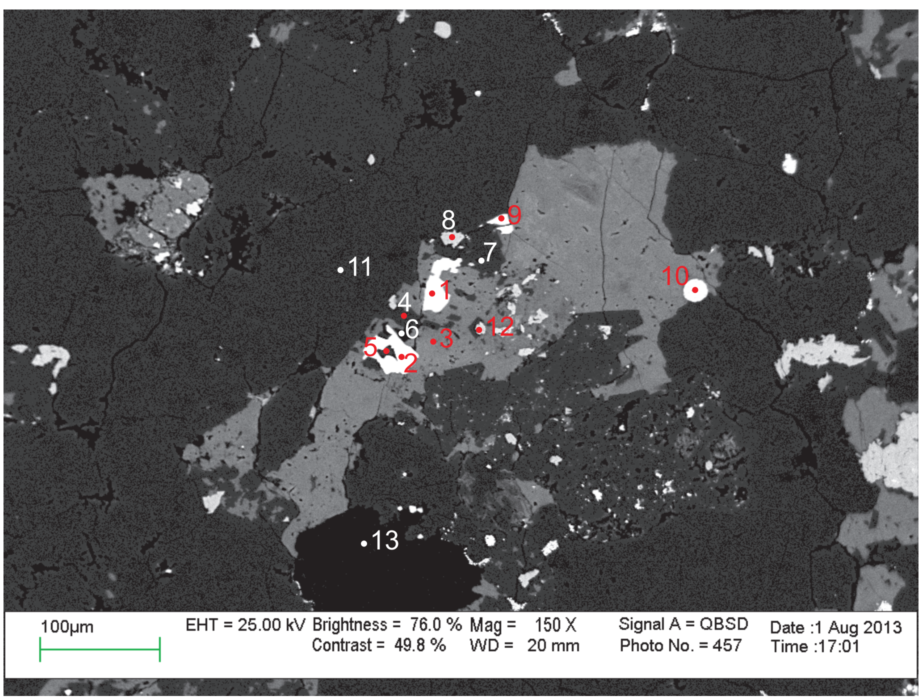
1. Barite
2. Fe-Calcite
3. Albite
4. Quartz
5. Kaolinite
6. Siderite
7. Pyrite
8. Muscovite
9. Siderite + Albite
10. Zircon + Muscovite
11. Pyrite
12. Siderite
13. Kaolinite
14. Kaolinite

Figure 8: M-41 5296.24 m. site 8 (SEM). Similar to Fig.7. It may also contain late pyrite (11) and siderite (12).



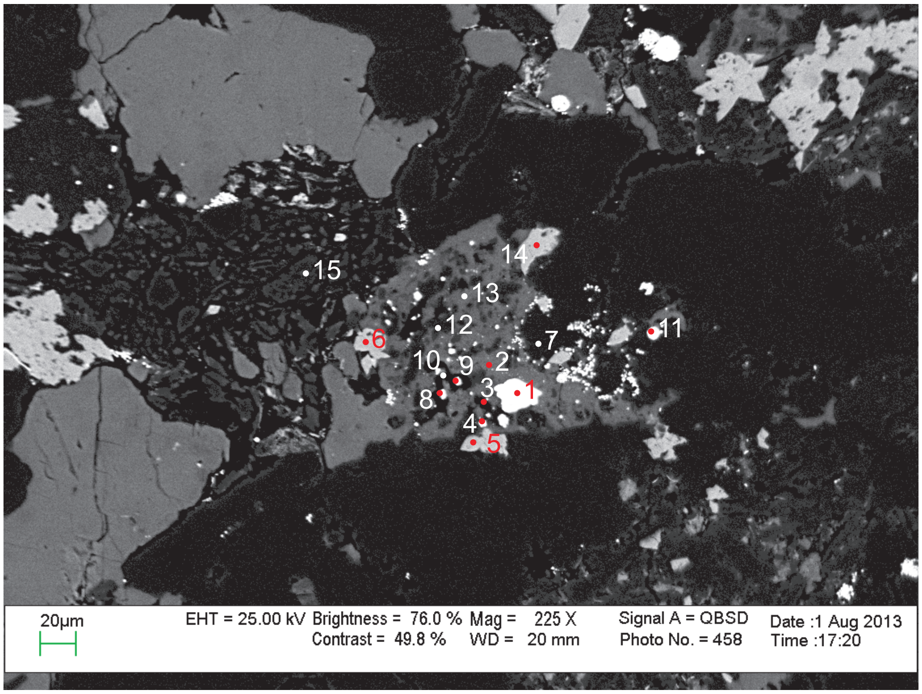
1. Barite
2. Calcite + K-feldspar
3. Albite
4. Siderite
5. Kaolinite
6. Pyrite
7. Albite
8. Albite + Calcite

Figure 9: M-41 5296.24 m. site 9(SEM). Diagenetic barite engulfs feldspars (2,3) that have been partly replaced by calcite. Late pyrite (6) and siderite (4) are also present.



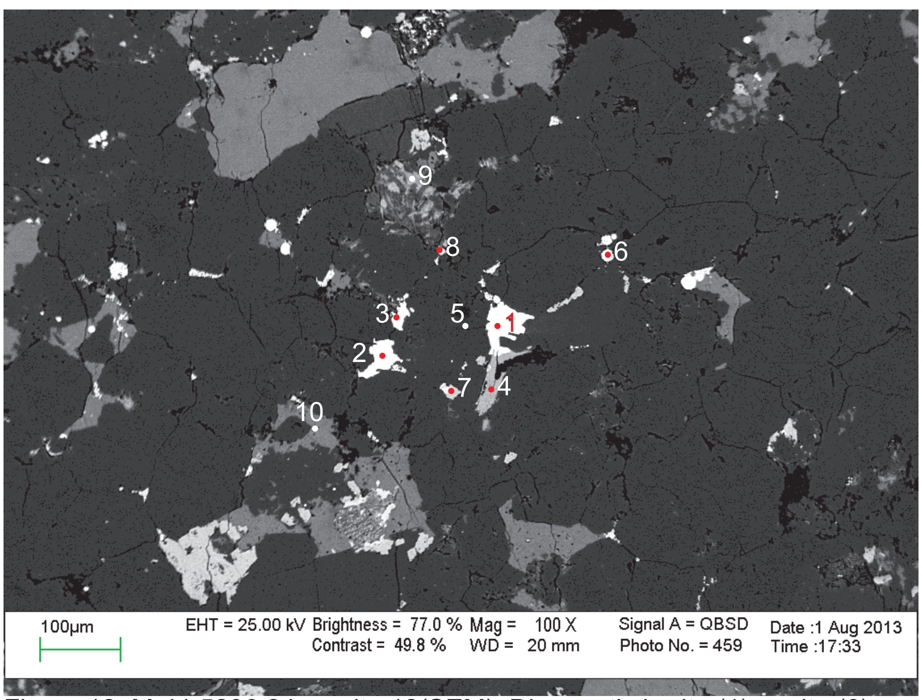
1. Barite
2. Barite
3. Fe-Calcite
4. Albite
5. Albite
6. Kaolinite
7. Quartz
8. Siderite + Chlorite
9. Barite
10. Pyrite
11. Quartz
12. Siderite + K-feldspar
13. Kaolinite

Figure 10: M-41 5296.24 m. site 10(SEM). Similar to Fig. 9.



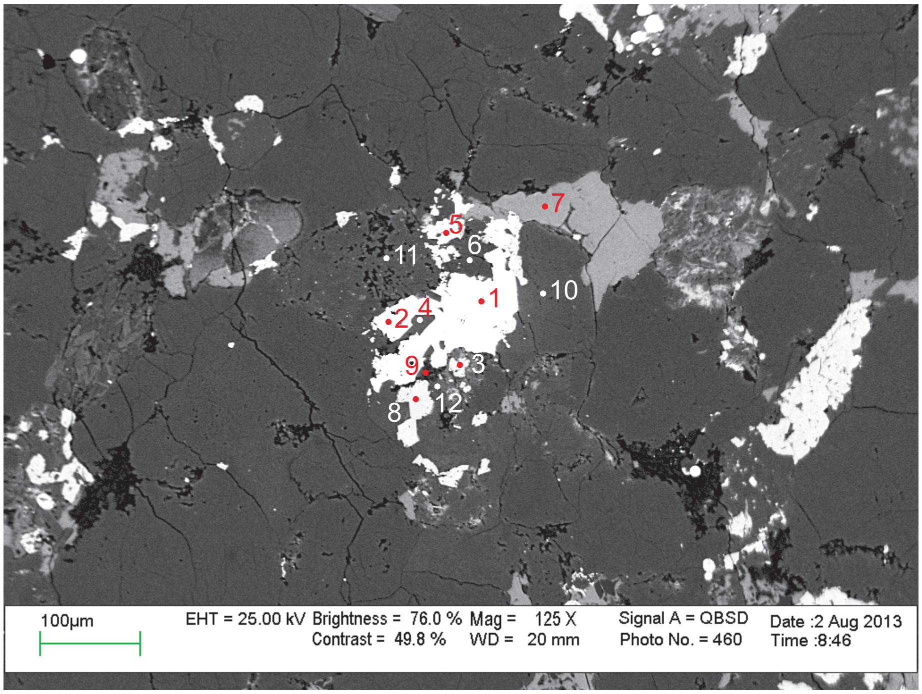
1. Barite
2. Fe-Calcite
3. Calcite + Albite
4. Pyrite
5. Siderite
6. Siderite
7. Quartz
8. Barite
9. Barite
10. Calcite + Albite
11. Pyrite
12. Albite + Calcite
13. Fe-Calcite
14. Siderite
15. Quartz + K-feldspar

Figure 11: M-41 5296.24 m. site 11(SEM). Similar to Fig.9.



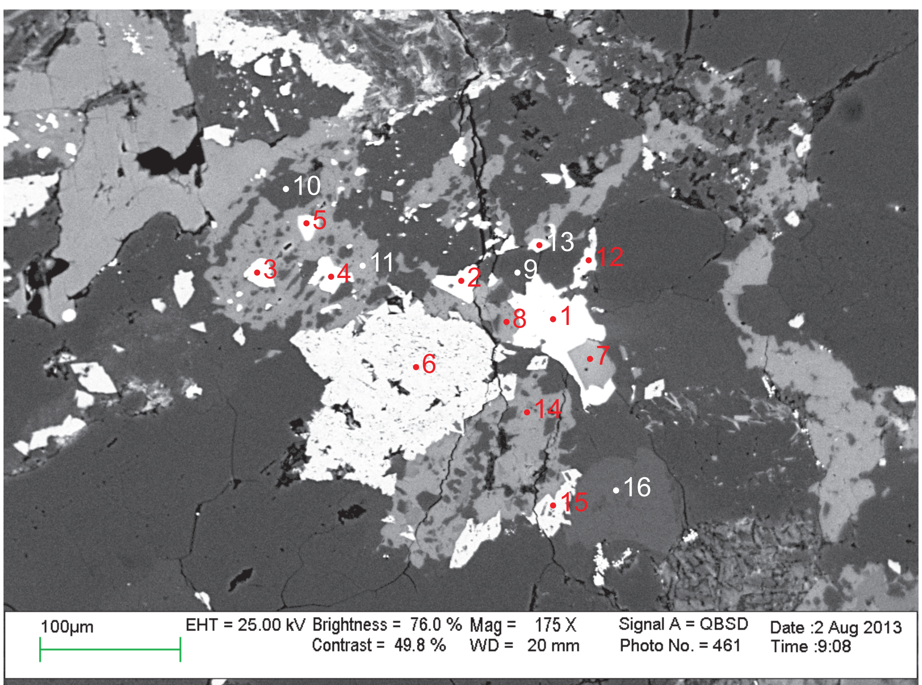
1. Barite
2. Barite
3. Barite
4. Chlorite
5. Quartz
6. Pyrite
7. Siderite
8. Pyrite
9. Siderite + K-feldspar
10. Fe-Calcite

Figure 12: M-41 5296.24 m. site 12(SEM). Diagenetic barite (1), pyrite (6), siderite (7) and chlorite (4) fill pore spaces, mostly along intergranular boundaries.



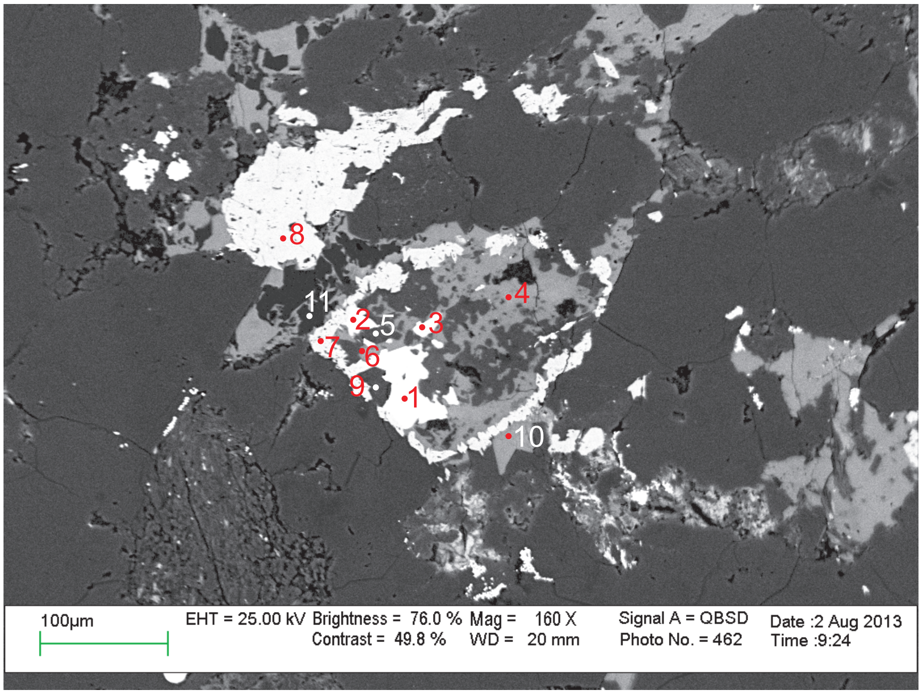
1. Barite
2. Barite
3. Siderite + Pyrite
4. Albite
5. Barite
6. Quartz
7. Fe-Calcite
8. Siderite
9. Kaolinite
10. Albite
11. Albite
12. Albite

Figure 13: M-41 5296.24 m. site 13(SEM). Similar to Fig. 9.



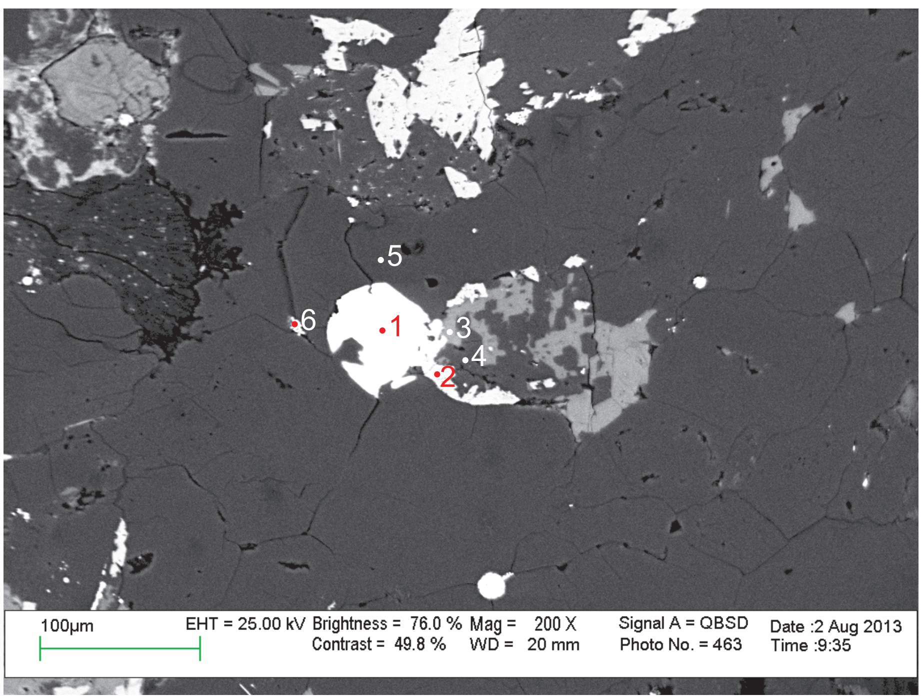
1. Barite
2. Barite
3. Barite
4. Barite
5. Barite
6. Siderite + Apatite
7. Fe-Calcite
8. Fe-Calcite
9. Albite
10. Albite
11. Fe-Calcite
12. Barite + Siderite
13. Barite
14. Fe-Calcite
15. Siderite
16. Albite

Figure 14: M-41 5296.24 m. site 14(SEM). Similar to Fig.9.



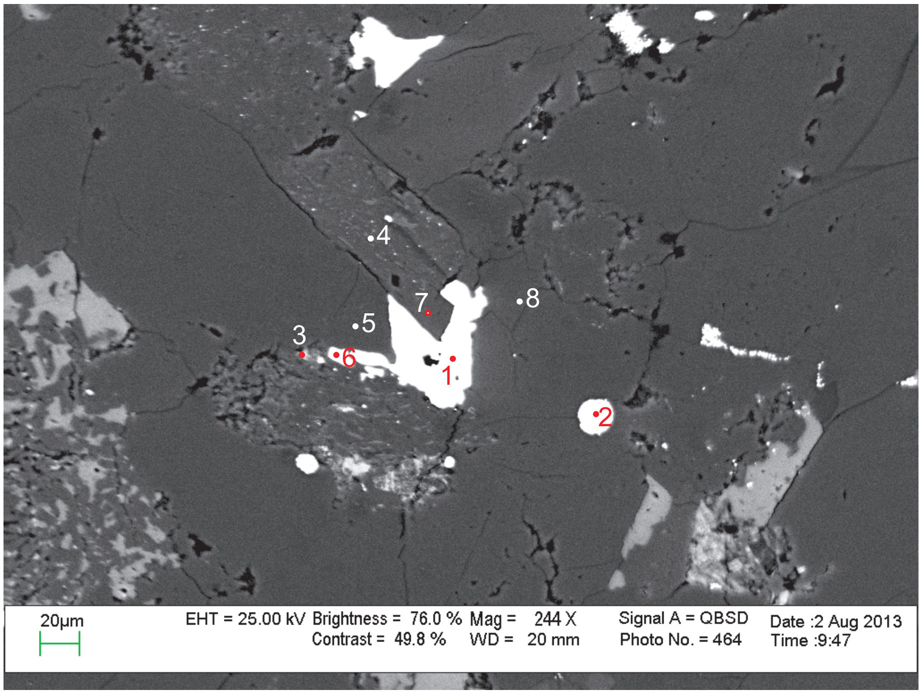
1. Barite
2. Barite
3. Barite
4. Fe-Calcite
5. Albite
6. Fe-Calcite
7. Siderite
8. Siderite
9. Albite
10. Fe-Calcite
11. Albite

Figure 15: M-41 5928.37 m. site 15(SEM). Diagenetic barite (1-3) and late siderite (7,8) engulf albite (5) or Fe-calcite (4) and Fe-calcite has partially replaced feldspars.



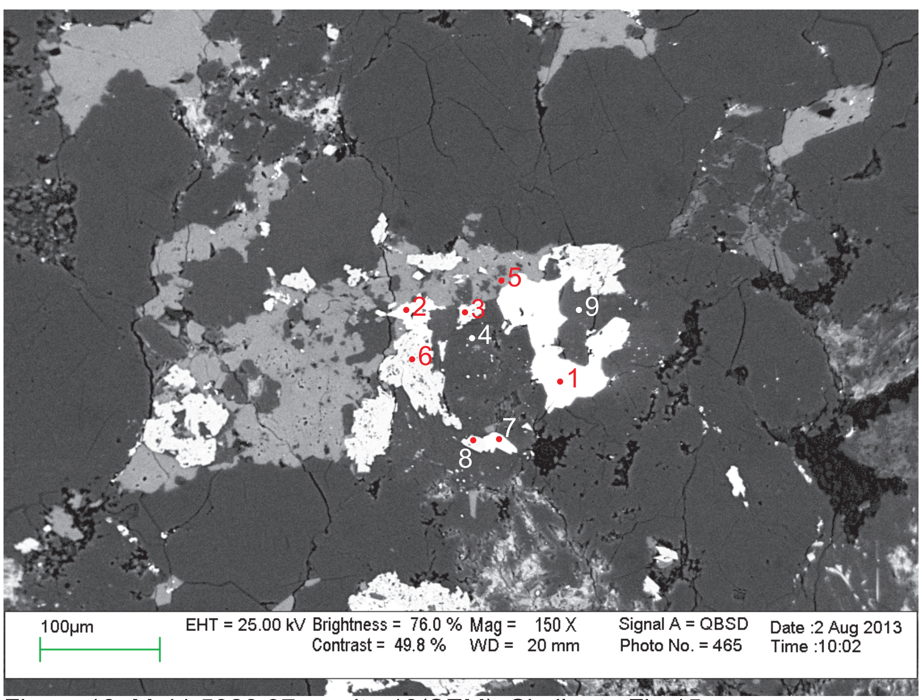
1. Barite
2. Siderite
3. Fe-Calcite + Albite
4. Albite
5. Quartz
6. Pyrite

Figure 16: M-41 5928.37 m. site 16(SEM). Similar to Fig. 15. Late pyrite (6) also present along intergranular boundaries.



1. Barite
2. Pyrite
3. Chlorite
4. Albite
5. Quartz
6. Barite
7. Albite
8. Quartz

Figure 17: M-41 5928.37 m. site 17(SEM). Diagenetic barite (1), and chlorite (3) engulf partially altered albite (4,7).



1. Barite
2. Barite
3. Siderite + K-feldspar
4. Albite
5. Fe-Calcite
6. Siderite
7. Barite
8. Siderite
9. Albite

Figure 18: M-41 5928.37 m. site 18(SEM). Similar to Fig.15.

Table A: Scanning Electron Microscope chemical analyses of sample 5928.37 from the Tantallon M-41 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	NiO	ZnO	As_2O_3	ZrO_2	Nb_2O_5	SnO_2	BaO	Yb_2O_3	WO_3	Total	Actual Total
M-41 5928.37	1	1	Sph	0.56			1.94							51.09				46.42								100.01	178.45
M-41 5928.37	1	2	Sph	0.68			4.17		0.70					48.64				45.81								100.00	166.49
M-41 5928.37	1	3	Sph	1.13		0.36	5.65		0.56	0.21				48.42				43.67								100.00	161.06
M-41 5928.37	1	4	Sph	10.57		3.14	1.88							45.57				38.84								100.00	160.37
M-41 5928.37	1	5	Sph	0.79		0.36	8.79		2.16	0.35				44.87				42.69								100.01	150.69
M-41 5928.37	1	6	Sd	2.43		0.73	43.10	0.83	5.97	2.51	0.43															56.00	60.11
M-41 5928.37	1	7	Py	0.28			28.35							71.37												100.00	209.39
M-41 5928.37	1	8	Qz	90.19		2.57	5.78		0.32	0.49	0.42	0.25														100.02	110.56
M-41 5928.37	1	9	Fe-Cal+Brt+Kfs	18.23		5.82	6.52		0.55	59.97	1.19	2.30		2.32				0.40					2.74			100.04	66.53
M-41 5928.37	1	10	Ab	67.73		19.54	0.30			0.42	11.37	0.64														100.00	113.73
M-41 5928.37	1	11	Chl	34.75		19.13	21.77		8.22	0.37	0.55	0.22														85.00	85.14
M-41 5928.37	1	12	Sd	3.28		1.13	40.84	0.71	6.62	2.50	0.92															56.00	62.73
M-41 5928.37	1	13	Chl+Qz	69.91		16.87	8.26		1.72		0.31	1.92		0.6				0.4								99.99	100.21
M-41 5928.37	1	14	Qz	99.99																						99.99	115.88
M-41 5928.37	1	15	Qz	99.30			0.33															0.37				100.00	117.16
M-41 5928.37	1	16	Kln	48.62		36.30	0.80				0.28															86.00	95.46
M-41 5928.37	1	17	Sd				45.14	0.67	8.55	1.64																56.00	56.59
M-41 5928.37	1	18	Py	0.30			29.73				1.11	0.12		68.74												100.00	173
M-41 5928.37	1	19	Ab	67.56	0.70	19.39	0.44			0.27	11.08	0.58														100.02	112.6
M-41 5928.37	2	1	Brt	1.03										37.41									61.57			100.01	102.85
M-41 5928.37	2	2	Brt	0.90										37.96									61.15			100.01	106.6
M-41 5928.37	2	3	Fe-Cal+Chl	8.83		3.99	3.51		0.9	82.75																99.98	55.19
M-41 5928.37	2	4	Fe-Cal	1.18			1.69		0.37	52.76																56.00	51.05
M-41 5928.37	2	5	Qz	91.56		4.18	3.20		0.65			0.41														100.00	108.85
M-41 5928.37	2	6	Sd	2.01		0.63	43.01	0.83	6.72	2.81																56.00	57.81
M-41 5928.37	2	7	Sd+Chl	4.24		0.96	77.01	1.2	12.83	3.78																100.02	58.65
M-41 5928.37	2	8	Qz	99.99																						99.99	113.74
M-41 5928.37	2	9	Qz	92.76		0.64	0.15			6.45																100.00	105.69
M-41 5928.37	2	10	Fe-Cal				2.23		0.52	52.56														0.69		56.00	49.12
M-41 5928.37	2	11	Py	3.40		1.13	39.35	0.34	2.52	0.77	0.86			51.61												99.98	123.23
M-41 5928.37	2	12	TiO_2	1.52	78.43	1.34	14.96	0.80		0.28	2.01			0.67												100.01	95.62
M-41 5928.37	2	13	Py+Ab	21.80		6.41	18.22			0.73	4.22	0.23		47.64			0.18		0.57							100.00	146.92
M-41 5928.37	2	14	Sd				44.65	0.68	9.00	1.66																56.00	53.31
M-41 5928.37	2	15	Py	0.28			28.66				0.27			70.79												100.00	181.73
M-41 5928.37	2	16	Sd+Ap+Chl	2.99	0.75	1.38	70.43	1.43	11.19	7.81		0.28	3.74													100.00	57.77
M-41 5928.37	2	17	Qz	94.51		3.02	0.93		0.68			0.86														100.00	99.72
M-41 5928.37	3	1	Sph				0.60			0.36				51.64				47.39								99.99	168
M-41 5928.37	3	2	Sd				44.84	0.82	7.50	2.84																56.00	56.05
M-41 5928.37	3	3	Fe-Cal	4.25		1.24	1.00			48.62	0.49	0.40														56.00	54.14
M-41 5928.37	3	4	Ab	68.26		19.27	1.14				11.31															99.98	111.38
M-41 5928.37	3	5	Py	5.09		2.06	26.94			0.14	1.44			64.35												100.02	172.15
M-41 5928.37	3	6	Sd	3.11		0.50	38.95	0.78	6.20	6.08		0.37														56.00	59.22
M-41 5928.37	3	7	Qz	99.64		0.36																				100.00	111.94
M-41 5928.37	3	8	Sd	1.16			43.86	0.84	7.00	3.14																56.00	57.28

