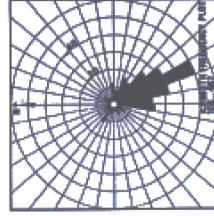
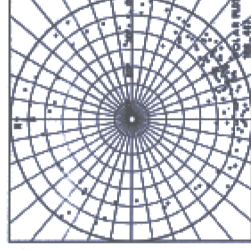
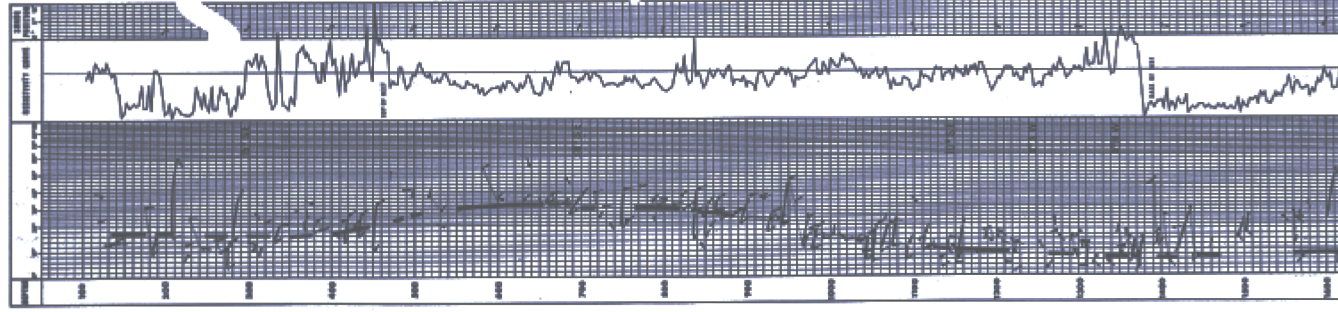


## Exercise 6-1

REEF



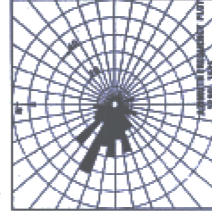
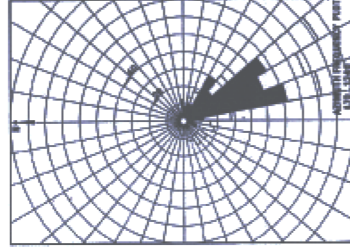
In this well a reef was encountered; base and top of the reef are marked; there were oil shows in the well.

Dipmeter values are plotted for different horizons.

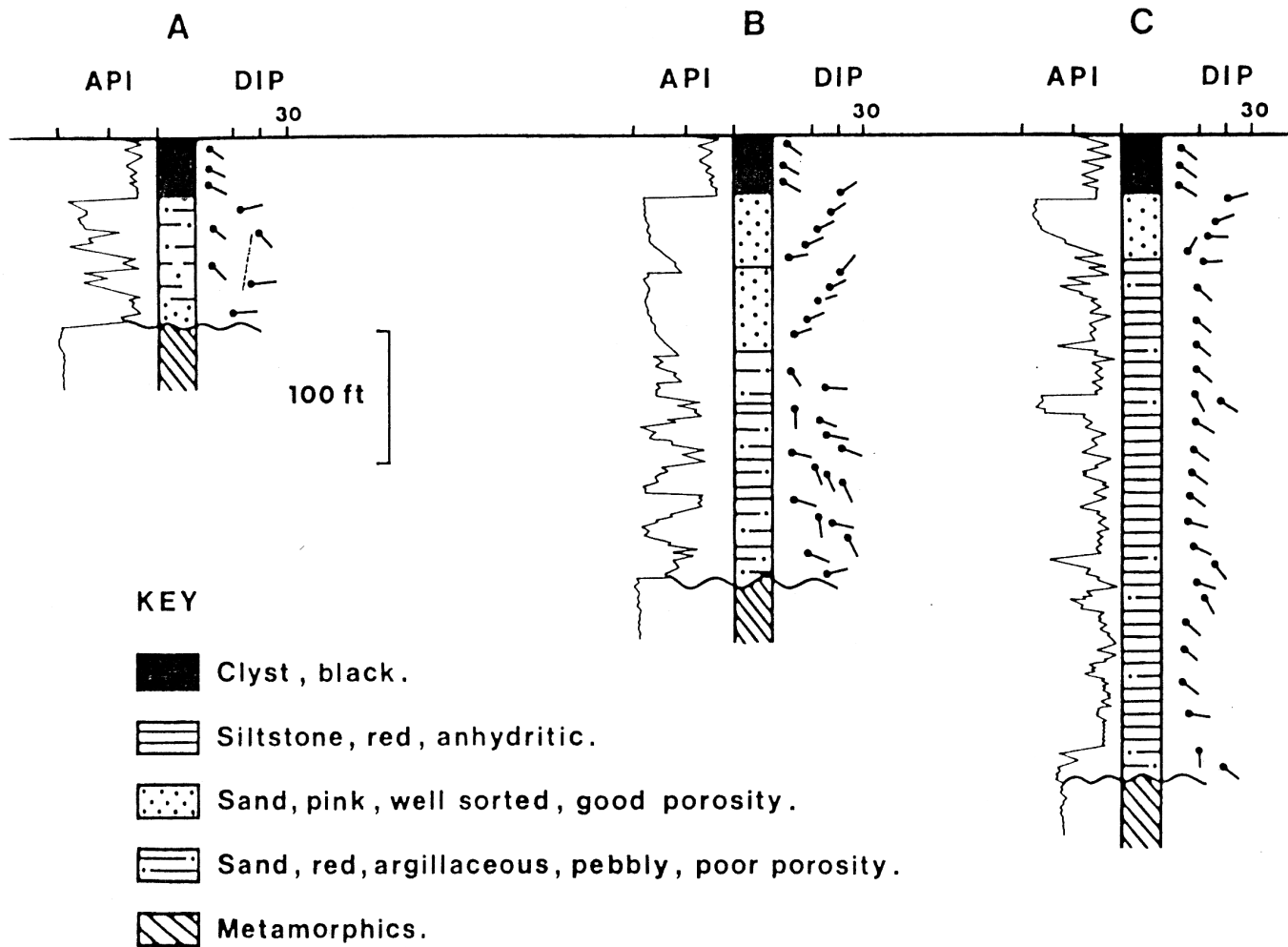
Questions:

- Which part of a reef might be represented?
- Does it make sense, to drill a second well?  
In which direction?

