It can be seen from Figure 18 that the operation valve is on and off at times and that production is not stable after the pressure drop between the operation valve and the third valve is decreased. The gas flow rate through each valve is sensitive to the dorm pressure of the operation valve.

6. CONCLUSION

The gas-lift unloading process is the basis of the production process. A reasonable unloading process can shorten unloading time, advance unloading efficiency and keep production stable. In this paper, a comprehensive transient dynamic simulation of gas-lift well unloading has been carried out using OLGA. A parameter sensitivity analysis of the unloading process is given. The results provided in this paper can be used in gas-lift design, operation and optimization. The following conclusions can be obtained from this study.

(1) The gas injection rate determines the length of time for gas-lift unloading. The larger the gas injection rate, the shorter the unloading time. However, if the gas injection rate is too large, it results in high casing pressure and the gas-lift valves cannot close normally. Multi-point gas injection therefore occurs. At the same time, too large a gas injection rate will damage the gas-lift valves and enhance the ground gas injection pressure. The gas injection rate must therefore be increased gradually.

(2) For each production index, there is a reasonable gas injection rate.

(3) The pressure drop between valves guarantees that the injection gas enters the tubing through a single valve. Too large a pressure drop between valves will decrease the gas injection depth, but too small a pressure drop will result in multi-point gas injection.

(4) The pressure drop between the operation valve and the third valve must be relatively large. If this pressure drop is too small, it will result in multi-point gas injection or unstable work of the operation valve.

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