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Original scientific paper

PROSPER AND PIPESIM SOFTWARE FOR MODELING OF WELLS EQUIPPED WITH ESP SYSTEMS

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Abstract: When the pressure at the bottom of the well is insufficient to overcome the total pressure losses from the bottom of the well to the separator, production using reservoir energy is no longer possible, and the well ceases to naturally flow. To enable fluid production from the well again, it is necessary to apply some artificial lift systems. The most applicable artificial lift methods are gas lift (GL), sucker rod pumps (SRP), electric submersible pumps (ESP), progressive cavity pumps (PCP), and hydraulic pumps (HP).

This paper will delve into the modeling of wells equipped with electric submersible pump (ESP) systems, which are a widely adopted artificial lift methods in the oil and gas industry. This research aims to create accurate models that reflect the performance of these systems. For the modeling we will use industry standard software Prosper and Pipesim and perform a comparative study between both. Study will aim to show advantages and disadvantages of using both software, contributing to the understanding of their applicability in optimizing ESP system performance. Ultimately, this work seeks to enhance the knowledge base regarding effective exploitation methods in hydrocarbon extraction.

We begin by explaining the cessation of the well's natural flow, followed by a transition to an artificial lift method. The second section focuses on the methodology, explaining how each software Pipesim and Prosper employs specific empirical formulas and correlations for modeling, and how they use NODAL analysis to predict the well's behavior. The final part of the paper presents an actual case study in which the output data from both software programs are compared with the actual field-collected data from the ESP-equipped Well-X-1. Additionally, this analysis offers valuable insights into the strengths and limitations of using both Prosper and Pipesim, contributing to a deeper understanding of their applicability in optimizing ESP system performance. Ultimately, this study aims to enhance the knowledge base on effective exploitation methods in hydrocarbon extraction.

Keywords: Electric Submersible Pump (ESP), Fluid Production, Mechanical Exploitation Methods, Prosper, Pipesim

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1 INTRODUCTION

In oil production, the initial phase often sees wells producing oil through a process known as natural lift. This phase relies on the inherent energy of the reservoir, which,when substantial enough, enables fluids to ascend to the surface at economically viableflow rates (Martinović B. et al. 2023). When this condition is no longer met, natural flow ceases, and the well stops producing fluid. There are two main reasons for the cessation of reservoir fluid production:

- The dynamic pressure at the bottom of the well drops below the total pressure losses in the well.
- The pressure losses in the well become greater than the dynamic pressure required for oil flow to the surface (Gabor, T., 2018).

The first reason occurs due to a reduction in reservoir pressure caused by fluid depletion, while the second reason involves increased flow resistance in the tubing (production pipe). This can be caused by an increase in fluid density due to reduced gas production or various mechanical issues, such as smaller tubing dimensions and other limitations in the well equipment (Gabor, T., 2018).

When the pressure drops below the level that allows for eruptive operation or when production falls below the desired level, it is essential to apply one of the mechanical methods (gas lift, sucker rod pump, electric submersible pump, hydraulic pump, or progressive cavity pump) as soon as possible to ensure an extension of the production lifespan and increased ultimate recovery. The choice of method depends on the characteristics of the reservoir, the well, and the fluid being produced (Zhu, J. & Zhang H.Q., 2018).

In modern petroleum engineering, efficient well management and optimization of oil and gas production are key aspects of achieving commercial success. Electric submersible pumps (ESP) are one of the most important components in this process, playing a crucial role in lifting fluids from wells and ensuring production continuity. Modeling the well with an ESP system is a complex task that requires a detailed analysis of numerous factors, including the specific characteristics of the well, the mechanical properties of the fluid, and economic feasibility (Petroleum Experts 2022; Schlumberger, 2022).

This paper will discuss the method of modeling a well equipped with an ESP system, utilizing Prosper and Pipesim software for detailed modeling. The modeling process will involve inputting critical parameters such as fluid properties, reservoir characteristics, and operational conditions to create accurate representations of the well's performance with the ESP system.

The results obtained from these models will be compared with actual data collected from Well X-1 to assess their accuracy and effectiveness in predicting production behavior. This comparison will highlight any discrepancies and offer insights into the reliability of the modeling tools used. By analyzing the modeled outputs alongside real-world input data, this study will contribute to a deeper understanding of the dynamics at play in Well X-1, specifically in relation to the ESP system, and will evaluate the strengths and limitations of the Prosper and Pipesim software in practical applications. Ultimately, this research seeks to enhance methodologies for well modeling, particularly for wells equipped with ESP systems.

2 METHODOLOGY

The methodological framework of this paper consists of four distinct steps, each crafted to offer a systematic approach to the scientific objectives. The next section details the methodology of this study, encompassing data collection, model creation, model validation, and result finalization. Each of these steps is essential for a comprehensive understanding and interpretation of the results. The schematic diagram presented below (Figure 1) illustrates the interconnectedness of these methodological components

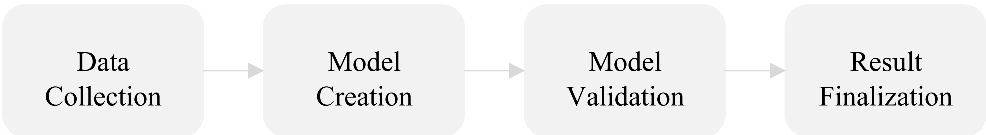

Figure 1 Schematic representation of methodology

2.1 Data collection

The data for this paper were collected from an operational oil well equipped with an ESP system. This comprehensive dataset includes a wide range of critical parameters that are vital for the analysis and modeling. Specifically, it encompasses production data (Table 1), which provides insights into the well's output over time; PVT properties of the fluid (Table 2), detailing the physical and thermodynamic characteristics of the produced fluid; information about the well equipment (Table 3), which outlines the technical specifications and components used; data related to the pump (Table 4), which includes specifications and performance metrics; well inclinometrics (Table 5), which present measurements of the well's inclination; and surface equipment data (Table 6), Together, these tables serve as a foundation for a thorough examination of the well's performance and the effectiveness of the ESP system.