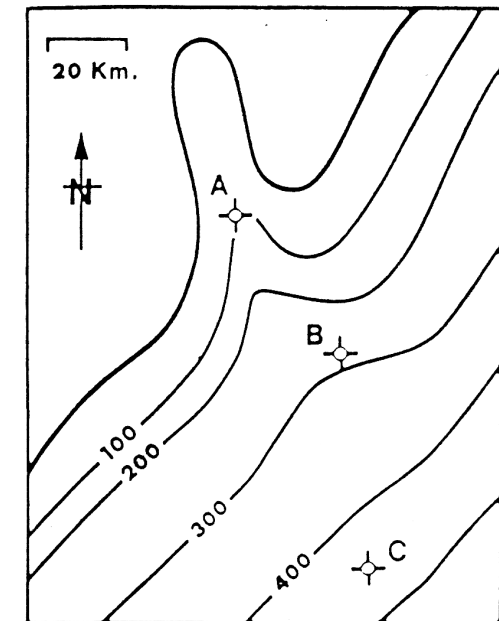
- Give an NW-SE cross section of the probable situation.



# Exercise 6-2



Isopach map of the interval between the black shale & metamorphic basement.



## PROBLEM.

The attached logs & isopach map penetrate a clastic sequence. Define the area on the map where porous beds are likely to be present.

## Exercise 6-3: Bartlesville Sandstone, Kansas (1)

The Bartlesville Sandstone is known to form elongated “shoestring sands”. The orientation of these is often difficult to find out.

Two differing interpretations have been given of these sandstone bodies: an offshore bar, with a (?) convex upper surface, or a channel-fill sandstone with a (?) concave upper top. Question is, in addition, the effect of compaction on the geometry of the sandstones.

For a bar, the strike of bedding should be at right angles to the axis, and subparallel to the axis for the channel.

You have well data, containing SP, GR, resistivities and dipmeter. Due to these and other logs, the succession has been divided into 5 units. Within these units the dipmeter data are grouped and plotted in a sort of Schmidt’s net, that project the poles of the bedding or crossbedding onto the upper half of a hemisphere. From it, only a perimeter of 15 degrees dip is shown: this means poles in the western quadrant indicates a dip to the west. Poles in the centre indicate flat lying strata.

## Exercise 6-3: Bartlesville Sandstone, Kansas (2)

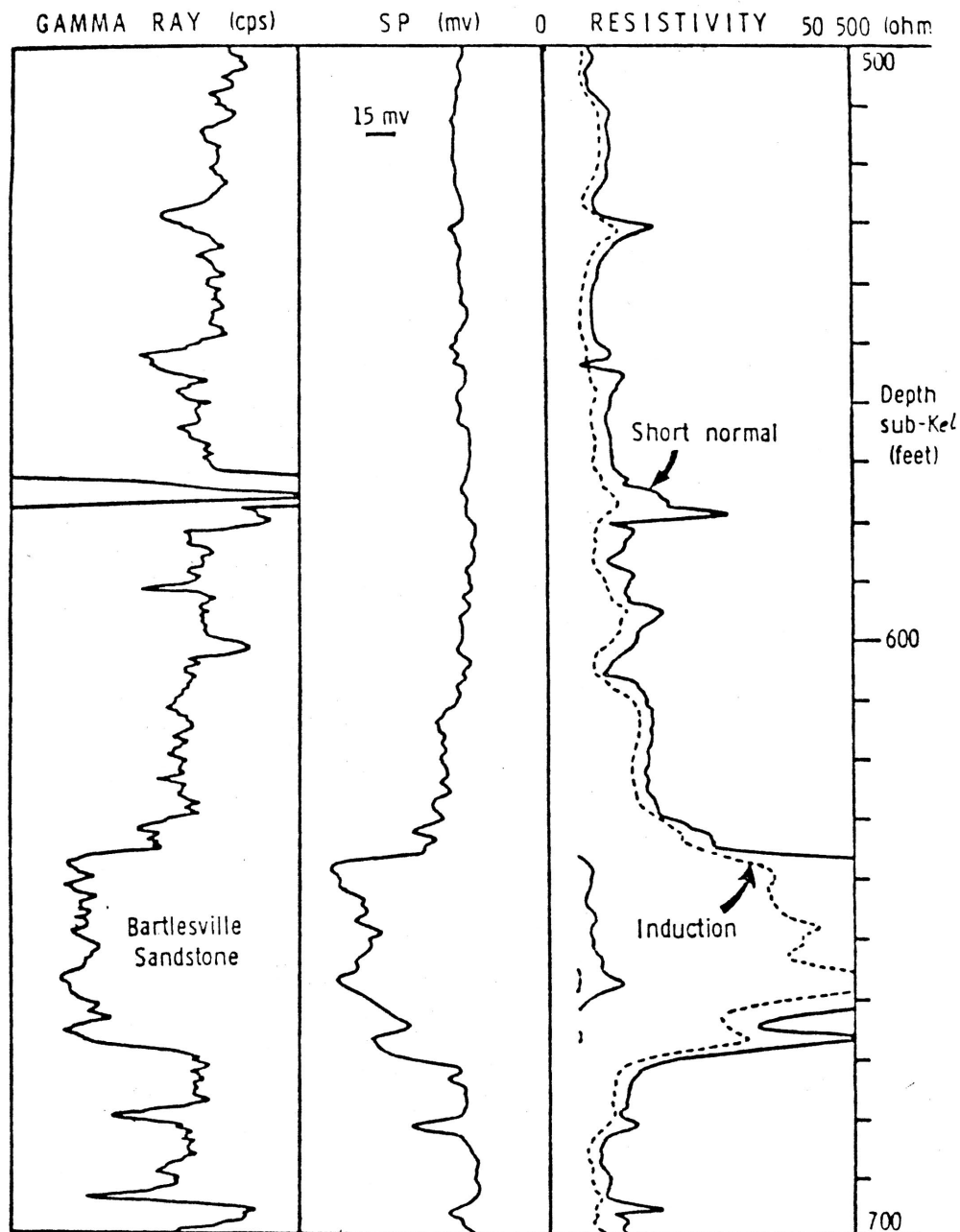
Your colleague has plotted these data, but he left the company. Now you are involved in the evaluation of the concession, and the chief geologist has asked you some questions:

- (a) What is the regional dip?
- (b) What is the linear extension of the sandstone body near the well?
- (c) Did the well encounter the maximum thickness of the sandstone body? If no, in which direction do you assume the thickest part is to be found? Is the top in this part probably higher or lower as in the well drilled?
- (d) What could be the depositional environment of the Bartlesville Sandstone?
- (e) To meet the requirements of the concession, another well has to be drilled. In which direction(s) would you go and order additional detailed seismics?



