

# Circular Economy of Chemical Injection During Field Start-Up

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## Abstract

**Objectives/Scope:** Northern Area Gas Producing Department (NAGPD) produces nonassociated gas from the Karan, Arabiyah and Hasbah offshore fields, and Khursaniyah onshore field. Khursaniyah onshore field consists of 22 wells and two gas-gathering manifolds (GGMs), which require mono-ethylene glycol (MEG) for hydrate inhibition in well cold start-up. The conventional start-up philosophy is to inject MEG through portable skids prior to, and during the start-up, until the gas temperature rises above the hydrate formation region. The new start-up philosophy is to start-up Khursaniyah field without MEG injection utilizing the optimum weather conditions, optimum first well selection, and back-pressurization of the well pipelines network.

**Methods, Procedures, Process:** The new operation philosophy minimizes the risk of hydrate formation through three protection layers: weather conditions, well temperature conditions, and network back-pressurization. The heat transfer between produced gas and atmospheric temperature is minimized by setting start-up time at the best possible weather conditions. The first well to be started is set, based on the well's historical operating parameters to minimize the risks associated with first well start-up. The network was fully pressurized to minimize the pressure drop after start-up, which will yield joule-Thomson effect across the choke valve increasing the risk of hydrate formation. The evaluation of the new approach was done through data analytics tool and process software simulation (Hysys), to ensure safe operation of the field without hydrate risks.

**Results, Observations, Conclusions:** NAGPD has implemented its chemical injection optimization during field start-up by utilizing data-analytics tool and process simulation software. The elimination of chemical injection during start-up in Khursaniyah field is part of NAGPD transition toward the circular economy, which aims to retain the maximum value of resources. The optimization resulted in cost saving equivalent to \$150,000 per field start-up, and minimized the required start-up time providing more operational flexibility.

**Novel/Additive Information:** The paper provides insights about how utilizing digitization and technologies has led to elimination of chemical injection during field start-up. The achievement of this initiative comes in line with Saudi Aramco vision to be the leading company — in implementing a circular economy — within the energy industry, and to support our operations to be more sustainable.