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A Comparative Evaluation of Two Techniques for OOIP Identification

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Abstract

This study presents a comparative evaluation of two techniques for estimating original oil in place (OOIP) in petroleum reservoirs: traditional reservoir engineering methods and advanced data-driven approaches. The objective is to assess the strengths, limitations, and applicability of each technique in various reservoir settings. Factors such as data availability, computational requirements, and expertise level are considered to evaluate the practicality and reliability of the techniques. The study results reveal that the material balance method, specifically utilizing both Excel sheets and MBAL software, yields an estimated OOIP of 550 million stock tank barrels (MMSTB). In contrast, the MBAL software alone estimates an OOIP of 2568 MMSTB. The percentage of error between the material balance and Excel sheet approaches is 82%. These findings underscore the significance of considering reservoir characteristics and incorporating all relevant reservoir parameters for accurate OOIP estimation, highlighting the effectiveness of the material balance method.The practical implications of these insights are valuable for reservoir engineers and industry professionals when selecting the most appropriate approach for OOIP identification.

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Additionally, this research contributes to the ongoing efforts in the oil and gas industry to develop improved methods for accurate and efficient reserve estimation. The successful application and favorable results obtained from the material balance method further support its utilization in reservoir engineering practices.

Keywords: reserve, material balance, OOIP, MBAL software, reservoir characteristics, reservoir parameters.

تقييم ومقارنة لطرقتين تستخدم في حساب المخزون الاصلي OOIP"

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الملخص

تقدم هذه الدراسة تقييماً لمقارنة بين طريقتين تستخدم في تقدير المخزون الأصلي للنفط الموجود في المكامن النفطية، حيث ان الطرق التقليدية المستخدمة من قبل مهندسي المكامن يفتقر لاستخدام المنهجيات الحديثة والتي تعتمد على تحليل أكبر قدر من البيانات للمكمن النفطي. حيث ان الهدف الاساسي من هده الدراسة هو تقييم مدي دقة كل تقنية وحدودها وإمكانية تطبيقها في مختلف حالات المكمن النفطي. ويُنظر في عوامل مثل توافر البيانات، والمتطلبات الحسابية، ومستوى الخبرة، لتقييم التقنيات وامكانية تطبيقها ودقة نتائجها ومدي امكانية الاعتماد عليها من خلال النتائج المتحصل عليها في هده الدراسة فان طريقة موازنة المواد، تختلف عن نتائج استخدام برنامج إكسيل. اعطت نتائج ان المخزون النفطي يقدر بـ 550 مليون برميل (MMSTB). وعلى النقيض من ذلك، فإن برامجية MBAL وحدها تقدر OOIP 2568 MMSTB. حيث ان نسبة الخطأ في

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نتائج برنامج الاكسل وصلت الي 82% في المائة. وتؤكد هذه النتائج أهمية النظر في خصائص المكمن النفطي وتحليل البيانات ذات الصلة من أجل التقدير الدقيق، مع الأخذ في الاعتبار فعالية طريقة التوازن المادي.

وتتسم قدرة هده البرمجيات في مساعدة مهندسي المكمن والمهنيين الصناعيين عند اختيار أنسب طريقة لتحديد المخزون. وبالإضافة إلى ذلك، يسهم هذا البحث في الجهود الجارية في صناعة النفط والغاز لوضع انسب الطرق لتقدير الاحتياطي بدقة وكفاءة. كما أن نجاح التطبيق والنتائج الإيجابية التي تم الحصول عليها من طريقة موازنة المواد يدعم استخدامها في تقيم المكمن النفطي بدقة.

الكلمات الرئيسية: الاحتياطي، توازن المواد، المخزون النفطيOOIP، وبرمجيات MBAL، وخصائص المكمن، معاملات المكمن.

1. Introduction

The material balance equation (MBE) has long been recognized as one of the basic tools of reservoir engineers for interpreting and predicting reservoir performance. The MBE, when properly applied, can be used to:

- Estimate the initial hydrocarbon volumes in place.
- Predict future reservoir performance.
- Predict ultimate hydrocarbon recovery under various types of primary driving mechanisms.

Since oil, gas, and water are present in petroleum reservoirs, the material balance equation can be expressed for the total fluids or for any one of the fluids present [1]. The equation describes the fundamental physics of the production scheme of the reservoir.

MBE depends on production data, which is usually available, and other reservoir properties can be obtained from laboratory experiments. However, it isn't proper to be used when the reservoir is connected to an aquifer or gas cap without enough information about them. The reservoir simulation is a quick and accurate method for calculating OOIP [2].

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2. Analytical Method:

The analytical method is a mathematical approach used to analyze and evaluate reservoir performance and behavior. It involves solving mathematical equations and applying analytical models to estimate reservoir properties and predict production performance. The method aims to establish a correlation between observed or measured data and the model parameters, such as reservoir characteristics, fluid properties, and production history. By quantifying the level of agreement or regression through metrics like standard deviation, it helps validate the accuracy and reliability of the model.

3. MBAL Software:

Is a commonly used reservoir engineering tool for estimating and analyzing reservoir performance. It utilizes the material balance equation, which is a fundamental equation in reservoir engineering, to estimate reservoir parameters such as original oil in place (OOIP), aquifer influx, and reservoir pressure. By inputting various reservoir characteristics, production history, and other relevant data, MBAL software performs calculations and generates output that aids in reservoir evaluation, production forecasting, and optimization [3].