# EXERCISE 6-3: BARTLESVILLE SANDSTONE (3)

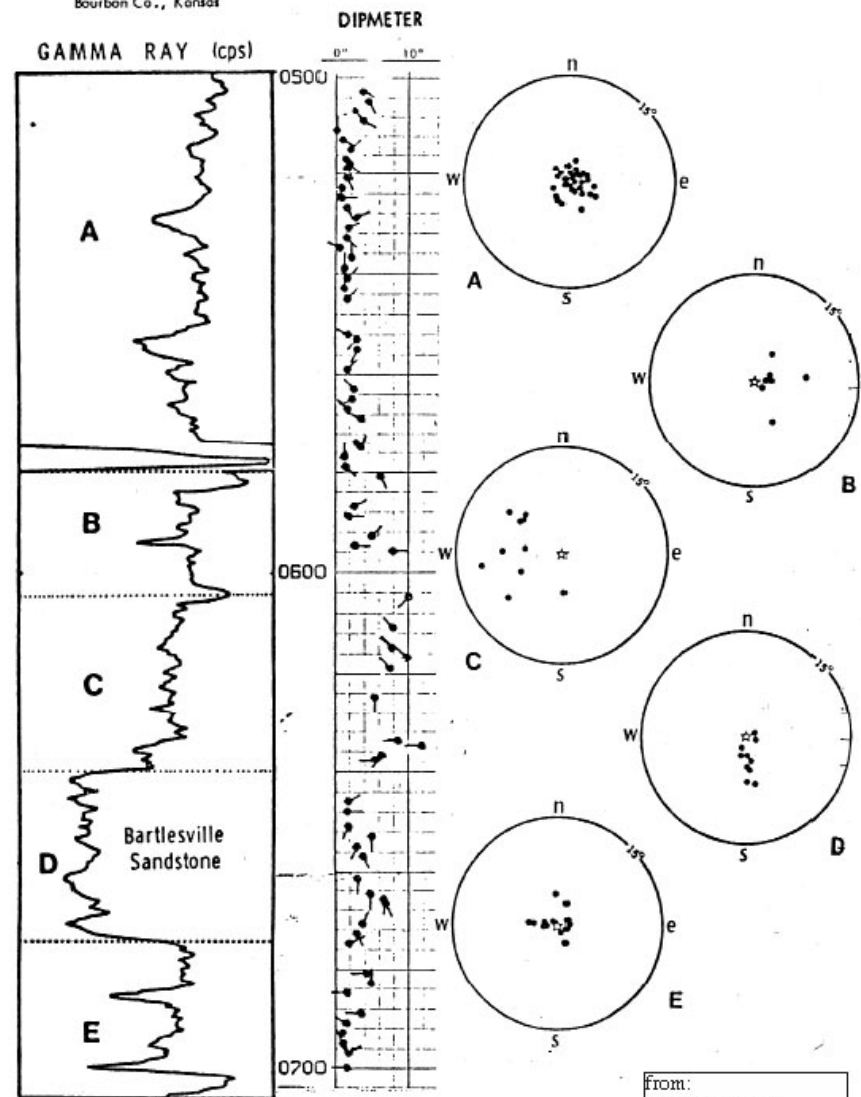
Woodward #4 12-25S-21E



Woodward #4

12-25S-21E

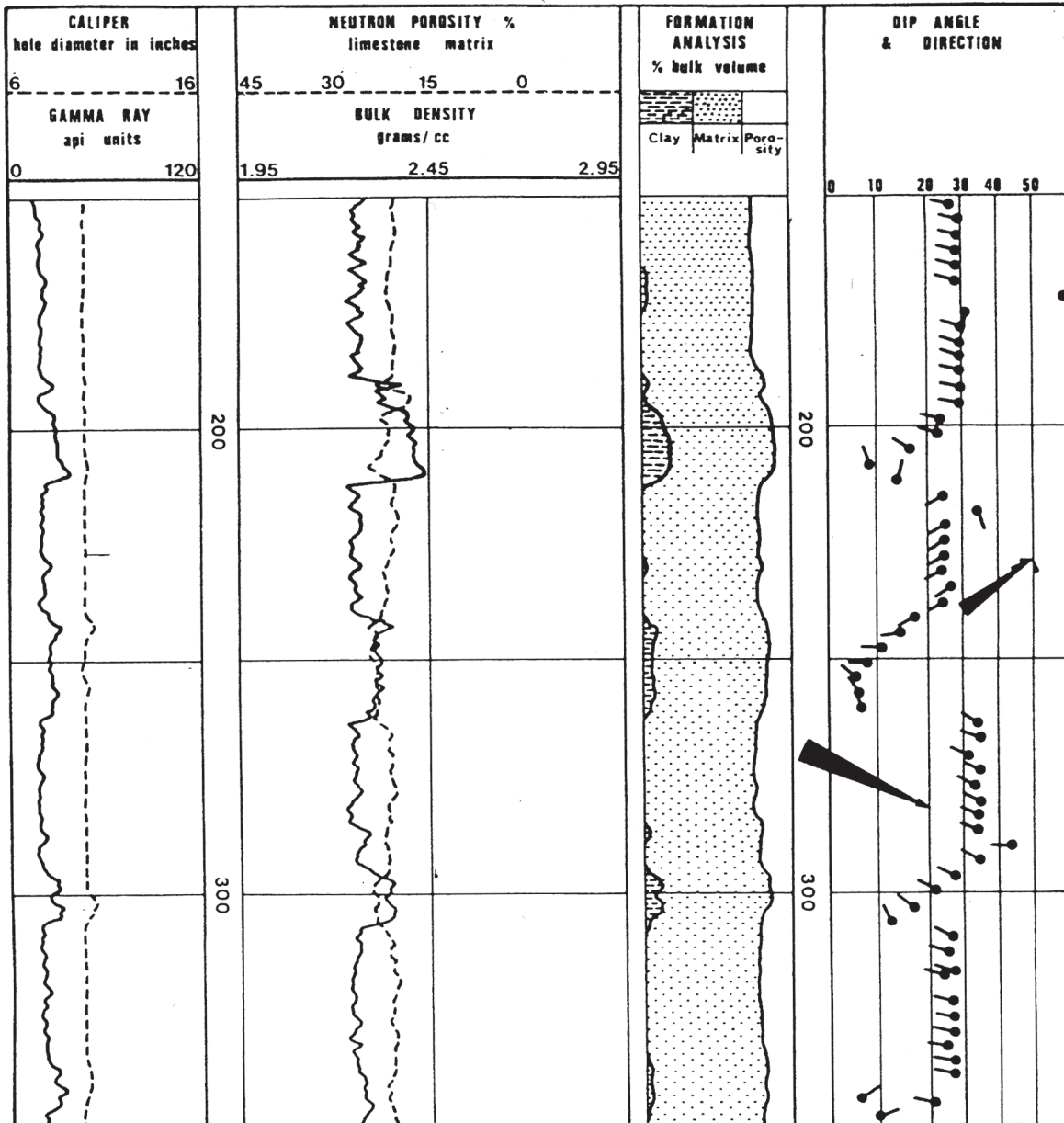
Bourbon Co., Kansas



## Exercise 6-4 (A-I)

### WELL A

Sandstone (pale red, medium-fine grained, well to very well sorted), minor intervals containing sand and mica, clay and silt between clean sandstone lithologies. Scale is in feet.