Table 1 Production data

Serial number	Parameter	Unit of measure	Value
1	P_r	bar	181.7
2	T_r	°C	128.9
3	WC	%	62
4	Q_{ftest}	m^3/day	50.5
5	P_{wf}	bar	153.88
6	P_{wh}	bar	24
8	P_{casing}	bar	1.1

Table 2 PVT data

Serial number	Parameter	Unit of measure	Value
1	Solution GOR	sm^3/m^3	60.6
2	Total GOR	sm^3/m^3	33
3	ρ_o	kg/m^3	857.5
4	ρ_{gr}	ρ_{gr}	0.814
5	Water salinity	ppm	16935
6	Molar percentage H_2S	mol %	0
7	Molar percentage CO_2	mol %	2.22
8	Molar percentage N_2	mol %	5.51

Table 3 Information about the well equipment

Serial number	Parameter	Unit of measure	Value
1	H_{tubing}	m	2100
2	ID_{tubing}	mm	62
3	$H_{perforations}$	m	2304-2313

4	OD_{tubing}	mm	73
5	H_{casing}	m	2309
6	ID_{casing}	mm	162
7	ID_{choke}	mm	4.6

Table 4 Data related to the pump

Serial number	Parameter	Unit of measure	Value
1	H_{ugr}	m	2100
2	F	Hz	39
3	L_{cable}	m	2100
4	$V_{surface}$	V	1000
5	Pump stages	/	360

Table 5 Well inclinometrics

Serial number	MD (m)	TVD (m)
1	0	0
2	10	10
3	140	139.998
4	270	269.992
5	400	399.988
6	530	529.988
7	660	659.985
8	790	789.983
9	920	919.979
10	1050	1049.97
11	1180	1178.31
12	1310	1305.48
13	1440	1431.86
14	1570	1558.81
15	1700	1685.71

16	1830	1812.84
17	1960	1939.15
18	2090	2065.8
19	2220	2193.03
20	2386	2354.1

Table 6 Surface equipment data

Serial number	**Parameter**	**Unit of measure**	**Value**
1	Pipeline length	m	300
2	Internal diameter of the pipeline	mm	73
3	Pipe wall thickness	mm	5.3
4	Coefficient of thermal conductivity of pipelines	W/mK	X
5	Absolute roughness of the inner wall of the pipeline	mm	X
6	Average digging depth	m	0.8-1
7	Soil temperature at the depth of burial	◦C	X
8	Thermal conductivity coefficient of the soil	W/mK	X
9	Thermal conductivity coefficient of polyurethane foam insulation	W/mK	X
10	Separator pressure	bar	2
	Separator temperature	◦C	X

2.2 Model Creation

NODAL analysis, as applied in this study to assess well performance, is a key technique in reservoir and production engineering. It provides a structured framework for evaluating and optimizing the operation of oil and gas wells—including those using Electric Submersible Pumps (ESP)—from the reservoir all the way to the wellhead. By incorporating factors such as wellbore geometry, tubing and casing dimensions, and completion design, this method offers a realistic representation of well behavior under actual operating conditions (Mach et al., 1979; Ješić M. et al. 2023).

All modeling performed in Prosper and Pipesim is based on the principles of nodal analysis, which will be the core methodology used in this study to better understand and forecast well behavior. This approach enables a comprehensive exploration of the factors influencing well performance. (Petroleum Experts 2022; Schlumberger, 2022).

In the oil and gas sector, Inflow Performance Relationship (IPR-curve) and Vertical Lift Performance (VLP-curve) are two fundamental tools used to evaluate and optimize well performance. IPR describes how the production rate of a well relates to its bottomhole pressure, providing valuable insights for managing reservoir behavior and improving production efficiency. On the other hand, VLP examines how the production rate correlates with tubing head pressure, helping engineers assess the performance of artificial lift systems and surface facilities (Golan & Whitson, 1991). Both IPR and VLP are utilized in modeling wells using Prosper and Pipesim, allowing for a comprehensive evaluation of well performance and optimization strategies.

The Inflow Performance Relationship (IPR) describes the link between the wellbore flowing pressure and the surface liquid production rate. This concept has been a cornerstone of well performance analysis since bottom hole pressure gauges were first introduced in the 1920s (Golan & Whitson, 1991). Among the different models within the IPR framework, the Productivity Index (PI) is one of the most straightforward. It expresses how efficiently a well produces by relating the surface liquid flow rate to the pressure drawdown across the reservoir, typically measured at the midpoint of the producing zone, as shown in Equation 1 (Gabor, T., 2018)

$$J = \frac{Q}{(p_r - p_{wf})} \tag{1}$$

Where:

Q - flow rate, m³/day

J - productivity index, m³/day/bar

p_r - reservoir pressure, bar

p_{wf}- flowing bottomhole pressure, bar

In many wells using mechanical production methods, bottomhole pressures are below saturation pressure, resulting in a certain amount of gas being released from the oil. Due to the presence of a free gas phase in the reservoir, the assumptions used to develop the PI equation are no longer valid. There are methods employed when reservoir pressure is lower than saturation pressure, one of which is Vogel’s method (1968) (Golan & Whitson, 1991).

$$\frac{Q}{Q_{max}} = 1 - 0.2\frac{p_{wf}}{p_r} - 0.8(\frac{p_{wf}}{p_r})^2 \quad 2$$

Q - production at pressure p_{wf}, m³/day

Qmax - maximum production, m³/day

p_r - average reservoir pressure, bar

p_{wf} - flowing bottomhole pressure, bar

Vertical Lift Performance (VLP) correlations are empirical relationships and mathematical expressions used to predict and analyze the performance of artificial lift systems in oil and gas wells. These correlations are crucial for engineers and industry professionals, enabling them to estimate production rates, optimize lift systems, and make informed decisions regarding well operations (Soleša, M., Danilović, D & Buza, Z. 1999).

Some of the empirical correlations are illustrated in Figure 2 and can be classified into the following categories:

- Category "a": No slip, no flow pattern consideration required is for the two-phase friction factor
- Category "b": Slip and no flow pattern was considered. A correlation is required for both liquid holdup and friction factor
- Category "c": After using a method to establish the flow pattern, the appropriate holdup and friction-factor correlations are determined (Hofstatter, H., 2018).

