

APPENDIX A (i)CORE DESCRIPTIONS

Core No 1: 4190' - 4215' Recovered: 20'7"

Coring Times: 17, 12, 17, 13, 9, 8, 10, 24, 20, 24, 30, 24, 33, 26, 22,  
25, 23, 37, 29, 25, 24, 36, 37, 38, 56. Mins/ft.

Top 3'8": Interbedded Sandstone (30%) and Shale (70%) Sandstone is white, grey, clean, siliceous, scattered argillaceous blebs and inclusions very fine to fine grained well to medium sorted pyritic in part. Quartz is clear, slightly smoky, sub-angular to sub-rounded, well consolidated. Shale is dark grey, black, argillaceous, micaceous, pyritic, contains scattered very fine grained Sandstone grains in stringers and lenses and is siltstone in part. Sandstone has scattered black residual hydrocarbon around quartz grains and is concentrated in thin (2") beds through top 1'10" of core. Shale breaks in platy (poker chip) layer in part. Minor scattered random orientated worm tubes through section.

7'10" Sandstone. Sandstone is grey, black well consolidated, siliceous, minor argillaceous blebs and inclusions, much black residual hydrocarbon surrounding quartz grains (Asphaltic ?), quartz is clear, smoky, angular to sub-rounded, very fine (minor) to coarse grained, medium to poorly sorted, scattered patches pyrite through interval, minor lenses and stringers shale, grey, black, argillaceous, micaceous through interval; Sandstone is friable, breaks around quartz grains and exhibits some permeability (soaks up water). Some minor scattered bluish fragments (probably fossil fragments) through interval.

8'4" Interbedded Sandstone (50%) and Shale (50%). Sandstone is white, grey, well consolidated, minor argillaceous, blebs and inclusions, siliceous, pyritic in part, slightly pyritic, shale has tendency to present "bubbly" surface when broken; scattered grains very fine grained Sandstone through shale which is silty in part. Abundant scatter random orientated worm tubes through interval.



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Bottom 9" Sandstone: Sandstone is white, grey, well consolidated, hard, siliceous, minor scattered argillaceous blebs and inclusions. Pyritic in part quartz is clear, smoky (minor), sub angular to sub rounded, well to medium sorted. Some angular, platy, shale inclusions, grey black argillaceous, micaceous, sandstone is quartzitic in part (breaks across quartz grains with smooth fracture). Scattered minor patches black, residual hydrocarbon around quartz grains, some bluish fragments (broken fossil fragments) through sandstone. Minor lenses shale, black, grey, argillaceous, micaceous, pyritic, near top of interval, interval tight.

Gas and condensate bleeding through 8' sandstone section of Core. Scattered golden pinpoint fluorescence, purple sheen fluorescence through core, minor pinpoints blue fluorescence. Petroliferous odour when broken. Patches black residual hydrocarbon around quartz grains (high concentration in 8' sandstone section of Core. Other section of Core tight. Dip wavy appears flat (0°).

NOTE: Hole deviation at Core Depth is 4½°. ∴ Core has dip of approximately 5°.

Core No 2: 4585' - 4620' Recovered 33'7"

Coring Times: 46, 41, 51, 49, 46, 81, 55, 45, 49, 44, 45, 32, 18, 30, 20,  
20, 30, 54, 13, 24, 21, 21, 26, 31, 26, 21, 29, 25, 26, 28,  
23, 29, 25, 24 mins/ft.

Top 12'1" Interbedded sandstone (50%) and shale (50%) sandstone is white, grey, very fine to medium grained, well consolidated, siliceous, slight quartzitic in part, minor scattered black, argillaceous blebs and inclusions, pyritic, quartz is clear, slight frosted, sub angular to sub rounded, faceted in part. Shale is grey, black, argillaceous, micaceous, pyritic, lenses of sandstone and shale interfinger, some sections grey sandstone and shale contain oval vug like patches (to  $\frac{3}{4}$ " ) of very fine grained (almost siltstone) sandstone grey, greenish in colour which are approximately parallel to bedding. Silty part of vugs are worked out on

  
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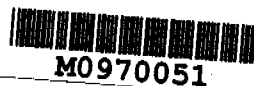
recovery and appear porous (one tight in fact). Cone shows some current bedding with sets to approximately 20° (in some cases in off (180°) directions). Beds of sandstone and shale vary but usually are a maximum of 6" thick.

