

调试业务  
COMMISSIONING

业务介绍  
Business Introduction

调试数字化及工程调试管理全流程解决方案  
Commissioning Digitization and Project Commissioning Management Full Chain Solutions



工程预调试及调试  
Pre-commissioning and Commissioning



仪表标定、结构物称重及运维  
Calibration, Structure Weighing and Operation and Maintenance



## 调试数字化及工程调试管理全流程解决方案

Commissioning digitization and project commissioning management full chain solutions



### 数字化子系统完工/调试服务

### Digital-commissioning

该数字化调试管理系统实现了包括系统划分、调试文件管理、子系统完工管理、预调试/调试管理、尾项管理、系统移交管理等在内的各个管理环节。

The system actualized commissioning activities digital management, including the sub-system MARK-UPS, Database, sub-system mechanical completion, Pre-commissioning, punch list mangement, hand over and so on.



### 数字化隔离锁定系统服务

### Digital LO&TO System

为了保证调试工作能够按调试方案安全有效实施，避免调试作业与其它施工作业相互影响，防止因人员误操作和其它原因引起的人身伤亡、财产损失及环境污染事故的发生。

用线上或者终端对执行的流程进行实时的监管，实现从申请到现场校核及过程中的监管。可以实现珠海、青岛、塘沽多地地的隔离锁定的监管。

实现了调试工艺/公用系统和调试电气激活及隔离锁定的数字化管理。



In order to ensure that the commissioning activities can be carried out safely and effectively, avoid the risks from SIMPOS, avoid the personal injury and equipment damage and environmental pollution from misoperation.

The LO&TO system can manage the LOCK OUT and TAG OUT activities online.

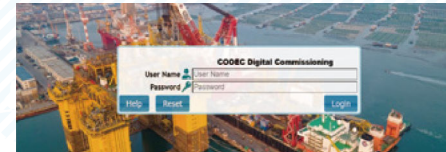
The system actualized the LOCK OUT and TAG OUT and LUN digital management.

### 数字化能力

### Digital Capability

近些年通过多个国际项目的锤炼，调试业务一直对标国际知名总承包商的标准化调试流程，吸收了FIC、MIPS、Easyplant、Co-console、E-comm.、CMS等国际知名数字化系统的优势，结合海油项目调试特有经验，研发了Digital-commissioning系统，并已成功应用到深海一号、陆丰12-3项目、恩平油田群等项目，目前已实现公司项目全覆盖，调试数字化建设及项目实体化应用已走在前列。

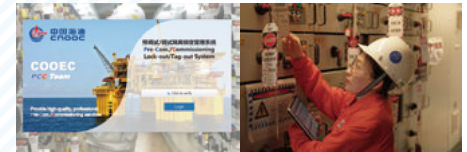
In recent years, through a number of international projects, we have absorbed the advantages of many different digital system from well-known general contractors, such as FIC, MIPS, Easyplant, Co-console, E-comm., CMS and other international famous digital systems, and we combined with CNOOC project commissioning unique experience, has already developed and developed the Digital-Commissioning system, and has successfully applied to the SHYH, commissioning, Enping Oilfield Group and other projects, has achieved full coverage of the company's projects, commissioning digitalization construction has taken the lead in China.



### DIGITAL-COMMISSIONING

Digital Commissioning是一套以数据库为基础，可以覆盖海上油气田工程项目调试工作全流程各个环节管理要素和内容的数字化管理系统。

Digital-Commissioning is a database-based digital management system that can cover the management elements and content of each link of the commissioning work of the offshore oil and gas field engineering project.