Method	Category
Poettmann and Carpenter	a
Baxendell and Thomas	a
Fancher and Brown	a
Hagedorn and Brown	b
Gray	b
Asheim	b
Duns and Ros	c
Orkiszewski	c
Aziz et al.	c
Chierici et al.	c
Beggs and Brill	c
Mukherjee and Brill	c

Figure 2 Empirical correlations (Hofstatter, H., 2018)

The creation of a well model during NODAL analyses for Pipesim and Prosper software consists of the following steps (Ješić M. et al. 2023):

1. Outline key aspects of the well completion: Begin by inputting essential completion data such as tubing and casing sizes, the type of completion, and any artificial lift methods being used;

2. Specify PVT Properties: Define the pressure-volume-temperature (PVT) properties of the well fluids, including composition, density, viscosity, and other key characteristics that influence flow behavior;

3. Define the Inflow Performance Relationship (IPR-curve): Establish the relationship between bottomhole pressure and production rate to evaluate the well’s productivity under different reservoir conditions;

4. Input Hydrodynamic Measurements: Incorporate the most recent dynamic pressure data to accurately represent the current performance of the well;

5. Vertical Lift Performance (VLP-curve): Develop VLP models to assess the well's response to changes in tubing and casing pressures;

6. Run NODAL Analysis: Carry out the NODAL analysis to model how the well behaves under different operating scenarios. This involves calculating key parameters such as pressure, flow rate, and temperature at various points along the production system to better understand and predict overall well performance;

7. Review Simulation Results: Analyze the output, focusing on parameters such as wellhead pressure, tubing and casing pressures, flow rates, and temperature profiles. Assess performance across a range of scenarios;

8. Optimize Well Performance: Based on the analysis, make adjustments as needed—such as modifying choke size, changing completion configuration, or tuning artificial lift parameters—to enhance production efficiency (Ješić M. et al. 2023).

2.3 Model Validation

To successfully validate the model, whether using Prosper or Pipesim, it is essential that the actual production data closely align with the data generated by the constructed model. It is important to recognize that some discrepancies may arise between the modeled data and the actual measurements, regardless of the software used.

If, for any reason, the model fails to align with the actual well data, it may be necessary to adjust specific parameters that are either unavailable or considered unreliable. Such adjustments are crucial for enhancing the model's accuracy and predictive capabilities.

For example, it may be necessary to modify the discharge coefficient for the nozzle, as it can significantly impact flow characteristics. Additionally, if the well uses artificial lift methods, adjustments to parameters such as the pump wear factor and the volumetric pump factor may also be required. These parameters are critical for accurately reflecting the well's performance and ensuring that the model provides a reliable representation of the actual operating conditions.

Additionally, various correlations can be employed, as they can significantly influence the final results of the model. Prosper utilizes proprietary correlations, such as the "Petroleum Experts 3" correlation, which are specifically tailored to enhance modeling accuracy within its framework. In contrast, Pipesim uses established and experimentally validated correlations that have been rigorously tested in real-world scenarios. These correlations play a crucial role in determining fluid behavior, pressure drops, and overall production performance. The choice between proprietary and established correlations can affect not only the reliability of the model but also its applicability to different well conditions. Therefore, understanding the implications of these correlations is essential for optimizing the modeling process and ensuring that the results accurately reflect the well's performance. (Petroleum Experts, 2022; Schlumberger, 2022).

By making these necessary corrections, we can improve the model's alignment with the real-world data, thereby increasing its validity and usefulness in predicting future well behavior.

3 RESULTS AND DISCUSSION

This analysis focuses on well X-1, which is equipped with an Electric Submersible Pump (ESP) system. The modeling was conducted using Prosper and Pipesim software.

3.1 Modeling in Prosper

The Prosper software enables detailed well modeling, beginning with the input of PVT fluid properties (Figure 3). To create the IPR (Inflow Performance Relationship) curve, Vogel's method is utilized (Figure 4). This method is efficient as it requires only a single measurement to produce reliable results