5'4" from top of Interval is 1'6" white Sandstone which is very fine to medium grained, quartzitic, pyritic. Overall Interval is tight but bottom 2' of Interval shows some bleeding and slight porosity (to 2%) in grey medium grained sandstone patches. Scattered black random streaks through core indicate patches black residual CH around quartz grains. Sandstone is well to medium sorted.

The remaining 21'6" of Core was dropped from the barrel when cone recovered. The recovery was broken down into shale, slight porosity sandstone and porosity sandstone sections for description. Thicknesses indicated extent of these units but do not necessarily represent actual Interval cored. Coring times, show top of sandstone section to be at 2604'.

5'9" Interbedded Sandstone (30%) and Shale (70%) Sandstone is white, grey, well consolidated, siliceous, tight, pyritic, quartz is clear, slightly frosty, sub rounded. Very fine to medium grained, well sorted. Scattered black argillaceous included minor patches black residual CH through sandstone sections. Shale is grey, black, argillaceous, micaceous, pyritic. Some greenish chloritic inclusions through sandstone sections of core. Bottom 3' of section has vugs and patches sandstone white with red spots, fine to medium grained, siliceous. Vugs are up to 1" diameter and shale surrounding them shows "flow structure". Vugs have reddish colouring when wet. Beds and lenses sandstone shale through average 6" thickness. Some shale partings through interval extremely micaceous and pyritic. Interval tight.

6'2" Sandstone. White, with minor shale partings. Shale is grey, slightly greenish, very micaceous and pyritic. Sandstone is well consolidated, siliceous, scattered black argillaceous inclusions, minor patches black residual hydrocarbon, pyritic. Quartz is clear, slightly



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frosted, sub angular to sub rounded, slightly faceted in part, very fine to medium grained, well sorted. Interval has come scattered current bedding with sets to 30%. Possibly some Anhydrite scattered through section, (clear plate like Rhombs with no acid reaction). Interval shows overall porosity to 5% (patchy porosity throughout this section and permeability appears low) Sandstone is friable and breaks around quartz grains.

9'7" Sandstone: (100%) Sandstone is white, with scattered pinkish red blebs and patches (to  $\frac{1}{4}$ " in diameter). Sandstone is well consolidated, siliceous, friable (breaks around quartz grains), very slight pyritic, scattered minor black argillaceous inclusions. Quartz is clear, sub angular to sub rounded, faceted in part, fine to coarse grained, well to medium sorted. Overall section of Core has white brown, mottled appearance on standing (probably due Oil Bleeding). Pink red blebs contain reddish, pink coloured quartz (colouring is in quartz possibly due Haematitic material in grain). Coloured quartz is usually coarse grained. Red colour, stains surrounding cement slightly. Slight trace anhydrite patches. (Colourless Rhombs with no acid reaction). Overall porosity of sandstone is 8%. Porosity is patchy however and some intervals have 10% porosity. Very good bleeding from this interval with strong petroliferous odour. Slight evidence of some fracturing in lower sandstone section of Core. Fracture is approximately 8" long at 70° angle is open at surface but is probably hairline at depth (only 2 noted in Core).

NOTE: Where current bedded core tends to part along current bedding planes rather than true bedding planes. Scattered black residual hydrocarbon. Through sandstone in Upper part of Core. Associated with pinpoint golden fluorescence (no cut with acetone). Bright blue fluorescence. Throughout Core (oil fluorescence). Oil and Gas bleeding from lower sandstone sections of Core. Porosity through lower sandstone section of Core to 8%. Good petroliferous odour throughout. Dip Maximum 8°. Average 4°-5°.



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Core No 3: 4621' - 4646'

Recovered: 23'0"

Coring Times: 33, 37, 32, 35, 40, 47, 46, 45, 52, 47, 51, 45, 46, 63, 96,  
75, 79, 104, 72, 122, 46, 93, 79, 49, 64 mins/ft.