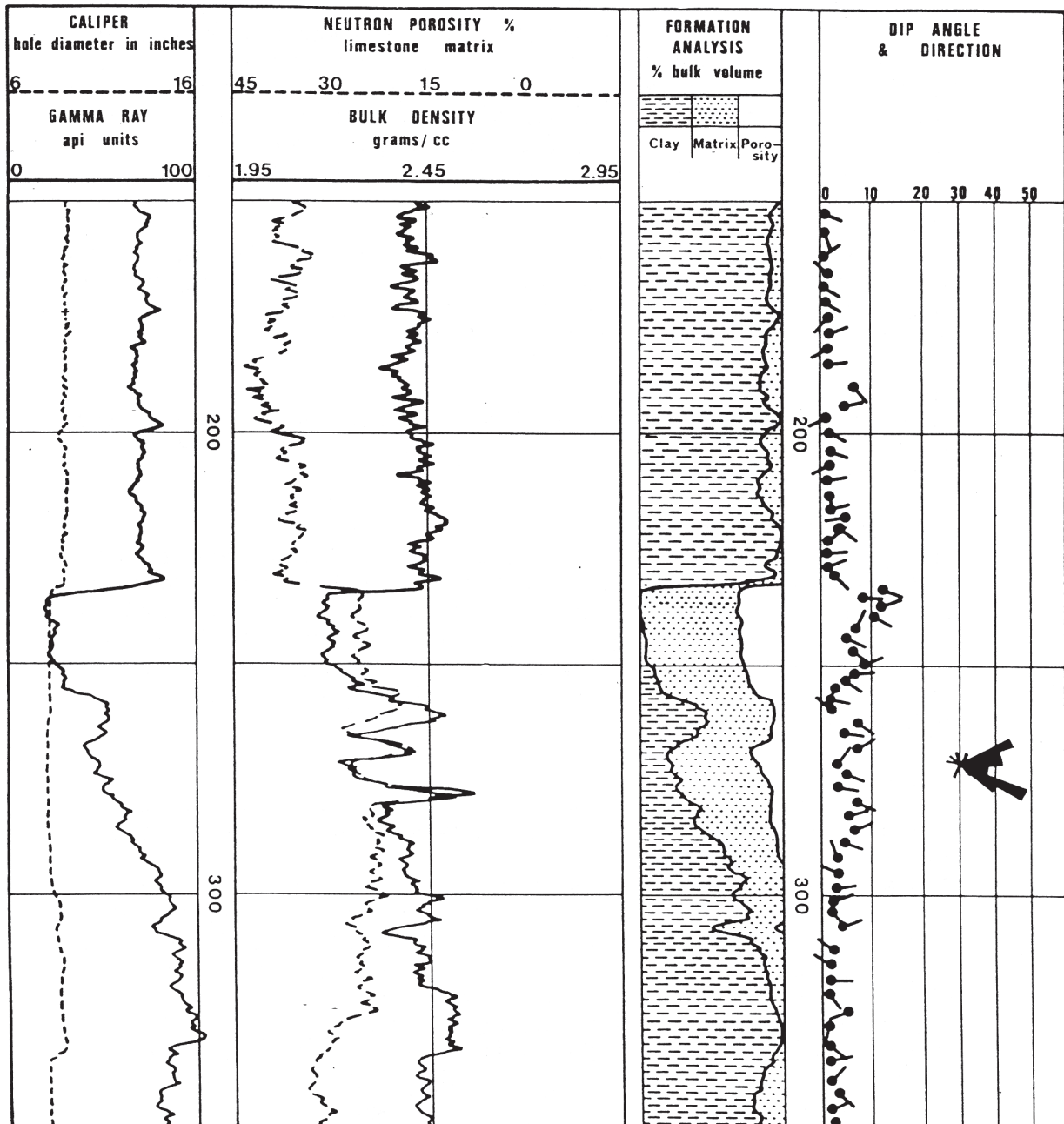
### QUESTIONS:

Depositional environment? Which environment represents the shaly intervals between the sandstones? What is the difference, if any, between the sandstone bodies?

Directions of paleocurrents? Structural dip?

## WELL B

Claystone (grey, silty, micromicaceous) at the base and top, in between sandstone (medium to fine grained, well-sorted, quartzose, trace glauconite). Scale is in feet.



## QUESTIONS:

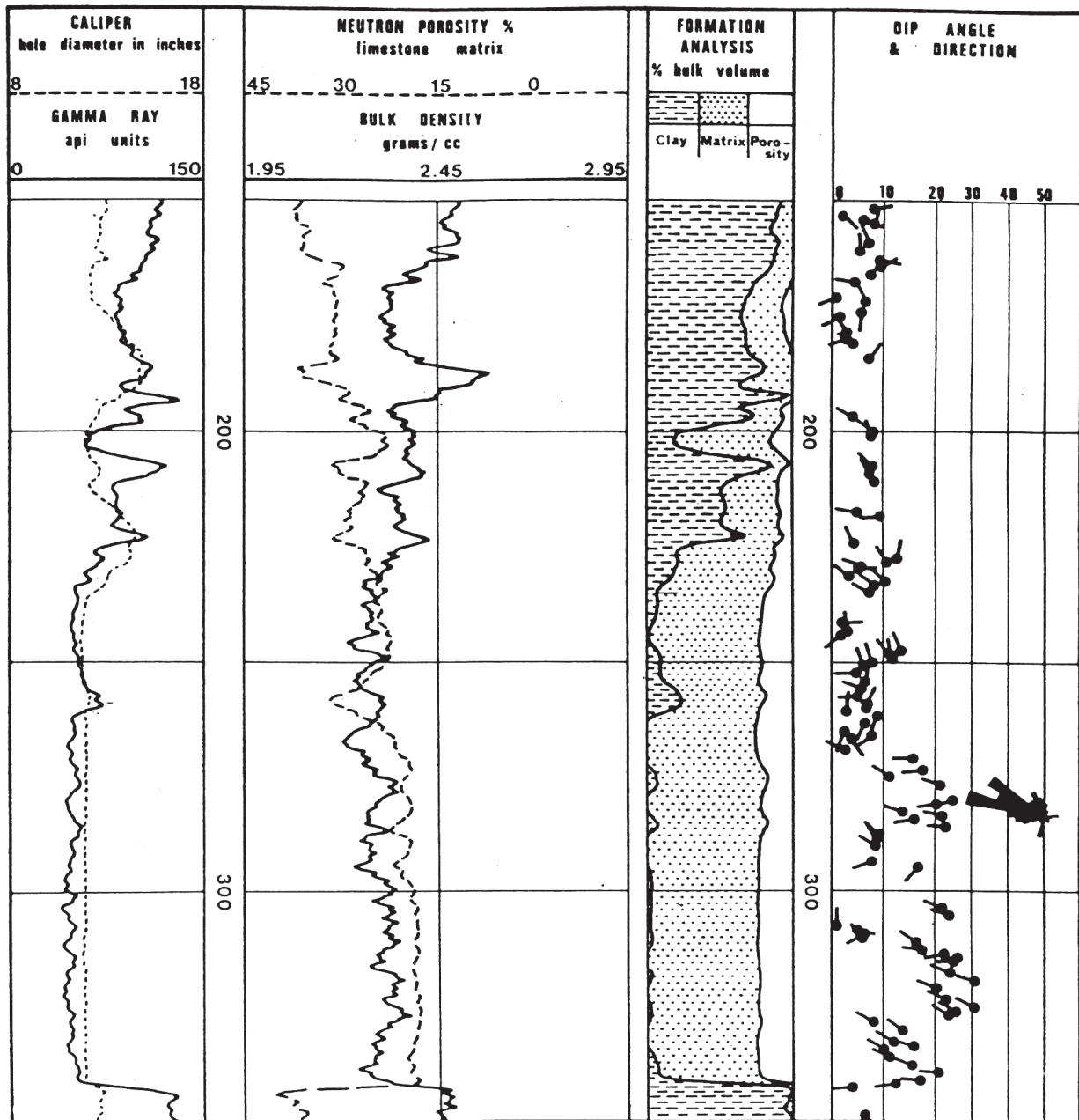
Depositional environment?