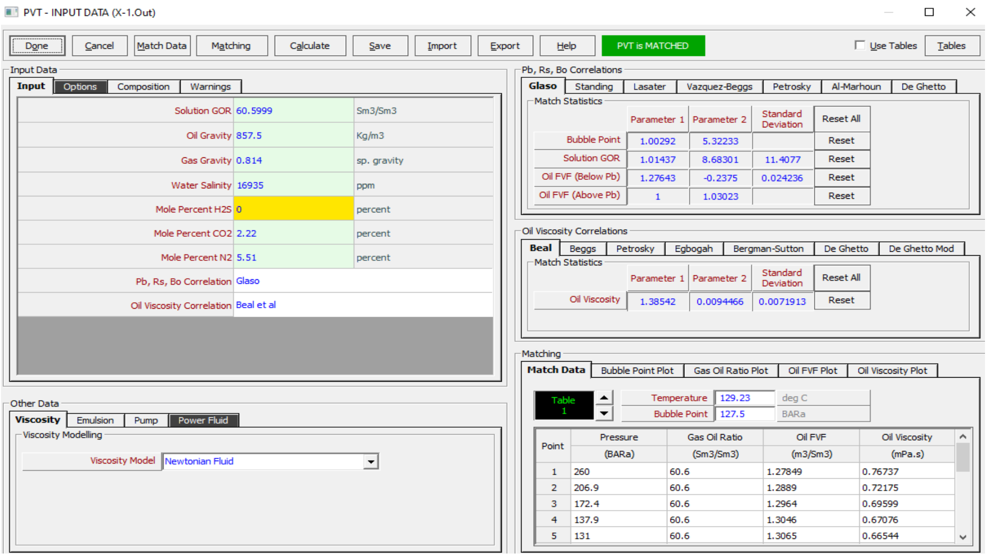

Figure 3 Input of PVT fluid properties

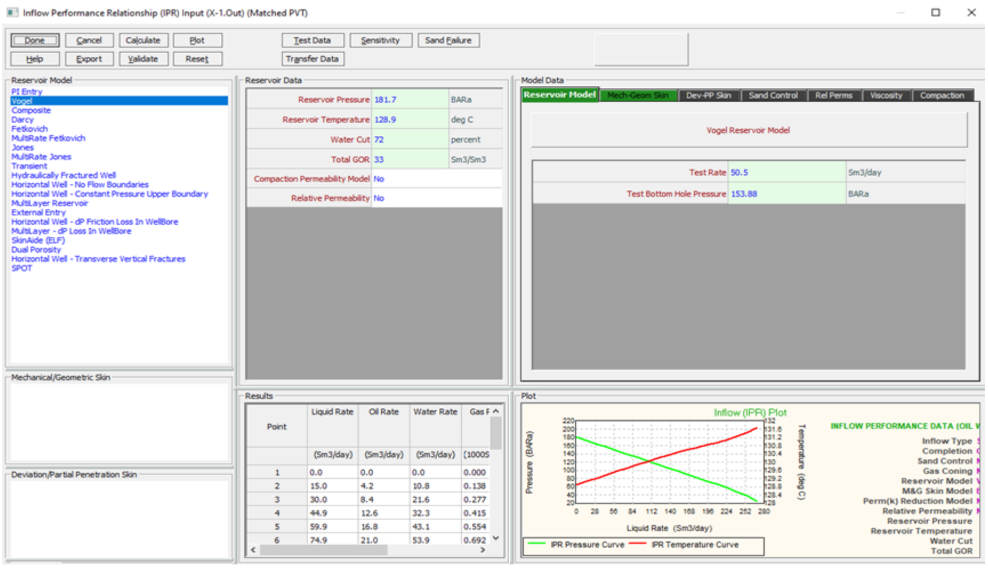

Figure 4 Input data for IPR

The selection of an ESP system (Figure 5) involves several key factors: the target production rate should be a percentage of the well's Absolute Open Flow Potential (AOFP), the chosen ESP must offer the highest pump efficiency at the desired production rate, and the pump diameter must be smaller than the internal diameter of the casing. In this study, the scenarios analyzed include using an ESP with an anchor gas efficiency of 90% (Gas in Place, GIP = 10%), with the pump positioned at the bottom of the well (Bagci A. et al. 2010). Based on these criteria, the 5-50 pump was selected.

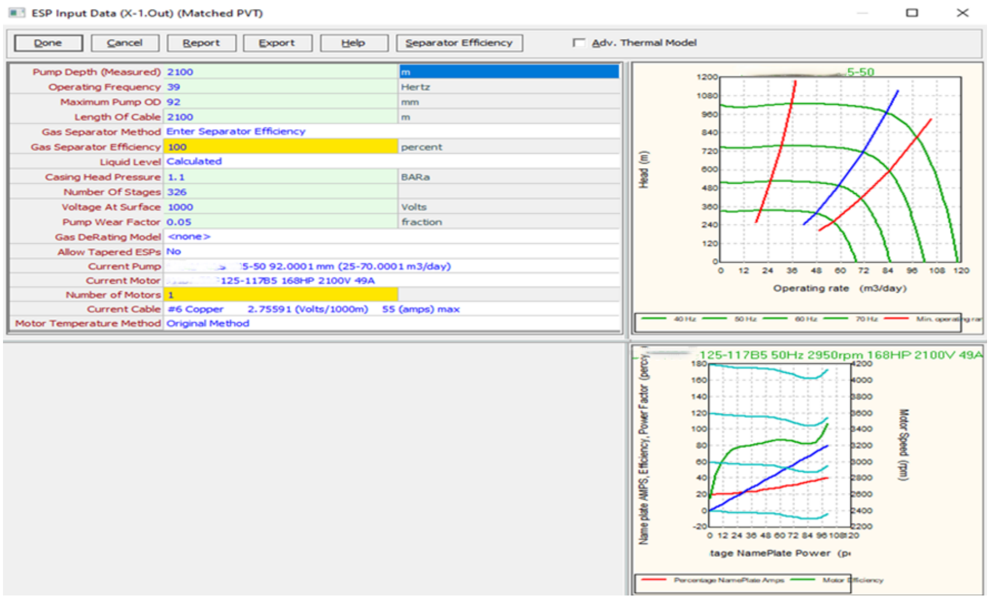

Figure 5 Input data for the Pump

The modeling process involves incorporating inclination data (Figure 6) and specifying the downhole equipment (Figure 7). Additionally, surface choke parameters (Figure 8) are included if necessary to accurately simulate the flow conditions.

DEVIATION SURVEY (X-1.Out)

Done | Cancel | Main | Help | Filter | Plot

MD <-> TVD

662 | 661.985 | Calculate

Input Data

Point	Measured Depth (m)	True Vertical Depth (m)	Cumulative Displacement (m)	Angle (degrees)
1	0	0	0	0
2	10	10	0.00349	0.019996
3	140	139.998	0.75223	0.33
4	270	269.992	1.93206	0.52
5	400	399.988	2.95307	0.45
6	530	529.988	3.36147	0.18
7	660	659.985	4.17828	0.36
8	790	789.983	4.94971	0.34
9	920	919.979	5.94803	0.44
10	1050	1049.97	7.35472	0.61999
11	1180	1178.31	28.0721	9.17
12	1310	1305.48	55.034	11.97
13	1440	1431.86	85.5143	13.56
14	1570	1558.81	113.518	12.44
15	1700	1685.71	141.744	12.54
16	1830	1812.84	168.884	12.05
17	1960	1939.15	199.629	13.68
18	2090	2065.8	228.983	13.05
19	2220	2193.03	255.656	11.84
20	2386	2354.1	295.815	14