Table A: Scanning Electron Microscope chemical analyses of sample 5928.37 from the Tantallon M-41 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	NiO	ZnO	As_2O_3	ZrO_2	Nb_2O_5	SnO_2	BaO	Yb_2O_3	WO_3	Total	Actual Total
M-41 5928.37	3	9	Chl	34.27		20.96	23.04		4.97	0.36	0.64	0.48				0.27										85.00	82.65
M-41 5928.37	4	1	Brt											36.33									63.67			100.00	93.54
M-41 5928.37	4	2	Brt	0.88										37.81									61.33			100.02	104.4
M-41 5928.37	4	3	Brt	0.62										37.93									61.47			100.02	103.1
M-41 5928.37	4	4	Py	0.34			28.23				1.20			70.22												99.99	180.12
M-41 5928.37	4	5	Qz	99.99																						99.99	110
M-41 5928.37	4	6	Py	3.12		0.26	27.26				0.59			68.74												99.97	172.89
M-41 5928.37	4	7	Kln	49.74		35.09	0.57			0.21	0.23	0.16														86.00	87.79
M-41 5928.37	4	8	Chl	28.64		20.10	28.63	0.64	6.99																	85.00	89.51
M-41 5928.37	4	9	Rt	1.16	96.76	0.62	1.45																			99.99	75.82
M-41 5928.37	4	10	Kln	49.03		36.97																				86.00	91.03
M-41 5928.37	4	11	Ap							47.74			44.32		7.90										0.05	100.01	99.19
M-41 5928.37	4	12	Rt	0.81	96.41		0.98			0.28											1.52					100.00	99.79
M-41 5928.37	5	1	Sph	0.28			0.37							51.46				47.88								99.99	165.45
M-41 5928.37	5	2	Sph				0.44							51.59				47.98								100.01	164.42
M-41 5928.37	5	3	Ab	68.84		18.86	0.17			0.20	11.82	0.13														100.02	107.96
M-41 5928.37	5	4	Sd	0.49			44.42	0.65	8.82	1.28								0.34								56.00	54.94
M-41 5928.37	5	5	Cal+Kfs	56.28		14.83	0.35			19.98	1.21	7.35														100.00	86.02
M-41 5928.37	5	6	Qz	99.99																						99.99	111.35
M-41 5928.37	5	7	Sd				45.56	0.82	8.01	1.61																56.00	54.16
M-41 5928.37	6	1	Brt											37.96									62.04			100.00	98.42
M-41 5928.37	6	2	Sd+Py+Chl	6.44		1.93	68.49	0.96	10.81	1.06	2.01			8.32												100.02	64.28
M-41 5928.37	6	3	Sd+Kfs	34.65		5.74	48.55	0.94	5.09	2.46		2.54														99.97	69.1
M-41 5928.37	6	4	Fe-Cal	5.85		0.30	1.60		0.41	47.24														0.61		56.00	52.79
M-41 5928.37	6	5	Sd	2.62		0.72	43.15	0.67	7.55	1.30																56.00	55.35
M-41 5928.37	6	6	Py	2.22			28.78			0.39	0.73			67.90												100.02	172.5
M-41 5928.37	6	7	Py	2.25		0.55	28.28				0.54			68.37												99.99	165.25
M-41 5928.37	6	8	Qz	99.99																						99.99	104.26
M-41 5928.37	6	9	Ab	68.99		18.90					12.12															100.01	104.65
M-41 5928.37	6	10	Ab	69.29		18.67					12.03															99.99	105.36
M-41 5928.37	6	11	Fe-Cal	2.05			1.46	0.22		52.27																56.00	47.16
M-41 5928.37	7	1	Brt	2.85		1.06					0.71			36.16									59.25			100.03	101.09
M-41 5928.37	7	2	Brt+Ab	30.80		9.67				0.21	5.70			20.00									33.61			99.99	113.46
M-41 5928.37	7	3	Cal+Ab	8.45		2.15	1.44			83.52	1.74				2.71											100.01	51.53
M-41 5928.37	7	4	Ab	69.22		18.71					12.05															99.98	103.41
M-41 5928.37	7	5	Ms	46.72	0.73	34.23	0.72		0.42		1.33	8.86														93.00	92.83
M-41 5928.37	7	6	Kln	49.05		36.95																				86.00	84.73
M-41 5928.37	7	7	Sd	2.25		1.13	43.16	0.64	7.27	1.55																56.00	53.93
M-41 5928.37	7	8	Qz	99.99																						99.99	101.12
M-41 5928.37	7	9	TiO_2	24.13	74.00		1.88																			100.01	92.1
M-41 5928.37	8	1	Brt											37.96									62.06			100.02	92.88
M-41 5928.37	8	2	Cal				0.74			55.26																56.00	43.01
M-41 5928.37	8	3	Ab	64.03		17.42				6.45	11.69												0.42			100.01	96.63
M-41 5928.37	8	4	Qz	99.99																						99.99	100.52

Table A: Scanning Electron Microscope chemical analyses of sample 5928.37 from the Tantallon M-41 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	NiO	ZnO	As_2O_3	ZrO_2	Nb_2O_5	SnO_2	BaO	Yb_2O_3	WO_3	Total	Actual Total
M-41 5928.37	8	5	Kln	49.10		36.90																				86.00	80.87
M-41 5928.37	8	6	Sd+Chl	2.42		0.74	77.54	1.64	12.64	5.04																100.02	50.34
M-41 5928.37	8	7	Py				28.16			0.38	0.31			71.14												99.99	174.48
M-41 5928.37	8	8	Ms	47.18	0.26	34.46	0.81		0.38		1.08	8.83														93.00	92.12
M-41 5928.37	8	9	Sd+Ab	11.38		1.32	71.99	1.33	10.36	2.85	0.77															100.00	54.13
M-41 5928.37	8	10	Zrn+Ms	46.33		27.06	1.35		0.35		0.54	3.95								20.44						100.02	82.55
M-41 5928.37	8	11	Py	7.77		0.21	27.21				0.23	0.12		64.47												100.01	153.63
M-41 5928.37	8	12	Sd+Qz	20.13		0.72	63.36	1.3	9.45	5.04																100	57.45
M-41 5928.37	8	13	Kln	49.07		36.93																				86.00	81.09
M-41 5928.37	8	14	Kln	49.33		35.15						1.52														86.00	79.12
M-41 5928.37	9	1	Brt	0.49						0.63				37.43									61.46			100.01	91.84
M-41 5928.37	9	2	Cal+Kfs	15.25		4.46	1.38			75.58	0.57	2.77														100.01	51.63
M-41 5928.37	9	3	Ab	69.20		18.71				0.18	11.92															100.01	95.2
M-41 5928.37	9	4	Sd	2.59		0.60	42.58	0.90	6.46	2.45		0.42														56.00	50.57
M-41 5928.37	9	5	Kln	48.66		37.34																				86.00	78.42
M-41 5928.37	9	6	Py	2.65			26.75			3.96	0.47			66.20												100.03	142.5
M-41 5928.37	9	7	Ab	69.48		18.63					11.89															100.00	92.58
M-41 5928.37	9	8	Ab+Cal	43.87		12.19	0.49			33.13	10.33															100.01	74.02
M-41 5928.37	10	1	Brt							0.36				37.58									62.05			99.99	88.02
M-41 5928.37	10	2	Brt							0.45				37.83									61.74			100.02	87.01
M-41 5928.37	10	3	Fe-Cal	1.78		1.19	1.10			51.94																56.00	42.5
M-41 5928.37	10	4	Ab	68.88		19.14				0.20	11.77															99.99	91.95
M-41 5928.37	10	5	Ab	66.53		18.18					11.74			1.25									2.30			100.00	91.87
M-41 5928.37	10	6	Kln	46.77		35.53				3.71																86.00	77.32
M-41 5928.37	10	7	Qz	99.41		0.59																				100.00	92.69
M-41 5928.37	10	8	Sd+Chl	3.62		1.16	41.57	0.88	6.09	2.42		0.25														56.00	49.2
M-41 5928.37	10	9	Brt	2.01		0.43				0.62				36.83									60.12			100.01	89.45
M-41 5928.37	10	10	Py	0.19			28.28			0.36	0.66			70.49												99.98	161.87
M-41 5928.37	10	11	Qz	99.99																						99.99	90.81
M-41 5928.37	10	12	Sd+Kfs	13.05		3.25	62.25	0.98	9.55	7.58		3.34														100.00	51.05
M-41 5928.37	10	13	Kln	48.98		35.79	0.54				0.40	0.28														86.00	69.34
M-41 5928.37	11	1	Brt							0.52				37.88									61.63			100.03	84.98
M-41 5928.37	11	2	Fe-Cal	0.65			1.01			53.33		0.14		0.87												56.00	41.04
M-41 5928.37	11	3	Cal+Ab	43.87		34.24	0.77			19.17	0.38			1.57												100.00	72.62
M-41 5928.37	11	4	Py	9.28		2.53	22.49			4.90	2.01			58.81												100.02	131.3
M-41 5928.37	11	5	Sd	1.84		0.53	43.74	0.80	6.26	2.08	0.74															56.00	46.67
M-41 5928.37	11	6	Sd	0.76			45.08	0.69	7.50	1.78		0.19														56.00	45.22
M-41 5928.37	11	7	Qz	99.79			0.21																			100.00	90.58
M-41 5928.37	11	8	Brt	7.08		5.08	0.45			8.16	0.77			30.21									48.25			100.00	81.99
M-41 5928.37	11	9	Brt	15.10		13.64	0.51			1.83				27.12									41.78			99.98	85.57
M-41 5928.37	11	10	Cal+Ab	42.70		29.00	0.67			24.14	1.08			0.75	1.69											100.03	67.93
M-41 5928.37	11	11	Py	0.62			27.90			0.25				71.24												100.01	164.81
M-41 5928.37	11	12	Ab+Cal	64.43		17.74	1.09			3.16	11.31			2.25												99.98	87.97
M-41 5928.37	11	13	Fe-Cal	2.54		0.76	1.22			51.48																56.00	40.16

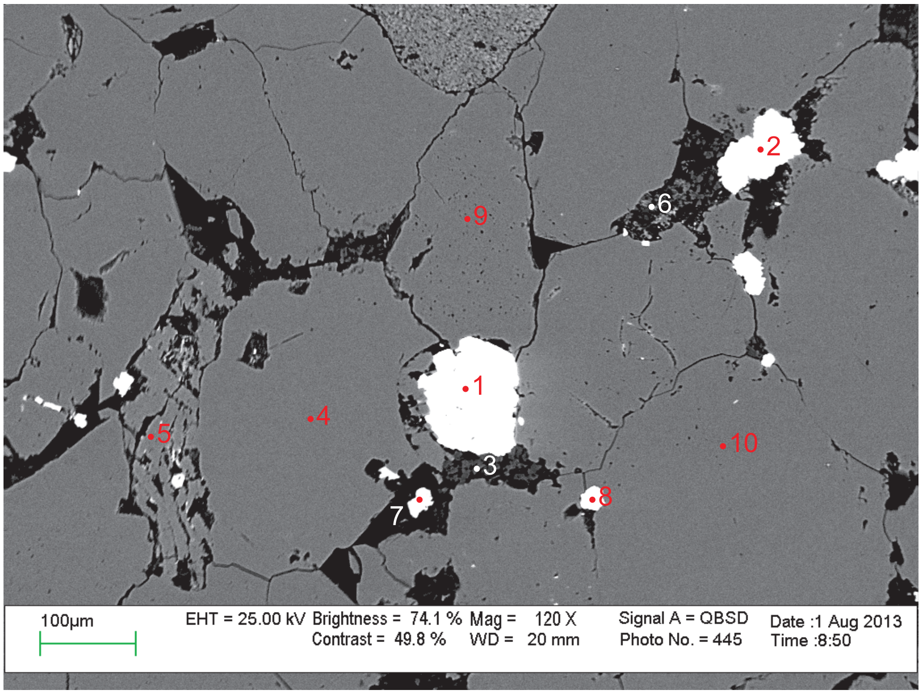
Table A: Scanning Electron Microscope chemical analyses of sample 5928.37 from the Tantallon M-41 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	NiO	ZnO	As_2O_3	ZrO_2	Nb_2O_5	SnO_2	BaO	Yb_2O_3	WO_3	Total	Actual Total
M-41 5928.37	11	14	Sd	0.45			44.68	0.77	7.69	2.41																56.00	45.35
M-41 5928.37	11	15	Qz+Kfs	81.37	0.80	10.86	1.87		1.38		0.38	3.34														100.00	79.8
M-41 5928.37	12	1	Brt	1.35										36.93									61.75			100.03	82.78
M-41 5928.37	12	2	Brt											37.96									62.05			100.01	83.87
M-41 5928.37	12	3	Brt	0.94										37.38									61.68			100.00	83.16
M-41 5928.37	12	4	Chl	29.26	0.36	21.70	29.58		4.11																	85.00	73.57
M-41 5928.37	12	5	Qz	99.99																						99.99	88.93
M-41 5928.37	12	6	Py+Qz	10.52			24.79							64.67												99.98	148.26
M-41 5928.37	12	7	Sd+Chl	3.91		1.06	77.96	1.05	13.46	2.56																100	45.56
M-41 5928.37	12	8	Py	21.76		7.27	23.85		0.90			0.18		46.02												99.98	114.88
M-41 5928.37	12	9	Sd+Kfs	35.45		23.94	30.30		7.23	1.30		1.79														100.01	65.38
M-41 5928.37	12	10	Fe-Cal	1.34		0.72	1.56		0.42	51.96																56.00	38.1
M-41 5928.37	13	1	Brt											38.06									61.95			100.01	97.9
M-41 5928.37	13	2	Brt											37.48									62.52			100.00	95.53
M-41 5928.37	13	3	Sd+Py+Chl	11.27		3.33	63.45	0.89	11.19	4.41		0.57		4.89												100.00	60.7
M-41 5928.37	13	4	Ab	69.37		18.52					12.12															100.01	104.12
M-41 5928.37	13	5	Brt	0.79			1.65							39.45				4.61					53.52			100.02	99.71
M-41 5928.37	13	6	Qz	99.99																						99.99	104.99
M-41 5928.37	13	7	Fe-Cal				1.39	0.24		54.37																56.00	46.54
M-41 5928.37	13	8	Sd				44.83	0.73	9.21	1.23																56.00	52.34
M-41 5928.37	13	9	Kln	44.94		34.83	5.34		0.89																	86.00	84.62
M-41 5928.37	13	10	Ab	69.20		18.52				0.36	11.92															100.00	104.16
M-41 5928.37	13	11	Ab	68.86		19.07					11.93	0.13														99.99	101.97
M-41 5928.37	13	12	Ab	65.07		21.28	0.90			2.27	9.28	1.19														99.99	101.08
M-41 5928.37	14	1	Brt											37.08									62.93			100.01	94.4
M-41 5928.37	14	2	Brt							0.31				37.58									62.12			100.01	96.58
M-41 5928.37	14	3	Brt							0.69				37.61									61.73			100.03	94.57
M-41 5928.37	14	4	Brt							0.46				38.33									61.21			100.00	94.27
M-41 5928.37	14	5	Brt							0.92				37.68									61.39			99.99	94.51
M-41 5928.37	14	6	Sd+Ap+Chl	9.90		2.97	62.02	1.20	9.82	8.09	1.94		4.06													100.00	59.41
M-41 5928.37	14	7	Fe-Cal				1.13			54.87																56.00	45.27
M-41 5928.37	14	8	Fe-Cal				1.64	0.27	0.34	53.75																56.00	44.56
M-41 5928.37	14	9	Ab	69.18		18.78					12.04															100.00	102.43
M-41 5928.37	14	10	Ab	68.95		18.61				0.22	12.23															100.01	101.21
M-41 5928.37	14	11	Fe-Cal	3.58		0.74	1.10			50.15		0.43														56.00	47.3
M-41 5928.37	14	12	Brt+Sd	3.70		0.57	16.53		1.46	0.98				29.91									46.87			100.02	80.13
M-41 5928.37	14	13	Brt							0.62				38.50									60.91			100.03	96.17
M-41 5928.37	14	14	Fe-Cal	2.16		0.77	1.10			51.54		0.43														56.00	46.99
M-41 5928.37	14	15	Sd	1.23		0.43	44.63	0.65	7.83	1.04		0.19														56.00	53.56
M-41 5928.37	14	16	Ab	63.17		22.98				4.58	9.13	0.14														100.00	102.83
M-41 5928.37	15	1	Brt											37.93									62.09			100.02	97.84
M-41 5928.37	15	2	Brt	1.03			0.48							37.78									60.76			100.05	92.45
M-41 5928.37	15	3	Brt	5.48		2.02					0.59	0.37		34.71									56.85			100.02	102.88
M-41 5928.37	15	4	Fe-Cal	0.53			1.09			54.39																56.00	46.04

Table A: Scanning Electron Microscope chemical analyses of sample 5928.37 from the Tantallon M-41 well.

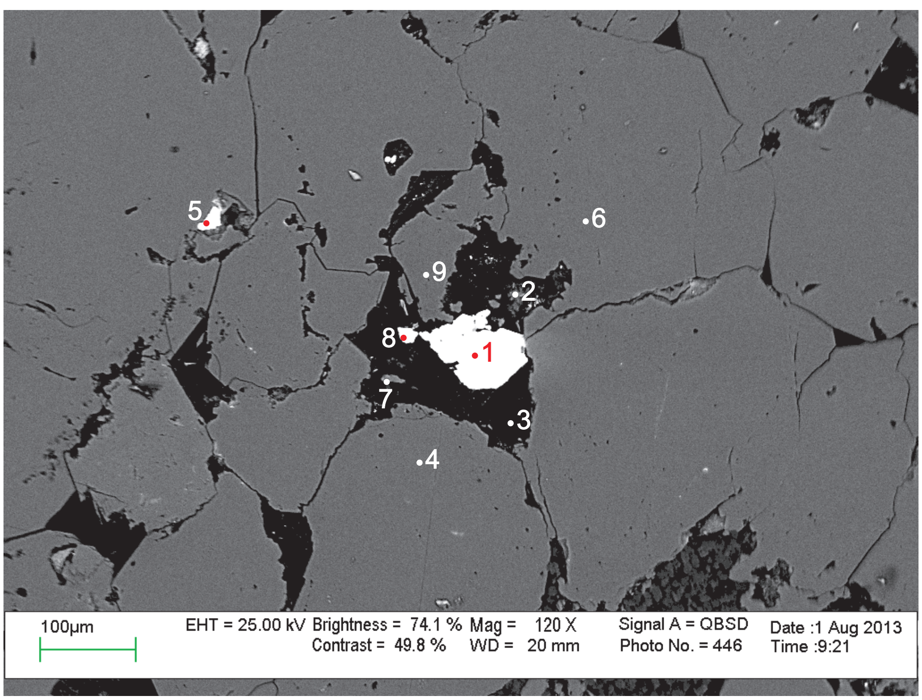
Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	NiO	ZnO	As_2O_3	ZrO_2	Nb_2O_5	SnO_2	BaO	Yb_2O_3	WO_3	Total	Actual Total
M-41 5928.37	15	5	Ab	69.16		18.73					12.11															100.00	102.26
M-41 5928.37	15	6	Fe-Cal+Chl	8.13		2.4	4.04			83.74		1.69														100	49
M-41 5928.37	15	7	Sd+Chl	5.82		1.53	75.07	1.33	11.39	4.27		0.6														100.01	53.27
M-41 5928.37	15	8	Sd	0.96			44.22	0.80	7.27	2.76																56.00	51.32
M-41 5928.37	15	9	Ab	69.20		18.78					12.01															99.99	100.68
M-41 5928.37	15	10	Fe-Cal				2.39		0.44	52.45														0.72		56.00	45.36
M-41 5928.37	15	11	Ab	64.39		21.39				0.91	13.31															100.00	91.18
M-41 5928.37	16	1	Brt											38.18									61.84			100.02	94.6
M-41 5928.37	16	2	Sd	0.53			45.07	0.77	8.06	1.57																56.00	51.42
M-41 5928.37	16	3	Fe-Cal+Ab	6.01		1.70	1.74	0.39		88.65	1.52															100.01	47.33
M-41 5928.37	16	4	Ab	69.33		18.31				0.27	12.08															99.99	101.66
M-41 5928.37	16	5	Qz	99.99																						99.99	99.47
M-41 5928.37	16	6	Py	24.49			20.07							55.46												100.02	151.95
M-41 5928.37	17	1	Brt											38.11									61.91			100.02	
M-41 5928.37	17	2	Py	0.19			28.08							71.72												99.99	
M-41 5928.37	17	3	Chl	35.55		21.97	23.92		3.55																	85.00	
M-41 5928.37	17	4	Ab	64.82		22.84	0.60			0.32	8.57	2.84														99.99	
M-41 5928.37	17	5	Qz	99.99																						99.99	
M-41 5928.37	17	6	Brt	1.37										37.13									61.52			100.02	
M-41 5928.37	17	7	Ab	69.50		18.59					11.92															100.01	
M-41 5928.37	17	8	Qz	99.99																						99.99	
M-41 5928.37	18	1	Brt											38.11									61.91			100.02	
M-41 5928.37	18	2	Brt	2.18		0.60				0.36				36.26									60.59			99.99	
M-41 5928.37	18	3	Sd+Kfs	3.98		1.13	76.17	1.72	11.91	4.52		0.58														100.01	
M-41 5928.37	18	4	Ab	78.96		12.49	0.33				7.36	0.13		0.72												99.99	
M-41 5928.37	18	5	Fe-Cal	0.91		0.41	1.45	0.23		52.99																56.00	
M-41 5928.37	18	6	Sd	1.60		0.46	43.13	0.80	7.41	2.40		0.21														56.00	
M-41 5928.37	18	7	Brt+Qz	2.48										36.66									60.86			100.00	
M-41 5928.37	18	8	Sd+other	7.36		1.36	73.54	1.14	14.58	2.01																99.99	
M-41 5928.37	18	9	Ab	69.25		18.67					12.09															100.01	

Appendix 15: Scanning Electron Microscope Backscattered Electron Images for Thebaud C-74 3918.64 and Thebaud 5 4934.34



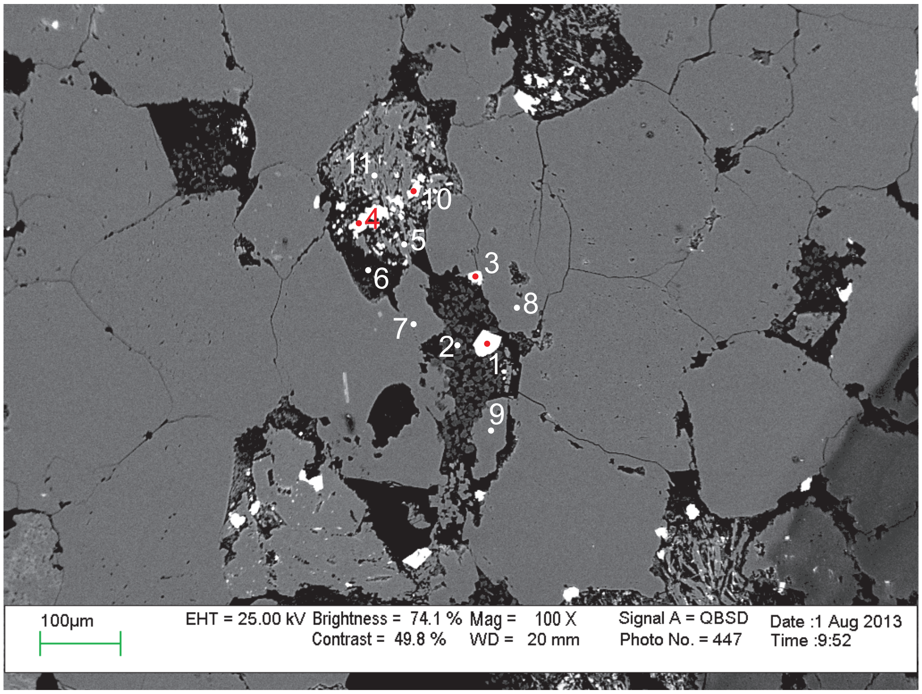
1. Barite
2. Pyrite
3. Kaolinite
4. Quartz
5. Albite
6. Chorite
7. Rutile
8. Pyrite
9. Quartz
10. Quartz

Figure 1: C-74 3918.64 m. site 2 (SEM). Diagenetic barite (1) fills dissolution voids and has probably partly replaced kaolinite (3). Pyrite (2), chlorite (6) and TiO_2 minerals (7) show the same mode of occurrence.



1. Barite
2. Chlorite
3. Mixture
4. Quartz
5. Pyrite
6. Quartz
7. Quartz
8. Pyrite
9. Quartz

Figure 2: C-74 3918.64 m. site 3 (SEM). Similar to Fig.1.

