IATMI22-025

Reduce Cycle Time by Accelerate POP Well Pounding after MPU Job Completed using JDE Database Excel-based Monitoring

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Abstract.
Sucker rod pump is an artificial lift method that is often used to lift heavy oil, where the lifting process from the well to the surface is using rod pump. In sucker rod pump operation, there are several pump problems that can interfere with the pump performance, one of them is fluid pounding. Fluid pounding occurs when there is not enough fluid to fill the pump barrel. When there is fluid pounding, the load borne by the SRP rod will decrease drastically because the pump capacity used exceeds the amount of fluid flowing from the reservoir to the well. Usually for safety reasons the field operator will turn off the well until the problem is resolved, turning off the well will cause an increase in oil loss. Therefore, cycle time to overcome the problem is critical. This paper proposes cycle time improvement through JDE Database Excel-based Monitoring. The improvement will ensure well will be immediately re-POP so as to reduce LPO.
To identify the presence of fluid pounding, it can be seen from the shape of the dyno card that indicating a lump (load up/down) during the down stroke and there is a large pressure difference between the upstroke and down stroke (> +/- 25%). Usually, the operation team will do a daily check and when the pumping unit of a well is found vibrated, it will be declared as suspect pounding. One way to overcome the problem of fluid pounding is to reduce the stroke per minute or stroke length. When fluid pounding occurs, an exception signal will pop to engineer's dashboard to do review the dyno card and release stroke length adjustment program. it has been identified that the delay time to put well back on production after program execution is due to lack of monitoring when the work is completed. The improvement is fully utilizing digital surveillance and information by combining exception-based signal (online dashboard) with excel based tool that connects with enterprise resource planning database system. Once the ticket is completed, the information will pop and flag the monitoring tool for follow up or reminder to put well back on production. The improvement results show that put on production cycle time data have increased from 58 hours in the 1st to 4th month period to 6.4 hours. Utilizing digital surveillance and operation information to improve well down cycle time by combining exception-based signal (online dashboard) with excel based tool that connects with enterprise resource planning database system.

Keyword(s): pounding, cycle time, Put on Production (POP), IEMs, JDE

1 Introduction

One of the important equipment that plays role in the oil production process is sucker rod pump, also known as the tubing pump unit, which is used for X Field oil wells because it is with the characteristics of the fluid in the form of heavy oil. Sucker Rod Pump, often also called pumping beam, is one of the artificial lift methods that utilizes the up-and-down motion of the plunger to push fluid from the reservoir to the surface. The problem that often occurs is the cause of gearbox damage when pump off/fluid pound occurs which results in a shorter life than the design life. Fluid pounding occurs when there is not enough fluid to fill the pump barrel, when there is fluid pounding, the load borne by the SRP rod will decrease drastically because the pump capacity used exceeds the amount of fluid flowing from the reservoir to the well.
To identify the presence of fluid pounding, it can be seen from the shape of the dyno card that there is an indication of a lump (load up/down) during the down stroke and there is a large pressure difference between the upstroke and down stroke (> +/- 25%). One way to overcome the problem of fluid pounding is to reduce the SPM/SL MPU.
During this time, delays often occur after the MPU work is complete, not immediately POP due to the lack of monitors and information on when the work is complete. To overcome this problem, a monitor is carried out using a tool in excel-based on the JDE database. After the MPU reduce SPM/SL work is complete, immediately inform the operator so that the well is immediately revived.

2 Accelerate POP Well Pounding after MPU Job Completed using JDE Database Excel-based Monitoring

2.1 Well pounding identification and solution

Well pounding problems can cause damage to the pump, therefore this problem should be identified as soon as possible. Well pounding problems can be identified in 2 ways, the first is looking at the shape of the dyno card, if pounding is identified, a lump will form (load goes up/down). During down stroke and there is a large pressure difference between upstroke and downstroke (> +/- 25%), second, well caught pounding from Checklist or Artificial lift (AL) operation issue signal (with criteria Low pump fillage with high SPM (PF<30%, SPM>6)), usually the operation team will check every day if the pump unit is found vibrates it will be expressed as pounding.
One way to overcome the problem of well pounding is to reduce strokes per minute or stroke length. In this case Operation team shut in well due to pounding for safety operation.

2.2 Previous workflow for POP Well Pounding after MPU Job Complete.

After the MPU work is completed (decrease SPM/SL) the well should be POP immediately by the operator, so that the well can produce normally again. Workflow of this process is once MPU completed job they give information to FO via radio communications and then FO will POP well. But sometimes there is a miscommunication either MPU and the FO or FO and AL (when well still pounding but no feedback to AL). resulting in a long delay between completed MPU work with the POP well.

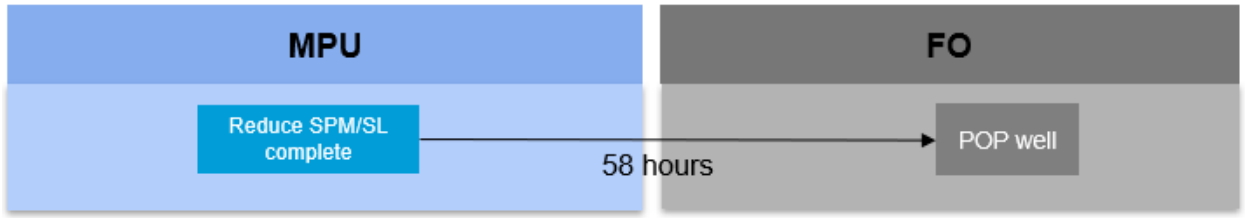

Figure 1. Previous Delay Time

2.3 Propose work flow for POP Well Pounding after MPU Job Completed.

The delay time that occurs between the completed MPU job and the POP wells is quite long and increases the number of LPO, because wells that should be able to be produced have not POP due to delays in information. Therefore, this paper offers a solution to overcome this problem by identifying wells whose MPU jobs are completed using JDE data base excel. From the excel we can easily notice and follow up the list of wells with completed MPU job. After it is identified by JDE, it will be informed by email to the operator to POP the wells, so the possibility of delay time between completed job and the POP well will decrease and will have an impact on reducing LPO.