Figure 6 Input data for deviation survey

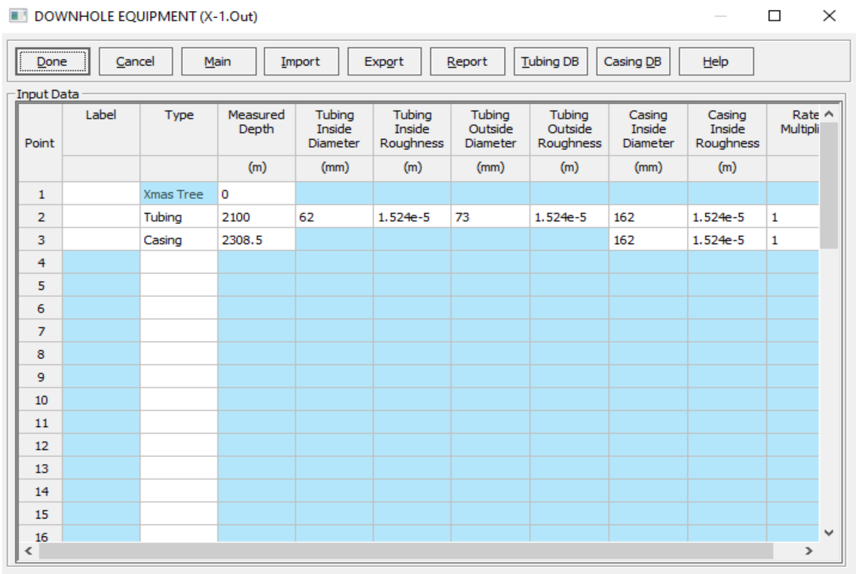

Figure 7 Input data for downhole equipment

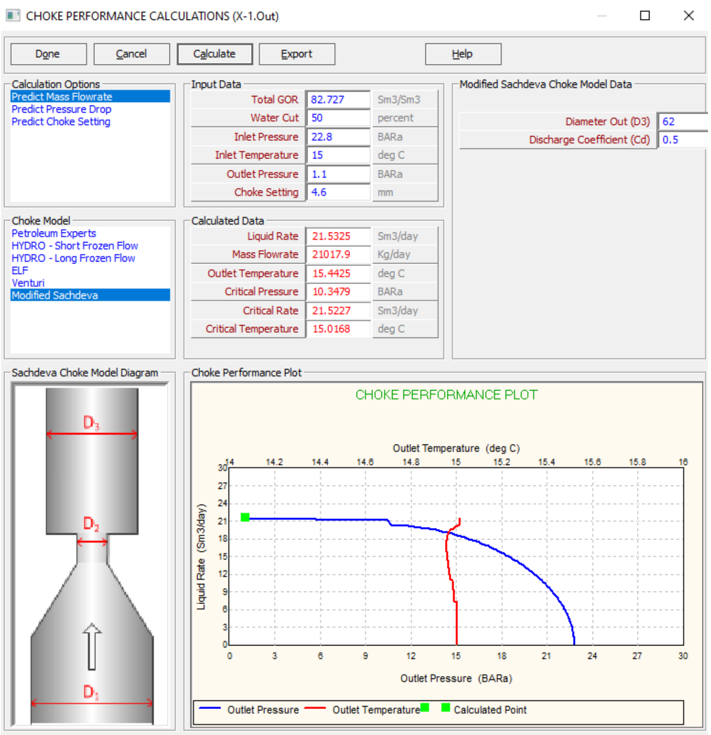

Figure 8 Input data for surface choke parameters

At the end of the modeling process, users can access the sensitivity analysis window (Figure 9) to select specific correlations that align with actual data on fluid flow rates and bottom hole pressure. When the simulated results closely match the actual measurements, it confirms that the well has been accurately modeled.

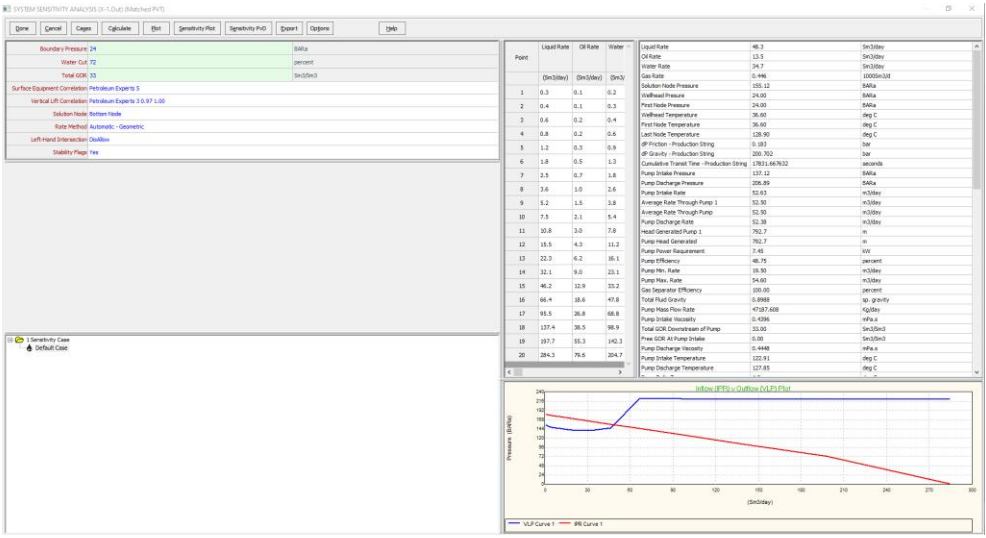

Figure 9 Sensitivity analysis window

In this window, users can also conduct a sensitivity analysis, which allows for the modification of specific parameters such as frequency, tubing diameter, and choke diameter. This analysis enables the evaluation of how changes in these parameters impact other variables, such as fluid production. By examining these relationships, engineers can identify optimal conditions and make informed decisions to enhance overall well performance. Additionally, this approach helps predict the well's behavior in response to these changes, providing valuable insights for future operational strategies.

3.2 Modeling in Pipesim

The initial step in the process of modeling any well in Pipesim involves entering crucial parameters that pertain to both the well dimensions and the associated production equipment (Figure 10). This specifically includes detailed information about the sizes and specifications of the tubing and casing. Accurately inputting these parameters is essential, as they lay the groundwork for all subsequent analyses and simulations within the modeling framework.

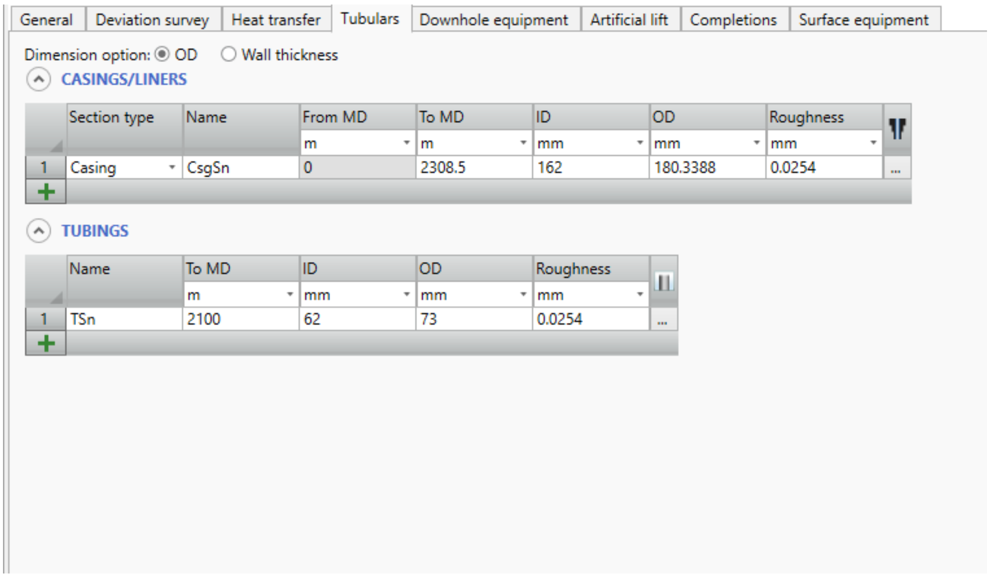

Figure 10 Input of data for well dimensions and production equipment

The next step involves entering the PVT properties of the fluid (Figure 11) and the data needed to construct the IPR curve (Figure 12). The "Black oil model" was used for constructing the reservoir fluid, which is the same model utilized in Prosper, and Vogel's method was also employed for the IPR curve. The primary and most important parameter in the Black oil model is the oil viscosity; without this parameter, it is not possible to construct the Black oil model.

