

PTE 317

INTRODUCTION TO PETROLEUM INDUSTRY

Shadrach O. OGIRIKI

Department of Chemical and Petroleum Engineering

Afe Babalola university, Ado-Ekiti,

Nigeria



COURSE CONTENT

- Worldwide distribution of Oil and Gas
- Distribution of Energy and Hydrocarbon in Nigeria
- Role of hydrocarbons
- Alternative energy resources Available in Nigeria
- Exploration and mining for energy resources
- Technologies for the use of coal, shale, tar sands and biomass
- Economic assessment of hydrocarbon resources
- Opportunities in Petroleum Industry
- Phases in Petroleum Industry-exploration, drilling, production, refining and marketing.



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WORLDWIDE DISTRIBUTION OF OIL AND GAS

Shadrach O. Ogiriki

Department of Chemical and Petroleum Engineering

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WHAT IS PETROLEUM?

- Petroleum is defined in variety of ways by engineers, geologist, chemists, entrepreneurs and others.
- There is, therefore, no uniform or full agreement on the definition of petroleum, but since it is a naturally occurring product formed in a rock, the geological definition is therefore more generally accepted.
- The word **PETROLEUM** is derived from the Latin words *PETRA*; meaning rock and *OLEUM*; meaning oil.
- Petroleum is loosely called *CRUDE* or *CRUDE OIL*
- Petroleum (or crude oil) is a complex, naturally occurring liquid mixture containing mostly *hydrocarbons*, but containing also some compounds of oxygen, nitrogen and sulfur.



WHAT IS PETROLEUM?Cont'd

- The word *Petroleum* is a generic term covering a wide range of substances comprising *hydrocarbons* (which are naturally occurring molecules of mostly carbon and hydrogen).
- Hydrocarbons (or Petroleum) exist in three states (or phases)
 - Gaseous State
 - Liquid State
 - Solid State.
- Petroleum is found in geological formations below the earth surface.



WHAT IS PETROLEUM?Cont'd

- Gaseous Hydrocarbon is NATURAL GAS
- Natural Gas is mainly Methane (over 90% by composition)
- Natural Gas can also contain condensate, a liquid comprising some hydrocarbons with higher boiling points

- Liquid Petroleum or Hydrocarbon is Crude Oil

- Solid Petroleum is Tar sands and bitumen
- Tar sands and bitumen can be found on the surface unlike natural gas and crude oil.



WHAT IS PETROLEUM? ...Cont'd



IMPORTANCE OF PETROLEUM

- Crude oil is a central part of modern life and the world's most important energy resource.
- We rely on it in many ways for the food we eat, the clothes we wear and the electronics we use at home and in the workplace.
- Without crude oil, we would not be able to continue to enjoy the same standard of living



WHAT IS PETROLEUM ENGINEERING?

- **Petroleum engineering** is a field of engineering concerned with the activities related to the exploration and production of hydrocarbons, which can be either crude oil, natural gas or oil sands.
- Petroleum engineering is a combination of innovation, exploration and expansion. This major fuels the world and provides the building blocks for every other profession to effectively carry out its work.



CRUDE OIL RESERVES

- **Oil reserves** are the amount of technically and economically recoverable oil
- Reserves may be for a well, for a reservoir, for a field, for a nation, or for the world
- Different classifications of reserves are related to their degree of certainty
- The two major classes of reserve are:
 - Proven Reserve
 - Unproven Reserve



PROVEN RESERVES

- **Proven** reserves are those reserves claimed to have a *reasonable certainty* (normally at least 90% confidence) of being recoverable under existing economic and political conditions, with existing technology
- Industry specialists refer to this as **P90** (that is, having a 90% certainty of being produced). Proven reserves are also known in the industry as **1P**
- Proven reserves are further subdivided into "proven developed" (PD) and "proven undeveloped" (PUD)



PROVEN RESERVESCont'd

- PD reserves are reserves that can be produced with existing wells and perforations, or from additional reservoirs where minimal additional investment (operating expense) is required
- PUD reserves require additional capital investment (e.g., drilling new wells) to bring the oil to the surface



