









NOV Wellstream Processing

#NOVGlobalFamily #NOVExpertiseInAction

Completion & Production Solutions



NOV Wellstream Processing

Problems to be Solved

Compressor Fouling



Oily Solids



Stable Emulsions

Chemical Sludge



#NOVGlobalFamily #NOVExpertiseInAction



C

Dutput of a Dose Related Risk and Effect Assessment Modelling (DREAM) ndicating high risk impact affecting species in the top part of the water column

NOV Wellstream Processing

Environmental Impact Reduction

#NOVGlobalFamily #NOVExpertiseInAction



23

Carbon Capture

Output of a Dose Related Risk and Effect Assessment Modelling (DREAM) indicating high risk impact affecting species in the top part of the water column

Flare Gas Recovery

Dieter Muller

Flare Gas Recovery



#NOVGlobalFamily #NOVExpertiseInAction



Flare Gas Recovery Portfolio

NOV Wellstream Processing



- Flexible offering based on customer's gas utilization needs and specifications
- 3+ decades of execution experience in delivering gas processing systems
- Enabling better plant economics and additional revenue source / cost reduction



NOV Expertise – NOV ZeroFlare Offshore Solutions



Brownfield and Greenfield Applications

Principle

- Closing of the LP/HP flares
- Management of the storage tanks pressure during loading and unloading operations
- Installation of a new VRU to reinject the flares and storage tank gases in the process gas network

Scope of supply: Vapor Recovery Unit (VRU)

- Inlet scrubber
- Blower package
- Interconnecting piping/valving

Potential Users:

Existing and newbuild gas-producing offshore assets, with emissions/flaring reduction objectives

What Value does it bring:

Our solution allows clients to recover and utilize:

- Low pressure off gas
- Excess gas during loading/unloading of storage tanks

Our offering is applicable to all offshore assets that process gas.

NOV's solutions will be tailored made for existing and greenfield assets.

ZeroFlare Offshore Solutions



#NOVGlobalFamily #NOVExpertiseInAction

Comparison Study – Use of Membranes for NGL Recovery

To compare the performance of a regular Refrigeration style NGL recovery system with the *Evonik Puramem*[®] system

- Flare gas flowrate: 2000+1500 Nm³/h
- Flare gas pressure and temperature: 5 barg and 40°C
- Composition:

	Flare Gas 1 Mol%	Flare Gas 2 Mol%
H2	82.09	74.02
C1	0.65	0.24
C2	1.69	0.93
C3	1.72	3.24
iC4	1.6	4.56
nC4	3.4	17
iC5	8.45	0
nC5	0.4	0
C6+	0	0
H2S	0	<0.01



Typical PFD for Refrigeration System

• Specification: H2 concentration > 90% in the product gas

#NOVGlobalFamily #NOVExpertiseInAction



Comparison Study – Use of Membranes for NGL Recovery

Reciprocating Compressor (API 618)







Completion & Production Solutions

Comparison Study – Use of Membranes for NGL Recovery

Basis of the comparison study:

To compare the performance of a regular Refrigeration style NGL recovery system with the *Evonik Puramem*[®] system

- Flare gas flowrate: 2000+1500 Nm³/h
- Flare gas pressure and temperature: 5 barg and 40°C
- Composition:

	Flare Gas 1 Mol%	Flare Gas 2 Mol%
H2	82.09	74.02
C1	0.65	0.24
C2	1.69	0.93
С3	1.72	3.24
iC4	1.6	4.56
nC4	3.4	17
iC5	8.45	0
nC5	0.4	0
C6+	0	0
H2S	0	<0.01

• Specification: H2 concentration > 90% in the product gas







Comparison Study – Use of Membranes for NGL Recovery

Basis of the comparison study:

To compare the performance of a regular Refrigeration style NGL recovery system with the *Evonik Puramem®* system.

Methodology:

Understand

- Existing facility
- Client's objective & targets
- Utility constraints

• Define

 Propose optimum solution with wide range of available technologies

Results:

- The CAPEX of the membranes solution was 13% lower
- The OPEX of the two options are similar
- Membranes solution to recover NGLs from flare gas can be economically attractive

Conclusions & Next Steps:

- Effective understanding of technical and commercial feasibility
- Approach applicable to any client's assets.
- Holistic approach to reviewing and optimising the client's Flare Gas System
- Client makes informed decision



© 2022 National Oilwell Varco. All rights reserved.

#NOVGlobalFamily #NOVExpertiseInAction



NOV Low Carbon Solutions







Capturing Carbon at the Source

How do we implement CC offshore?

- Compromise on Efficiency?
- Step Change in Technology?
- Optimise Design?

NOV can bring technical expertise, brownfield experience, a robust supply chain and a strategic mind-set.

Can you bring the Technical Challenge?



David King

Sales Manager, Wellstream Processing

David.King3@nov.com

Dieter Müller

Technology and Sales Manager, Low Carbon Solutions

Dieter.Muller@nov.com