

DISPLAY A3

Ardmore Field – rebirth of the UK’s first offshore oilfield

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The UK’s first offshore oil production began in June 1975 from the Argyll Field. In a 17 year period the field produced 73 million barrels of sweet, light crude. However, in 1992 production from the field became uneconomic and the field was abandoned. All wells were plugged and all facilities removed.

Ten years later in January 2002 two new oil companies, Tuscan Energy and Acorn Oil and Gas were awarded the licence to reactivate the Argyll Field – now renamed Ardmore. A field development plan was submitted to the DTI and approval granted in October 2002. New wells were drilled in the summer of 2003 and first (or should that be second) oil will flow in October 2003.

Ardmore is a geologically complex field with oil having been won from four distinct reservoirs, of which at least three appear to be in both pressure and fluid communication. During the ‘Argyll’ production years (1975-2002) vuggy, fractured, Zechstein carbonates appeared to deliver about 80% of their oil in place. Much of this oil must have come from the underlying Rotliegend sandstone and Devonian sandstone. Natural aquifer support was probably only significant in the Rotliegend interval while the volumetrically dominant Devonian sandstones had the poorest recovery. Recovery from Jurassic sandstones on the west flank of Ardmore was minimal.

This core display shows two of the four produced horizons with examples of the heterogeneous and variable quality Devonian, and the high quality.

Plate A

Well: UKCS 30/24-18	Interval: 9156 ft – 9161 ft 10 in
Well: UKCS 30/24-32	Interval: 12805 ft – 12810.7 ft
Well: UKCS 30/24-32	Interval: 12655 ft – 12660.6 ft

ROTLIEGEND Aeolian facies associations. A- Vertical well, dips are approximately depositional, though compacted. 25° dipping, cm-thick, dune slipface grainflow sands, underlain and overlain by more gently dipping mm-thick wind ripple-laminated apron and dry interdune sands. BS = bounding surface. The origin of the brownish-red colour in the photograph is uncertain, wetting prior to photography or residual oil stain?, the interval having dried out is now yellow-white. B- Granulation seams and fluidisation features cutting a massive fine-grained aeolian sandstone. In this case, the seams are uncemented and pathways for fluid flow and discolouration. More typically there is some cementation by quartz and dolomite.

Plate B

Well: UKCS 30/24-27	Interval: 12499.8 ft – 12510.9 ft
Well: UKCS 30/24-24	Interval: 12375 ft – 12384 ft

ROTLIEGEND Waterlain Weissliegend facies. A- Erosive base, arrowed, overlying wind ripple-laminated sands. The coarse grained massive sands of the Weissliegend fine slightly and show crude ~horizontal stratification in the left-most section of core. B- UV photo, of massive oil stained sands from a well deviated at 38°. The massive character of the sands is evident from the uniform fluorescence and from the way the core breaks at right angles to the borehole rather than along bedding. C- Two thin wind ripple-laminated aeolian intervals, arrowed, within massive coarse-medium grained Weissliegend sands. Whatever depositional processes led to the massive sands, they were interrupted at times by a return to aeolian conditions. Core from well deviated at 27°.

Plate C

Well: UKCS 30/24-35	Interval: 12520 ft – 12531 ft 8 in
Well: UKCS 30/24-20	Interval: 9836 ft – 9841.2 ft
Well: UKCS 30/24-32	Interval: 12609.5 – 12614.9 ft

ROTLIEGEND Other Waterlain facies. A- Basal Rotliegend conglomerate with clasts of quartz, quartzite and red-grey Devonian sandstone. Small arrow indicates a multicycle half-round clast, larger arrow a large desiccation crack filled with rounded aeolian sand grains. Overlying wind ripple-laminated sands are impregnated by bitumen along the more permeable laminae. Vertical well. B- Matrix supported breccia, containing angular clasts of fossiliferous Middle Devonian dolomites (Kyle Group). The shard-like clasts are typical of the desert weathering of carbonates. C- Thin bed of massive waterlain sand, arrowed, interbed within wind ripple-laminated aeolian deposits. Photographs B and C are from a well deviated at 27°.

