

[本期目录](#) | [下期目录](#) | [过刊浏览](#) | [高级检索](#)  
[页](#) [[关闭](#)]

[打印本

[加工利用](#)

## 海上天然气液化工艺流程优选

朱建鲁, 李玉星, 王武昌, 刘永浩, 谢彬, 喻西崇

1.中国石油大学(华东); 2.中海石油气电集团有限责任公司; 3.中海石油研究总院

摘要:

LNG—FPSO (LNG Floating Production Storage and Offloading Unit, 又称FLNG)是集海上液化天然气的生产、储存、装卸和外运为一体的新型浮式生产储卸装置。作为LNG—FPSO的核心技术,海上天然气液化工艺将对该装置的建造运营费用、运行稳定性和整个系统的安全性产生很大的影响,而现有的3种基本类型的天然气液化工艺(氮膨胀、混合冷剂和级联式制冷液化工艺)都不能完全符合海上天然气液化工艺的设计标准。为此,根据海上作业的特殊工况,组合模拟了6种适用于海上天然气液化的工艺流程,并从制冷剂流量、功耗、关键设备数量、天然气流量敏感性、天然气组成敏感性、易燃制冷剂储存和海上适应性等方面对各流程进行了比较,根据计算结果及对各流程的定性分析,优选出带预冷的氮膨胀液化工艺[即丙烷预冷双氮膨胀流程、混合制冷剂—氮气膨胀(并联)流程和混合制冷剂—氮气膨胀(串联)流程]为LNG—FPSO装置的首选工艺,且发现随着预冷深度的增加,该工艺的海上适应性减弱,功耗降低,处理能力增强。

关键词: [海上天然气液化](#) [LNG—FPSO](#) [液化工艺](#) [预冷](#) [流程模拟](#) [海上适应性](#) [评价](#) [优选](#)

## Optimal selection of natural gas liquefaction process for an LNG FPSO unit

Zhu Jianlu, Li Yuxing, Wang Wuchang, Liu Yonghao, Xie Bin, Yu Xichong

1.China University of Petroleum East China, Qingdao, Shandong 2665552, China;  
2.CNOOC Gas & Power Group, Beijing 100027, China; 3.CNOOC Research Center, Beijing 100027,China

Abstract:

An LNG FPSO (LNG Floating Production Storage and Offloading) facility is based on a ship like vessel that will be able to produce, store and offload LNG in a marine environment. The selection of the liquefaction technology and corresponding equipment to be employed in an LNG FPSO unit is critical to reducing risks and increasing project viability, meanwhile meeting production and market targets and controlling costs. However, the presently used liquefaction technologies include nitrogen expander loop, mixed refrigerant, or multistage refrigeration can not completely meet the design criteria for offshore LNG process. In view of this, a simulation study is conducted of 6 kinds of differently combined processes and a comparison study was made in terms of flow rate of refrigerant, power consumption, number of key equipment, gas flow sensitivity, gas component sensitivity, storage of flammable refrigerant, offshore adaptability, etc. Thus, based on the calculation results and qualitative analysis, the liquefaction process with pre cooling nitrogen expander loop is an optimal option for an LNG FPSO facility, that is, two stage nitrogen expander plus propane pre cooling or paralleled/series connection of mixed refrigerant and nitrogen expander, in which the deeper the degree of pre cooling is, the poorer its offshore adaptability becomes, but the lower the power consumption and the higher its dealing ability will be.

Keywords:

收稿日期 修回日期 网络版发布日期

DOI: 10.3787/j.issn.1000-0976.2012.03.022

基金项目:

扩展功能

本文信息

[Supporting info](#)

[PDF 3786KB\)](#)

[CEB \(356 KB\)](#)

[\[HTML全文\]](#)

[参考文献\[PDF\]](#)

[参考文献](#)

服务与反馈

[把本文推荐给朋友](#)

[加入我的书架](#)

[加入引用管理器](#)

[引用本文](#)

[Email Alert](#)

[文章反馈](#)

[浏览反馈信息](#)

本文关键词相关文章

[海上天然气液化](#)

[LNG—FPSO](#)

[液化工艺](#)

[预冷](#)

[流程模拟](#)

[海上适应性](#)

[评价](#)

[优选](#)

本文作者相关文章

PubMed

通讯作者:

作者简介:

作者Email:

---

参考文献:

本刊中的类似文章

1. 张宝生,彭贤强,罗东坤.中国煤层气含气带资源条件评价与排序分析[J]. 天然气工业, 2009,29(10): 10-13
2. 王尤富,乐涛涛.气层岩石流速敏感性评价实验的新方法[J]. 天然气工业, 2009,29(10): 80-82
3. 黄东,王逊,戴鸿鸣,贺雪萌,高贵冬.四川盆地五指山地区烃源岩特征与评价[J]. 天然气工业, 2009,29(11): 16-19