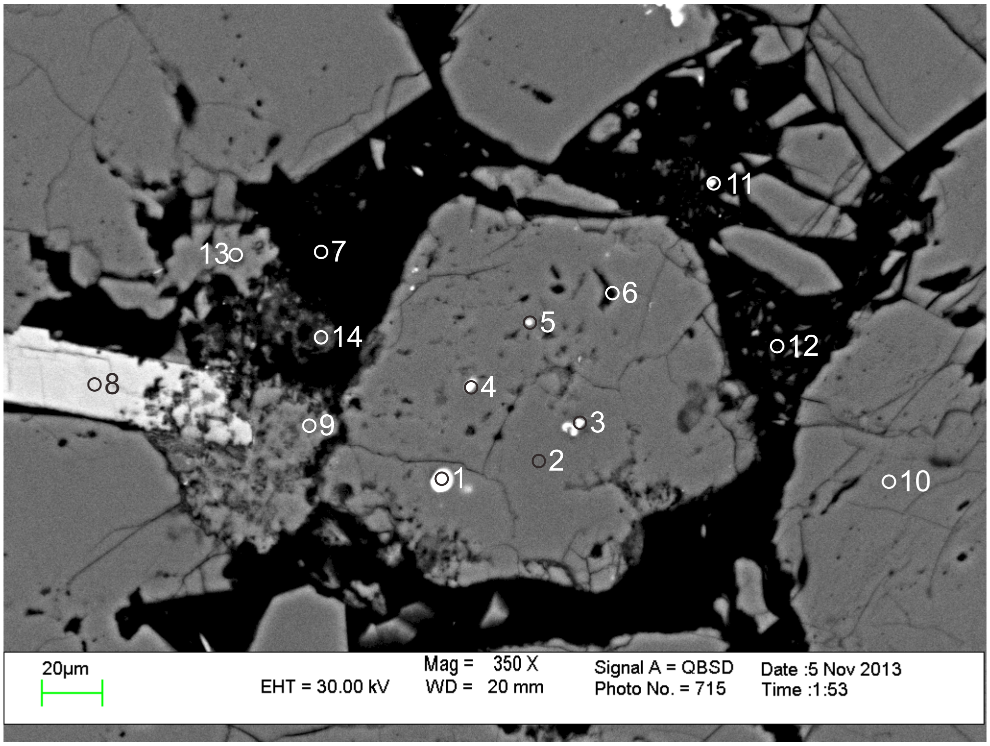


1. Sphalerite
2. Kaolinite
3. Rutile
4. Rutile
5. Albite + Apatite
6. K-feldspar + Pyrite + other
7. Quartz
8. Quartz
9. Quartz
10. Pyrite
11. Albite

Figure 3: C-74 3918.64 m. site 4 (SEM). Sphalerite (1), TiO_2 minerals (3,4), and pyrite fill dissolution voids, probably due to K-feldspar dissolution (6), and have partially replaced kaolinite.

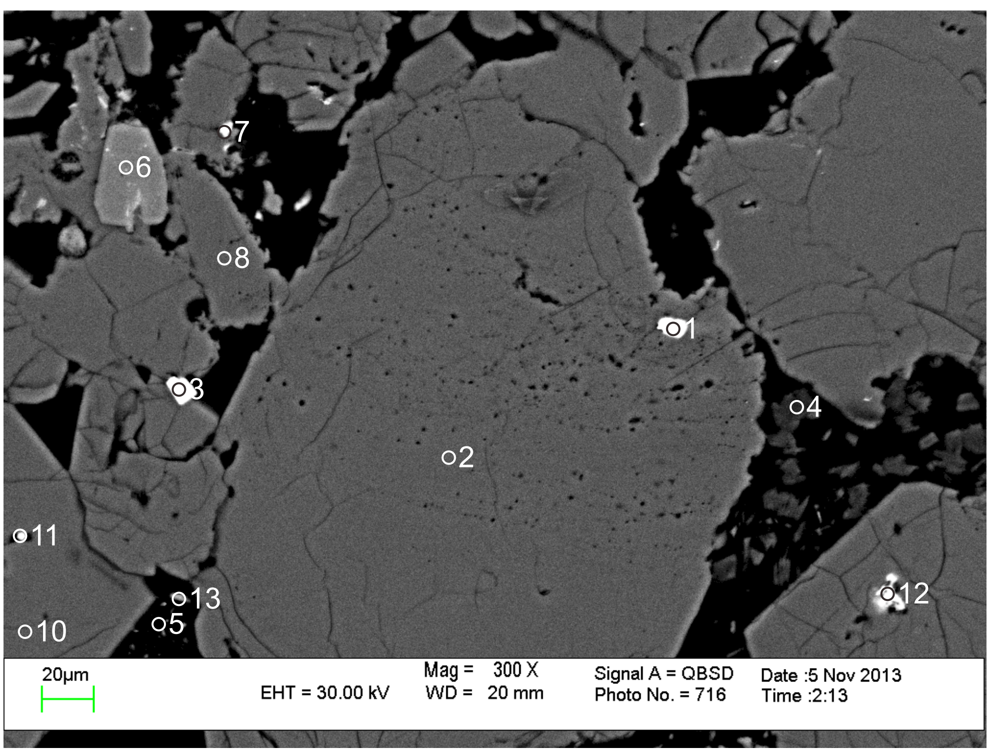
Table A-1: Scanning Electron Microscope chemical analyses of sample 3918.64 from the Thebaud C-74 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	CuO	ZnO	In_2O_3	BaO	Total
C-74 3918.64	2	1	Brt										38.43						61.57	100.00
C-74 3918.64	2	2	Py	0.17			25.10			4.73			69.99							99.99
C-74 3918.64	2	3	Kln	49.14		35.60				0.26				1.00						86.00
C-74 3918.64	2	4	Qz	99.99																99.99
C-74 3918.64	2	5	Ab	68.18		19.88	0.27			11.68										100.01
C-74 3918.64	2	6	Chl	36.28		24.64	16.87	3.47	0.90		2.49				0.35					85.00
C-74 3918.64	2	7	Rt	1.71	95.63	1.10	1.56													100.00
C-74 3918.64	2	8	Py				25.82			0.54			73.66							100.02
C-74 3918.64	2	9	Qz	99.99																99.99
C-74 3918.64	2	10	Qz	99.99																99.99
C-74 3918.64	3	1	Brt										40.30						59.71	100.01
C-74 3918.64	3	2	Chl	34.44	0.64	24.38	18.39	3.86	0.76	0.70	1.55				0.29					85.00
C-74 3918.64	3	3	Mix	61.12	0.77	10.96	4.68	4.48	3.67	5.34	1.04		4.44		2.62	0.89				100.01
C-74 3918.64	3	4	Qz	99.99																99.99
C-74 3918.64	3	5	Py	0.32			23.59			5.45			70.64							100.00
C-74 3918.64	3	6	Qz	99.99																99.99
C-74 3918.64	3	7	Qz	90.81		2.68	3.49	0.63		0.88					1.52					100.01
C-74 3918.64	3	8	Py	0.21			25.64						74.16							100.01
C-74 3918.64	3	9	Qz	99.99																99.99
C-74 3918.64	4	1	Sph	0.28			0.30						57.28				42.15			100.01
C-74 3918.64	4	2	Kln	49.25		36.75														86.00
C-74 3918.64	4	3	Rt	0.81	98.92		0.28													100.01
C-74 3918.64	4	4	Rt		97.40	0.72	1.89													100.01
C-74 3918.64	4	5	Ab+Ap	58.83		16.78	0.21		4.88	11.46		6.39		1.43						99.98
C-74 3918.64	4	6	Kfs+Py+other	47.75	1.78	28.46	11.39	2.93	0.83		3.97		1.05		1.84					100.00
C-74 3918.64	4	7	Qz	99.99																99.99
C-74 3918.64	4	8	Qz	99.99																99.99
C-74 3918.64	4	9	Qz	99.64														0.35		99.99
C-74 3918.64	4	10	Py	5.37		1.44	23.52		0.13	1.35			68.19							100.00
C-74 3918.64	4	11	Ab	67.81		18.95	0.40			12.83										99.99



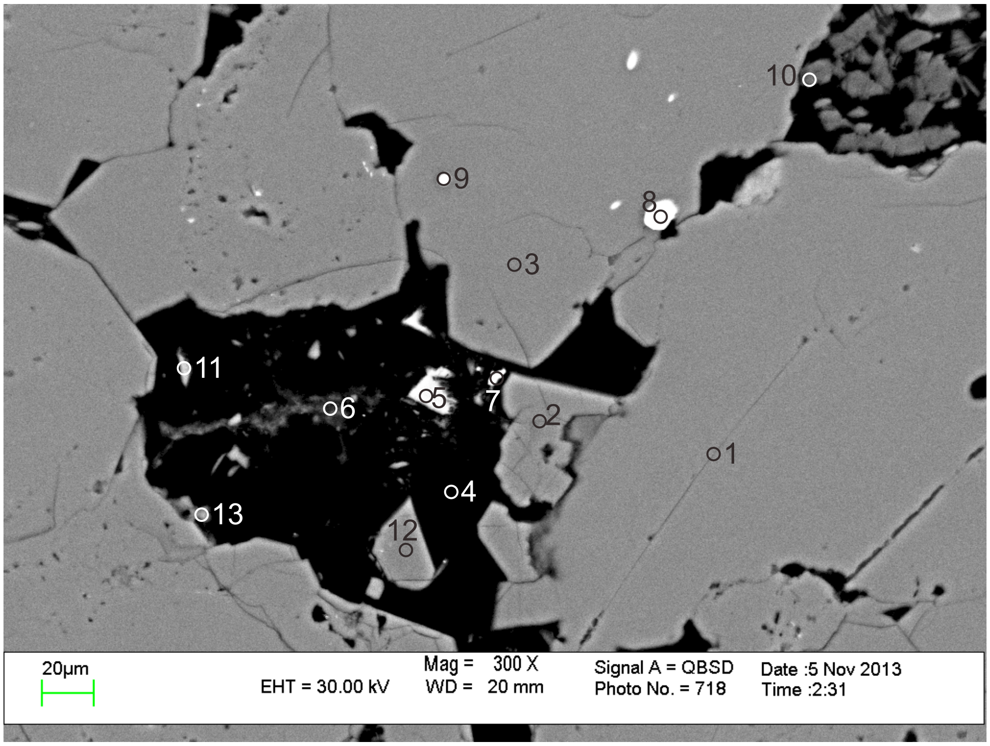
1: Barite+Quartz (inclusion in detrital quartz)
2: Quartz
3: Quartz+Pyrite
4: Barite+Quartz
5: Quartz
6: Quartz
7: mixture
8: Ankerite
9: Albite
10: Quartz
11: Pyrite+other
12: Quartz
13: Albite
14: mixture

Figure 1: Sample Thebaud 5 4934.34m site 1.



1: Galena (inclusion in detrital quartz)
2: Quartz
3: Rutile
4: Kaolinite
5: Quartz
6: Kaolinite
7: Kaolinite
8: Quartz
9: Quartz
10: Quartz
11: mixture
12: Siderite?+Quartz
13: Quartz

Figure 2: Sample Thebaud 5 4934.34m site 2.



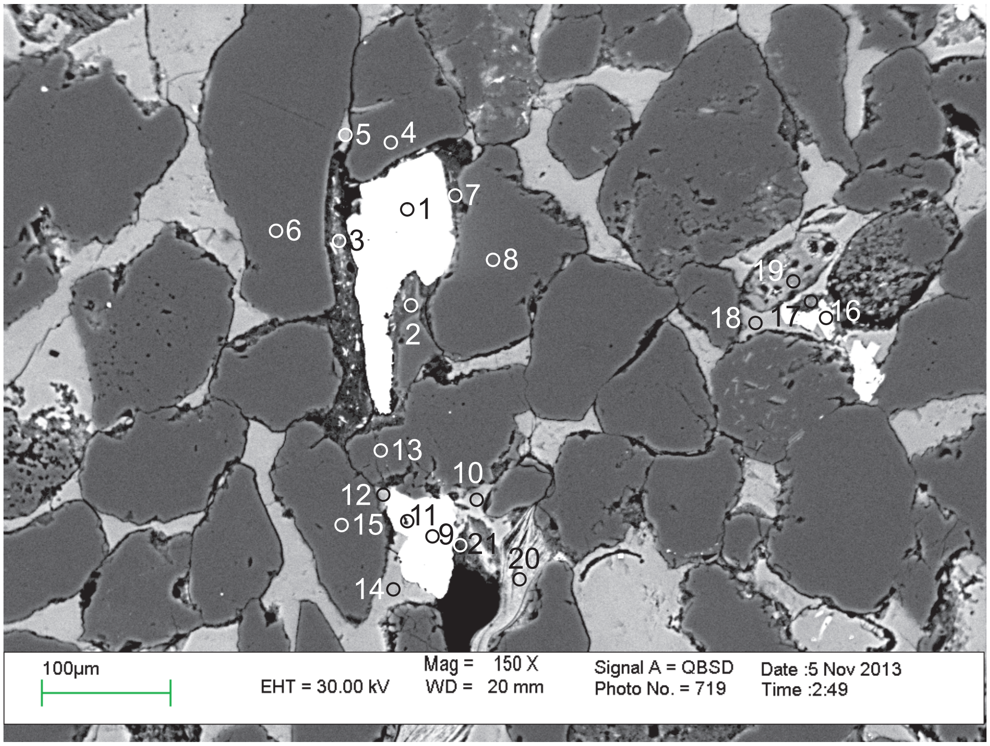
1: Quartz
2: Quartz
3: Quartz
4: mixture
5: Ankerite
6: Illite
7: ?Contaminant
8: Zircon
9: Zircon
10: Kaolinite
11: Quartz
12: Quartz
13: Quartz

Figure 3: Sample Thebaud 5 4934.34m site 3.

Table A-1 : Scanning Electron Microscope chemical analyses of sample 4934.34 from the Thebaud 5 well.

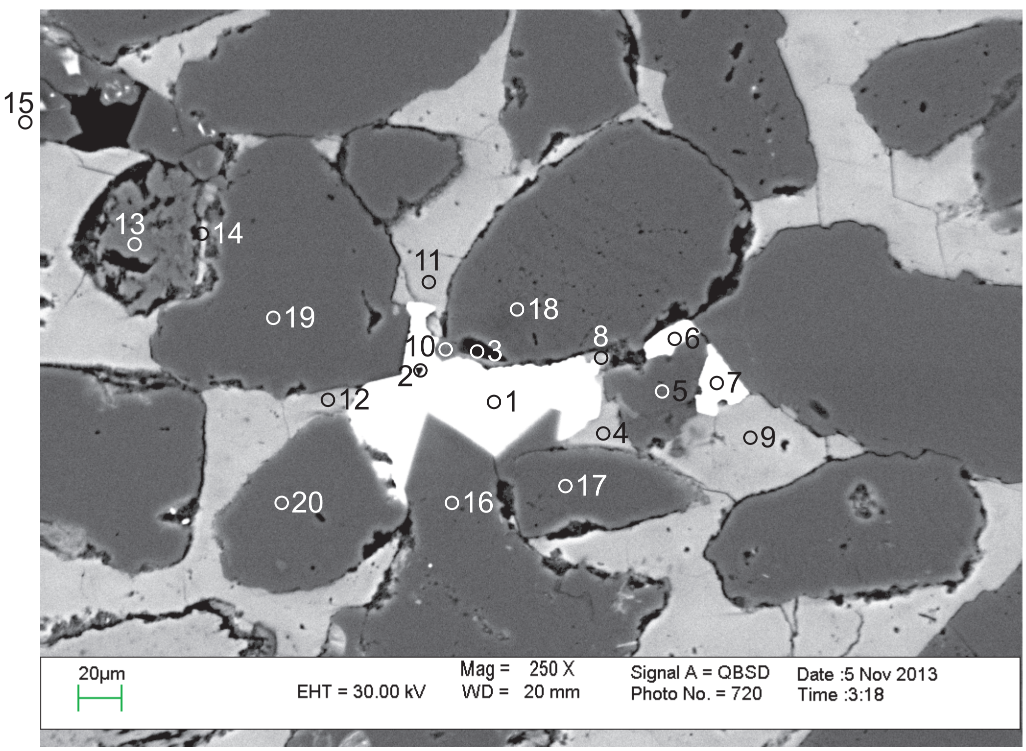
Sample	Site	Position	Mineral	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	SO3	F	Cl	NiO	CuO	SrO	ZrO2	BaO	HfO2	PbO	Total	Actual Total
Th5-11 4934.34	1	1	Brt+Qz	18.05									33.49					1.95		46.53			100.02	133.12
Th5-11 4934.34	1	2	Qz	99.99																			99.99	131.3
Th5-11 4934.34	1	3	Qz+Py	55.43			9.01				2.26	0.1	33.21										100.01	172.83
Th5-11 4934.34	1	4	Brt+Qz	63.64		1.28						0.19	13.93					0.84		20.11			99.99	164.04
Th5-11 4934.34	1	5	Qz	86.17		0.42							6.27							7.14			100	139.22
Th5-11 4934.34	1	6	Qz	98.64		0.59	0.3			0.34		0.12											99.99	111.27
Th5-11 4934.34	1	7	mix	33.31		5.05	0.39			18.48		1.07	33.34	5.73	2.63								100	42.48
Th5-11 4934.34	1	8	Ank	0.40			15.90	0.33	10.58	28.80													56.00	64.83
Th5-11 4934.34	1	9	Ab	66.36		21.07	0.18			0.18	10.52	1.7											100.01	130.86
Th5-11 4934.34	1	10	Qz	99.99																			99.99	133.06
Th5-11 4934.34	1	11	Py+other	40.11		2.08	14.85		0.45	0.34	0.67	0.46	41.05										100.01	118.37
Th5-11 4934.34	1	12	Qz	91.71	0.67	1.08	1.39			1.05		0.26	2.2	1.43	0.21								100	83.01
Th5-11 4934.34	1	13	Ab	67.23		21.16				0.13	10.45	1.04											100.01	125.29
Th5-11 4934.34	1	14	mix	21.18		7.27	0.32		0.63	24.64	0.51	2.16	40.05	2.48	0.78								100.02	94.99
Th5-11 4934.34	2	1	Galena	5.84			1.2						31.84									61.13	100.01	143.9
Th5-11 4934.34	2	2	Qz	99.99																			99.99	132.69
Th5-11 4934.34	2	3	Rt	2.82	96.15	0.43	0.59																99.99	113.6
Th5-11 4934.34	2	4	Kln	50.00		36.00																	86.00	108.47
Th5-11 4934.34	2	5	Qz	85.8	0.35	3.97	1.13		0.6	3.57		0.77	0.55	3.01	0.25								100	59.62
Th5-11 4934.34	2	6	Kln	40.00	0.79	29.77	5.92		6.89	0.00	2.63												86.00	110.21
Th5-11 4934.34	2	7	Kln	50.81	33.76	0.81	0.46					0.17											86.00	135.13
Th5-11 4934.34	2	8	Qz	99.99																			99.99	130.06
Th5-11 4934.34	2	9	Qz	99.99																			99.99	135.97
Th5-11 4934.34	2	10	Qz	99.99																			99.99	156.55
Th5-11 4934.34	2	11	mix	70.94			23.71	0.22	4.36	0.55					0.23								100.01	114
Th5-11 4934.34	2	12	Sd?+Qz	16.02		0.66	67.14	0.74	13.61	1.83													100	74.82
Th5-11 4934.34	2	13	Qz	99.37		0.62																	99.99	103.79
Th5-11 4934.34	3	1	QZ	99.99																			99.99	133.44
Th5-11 4934.34	3	2	Qz	99.99																			99.99	135.63
Th5-11 4934.34	3	3	Qz	99.99																			99.99	136.42
Th5-11 4934.34	3	4	mix	79.43		4.65	1.84		3.35	4.8	2.04	0.71	2.65		0.53								100	40.06
Th5-11 4934.34	3	5	Ank	1.10			15.66	0.33	11.68	27.08					0.15								56.00	62.58
Th5-11 4934.34	3	6	Ilt	47.51	0.49	22.40	3.63		1.39	1.90	0.53	5.25	1.57	4.34	0.67		0.31						90.00	73.92
Th5-11 4934.34	3	7	?contaminant	38.1	0.2	2.27	1.07			0.32	0.65	0.16	2.67		0.27	54.29							100	144.92
Th5-11 4934.34	3	8	Zrn	31.96															66.68		1.37		100.01	136.42
Th5-11 4934.34	3	9	Zrn	56.07															43.16		0.77		100	159.55
Th5-11 4934.34	3	10	Kln	53.54		32.32	0.00			0.15													86.00	102.35
Th5-11 4934.34	3	11	Qz	99.99																			99.99	132.39
Th5-11 4934.34	3	12	Qz	99.99																			99.99	133.61
Th5-11 4934.34	3	13	Qz	98.36		1.27						0.37											100	88.9

Appendix 16: Scanning Electron Microscope Backscattered Electron Images for Venture-4 5383.28–5383.54



1: Barite
2: Quartz
3: Chlorite+Apatite+Illite
4: Quartz
5: Calcite
6: Quartz
7: mixture
8: Quartz
9: Barite
10: Calcite
11: Barite+Chlorite?
12: Calcite
13: Quartz
14: Calcite
15: Quartz
16: Rutile
17: K-feldspar+other
18: Calcite
19: K-feldspar+Chlorite
20: Chlorite
21: Chlorite+Illite

Figure 1: Sample Venture 4 5383.28-5383.54m site 1.



1: Barite
2: Barite+Chlorite?
3: Quartz
4: Calcite
5: Quartz
6: Barite
7: Barite
8: Calcite+other
9: Calcite
10: Quartz
11: Calcite
12: Calcite
13: Albite
14: Calcite+Illite
15: Chlorite
16: Quartz
17: Quartz
18: Quartz
19: Quartz
20: Quartz

Figure 2: Sample Venture 4 5383.28-5383.54m site 2.

Table A: Scanning Electron Microscope chemical analyses of sample 5383.28-5383.54 from the Venture 4 well.

Sample	Site	Position	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	SO_3	F	Cl	ZnO	SrO	ZrO_2	BaO	B_2O_3	Total	Actual Total
venture 4 5383.28-5383.54	1	1	Brt	0.81										32.49						66.71		100.01	94.21
venture 4 5383.28-5383.54	1	2	Qz	91.19	0.38	3.8	3.01		1.28	0.32												99.98	119.55
venture 4 5383.28-5383.54	1	3	Chl+Ap+Ilt	23	0.6	17.4	14.99		4.1	15.1		1.04	18.51		4.82	0.45						100.01	108.74
venture 4 5383.28-5383.54	1	4	QZ	99.99																		99.99	129.34
venture 4 5383.28-5383.54	1	5	Cal	2.12			1.09	0.57	0.43	51.79												56.00	60.87
venture 4 5383.28-5383.54	1	6	Qz	99.99																		99.99	128.42
venture 4 5383.28-5383.54	1	7	mix	47.7	3	22.88	14.86		4.23	2.25		2.93	1.26	0.5		0.37						99.98	85.93
venture 4 5383.28-5383.54	1	8	QZ	99.99																		99.99	132.12
venture 4 5383.28-5383.54	1	9	Brt											21.9						36.78	41.33	100.01	208.39
venture 4 5383.28-5383.54	1	10	Cal	0.71			1.00	0.45		53.84												56.00	59.72
venture 4 5383.28-5383.54	1	11	Brt+Chl?	13.76		11.36	5.57		2.5	2.34	0.5	0.82	2.93	19.48						40.78		100.04	105.76
venture 4 5383.28-5383.54	1	12	Cal	4.13		0.53	1.25	0.55	0.34	47.16				0.73						1.32		56.00	65.25
venture 4 5383.28-5383.54	1	13	QZ	96.82	2.9		0.13			0.15												100	120.89
venture 4 5383.28-5383.54	1	14	Cal	0.43			1.23	0.65	0.41	53.28												56.00	59.28
venture 4 5383.28-5383.54	1	15	Qz	99.99																		99.99	129.19
venture 4 5383.28-5383.54	1	16	Rt	1.18	95.65	0.96	1.36			0.63									0.22			100	116.4
venture 4 5383.28-5383.54	1	17	Kfs+other	48.45	0.73	35.2	2.24		0.98	1.93	0.27	10				0.19						99.99	123.78
venture 4 5383.28-5383.54	1	18	Cal				1.04	0.43		54.54												56.00	60.89
venture 4 5383.28-5383.54	1	19	Kfs+Chl	52	0.4	31.2	5.13		1.49			9.76										99.98	122.55
venture 4 5383.28-5383.54	1	20	Chl	29.78	0.68	21.37	24.59		6.62	1.18	0.33	0.31				0.14						85.00	112.65
venture 4 5383.28-5383.54	1	21	Chl+Ilt	40	1.85	25.83	20.4		4.73	2.13	0.49	2.51		1		1.08						100.02	63.88
venture 4 5383.28-5383.54	2	1	Brt											22.07				0.95		38.43	38.59	100.04	194.14
venture 4 5383.28-5383.54	2	2	Brt+Chl?	14.53	3.2	11.85	11.69		3.18	0.63	0.55	0.47		13.91		0.35				39.61		99.97	77.09
venture 4 5383.28-5383.54	2	3	Qz	97.42			0.22		0.45	0.38	1.17			0.37								100.01	96.58
venture 4 5383.28-5383.54	2	4	Cal				0.92	0.67		54.40												56.00	60.25
venture 4 5383.28-5383.54	2	5	Qz	99.99																		99.99	133.23
venture 4 5383.28-5383.54	2	6	Brt	1.9						0.11				19.28			0.15			34.77	43.77	99.98	209.16
venture 4 5383.28-5383.54	2	7	Brt	6.46		0.62	0.28		0.48	0.48	0.92			26.97						63.81		100.02	99.28
venture 4 5383.28-5383.54	2	8	Cal+other	13.89		1.69	2.93	0.38	0.74	36.36												56.00	71.43
venture 4 5383.28-5383.54	2	9	Cal				1.15	0.74		54.11												56.00	62.89
venture 4 5383.28-5383.54	2	10	Qz	97.33			0.51							0.47						1.66		99.97	128.63
venture 4 5383.28-5383.54	2	11	Cal				1.04	0.64		54.33												56.00	60.37
venture 4 5383.28-5383.54	2	12	Cal	1.92			0.93	0.62		52.54												56.00	61.84
venture 4 5383.28-5383.54	2	13	Ab	65.42		21.39	0.26			2.7	10.25											100.02	128.48
venture 4 5383.28-5383.54	2	14	Cal+Ilt	18.24	1.39	9.57	6.29	0.15	1.55	16.94	1.04	0.82										56.00	86.24
venture 4 5383.28-5383.54	2	15	Chl	40.08		16.03	23.22	2.64	1.90	1.12												85.00	128.54
venture 4 5383.28-5383.54	2	16	QZ	99.99																		99.99	136.4
venture 4 5383.28-5383.54	2	17	QZ	99.99																		99.99	132.01
venture 4 5383.28-5383.54	2	18	QZ	99.99																		99.99	131
venture 4 5383.28-5383.54	2	19	QZ	99.99																		99.99	130.21
venture 4 5383.28-5383.54	2	20	QZ	99.99																		99.99	130.85

Appendix 17: Scanning Electron Microscope and Electron Microprobe Backscattered Electron Images for Wenonah J-75 3076.94

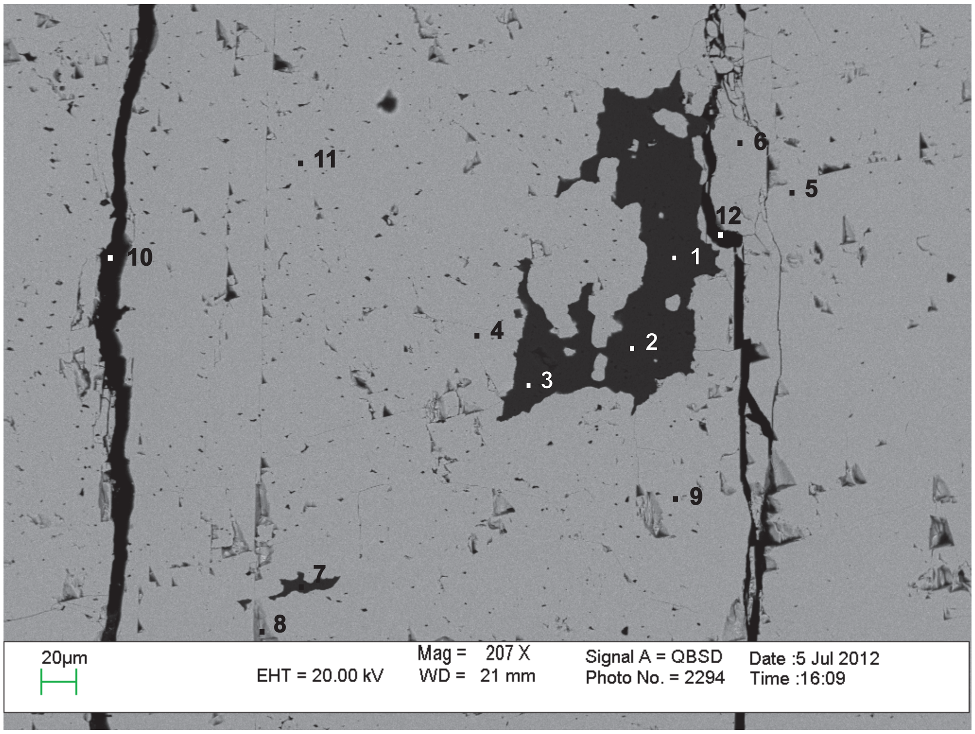


Figure 1: J-75-3076.94 m-soi1(SEM). Vein barite with small areas of Fe-calcite (analyses 1-3).

