

DISPLAY B5

110/2b-9: Dalton Field, East Irish Sea

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Dalton is a gas field located in Block 110/2b at the north of the East Irish Sea Basin in the UKCS. Dalton was discovered in 1990 by well 110/2b-9 which encountered a dry gas column of 345ft within the Ormskirk Sandstone Formation of the Triassic Sherwood Sandstone.

The field was developed in 1999 by wells 110/2b-R1, and 110/2b-R2. Wells were located on the eastern field crest in order to attain maximum gas column, and maximise recovery from the good quality reservoir (average permeability > 50mD). Production tests showed the majority of flow from the wells to come from thin high permeability (> 200 mD) aeolian sands. Two smaller highs located in the west and south, separated from the eastern crest by a saddle and normal faults were not drilled, and were assumed to be in communication through the good quality reservoir and open intra-reservoir faults with the field crest in the east. The risk of fault sealing in the high permeability, high net reservoir was considered as low.

Initial gas production in 1999 of 100mmscf/d was followed by a rapid decline to 15mmscf/d early in 2001. This rapid decline suggests more complex reservoir geology than was anticipated, with barriers to field-wide reservoir communication occurring due to faulting or variation in reservoir quality. Understanding of well underperformance was gained by reservoir remodeling. Geological, production, and simulation data suggest that current wells located on the eastern crest are not accessing gas reserves elsewhere in the field due to sealing of major intra-reservoir faults. Field production has led to the generation of a significant pressure differential c. 600psi between the eastern fault compartment and the rest of the field. An innovative infill well solution to harness this pressure differential, and induce cross flow across the sealing fault into existing wells via the high permeability aeolian beds is underway.

The horizontal well will not be completed or tied back at surface, and hence, if successful will be a neat, low cost solution to increasing Dalton field reserves.

Plate A

Well: UKCS 110/2b-9 Interval: 3673.5 ft – 3693.4 ft

Aeolian deposits in Ormskirk SST contributing to high reservoir flow in the well. Unit contains a mixture of aeolian dunes, minor sheetfloods and ephemeral channels. Note the late poikilotopic cement blebs overprinting the facies elements and found particularly within the cross-bedded sands.

Plate B

Well: UKCS 110/2b-9 Interval: 3885.3 ft – 3891.2 ft

Stacked perennial channel deposits showing late stage deformation features. Phyllosilicate framework fault (PFFR) developed by clay concentration along a partially cataclastic fault zone (3887.9ft MD). Note how the fault zone is dark and clay-rich within a reddened sand which appears comparatively clean.

Plate C

Well: UKCS 110/2b-9 Interval: 4142.7 ft – 4147.9 ft

Wet and dry sand flat deposits with ephemeral channels. Prominent fault zone located at 4144.2ft mD containing partitioned clay-rich cataclastic material along the main fault . Cleaner cataclastic faults occur along the white pair of strands within the red quartz cemented sandstone in the footwall. Note partitioned domains within the fault zone where it offsets a 6" laminated unit within clean sands. Note also concentration of clays into the main fault where the major offset of the main sands occurs.

Plate D

Well: UKCS 110/2b-9 Interval: 4170.5 ft – 4173.1 ft

Stacked perennial channels containing minor faults at 4172 ft. Note the moderately inclined pair of faults, one of which is a clay-rich partitioned fault (dark domains). Also note pale cataclastic domains.

Plate E

Well: UKCS 110/2b-9 Interval: 4179.8 ft – 4184.4 ft

Sand flat deposits with aeolian sandsheets and dune remnants containing major cataclastic fault zone between 4179-4180ft. Note the sharply defined boundary to the cataclastic fault zone which contains conjugate and ladder deformation bands as an ultracataclastic zone with fluid flow bleaching at the fault margin.