Crude oil viscosity affects the flow of oil through porous media and pipes. It is defined as the internal resistance of the fluid to flow (Wang et al., 1964). Literature survey shows that change of viscosity with temperature and pressure is commonly predicted empirically when it is not possible to perform analysis in laboratory (Martinović B., Zivkovic, M. and Grubac, B. 2022).

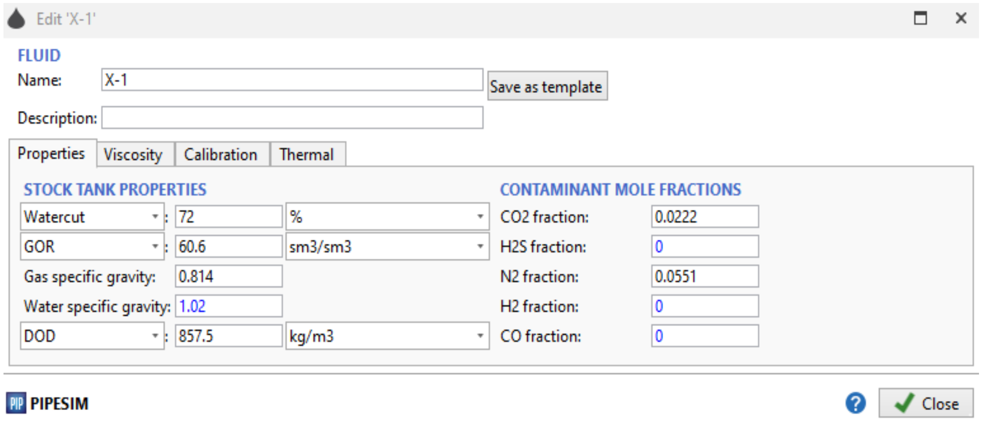

Figure 11 Input of PVT fluid properties

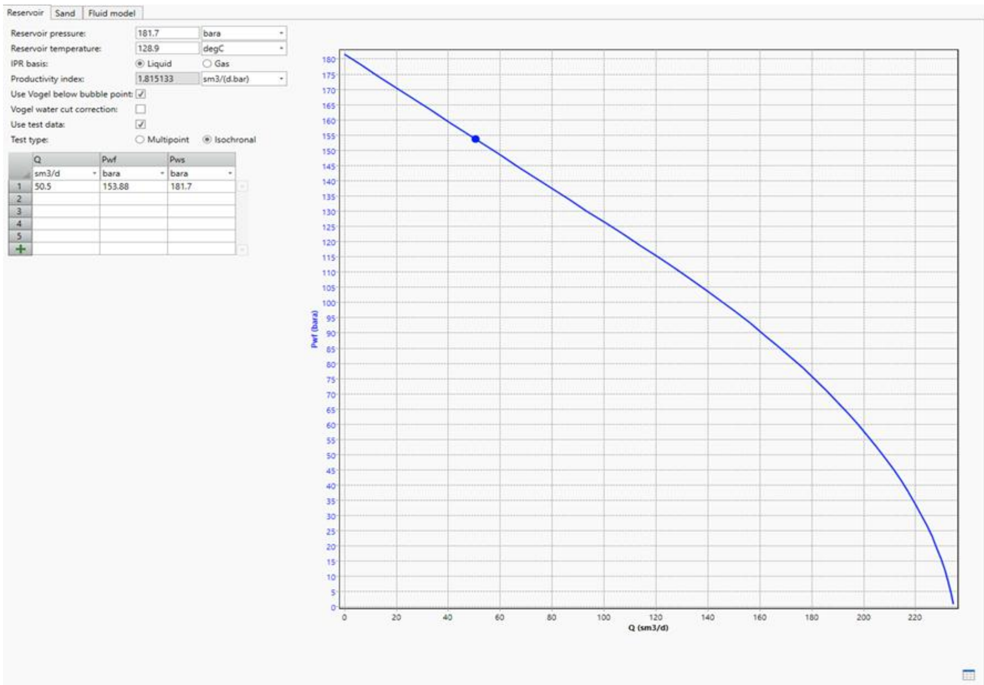

Figure 12 Input data for IPR

After that, data for the well's inclinometry is entered (Figure 13), along with information related to the pump. Using the software, the appropriate pump is selected—in this case, the Borets ESPM5-50. This process is illustrated in Figure 14, where the performance curve of the pump is shown on the left. Additionally, a suitable electric motor is selected.