1. Fe-Calcite
2. Fe-Calcite
3. Fe-Calcite
4. Barite
5. Barite
6. Barite
7. Calcite
8. Barite
9. Barite
10. Hole
11. Barite
12. Hole

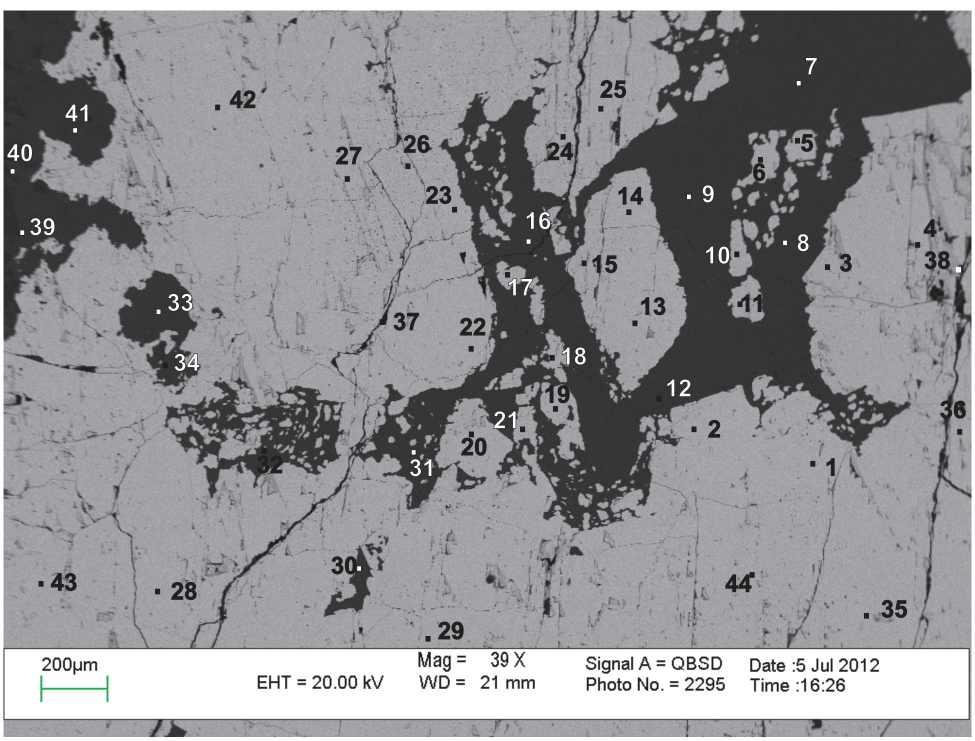


Figure 2: J-75-3076.94 m-soi3(SEM). Similar to Fig. 1.

1. Barite
2. Barite
3. Barite
4. Barite
5. Barite
6. Barite
7. Calcite
8. Calcite
9. Calcite
10. Barite
11. Barite
12. Fe-Calcite
13. Barite
14. Barite
15. Barite
16. Fe-Calcite
17. Barite
18. Barite+Calcite
19. Barite
20. Barite
21. Barite
22. Barite
23. Barite
24. Barite
25. Barite
26. Barite
27. Barite
28. Barite
29. Barite
30. Fe-calcite
31. Fe-calcite
32. Calcite
33. Fe-calcite
34. Fe-calcite
35. Barite
36. Barite
37. Barite
38. Barite
39. Quartz+Albite
40. Quatz
41. Fe-Calcite
42. Barite
43. Barite
44. Barite

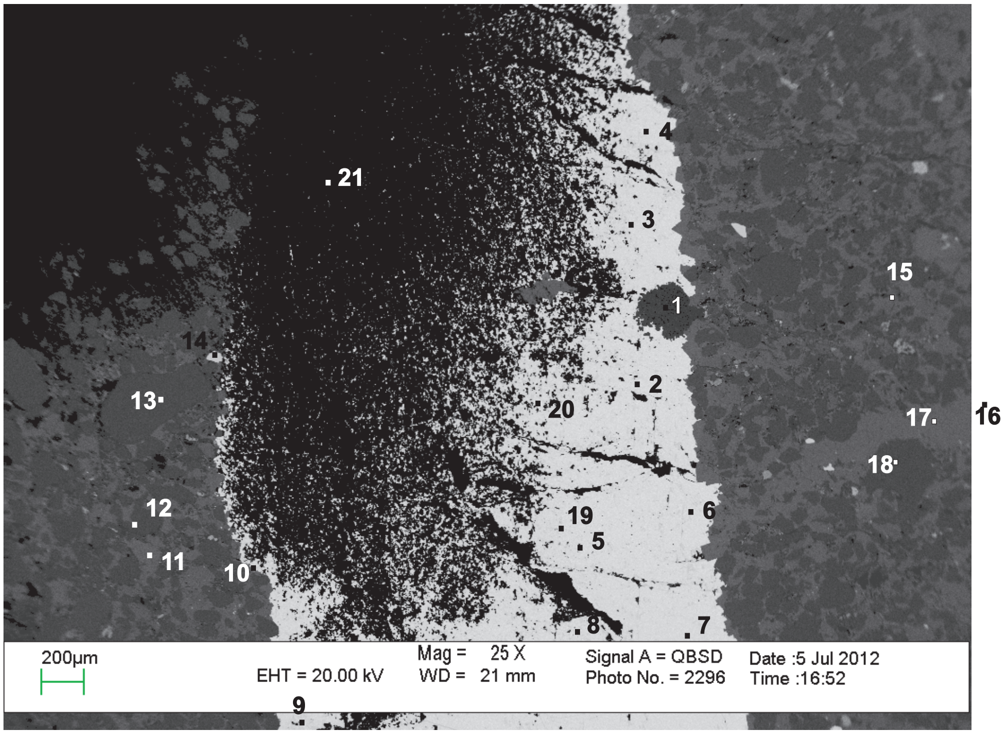


Figure 3: J-75-3076.94 m-soi4(SEM). Vein barite engulfs kaolinite (1).

1. Kaolinite *
2. Barite
3. Barite
4. Barite
5. Barite
6. Barite
7. Barite
8. Barite
9. Barite
10. Barite
11. Ankerite
12. Quartz
13. Quartz
14. Zircon
15. Ankerite
16. Barite (outside field of view)
17. Fe-Calcite
18. Quartz
19. Barite
20. Barite

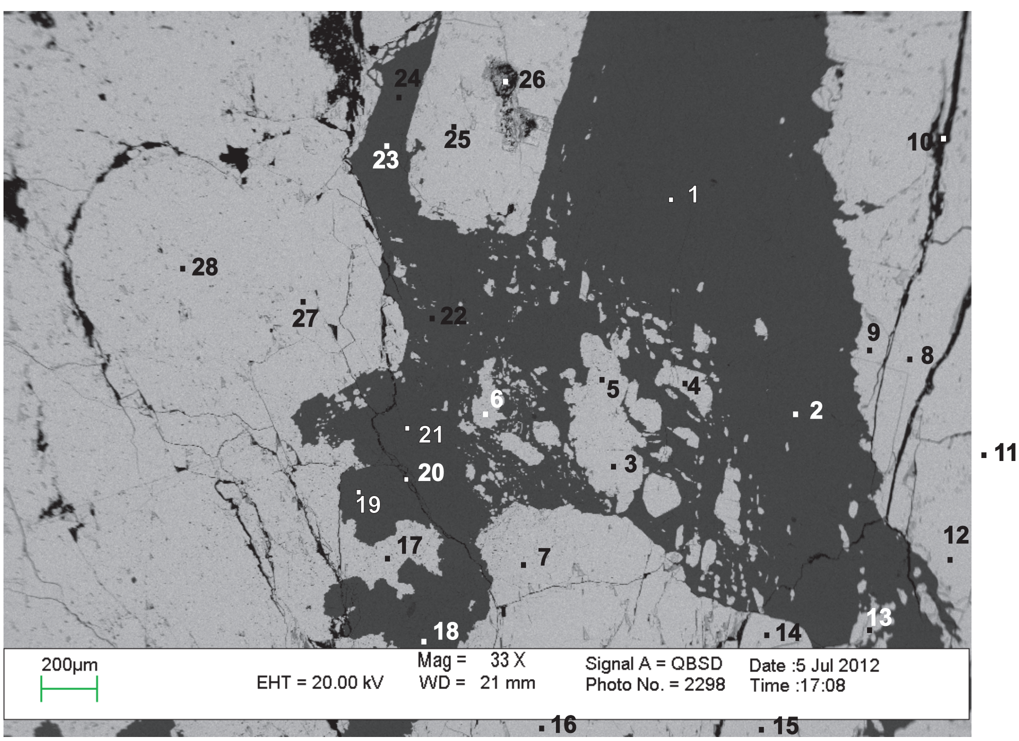
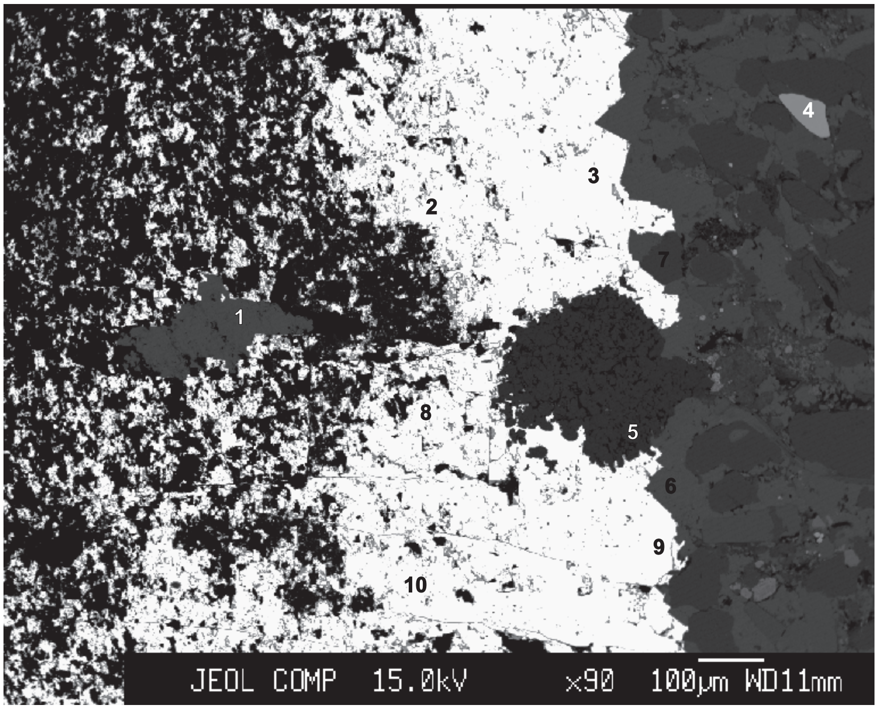


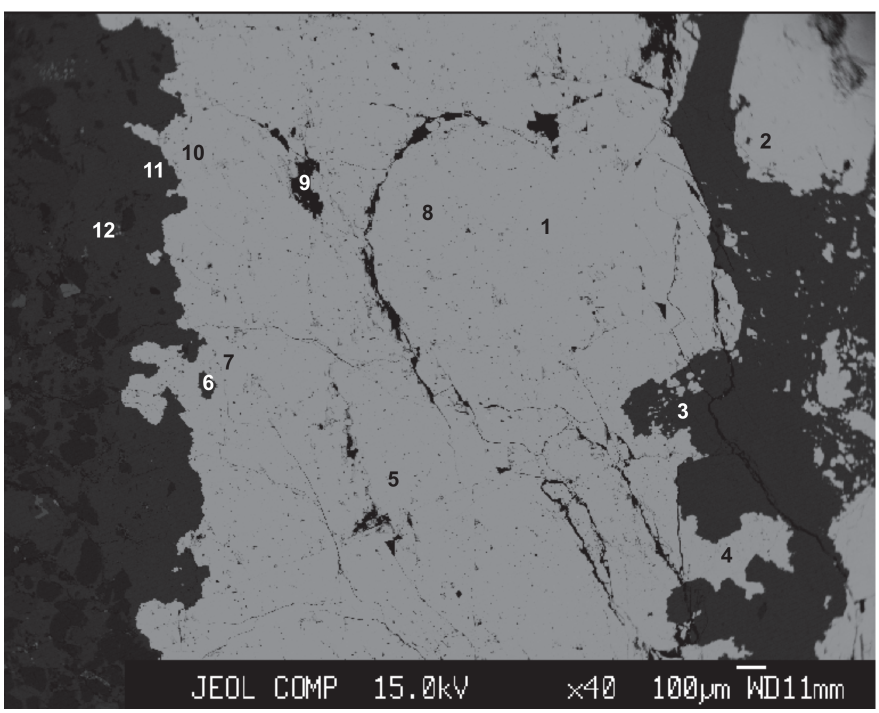
Figure 4: J-75-3076.94 m-soi6(SEM). Vein barite and Fe-calcite (1,2).

1. Fe-Calcite
2. Fe-Calcite
3. Barite
4. Barite
5. Barite
6. Barite
7. Barite
8. Barite
9. Barite
10. Barite+ Quartz
11. Barite+ Quartz
12. Barite
13. Barite
14. Barite
15. Barite
16. Barite
17. Barite
18. Fe-Calcite
19. Fe-Calcite
20. Fe-Calcite
21. Fe-Calcite
22. Fe-Calcite
23. Fe-Calcite
24. Calcite
25. Barite
26. Barite
27. Barite
28. Barite



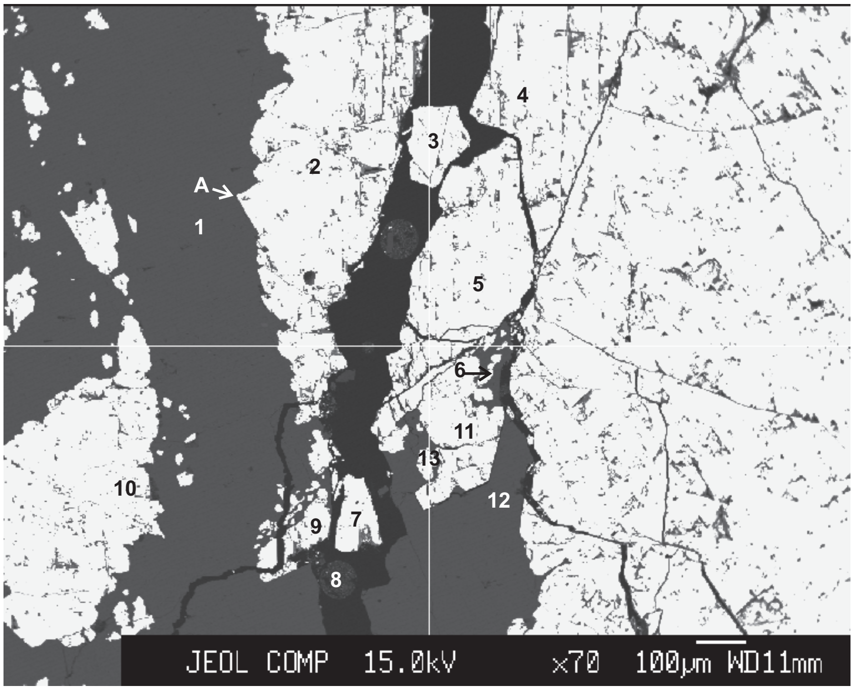
1. Fe- Calcite
2. Barite
3. Barite
4. Hole
5. Kaolinite
6. Fe-Calcite
7. Quartz
8. Barite
9. Barite
10. Barite

Figure 5: J-75-3076.94 m-soi1(Probe). Vein barite engulfs Fe-calcite (6) and kaolinite.



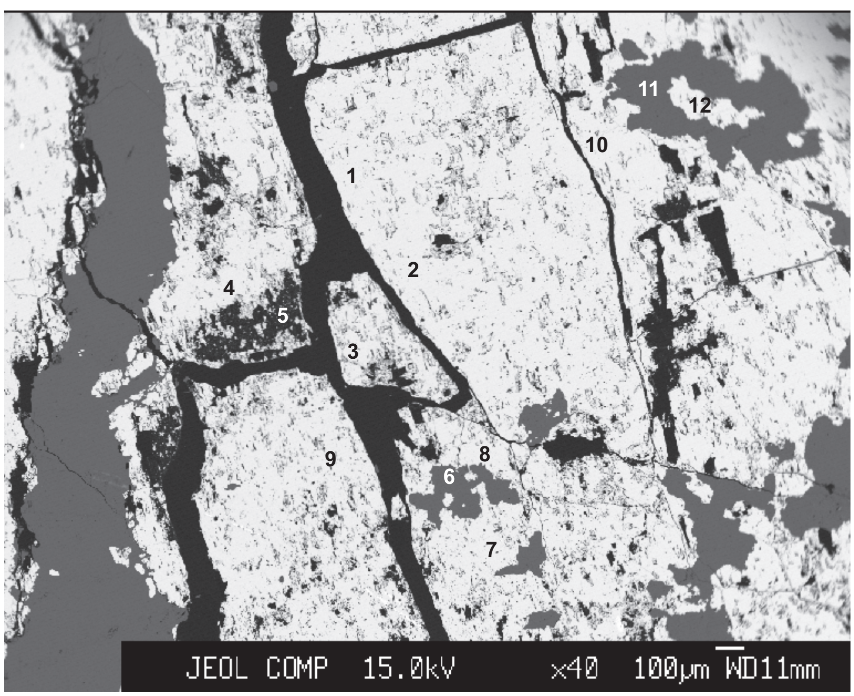
1. Barite
2. Barite
3. Fe-Calcite
4. Barite
5. Barite
6. Fe-Calcite
7. Barite
8. Barite
9. Hole
10. Barite
11. Fe-Calcite
12. Quartz

Figure 6: J-75-3076.94 m-soi2 (Probe). Composite vein of barite and calcite. Vein barite engulfs Fe-calcite (3,11) and contains very small patches of Fe-calcite (6).



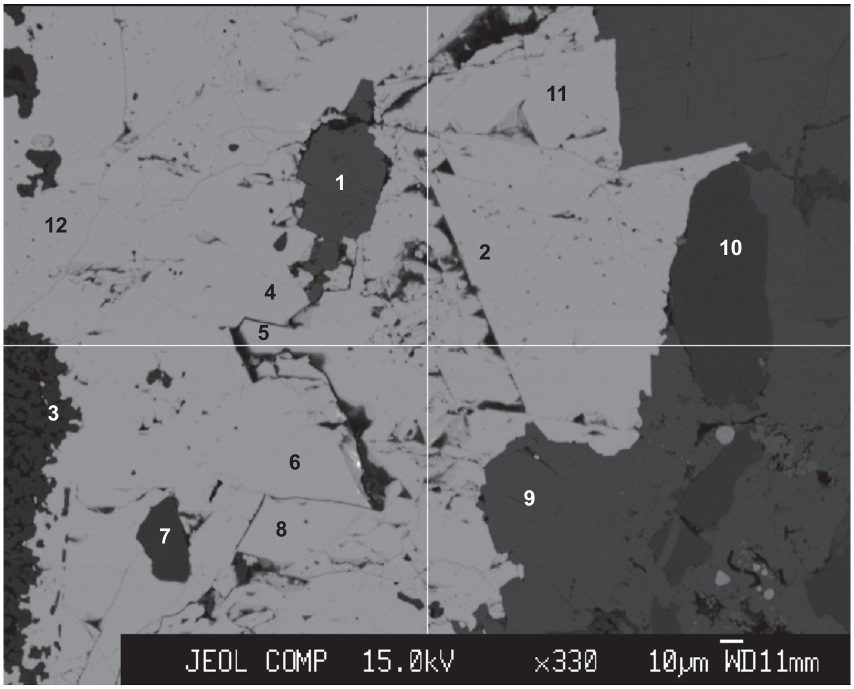
1. Fe-Calcite
2. Barite
3. Barite
4. Barite
5. Barite
6. Fe-Calcite
7. Barite
8. Quartz + others
9. Barite
10. Barite
11. Barite
12. Fe-Calcite
13. Barite

Figure 7: J-75-3076.94 m-soi3 (Probe). Similar to Fig.6. It seems that barite crystallized later than Fe-calcite (position A).



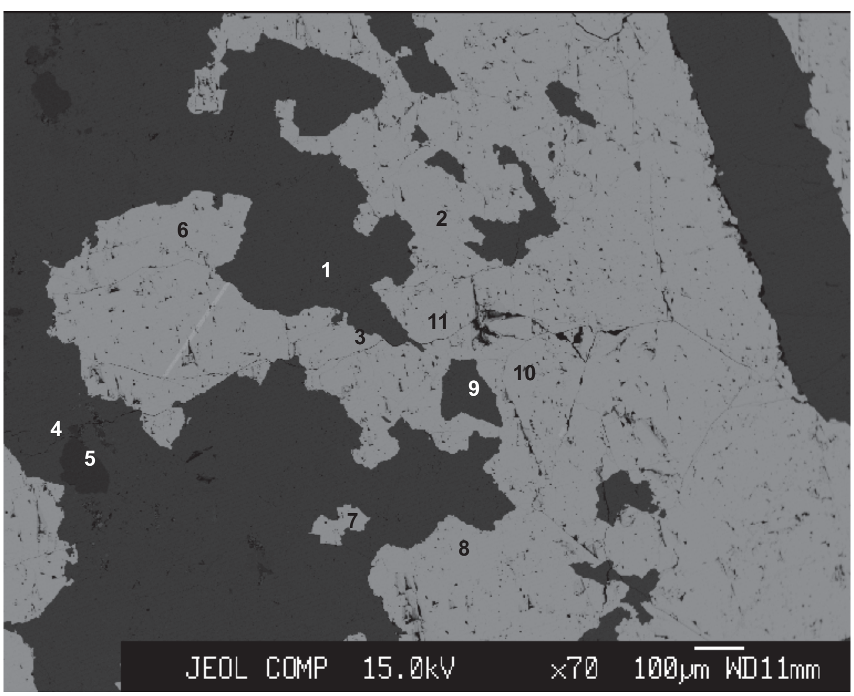
1. Barite
2. Barite
3. Barite
4. Barite
5. Hole
6. Fe-Calcite
7. Barite
8. Barite
9. Barite
10. Barite
11. Fe-Calcite
12. Barite

Figure 8: J-75-3076.94 m-soi4 (Probe). Similar to Fig. 6.



1. Fe-Calcite
2. Barite
3. Kaolinite
4. Barite
5. Barite
6. Barite
7. Albite
8. Barite
9. Fe-Calcite
10. Quartz
11. Barite
12. Barite

Figure 9: J-75-3076.94 m-soi5 (Probe).



1. Fe-Calcite
2. Barite
3. Barite
4. Fe-Calcite
5. Quartz
6. Barite
7. Barite
8. Barite
9. Fe-Calcite
10. Barite
11. Barite

Figure 10: J-75-3076.94 m-soi6 (Probe).

Table A-1: Scanning Electron Microscope chemical analyses of sample 3076.94 from the Wenonah J-75 well.