Display B5 Plate A

Well UKCS 110/2b-9

3673.5 ft

3676.2 ft

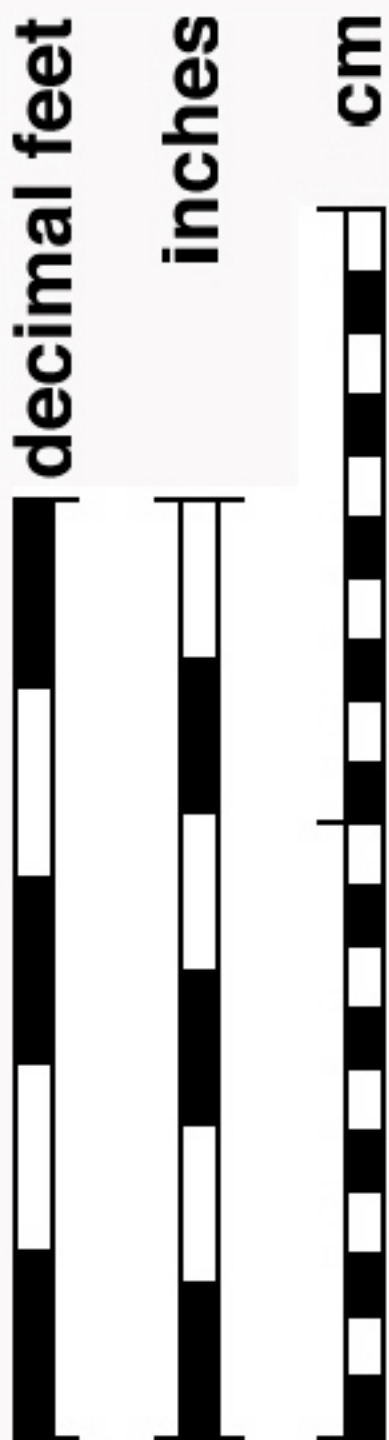
3677.8 ft

3681.55 ft

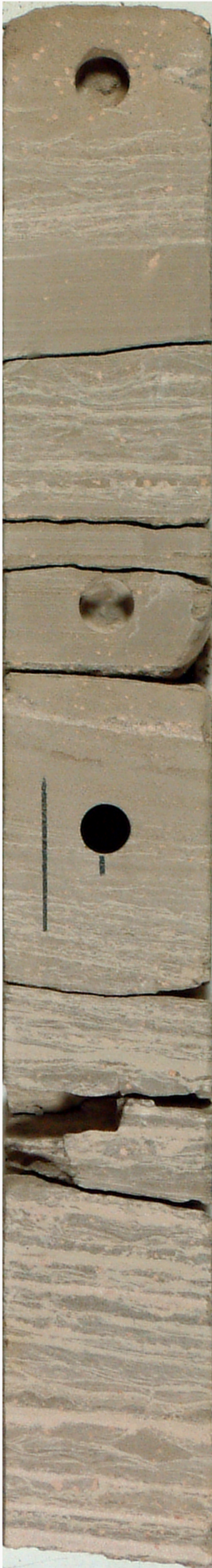
3684.25 ft

3687.15 ft

3690.3 ft



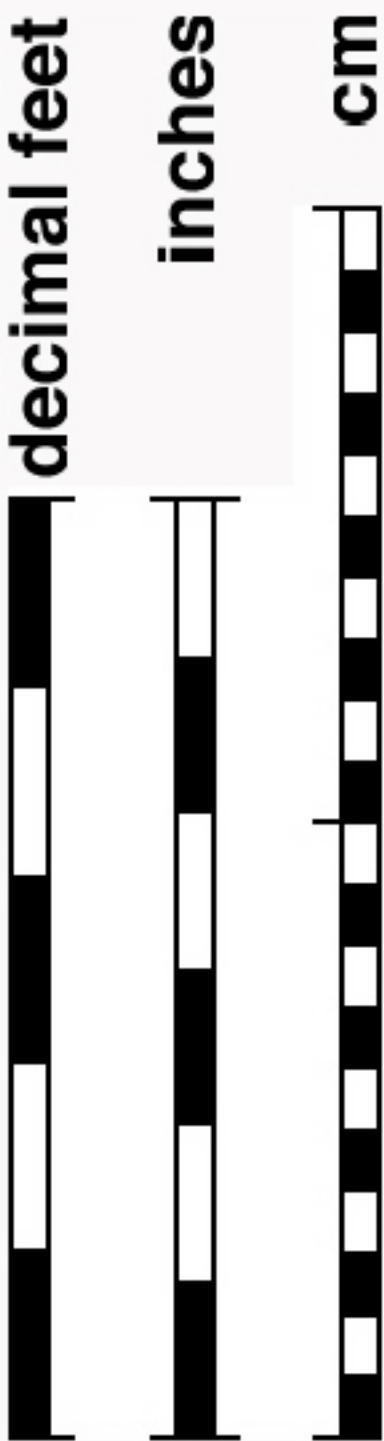
Core photography and digital processing by
Robert Leppard (Leppard Sedimentology Ltd)
and
Colin Oakman (Colin Oakman Associates)



3693.4 ft

Display B5 Plate B

Well UKCS 110/2b-9



Core photography and digital processing by
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Colin Oakman (*Colin Oakman Associates*)