Plate D

Well: UKCS 30/24-28	Interval: 9469 ft – 9472 ft 2 in
Well: UKCS 30/24-28	Interval: 9496 ft 1 in – 9499 ft 3 in

DEVONIAN Aeolian and possible aeolian successions, 30/24-28, basal B08 and upper part of B07:

a) pin-stripe horizontal laminated sandstone (wind ripple lamination) passing up into base of large scale cross-bedded dune apron; sedimentary structure picked out by bitumen stain;

b) possible large scale dune foreset cross bedding; internal structure picked out by finer grained foresets that might be interpreted as rainfall laminae; this unit may also be interpreted as fluvially reworked dune material

Plate E

Well: UKCS 30/24-28 Interval: 9164 ft – 9173 ft

DEVONIAN Typical channel succession, 30/24-28, basal B10 and upper part of B09; comprising erosively based, fining upward units with basal intraformational conglomerate (lithotype S(G); sub-association CH_C), passing upwards into dominantly trough cross-bedded sand (lithotype St; sub-association CH_B)

Plate F

Well: UKCS 30/24-34 Interval: 9773 ft – 9776 ft

DEVONIAN Overbank facies, arid fluvial associations. Volumetrically very insignificant. Red mudstone with thin sheet sands and sand-filled desiccation cracks

Plate G

Well: UKCS 30/24-28 Interval: 9331 ft 7 in – 9334 ft 5 in

Well: UKCS 30/24-28 Interval: 9398 ft 1 in – 9404 ft 3 in

DEVONIAN Typical sand flat successions, 30/24-28, unit B08

a) 'proximal' sand flat (sub-association SF_P), composed mainly of sandstone showing poorly defined horizontal lamination (lithotype Sh) and slightly deformed lamination (lithotype Sld);

b) 'distal' sand flat (sub-association SF_D), with gradational transition (in left hand core piece) into 'proximal' sand flat (sub-association SF_P); better reservoir quality in SF_P sandstone reflected by more intense oil stain.