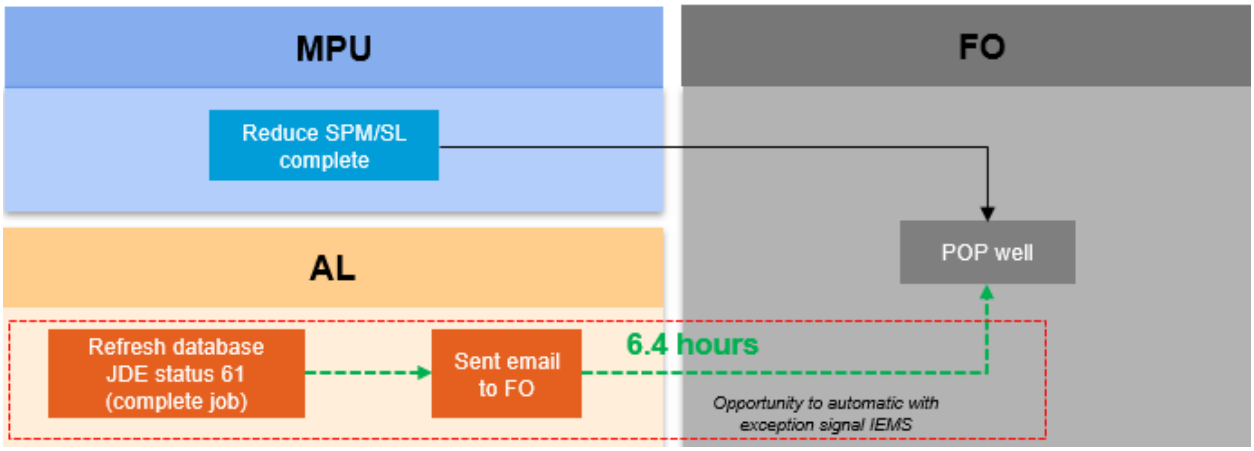

Figure 2. Recent Delay Time

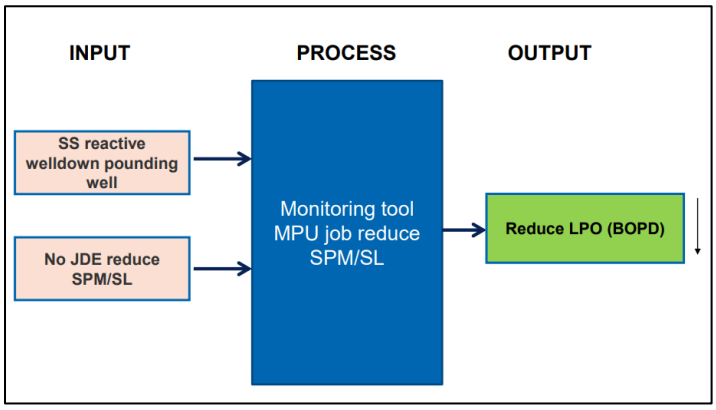

Figure 3. Cascading IPO

3 Result and Conclusion

After the improvement using JDE Excel Data base, there is a decreasing in delta time between completed MPU job and the POP well, where the average delta time before improvement is around 58 hours, and the delta time after improvement is only about 6.5 hours.

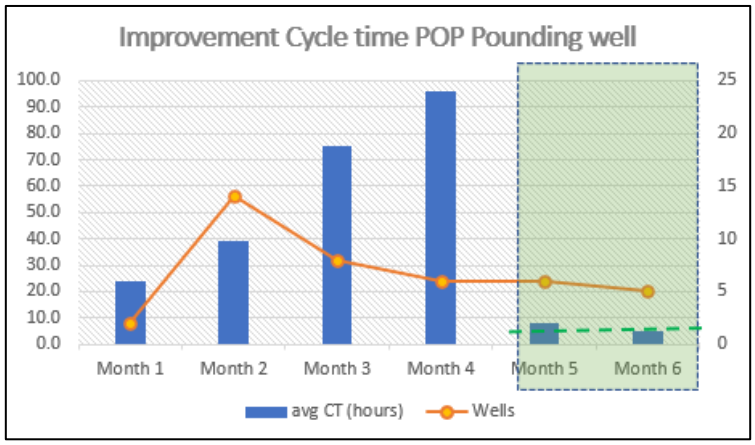

Figure 4. Cycle Time POP Pounding Well

From the figure above, it can be concluded that this method is successful in reducing cycle time which in turn also has an impact on reducing LPO. Then, it is hoped that further improvements will be made by performing digital automation to make monitoring easier.

References

Acknowledgments

We would like to thank Pertamina Hulu Rokan, SKK Migas, and Dirjen Migas for their permission to publish this paper.