### DIGITAL-LO&TO

LOTO则是以海工隔离锁定安全管理体系为基础，集电气/工艺隔离锁定与激活、电气/工艺/仪表拆除与恢复以及表单记录与审批等功能于一体的过程控制系统。

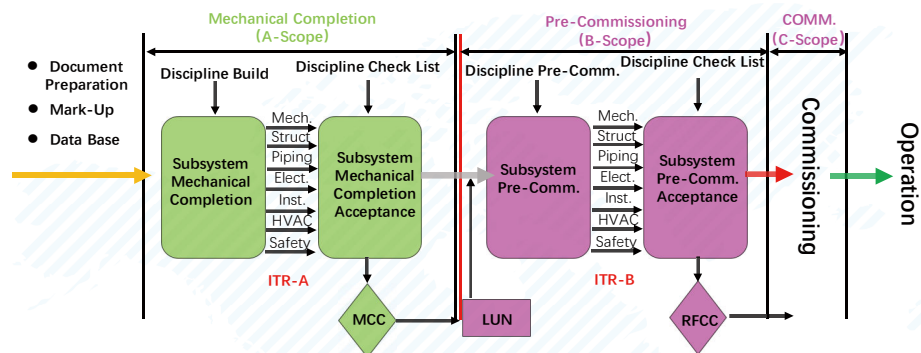
Digital-LOTO is a process control system that integrates EL/PR isolation and energization, EL/PR/IN dismantling and reinstatement, form recording and approval and other functions based on the isolation locking safety management system.

两套系统相配合，可以实现海上油气田工程项目调试阶段的全流程数字化追踪。同时海工调试团队的数字化脚步不断加快，还将建立一体化调试数字化管理系统，从而实现调试流程统筹管理的可视化、多地调试业务统筹协调、调试经营数据及投标过程预测分析，调试资源统筹管理、发电机负载试验相关的干式负荷装置选型及规划使用数字化、电气交接/预防性试验管理等调试业务全流程数字化

The coordination of the two systems can realize the digital tracking of the whole process in the commissioning stage. At the same time, we are building "Integrated digital commissioning management system", which will realize the digital coverage of the whole process of resource management, high voltage power facility handover/prevention test, load bank selection analysis and so on.

## 工程预调试及调试

Pre-commissioning and commissioning



**海油工程调试团队** 可为各类油气项目(如常规油气生产平台、FPSO、深水浮式半潜平台、自升式钻井船、LNG模块、深水铺管船等)提供专业的预调试、调试及维护保养服务。

**COOEC Commissioning Team** can provide professional services and best solutions of onshore and offshore Pre-commissioning, commissioning, maintenance for all kinds of OIL & GAS project(like fixed oil & gas production platform, FPSO, Jack Up, LNG module, SEMI, Pipe-laying Vessel and so on ).