Probable trend of reservoir body?

Structural dip?

## WELL C

Sandstone (red, coarse-medium grained, fair sorting), interbedded with siltstone (red, argillaceous, micaceous). Scale is in feet.



## QUESTIONS:

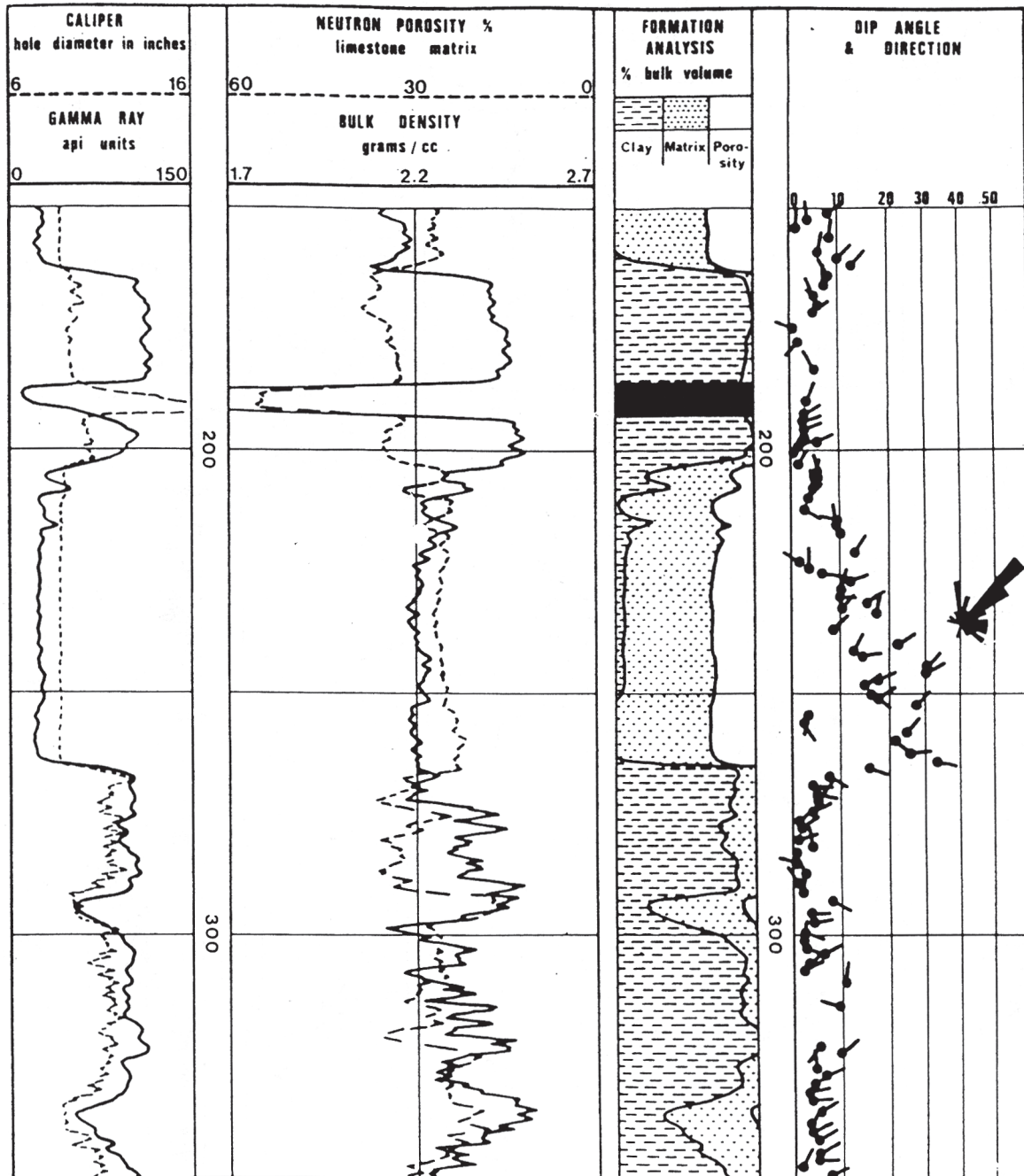
Depositional environment?

General porosity and probable trend of reservoir body?

Conditions of borehole?

## WELL D

Siltstone (dark grey, argillaceous, occasionally carbonaceous), interbedded with sandstone (grey - dark grey, medium - very fine grained, fair sorting, occasionally carbonaceous). Coal bed at 190'. Scale in feet.



## QUESTIONS:

Depositional environment? Likely vertical and lateral facies transitions? Can you distinguish different facies units?