4. Production History:

Production history refers to the recorded data of production rates and fluid compositions over time in an oil or gas field. It provides crucial information about the behavior and performance of the reservoir, including production trends, decline rates, and changes in fluid composition. Analyzing production history helps in identifying reservoir characteristics, evaluating recovery mechanisms, detecting reservoir boundaries, and optimizing production strategies.

5. Drive Mechanisms:

Drive mechanisms refer to the forces or energy sources that push or displace oil within a reservoir, contributing to its recovery. In the

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context of the Wafa oil and gas field, the fractional contributions of different drive mechanisms. The drive mechanisms mentioned include water influx, which occurs when water from an aquifer or external source enters the reservoir and displaces oil; pore volume compressibility, which represents the expansion or contraction of reservoir volume due to fluid withdrawal or injection; and fluid expansion, which refers to the expansion of fluids upon pressure reduction. Analyzing the contributions of these drive mechanisms helps in understanding the dominant mechanisms affecting oil recovery and optimizing reservoir management strategies.[4].

1.4.1 The data requirements for material balance analysis:

1. Initial reservoir pressure, pressure decline as a function of time,
2. Production data for gas, oil, and water as a function of time,
3. Formation volume factors for gas, oil, and water
4. Ratio of the initial gas-cap volume to the initial reservoir oil volume (estimated from the well).

6. The objective:

The specific objectives can be listed in the following points:

1- Calculate (OOIP) from material balance equation (MBE) based on PVT and production data by using both excel sheet and MBAL Software.

2- Compare the results from various methods.

7. Petroleum Reserves

One of the more complete classification systems for Petroleum Reserves as depicted in Aropub Published Classified Reserves [5].

7.1. Classification of Reserves

The classifications of the reserves are categorized (according to the degree of confidence in producing these reserves) into three main categories: Proven, Probable, and Possible. (Figure1).

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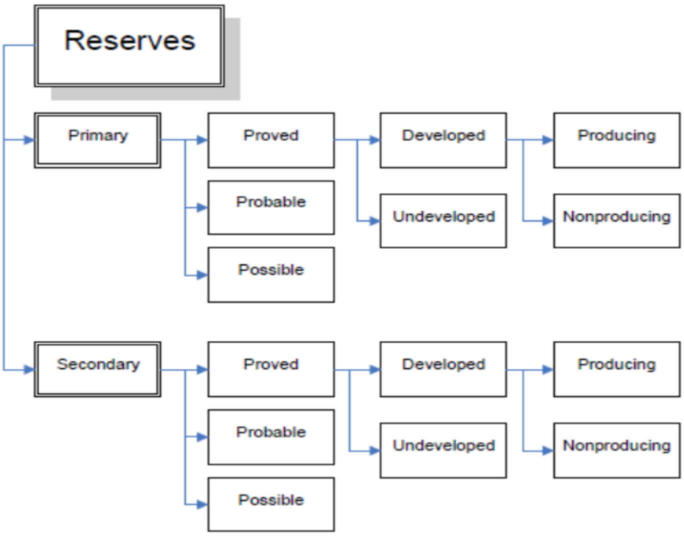

Figure 1: Aropub Published Classified Reserves.[5].

7.2. Proven Reserves

Proven Reserves are defined as the volumes of crude oil, natural gas, condensate, and/or natural gas liquids which the Geological information and Engineering data demonstrate with HIGH degree of certainty that they can be recovered from a certain reservoir under the current economic circumstances and using the current standards of technology [6].

7.3. Probable Reserves

The Probable Reserves are hydrocarbons, which Geologic information and engineering data indicate with Reasonable degree of certainty to be recoverable. In other words, Probable Reserves have lower degree of certainty of being recovered than Proven Reserves.

7.4. Possible Reserves

Possible Reserves are those which have less degree of certainty (than the Probable Reserves), insufficient to indicate whether they are more likely to be recovered than not.

7.5. Estimation of Reserves

The estimation of reserves is the most important step toward taking any decisions regarding the oil property; buying, selling, development, etc.There are four methods to estimate the reserves, with different levels of sophistication. The choice will depend mainly on the data, which is available as follows:

1. Volumetric method.
2. Material Balance method.
3. Numerical Simulation Models method.
4. Production Decline Curve Analysis method.

7.5.1. Material Balance Method:

The amount of oil or gas in place in a reservoir can be computed by the Material Balance method. This method is based on the premise that the pore volume (PV) of a reservoir remains constant or changes in a predictable manner with the reservoir pressure drop, as oil, gas, and/or water are produced. [7].

Material balance calculations also may be designed to extend the observed performance of a reservoir into the future. These predictive tools assume a homogeneous reservoir and require application of relative permeability concepts.

The general material balance equation is:

$$N(B_t - B_{ti}) + mNB_{ti}\left(\frac{B_g}{B_{gi}} - 1\right) + (1+m)NB_{ti}\left(\frac{C_f + C_w S_{wi}}{1 - S_{wi}}\right)\Delta P =$$
$$N_p\left(B_t + (R_p - R_{si})B_g\right) + W_p B_w - W_i B_w - G_i B_g - W_e . Eq \ldots\ldots\ldots\ldots (1)$$

8. Case Study

Wafa oil field is a gas-condensates reservoir located about 600 km southwest of Tripoli in the NC169a, along the Libyan-Algerian border as shown in (Figure 2), a stratigraphic trap formed by F3 sandstone member of the AouinetOuenine formation of Middle Devonian age.