3885.3 ft



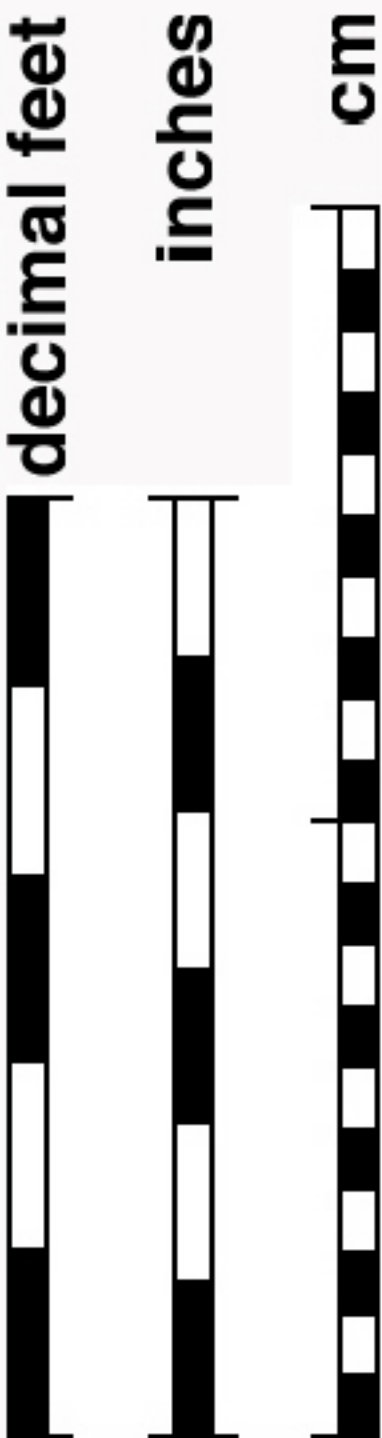
3887.9 ft



3891.2 ft

Display B5 Plate C

Well UKCS 110/2b-9



Core photography and digital processing by
Robert Leppard (Leppard Sedimentology Ltd)
and
Colin Oakman (Colin Oakman Associates)

4142.7 ft



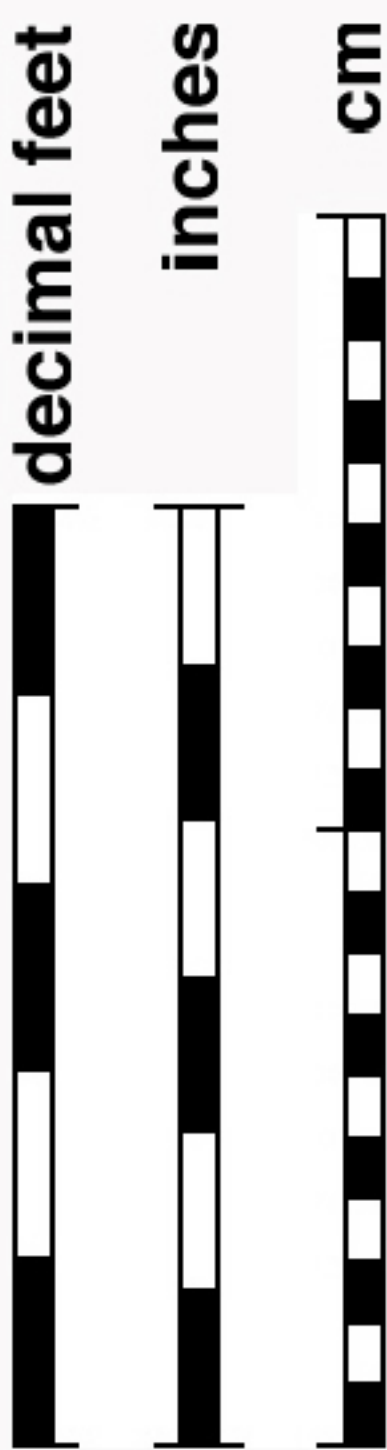
4145.5 ft



4147.9 ft

Display B5 Plate D

Well UKCS 110/2b-9



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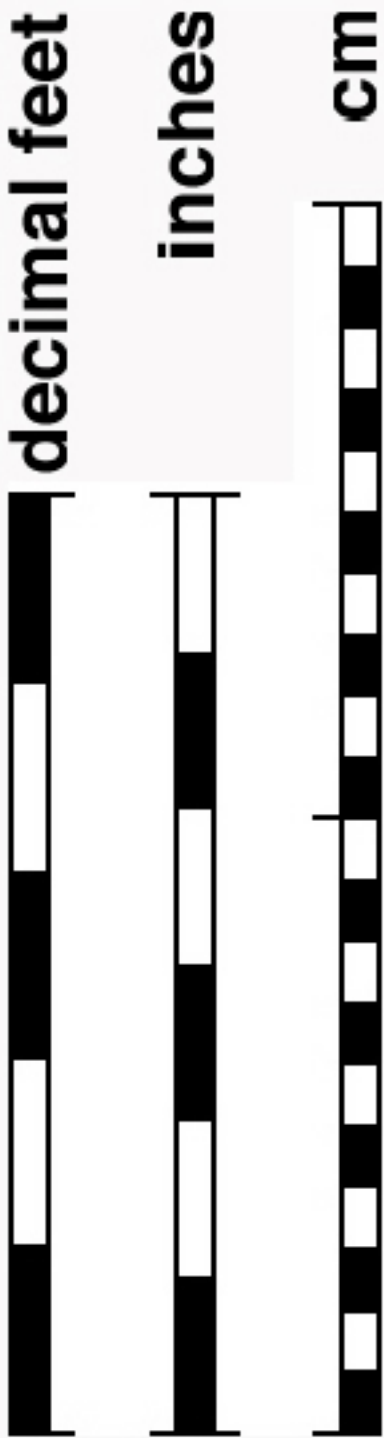
4170.5 ft



4173.1 ft

Display B5 Plate E

Well UKCS 110/2b-9



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Colin Oakman (*Colin Oakman Associates*)

4179.8 ft



4182.1 ft



4184.4 ft