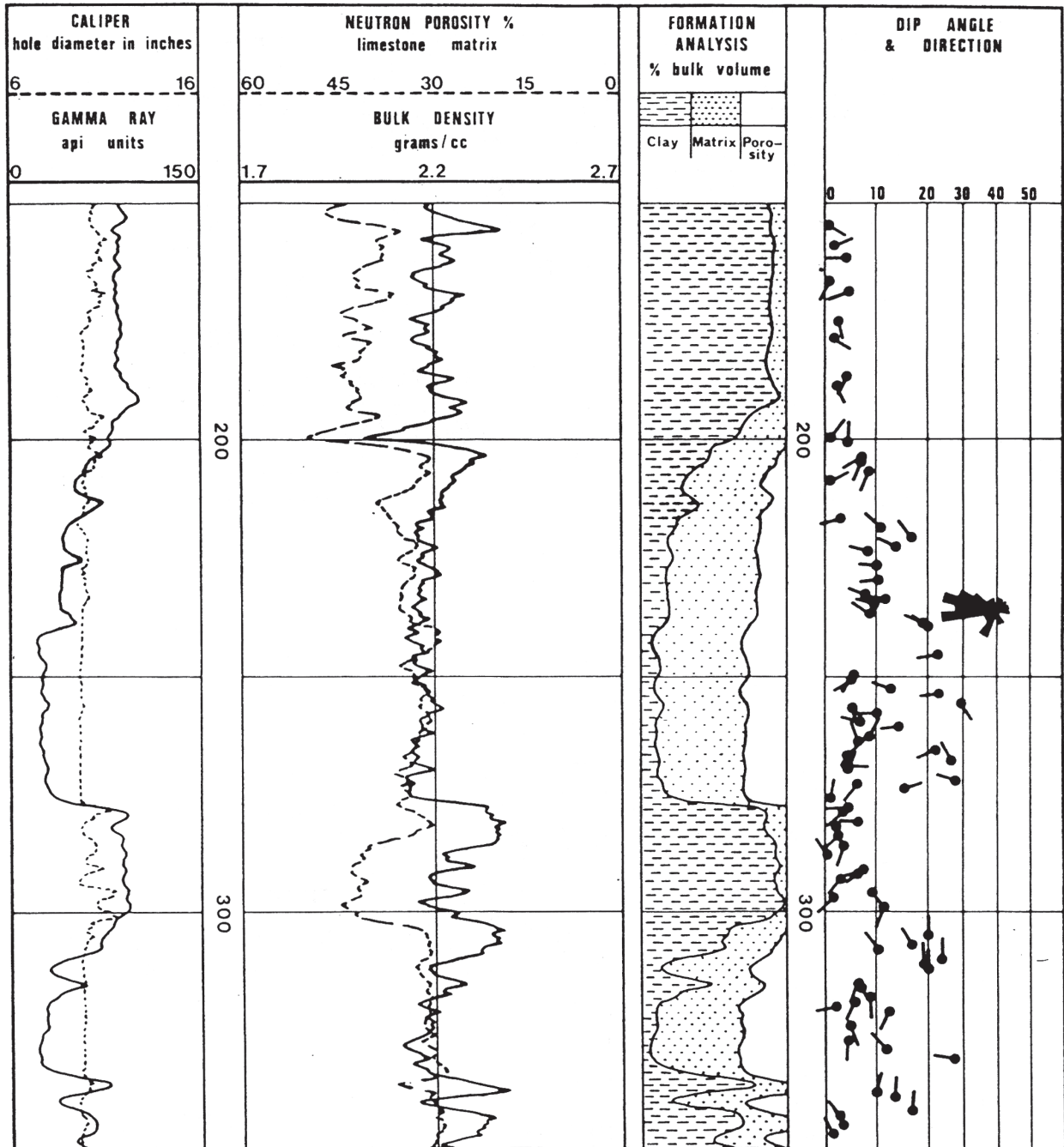
Structural dip?

Conditions of borehole?



## WELL E

Siltstone (grey - green, argillaceous, slightly carbonaceous), interbedded with sandston ( pale grey - brown, coarse - fine grained, fair sorting, feldspatic, micaceous, traces coal, black, brittle). Scale in feet.



## QUESTIONS:

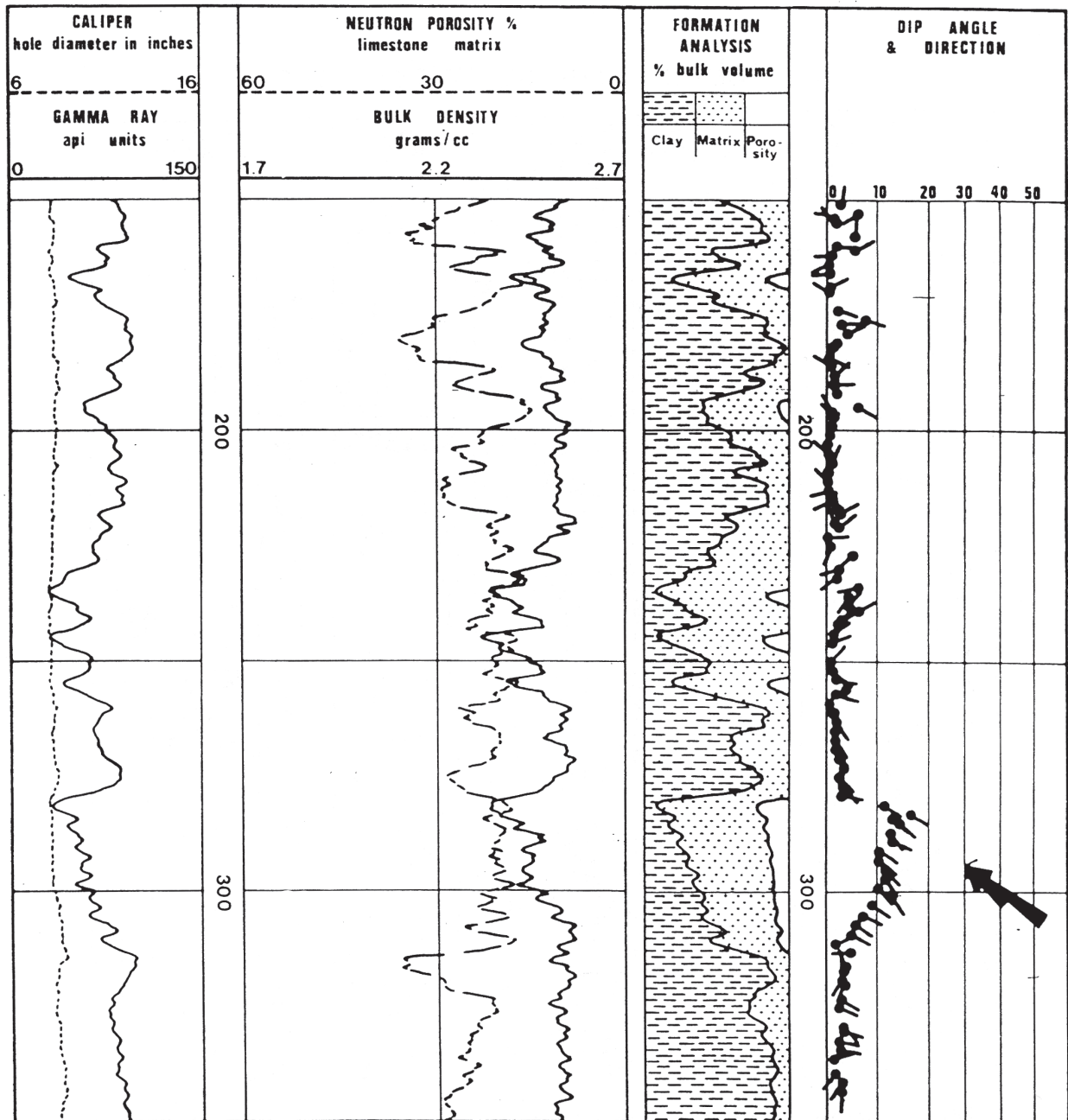
Depositional environment?