UNPROVEN RESERVES

- Unproven reserves are based on geological and/or engineering data similar to that used in estimates of proven reserves, but technical, contractual, or regulatory uncertainties preclude such reserves being classified as proven
- Unproven reserves may be used internally by oil companies and government agencies for future planning purposes but are not routinely compiled
- They are sub-classified as *probable* and *possible*



UNPROVEN RESERVESCont'd

- **Probable reserves** are attributed to known accumulations and claim a 50% confidence level of recovery
- **Possible reserves** are attributed to known accumulations that have a less likely chance of being recovered than probable reserves
- This term is often used for reserves which are claimed to have at least a 10% certainty of being produced



WORLD PROVEN CRUDE OIL RESERVE

Latin America	336,996	338,356	341,522	341,296	342,757
Argentina	2,505	2,805	2,820	2,354	2,380
Brazil	12,841	13,154	15,050	15,544	16,184
Colombia	1,900	2,200	2,377	2,445	2,308
Ecuador	8,235	8,235	8,832	8,273	8,273
Mexico	11,362	11,424	11,079	9,711	9,711
Venezuela	297,571	297,735	298,350	299,953	300,878
Others	2,582	2,803	3,014	3,016	3,023

WORLD PROVEN CRUDE OIL RESERVE ..Cont'd

Eastern Europe and Eurasia	117,314	119,881	119,874	119,863	119,860
Azerbaijan	7,000	7,000	7,000	7,000	7,000
Belarus	198	198	198	198	198
Kazakhstan	30,000	30,000	30,000	30,000	30,000
Russia	77,403	80,000	80,000	80,000	80,000
Turkmenistan	600	600	600	600	600
Ukraine	395	395	395	395	395
Uzbekistan	594	594	594	594	594
Others	1,124	1,094	1,087	1,076	1,073

WORLD PROVEN CRUDE OIL RESERVE ..Cont'd

Western Europe	10,880	10,800	11,336	10,760	10,064
Denmark	900	805	805	611	511
Norway	5,320	5,366	5,825	5,497	5,139
United Kingdom	2,800	2,800	2,979	2,982	2,755
Others	1,860	1,829	1,727	1,670	1,660

WORLD PROVEN CRUDE OIL RESERVE ..Cont'd

Middle East	797,155	799,132	802,958	802,512	802,848
IR Iran	154,580	157,300	157,800	157,530	158,400
Iraq	141,350	140,300	144,211	143,069	142,503
Kuwait	101,500	101,500	101,500	101,500	101,500
Oman	5,500	5,500	4,974	5,151	5,306
Qatar	25,382	25,244	25,244	25,244	25,244
Saudi Arabia	265,405	265,850	265,789	266,578	266,455
Syrian Arab Republic	2,500	2,500	2,500	2,500	2,500
United Arab Emirates	97,800	97,800	97,800	97,800	97,800
Others	3,138	3,138	3,139	3,140	3,140



WORLD PROVEN CRUDE OIL RESERVE ..Cont'd

Asia and Pacific	47,322	47,552	47,860	48,197	48,597
Australia	3,873	3,922	3,957	3,982	3,982
Brunei	1,100	1,100	1,100	1,100	1,100
China	23,747	24,428	24,376	24,649	25,132
India	5,549	5,571	5,643	5,675	5,680
Indonesia	3,640	3,291	3,303	3,303	3,230
Malaysia	3,739	3,668	3,750	3,750	3,750
Vietnam	4,400	4,400	4,400	4,400	4,400
Others	1,274	1,172	1,331	1,338	1,323



WORLD PROVEN CRUDE OIL RESERVE ..Cont'd

North America	30,625	34,661	37,652	40,503	40,503
Canada	4,081	4,132	4,281	4,118	4,118
United States	26,544	30,529	33,371	36,385	36,385

- Total World Proven Crude Oil Reserve is **1, 465,813** billion barrels



Assignment

- What is Nigeria's proven crude oil reserve?
- What is Ghana's proven crude oil reserve?
- What is West Africa's proven crude oil reserve?
- What is Africa's proven crude oil reserve?

Submit your assignment on LMS before stipulated deadline.

