

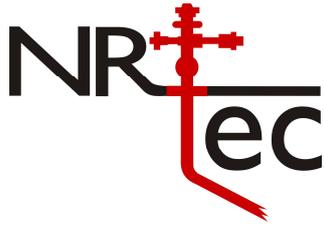


OPTIMIZING PRODUCING WELLS

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NR-Tec Ltd. OPTIMIZING PRODUCING WELLS

The petroleum industry continues to focus on the importance of improving efficiency and profitability. NR-Tec Ltd. has the experience and personnel to assist in optimizing oil and gas well production to realize these goals.

Production Optimization and Operating Cost Reduction

To achieve optimum production from a well (or wells) it is necessary to evaluate the current productivity and production potential of each well.

The following is a step-by-step method to assist in identifying where a well is in the optimization cycle and what should be considered to advance the well closer to proper / full optimization.

Step 1)

Evaluate producing wells by conducting fluid level testing (and annular fluid depression tests if necessary). The data gathered from these tests will be used to determine existing producing pressures and Inflow Performance Relationships (IPR) to determine production potential. A representative production rate is required for the IPR calculation and to ensure the well is producing in a stabilized condition.

Step 2)

Evaluate the existing pumping system. A Dynamometer Survey is recommended to evaluate beam pumping wells for equipment loading / sizing requirements and bottomhole pump performance. If production potential is to be realized it is important to be able to properly evaluate the current pumping system as to its available potential.

The following questions can now be answered:

- Is the well pumped off?
- Is there any production potential as indicated from the IPR?
- Is the current equipment overloaded and, if so, can loading be reduced to within the manufacturer's ratings?
- Can any additional production be realized using the existing pumping system?

Step 3)

If additional production is available, but the existing surface equipment is not sufficient, the pumping system will have to be redesigned.

If there is no additional production potential available, the system should be evaluated to possibly reduce operating costs by matching existing pump displacement with well inflow. This may also extend the life of the existing pumping equipment or may allow for equipment downsizing (with the existing equipment being better utilized elsewhere).

Wells with no additional production available, where productivity is considered to be lower than expected, should have Acoustic Bottomhole Pressure Surveys conducted. This will allow for wellbore damage characteristics to be evaluated with Pressure Transient Analysis and determine if well inflow could be improved with a stimulation treatment.

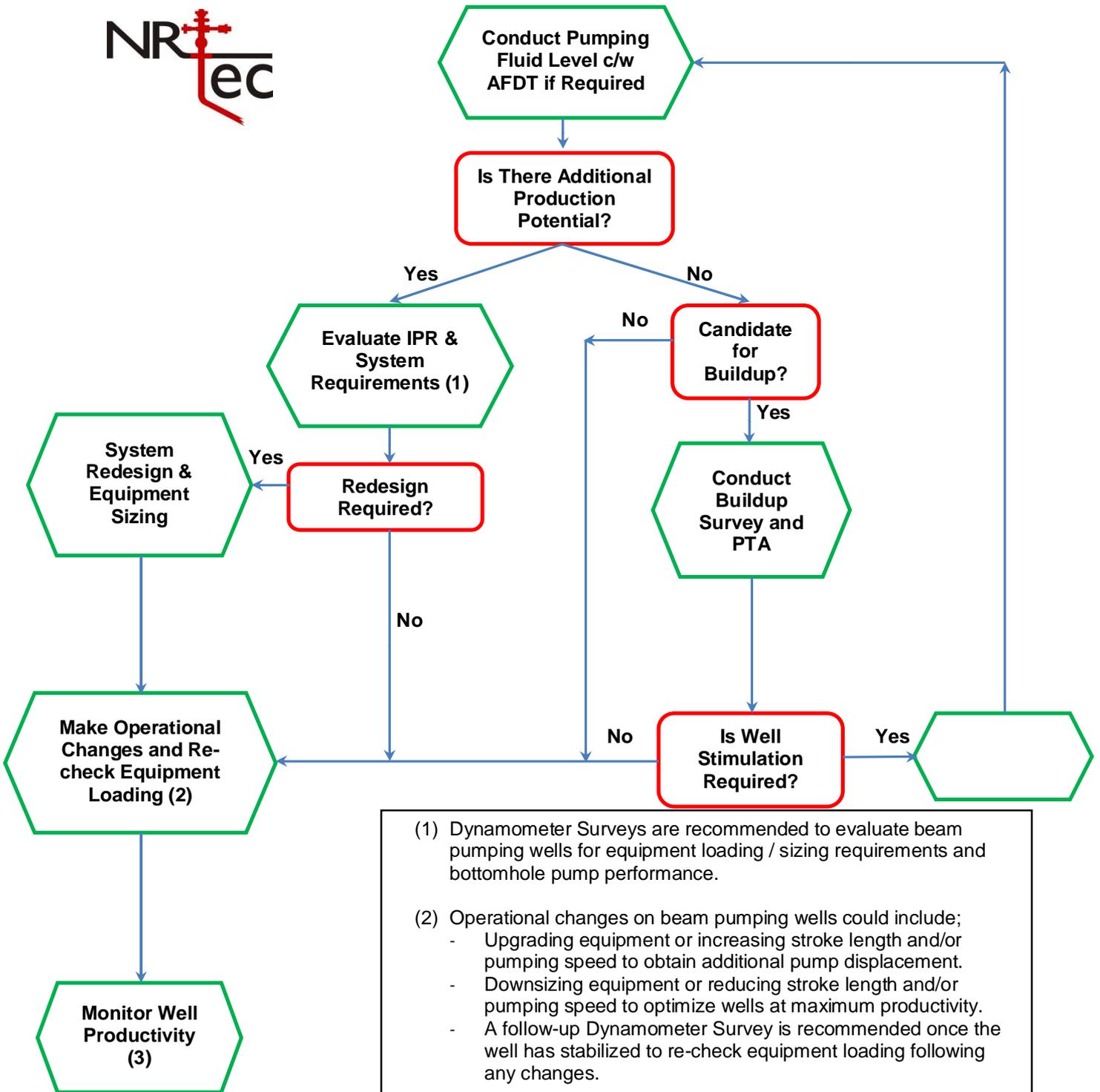
Step 4)

Operational or equipment changes can now be made in the field to optimize production and/or reduce operating cost.

Step 5)

Continue with ongoing optimization. The success of any optimization program is the continuation of a regular testing procedure (**Step 1**). By implementing a good testing program you are better able to monitor changes in well conditions and potential problems.

For further information please visit our website: www.nr-tec.com



- (1) Dynamometer Surveys are recommended to evaluate beam pumping wells for equipment loading / sizing requirements and bottomhole pump performance.
- (2) Operational changes on beam pumping wells could include;
- Upgrading equipment or increasing stroke length and/or pumping speed to obtain additional pump displacement.
 - Downsizing equipment or reducing stroke length and/or pumping speed to optimize wells at maximum productivity.
 - A follow-up Dynamometer Survey is recommended once the well has stabilized to re-check equipment loading following any changes.
- (3) Any change in production rates and/or fluid levels would suggest a change in wellbore conditions, prompting the entire process to be repeated.