Display A3 Plate A

Multi-well

Well UKCS 30/24-18

Well UKCS 30/24-32

Well UKCS 30/24-32

9156 ft

9158 ft 8 in

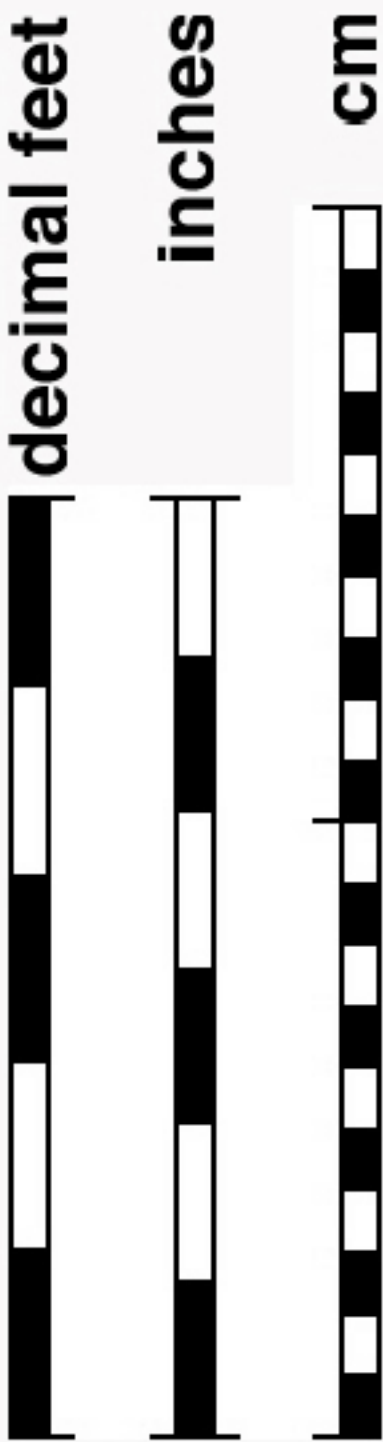
9159 ft 5 in

12805 ft

12807.8 ft

12655 ft

12657.6 ft



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



Display A3 Plate B

Multi-well

Well UKCS 30/24-27

Well UKCS 30/24-24

12499.8 ft

12502.6 ft

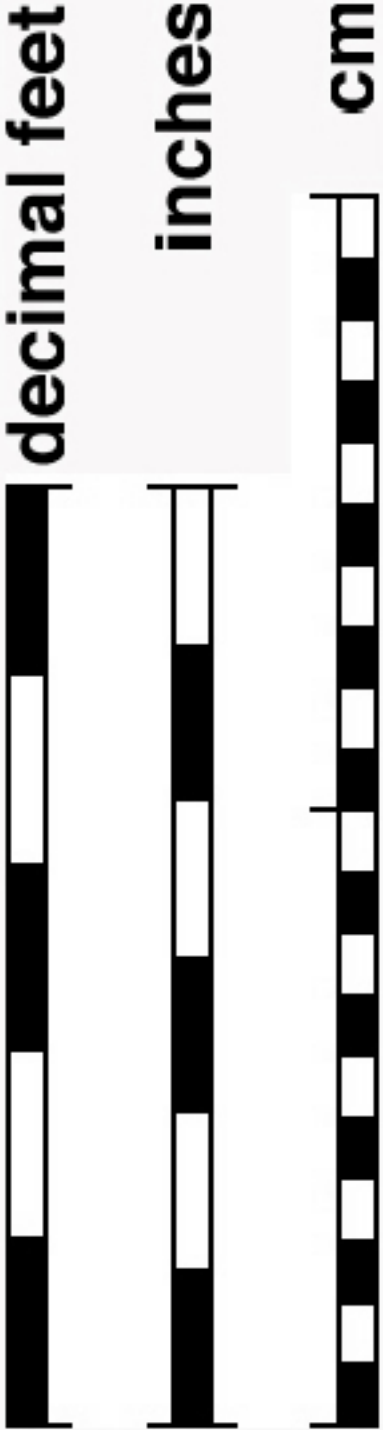
12505.25 ft

12507.8 ft

12375 ft

12378 ft

12381 ft



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Display A3 Plate C