Structural dip?

Likely vertical and lateral facies transitions? Direction of lateral extension of main sandstone body?

## WELL F

Siltstone (grey - dark grey, argillaceous, carbonaceous, micromicaceous), interbedded with sandstone (grey - pale grey, fine - very fine grained, argillaceous, silty, traces carbonaceous detritus).  
Scale in feet.



## QUESTIONS:

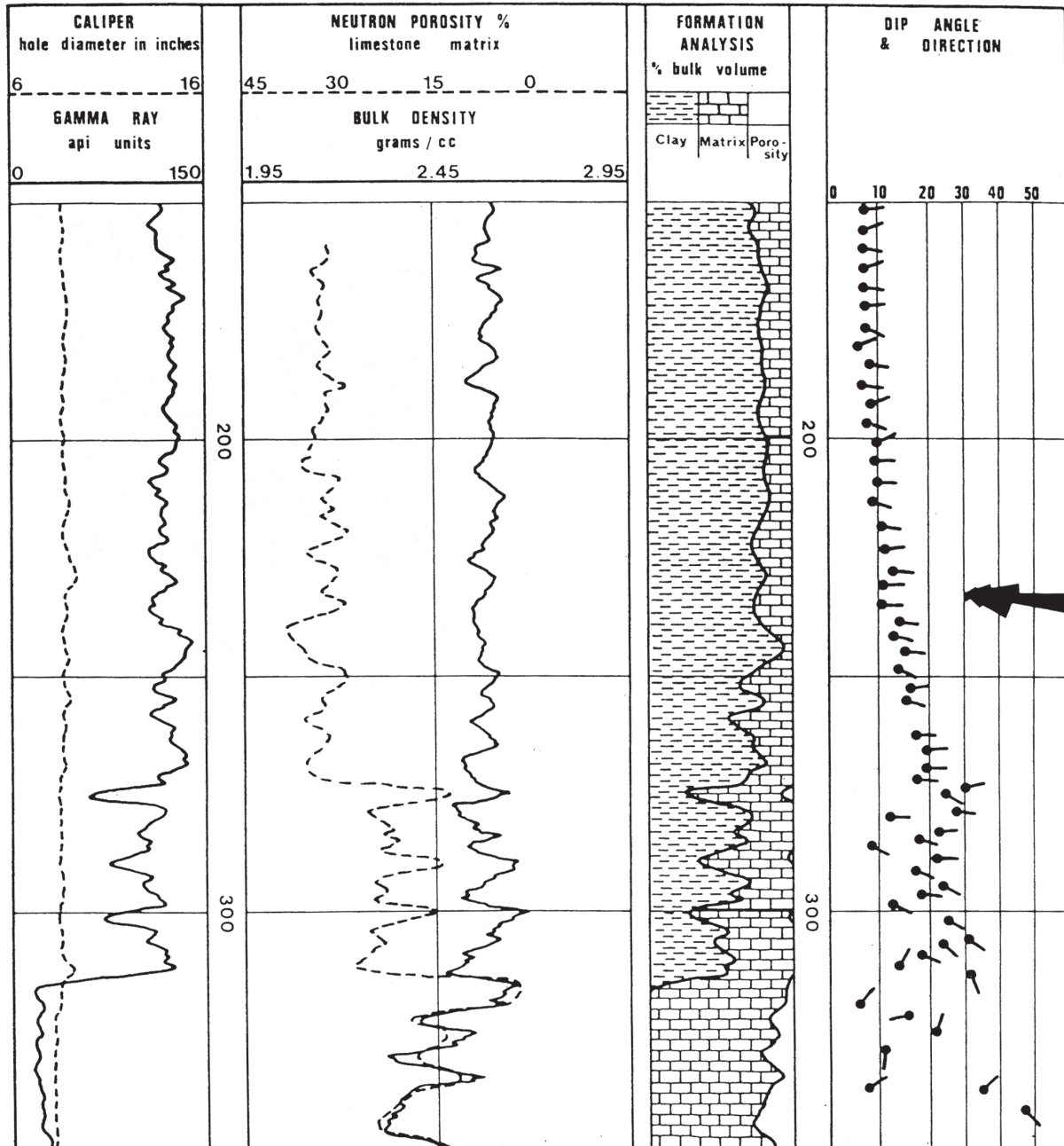
Depositional environment?

What are possible reasons for the changes in sand:shale ratio? In which direction might better reservoir sandstones occur?

Structural dip?

## WELL G

Down to 230': Claystone, dark grey, silty, micromicaceous. 230' - 310': Claystone as above, interbedded with limestone (Wackestone and packstone), grey, argillaceous, fragments of algae, bryozoa, and lamellibranch shells (?). 310' - 350': Limestone, cream-pale grey with fragments of algae, bryozoa, shells. Few corals; carbonate cement. Scale in feet.



