

Oil Prospector Game

Aim

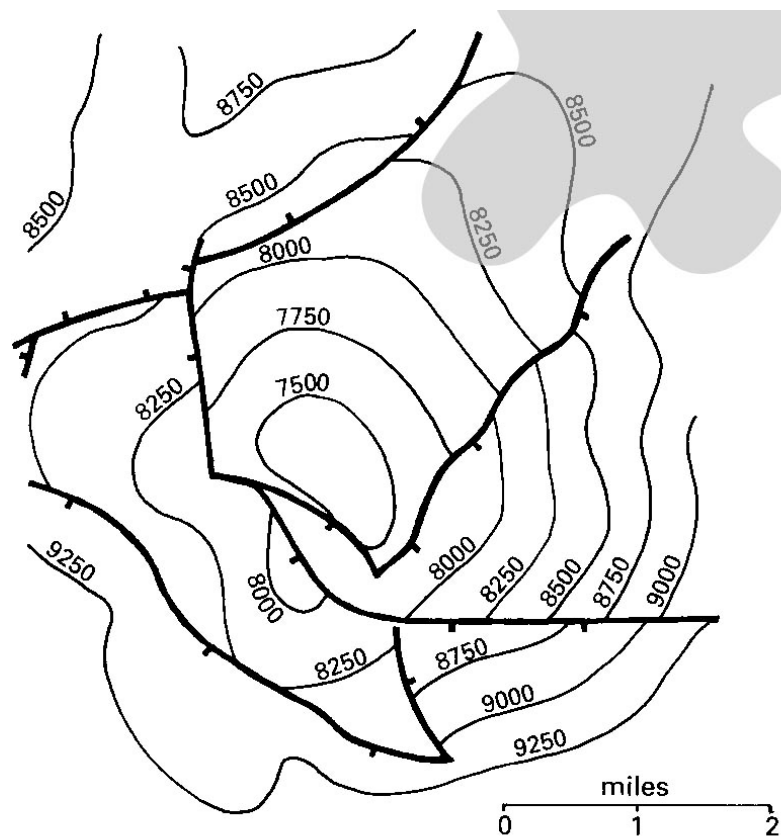
The aim of this practical is to teach the basics of oil exploration

Introduction

You are a young exploration geologist. Your boss has just given you a map of a possible oil prospect and has asked your advice about where to drill. Mark on the map the most likely place to hit oil and explain why you have chosen this spot. The following information will help you decide.

The rocks that completely underlie the map area comprise a porous sandstone layer with an impermeable shale layer on top. The thin lines (with numbers) are contours that mark the depth of the sandstone-shale contact measured from the surface in feet (so, the bigger the figure, the deeper the boundary). The heavy lines mark faults where the depth of the sandstone-shale junction has been changed. The dark area in the top right shows where source rocks (which generate oil and gas) occur deep down in the rock succession. Note that you belong to an American company that uses feet and miles!

Clue: Try and visualize the shape of the boundary between the sandstone and shale underground.



Solution

The sandstone is a permeable reservoir rock and the shale is an impermeable cap rock. The contour lines show that the contact between the shale and the sandstone has been deformed into a large faulted dome. The dark area shows where the source rock (which generates the oil and gas) occurs at depth.

As oil and gas is produced, it will rise up through the sandstone and accumulate beneath the shale cap rock. The dome shape will funnel the rising oil and gas into the top of the dome, which is marked by the 7500 feet contour. The best place to drill is therefore in the middle of this contour.

If we assume that the faults are impermeable barriers to flow, then some oil and gas might also accumulate above the 8000 feet contour to the right of the fault. Only an especially gifted student would be expected to recognize this.