

OIL & GAS METHANE REDUCTION PROJECT OPPORTUNITY

Substitution of Wet Seals with Dry Seals in Gas Compressors

PEMEX Gas and Basic Petrochemicals

Poza Rica and Nuevo Pemex, Mexico

OVERVIEW OF OIL & GAS PROJECT OPPORTUNITY:

The project opportunity aims to reduce methane emissions at gas processing plants through the substitution of wet seals with dry seals in 15 centrifugal gas compressors. PGPB (Pemex Gas y Petroquímica Básica (PEMEX Gas and Basic Petrochemicals)) will implement the project at the Gas Processing Centers located in Nuevo Pemex, in the State of Tabasco; and Poza Rica, in the State of Veracruz, Mexico. The decision to go ahead with its implementation was strongly influenced by previous joint PGPB-M2M measurement surveys at the Ciudad Pemex Gas Processing Complex, both before and after a dry seal implementation. The measured results showed a 95% reduction in overall real methane emissions from this source and helped in the determination of typical CH₄ emission factors and project emission reduction potential.

ESTIMATED ANNUAL EMISSION REDUCTIONS: 6.03 million m³/ 90,728 tons CO₂E

PROJECT DETAILS

The project activity aims to significantly reduce vented methane emissions that occur in gas processing plants and gas compressor stations using wet seals by replacing them with dry seals.

Seals in centrifugal compressors prevent high pressure natural gas from escaping the compressor casing. Traditionally, these seals use oil at high pressure as a liquid barrier. Most emissions from wet seals occur when absorbed gas in the high pressure side of the seal is released by flashing it from the circulating oil. Recovered methane is commonly vented to the atmosphere. Since a mechanical dry seal system does not use a circulating seal oil, this venting of methane is avoided. Replacing wet seals with dry seals has been found to reduce operational and maintenance costs as well as methane emissions.



Dry seal installation

Ten Year Estimated Emission Reductions

Year	Annual Estimation of Emission Reduction in tons of CO ₂ E
2009	9,942
2010	71,843
2011	129,601
2012	129,601
2013	126,760
2014	109,480
2015	95,041
2016	90,851
2017	66,280
2018	49,000
2019	28,879
Total estimated reductions	907,278
Annual average over a 10-year period of estimated reductions	90,728

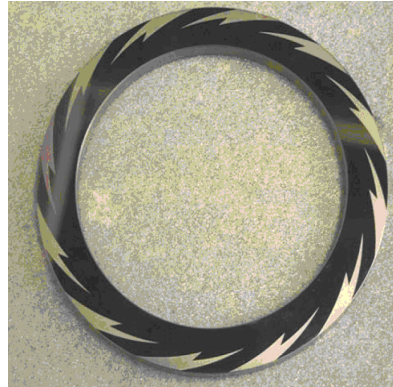
PROJECT DEVELOPMENT PLAN

The project is scheduled to be implemented during 2010, for 11 compressors operating at the 3 Nuevo Pemex Gas Processing Center Cryogenic Plants and 4 more compressors in the Poza Rica Gas Processing Center.

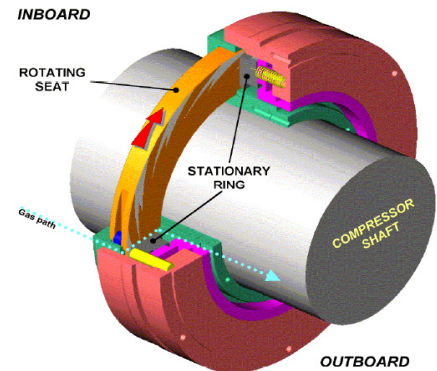
PROPOSED TECHNOLOGIES



**Dry seal housing w/
stationary ring**



Dry seal rotating disk



Dry seal operation scheme

PROJECT CHALLENGES

There are no legal and/or regulatory frameworks enforced per Mexican Law about the substitution of dry seals for wet seals in Mexico, nor for leak detection and measurement techniques. The project must compete for scarce funds in PEMEX. In addition, implementation costs are substantially higher than those encountered in other countries, due to overheads and pricing policy toward PEMEX, making it less profitable than in other applications.

ECONOMIC BENEFITS

- Potential annual gas savings: US\$ 1,359,000 in commercial gas value at the time of the study.
- Desktop analysis indicates that the project activity will have an approximate 11% rate of return and a nearly 20% rate of return with the sale of emissions reduction credits.

TYPES OF ASSISTANCE SOUGHT

- None

PROJECT FINANCES

- Projected capital costs: US \$ 7,500,000
- Savings from reduced O&M are to be expected, but were not considered for financial analysis purposes.

FOR MORE INFORMATION

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