Top 14'10" Sandstone (100%) white, with scattered blebs and patches red, pink quartz (to  $\frac{1}{4}$ "). Very minor shale partings at top and bottom of interval. Shale is grey, slightly greenish, very micaceous, pyritic. Sandstone is well consolidated, siliceous, friable (breaks around quartz grains). Very slight pyritic, scattered minor black, argillaceous blebs and inclusions. Quartz is clear, slightly frosted, sub angular to sub rounded, faceted in part, fine to coarse grained, well to medium sorting. Some sandstone grains are inclusions to "cobble" size (up to  $\frac{1}{2}$ " across), these are scattered in single grains throughout interval. Sandstone sections appears to have good permeability (rapid bleeding etc). Red and pinkish colour is in quartz grains (possibly haematitic) and stains surrounding cement slightly. Core has white, brown mottled appearance on standing. (Probably due oil bleeding). Porosity is patchy through sandstone but runs to 10% in general. Very good oil bleeding from this interval with strong petroliferous odour.

Bottom 8'2" interbedded sandstone (70%) and shale (30%) sandstone is white, pinkish, grey, well consolidated, minor scattered black argillaceous inclusions siliceous, quartzitic in part, hard. Quartz is clear, pinkish, greyish (minor) sub angular to subrounded, faceted in part, very fine to medium grained, well to medium sorted. Minor scattered blebs and patches reddish quartz (to  $\frac{1}{4}$ ") near top of Core. Sandstone is current bedded with sets to 20°. Shale is grey, greenish, argillaceous micaceous (some very micaceous, greenish shale partings). Some open vugs near base of core (5' from bottom of interval) are due to washing out of very fine grained sandstone from vuggy patches in sandstone. Overall intervals is tight with some slight scattered porosity (very slight bleeding) from sandstone patches towards bottom of interval. Some green (chlomites) very fine grained shaly. Sandstone scattered in patches and through interval (mainly towards Core). Sandstone grades to quartzite in part and sandstone shale show "flowing" on some contacts, ie small scale flow



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structures are apparent on sandstone/shale contacts, and sandstone appears to have "Intruded" shale beds. This may be due current or bottom movement at time of deposition (ie wave action on shallow deposited sediments). Some shale lenses and partings are Styolitic in type. (These "styolites" are apparent through Core Nos 2 and 3).

NOTE: Overall bright blue oil fluorescence throughout interval. Porosity in top sandstone section to 10%. Oil and Gas bleeding from top sandstone section of core. Dip approximately 4°. Good petroliferous odour throughout. Very minor traces black residual hydrocarbon around quartz grains, associated with slight pinpoint golden fluorescence (no cut with acetone).

Core No 4: 4700' - 4760'      Recovered: 60'0"

Coring Times: 55, 51, 49, 20, 34, 27, 22, 25, 26, 17, 19, 20, 21, 24, 21, 19, 43, 38, 21, 42, 14, 30, 27, 20, 17, 28, 14, 31, 38, 24, 30, 29, 31, 38, 36, 36, 29, 23, 41, 33, 24, 17, 15, 15, 14, 13, 14, 14, 12, 11, 13, 12, 14, 13, 17, 15, 13, 15 mins/ft.

Top 3'0": Sandstone (100%) white, with scattered bulbs and patches red, pink quartz (to ½"), very minor shale partings. Shale is grey, slightly greenish, micaceous, pyritic. Sandstone is well consolidated, siliceous very fine to medium grained, very slightly pyritic, scattered minor black, argillaceous blebs and inclusions. Quartz is clear, frosted, sub angular to subrounded, faceted in part, well to medium sorting. Red colour is in quartz grains (possibly Haematite). Very slight scattered Porosity (to 4%) through sandstone. Slight oil bleeding through sandstone. Petroliferous odour when core broken.

1'0" Interbedded Shale (90%) and Sandstone (10%). Shale is green, reddish brown, argillaceous, micaceous, sandstone is white with scattered blebs and patches red, pink quartz, well consolidated, siliceous, very fine to medium grained, well to medium sorted. Quartz is clear, frosted, sub angular to sub rounded.