Multi-well

Well UKCS 30/24-35

Well UKCS 30/24-20

Well UKCS 30/24-32

12520 ft

12522 ft 10 in

12525 ft 6 in

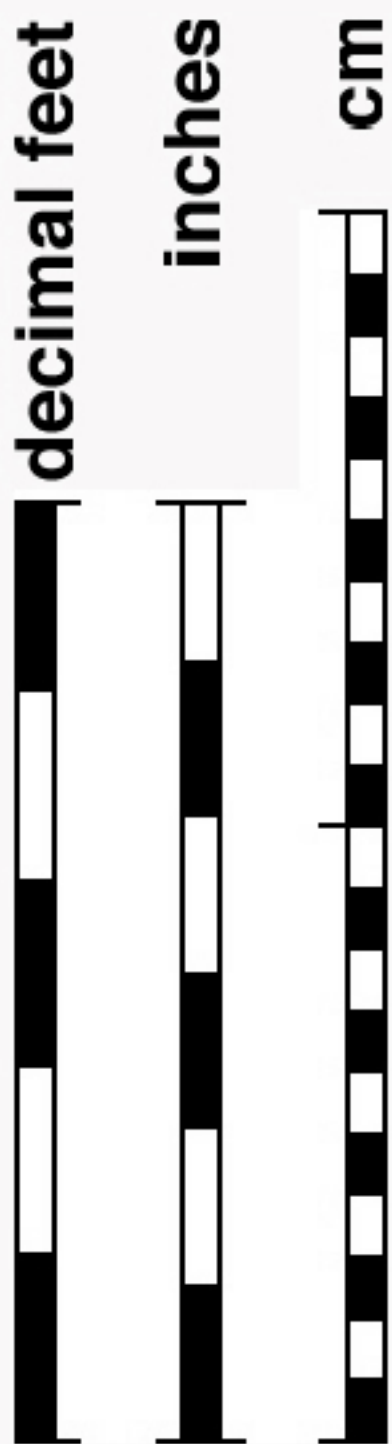
12528 ft 7 in

9836 ft

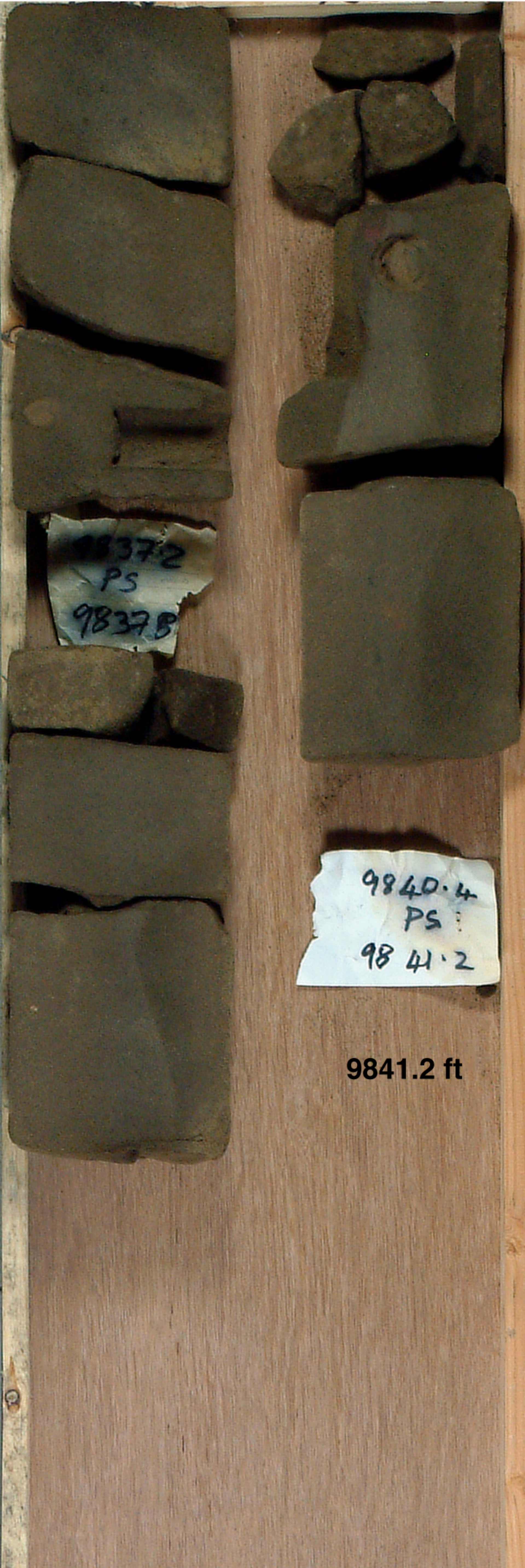
9838.8 ft

12609.5 ft

12612.3 ft



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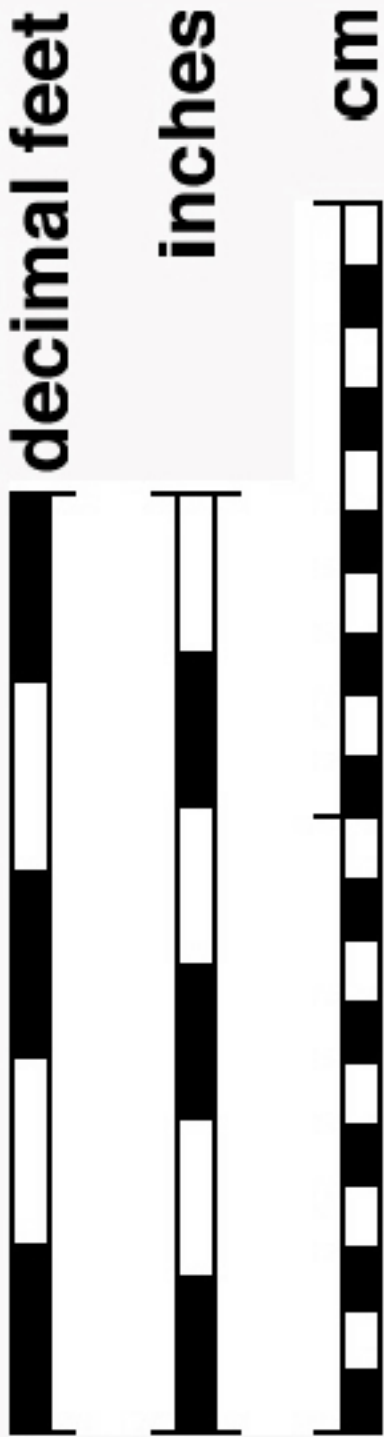


Display A3 Plate D

Well UKCS 30/24-28

9469 ft

9496 ft 1 in



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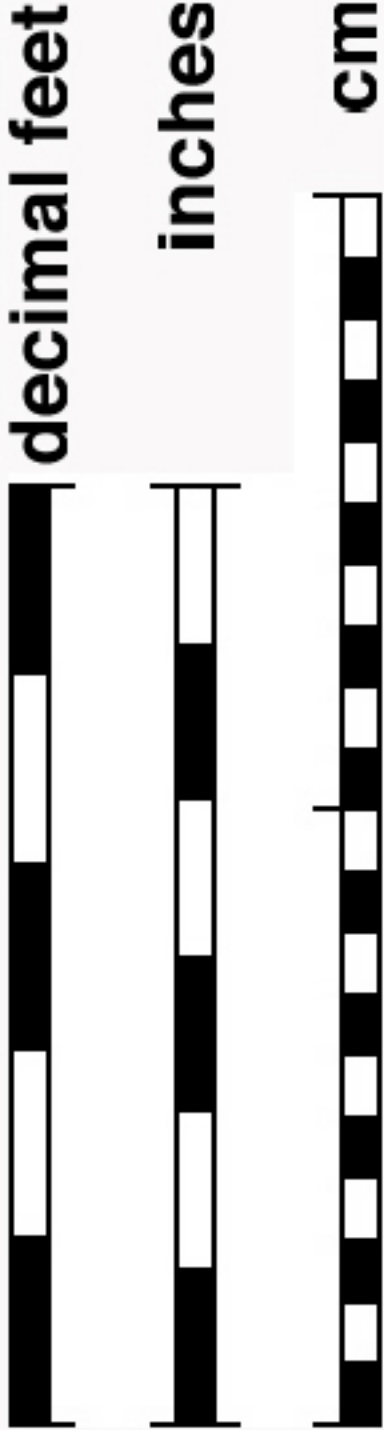
Display A3 Plate E

