

# CASE STUDY

## JOHN CRANE SENSE®

# TURBO



## HOW JOHN CRANE SENSE® HELPED A LIQUEFIED NATURAL GAS PRODUCER REDUCE UNPLANNED DOWNTIME BY EIGHT DAYS

### INDUSTRY

Oil and Gas

### SITE

Liquefied natural gas plant

### LOCATION

South America

### END PRODUCT

15M metric tons p/a

The John Crane Sense® solution was deployed to increase asset reliability and the mean time between repair (MTBR) to shorten the duration of an unplanned shutdown due to a process upset. An industry-first dry gas seal with embedded sensors was installed to collect data and help determine if the seal should be replaced after an event.

### CUSTOMER NEED

- One of the world's largest producers of Liquefied Natural Gas (LNG) had the goal of extending the MTBR of a compressor and get better visibility into the dry gas seal's health
- The operators primarily relied on seal vent leakage detection for diagnosing and assessing the health of the mechanical seal
- While vent leakage and traditional forms of seal monitoring provide some essential health information, they may not give a complete or sufficiently leading indication of the seal's health
- Having a spare compressor staged to take over the duties during any downtime was not feasible due to the high cost and limited operation real estate available
- To avoid possible catastrophic seal failure, the LNG plant reliability engineers were forced to routinely shut down the compressor each time they observed high vibration measurements or other mechanical/operation issues
- In a post-mortem, the majority of the events proved to be unrelated to any seal issues, but each shutdown caused as much as a week of lost production while seals were removed and replaced with spare seals as a precautionary measure
- Wasting useful life of mechanical seals because they were prematurely replaced added to the costs incurred due to lost production

### HIGHLIGHTS

- A leading producer of LNG sought the help of John Crane to take a proactive approach with compressor maintenance and extend its MTBR to shorten the duration of an unplanned shutdown due to a process upset
- John Crane engineers recommended installing John Crane Sense®, which included dry gas seals with embedded sensors and online monitoring apps used in conjunction with a diagnostic monitoring system to develop an improved view of overall seal health
- Because of John Crane Sense®, the unplanned maintenance period was reduced by eight days, saving \$4 million in production losses, and resulted in the addition of the John Crane Sense® Turbo solution to additional compressor trains in the plant

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### APPLICATION

- The LNG company's reliability engineers theorized that most of the shutdowns were not related to premature seal failure
- John Crane engineers recommended installing John Crane Sense® Turbo as a solution that would enable more leading indicators, improved troubleshooting and analysis to achieve the goals of extending MTBR and understanding seal health
- The smart seal technology is unique, as sensors are embedded in the dry gas seal, enabling health monitoring within the seal
- An online monitoring system for John Crane Sense® used in conjunction with the asset's conventional monitoring capabilities enabled an improved and comprehensive view of asset health
- In the event of a high alarm on transmitters (i.e., high leakage flow or vibration), the company could also proactively shut down the compressor before further damage occurs and potentially mask a true root cause

### SOLUTION

- Seal failure inside a compressor is very costly, making an aggressive approach to maintenance a necessity. But an unplanned shutdown and prematurely replacing a mechanical seal as a precautionary measure is costly, too
- The data collected from the smart seal showed that despite the vibration observed, there was no face contact or temperature rise, and the seal was functioning properly
- To diagnose the problem further, the team performed an in-depth study of the information and analysis provided by the John Crane Sense® solution apps
- Upon completing the study, engineers determined that the high alarm recorded by the transmitters was not related to premature seal failure, and the recorded vibration did not have an adverse effect on normal seal operation or on the life expectancy of the seal



### RESULTS

- By showing the seal was healthy, and the recorded data was not related to any seal issues, the plant bypassed the need for a complete operational shutdown of the compressor
- By proving that the seal neither damaged nor was the cause of the problem, the facility reduced the unplanned maintenance event by eight days
- As a result of getting their operations running sooner than expected, the company avoided an estimated \$4 million of production losses

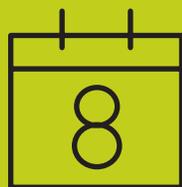
**ESTIMATED**

**\$4 MILLION**

**SAVINGS OF  
PRODUCTION  
LOSSES**

**REDUCED UNPLANNED  
DOWNTIME  
PERIOD BY**

**8 DAYS**



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