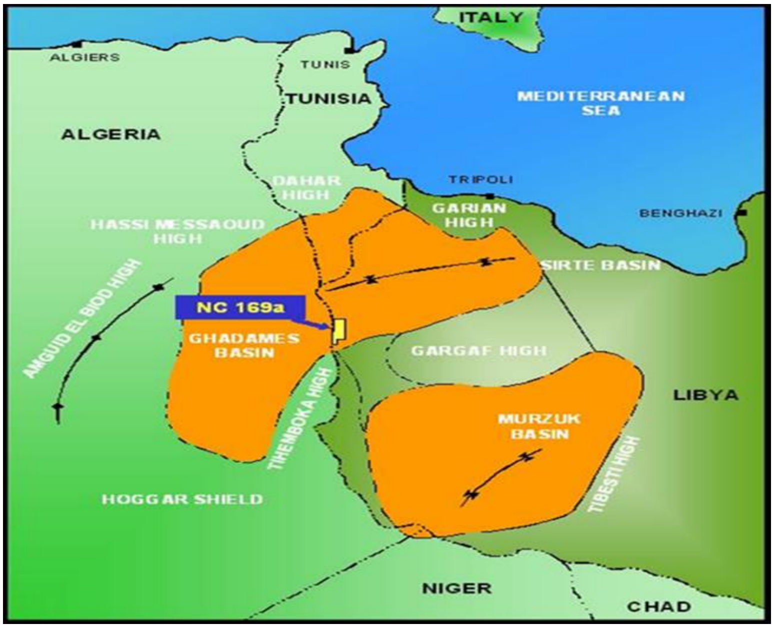

Figure 2:Wafa Field Locations Map (MOG Files).

The MB equation has some basic assumptions and limitations:

1. Temperature is constant because of changes in a reservoir generally take place at isothermal.
2. Production rate sensitivity is not part of the equation.
3. The PVT measurements should be made in an attempt to reflect the behavior in the reservoir.

8.1. Significance and usage of the material balance equation:

The material balance is roughly a relation between four quantities[8]:

1. Oil and gas in place (N, m or G).
2. Production (Np, Rp, Wp).
3. Water influx (We).

8.2. Cumulative oil production (Np)

The table (1) content the Cumulative production of the field form 2003 until 2014.

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Table 1 Cumulative Oil production

Year No.	Year	Cum Oil production (MMbbl)
0	2003	0.0
1	2004	12.05
2	2005	20.00
3	2006	25.40
4	2007	29.87
5	2008	33.32
6	2009	36.25
7	2010	38.88
8	2011	40.42
9	2012	41.34
10	2013	42.05
11	2014	42.60

8.3. Average reservoir pressures

The average static pressure data from 2003 to 2015 are summarized in the (table2).

Table 2:Wafa field Average reservoir pressure with years.

Year	Pressure(psia)
2004	4000
2005	3886
2006	3837
2007	3763
2008	3705
2009	3655
2010	3708
2011	3648
2012	3603
2013	2565
2014	2532
2015	3502

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8.4. Fluid PVT Data for reservoir pressure:

The PVT Laboratory Studies report from exploration wells A3 and A6 has been selected to represent Wafa Field. From mentioned PVT studies, an oil sample composition shows in chart (Figure 3).

8.5. OOIP Calculations

The equation can be organized to show linear behavior. Based on the rearrangement below, the large combinations of terms are used as x and y, while G is the slope, and N is the intercept.[9].

In practice, the scatter in the data may be great enough, and the signature of water drive subtle enough that deviation from linear behavior on the Havlena- Odeh plot may go unnoticed as shown in figure (4).[10]. The slope of the line is G and the y-intercept is N shown in plot (Figure 4). This plot provides a solution to G and N simultaneously. Either G or N can be manually adjusted to achieve the best answer.

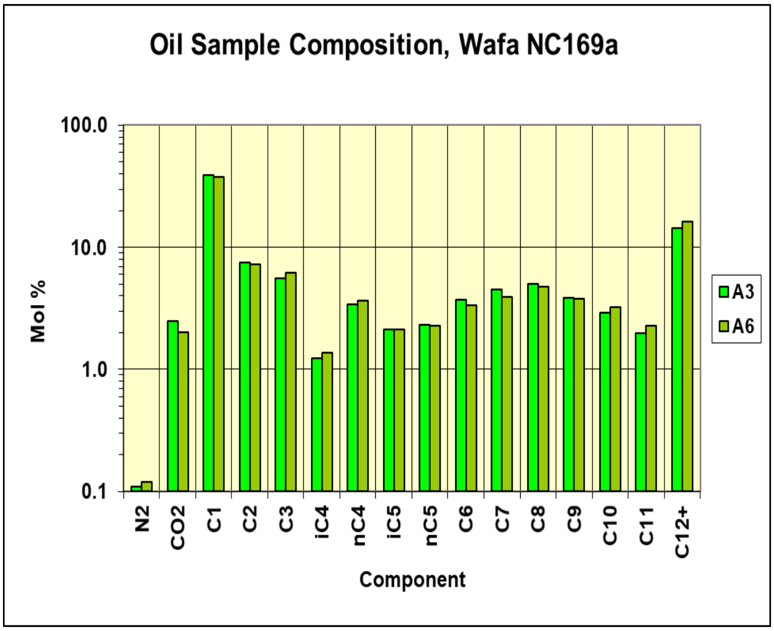

Figure 3: PVT Wafa field oil sample composition of well A6 –A3.