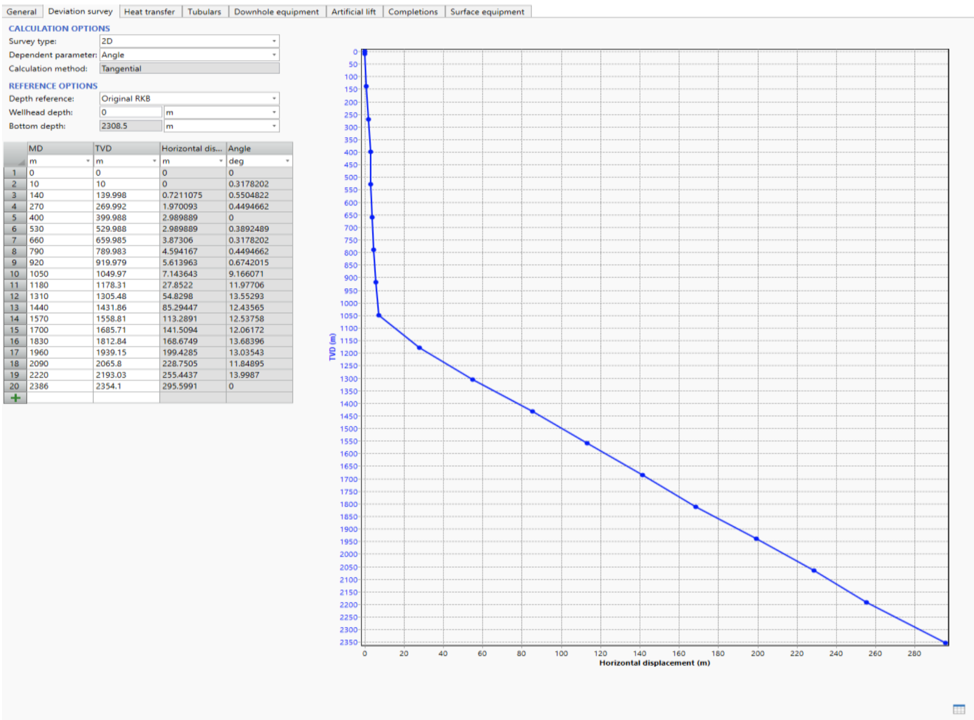

Figure 13 Input data for deviation survey

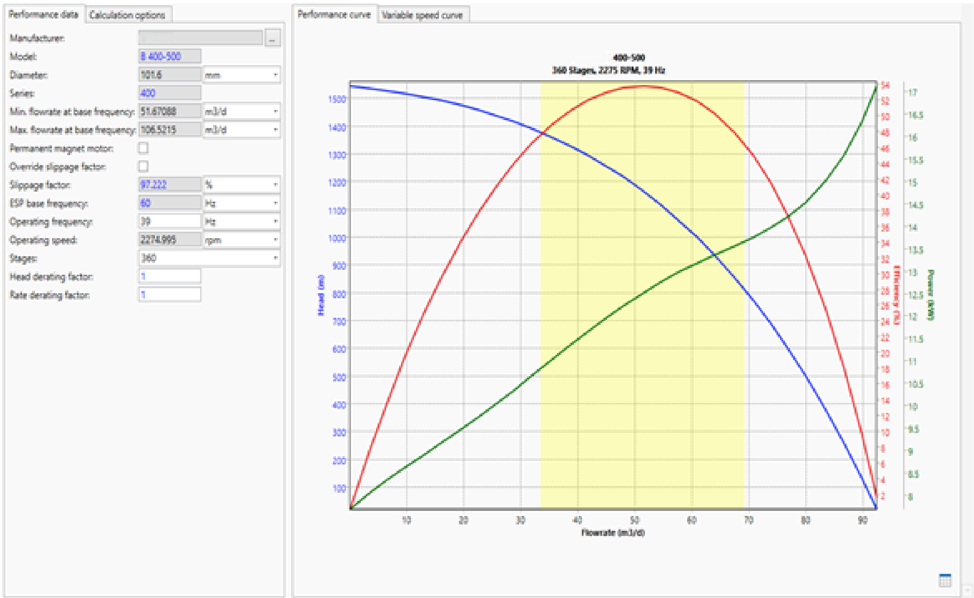

Figure 14 Input data for the Pump

The next step involves entering the surface nozzle data, as shown in Figure 15. After that, you proceed to the "Data comparison" window, where specific correlations are selected. The software then identifies the most suitable correlation that aligns with the entered data. This window is illustrated in Figure 16.

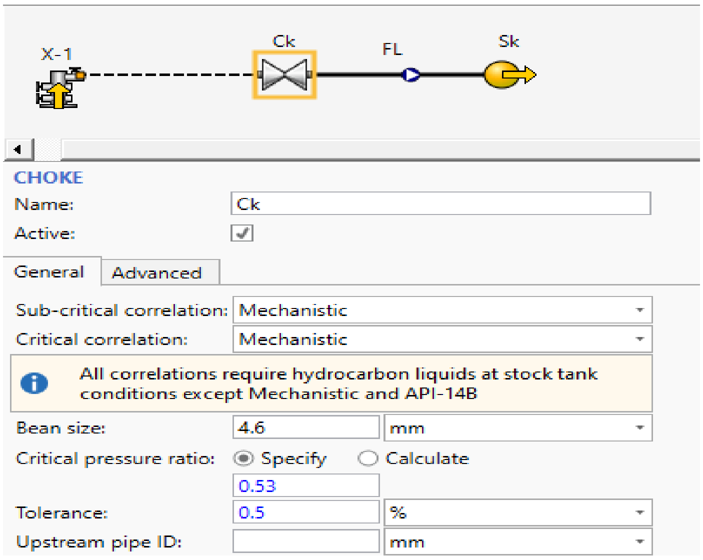

Figure 15 Input data for surface choke parameters

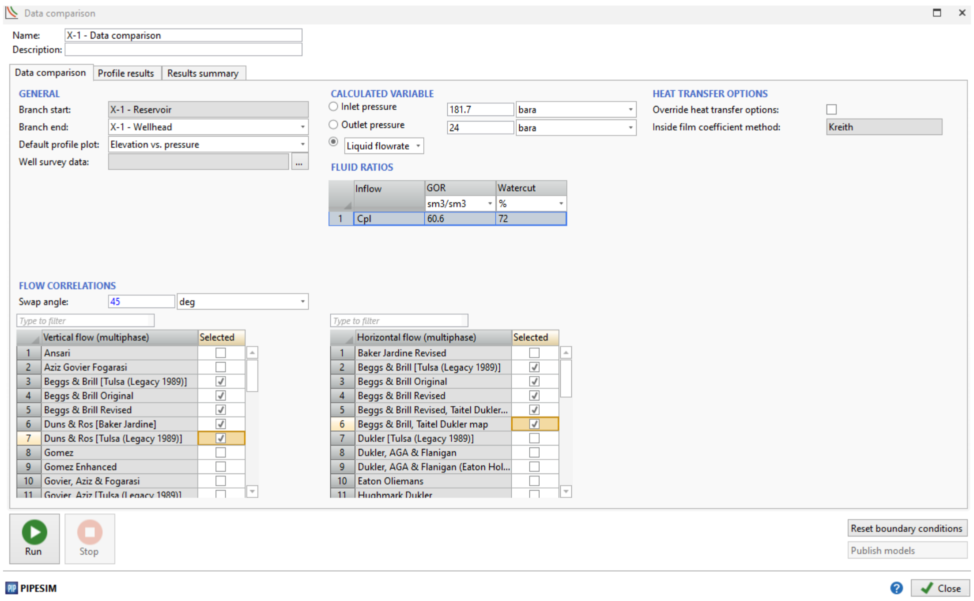

Figure 16 Selection of correlation

Finally, the "Nodal analysis" window (Figure 17) is opened, where the results are obtained, including the production rate of the reservoir fluid and the bottom-hole pressure. In Figure 17, the intersection of the IPR and TPR (VLP) curves is shown. The Tubing Performance Relationship (TPR) represents the ability of the tubing to transport fluid. The optimal tubing size can be selected by determining the best flow rate for each well using a sensitivity analysis that compares the TPR curves for various tubing sizes with the IPR curve. (Guo et al. 2015)

These results are then compared with actual data, and we can conclude that the model has been validated, as the results obtained from the nodal analysis closely match the actual data from the well.