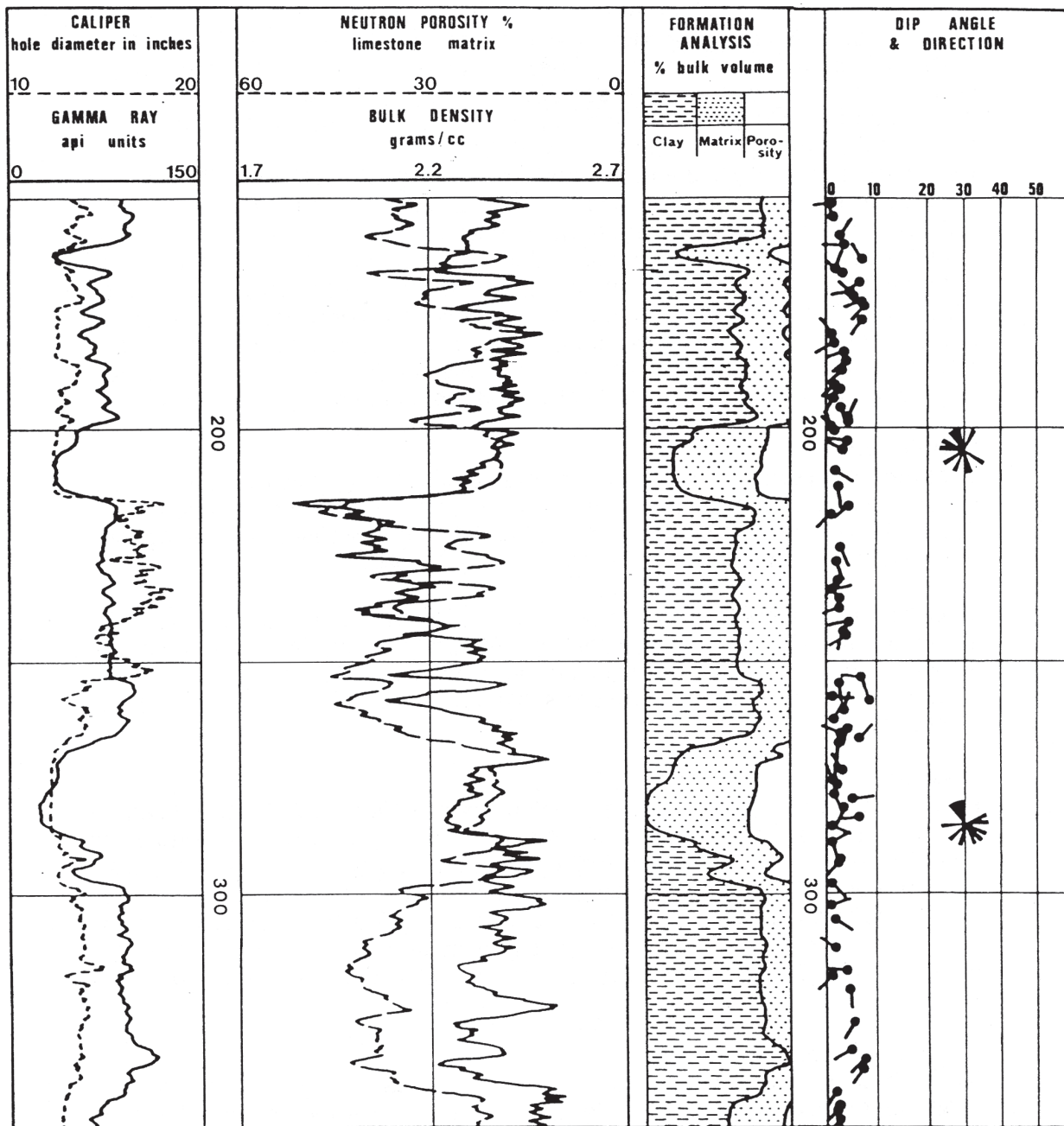
## QUESTIONS:

Depositional environment? Describe the dip motif between 225' and 305'. Give reasons for the different dip motifs. Structural dip?



## WELL H

Claystone (grey, silty, slightly calcareous), interbedded with sandstone (white -pale grey, medium - fine grained, well sorted, few crinoids, shell debris in sandstones). Scale in feet.



QUESTIONS:

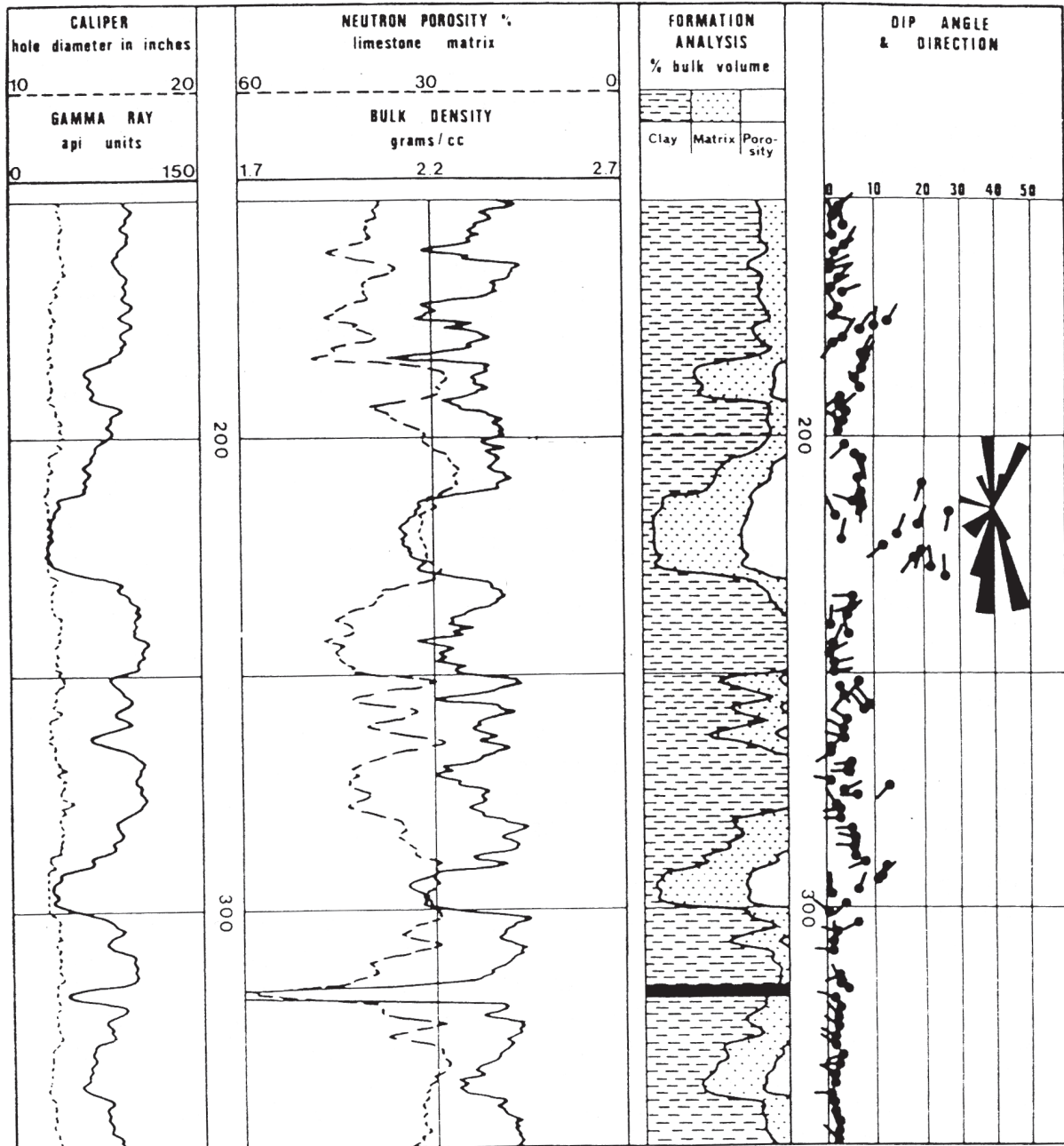
## Depositional environment?

## Conditions of borehole?

Structural dip?

## WELL I

Sandstone (pale grey, medium - fine grained, fair sorting, traces glauconite and shell debris), intercalated with claystone (grey - dark grey, silty, traces carbonaceous detritus). Coal at 320'. Scale in feet.



## QUESTIONS:

Depositional environment? Are there vertical changes of the depositional environment?

Trend of main sandstone body?

Structural dip?

TRUE DIP ANGLE  
AND DIRECTION

0 GR API 200

0° 10° 20° 30° 40° 50° 60° 90°

EXERCISE 6-5

04450

04475

1. Determine type of stratigraphic feature.
2. Define trend and relationship to paleoslope.