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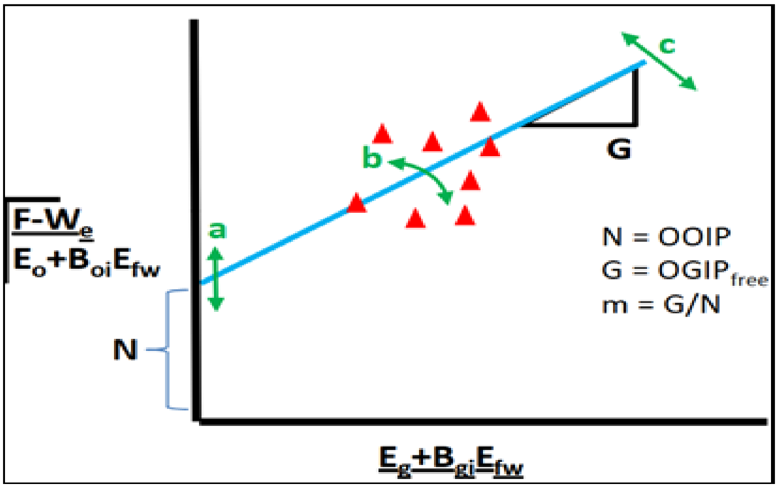

Figure 4: Havlena-Odeh plot.[10].

From the above plot, the y-intercept is N = Initial (original) oil in place, 550 STB) estimated. This plot provides a solution to G and N simultaneously.

8.6. Material Balance Method by MBAL Software

Analytical methods are used to assess the regression match between observed/ measured data used to construct this model. The value of this match is represented by the standard deviation between model obtained by MBAL software and measured used data.[11]

9. Case Study

Reservoir Model selection techniques can be regarded as estimators of some physical quantity like the probability of the model producing (reservoir recovery).

The special challenge in calibrating reservoir model is to describe different physical processes and therefore includes a lot of different physical reservoir parameters (e.g., porosity, K, Pc, and relative K).

- Reservoir data entering and Production history.
- PVT data entering.

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- ➢ Aquifer data entering.

To accomplish this method, all the data collected from Wafa oil field NC169a required filtering in some cases to get accurate results. The raw data file contains:

1) Tank Type: For the general fluid model (specify tank as oil or condensate).
2) Temperature: The reservoir models are isothermal the temperature will remain constant during the calculation.
3) Initial Pressure: Defines the original pressure of reservoir and is the entering point of all the calculations.
4) Porosity: porosity entered for rock compressibility calculations.
5) Connate water saturation: This parameter used in compressibility and pore volume calculations.
6) Production data: History of production entered to compare the real data (real production data) with simulator runs.[11]

9.1 PVT matching

PVT matching is used to build a unique PVT for the tank by measuring the quality of plot which appeared from PVT match calculations. The (table 3) including the PVT data. While the matching process is verified by comparing the data entered in match tables with the correlations that are used to get minimum standard deviation (accurate results).

The purpose and primary objective of history matching reservoir models is to reduce uncertainty, improve reservoir understanding, validated reservoir simulation model, and to enhance the accuracy of reservoir performance prediction. It is also test and validate that the simulation model is similar to the reservoir process known as history matching is performed. Figure (5) shows Wafa Field Oil Production History.

The final history matched model is assumed to accurately represent the reservoir characteristics and was able to predict reservoir performance.

The Figure 6, show Wafa Field Oil Reserve Plot of flow with time

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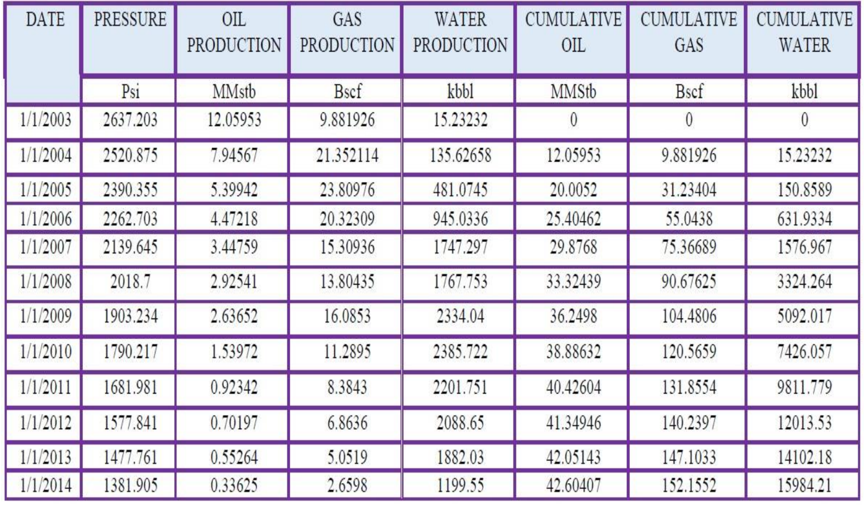
Table 3: Wafa Field PVT Measurements