Well	Depth	Site	Analysis #	Mineral	SiO_2	Al_2O_3	FeO	MgO	CaO	Na_2O	BaO	SO_3	CoO	B_2O_3*	ZrO_2	Total
J75	3076.94	soi1	1 V*	Fe-Cal			1.05		54.95							56.00
J75	3076.94	soi1	2 V	Fe-Cal			1.03		54.97							56.00
J75	3076.94	soi1	3 V	Fe-Cal			1.14		54.86							56.00
J75	3076.94	soi1	4	Brt							62.01	37.99				100
J75	3076.94	soi1	5	Brt							61.92	38.08				100
J75	3076.94	soi1	6	*Brt							39.23	21.36		39.41		100
J75	3076.94	soi1	7 V	Cal					52.47		1.99	1.53				56.01
J75	3076.94	soi1	8	Brt							74.93	25.07				100
J75	3076.94	soi1	9	*Brt							37.72	20.7		41.58		100
J75	3076.94	soi1	10													
J75	3076.94	soi1	11	*Brt							37.42	20.81		41.77		100
J75	3076.94	soi3	1	*Brt							38.2	21.35		40.45		100
J75	3076.94	soi3	2	Brt							62.11	37.89				100
J75	3076.94	soi3	3	Brt							61.97	37.66	0.38			100
J75	3076.94	soi3	4	Brt							65.86	34.14				100
J75	3076.94	soi3	5	*Brt							35.7	19.82		44.48		100
J75	3076.94	soi3	6	Brt							61.76	37.82	0.42			100
J75	3076.94	soi3	7 V	Cal			0.92		55.08							56.00
J75	3076.94	soi3	8 V	Cal					56.00							56.00
J75	3076.94	soi3	9 V	Cal					56.00							56.00
J75	3076.94	soi3	10	Brt							62.05	37.95				100
J75	3076.94	soi3	11	Brt							62.03	37.97				100
J75	3076.94	soi3	12	Fe-Cal			1.20		54.80							56.00
J75	3076.94	soi3	13	Brt							62.54	37.46				100
J75	3076.94	soi3	14	Brt							62.18	37.82				100
J75	3076.94	soi3	15	Brt							61.86	38.14				100
J75	3076.94	soi3	16 V	Fe-Cal			1.17		54.83							56.00
J75	3076.94	soi3	17	Brt							61.31	38.69				100
J75	3076.94	soi3	18	Brt+Cal					16.82		55.99	27.19				100
J75	3076.94	soi3	19	*Brt							37	20.61		42.39		100
J75	3076.94	soi3	20	Brt							61.27	38.4	0.33			100
J75	3076.94	soi3	21	Brt							62.9	37.1				100
J75	3076.94	soi3	22	Brt							62.48	37.52				100
J75	3076.94	soi3	23	Brt							62.75	37.25				100
J75	3076.94	soi3	24	Brt							62.48	37.52				100
J75	3076.94	soi3	25	Brt							62.02	37.98				100
J75	3076.94	soi3	26	Brt							60.5	39.5				100
J75	3076.94	soi3	27	Brt							61.53	38.47				100

Table A-1: Scanning Electron Microscope chemical analyses of sample 3076.94 from the Wenonah J-75 well.

Well	Depth	Site	Analysis #	Mineral	SiO_2	Al_2O_3	FeO	MgO	CaO	Na_2O	BaO	SO_3	CoO	B_2O_3*	ZrO_2	Total
J75	3076.94	soi3	28	*Brt							32.56	18.12	0.2	49.12		100
J75	3076.94	soi3	29	Brt							35.72	19.56		44.73		100
J75	3076.94	soi3	30 V	Fe-Cal			1.52		54.48							56.00
J75	3076.94	soi3	31 V	Fe-Cal			1.30		54.70							56.00
J75	3076.94	soi3	32 V	Cal			0.83		55.17							56.00
J75	3076.94	soi3	33 V	Fe-Cal			1.16		54.84							56.00
J75	3076.94	soi3	34 V	Fe-Cal			1.32		54.68							56.00
J75	3076.94	soi3	35	Brt							62.42	37.58				100
J75	3076.94	soi3	36	Brt	4.91	1.04					59.99	34.06				100
J75	3076.94	soi3	37	Brt							59.62	40.38				100
J75	3076.94	soi3	38	Brt	3.05						59.63	37.32				100
J75	3076.94	soi3	39	Qz+Ab	77.67	13.5				8.84						100
J75	3076.94	soi3	40	Qz	98.89				1.11							100
J75	3076.94	soi3	41 V	Fe-Cal			1.56		54.44							56.00
J75	3076.94	soi3	42	Brt							62.33	37.67				100
J75	3076.94	soi3	43	Brt							62.05	37.95				100
J75	3076.94	soi3	44	Brt							62.3	37.7				100
J75	3076.94	soi4	1	Kln	50.48	33.90	1.62									86.00
J75	3076.94	soi4	2	*Brt							37.54	20.68		41.78		100
J75	3076.94	soi4	3	Brt							62.37	37.63				100
J75	3076.94	soi4	4	Brt							62.29	37.71				100
J75	3076.94	soi4	5	Brt							62.44	37.56				100
J75	3076.94	soi4	6	Brt							62.31	37.69				100
J75	3076.94	soi4	7	Brt							62.4	37.6				100
J75	3076.94	soi4	8	Brt							62.57	36.95	0.48			100
J75	3076.94	soi4	9	*Brt							29.94	16.52		53.54		100
J75	3076.94	soi4	10	*Brt							34.31	18.9		46.79		100
J75	3076.94	soi4	11	Ank			12.95	11.07	31.98							56.00
J75	3076.94	soi4	12	Qz	100											100
J75	3076.94	soi4	13	Qz	100											100
J75	3076.94	soi4	14	Zr	31.46										68.54	100
J75	3076.94	soi4	15 H	Ank			18.68	12.80	24.53							56.00
J75	3076.94	soi4	16	*Brt							38.6	21.07		40.33		100
J75	3076.94	soi4	17 H	Fe-Cal			1.42		54.58							56.00
J75	3076.94	soi4	18	Qz	98.46	0.8				0.74						100
J75	3076.94	soi4	19	Brt							66.38	33.62				100
J75	3076.94	soi4	20	Brt							61.92	38.08				100
J75	3076.94	soi6	1 V	Fe-Cal			1.51		54.49							56.00

Table A-1: Scanning Electron Microscope chemical analyses of sample 3076.94 from the Wenonah J-75 well.

Well	Depth	Site	Analysis #	Mineral	SiO_2	Al_2O_3	FeO	MgO	CaO	Na_2O	BaO	SO_3	CoO	B_2O_3*	ZrO_2	Total
J75	3076.94	soi6	2 V	Fe-Cal			1.18		54.82							56.00
J75	3076.94	soi6	3	*Brt							35.98	19.64		44.38		100
J75	3076.94	soi6	4	Brt							61.71	38.29				100
J75	3076.94	soi6	5	*Brt							37.23	19.97		42.8		100
J75	3076.94	soi6	6	*Brt							36.27	19.78		43.95		100
J75	3076.94	soi6	7	Brt							62.54	37.46				100
J75	3076.94	soi6	8	*Brt							36.12	19.37		44.51		100
J75	3076.94	soi6	9	Brt	2.24						61.2	36.56				100
J75	3076.94	soi6	10	Brt+Qz	24.59						42.33	33.08				100
J75	3076.94	soi6	11	Brt+Qz	6.15						54.79	36.65				97.59
J75	3076.94	soi6	12	Brt							62.26	37.74				100
J75	3076.94	soi6	13	Brt							61.88	38.12				100
J75	3076.94	soi6	14	*Brt							38.65	20.62	0.19	40.53		100
J75	3076.94	soi6	15	*Brt							38.39	21.41		40.2		100
J75	3076.94	soi6	16	Brt							62.9	37.1				100
J75	3076.94	soi6	17	Brt							61.75	38.25				100
J75	3076.94	soi6	18 V	Fe-Cal			1.35		54.65							56.00
J75	3076.94	soi6	19 V	Fe-Cal			1.20		54.80							56.00
J75	3076.94	soi6	20 V	Fe-Cal			1.08	0.95	53.97							56.00
J75	3076.94	soi6	21 V	Fe-Cal			1.13		54.87							56.00
J75	3076.94	soi6	22 V	Fe-Cal			1.66		54.34							56.00
J75	3076.94	soi6	23 V	Fe-Cal			1.70		54.30							56.00
J75	3076.94	soi6	24 V	Cal					56.00							56.00
J75	3076.94	soi6	25	*Brt							35.59	19.49	0.27	44.65		100
J75	3076.94	soi6	26	Brt							62.7	36.73	0.57			100
J75	3076.94	soi6	27	Brt							62.65	37.35				100
J75	3076.94	soi6	28	Brt							61.9	38.1				100

*: Boron is artifact of analysis

*: Analysis checked by electron microprobe do not contain any boron

Notes: 1. Only vein barite.

2. No SrO data available.

3. FeO in Fe-Calcite is generally low (FeO : 1-1.5%) in both the vein Fe-calcite and the Fe-calcite in the host sandstone.

4. *: V= Vein carbonate; H= carbonate cement in the host sandstone.

Table A-2: Electron Microproble analyses of sample 3076.94 from the Wenonah J-75 well.

Well	Depth	Site	Analysis	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MgO	CaO	Na_2O	K_2O	P_2O_5	SrO	BaO	SO_3	Ce_2O_3	B_2O_3	Total
J75	3076.94	SOI1	1 H	Fe-Cal	0.02		0.01	1.46	0.37	56.33		0.02	0.03	0.55		0.02	0.02		58.83
J75	3076.94	SOI1	2	Brt			0.04	0.01	0.01	0.07	0.22	0.06	0.12	0.12	64.61	33.51			98.74
J75	3076.94	SOI1	3	Brt	0.00		0.06	0.03		0.03	0.34	0.03	0.02	0.13	66.69	33.24			100.58
J75	3076.94	SOI1	4	hole	33.01			0.10	0.00	0.04	0.01	0.03		0.39			0.03		33.62
J75	3076.94	SOI1	5	Kln	40.72		30.90	0.04	0.04	0.11	0.13	0.06			0.00	0.05	0.00		72.03
J75	3076.94	SOI1	6 H	Fe-Cal	0.02		0.01	1.51	0.29	55.17	0.02	0.02	0.03	0.40		0.03	0.05		57.55
J75	3076.94	SOI1	7	Qz	99.71		0.01	0.04		0.05	0.02	0.02	0.05		0.08	0.01			99.97
J75	3076.94	SOI1	8	Brt	0.07	0.10	0.06		0.00	0.09	0.22	0.05	0.01	0.18	63.91	33.26	0.08		98.02
J75	3076.94	SOI1	9	Brt			0.09		0.02	0.02	0.25	0.03	0.01	0.18	65.41	33.54			99.55
J75	3076.94	SOI1	10	Brt			0.06			0.06	0.19	0.07	0.04	0.16	64.08	33.32	0.16		98.13
J75	3076.94	SOI2	1	Brt			0.07	0.00		0.03	0.27	0.07		0.20	67.00	32.93			100.57
J75	3076.94	SOI2	2	Brt	0.00		0.05	0.01		0.02	0.35	0.04		0.09	65.31	33.65			99.53
J75	3076.94	SOI2	3 V	Fe-Cal	0.01			1.48	0.32	54.16	0.06	0.02	0.07	0.38	0.01	0.07	0.01		56.60
J75	3076.94	SOI2	4	Brt			0.01			0.03	0.23	0.04		0.21	66.62	33.12	0.05		100.30
J75	3076.94	SOI2	5	Brt	0.07		0.04		0.00	0.00	0.19	0.06	0.01	0.10	64.65	33.42	0.07		98.61
J75	3076.94	SOI2	6 V	Fe-Cal	0.02			1.35	0.37	55.69	0.01	0.01	0.04	0.56		0.03	0.04		58.09
J75	3076.94	SOI2	7	Brt			0.09			0.02	0.22	0.06		0.18	63.96	33.08	0.07		97.69
J75	3076.94	SOI2	8	Brt	0.03	0.23	0.07			0.01	0.19	0.04	0.06	0.17	63.76	33.56	0.14		98.24
J75	3076.94	SOI2	9	hole	0.02	0.01	0.01	0.00		0.02		0.01				0.01	0.02		0.10
J75	3076.94	SOI2	10	Brt			0.05	0.03		0.00	0.26	0.04	0.08	0.07	64.88	33.12			98.53
J75	3076.94	SOI2	11 V	Fe-Cal	0.07			1.63	0.58	55.21	0.02	0.04	0.03	0.53		0.01	0.03	0.68	58.80
J75	3076.94	SOI2	12	Qz	94.45		0.00	0.06		0.04	0.00	0.01	0.05			0.02		4.89	99.53
J75	3076.94	SOI3	1 V	Fe-Cal	0.00		0.01	1.47	0.26	56.14		0.00	0.00	0.14			0.02		58.05
J75	3076.94	SOI3	2	Brt	0.02		0.11	0.01		0.01	0.23	0.03		0.11	64.83	33.87	0.01		99.22
J75	3076.94	SOI3	3	Brt			0.08	0.02	0.02	0.03	0.25	0.05	0.06	0.12	63.95	34.28	0.09		98.95
J75	3076.94	SOI3	4	Brt			0.08	0.00	0.01		0.25	0.05		0.18	63.91	33.78	0.08		98.35
J75	3076.94	SOI3	5	Brt	0.01		0.07	0.00			0.19	0.03	0.03	0.16	65.56	33.59	0.01		99.66
J75	3076.94	SOI3	6 V	Fe-Cal (lt)	0.50		0.04	0.98	0.22	43.07	0.04	0.03	0.02	0.27	0.54	0.23	0.03		45.98
J75	3076.94	SOI3	7	Brt	0.01		0.07	0.04	0.00	0.02	0.21	0.06		0.16	65.35	33.16	0.16		99.25
J75	3076.94	SOI3	8	Qz+others	77.63	0.12	0.57	0.68	0.53	0.76	0.31	0.03			0.66	0.39		1.37	83.05
J75	3076.94	SOI3	9	Brt			0.09	0.01		0.05	0.21	0.06	0.02	0.06	63.89	34.16	0.05		98.60
J75	3076.94	SOI3	10	Brt	0.01	0.13	0.07	0.07		0.02	0.21	0.06		0.06	63.76	33.79	0.12		98.29
J75	3076.94	SOI3	11	Brt			0.05	0.02	0.01	0.02	0.19	0.06		0.09	64.34	33.67	0.00		98.45
J75	3076.94	SOI3	12 V	Fe-Cal	0.01		0.01	1.41	0.28	55.79	0.01	0.02	0.01	0.43		0.02	0.01		57.99
J75	3076.94	SOI3	13	Brt		0.19	0.03	0.01		0.15	0.19	0.01	0.02	0.18	64.10	33.38	0.09		98.33
J75	3076.94	SOI4	1	Brt	0.04		0.07	0.00		0.02	0.22	0.06		0.13	64.67	33.60	0.17		98.96
J75	3076.94	SOI4	2	Brt		0.15	0.06		0.01	0.02	0.23	0.06		0.14	63.63	34.30	0.20		98.80
J75	3076.94	SOI4	3	Brt	0.01		0.08		0.01	0.05	0.29	0.07	0.05	0.15	64.06	34.22	0.01		98.98
J75	3076.94	SOI4	4	Brt			0.11	0.00		0.02	0.23	0.06		0.06	64.12	33.53	0.08		98.20
J75	3076.94	SOI4	5	hole	1.48	0.03	0.23	0.10	0.17	0.39	0.21	0.24			0.52	0.41	0.01		3.79
J75	3076.94	SOI4	6 V	Fe-Cal			0.02	1.54	0.44	55.82	0.10	0.04	0.03	0.57	0.02	0.03	0.01		58.62
J75	3076.94	SOI4	7	Brt		0.35	0.08	0.02		0.04	0.19	0.05	0.01	0.16	62.80	34.72	0.22		98.62
J75	3076.94	SOI4	8	Brt		0.18	0.11			0.03	0.23	0.06		0.18	63.49	33.56	0.42		98.26
J75	3076.94	SOI4	9	Brt		0.05	0.08			0.03	0.27	0.05	0.05	0.11	64.23	33.68	0.17		98.71
J75	3076.94	SOI4	10	Brt		0.10	0.07	0.01	0.00	0.02	0.22	0.04	0.03	0.16	64.64	33.34	0.15		98.78
J75	3076.94	SOI4	11 V	Fe-Cal		0.02		1.53	0.41	56.15	0.05	0.02	0.06	0.41		0.04	0.02		58.71

Table A-2: Electron Microproble analyses of sample 3076.94 from the Wenonah J-75 well.

Well	Depth	Site	Analysis	Mineral	SiO_2	TiO_2	Al_2O_3	FeO	MgO	CaO	Na_2O	K_2O	P_2O_5	SrO	BaO	SO_3	Ce_2O_3	B_2O_3	Total
J75	3076.94	SOI4	12	Brt		0.10	0.06	0.03		0.00	0.21	0.03	0.02	0.13	64.76	33.97	0.31		99.61
J75	3076.94	SOI5	1 V	Fe-Cal	0.10	0.01	0.05	1.39	0.33	55.76		0.02	0.04	0.66	0.04	0.03			58.42
J75	3076.94	SOI5	2	Brt		0.10	0.06			0.01	0.25	0.04	0.03	0.11	64.62	33.77	0.13		99.11
J75	3076.94	SOI5	3	Kln	47.79	0.02	37.76	0.03	0.03	0.07	0.04	0.03			0.09	0.05	0.03		85.95
J75	3076.94	SOI5	4	Brt		0.13	0.05	0.04	0.01		0.22	0.06		0.08	64.04	33.44	0.32		98.38
J75	3076.94	SOI5	5	Brt	0.08	0.22	0.11	0.01		0.00	0.28	0.04		0.09	64.04	34.41	0.15		99.43
J75	3076.94	SOI5	6	Brt		0.15	0.05	0.02			0.15	0.05		0.22	64.11	33.23	0.09		98.07
J75	3076.94	SOI5	7	Ab	63.50		22.31	0.00		0.03	9.40	0.03	0.01		0.19	0.01			95.49
J75	3076.94	SOI5	8	Brt		0.23	0.07	0.00			0.24	0.05	0.04	0.11	63.16	33.98	0.14		98.02
J75	3076.94	SOI5	9 V	Fe-Cal	0.01			1.32	0.33	55.69	0.03	0.03	0.05	0.52		0.00	0.02	0.30	58.30
J75	3076.94	SOI5	10	Qz	99.61			0.02		0.08	0.02	0.02			0.01		0.01		99.77
J75	3076.94	SOI5	11	Brt		0.20	0.09	0.02		0.01	0.22	0.04		0.14	63.82	33.17	0.23		97.93
J75	3076.94	SOI5	12	Brt		0.29	0.08			0.01	0.22	0.04		0.01	64.13	33.77	0.37		98.90
J75	3076.94	SOI6	1 V	Fe-Cal			0.01	1.80	0.44	56.55	0.05	0.03	0.02	0.49	0.02	0.03			59.44
J75	3076.94	SOI6	2	Brt			0.06			0.03	0.23	0.04	0.04	0.05	64.95	32.54	0.01		97.95
J75	3076.94	SOI6	3	Brt		0.55	0.07		0.01	0.02	0.25	0.06		0.17	63.56	32.81	0.42		97.91
J75	3076.94	SOI6	4 V	Fe-Cal	0.25	0.02	0.11	1.49	0.46	55.66	0.02	0.03	0.04	0.41		0.02	0.01		58.50
J75	3076.94	SOI6	5	Qz	99.82	0.04		0.04	0.00	0.06	0.02	0.02	0.01			0.01	0.01	0.89	100.92
J75	3076.94	SOI6	6	Brt	0.02	0.57	0.07	0.01		0.04	0.23	0.05	0.03	0.16	64.18	33.51	0.32		99.19
J75	3076.94	SOI6	7	Brt	0.01	0.53	0.06	0.01	0.03	0.12	0.20	0.04	0.04	0.06	62.73	33.29	0.38		97.49
J75	3076.94	SOI6	8	Brt		0.71	0.10			0.03	0.22	0.04	0.02	0.10	63.68	33.42	0.46		98.78
J75	3076.94	SOI6	9 V	Fe-Cal	0.00	0.01	0.02	1.64	0.45	55.04	0.05	0.03	0.05	0.50		0.02			57.80
J75	3076.94	SOI6	10	Brt		0.75	0.05			0.04	0.19	0.04	0.04	0.10	62.01	33.45	0.59		97.25
J75	3076.94	SOI6	11	Brt	0.01	0.11	0.04	0.04		0.03	0.22	0.04	0.03	0.12	66.56	32.57	0.35		100.11

lt=low total; *= B_2O_3 is an SEM analysis artifact.

Notes: 1. Barite in vein together with Fe-calcite.

2. The SrO concentration is very low in barite (0.1- 0.2%), and much higher in Fe-calcite (~0.5%) in both vein and host sandstone.

Appendix 18: Fluid Inclusions in Diagenetic and Vein Barite

Studied samples

O-76-3809.66 South Debarres
J-47-5445.94 Louisbourg
J-75-3076.94 Wenonah

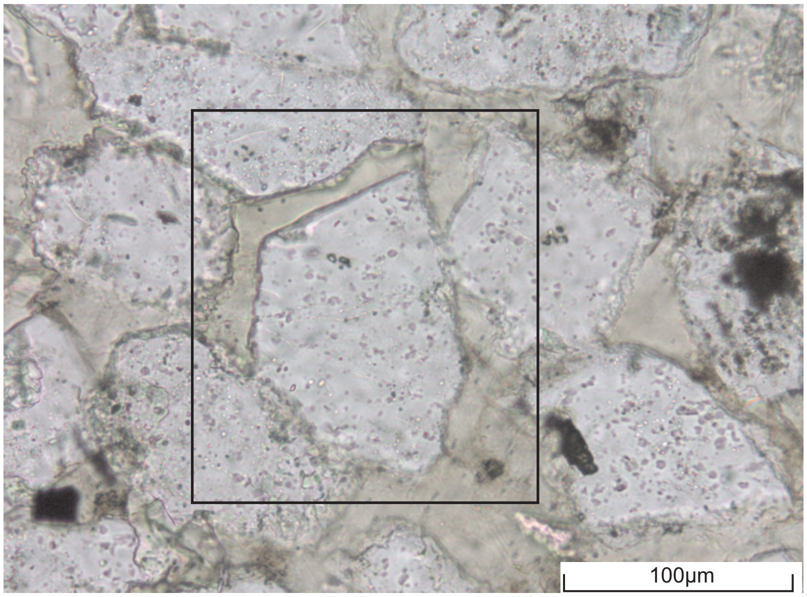


Figure 1: J-47 5445.94 (PPL)
Coordinates: 63, 19.4

Fluid inclusions in barite. They do not show well defined linear distribution and are mostly two phase fluid inclusions.

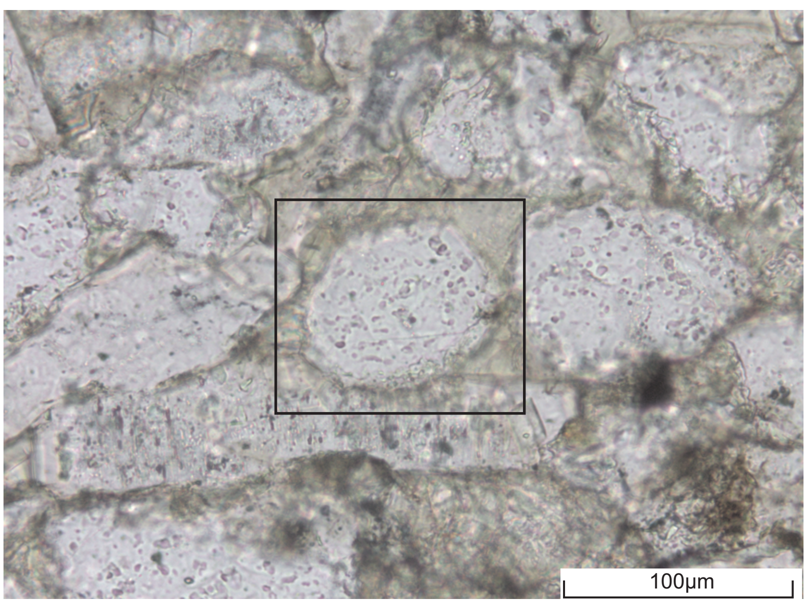


Figure 2: J-47 5445.94 (PPL)
Coordinates: 59.6, 9.5

Mostly two phase fluid inclusion within grain.

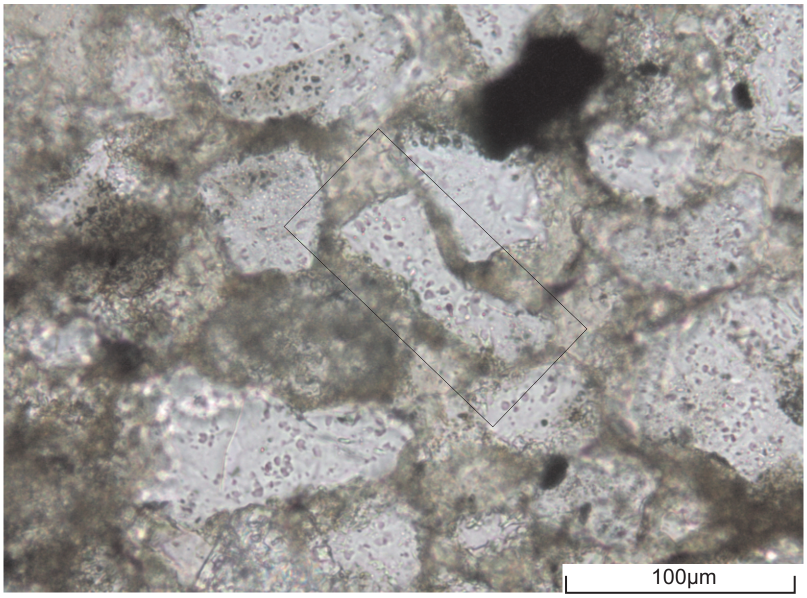


Figure 3: J-47 5445.94 (PPL)
Coordinates: 59, 9.3

Linear distribution of fluid inclusion along fractures in barite. Mostly two phases fluid inclusions.

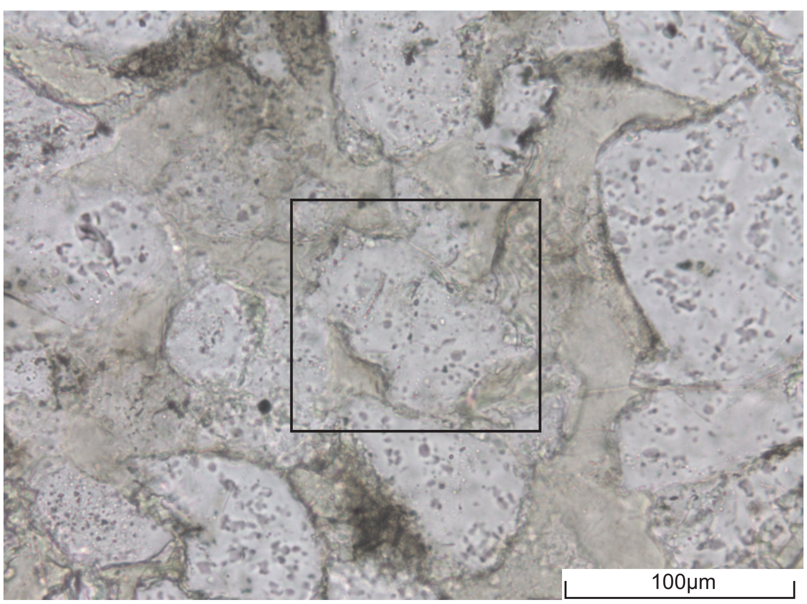


Figure 4: J-47 5445.94 (PPL)
Coordinates: 62.3, 19.1

Linear distribution of fluid inclusions. Mostly two phase fluid inclusions.