## 核心能力

## Core Capabilities

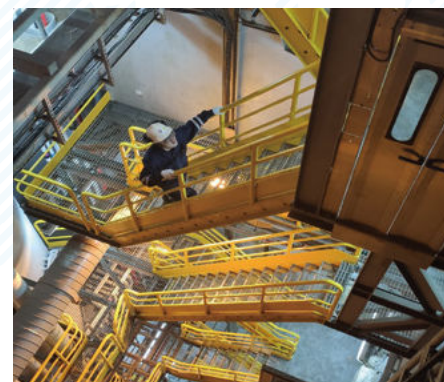
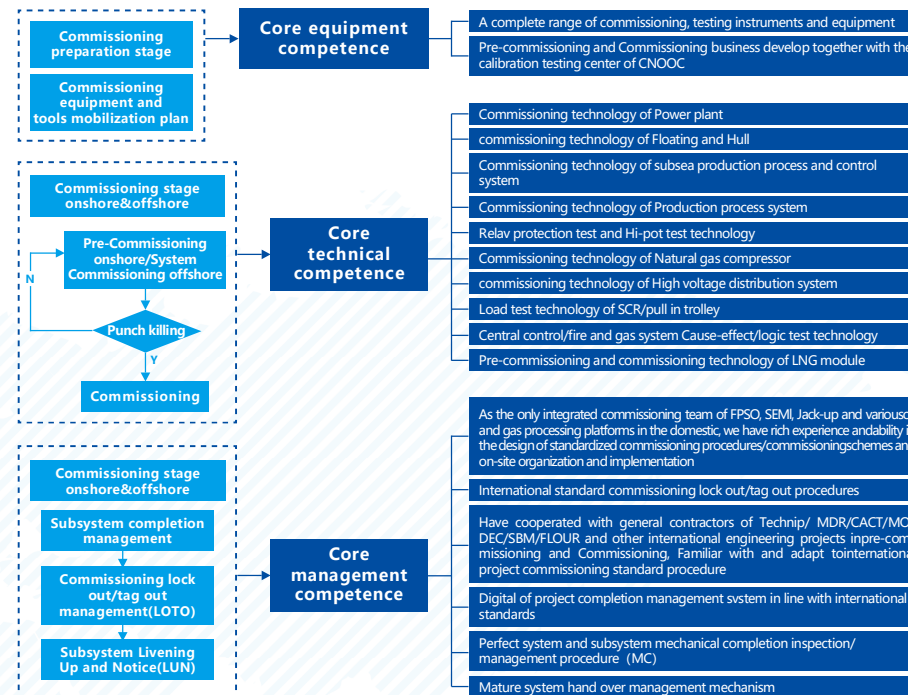
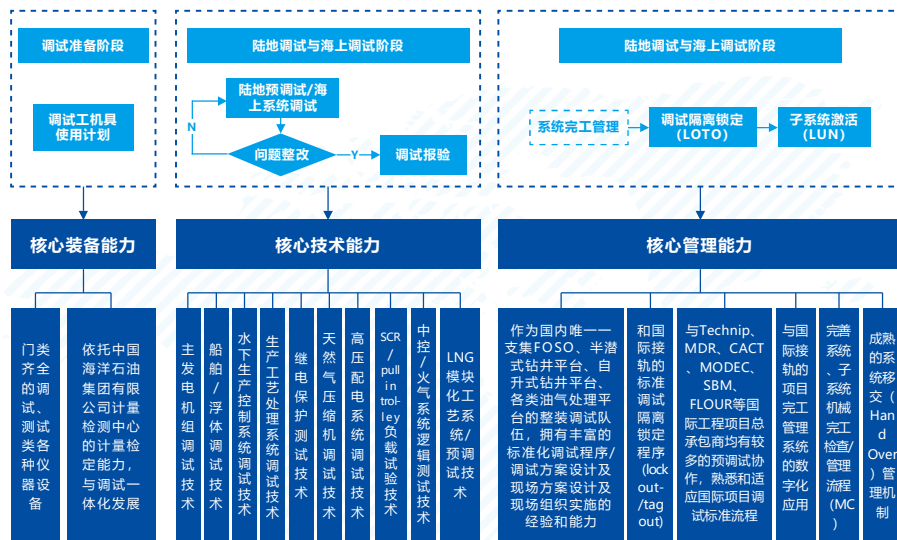


- 01 具备以数字化调试完工管理系统 (Digital Commissioning System) 为抓手的标准化调试技术及管理体系; The standardized commissioning technology management hierarchy with Digital commissioning system.
- 02 具备行业领先的数字化预调试/调试LOTO管理系统, 可实现项目全周期调试过程安全管控及现场安全管控; Industrial advanced digital pre-commissioning/commissioning LOTO system to realize process safety
- 03 具备海洋工程及陆地LNG 模块项目调试文件、调试方案、调试实施策略等设计能力, 包括传统海洋油气平台、FPSO、半潜浮式平台、LNG模块、工程船舶、海上风电设施等各类海洋工程项目; Offshore and onshore LNG modules project commissioning documentation/plan/implementation strategy design capacity,including offshore platform/FPSO/submerged platform/LNG module/engineering vessel/offshore wind
- 04 具备适用于各类海洋工程项目预调试——调试——完工交付的全流程调试管理能力, 拥有丰富的EPCI工程项目交钥匙经验; Whole process commissioning capacity project pre-commissioning-commissioning-completion,rich experience in turnkey EPCI project
- 05 具备深水浮体设施、水下生产系统、高压配电系统、继电保护、LNG核心工艺模块预调试、天然气压缩机、控制系统逻辑测试、主发电机组等十大专项核心调试能力; Deep-water floating facility/subsea production system/high voltage distribution system/LNG core Process module pre-commissioning/natural gas compressor/power plant/control system logical test capacity
- 06 具备门类齐全的调试装备, 包括干式负荷装置、变频电源装置、电源站及120多种测试、标定类设备。 Dry load device/frequency converter/power station and 120 test calibration equipment



## 基于调试流程的核心技术

## Core Capabilities Based on Commissioning Flow



## 核心技术能力

## Core Technical Capabilities

调试业务经过多年来项目积累，逐步形成了常规组块项目、LNG模块预调试、新能源项目、FPSO等领域的十大核心技术。

Through after many years of project accumulation, we have gradually formed ten core technologies in fixed platform projects, LNG module pre-commissioning, new energy projects, FPSO and other fields.