Pressure Psi	Bo rb/stb	Bg ft3/scf	GOR scf/stb	Mo cp	Mg cp
3500		0.005423			0.023793
3300		0.005691			0.022901
3100	1.47382	0.006	783.86	0.36294	0.022008
3011	1.47381	0.006154	775.78	0.36332	0.021579
2813	1.4738	0.006539	773	0.36345	0.020644
2425	1.4229	0.007513	666.81	0.41026	0.018922
2025	1.36851	0.008979	554	0.47301	0.017347
1600	1.31593	0.011447	445.88	0.55037	0.015951
1200	1.27021	0.015514	352.93	0.63526	0.014918
1000	1.23451	0.018836	281.33	0.71596	0.014499
900	1.21283	0.021071	238.34	0.77222	0.014312
800	1.19115	0.023881	196.01	0.83452	0.014137
700	1.18046	0.027515	175.37	0.86758	0.013975
600	1.16938	0.032388	154.26	0.90349	0.013823
500	1.15798	0.039251	132.96	0.94183	0.013679
400	1.14277	0.04961	106.59	0.984	0.01354
250	1.11654	0.080981	62.98	1.06315	0.013328
15	1.06821	1.432606	0	3.55038	0.012756

The (table 4) including the Input Production Data of Wafa Field that used in the study.

Table 4: Input Production Data



DATE	PRESSURE	OIL PRODUCTION	GAS PRODUCTION	WATER PRODUCTION	CUMULATIVE OIL	CUMULATIVE GAS	CUMULATIVE WATER
	Psi	MMstb	Bscf	kbbl	MMStb	Bscf	kbbl
1/1/2003	2637.203	12.05953	9.881926	15.23232	0	0	0
1/1/2004	2520.875	7.94567	21.352114	135.62658	12.05953	9.881926	15.23232
1/1/2005	2390.355	5.39942	23.80976	481.0745	20.0052	31.23404	150.8589
1/1/2006	2262.703	4.47218	20.32309	945.0336	25.40462	55.0438	631.9334
1/1/2007	2139.645	3.44759	15.30936	1747.297	29.8768	75.36689	1576.967
1/1/2008	2018.7	2.92541	13.80435	1767.753	33.32439	90.67625	3324.264
1/1/2009	1903.234	2.63652	16.0853	2334.04	36.2498	104.4806	5092.017
1/1/2010	1790.217	1.53972	11.2895	2385.722	38.88632	120.5659	7426.057
1/1/2011	1681.981	0.92342	8.3843	2201.751	40.42604	131.8554	9811.779
1/1/2012	1577.841	0.70197	6.8636	2088.65	41.34946	140.2397	12013.53
1/1/2013	1477.761	0.55264	5.0519	1882.03	42.05143	147.1033	14102.18
1/1/2014	1381.905	0.33625	2.6598	1199.55	42.60407	152.1552	15984.21

9.2 History matching

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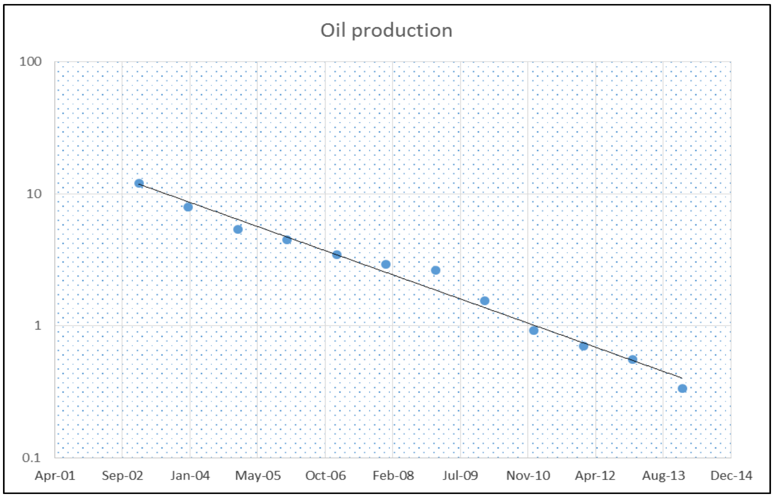

Figure 5: Wafa Field Oil Production History.

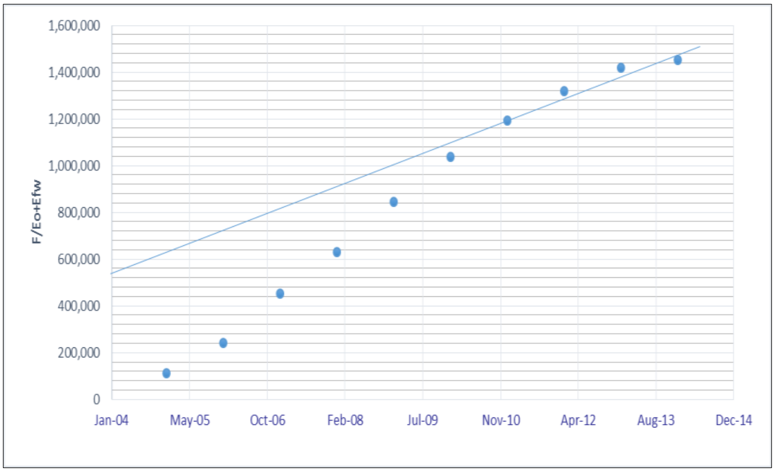

Figure 6: Wafa Field Oil Reserve Plot.

