

# Oil & Gas Industry

## Formation

### The Beginning: Dead marine life

- Only a tiny amount (of died organisms) sinks into deep, \_\_\_\_\_ water

### Source Rock Formation

- With little oxygen and no tidal currents, it does not fully \_\_\_\_\_.
- This turns into a black, organic-rich rock called \_\_\_\_\_

### Diagenesis

- \_\_\_\_\_ is the process that turns loose sediments into sedimentary rock.
- It also alters buried organic matter to form \_\_\_\_\_

### CATEGENESIS

- A process where heat and pressure transform kerogen into \_\_\_\_\_.
- Geothermal \_\_\_\_\_ break down kerogen as it is buried deep in the Earth.
- Kerogen turns into oil: 60 to 130°C / 2000m - 3800m depth
- Kerogen turns into natural gas: 130°C/ 4000m depth

### Migration & Accumulation

- Hydrocarbons move upward through \_\_\_\_\_ rocks because they are less dense
- Accumulates when oil and gas hit the cap rock, which is hard and \_\_\_\_\_

## Identification of Oil and Gas

### Geological indicators

This includes identifying

- \_\_\_\_\_ Rocks, \_\_\_\_\_ Rocks, \_\_\_\_\_ rocks and Structural Traps (anticlines, domes, salt domes, faults)

### SEISMIC SURVEY

- Emmits \_\_\_\_\_ into the ground
- Records the \_\_\_\_\_ that are bounced back from subsurface rock layers

## Oil Location

### Western Canada Sedimentary Basin

- The \_\_\_\_\_ has perfect conditions: thick \_\_\_\_\_ layers, organic-rich source rocks and traps that hold hydrocarbon

### Alberta Oil Sands

- Only about 3 to 5 % of all oil deposits are \_\_\_\_\_ enough to the surface to be mined.
- In situ (in place) used to mine the rest: steam is injected \_\_\_\_\_ to melt the oil, which is then pumped to the surface

## The age of primitive extraction

### Process of modern oil extraction

- Use technology we discussed before to find the
- A drilling rig bores a \_\_\_\_\_ down to the reservoir!
- Natural pressure may push oil upward at first, but \_\_\_\_\_ or other pumping system are later needed.

### Early Extraction

- Cable-Tool drilling (drop \_\_\_\_\_)
- Inefficient, \_\_\_\_\_ wells (less than 70m)

### Early Refining

- Backyard-level \_\_\_\_\_ (like moonshine)
- Impure Kerosene - easily \_\_\_\_\_

### Improved Extraction

- Built the world's first large-scale \_\_\_\_\_ network
- Used \_\_\_\_\_ for safe transport of oil

### Improved Extraction

- Introduced \_\_\_\_\_ distillation.
- Developed \_\_\_\_\_ treatment

### Temperature-Controlled Distillation

- The vapor enters a tall tower where the bottom is very \_\_\_\_\_ and the top is much cooler.
- Light molecules rise \_\_\_\_\_, and heavy molecules stay
- When the vapor reaches a place cooler than its boiling point, it turns back into \_\_\_\_\_

### Acid Treatment

- Mixed kerosene with \_\_\_\_\_ ( $H_2SO_4$ )
- Sludge settles at the bottom
- \_\_\_\_\_ Kerosene remains on top

### Acid Treatment

- Rockefeller add \_\_\_\_\_ ( $NaOH$ ) to neutralize leftover acid and remove remaining

### Monopoly

- With technology, Rockefeller could sell cheaper kerosene while still earning high profits
- Competitors could not match his efficiency, so he \_\_\_\_\_ them out at fair prices before they went bankrupt

### Near-National Monopoly

- Controlled about \_\_\_\_\_% of U.S. refining capacity by 1880s
- This made Standard Oil the first nationwide \_\_\_\_\_ in the world

### Controlled the Politics

- He donated money to \_\_\_\_\_ political parties, ensuring that whichever side won would support his business interests
- Through his huge economic power, Standard Oil became a " \_\_\_\_\_ " in U.S. politics

### Usage of Oil

Write down two interesting usage of oil or gas.

Interesting Usage	What does it use?