Well UKCS 30/24-28

9164 ft

9167 ft

9170 ft 5 in



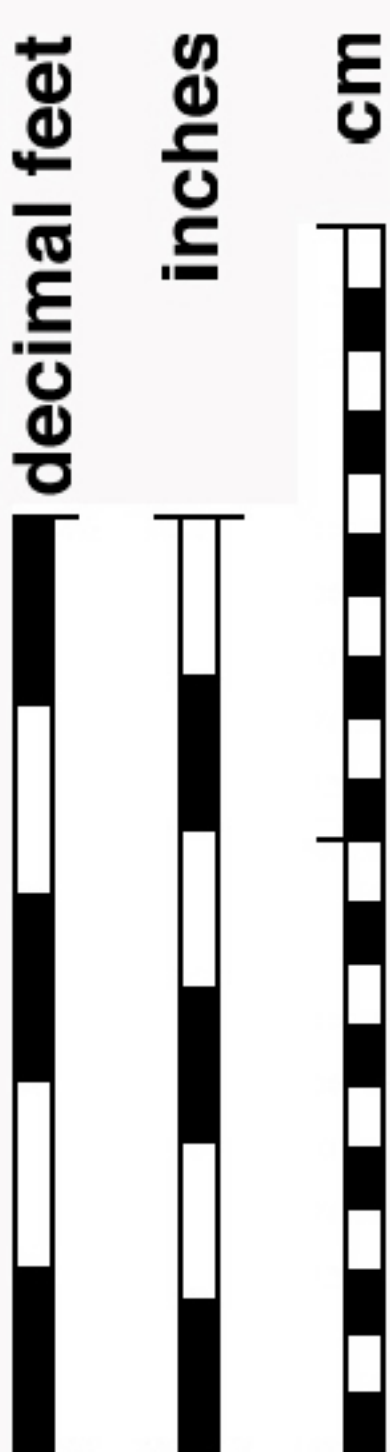
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Display A3 Plate F

Well UKCS 30/24-34

9773 ft



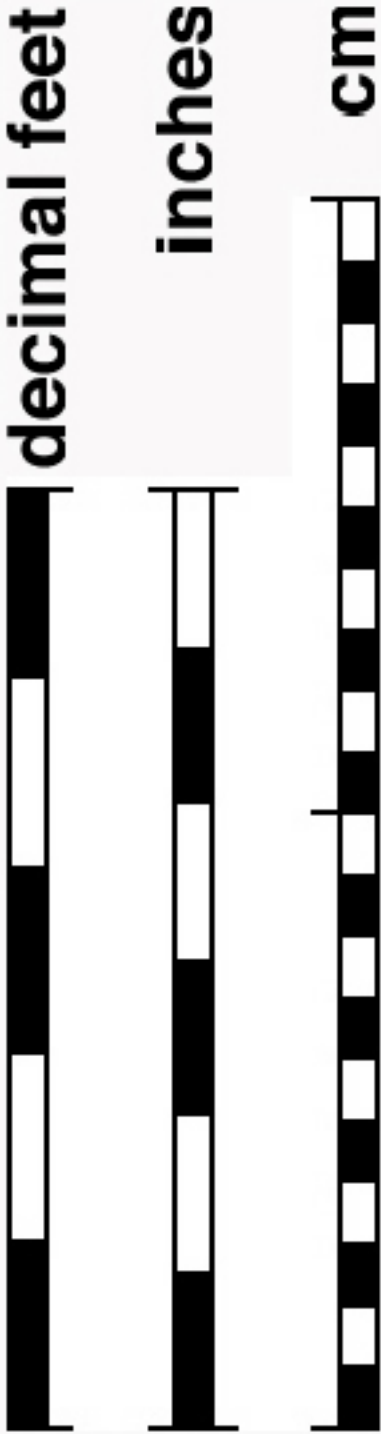
Display A3 Plate G

Well UKCS 30/24-28

9331 ft 7 in

9398 ft 1 in

9401 ft 3 in



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