### 01 电站测试 Power plant testing

电站作为项目的核心设备，为整个平台或作业区生产、生活系统提供电力供应。调试业务熟练掌握各类电站的测试工作，包括发电机辅机测试、回路测试、仪表功能测试、中压盘柜功能测试、发电机负载实验、发电机突加突卸实验、负载分配功能测试、变压器冲击试验、低压盘柜连锁功能测试、平台电力系统黑启动功能测试等。

As the core equipment of a project, Power plant as the core equipment can provide power for process and utility systems of the whole platform. we are proficient in Power plant testing, includes generator auxiliary machine test, loop test, instrument function test, medium voltage panel function test, generator load test, generator sudden unloading test, load share function test, transformer impact test, low voltage panel interlocking function test, black start function test.



### 02 船舶/浮体调试技术 Ship/Floating facilities commissioning

我们已熟练掌握FPSO及半潜平台船体中压配电系统、货油系统、压载系统、艉输系统、系泊系统、阀门遥控系统、IMMS系统、倾斜试验等关键性浮体调试技术。并成功应用在各类型的浮体、船舶设施项目。

We have proficiently mastered key floating facilities commissioning techniques such as FPSO and semi submersible platform hull medium voltage distribution system, cargo oil system, ballast system, offloading system, mooring system, valve remote control system, IMMS system, tilt test, etc. And successfully applied in various types of floating facilities and ship facilities projects.



### 03 高压配电系统测试 High voltage distribution systems testing

高压配电系统包含了高压配电柜，高压变压器等电力中枢系统，是打通电站和负载的必经之路，也是其他子系统调试的前置条件，通过多个国内外项目的实施，电气调试团队能够在完全满足国际国内行业标准的基础上，熟练完成35kV及以下各类电制的一次和二次电力设施试验及系统调试。

The high-voltage distribution system includes high-voltage distribution cabinets, high-voltage transformers, and other power central systems. It is a necessary path to connect power stations and loads, and also a prerequisite for other subsystems commissioning. Through the implementation of multiple domestic and foreign projects, the electrical commissioning team can proficiently complete primary and secondary power facility tests and system commissioning for various types of 35kV and below power systems on the basis of fully meeting international and domestic industry standards.





## 04 生产工艺系统测试 Production process systems testing&Plant simulation testing

我们掌握了涵盖原油处理系统、生产水工艺系统等各类型生产工艺系统与中控联调模拟运行调试的成熟方案。同时，熟练掌握了TEG、MEG、MRU等大型天然气处理设施的调试技术，并在多个大型油气田工程项目中成功应用。

We have mastered mature solutions for simulating the operation and commissioning of various types of production process systems, including crude oil treatment systems and production water process systems, as well as central control joint commissioning. At the same time, we have proficiently mastered the commissioning technology of large natural gas processing facilities such as TEG, MEG, and MRU, and have successfully applied them in multiple large oil and gas field projects.



## 05 LNG模块预调试 LNG module Pre-commissioning

具备LNG模块化预调试/调试（PCC）总包管理技术服务能力。创新利用云调试技术，完成非集成模块下的集成调试，实现建造场地调试最大化。具备工艺系统最大操作压力测试等为代表的LNG工艺系统调试和装备能力。具备工艺系统化学清洗的总包管理能力和技术服务能力，实现了LNG模块化建造项目首次国内自主实施化学清洗。

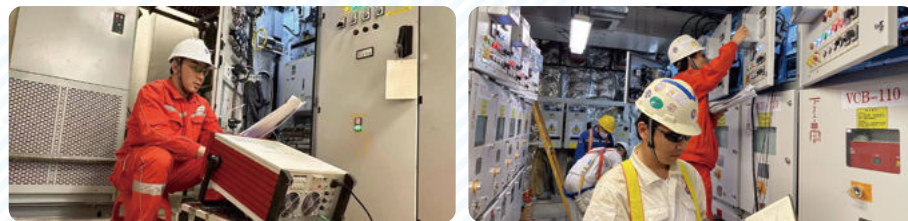


Having the ability to provide technical services for LNG modular pre commissioning/commissioning (PCC) general contracting management. Utilize cloud commissioning technology to complete integrated commissioning under non integrated modules and maximize construction site commissioning. Possess LNG process system commissioning and equipment capabilities represented by maximum operating pressure testing of process systems. Having the general contracting management and technical service capabilities for chemical cleaning of process systems, we have achieved the first domestic independent implementation of chemical cleaning for LNG modular construction projects.