9.3 Input Parameters

The input data into MBAL model consist of PVT properties, Oil and gas Production data, aquifer parameter, relative permeability data, and reservoir thickness. Porosity and Permeability data were

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obtained from well logs .Correlation was used to evaluate relative permeability.

9.4 Reservoir Model Description

Initially the material balance analysis is conducted assuming the reservoir as a volumetric depletion drive type reservoir using MBAL, Reservoir Engineering Toolkit of Petroleum Experts.

The reservoir model was initiated with pressure, production and PVT data. Data input in the tank with initial pressure 4000 psi and other reservoir data and calculation as shown in table 5, 6 and 7.

Table 5: Wafa Field Material Balance Calculations.

MBE						
Bo	dp	F	Eo	Efw	Eo+Efw	F/Eo+Efw
1.478400	0	0	0.000000	0.00E+00	0.00E+00	0
1.478400	785.797	1.17E+01	0.000000	4.58E-03	4.58E-03	2.56E+03
1.478400	902.125	2.96E+01	0.000000	5.26E-03	5.26E-03	5,625
1.478400	1032.645	6.71E+02	0.000000	6.02E-03	6.02E-03	111,448
1.478400	1160.297	1.62E+03	0.000000	6.76E-03	6.76E-03	240,190
1.478400	1283.355	3.38E+03	0.000000	7.48E-03	7.48E-03	451,912
1.478400	1404.3	5.16E+03	0.000000	8.18E-03	8.18E-03	629,936
1.478400	1519.766	7.50E+03	0.000000	8.86E-03	8.86E-03	846,550
1.478400	1632.783	9.89E+03	0.000000	9.52E-03	9.52E-03	1,039,394
1.478400	1741.019	1.21E+04	0.000000	1.01E-02	1.01E-02	1,192,328
1.478400	1845.159	1.42E+04	0.000000	1.08E-02	1.08E-02	1,319,738
1.478400	1945.239	1.61E+04	0.000000	1.13E-02	1.13E-02	1,418,245
1.478400	2041.095	1.73E+04	0.000000	1.19E-02	1.19E-02	1,452,720

Table 6: Reservoir Data

Datum depth (OWC)	6392 ft SSL
Producing formation	F3 sandstone
Initial. res. Pressure	3423 psi
Res. Temperature	248 ºF
Drive Mechanism	Natural depletion

Table 7: Fluid & Rock properties data

Solution GOR	780 scf/stb
Form volume factor	1.47 rb/stb
Avg. permeability	250 md
Sat. pressure	3100 psia
Oil gravity	40° API
Avg. porosity	12.5 %

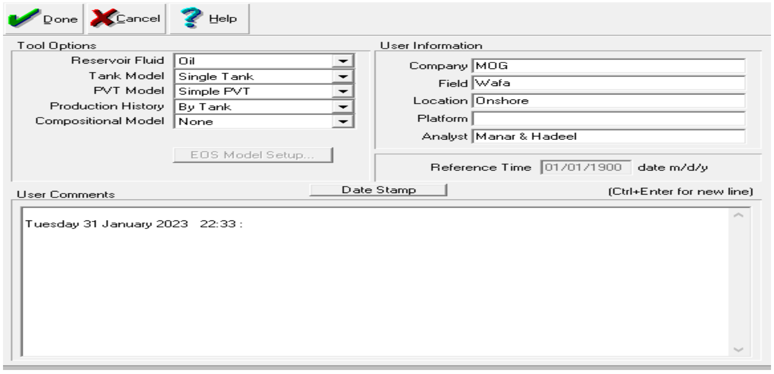
9.5 Reservoir Model Description

The material Balance model used the (MBAL System Options) as shown in Figure 7, and used the Black Oil Input (Figure 8).

Initially the material balance analysis is conducted assuming the reservoir as a volumetric depletion drive type reservoir using MBAL, Reservoir Engineering Toolkit of Petroleum Experts. The reservoir model was initiated with pressure, production and PVT data listed in Table 3 and 4.

The data input in the tank with initial pressure 4000 psi and other reservoir data as shown in table 6 and 7.

Then, history matching was developed to show the performance of the reservoir and estimation OOIP. Also, to identify the contribution of all dive mechanism that found in the reservoir and the average oil rate for any period. After that, generating production predictions by input constraint data.



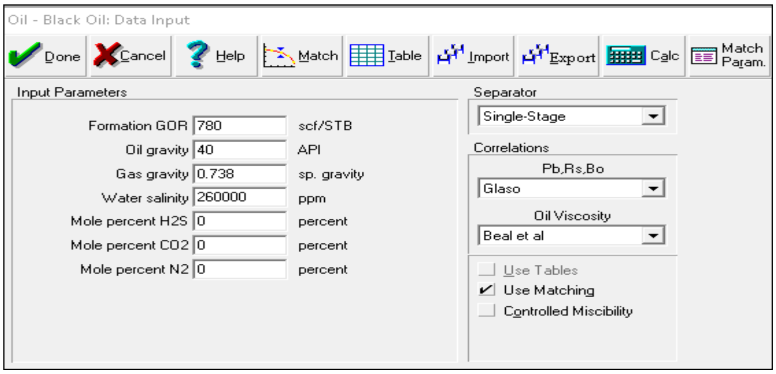
Reservoir Fluid: Oil
Tank Model: Single Tank
PVT Model: Simple PVT
Production History: By Tank
Compositional Model: None

Company: MOG
Field: Wafa
Location: Onshore
Platform:
Analyst: Manar & Hadeel

Reference Time: 01/01/1900 date m/d/y

Tuesday 31 January 2023 22:33 :

Figure 7: MBAL System Options



Input Parameters

Formation GOR	780	scf/STB
Oil gravity	40	API
Gas gravity	0.738	sp. gravity
Water salinity	260000	ppm
Mole percent H2S	0	percent
Mole percent CO2	0	percent
Mole percent N2	0	percent

Separator: Single-Stage

Correlations
Pb,Rs,Bo: Glaso
Oil Viscosity: Beal et al

☐ Use Tables
☑ Use Matching
☐ Controlled Miscibility

Figure 8, Black Oil Input.