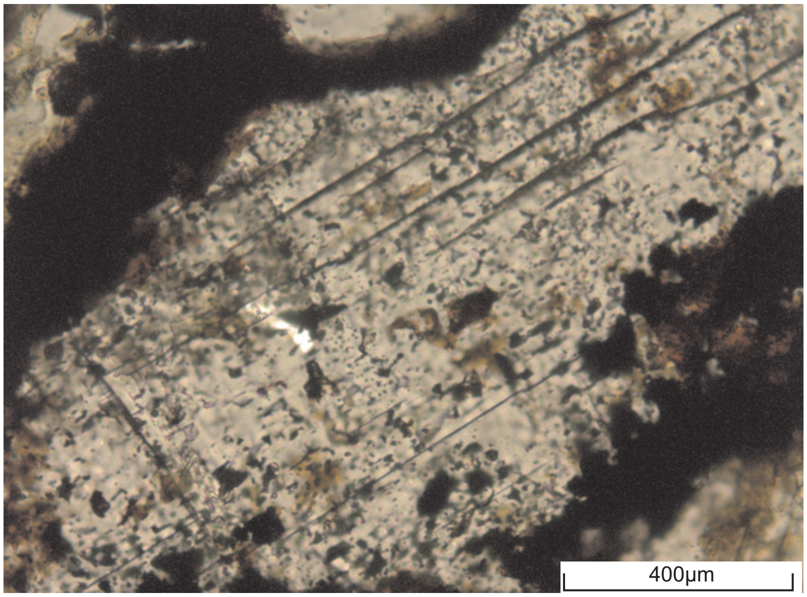


Figure 5: O-76 3809.66 (PPL)
Coordinates: 72.8, 7.8

Linear distribution of fluid inclusions in barite perpendicular to fractures. Mostly two phases fluid inclusions.

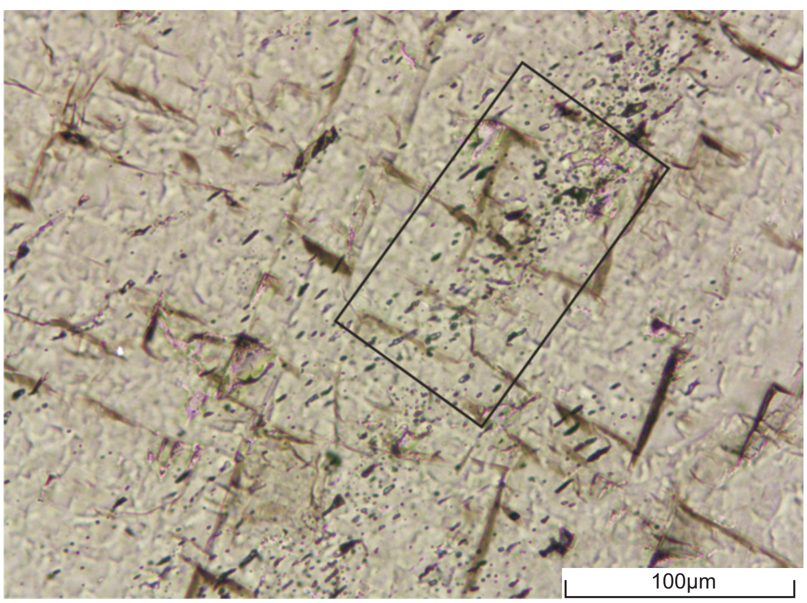


Figure 6: J-75 3076.94 (PPL)
Coordinates: 63.9, 17.3

Linear distribution of fluid inclusions ranging in size. Mostly two phases inclusions.

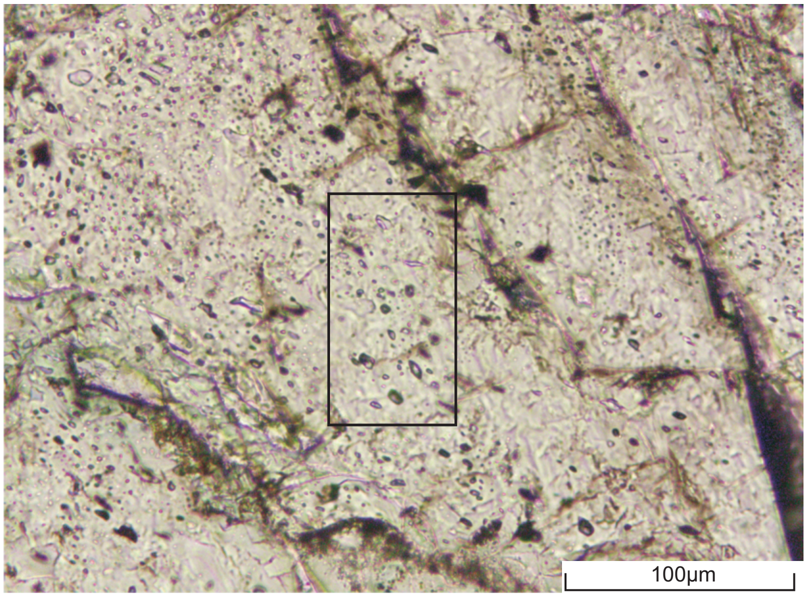


Figure 7: J-75 3076.94 (PPL)
Coordinates: 64,6

Linear distribution of small fluid inclusions due to the presence of original micro fractures along which the fluid circulated. Mostly two phases (fluid inclusions in the rectangle) fluid inclusions.

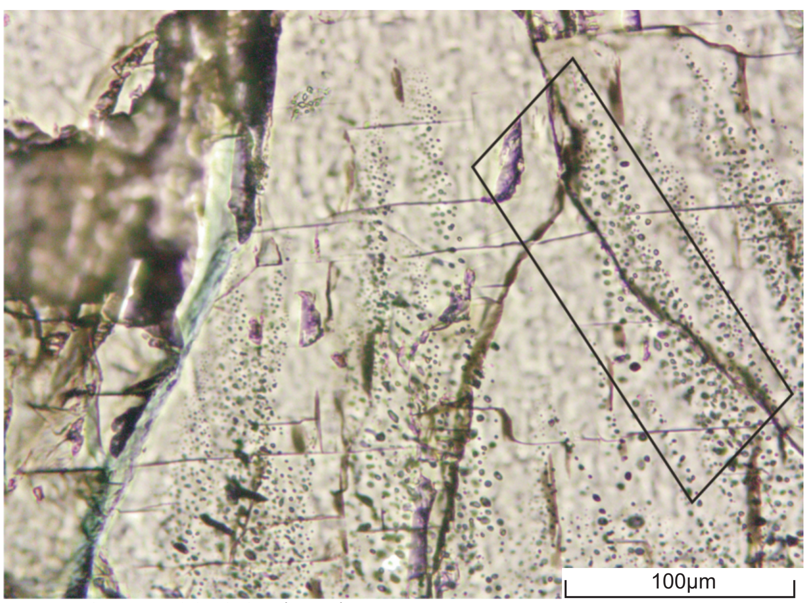


Figure 8: J-75 3076.94 (PPL)
Coordinates: 59,4

Linearly distributed fluid inclusions along fractures in barite. Mostly two phases fluid inclusions.

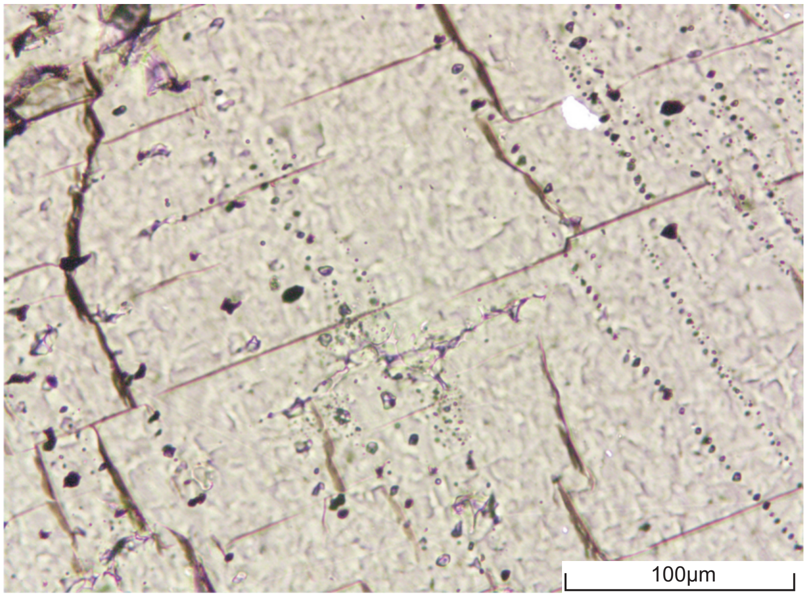


Figure 9:J-75 3076.94 (PPL)
Coordinates: 59, 2

Well defined linear distribution of fluid inclusions along micro fractures. Presence of two and three phases (in square) fluid inclusions.

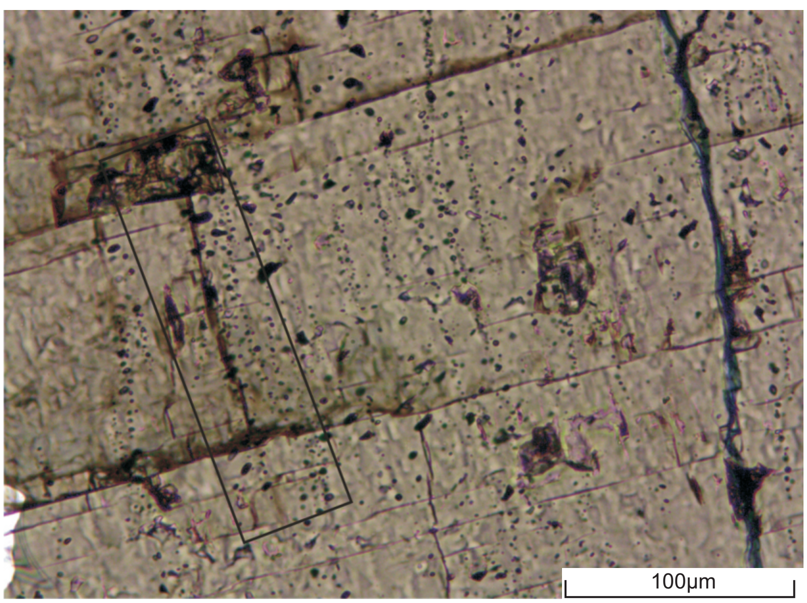


Figure 10: J-75 3076.94 (PPL)
Coordinates: 65.4, 19.7

Linear distribution of fluid inclusions, perpendicular to horizontal fractures. Mostly two phases fluid inclusions.

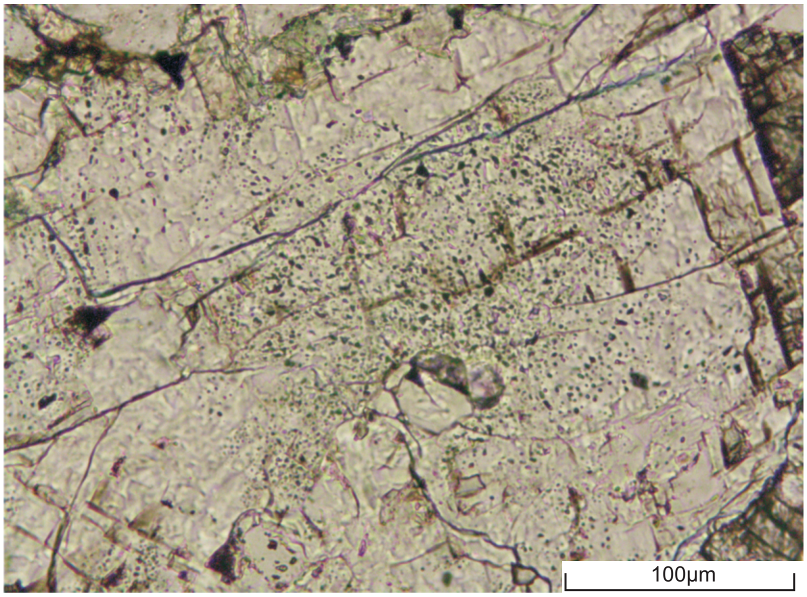


Figure 11: J-75 3076.94 (PPL)
Coordinates: 65.7, 21.9

Fluid inclusions, in grain, of two phases. They do not show well defined linear distribution, but they are present near fractures.

Appendix 19: Geochemistry of diagenetic barite and siderite

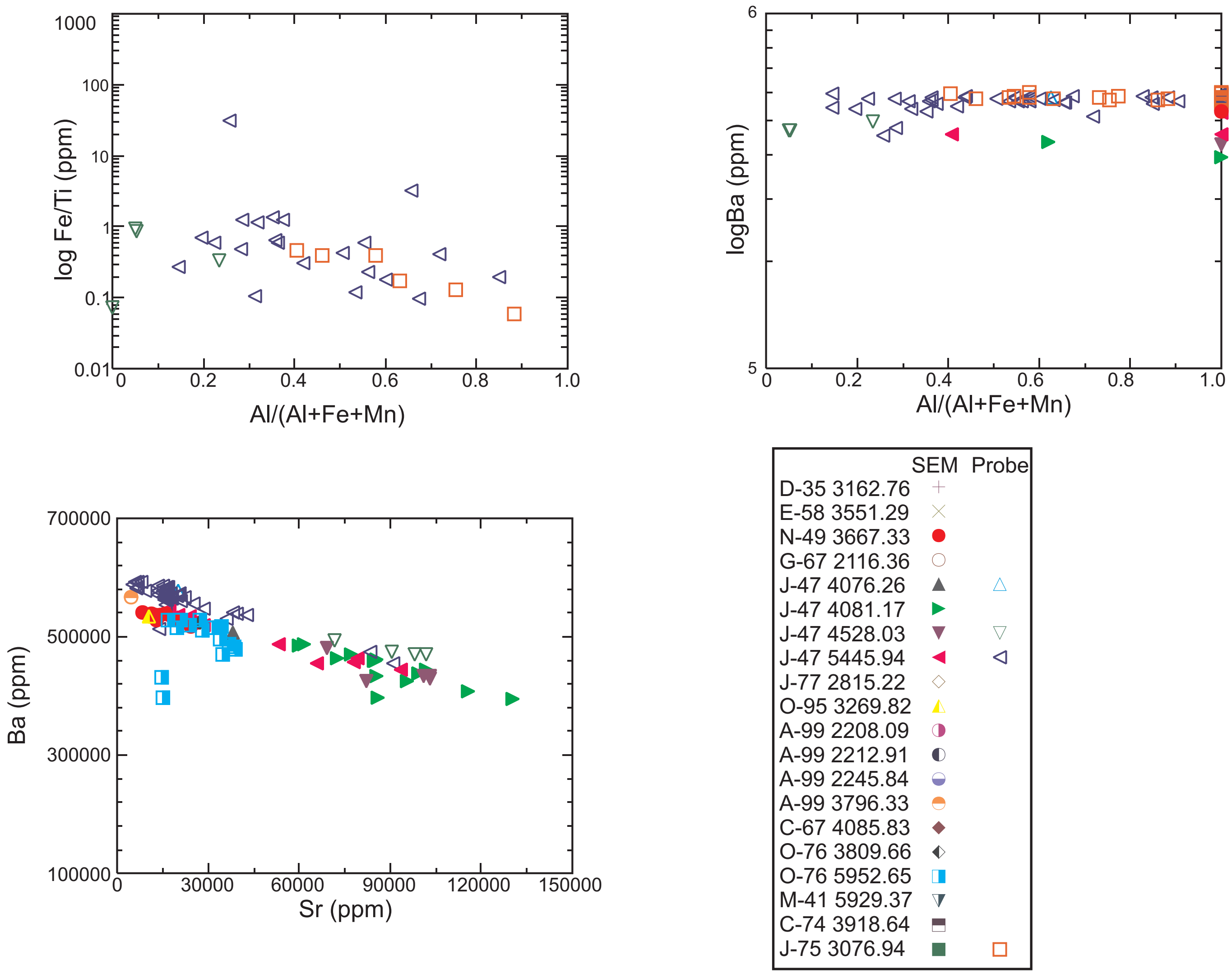


Figure 1: Diagrams of Fe/Ti vs. Al/(Al+Fe+Mn), Ba vs. Al/(Al+Fe+Mn), and Ba vs. Sr for diagenetic barite (Table 1).

Table 1: Representative chemical analyses of diagenetic barite.

Sample	Location	Analysis	Type	Source	Mineral	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	P2O5	SO3	F	Cl	NiO	Cr2O3	As2O3	SrO	Nb2O5	BaO	Ce2O3	WO3	HfO2	B2O3	CoO	ZrO2	Total
A-99 2208.09	2	2	M	SEM	Brt							0.63	1.42			40.13								57.84							100.02
A-99 2208.09	3	1	M	SEM	Brt											38.33								61.68							100.01
A-99 2208.09	4	1	M	SEM	Brt											58.32						1.84		39.85							100.00
A-99 2208.09	4	4	M	SEM	Brt											60.34								39.66							100.00
A-99 2208.09	4	7	M	SEM	Brt			3.40								59.04								37.56							100.00
A-99 2212.91	2	1	M	SEM	Brt											38.41						1.98		59.61							100.00
A-99 2212.91	4	1	M	SEM	Brt											37.96								62.04							100.00
A-99 2212.91	5	1	M	SEM	Brt											38.40								61.60							100.00
A-99 2212.91	5	2	M	SEM	Brt											38.71						1.88		59.41							100.00
A-99 2245.84	2	1	M	SEM	Brt											41.63								58.39							100.02
A-99 2245.84	2	2	M	SEM	Brt											39.05						2.53		58.45							100.03
A-99 2245.84	3	3	M	SEM	Brt			0.96								39.98								59.08							100.02
A-99 2245.84	4	1	M	SEM	Brt											38.48								61.54							100.02
A-99 2245.84	4	2	M	SEM	Brt											38.88								61.14							100.02
A-99 2245.84	5	1	M	SEM	Brt											38.60						3.49		57.92							100.01
A-99 2245.84	5	3	M	SEM	Brt											39.08								60.94							100.02
A-99 2245.84	5	7	M	SEM	Brt											39.90						2.71		57.38							99.99
A-99 2245.84	6	1	M	SEM	Brt											39.03						2.35		58.64							100.02
A-99 2245.84	6	4	M	SEM	Brt											38.13								61.87							100.00
A-99 2245.84	6	5	M	SEM	Brt											39.55						2.21		58.24							100.00
A-99 2245.84	7	2	M	SEM	Brt											40.03								60.00							100.03
A-99 3796.33	5	1	D	SEM	Brt											34.58								65.36		0.08					100.02
A-99 3796.33	6	1	D	SEM	Brt											35.21								64.81							100.02
A-99 3796.33	7	1	D	SEM	Brt			2.17								34.06						0.52		63.27							100.02
A-99 3796.33	9	1	D	SEM	Brt											34.53								65.48							100.01
A-99 3796.33	13	1	D	SEM	Brt											35.01								65.01							100.02
A-99 3796.33	13	2	D	SEM	Brt											35.03								64.97							100.00
C-67 4085.83	17	1	D	SEM	Brt											37.88								62.14							100.02
C-74 3918.64	2	1	D	SEM	Brt											38.43								61.57							100.00
C-74 3918.64	3	1	D	SEM	Brt											40.30								59.71							100.01
D-35 3162.76	1	2	D	SEM	Brt											38.83								61.18							100.01
D-35 3162.76	1	3	D	SEM	Brt											40.15								59.86							100.01
D-35 3162.76	1	5	D	SEM	Brt											38.90								61.10							100.00
D-35 3162.76	4	1	M	SEM	Brt											39.08						1.60		59.34							100.02
E-58 3551.29-2	2	1	D	SEM	Brt											34.38								65.64							100.02
G-67 2116.36	3	1	M	SEM	Brt											40.07								59.93							100.00
G-67 2116.36	5	1	M	SEM	Brt											39.76								60.24							100.00
G-67 2116.36	5	12	M	SEM	Brt											40.52								59.48							100.00
G-67 2116.36	6	1	M	SEM	Brt											39.19								60.81							100.00
G-67 2116.36	7	1	M	SEM	Brt											38.86								61.14							100.00
G-67 2116.36	8	1	M	SEM	Brt											39.53						2.94		57.53							100.00
G-67 2116.36	8	10	M	SEM	Brt											37.00								63.00							100.00
G-67 2116.36	9	1	M	SEM	Brt							0.45				39.00						0.45		60.32		-0.22					100.00
G-67 2116.36	9	2	M	SEM	Brt							0.84				40.27								58.89							100.00
G-67 2116.36	10	1	M	SEM	Brt			0.91				2.20				32.28	5.27							59.34							100.00
G-67 2116.36	12	1	M	SEM	Brt											36.08								63.92							100.00
G-67 2116.36	12	2	M	SEM	Brt											37.74								62.26							100.00
G-67 2116.36	13	1	M	SEM	Brt						0.75	0.56	1.60			30.46	2.07	0.58						63.98							100.00
J-47 4081.17	3	1	D	SEM	Brt											41.38						11.29		47.33							100.00
J-47 4081.17	3	2	D	SEM	Brt											40.92						13.67		45.41							100.00
J-47 4081.17	4	1	D	SEM	Brt									0.34		39.34						8.55		51.77							100.00
J-47 4081.17	5	1	D	SEM	Brt											39.44						11.74		48.82							100.00
J-47 4081.17	5	2	D	SEM	Brt											38.48						10.11		51.41							100.00
J-47 4081.17	5	3	D	SEM	Brt											38.68						10.05		51.27							100.00
J-47 4081.17	5	5	D	SEM	Brt			1.52	0.64			0.48				38.76						10.09		48.50							100.00

Table 1: Representative chemical analyses of diagenetic barite.

Sample	Location	Analysis	Type	Source	Mineral	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	P2O5	SO3	F	Cl	NiO	Cr2O3	As2O3	SrO	Nb2O5	BaO	Ce2O3	WO3	HfO2	B2O3	CoO	ZrO2	Total
J-47 4081.17	5	16	D	SEM	Brt				2.67			5.68				37.18						10.17		44.31							100.00
J-47 4081.17	7	1	D	SEM	Brt											38.48						9.12		52.40							100.00
J-47 4081.17	8	1	D	SEM	Brt											39.33						11.72		48.95							100.00
J-47 4081.17	9	1	D	SEM	Brt											38.25						7.27		54.49							100.00
J-47 4081.17	10	1	D	SEM	Brt											38.72						7.06		54.22							100.00
J-47 4081.17	10	6	D	SEM	Brt			0.73								39.91						15.40		43.96							100.00
J-47 4081.17	11	1	D	SEM	Brt											38.66						10.03		51.31							100.00
J-47 4081.17	11	2	D	SEM	Brt							0.53				37.96						12.03		49.48							100.00
J-77 2815.22	2	1	M	SEM	Brt											39.60								60.41							100.01
J-77 2815.22	2	2	M	SEM	Brt											39.98								60.03							100.01
J-77 2815.22	2	3	M	SEM	Brt											39.28								60.75							100.03
J-77 2815.22	2	4	M	SEM	Brt											38.95								61.05							100.00
J-77 2815.22	2	6	M	SEM	Brt											39.55								60.47							100.02
J-77 2815.22	2	7	M	SEM	Brt											38.38								61.64							100.02
J-77 2815.22	2	14	M	SEM	Brt			0.79								38.65								60.56							100.00
J-77 2815.22	3	1	M	SEM	Brt											39.00								61.01							100.01
J-77 2815.22	3	3	M	SEM	Brt											39.85								60.15							100.00
J-77 2815.22	3	4	M	SEM	Brt											39.48						2.46		58.07							100.01
J-77 2815.22	4	9	M	SEM	Brt				0.42							40.15								59.42							99.99
J-77 2815.22	5	1	M	SEM	Brt											39.55								60.47							100.02
J-77 2815.22	5	2	M	SEM	Brt											38.93								61.08							100.01
J-77 2815.22	5	3	M	SEM	Brt											39.08								60.94							100.02
J-77 2815.22	5	4	M	SEM	Brt											39.58								60.43							100.01
J-77 2815.22	5	5	M	SEM	Brt											39.40								60.60							100.00
M-41 5928.37	2	2	D	SEM	Brt	0.90										37.96								61.15							100.01
M-41 5928.37	4	1	D	SEM	Brt											36.33								63.67							100.00
M-41 5928.37	4	2	D	SEM	Brt	0.88										37.81								61.33							100.02
M-41 5928.37	4	3	D	SEM	Brt	0.62										37.93								61.47							100.02
M-41 5928.37	6	1	D	SEM	Brt											37.96								62.04							100.00
M-41 5928.37	8	1	D	SEM	Brt											37.96								62.06							100.02
M-41 5928.37	9	1	D	SEM	Brt	0.49						0.63				37.43								61.46							100.01
M-41 5928.37	10	1	D	SEM	Brt							0.36				37.58								62.05							99.99
M-41 5928.37	10	2	D	SEM	Brt							0.45				37.83								61.74							100.02
M-41 5928.37	11	1	D	SEM	Brt							0.52				37.88								61.63							100.03
M-41 5928.37	12	2	D	SEM	Brt											37.96								62.05							100.01
M-41 5928.37	12	3	D	SEM	Brt	0.94										37.38								61.68							100.00
M-41 5928.37	13	1	D	SEM	Brt											38.06								61.95							100.01
M-41 5928.37	13	2	D	SEM	Brt											37.48								62.52							100.00
M-41 5928.37	13	5	D	SEM	Brt	0.79			1.65							39.45				4.61				53.52							100.02
M-41 5928.37	14	1	D	SEM	Brt											37.08								62.93							100.01
M-41 5928.37	14	2	D	SEM	Brt							0.31				37.58								62.12							100.01
M-41 5928.37	14	3	D	SEM	Brt							0.69				37.61								61.73							100.03
M-41 5928.37	14	4	D	SEM	Brt							0.46				38.33								61.21							100.00
M-41 5928.37	14	5	D	SEM	Brt							0.92				37.68								61.39							99.99
M-41 5928.37	14	13	D	SEM	Brt							0.62				38.50								60.91							100.03
M-41 5928.37	15	1	D	SEM	Brt											37.93								62.09							100.02
M-41 5928.37	16	1	D	SEM	Brt											38.18								61.84							100.02
M-41 5928.37	17	1	D	SEM	Brt											38.11								61.91							100.02
M-41 5928.37	18	1	D	SEM	Brt											38.11								61.91							100.02
N-49 3667.33	4	1	D	SEM	Brt											38.31								61.71							100.02
N-49 3667.33	4	2	D	SEM	Brt											39.13								60.87							100.00
N-49 3667.33	4	3	D	SEM	Brt											39.35						2.87		57.78							100.00
N-49 3667.33	4	4	D	SEM	Brt			0.74								38.43						1.51		59.32							100.00
N-49 3667.33	6	1	D	SEM	Brt											38.58								61.45							100.03
N-49 3667.33	6	8	D	SEM	Brt							0.46				39.18						1.53		58.85							100.02

Table 1: Representative chemical analyses of diagenetic barite.

