

## Case Study

John Crane Dry Gas Seals



# Emissions Reduced at Natural Gas Liquid Extraction Plant in the Middle East by Using John Crane Dry Gas Seals



### BACKGROUND

**Industry:** Oil and Gas

**Site:** Natural Gas Liquid (NGL) Extraction Plant

**Location:** United Arab Emirates

**End Product:** Gas processing and NGL



*Type 28AT - Utilizing John Crane's patented spiral groove pattern, these dry-running seals were selected to reduce emissions*

### Customer Need

- The customer is a Natural Gas Liquid (NGL) extraction plant that processes associated gas from neighboring oil fields in the central desert of the United Arab Emirates
- After compression, two parallel gas processing trains refrigerate the gas, which each train comprising of two compressor casings: one low-pressure (LP) and one high-pressure (HP)
- In compressor stations, emissions are typically vented through a flare system resulting in product loss, and high operations and maintenance costs are increased when associated with wet seals

### Highlights

- An NGL extraction plant in the Middle East wanted to lower emissions and operation and maintenance costs, and increase reliability and operations safety
- Emission reduction of CO<sub>2</sub> of 97% by implementing dry gas seals for the compressors

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### Application

- John Crane retrofit the existing floating oil ring wet seals to dry gas seals technology on four centrifugal compressors installed at an NGL extraction plant in the United Arab Emirates
- New seal housing was required for the LP compressor to accommodate the new dry gas seal cartridge
- Due to limited space around compressors, it was difficult to find the location for dry gas seal panels
- John Crane suggested building metal bridges in between the LP and HP compressors on each train uniting concrete mezzanine structures to allow easier access to the dry gas seal panels

### Solution

- The retrofit included two Type 28XP for HP and two Type 28AT for LP compressors tandem seal for HP and LP compressors
- Each compressor was fit with a Type 83 barrier and one seal gas support system with a Nitrogen generator for each compressor
- A rotor-dynamic study concluded a rotor instability issue so new tilting pad journal bearings with squeeze film damper were provided for the LP compressor

### Results

- Upgraded bearing-type rotor vibration was dramatically reduced in the post-retrofit operation of the compressor
- Startup and commissioning were successfully completed on train one and train two with no major complications
- Emission reduction of CO<sub>2</sub> of 97%
- Besides the reduction in emissions, the retrofits significantly increased the reliability of the compressors. With oil seals in place, the seal change was carried out on average every three to five years. After the retrofit to dry gas seals, compressors ran for over 10 years prior to shutdown

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