  
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10'1" Sandstone (100%) white with scattered blebs and patches red, pink quartz. Sandstone is well consolidated, siliceous, very fine to medium grained, well to medium sorted. Quartz is clear, frosted, sub angular to sub rounded, faceted in part. Red colour possibly haematite) is in quartz grains, scattered minor lenses and partings. Shale through section. Shale is grey, slightly greenish, micaceous, slightly pyritic. Scattered minor black, angillaceous, blebs and inclusions through sandstone. Sandstone has scattered porosity throughout to 8%. Strong petroliferous odour when core broken; slight oil and gas bleeding from sandstone section.

1'9" Shale (100%) Shale is reddish, brown, green, angillaceous, micaceous, pyritic in part. Bottom 6" of interval is interbedded shale (30%) and sandstone (70%). Shale is as above. Sandstone is white, brown, well consolidated, siliceous, very fine to medium grained, well to medium sorted.

3'9" Sandstone (100%). White with scattered red, pink, quartz, well consolidated, siliceous, very fine to medium grained, well to medium sorted; minor scattered, black angillaceous blebs and inclusions. Slight oil and gas bleeding from interval. Very slight porosity scattered through sandstone (to 4%). Minor partings shale, greenish grey, angillaceous, micaceous. Slight oil and gas bleeding from sandstone.

8'4" Interbedded Shale (60%) and Sandstone (40%). Shale is green, reddish brown, angillaceous, micaceous, slightly pyritic, grades to siltstone in part. Sandstone is white, brown with scattered red and pink quartz, well consolidated, siliceous, very fine to medium grained, well to medium sorting, tight, quartz is clear, frosted sub angular to sub rounded, minor scattered black, angillaceous, blebs and inclusions through sandstone.

5'2" Sandstone (100%). Sandstone is white, brown, well consolidated, siliceous, very fine to medium grained, well to medium sorted. Quartz is clear, brownish, fronted, sub angular to sub rounded. Scattered black angillaceous blebs and inclusions through sandstone. Minor partings shale, greenish grey, angillaceous, micaceous, very slightly pyritic

  
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through section. Slight oil and gas bleeding from interval, slight scattered porosity through sandstone to 4%.

4'2" Interbedded shale (70%) and sandstone (30%). Shale is green, reddish brown, angillaceous, micaceous, slightly pyritic, grades to siltstone in part. Sandstone is white, brown, well consolidated, siliceous, very fine to medium grained, well to medium sorted, tight. Quartz is clear, brownish, fronted, subangular to sub rounded. Scattered black, angillaceous, blebs and inclusions through sandstone.

18'3" Sandstone (100%). White, brown, with scattered red and pink quartz, well consolidated, siliceous, fine to medium grained, well to medium sorted. Quartz is clear slightly brownish, frosted, faceted in part, sub angular to sub rounded. Minor scattered blebs and inclusions, black, angillaceous material, very slight residual hydrocarbon around quartz grains scattered through interval. Stringers and lines shale scattered through interval. Shale is green reddish brown, angillaceous, micaceous, pyritic in part.

Oil and gas bleeding from sandstone throughout interval. Strong Petroliferous odour when core broken. Good porosity (to 10%) scattered throughout interval. Increase in percentage red and pink spotty quartz (possibly heamatitic staining) over bottom 4' of interval. Red "spots" in sandstone are dominant and increase in size up to  $\frac{1}{2}$ " in this section of core.

Bottom 4'6": Interbedded Shale (80%) and Sandstone (20%). Shale is green, reddish brown, angillaceous, micaceous, pyritic in part, grades to siltstone in part. Sandstone is white, brown, well consolidated, siliceous, very fine to medium grained, well to medium sorted, tight. Quartz is clear, frosted, slightly brownish, faceted in part, sub angular to sub rounded, minor scattered black, angillaceous, blebs and inclusions in sandstone.

Note: Sandstone throughout core grades to quartzite in part and is generally quartzite in nature (faceted grains etc). Sandstone is current



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bedded in some sections of the core with sets to 20°. Slight oil and gas bleeding from sandstone sections of core. Scattered porosity in sandstone sections.

Core 2-10%. Strong blue oil fluorescence through core. Strong petroliferous odour when core broken. Very minor traces black residual hydrocarbon around quartz grains associated with slight pinpoint olden fluorescence. Dip approximately 4°.

