**Personal Description**

From what I have seen, this is predicting oil output rate which is a discharge q and as oil comes out perhaps during drilling, gas also comes out so in the current gilbert’s formula available, there’s something called gas-oil ratio and this seems to be determined naively at the surface drilling.

My major question was if the parameters provided were related to gas or oil or water but it might not be a necessary question because if there’s a constant ratio between gas and oil, it means same relationship with the features will be found.

**Drilling Process – Personal Explanation**

Basically, a well is dug and then sensors are used to determine where is rich in hydrocarbon and once that is found using sensors, some gun is fired and holes are made and the hydrocarbons flow up. Now what I think is that after this hole is drilled, a well head which seems to be an equipment to control the extraction is mounted there. The well head pressure seems to be a good feature together with the choke size of the amount of oil that will be obtainable but these seems to be surface level parameters like If the oil well has no potential to produce good amount of oil, the upstream won’t have a good output.

Good video explaining the drilling process - <https://youtu.be/wjm5k6Kf-RU>

**Important points to Note**

* Gas-Oil ratio helps us determine the economic limit of a well. There seem to be something about bubble point and stuff.
* Bubble point: It seems to be a pressure point where liquid turns to gas like in soda, it’s usually all liquid from the bottle but once we open it, some gas escaped

**Video2:** <https://youtu.be/pe71rV92GY8>

**Dataset Feature Explanation**

Explaining Features as per my understanding (the plan is to get an understanding of these features and know which to use for EDA)

1. WellBore Name - I think this is a useful parameter. I think in maybe similar regions there are multiple bores, and towards my thoughts, the date range is same for different wells like there’s say 1st may 2013 till 1st June 2013 for all wells.
2. FLOW\_KIND – It’s same for every day, it says Production, perhaps there’s some drilling for test environment or so. We don’t want to use this as a feature for EDA or anything.
3. WELL\_TYPE - It’s same for every day, it says [OP](https://www.google.com/search?q=whatts+an+OP+oil+well&oq=whatts+an+OP+oil+well&gs_lcrp=EgZjaHJvbWUyBggAEEUYOTIJCAEQIRgKGKABMgkIAhAhGAoYoAEyCQgDECEYChigAdIBCTEyNDIyajBqN6gCCLACAQ&sourceid=chrome&ie=UTF-8#:~:text=OP%3A%20A%20well%20used%20to%20produce%20oil%20from%20a%20reservoir.). From google, OP -> A well used to produce oil from a reservoir.
4. Downhole pressure – Oil pressure at the bottom of the reservoir.
5. Downhole Temperature (Kelvin) – Oil Temperature at the bottom of the reservoir.
6. Average Tubing Pressure – It seems to be the pressure of the oil in the tube.
7. Annulus Pressure – Pressure between two concentric pipes this seems to not be a very relevant feature but just something the pipe should be able to hold.
8. AVG WHP (PSI) – It seems it’s the flow pressure on the well head. This is a relevant feature for oil and Gas production.
9. Choke Size - The choke is typically installed at the wellhead, where it controls the flow of fluids as they come up from the reservoir. It seems an adjustable choke was used in this production system.

**Reference:** <https://otg.ca/what-is-a-choke-in-oil-and-gas-operations-2/#:~:text=The%20choke%20is%20typically%20installed%20at%20the%20wellhead%2C%20where%20it%20controls%20the%20flow%20of%20fluids%20as%20they%20come%20up%20from%20the%20reservoir>.

**ML Approach**

1. **EDA** – Check Gas-oil ratio rate overtime. Is it increasing? Is it stable? Is it dependent on the well bore (there’s a wellbore variable) I believe the different wells might behave differently so that will be a good feature to one hot encode.

**Answer**

The GOR itself is mostly the same for the different oil wells but the individual oil outputs overtime might differ.

1. It seems water rate is the only thing that doesn’t flow with the rest. Basically, anytime there’s gas, there’s oil but it’s not the same for water. In video2 it seems there’s some analysis of how we have water, oil and gas in the earth and how there’s some particular pressure where water will flow. Maybe some pressure is directly related to water and then water can be used to predict oil and gas.

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4. Split into 6 months and see if any daily sudden drop is there

5. from plot, we have to see if any formation GOR is above if just one differes, it doesn’t make it a combo. (You have to make plots and see the trend)

6. flt]at, incr, decr, or combination, water cut, we need to calculate from water production. Water cut is percentage of liquid that is water. Water/oil+water. You plot and from the trend =, you’ll k now what type it is.

7. oil productivity index: barrels of oils per day per psi i.e oil production/(current average reservoir pressure – bottomhole flowing pressure)….PI shouldn’t be negative. If it happens, disregard it. Again we plot and see the trend.