Sample	Location	Analysis	Type	Source	Mineral	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	P2O5	SO3	F	Cl	NiO	Cr2O3	As2O3	SrO	Nb2O5	BaO	Ce2O3	WO3	HfO2	B2O3	CoO	ZrO2	Total
N-49 3667.33	7	1	D	SEM	Brt											38.75						2.31		58.96							100.02
N-49 3667.33	7	2	D	SEM	Brt											38.48						1.31		60.21							100.00
N-49 3667.33	7	4	D	SEM	Brt											38.33						1.69		60.00							100.02
N-49 3667.33	7	5	D	SEM	Brt											38.18								61.84							100.02
N-49 3667.33	8	4	D	SEM	Brt											38.60								61.39							99.99
N-49 3667.33	10	1	D	SEM	Brt											39.08						1.27		59.66							100.01
N-49 3667.33	11	7	D	SEM	Brt											38.73						1.48		59.80							100.01
N-49 3667.33	12	1	D	SEM	Brt											38.08						1.87		60.06							100.01
N-49 3667.33	12	2	D	SEM	Brt											38.06						1.85		60.11							100.02
N-49 3667.33	13	1	D	SEM	Brt											38.53						0.98		60.50							100.01
N-49 3667.33	13	4	D	SEM	Brt											37.71								62.30							100.01
O-76 3809.66	2	1	D	SEM	Brt											38.68								61.32							100.00
O-76 3809.66	3	1	D	SEM	Brt											38.34						3.23		58.43							100.00
O-76 5952.65	4	1	D	SEM	Brt				0.44			0.66				37.63						3.75		57.54							100.02
O-76 5952.65	4	3	D	SEM	Brt				1.16		0.53	2.57				37.31						4.57		53.88							100.02
O-76 5952.65	4	5	D	SEM	Brt				0.42			0.81				38.06						2.83		57.90							100.02
O-76 5952.65	4	6	D	SEM	Brt				0.68			1.60				37.51						3.31		56.93							100.03
O-76 5952.65	4	7	D	SEM	Brt				0.76			1.78				37.11								60.34							99.99
O-76 5952.65	4	14	D	SEM	Brt				7.82		8.87	14.83				22.50						1.80		44.21							100.03
O-76 5952.65	4	16	D	SEM	Brt				1.16		1.33	2.50				35.18						2.32		57.52							100.01
O-76 5952.65	4	17	D	SEM	Brt				1.53			1.62				38.95						4.59		53.33							100.02
O-76 5952.65	4	18	D	SEM	Brt				5.39		1.09	3.53				40.05						1.75		48.17							99.98
O-76 5952.65	5	1	D	SEM	Brt				0.67			1.08				37.46								60.80							100.01
O-76 5952.65	5	2	D	SEM	Brt				1.14		0.93	2.03				34.76								61.15							100.01
O-76 5952.65	5	3	D	SEM	Brt				0.98			2.10				37.61						4.02		55.31							100.02
O-76 5952.65	5	8	D	SEM	Brt				2.77		1.54	6.04				33.76								55.88							99.99
O-76 5952.65	6	1	D	SEM	Brt				0.75			0.99				36.48						4.06		57.73							100.01
O-76 5952.65	7	1	D	SEM	Brt				1.57		0.66	3.02				36.13						4.33		54.30							100.01
O-76 5952.65	8	1	D	SEM	Brt	0.98										38.11						1.99		58.91							99.99
O-76 5952.65	9	1	D	SEM	Brt	0.96										37.66						2.45		58.94							100.01
O-76 5952.65	9	2	D	SEM	Brt											38.80						3.71		57.50							100.01
O-76 5952.65	10	1	D	SEM	Brt											37.86						3.19		58.96							100.01
O-76 5952.65	10	2	D	SEM	Brt				2.06		1.36	4.70				35.38						4.10		52.43							100.03
O-95-3269.82	1	11	D	SEM	Brt											39.23						1.22		59.56							100.01
O-95-3269.82	6	4	D	SEM	Brt											24.40								40.49				35.14			100.03
J-47 4076.26	1	1	D	SEM	Brt											38.06						2.98		58.96							100.00
J-47 4076.26	1	9	M	SEM	Brt											38.45								61.55							100.00
J-47 4076.26	1	14	M	SEM	Brt											37.24								62.76							100.00
J-47 4076.26	1	16	M	SEM	Brt											37.03			0.37					62.60							100.00
J-47 4076.26	1	24	M	SEM	Brt											37.75								62.25							100.00
J-47 4076.26	1	25	D	SEM	Brt											38.63			0.42			4.48		56.47							100.00
J-47 4076.26	1	30	M	SEM	Brt							0.75				38.12			0.38					60.75							100.00
J-47 4076.26	2	3	D	SEM	Brt											38.24						2.94		58.82							100.00
J-47 4076.26	P1	47	M	Probe	Brt	0.16		0.13	0.31	0.01	0.05	0.67	0.19	0.09	0.04	35.03						0.35		65.16		0.03				0.06	102.28
J-47 4076.26	P17	64	D	Probe	Brt	0.49		0.39	0.15	0.01	0.06	0.18	0.21	0.07		33.87						2.39		64.55	0.12	0.00					102.49
J-47 4076.26	P4	52	M	Probe	Brt	0.93		0.68	0.19		0.07	0.29	0.23	0.15	0.02	25.48						0.44		40.88					0.02	0.01	69.38
J-47 4528.03	2	5	D	SEM	Brt						1.29	0.94				40.77						35.18		18.99							97.17
J-47 4528.03	2	6	D	SEM	Brt											39.49						12.21		48.29							99.99
J-47 4528.03	2	21	D	SEM	Brt											39.98						12.21		47.80							99.99
J-47 4528.03	3	2	D	SEM	Brt											39.58						11.94		48.48							100.00
J-47 4528.03	3	6	D	SEM	Brt			4.55								38.17						9.73		47.55							100.00
J-47 4528.03	7	6	D	SEM	Brt											38.25						8.16		53.59							100.00
J-47 4528.03	soi2 P1	68	D	Probe	Brt		0.12	0.01	0.08	0.04	0.02	0.04	0.18	0.07		36.15						12.06		52.42						0.03	101.23
J-47 4528.03	soi3 P10	82	D	Probe	Brt		0.35	0.02	0.25	0.01		0.04	0.17	0.04	0.03	35.93						11.59		52.42	0.27						101.12
J-47 4528.03	soi7 P5	91	D	Probe	Brt		0.31	0.04	0.08	0.01	0.01	0.09	0.18	0.05		36.26						8.47		55.16	0.21						100.88

Table 1: Representative chemical analyses of diagenetic barite.

Sample	Location	Analysis	Type	Source	Mineral	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	P2O5	SO3	F	Cl	NiO	Cr2O3	As2O3	SrO	Nb2O5	BaO	Ce2O3	WO3	HfO2	B2O3	CoO	ZrO2	Total
J-47 4528.03	soi7 P6	92	D	Probe	Brt		0.35		0.02	0.00		0.04	0.15	0.05		36.25						10.71		53.03	0.06				0.05	0.11	100.81
J-47 5445.94	3	1	D	SEM	Brt											37.44						2.84		59.73							100.00
J-47 5445.94	5	1	D	SEM	Brt											37.98						3.21		58.81							100.00
J-47 5445.94	6	1	D	SEM	Brt											38.58						3.38		58.05							100.00
J-47 5445.94	8	1	D	SEM	Brt											38.80						9.36		51.84							100.00
J-47 5445.94	16	13	D	SEM	Brt											37.26						2.03		60.71							100.00
J-47 5445.94	16	16	D	SEM	Brt			1.03								37.13								58.49		3.36					100.00
J-47 5445.94	16	25	D	SEM	Brt				0.74							37.90						2.16		59.21							100.00
J-47 5445.94	16	27	D	SEM	Brt							0.56				37.88								61.56							100.00
J-47 5445.94	19	2	D	SEM	Brt											38.44						2.12		59.43							100.00
J-47 5445.94	51	1	D	Probe	Brt	0.91	0.12	1.45	2.89		0.19	0.39	0.18	0.05		34.07						10.74		50.69	0.21						101.87
J-47 5445.94	51	4	D	Probe	Brt	0.33	0.44	0.33	0.64		0.07	0.06	0.21	0.06	0.03	32.80						3.57		60.58	0.21						99.33
J-47 5445.94	51	4	D	SEM	Brt				0.92							38.50						6.29		54.29							100.00
J-47 5445.94	51	5	D	SEM	Brt				0.76							38.70						11.04		49.51							100.00
J-47 5445.94	59	2	D	Probe	Brt	0.34	0.57	0.34	0.50		0.07	0.13	0.21	0.05	0.01	33.28						4.63		60.03	0.23						100.39
J-47 5445.94	59	6	D	Probe	Brt	0.04	0.62	0.12	0.34			0.32	0.23	0.04		32.91						5.03		59.89	0.25						99.80
J-47 5445.94	61	1	D	SEM	Brt											38.60						2.92		58.48							100.00
J-47 5445.94	68	1	D	SEM	Brt											37.23						1.94		60.83							100.00
J-47 5445.94	68	5	D	Probe	Brt		0.06	0.03	0.02			0.08	0.26	0.04	0.05	33.70						1.93		64.24	0.25						100.65
J-47 5445.94	68	6	D	SEM	Brt											37.71						2.35		59.93							100.00
J-47 5445.94	68	7	D	SEM	Brt											37.75								62.25							100.00
J-47 5445.94	68	8	D	Probe	Brt		0.13	0.05	0.06			0.13	0.24	0.03		32.38						2.36		63.86							99.24
J-47 5445.94	68	9	D	Probe	Brt	0.14	0.00	0.09	0.08			0.13	0.25	0.05	0.05	32.11						1.59		64.54	0.10						99.13
J-47 5445.94	68	10	D	Probe	Brt	0.07		0.02	0.01		0.00	0.10	0.26	0.02		32.45						1.94		63.10	0.05						98.02
J-47 5445.94	68	12	D	SEM	Brt											38.40						1.82		59.78							100.00
J-47 5445.94	68	13	D	Probe	Brt	0.03		0.07				0.08	0.24	0.01	0.06	33.51						2.42		63.28							99.69
J-47 5445.94	68	13	D	SEM	Brt											38.00						1.87		60.13							100.00
J-47 5445.94	68	15	D	Probe	Brt	0.46	0.25	0.30	0.08		0.06	0.12	0.21	0.05	0.03	30.69						1.62		57.36	0.25						91.48
J-47 5445.94	68	17	D	Probe	Brt	0.18	0.22	0.09	0.11		0.05	0.24	0.28	0.05	0.07	33.35						2.09		63.30	0.04						100.06
J-47 5445.94	68	19	D	Probe	Brt		0.29	0.03				0.04	0.22	0.03		33.02						2.30		63.57	0.24						99.75
J-47 5445.94	68	22	D	Probe	Brt	0.01	0.41	0.04				0.02	0.22	0.04		33.49						1.93		63.27	0.13						99.56
J-47 5445.94	68	23	D	Probe	Brt		0.31	0.03				0.02	0.24	0.04	0.01	32.61						2.45		62.66	0.08						98.46
J-47 5445.94	68	26	D	Probe	Brt		0.43	0.06				0.09	0.25	0.05		33.37						1.96		63.40	0.24						99.86
J-47 5445.94	71	1	D	SEM	Brt			0.76								39.01						9.23		51.00							100.00
J-47 5445.94	71	5	D	SEM	Brt			1.80	1.79							37.84						7.76		50.81							100.00
J-47 5445.94	71	6	D	Probe	Brt	0.27	0.28	0.23	0.29		0.02	0.55	0.19	0.08		34.20						4.25		59.17	0.12						99.65
J-47 5445.94	74	4	D	SEM	Brt											37.24								62.76							100.00
J-47 5445.94	74	9	D	SEM	Brt											37.48								62.52							100.00
J-47 5445.94	74-1	1	D	Probe	Brt		0.37	0.02	0.03		0.00	0.13	0.22	0.05	0.02	33.42						2.08		62.99	0.22						99.55
J-47 5445.94	74-1	4	D	Probe	Brt		0.32	0.05	0.03			0.04	0.25	0.03	0.04	32.84						1.87		63.34	0.17						98.98
J-47 5445.94	74-1	5	D	Probe	Brt	0.15	0.23	0.06			0.01	0.03	0.21	0.05	0.01	33.69						1.57		63.76	0.16						99.93
J-47 5445.94	74-1	6	D	Probe	Brt	0.90	0.40	0.50	0.06		0.05	0.06	0.18	0.13		32.80						1.86		61.92	0.22						99.08
J-47 5445.94	74-1	7	D	Probe	Brt	0.03	0.36	0.11	0.05		0.06	0.24	0.24	0.06	0.04	33.36						1.86		64.10	0.22						100.72
J-47 5445.94	74-1	14	D	Probe	Brt			0.04	0.02			0.07	0.19	0.04	0.10	33.10						1.79		64.40							99.74
J-47 5445.94	74-1	17	D	Probe	Brt			0.05				0.05	0.20	0.06		32.79						2.07		63.88							99.10
J-47 5445.94	74-2	19	D	Probe	Brt		0.27	0.06	0.02			0.06	0.27	0.04	0.08	33.21						1.95		65.11							101.08
J-47 5445.94	74-2	21	D	Probe	Brt	0.65		0.11	0.04		0.03	0.12	0.26	0.04	0.09	32.61						1.91		62.67	0.05						98.58
J-47 5445.94	74-2	23	D	Probe	Brt			0.08	0.07		0.02	0.09	0.22	0.05		32.83						1.78		65.51							100.65
J-47 5445.94	74-2	25	D	Probe	Brt	0.07		0.06				0.03	0.23	0.05	0.06	32.92						0.80		66.13							100.35
J-47 5445.94	74-2	26	D	Probe	Brt			0.07	0.04		0.01	0.02	0.17	0.04	0.01	33.05						1.85		64.61	0.02						99.89
J-47 5445.94	74-2	32	D	Probe	Brt			0.05	0.00		0.00	0.03	0.24	0.03	0.05	32.77						0.73		64.97	0.06						98.93
J-47 5445.94	74-3	33	D	Probe	Brt	0.41	0.02	0.14	0.05			0.04	0.26	0.04	0.07	33.99						1.82		62.73							99.56
J-47 5445.94	74-3	35	D	Probe	Brt	0.06		0.07	0.01			0.09	0.22	0.04	0.08	32.18						0.76		65.14	0.11						98.76
J-47 5445.94	74-3	40	D	Probe	Brt	0.14		0.14				0.08	0.28	0.05	0.11	32.94						0.59		65.61	0.01						99.94
J-47 5445.94	74-3	42	D	Probe	Brt			0.08	0.01		0.00	0.06	0.20	0.05	0.01	33.26						1.86		64.58							100.10

Table 1: Representative chemical analyses of diagenetic barite.

Sample	Location	Analysis	Type	Source	Mineral	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	P2O5	SO3	F	Cl	NiO	Cr2O3	As2O3	SrO	Nb2O5	BaO	Ce2O3	WO3	HfO2	B2O3	CoO	ZrO2	Total
J-47 5445.94	74-3	43	D	Probe	Brt			0.08	0.04			0.06	0.26	0.04		33.03						1.90		64.29	0.09						99.79
J-47 5445.94	74-3	48	D	Probe	Brt	0.39		0.14	0.01			0.11	0.26	0.05	0.02	32.10						1.79		63.38	0.04						98.29
J-47 5445.94	74-4	59	D	Probe	Brt							0.03	0.23	0.04	0.04	32.67						2.44		63.92							99.37
J-47 5445.94	74-4	60	D	Probe	Brt			0.01				0.30	0.23	0.06	0.05	33.22						1.84		64.47							100.19
J-47 5445.94	74-4	61	D	Probe	Brt	0.02		0.08	0.04			0.03	0.25	0.05		32.79						1.58		65.50							100.32
J-47 5445.94	74-4	63	D	Probe	Brt			0.06	0.03		0.01	0.07	0.26	0.03		33.22						1.94		65.15	0.03						100.80
J-47 5445.94	74-4	66	D	Probe	Brt	0.02		0.05	0.20			0.41	0.29	0.05	0.09	32.63						0.68		66.18							100.59
J-47 5445.94	74-4	67	D	Probe	Brt	0.43		0.33	0.03			0.03	0.23	0.08	0.04	32.25						1.10		64.55	0.08						99.13
J-47 5445.94	74-4	70	D	Probe	Brt			0.05	0.02			0.02	0.23	0.04		33.47						2.34		63.53							99.70
J-47 5445.94	74-4	71	D	Probe	Brt	0.04		0.06				0.03	0.25	0.06	0.06	32.53						0.94		66.03							99.97
J-47 5445.94	soi16 P5	138	D	Probe	Brt	0.10	0.39	0.08	0.18	0.01		0.07	0.23	0.05		34.37						1.59		64.42	0.37	0.04			0.01	0.02	101.92
J-47 5445.94	soi19 P1	144	D	Probe	Brt		0.48	0.05		0.06		0.03	0.19	0.06	0.02	34.21						1.92		64.61	0.16					0.01	101.79
J-47 5445.94	soi3 P1	102	D	Probe	Brt	0.11	0.62	0.20	0.15	0.04	0.03	0.28	0.20	0.05	0.02	33.93						3.37		61.02	0.07	0.13					100.20
J-47 5445.94	soi3 P4	105	D	Probe	Brt	0.72	0.33	0.15	0.06	0.02		0.28	0.17	0.07		34.07						2.11		63.12	0.18						101.26
J-47 5445.94	soi5 P1	110	D	Probe	Brt	0.04	0.16	0.04	0.06	0.01	0.03	0.15	0.26	0.04		34.39						1.78		64.39	0.19						101.56
J-47 5445.94	soi5 P4	113	D	Probe	Brt	0.19	0.15	0.20	0.07	0.04		0.24	0.21	0.05	0.01	33.75						2.61		63.37	0.01				0.02		100.91
J-47 5445.94	soi5 P5	114	D	Probe	Brt		0.53	0.03	0.11	0.01		0.61	0.22	0.05		35.21						4.48		60.39	0.35						101.99
J-47 5445.94	soi6 P1	120	D	Probe	Brt	0.28	0.40	0.34	0.39		0.03	0.06	0.15	0.04	0.05	34.33						2.99		62.09		0.13			0.01		101.30
J-47 5445.94	soi8 P1	126	D	Probe	Brt		0.51	0.29	0.50		0.07	0.44	0.21	0.05	0.04	35.50						9.88		53.01	0.05	0.03					100.58
J-75 3076.94	SOI1	2	D	Probe	Brt			0.04	0.01		0.01	0.07	0.22	0.06	0.12	33.51						0.12		64.61							98.74
J-75 3076.94	SOI1	3	D	Probe	Brt	0.00		0.06	0.03			0.03	0.34	0.03	0.02	33.24						0.13		66.69							100.58
J-75 3076.94	soi1	4	D	SEM	Brt											37.99								62.01							100.00
J-75 3076.94	soi1	5	D	SEM	Brt											38.08								61.92							100.00
J-75 3076.94	soi1	6	D	SEM	Brt											21.36								39.23				39.41			100.00
J-75 3076.94	SOI1	8	D	Probe	Brt	0.07	0.10	0.06			0.00	0.09	0.22	0.05	0.01	33.26						0.18		63.91	0.08						98.02
J-75 3076.94	soi1	8	D	SEM	Brt											25.07								74.93							100.00
J-75 3076.94	SOI1	9	D	Probe	Brt			0.09			0.02	0.02	0.25	0.03	0.01	33.54						0.18		65.41							99.55
J-75 3076.94	soi1	9	D	SEM	Brt											20.70								37.72				41.58			100.00
J-75 3076.94	SOI1	10	D	Probe	Brt			0.06				0.06	0.19	0.07	0.04	33.32						0.16		64.08	0.16						98.13
J-75 3076.94	soi1	11	D	SEM	Brt											20.81								37.42				41.77			100.00
J-75 3076.94	SOI2	1	D	Probe	Brt			0.07	0.00			0.03	0.27	0.07		32.93						0.20		67.00							100.57
J-75 3076.94	SOI2	2	D	Probe	Brt	0.00		0.05	0.01			0.02	0.35	0.04		33.65						0.09		65.31							99.53
J-75 3076.94	SOI2	4	D	Probe	Brt			0.01				0.03	0.23	0.04		33.12						0.21		66.62	0.05						100.30
J-75 3076.94	SOI2	5	D	Probe	Brt	0.07		0.04			0.00	0.00	0.19	0.06	0.01	33.42						0.10		64.65	0.07						98.61
J-75 3076.94	SOI2	7	D	Probe	Brt			0.09				0.02	0.22	0.06		33.08						0.18		63.96	0.07						97.69
J-75 3076.94	SOI2	8	D	Probe	Brt	0.03	0.23	0.07				0.01	0.19	0.04	0.06	33.56						0.17		63.76	0.14						98.24
J-75 3076.94	SOI2	10	D	Probe	Brt			0.05	0.03			0.00	0.26	0.04	0.08	33.12						0.07		64.88							98.53
J-75 3076.94	soi3	1	D	SEM	Brt											21.35								38.20				40.45			100.00
J-75 3076.94	SOI3	2	D	Probe	Brt	0.02		0.11	0.01			0.01	0.23	0.03		33.87						0.11		64.83	0.01						99.22
J-75 3076.94	soi3	2	D	SEM	Brt											37.89								62.11							100.00
J-75 3076.94	SOI3	3	D	Probe	Brt			0.08	0.02		0.02	0.03	0.25	0.05	0.06	34.28						0.12		63.95	0.09						98.95
J-75 3076.94	soi3	3	D	SEM	Brt											37.66								61.97					0.38		100.00
J-75 3076.94	SOI3	4	D	Probe	Brt			0.08	0.00		0.01		0.25	0.05		33.78						0.18		63.91	0.08						98.35
J-75 3076.94	soi3	4	D	SEM	Brt											34.14								65.86							100.00
J-75 3076.94	SOI3	5	D	Probe	Brt	0.01		0.07	0.00				0.19	0.03	0.03	33.59						0.16		65.56	0.01						99.66
J-75 3076.94	soi3	5	D	SEM	Brt											19.82								35.70				44.48			100.00
J-75 3076.94	soi3	6	D	SEM	Brt											37.82								61.76					0.42		100.00
J-75 3076.94	SOI3	7	D	Probe	Brt	0.01		0.07	0.04		0.00	0.02	0.21	0.06		33.16						0.16		65.35	0.16						99.25
J-75 3076.94	SOI3	9	D	Probe	Brt			0.09	0.01			0.05	0.21	0.06	0.02	34.16						0.06		63.89	0.05						98.60
J-75 3076.94	SOI3	10	D	Probe	Brt	0.01	0.13	0.07	0.07			0.02	0.21	0.06		33.79						0.06		63.76	0.12						98.29
J-75 3076.94	soi3	10	D	SEM	Brt											37.95								62.05							100.00
J-75 3076.94	SOI3	11	D	Probe	Brt			0.05	0.02		0.01	0.02	0.19	0.06		33.67						0.09		64.34	0.00						98.45
J-75 3076.94	soi3	11	D	SEM	Brt											37.97								62.03							100.00
J-75 3076.94	SOI3	13	D	Probe	Brt		0.19	0.03	0.01			0.15	0.19	0.01	0.02	33.38						0.18		64.10	0.09						98.33
J-75 3076.94	soi3	13	D	SEM	Brt											37.46								62.54							100.00

Table 1: Representative chemical analyses of diagenetic barite.

