Well file
ADL

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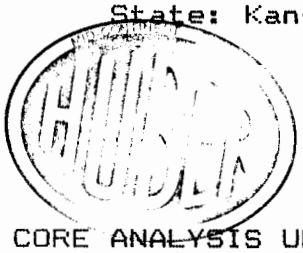
For the attention of Bud Larsen Date, 8th May, 1985,

Company: J.M.Huber Corp.

Well: E Smith 19-5
Field: Kinsley
County: Morton
State: Kansas



GEARHART MOBILE CORE ANALYSIS UNIT REPORT

GRAIN DENSITY
POROSITY
MINERALOGY BY X-RAY DIFFRACTION
CLAY ANALYSIS BY X-RAY DIFFRACTION

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Julian Pieniazek

WELLSITE CORE ANALYSIS

At well E Smith 19-5, Gearhart analysed core samples recovered from 2 runs of the Gearhart Hard Rock Coring Tool. A total of 5 cores were analysed at the wellsite. Using a rotary diamond saw, a 4 to 5g slice (approximately 1/4" long) was cut from the core for analysis. The main part of the core was made available to the client.

GRAIN DENSITY AND POROSITY

Bulk volume was determined by weighing the wet core core slice in water and then in air using a Mettler PE360 balance (accurate to 0.001g). The slice was then washed in methanol and heated in toluene to remove drilling fluids and any hydrocarbons. The grain volume was obtained using a Boyles Law porosimeter and the grain density was calculated. Hence the porosity was determined and the results are presented in Table 1 together with a brief of the rock and any fluorescence.

X-RAY DIFFRACTION

The sample was ground for 10 minutes in a Spex 8000 Series mixer-mill, pressed into an aluminium holder and analysed on a Rigaku Miniflex CN2005 Diffractometer with a copper target and nickel filter. The diffraction traces were compared with those of pure minerals and an estimate of the percentage of each mineral in the cores is presented in Table 2.

The clay content of the cores was determined by one of two methods depending on the rock type: for carbonates, about 0.5g was weighed into a test-tube and 10% HCl was added to dissolve the carbonates and gypsum. The acid solution was removed after centrifuging and the residue was cleaned several times with pure water. After drying the residue was weighed again and the percentage clay content calculated allowing for the presence of other insoluble minerals in the residue. Other rock-types were subjected to ultrasonic vibration in distilled water to put the clay minerals into suspension. After the suspension had been decanted off, the main part of the sample was dried and re-weighed to determine the percentage clay minerals.

The types of clay minerals were identified by drying part of the suspension (obtained in the above proceedure) on a glass slide and analysing this on the X-ray diffractometer. A semiquantitative interpretation of the results is presented in Table 3.

G E A R H A R T I N D U S T R I E S, I N C.

TABLE 1
*** WELLSITE CORE ANALYSIS ***

WELL: E. SMITH #19-5 DATE: 8 May 85

COMPANY: J.M. HUBER CORP

SAMPLE DEPTH	BULK DENSITY	GRAIN DENSITY	POROSITY	FLUOR.	R O C K T Y P E
4955	2.390	2.702	11.5	No flu No cut	LST:mod gry,breccia,pel pyr,rootlets,foss soil
5036	2.332	2.682	13.0	30% Pl yl Inst bl/wh	SST:f-m g,glau,calc cmt occ shl frags,tr coal.
5037	2.394	2.532	5.5	No flu No cut	CLYST: v dk gry,v carb, swelling
5303	2.657	2.718	2.2	No flu. No cut.	LST:pa gy,calc aren,pel mod hd,cmpct.
5591	2.607	2.700	3.4	No flu. No cut.	LST:pa gy,calc aren,pel occ shls,mod hd.

TABLE 2
X-RAY DIFFRACTION ANALYSIS
(WHOLE ROCK)

COMPANY: J.M. HUBER CORP WELL: E. SMITH #39-5 DATE: 8 May 85

DEPTH	QTZ	PLAG	K-FP	CAL	DOL	GYP	MIXED LAYERS	PYR	SID	CHL	CLAY
4955	29%	0%	0%	65%	0%	0%	-	6%	0%	-	43%
5036	61%	15%	0%	8%	15%	0%	-	0%	0%	-	14%
5037	21%	6%	0%	0%	0%	0%	32%	0%	2%	39%	*
5303	1%	0%	0%	99%	0%	0%	-	0%	0%	-	0%
5591	2%	0%	0%	98%	0%	0%	-	0%	0%	-	0%

Analysis does not include carbonaceous material

*Clay percentages determined from main run

PLAG = plagioclase feldspar
CHL=chlorite
SID= siderite
PYR=pyrite

TABLE 3
X-RAY DIFFRACTION ANALYSIS
(CLAY FRACTION)

COMPANY: J.M.HUBER CORP WELL: E.SMITH #19 5

DATE: 8 May 85 APPROX. CLAY PERCENTAGES

DEPTH	%CLAY	MIXED LAYERS	GLAUCONITE	KAOLINITE	CHLORITE
4955	0	75%	0%	25%	0%
5036	14	0%	55%	41%	4%