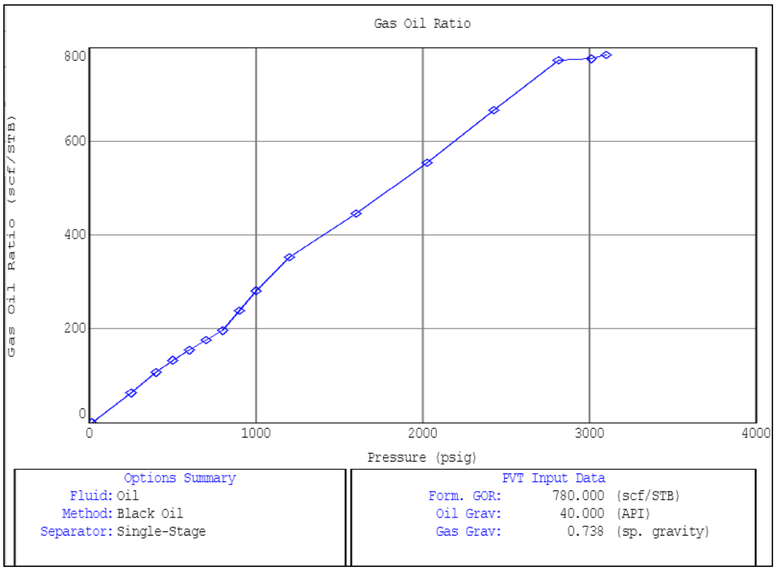
10. Results and Discussion

The analytical method is utilized to assess the agreement or correlation between the observed or measured data used in constructing the model. This agreement is quantified by calculating the standard deviation between the models generated using MBAL software and the measured data.

Figures 9, 10 and 11 illustrate the production history, gas-oil ratio plot, and the analytical approach applied to analyze the Wafa oil and gas field. The simulation was conducted under two scenarios: one with aquifer influx and another without aquifer influx.

In the presence of water influx, the simulation demonstrated a highly favorable match of approximately 100% with the observed data.

Figure 12 (Drive Mechanism), provides insights into the fractional contributions of different drive mechanisms to the recovery of Wafa oil and gas fields. The plot reveals that there are three primary energy sources influencing oil recovery: water influx, represented by the pink section, pore volume compressibility, illustrated in the green section, and the relatively minor impact of fluid expansion, indicated by the blue section (Figure 12).



Options Summary
Fluid: Oil
Method: Black Oil
Separator: Single-Stage

PVT Input Data
Form. GOR: 780.000 (scf/STB)
Oil Grav: 40.000 (API)
Gas Grav: 0.738 (sp. gravity)

Figure 9, Gas Oil Ratio Plot

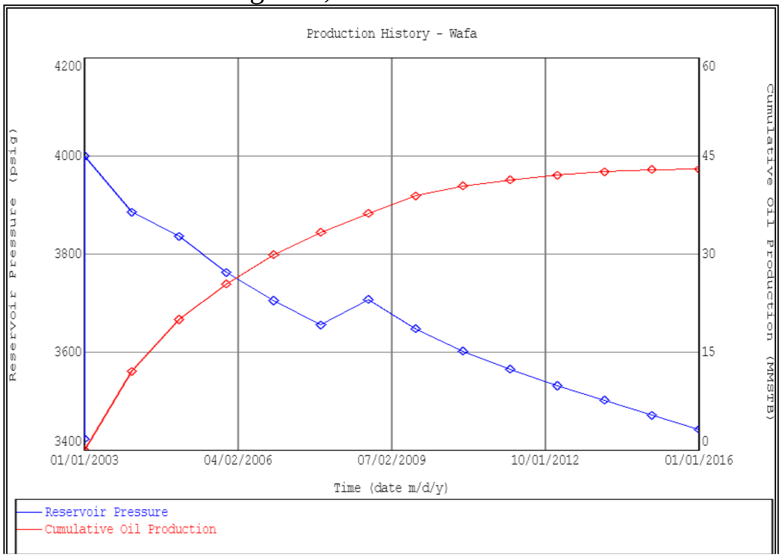
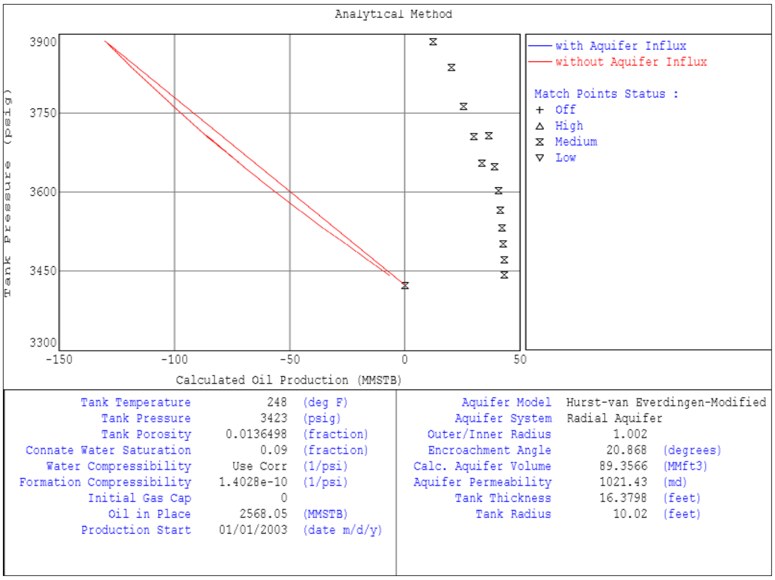