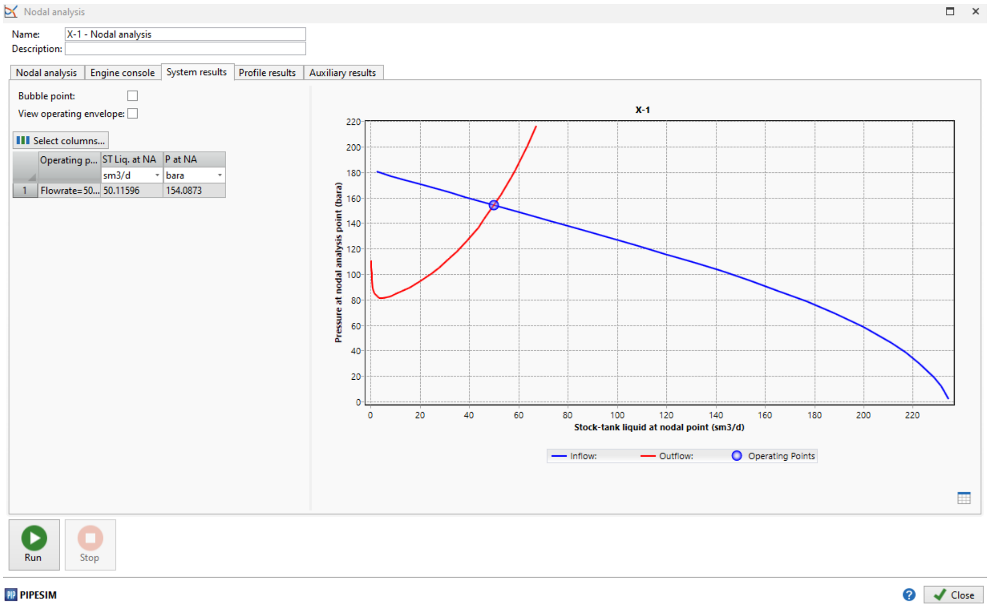

Figure 17 Display of the window with output data

3.3 Analysis of the results

The results for the models in Prosper and Pipesim are presented in Table 7. This table compares key metrics such as production rates, bottom-hole pressures, and pressure at the wellhead from both modeling approaches. Analyzing these results side by side allows for a comprehensive evaluation of the performance and reliability of each model, providing valuable insights into their effectiveness in simulating the well's behavior under various conditions.

Table 7 Results obtained from both software programs

Serial number	Parameter	Unit of measure	Prosper	Pipesim	Fakt
1	Q_f	m^3/day	49.8	50.1	50.5
2	P_{wf}	bar	154.3	154.1	153.9
3	P_{wh}	bar	24	23	24

Table 8 presents the deviations from actual values for both Prosper and Pipesim software. As we can see, the deviations in the Prosper model are smaller compared to those in the Pipesim model. Nonetheless, the deviations are relatively minor, indicating that both software programs have demonstrated their capability to effectively model a well equipped with an ESP system. This suggests that users can rely on either tool for accurate simulations in such applications.

Table 8 Deviation of results from actual values

Serial number	Unit of measure	Parameter	Prosper		Pipesim	
			Δ	Δ(%)	Δ	Δ(%)
1	m^3/day	Q_f	0.7	0.7	0.4	0.4
2	bar	P_{wf}	-0.4	-0.1	-0.22	-0.1
3	bar	P_{wh}	0	0	1	2.1

The primary difference between these two software programs lies in their approach to correlations. Prosper utilizes its proprietary correlations, such as "Petroleum Experts 3," while Pipesim employs existing, experimentally validated correlations. Prosper is distinguished by its simplicity and user-friendliness compared to Pipesim, as evidenced by its clearer and more accessible manual, which facilitates user familiarity with the software. In contrast, Pipesim provides a broader range of correlations and a more extensive catalog of ESP pumps (Petroleum Experts 2022; Schlumberger, 2022).

The Pipesim simulator includes models for a variety of common surface facility equipment to determine their impact on system design. The sophisticated sensitivity options in the Pipesim simulator can be used to design systems by varying key operating parameters, thus enabling determination of the optimal pipeline and equipment sizes. This entails the following:

- Control of pump performance by applying limits for ΔP, power, and other individual factors or a combination of these
- Calculation of pump parameters (such as ΔP and power) for single or multiple sets of operating conditions
- Simple thermodynamic model or user-specified curves
- Availability of most pump performance parameters (including head, ΔP, power, number of stages, speed, and efficiency) as sensitivity variables for design or uncertainty analysis
- Viscosity correction (Turzo method) (Schlumberger, 2022)

Prosper categorizes pumps and motors by diameter and performance characteristics, leaving it up to the user to ensure that the selected motor is physically compatible with the pump and to choose the most economical combination of voltage and current. Meanwhile, Pipesim filters appropriate pumps from the catalog based on the data provided in the model (Petroleum Experts 2022; Schlumberger, 2022).

Both software applications can also be utilized to model wells employing various types of artificial lift methods, as well as those that operate on a natural flow basis. This versatility allows for a comprehensive analysis of different extraction techniques, enabling users to simulate various scenarios and optimize performance based on specific operational conditions.

4 CONCLUSION

Effectively modeling a well equipped with an ESP (Electric Submersible Pump) system in specific reservoirs to enhance or increase production is a complex task. Making informed decisions requires extensive data collection on well conditions, reservoir characteristics, fluid properties, and production metrics. Software tools like Prosper and Pipesim enable a swift and accurate modeling process for ESP systems.

Using Prosper and Pipesim in ESP-equipped well modeling within the oil industry significantly streamlines and accelerates the workflow. It can be concluded that modeling wells equipped with ESP systems allows for accurate predictions of well behavior through sensitivity analysis. This approach enables parameter adjustments, such as changing the ESP system's operating frequency or installing a new pump, to observe potential pump performance in the well, along with anticipated production rates and pressure levels.

These models serve as digital replicas of actual wells, where parameters can be adjusted, mistakes can be explored and corrected, and lessons learned ultimately preventing similar issues in real-world conditions.

While both software programs effectively model ESP-equipped wells, each offers unique advantages depending on project needs. Prosper is ideal for projects requiring simplicity and high accuracy, while Pipesim is more suited to complex analyses involving multiple variables and advanced correlations. Therefore, oil industry professionals should select the software that best matches their project requirements and objectives to optimize the performance and efficiency of ESP-equipped wells.

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