

N2 Lift Instruction

Document Reference Number: Instruction 012

Version: 3.0

Date: October 2019

Approver: EPP Manager

Any changes to the work instruction must be approved by the EPP Manager.



Role	Key Responsibilities
Petroleum Engineer	Calculate injection rate of N2 and minimum lifting velocity to make informed decisions of when to stop N2 lift.
Well Test Supervisor	Make decision in consultation with management team and technical support to cease N2 lift based on information from the Petroleum Engineer.

1.0 N2 Lift

Nitrogen lifting shall only be utilised where a well will not unload fluid with natural formation pressure.

Open the relevant annulus valves and choke manifold. Commence pumping nitrogen at the required rate. The required rate will be based on the following parameters or considerations deemed relevant by the Petroleum Engineer:

- a. Natural gas rates, density and velocity
- b. Liquid rates, density and velocity
- c. Tubing size
- d. Pressure
- e. Temperature

The nitrogen injection rate shall be controlled using valves and choke. Continue monitoring returning liquid and gas flow rates.

Well begins to flow naturally, i.e. it has achieved minimum lifting velocity (gas velocity required to prevent a drop of liquid from falling), shut down nitrogen injection and close the appropriate annulus valves. The minimum lifting velocity is calculated based on the same above parameters (a-e) or considerations deemed relevant by the Petroleum Engineer.

If well stops achieving minimum lifting velocity and requires unloading re-start N2 lift. If the well no longer requires unloading shut in well and await further instruction from the Well Test Supervisor.

2.0 Decision to restart or stop N2 lift

The decision to stop or restart the N2 lift will be based on the judgement of the Well Test Supervisor using the following information:

- a. If the quantity of liquid returns are dominated by and consistently showing formation produced fluid measured by the levels of salinity.
- b. Lifting calculations by the Petroleum Engineer as outlined above.

3.0 Flare System

Monitor gas concentrations in all returning well fluids being directed to the flare. Once methane concentrations reach 20%v/v, undertake a supported ignition test. If ignition is not achieved after five minutes, withdraw the addition of support fuel to prevent the release of unburnt propane.

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Repeat supported ignition tests at each methane 5% increment above 20% v/v until ignition is successfully achieved. Ignition is anticipated to be possible when methane concentrations reach approximately 30% to 50% v/v.

4.0 N2 Process Flow