## 06 高压电力设施交接/预防试验 High voltage power facility handover/prevention test

具备35kV以下电力设施耐压、绝缘电阻、接地电阻、回路电阻、极性、变比等交接/预防试验能力;具备海洋油气工程电力系统、工厂变电站、办公楼宇变配电所等关键能源供给设施的运行维护能力。

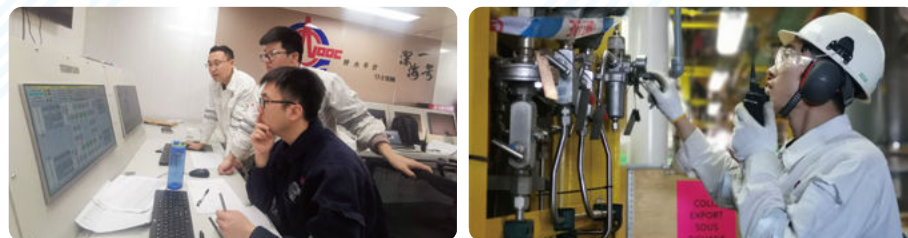
Having the ability to perform handover/preventive tests on hi-pots, insulation resistance, grounding resistance, circuit resistance, polarity, transformation ratio, etc. of power facilities below 35kV; Be capable of operating and maintaining key energy supply facilities such as offshore oil and gas projects power systems, factory substations, and office building substations.



## 07 紧急关断/火气系统因果测试 ESD/FGS Cause&Effect testing

拥有专业化的仪控测试团队以及成熟的测试方案，擅长为各类油气设施的工艺系统、水下生产系统、船体控制系统（包括海洋环境监测、压排控制、辅助靠泊、水下安防系统等）及其他监测系统提供系统化仪控调试服务。具备各系统与中控相关的紧急关断、火气系统因果测试以及消防系统、公共广播系统等联合测试能力。

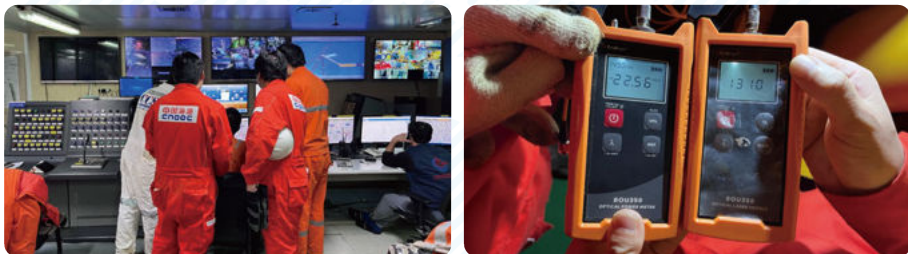
We have a professional I&C testing team and mature testing solutions, specializing in providing systematic I&C commissioning services for various oil and gas facilities' process systems, subsea production systems, ship control systems (including marine environmental monitoring, ballast discharge control, auxiliary berthing, underwater security systems, etc.), and other monitoring systems. Capable of ESD, F&GS logic testing, as well as joint testing of fire protection systems, public address systems, and other related systems and central control systems.



### 08 水下生产控制系统测试 Subsea production control systems testing

具备水下生产系统调试能力，有1500米水深和渤海区域的水下生产系统的调试经验，能够完成水下生产系统的MCS、HPU、EPU和TUTA，到水下脐带缆，水下管汇和采油树的从陆地接收测试、预调试、海上调试到海上联调全过程的调试。

We have the ability for commissioning subsea production systems, with experience in commissioning subsea production systems at a depth of 1500 meters and in the Bohai Sea region. We are able to complete the entire process of commissioning the MCS, HPU, EPU, and TUTA of subsea production systems, from land receiving testing, pre commissioning, offshore commissioning to offshore joint commissioning of subsea umbilical cables, subsea manifolds, and Christmas trees.