Sample	Location	Analysis	Type	Source	Mineral	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	P2O5	SO3	F	Cl	NiO	Cr2O3	As2O3	SrO	Nb2O5	BaO	Ce2O3	WO3	HfO2	B2O3	CoO	ZrO2	Total
J-75 3076.94	soi3	14	D	SEM	Brt											37.82								62.18							100.00
J-75 3076.94	soi3	15	D	SEM	Brt											38.14								61.86							100.00
J-75 3076.94	soi3	17	D	SEM	Brt											38.69								61.31							100.00
J-75 3076.94	soi3	19	D	SEM	Brt											20.61								37.00				42.39			100.00
J-75 3076.94	soi3	20	D	SEM	Brt											38.40								61.27					0.33		100.00
J-75 3076.94	soi3	21	D	SEM	Brt											37.10								62.90							100.00
J-75 3076.94	soi3	22	D	SEM	Brt											37.52								62.48							100.00
J-75 3076.94	soi3	23	D	SEM	Brt											37.25								62.75							100.00
J-75 3076.94	soi3	24	D	SEM	Brt											37.52								62.48							100.00
J-75 3076.94	soi3	25	D	SEM	Brt											37.98								62.02							100.00
J-75 3076.94	soi3	26	D	SEM	Brt											39.50								60.50							100.00
J-75 3076.94	soi3	27	D	SEM	Brt											38.47								61.53							100.00
J-75 3076.94	soi3	28	D	SEM	Brt											18.12								32.56				49.12	0.20		100.00
J-75 3076.94	soi3	29	D	SEM	Brt											19.56								35.72				44.73			100.00
J-75 3076.94	soi3	35	D	SEM	Brt											37.58								62.42							100.00
J-75 3076.94	soi3	37	D	SEM	Brt											40.38								59.62							100.00
J-75 3076.94	soi3	42	D	SEM	Brt											37.67								62.33							100.00
J-75 3076.94	soi3	43	D	SEM	Brt											37.95								62.05							100.00
J-75 3076.94	soi3	44	D	SEM	Brt											37.70								62.30							100.00
J-75 3076.94	SOI4	1	D	Probe	Brt	0.04		0.07	0.00			0.02	0.22	0.06		33.60						0.13		64.67	0.17						98.96
J-75 3076.94	SOI4	2	D	Probe	Brt		0.15	0.06			0.01	0.02	0.23	0.06		34.30						0.14		63.63	0.20						98.80
J-75 3076.94	soi4	2	D	SEM	Brt											20.68								37.54				41.78			100.00
J-75 3076.94	SOI4	3	D	Probe	Brt	0.01		0.08			0.01	0.05	0.29	0.07	0.05	34.22						0.15		64.06	0.01						98.98
J-75 3076.94	soi4	3	D	SEM	Brt											37.63								62.37							100.00
J-75 3076.94	SOI4	4	D	Probe	Brt			0.11	0.00			0.02	0.23	0.06		33.53						0.06		64.12	0.08						98.20
J-75 3076.94	soi4	4	D	SEM	Brt											37.71								62.29							100.00
J-75 3076.94	soi4	5	D	SEM	Brt											37.56								62.44							100.00
J-75 3076.94	soi4	6	D	SEM	Brt											37.69								62.31							100.00
J-75 3076.94	SOI4	7	D	Probe	Brt		0.35	0.08	0.02			0.04	0.19	0.05	0.01	34.72						0.16		62.80	0.22						98.62
J-75 3076.94	soi4	7	D	SEM	Brt											37.60								62.40							100.00
J-75 3076.94	SOI4	8	D	Probe	Brt		0.18	0.11				0.03	0.23	0.06		33.56						0.18		63.49	0.42						98.26
J-75 3076.94	soi4	8	D	SEM	Brt											36.95								62.57					0.48		100.00
J-75 3076.94	SOI4	9	D	Probe	Brt		0.05	0.08				0.03	0.27	0.05	0.05	33.68						0.11		64.23	0.17						98.71
J-75 3076.94	soi4	9	D	SEM	Brt											16.52								29.94				53.54			100.00
J-75 3076.94	SOI4	10	D	Probe	Brt		0.10	0.07	0.01		0.00	0.02	0.22	0.04	0.03	33.34						0.16		64.64	0.15						98.78
J-75 3076.94	soi4	10	D	SEM	Brt											18.90								34.31				46.79			100.00
J-75 3076.94	SOI4	12	D	Probe	Brt		0.10	0.06	0.03			0.00	0.21	0.03	0.02	33.97						0.13		64.76	0.31						99.61
J-75 3076.94	soi4	16	D	SEM	Brt											21.07								38.60				40.33			100.00
J-75 3076.94	soi4	19	D	SEM	Brt											33.62								66.38							100.00
J-75 3076.94	soi4	20	D	SEM	Brt											38.08								61.92							100.00
J-75 3076.94	SOI5	2	D	Probe	Brt		0.10	0.06				0.01	0.25	0.04	0.03	33.77						0.11		64.62	0.13						99.11
J-75 3076.94	SOI5	4	D	Probe	Brt		0.13	0.05	0.04		0.01		0.22	0.06		33.44						0.08		64.04	0.32						98.38
J-75 3076.94	SOI5	5	D	Probe	Brt	0.08	0.22	0.11	0.01			0.00	0.28	0.04		34.41						0.09		64.04	0.15						99.43
J-75 3076.94	SOI5	6	D	Probe	Brt		0.15	0.05	0.02				0.15	0.05		33.23						0.22		64.11	0.09						98.07
J-75 3076.94	SOI5	8	D	Probe	Brt		0.23	0.07	0.00				0.24	0.05	0.04	33.98						0.11		63.16	0.14						98.02
J-75 3076.94	SOI5	11	D	Probe	Brt		0.20	0.09	0.02			0.01	0.22	0.04		33.17						0.14		63.82	0.23						97.93
J-75 3076.94	SOI5	12	D	Probe	Brt		0.29	0.08				0.01	0.22	0.04		33.77						0.01		64.13	0.37						98.90
J-75 3076.94	SOI6	2	D	Probe	Brt			0.06				0.03	0.23	0.04	0.04	32.54						0.05		64.95	0.01						97.95
J-75 3076.94	SOI6	3	D	Probe	Brt		0.55	0.07			0.01	0.02	0.25	0.06		32.81						0.17		63.56	0.42						97.91
J-75 3076.94	soi6	3	D	SEM	Brt											19.64								35.98				44.38			100.00
J-75 3076.94	soi6	4	D	SEM	Brt											38.29								61.71							100.00
J-75 3076.94	soi6	5	D	SEM	Brt											19.97								37.23				42.80			100.00
J-75 3076.94	SOI6	6	D	Probe	Brt	0.02	0.57	0.07	0.01			0.04	0.23	0.05	0.03	33.51						0.16		64.18	0.32						99.19
J-75 3076.94	soi6	6	D	SEM	Brt											19.78								36.27				43.95			100.00
J-75 3076.94	SOI6	7	D	Probe	Brt	0.01	0.53	0.06	0.01		0.03	0.12	0.20	0.04	0.04	33.29						0.06		62.73	0.38						97.49

Table 1: Representative chemical analyses of diagenetic barite.

Sample	Location	Analysis	Type	Source	Mineral	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	P2O5	SO3	F	Cl	NiO	Cr2O3	As2O3	SrO	Nb2O5	BaO	Ce2O3	WO3	HfO2	B2O3	CoO	ZrO2	Total
J-75 3076.94	soi6	7	D	SEM	Brt											37.46								62.54							100.00
J-75 3076.94	SOI6	8	D	Probe	Brt		0.71	0.10				0.03	0.22	0.04	0.02	33.42						0.10		63.68	0.46						98.78
J-75 3076.94	soi6	8	D	SEM	Brt											19.37								36.12				44.51			100.00
J-75 3076.94	SOI6	10	D	Probe	Brt		0.75	0.05				0.04	0.19	0.04	0.04	33.45						0.10		62.01	0.59						97.25
J-75 3076.94	SOI6	11	D	Probe	Brt	0.01	0.11	0.04	0.04			0.03	0.22	0.04	0.03	32.57						0.12		66.56	0.35						100.11
J-75 3076.94	soi6	12	D	SEM	Brt											37.74								62.26							100.00
J-75 3076.94	soi6	13	D	SEM	Brt											38.12								61.88							100.00
J-75 3076.94	soi6	14	D	SEM	Brt											20.62								38.65				40.53	0.19		100.00
J-75 3076.94	soi6	15	D	SEM	Brt											21.41								38.39				40.20			100.00
J-75 3076.94	soi6	16	D	SEM	Brt											37.10								62.90							100.00
J-75 3076.94	soi6	17	D	SEM	Brt											38.25								61.75							100.00
J-75 3076.94	soi6	25	D	SEM	Brt											19.49								35.59				44.65	0.27		100.00
J-75 3076.94	soi6	26	D	SEM	Brt											36.73								62.70					0.57		100.00
J-75 3076.94	soi6	27	D	SEM	Brt											37.35								62.65							100.00
J-75 3076.94	soi6	28	D	SEM	Brt											38.10								61.90							100.00

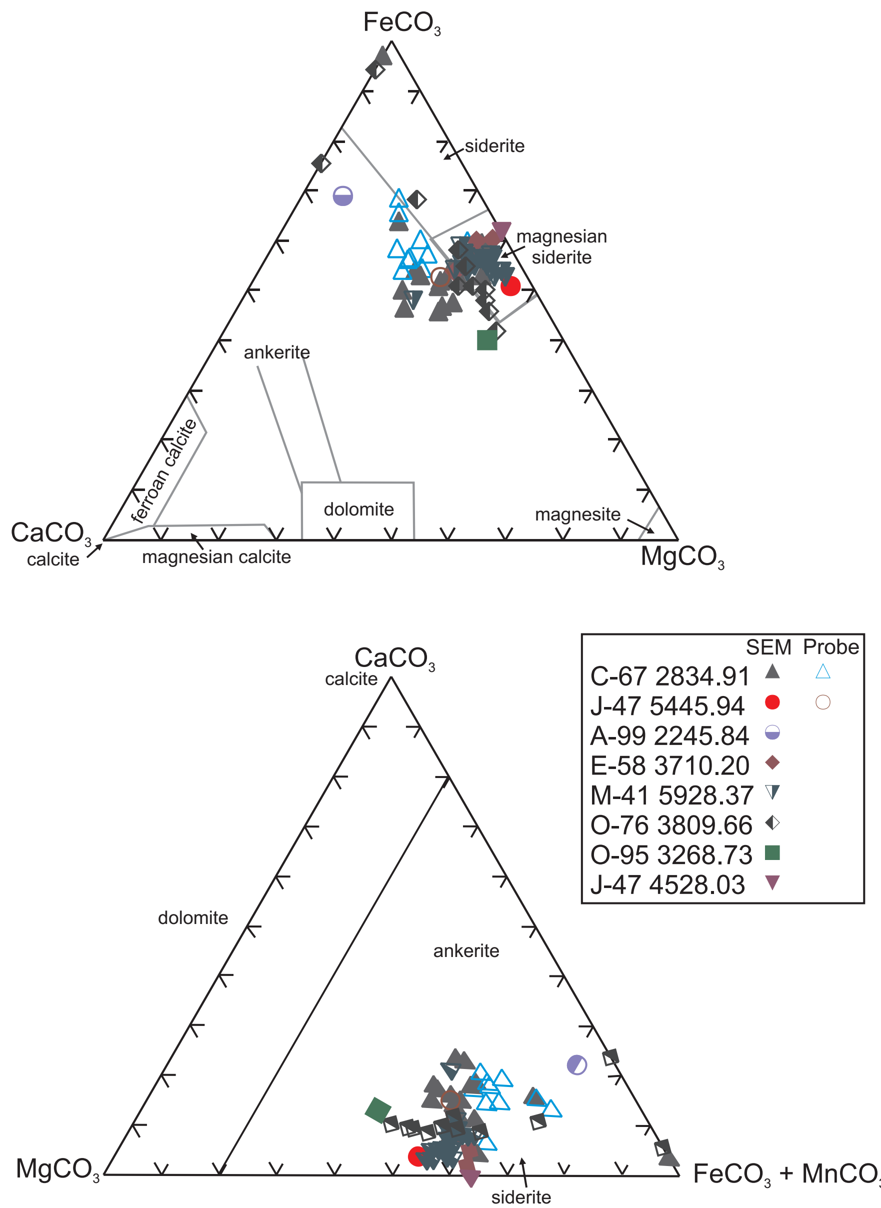
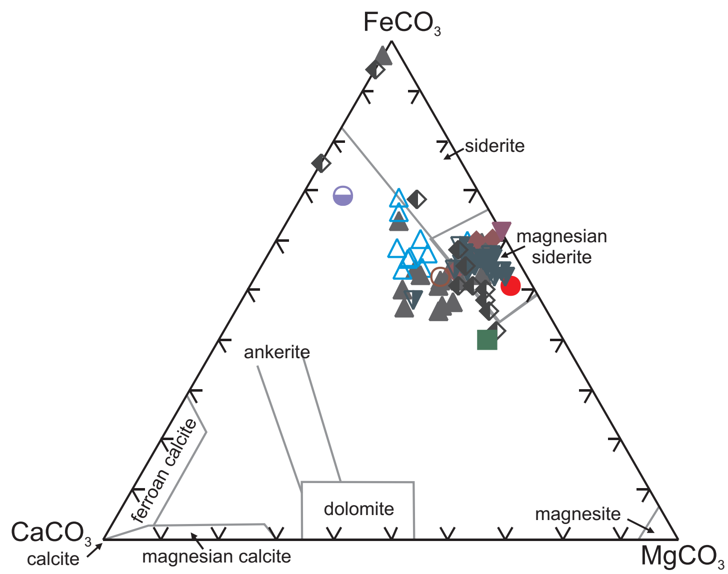


Figure 2: Ternary classification diagrams for siderite (Table 2).


FeCO3
siderite
magnesian
siderite
ankerite
ferroan calcite
dolomite
magnesite
CaCO3
calcite
magnesian calcite
MgCO3

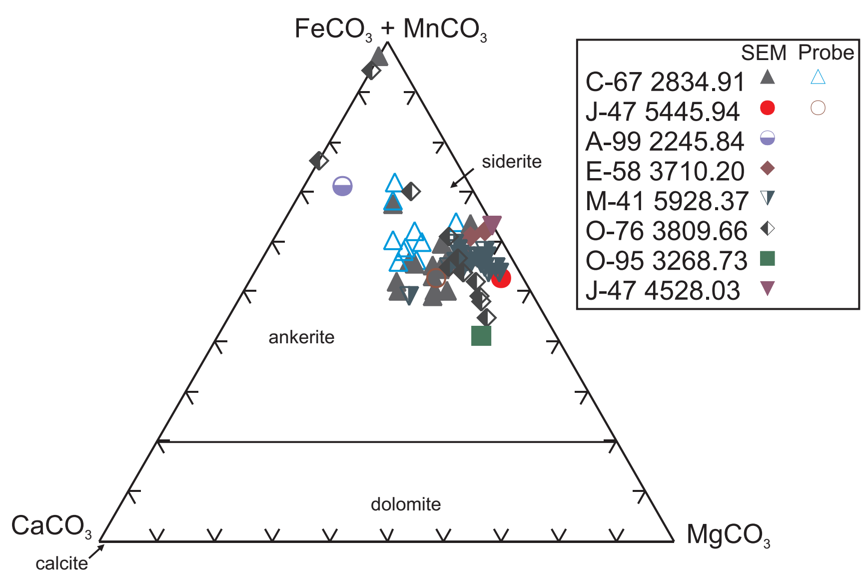

FeCO3 + MnCO3
siderite
ankerite
dolomite
CaCO3
calcite
MgCO3
SEM
Probe
C-67 2834.91
J-47 5445.94
A-99 2245.84
E-58 3710.20
M-41 5928.37
O-76 3809.66
O-95 3268.73
J-47 4528.03

Table 2: Representative chemical analyses of diagenetic siderite.

Sample	Well	Depth	Location	Analysis	Scode	Source	Mineral	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	P2O5	SO3	Cr2O3	ZrO2	F	Cl	NiO	CuO	ZnO	As2O3	SrO	SnO2	Sb2O3	MoO3	BaO	Total
A-99 2245.84	A-99	2245.84	4	9	13	SEM	Sd	1.19			45.72	2.20	1.30	5.60																		56.00
C-67 2834.91	C-67	2834.91	2	6	5	SEM	Sd	1.24		0.52	39.27	1.66	6.42	4.72	1.02	0.07	0.82					0.26										56.00
C-67 2834.91	C-67	2834.91	2	18	5	SEM	Sd	2.03		1.04	35.75	1.87	6.91	5.05	1.97		0.76	0.21				0.44										56.00
C-67 2834.91	C-67	2834.91	3	2	5	SEM	Sd	1.39		0.71	40.87	1.19	5.27	4.98	0.68		0.91															56.00
C-67 2834.91	C-67	2834.91	3	4	5	SEM	Sd	11.31		3.72	28.52	2.57	4.30	2.20	3.28							0.11										56.00
C-67 2834.91	C-67	2834.91	3	5	5	SEM	Sd	4.99		2.38	37.06	3.11	2.89	3.22	0.94	0.48		0.42				0.50										56.00
C-67 2834.91	C-67	2834.91	3	6	5	SEM	Sd	4.82		2.74	34.66	1.64	6.77	3.85	0.64	0.59						0.29										56.00
C-67 2834.91	C-67	2834.91	4	1	5	SEM	Sd	5.49	0.36	2.90	35.06	3.47	2.44	3.85	0.96	0.46		0.53				0.48										56.00
C-67 2834.91	C-67	2834.91	4	14	5	SEM	Sd	5.57		3.26	34.82	1.40	5.45	3.39	0.88	0.24	0.50	0.32				0.17										56.00
C-67 2834.91	C-67	2834.91	13	4	5	SEM	Sd	4.49		2.81	32.96	1.92	5.27	5.91	1.25	0.43		0.60				0.37										56.00
C-67 2834.91	C-67	2834.91	13	13	5	SEM	Sd	1.61		1.00	37.69	1.94	7.29	5.06	1.19							0.23										56.00
C-67 2834.91	C-67	2834.91	2	4	21	Probe	Sd	1.35	0.07	0.67	37.88	1.57	3.47	4.28	0.79	0.20	0.57		0.04								0.03				0.13	51.04
C-67 2834.91	C-67	2834.91	2	2	5	SEM	Sd	1.38			41.92	1.80	5.76	4.92	0.97																	56.75
C-67 2834.91	C-67	2834.91	3	1	21	Probe	Sd	1.55	0.07	1.16	40.32	1.27	5.07	4.68	0.30	0.04	0.61		0.05												0.08	55.19
C-67 2834.91	C-67	2834.91	3	3	21	Probe	Sd	1.34	0.10	0.56	40.32	1.47	4.53	4.52	0.49	0.13	0.54		0.06				0.01				0.08				0.06	54.18
C-67 2834.91	C-67	2834.91	4	1	21	Probe	Sd	1.07	0.09	0.89	43.24	2.33	5.38	3.68	0.19	0.03	0.30		0.05				0.01				0.00				0.08	57.34
C-67 2834.91	C-67	2834.91	5	4	21	Probe	Sd	1.09		0.65	38.61	2.74	2.59	2.71	1.36	0.08	0.47										0.01				0.02	50.34
C-67 2834.91	C-67	2834.91	5	5	21	Probe	Sd	7.51	0.14	5.20	39.91	2.36	2.76	3.15	1.06	0.51	0.44		0.01				0.03				0.04				0.03	63.14
C-67 2834.91	C-67	2834.91	6	2	21	Probe	Sd	0.70	0.04	0.38	38.31	5.53	4.47	8.27	0.57	0.12	0.17		0.04				0.03				0.02					58.66
C-67 2834.91	C-67	2834.91	6	2	5	SEM	Sd				42.86	2.87	6.71	4.56																		57.00
C-67 2834.91	C-67	2834.91	6	3	21	Probe	Sd	0.98	0.04	0.53	46.40	1.52	4.70	4.06	0.62	0.13	0.50		0.05				0.02				0.01				0.02	59.56
C-67 2834.91	C-67	2834.91	10	1	21	Probe	Sd	1.76	0.04	0.71	42.82	3.45	7.56	1.97	0.14	0.47	0.01		0.08				0.07				0.01				0.14	59.24
C-67 2834.91	C-67	2834.91	10	1	5	SEM	Sd				42.89	3.67	8.10	2.34																		57.00
C-67 2834.91	C-67	2834.91	10	4	21	Probe	Sd	0.21	0.05	0.06	42.67	1.12	4.86	5.32	0.46	0.03	0.81		0.08				0.04				0.03				0.10	55.83
C-67 2834.91	C-67	2834.91	10	5	5	SEM	Sd				42.21	1.20	5.54	6.99			1.07															57.00
C-67 2834.91	C-67	2834.91	11	1	21	Probe	Sd	3.62	0.07	1.21	42.60	3.53	5.95	1.56	0.05	0.88	0.03		0.07				0.05								0.06	59.68
C-67 2834.91	C-67	2834.91	11	2	5	SEM	Sd	0.87			44.37	3.63	6.94	1.19																		57.00
C-67 2834.91	C-67	2834.91	11	3	21	Probe	Sd	2.39	0.13	1.90	41.79	1.16	5.01	5.41	0.49	0.13	1.22		0.07				0.01				0.02				0.05	59.78
C-67 2834.91	C-67	2834.91	13	1	21	Probe	Sd	0.03	0.04		55.70	1.05		0.35	0.00	0.04	0.38		0.05				0.05								0.11	57.79
C-67 2834.91	C-67	2834.91	13	1	5	SEM	Sd				55.55	1.06		0.39																		57.00
C-67 2834.91	C-67	2834.91	13	2	21	Probe	Sd	0.05	0.04		41.66	4.56	6.95	3.26		0.02			0.05				0.03								0.04	56.66
C-67 2834.91	C-67	2834.91	13	2	5	SEM	Sd				41.58	4.59	7.37	3.46																		57.00
E-58 3710.20	E-58	3710.2	2	2	15	SEM	Sd	0.67			44.48	0.95	7.35	2.55																		56.00
E-58 3710.20	E-58	3710.2	2	6	15	SEM	Sd	6.53		2.40	37.95	0.77	5.59	1.39	0.67	0.36									0.33							56.00
E-58 3710.20	E-58	3710.2	2	9	15	SEM	Sd	5.52		3.65	34.72	1.04	5.60	2.55	2.11	0.43						0.38										56.00
E-58 3710.20	E-58	3710.2	4	4	15	SEM	Sd				45.80	0.90	7.10	2.20																		56.00
E-58 3710.20	E-58	3710.2	4	14	15	SEM	Sd	0.42			46.60	1.10	7.15	0.73																		56.00
M-41 5928.37	M-41	5928.37	1	6	18	SEM	Sd	2.43		0.73	43.10	0.83	5.97	2.51	0.43																	56.00
M-41 5928.37	M-41	5928.37	1	12	18	SEM	Sd	3.28		1.13	40.84	0.71	6.62	2.50	0.92																	56.00
M-41 5928.37	M-41	5928.37	1	17	18	SEM	Sd				45.14	0.67	8.55	1.64																		56.00
M-41 5928.37	M-41	5928.37	2	6	18	SEM	Sd	2.01		0.63	43.01	0.83	6.72	2.81																		56.00
M-41 5928.37	M-41	5928.37	2	14	18	SEM	Sd				44.65	0.68	9.00	1.66																		56.00
M-41 5928.37	M-41	5928.37	3	2	18	SEM	Sd				44.84	0.82	7.50	2.84																		56.00
M-41 5928.37	M-41	5928.37	3	6	18	SEM	Sd	3.11		0.50	38.95	0.78	6.20	6.08		0.37																56.00
M-41 5928.37	M-41	5928.37	3	8	18	SEM	Sd	1.16			43.86	0.84	7.00	3.14																		56.00
M-41 5928.37	M-41	5928.37	5	4	18	SEM	Sd	0.49			44.42	0.65	8.82	1.28											0.34							56.00
M-41 5928.37	M-41	5928.37	5	7	18	SEM	Sd				45.56	0.82	8.01	1.61																		56.00
M-41 5928.37	M-41	5928.37	6	5	18	SEM	Sd	2.62		0.72	43.15	0.67	7.55	1.30																		56.00
M-41 5928.37	M-41	5928.37	7	7	18	SEM	Sd	2.25		1.13	43.16	0.64	7.27	1.55																		56.00

Table 2: Representative chemical analyses of diagenetic siderite.

Sample	Well	Depth	Location	Analysis	Scode	Source	Mineral	SiO2	TiO2	Al2O3	FeO	MnO	MgO	CaO	Na2O	K2O	P2O5	SO3	Cr2O3	ZrO2	F	Cl	NiO	CuO	ZnO	As2O3	SrO	SnO2	Sb2O3	MoO3	BaO	Total
M-41 5928.37	M-41	5928.37	9	4	18	SEM	Sd	2.59		0.60	42.58	0.90	6.46	2.45		0.42																56.00
M-41 5928.37	M-41	5928.37	11	5	18	SEM	Sd	1.84		0.53	43.74	0.80	6.26	2.08	0.74																	56.00
M-41 5928.37	M-41	5928.37	11	6	18	SEM	Sd	0.76			45.08	0.69	7.50	1.78		0.19																56.00
M-41 5928.37	M-41	5928.37	11	14	18	SEM	Sd	0.45			44.68	0.77	7.69	2.41																		56.00
M-41 5928.37	M-41	5928.37	13	8	18	SEM	Sd				44.83	0.73	9.21	1.23																		56.00
M-41 5928.37	M-41	5928.37	14	15	18	SEM	Sd	1.23		0.43	44.63	0.65	7.83	1.04		0.19																56.00
M-41 5928.37	M-41	5928.37	15	8	18	SEM	Sd	0.96			44.22	0.80	7.27	2.76																		56.00
M-41 5928.37	M-41	5928.37	16	2	18	SEM	Sd	0.53			45.07	0.77	8.06	1.57																		56.00
M-41 5928.37	M-41	5928.37	18	6	18	SEM	Sd	1.60		0.46	43.13	0.80	7.41	2.40		0.21																56.00
O-76 3809.66	O-76	3809.66	1	8	16	SEM	Sd	1.24		0.40	38.66	2.99	6.78	3.28	0.81			1.44				0.41										56.00
O-76 3809.66	O-76	3809.66	1	20	16	SEM	Sd	2.35		0.59	36.87	1.62	6.15	2.30	1.72			2.25				2.15										56.00
O-76 3809.66	O-76	3809.66	1	21	16	SEM	Sd	0.85			36.06	1.73	7.51	2.31	1.36			3.43				2.75										56.00
O-76 3809.66	O-76	3809.66	1	22	16	SEM	Sd				36.70	1.79	8.87	3.02	1.41			1.88				2.34										56.00
O-76 3809.66	O-76	3809.66	1	24	16	SEM	Sd				40.18	1.78	7.61	2.53	1.08			1.06				1.76										56.00
O-76 3809.66	O-76	3809.66	1	29	16	SEM	Sd				36.78	1.81	10.41	3.59	0.78			0.95				1.68										56.00
O-76 3809.66	O-76	3809.66	1	33	16	SEM	Sd				40.15	1.91	5.67	2.34	1.25			1.75				2.92										56.00
O-76 3809.66	O-76	3809.66	26	7	16	SEM	Sd				49.82	0.73		5.45																		56.00
O-76 3809.66	O-76	3809.66	26	8	16	SEM	Sd				47.82	1.82	3.62	2.73																		56.00
O-76 3809.66	O-76	3809.66	26	15	16	SEM	Sd				54.91			1.09																		56.00
O-76 3809.66	O-76	3809.66	26	20	16	SEM	Sd				39.64		8.81	2.85				2.33				2.36										56.00
O-95 3268.73	O-95	3268.73	1	5	20	SEM	Sd	0.95		0.77	38.28	0.43	11.26	4.31																		56.00
J-47 4528.03	J-47	4528.03	2	4	7	SEM	Sd				47.05	1.60	7.35																			56.00
J-47 5445.94	J47	5445.94	74-1	8	4	Probe	Sd	0.08	0.02	0.04	44.68		6.67	4.30	0.09	0.04	0.01	0.00			0.00										0.01	55.95
J-47 5445.94	J-47	5445.94	19	20	3	SEM	Sd				43.66	1.51	9.68	1.16																		56.00