Core No 5: 6456' - 6477'      Recovered: 13'7"

Coring Times: 11, 9, 7, 5, 5, 6, 5, 4, 4, 4, 3, 6, 5, 6, 5, 6, 6, 7, 6,  
8, 8 mins/ft.

Top 11'3" Green Siltstone with minor green sandstone interbeds and patches. Siltstone is green, argillaceous, dolomitic, micaceous, siliceous in part. Sandstone stringers and patches are contained through siltstone section. Sandstone is green, slightly blackish in colour, quartz is clear, greenish, sub angular to sub rounded, very fine to fine grained, well sorted. Scattered black argillaceous inclusions occur through siltstone and sandstone. Whole interval is massive siltstone grading to very fine grained sandstone patches with little discernable bedding. Siltstone is shale in part.

Bottom 2'4" brown siltstone (minor shale) with occasional brown sandstone interbeds and patches. Siltstone is brown, argillaceous, dolomitic, micaceous, siliceous in part. Sandstone stringers and patches are brown with clear, brownish quartz sub angular to sub rounded, very fine to fine grained, well sorted. Scattered black argillaceous inclusions occur through siltstone and sandstone sections. Siltstone is shale in part and grades to sandstone in patches.

Overall interval is tight and appears as massive siltstone gradational in part to shale and sandstone.

Very slight scattered blue mineral fluorescence. Interval tight. Dip wavy 2° - 5°.

  
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Core No 6: 6948' - 6957' Recovered 6'11"

Coring Times: 13, 9, 11, 17, 13, 17, 19, 19, 21 mins/ft.

6'11" Sandstone with scattered lenses and interbeds siltstone. Sandstone is generally grey, quartzitic, slightly dolomitic to calcareous, with dense grains and inclusions. Quartz is clear, frosted, grey brown, sub angular to sub rounded, faceted when broken (quartzitic nature), very fine to medium grained, medium to poorly sorted. Siltstone lenses are scattered throughout core but prominent 1' - 3' from top of core and over bottom 2'. Siltstone is green in part, red-brown in part, grey, black in part, is generally argillaceous, siliceous in part, micaceous, dolomitic to calcareous. Occurs usually as thin interbeds and stringers but is occasionally patchy as inclusions through sandstone. Sandstone varies in colour and is occasionally green and brown, always has quartzitic nature. Inclusions are argillaceous in part (black or green) but are also dolomitic (brown and reddish) and probably feldspathic (pink-brown). Some scattered green (chloritic) inclusions. Overall core is tight and appears dirty grey in colour. Sandstone has appearance of being a "dump" sediment and may contain inclusions of older rock types. Quartzitic nature of sediment may be secondary. Cementing material as well as being siliceous is in part very calcareous.

Scattered blue mineral fluorescence. Interval tight. Dip wavy indeterminate 0° - 5°.

Core No 7: 8577' - 8584' Recovered 7'

Coring Times: 20, 9, 13, 14, 21, 25, 19 mins/ft.

7' Dolomitic grey, white highly fractured. Dolomite is crypto to medium crystalline, dense has scattered vugs with pinpoint porosity scattered through interval. Patches limestone (generally white) through interval. Limestone is cryptocrystalline and very patchy but interfingers with dolomite throughout cored interval. Scattered patches anhydrite through section (clear Rhomboid sheets) usually along fracture plains; most

  
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prominent zone is 2 feet from top of core. Top 18" core has black silty bands with apparent dip of approximately 75°. These bands are not continuous and appear as partings and lenses along what may be bedding. Black bands are silty and argillaceous but may contain patches black residual hydrocarbon. The bands are Styolitic in part. Fracturing is prominent throughout core (whole core is broken up into small pieces and fragments with apparent random fracture patterns). The dominant fracture plane is near vertical (70° - 90°) with minor fracture plane intersecting at approximately 40°.

Overall interval is tight. Slightly scattered yellow and blue patchy mineral fluorescence.

Interval highly fractured. Tight. Apparent dip 70°+. Possible black asphaltic interbeds and partings (no cut).



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