### 09 天然气压缩机测试 Gas compressor testing

调试团队具备外输型、注气型、增压型等多个类型天然气压缩机的调试能力和调试经验，涉及天然气系统、BOP系统、CCUS等多个系统。能够为各类油气设施提供系统化天然气处理解决方案和现场测试，包括功能测试、电机测试、空气运行、负载测试等。

The commissioning team has commissioning capabilities and experience in various types of natural gas compressors, including export type, gas injection type, and pressurized type, involving multiple systems such as natural gas system, BOP system, CCUS, etc. We can provide systematic natural gas processing solutions and on-site tests for various oil and gas facilities, including function test, motor test, air running, load testing, etc.



### 10 SCR/PULL IN TROLLEY负荷试验 SCR/pull in trolley/crane load testing



我们具备多类型、多模式、大负荷深水立管提升系统测试技术经验和大型负载试验方案设计能力，拥有拉力计（50T-600T）、称重水袋等大型设备，能够为负载试验提供全方位的技术服务。

We have experience in testing deep water riser lifting systems with multiple types, modes, and heavy loads, as well as the ability to design large-scale load testing schemes, possessing large-scale equipment such as tension gauges (50T-600T) and weighing water bags, capable of providing comprehensive technical services for load testing.





## 标定、结构物称重及运维

Calibration, structure weighing and Operation and Maintenance



### 仪表/安全阀标定

Instrument/PSVs Calibration

计量检测中心由中海油批准成立，隶属于海洋石油工程股份有限公司，经国家市场监督管理总局（原国家质量监督检验检疫总局）考核批准，建立13项一级计量标准，可开展计量检定项目44项。

2009年，获中国合格评定国家认可委员会（CNAS）认可资质，获得认可6个领域28项校准能力。

Calibration center established in 1993 and 13 first-level measurement standards 44 metrological verification items can be carried out.

In 2009 accredited by the (CNAS) and approved 28 calibration capabilities in 6 fields.

13项(set)

一级计量标准  
measurement  
standard level 1

44项(set)

计量检定项目  
calibration items

中国合格评定国家认可委员会（CNAS）认可资质  
CNAS QUALIFICATION

6个领域28项校准能力  
28 CALIBRATION CAPABILITIES IN 6 FIELDS

### 结构物称重

Weighing System

➢ 国家专利的称重系统对各类结构进行称重、重量转移、同步顶升  
Offshore engineering and modular plant weighing, weight transfer, synchronous jacking work

➢ 国家标准GB/T35987-2018《海洋工程结构物称重作业规范》的制定者  
With independent intellectual property rights national standard GB/T35987-2018

➢ 两套系统高精度：分别为WS30000（测量准确度：1%，128个控制点）和WS8000（测量准确度：0.5%，96个控制点）称重控制系统

Two sets of weighing system, WS30000 (measurement accuracy: 1%, 128 control points) and WS8000 (measurement accuracy: 0.5%, 96 control points) weighing control system

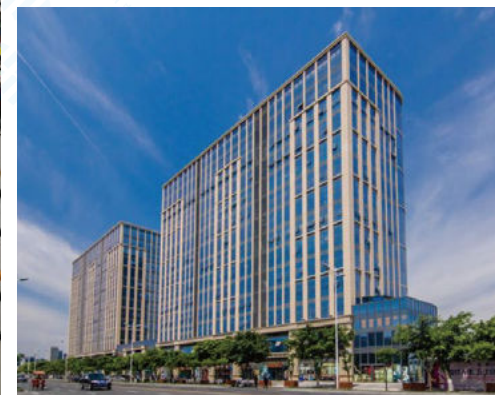


### 运维

Operation and Maintenance

我们拥有国家能源局-承装、承修、承试四级资质，装备能力全面覆盖承装（修、试）电力设施服务工作，各类电气检测仪器、试验装备超过300台套，满足多种应用场景，同时拥有一支专业齐全的高素质运维队伍，可为在役油田设施、大型办公楼宇及各类建造场地电力系统等提供运维服务。

We have the National Energy Administration - Installation, maintenance, commissioning qualification level 4, and our equipment fully covers the installation, maintenance and commissioning activities of electric power facilities service work, all kinds of electrical testing instruments, test equipment are more than 300 sets, meet a variety of application scenarios. We also have a full-discipline and high-quality operation and maintenance team. We can provide operation and maintenance services for oil & gas field facilities, large office buildings and electrical power distribution systems of various construction yard.