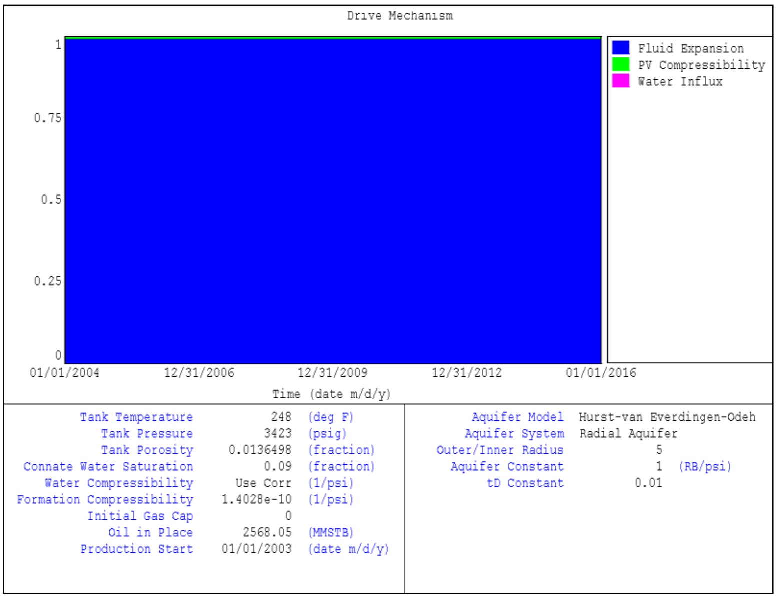
Figure 10,Wafa Field Production History



Tank Temperature	248	(deg F)
Tank Pressure	3423	(psig)
Tank Porosity	0.0136498	(fraction)
Connate Water Saturation	0.09	(fraction)
Water Compressibility	Use Corr	(1/psi)
Formation Compressibility	1.4028e-10	(1/psi)
Initial Gas Cap	0	
Oil in Place	2568.05	(MMSTB)
Production Start	01/01/2003	(date m/d/y)

Aquifer Model	Hurst-van Everdingen-Modified	
Aquifer System	Radial Aquifer	
Outer/Inner Radius	1.002	
Encroachment Angle	20.868	(degrees)
Calc. Aquifer Volume	89.3566	(MMft3)
Aquifer Permeability	1021.43	(md)
Tank Thickness	16.3798	(feet)
Tank Radius	10.02	(feet)

Figure 11, Analytical Method without Aquifer Inflow



Tank Temperature	248	(deg F)
Tank Pressure	3423	(psig)
Tank Porosity	0.0136498	(fraction)
Connate Water Saturation	0.09	(fraction)
Water Compressibility	Use Corr	(1/psi)
Formation Compressibility	1.4028e-10	(1/psi)
Initial Gas Cap	0	
Oil in Place	2568.05	(MMSTB)
Production Start	01/01/2003	(date m/d/y)

Aquifer Model	Hurst-van Everdingen-Odeh	
Aquifer System	Radial Aquifer	
Outer/Inner Radius	5	
Aquifer Constant	1	(RB/psi)
tD Constant	0.01	

Figure 12, Drive Mechanism.

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11. Conclusion:

Based on the analysis, results, and observations, the following conclusions can be drawn:

Formation in the Wafa oil and gas field was carried out using the Material Balance equation implemented through MBAL software. This estimation incorporated various reservoir characteristics, including tank parameters, water influx, rock compressibility, relative permeability, and production history. After inputting these parameters into the software, the calculated OOIP for the F3 sand formation was determined to be 2568 million stock tank barrels (MMSTB).

In order to account for the impact of gas expansion on pressure and ensure consistency with the results obtained from the material balance equation, certain factors were disregarded. Specifically, the influence of water influx and the presence of an oil rim were neglected. By excluding these factors, the effects of pressure resulting from gas expansion were effectively integrated into the calculations, aligning with the outcomes obtained from the material balance equation. Consequently, the results were satisfactory, demonstrating the usefulness of employing the Material Balance method.

12. Recommendations:

1. As future work, we recommended to using data with range more than the data used for example the production history must given for each month.
2. Estimation of OOIP should repeat once reliable data is available in order to confirm the results.
3. Using the results for Predict future reservoir performance.
4. Using the results for Predict ultimate hydrocarbon recovery under various types of primary driving mechanisms.

13. References

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