调试业务  
COMMISSIONING

典型调试业绩介绍  
Typical Commissioning Achievements

## FPSO/半潜式平台完工业绩

FPSO/SEMI EXPERIENCES



### FPSO/半潜调试业绩总览

### FPSO/SEMI EXPERIENCES SUMMARY

Project Name	Client	Year
Penguin FPSO	SHELL	2020
LS17-2 SEMI	CNOOC	2020
HYSY119	CNOOC	2019
BRAZIL P67 & P70 FPSO Project	TUPI BV	2015
ENPING Project	CNOOC	2014
TUPI FPSO Topsides EPC Project	Modec/Petrobras	2009
PB Gas FPSO Topsides EPC Project	Modec/Petrobras	2008
PB Oil FPSO Topsides EPC Project	MODEC/Petrobras	2007
TSJOC FPSO Topsides EPC Project	MODEC/TSJOC	2007
Pyrenees FPSO Topsides EPC+Integration Project	MODEC/BHPB	2007
LIUHUA FPSO Repair Project	CNOOC	2007
PL 19-3 FPSO Hook-up & Commissioning Project	CNOOC/COPC	2006
Nanhai (WEN CHANG & XI JIANG ) FPSO EPC Project	CNOOC	2005
BZ 25-1 FPSO EPC Project	CNOOC	2002
BN FPSO EPC Project	CNOOC	2003
CFD 11-1/11-2 FPSO EPC Project	CNOOC/KMG	2002
PY 4-2/5-1FPSO EPC Project	CNOOC	2002
WENCHANG FPSO EPC Project	CNOOC/Husky	1999

## FPSO/半潜式平台完工业绩

FPSO/SEMI EXPERIENCES



### “深海一号”（陵水17-2半潜平台）

LS17-2 SEMI Project

#### 项目信息

- ◆ 建造场地: 青岛
- ◆ 集成场地: 烟台来福士
- ◆ 业主: 中海油
- ◆ 地点: 中国南海
- ◆ 工期: 2019.12-2021.06

#### Project

- ◆ Construction Yard: Qingdao yard
- ◆ Integrated Yard: CIMC Yantai yard
- ◆ Client: CNOOC
- ◆ Location: China
- ◆ Duration: 2019.12-2021.6

#### 主要技术参数

- ◆ 总宽: 91.5米
- ◆ 总长: 91.5米
- ◆ 总高: 120米
- ◆ 容量: 10万吨
- ◆ 总重: 53000吨

#### Main Hull Particulars

- ◆ Hull Length overall: 91.5m
- ◆ Hull Width overall: 91.5m
- ◆ Total high overall: 120m
- ◆ Storage capacity: 100000 Tons
- ◆ Total weight: 53000T



#### 工作范围

- ◆ 船体及上模调试
- ◆ 投入DIGITAL-COMMISSIONING系统进行完工管理
- ◆ 预调试及调试

#### Our Scope Of Work

- ◆ Commissioning for HULL and TOPSIDE
- ◆ Mechanical completion management with Digital-Commissioning system
- ◆ Pre-commissioning and commissioning



## FPSO/半潜式平台完工业绩

FPSO/SEMI EXPERIENCES



### 巴西 FPSO P67/P70 项目

Brazil FPSO P67/P70 Project

#### 项目信息

- ◆ 建造场地: 海工青岛场地
- ◆ 业主: PETROBRAS巴西国家石油公司
- ◆ 位置: 巴西海域
- ◆ 工期: 2015.10-2018.10

#### Project

- ◆ Construction Yard: Qingdao yard
- ◆ Client: PETROBRAS
- ◆ Location: Offshore oil field in Brazil
- ◆ Duration: 2015.10-2018.10

#### FPSO主要参数

- ◆ 船体总长: 307米
- ◆ 船体总宽: 74米
- ◆ 上部模块数量: 18个
- ◆ 存储油量: 1600000桶
- ◆ 船体干重: 25000吨
- ◆ 上部模块重量: 50000吨

#### Main Hull Particulars

- ◆ Hull Length overall: 307m
- ◆ Hull Width overall: 74m
- ◆ Quantity of topside: 18
- ◆ Storage capacity: 1600000bbl
- ◆ Hull dry weight: 25000T
- ◆ Topsides weight: 50000T

#### 工作范围

- ◆ 两条 FPSO(P67/P70) 的调试工作
- ◆ 船体调试
- ◆ 8 个上部模块预调试
- ◆ 36 个上部模块调试船体和上部模块的集成调试
- ◆ 海上投产开车的技术支持服务
- ◆ 调试完工管理系统 (FIC) 数据库管理

#### Our Scope Of Work

- ◆ Commissioning for two FPSO(P67/P70)
- ◆ Hull commissioning
- ◆ 8 topsides pre-commissioning
- ◆ 36 topsides commissioning Union commissioning for hull and topsides
- ◆ Technical support for start-up offshore
- ◆ Commissioning integration tool (FIC) management





## 圆筒形 FPSO 业绩

CYLINDRICAL FPSO EXPERIENCES



### “壳牌”企鵝 FPSO 项目

### “SHELL” Penguins FPSO Project



#### 项目信息

- ◆ 建造场地: 海工青岛场地
- ◆ 业主: 壳牌
- ◆ 位置: 英国北海
- ◆ 工期: 2018.07-2022.10

#### Project

- ◆ Construction Yard: Qingdao yard
- ◆ Client: Shell U.K. Limited
- ◆ Location: Offshore oil field in North sea
- ◆ Duration: 2018.07-2022.10

#### 主要技术参数

- ◆ SEVAN 400 型船体
- ◆ 总宽度: 87.5米
- ◆ 上模数量: 7
- ◆ 储油量: 400000 桶
- ◆ 船体重量: 15684吨
- ◆ 上模重量: 9897吨

#### Main Hull Particulars

- ◆ Sevan 400 type circular hull
- ◆ Hull Width overall: 87.5m
- ◆ Quantity of topside: 7
- ◆ Storage capacity: 400000 barrels
- ◆ Hull dry weight: 15684T
- ◆ Topsides weight: 9897T

#### 工作范围

- ◆ 企鵝 FPSO调试工作
- ◆ 53 个系统 & 597 个子系统预调试
- ◆ 7597个回路测试 (包括1167个现场总线回路)
- ◆ 14840份ITRB执行工作
- ◆ 24台潜没泵调试
- ◆ 整船陆地调试

#### Our Scope Of Work

- ◆ Commissioning for Penguins FPSO
- ◆ Overall 53 systems & 597 subsystems of pre- commissioning
- ◆ Overall 7597 loop test inclusive of 1167 field foundation bus
- ◆ Overall 14840 ITRB work
- ◆ Overall 24 Framo submerged pump commissioning of hull
- ◆ Overall onshore commissioning work without hydrocarbons
- ◆ Technical support for commissioning integration tool (Go-tech) management



## 半潜式钻井平台完工经验

SEMI DRILLING RIG EXPERIENCES



### HYSY 981 项目

——深水半潜式钻井平台

### HYSY 981 Project

——Deepwater semi-submersible drilling rig

#### 项目信息

- ◆ 业主: CNOOC
- ◆ 工作水深: 3050米
- ◆ 钻井深度: 10000米
- ◆ 船级: ABS/CCS
- ◆ 工期: 2009年11月 – 2011年11月

#### Project

- ◆ Owner: CNOOC
- ◆ Working Water Depth: 3050m
- ◆ Drilling Depth: 10000m
- ◆ Class: ABS/CCS
- ◆ Duration: Nov 2009 – Nov 2011

#### 工作范围

- ◆ 仪控系统调试
- ◆ 通讯系统调试
- ◆ 钻井系统调试

#### Scope of Work

- ◆ Control System Commissioning
- ◆ Communication System Commissioning
- ◆ Drilling System Commissioning



## LNG 项目经验

LNG PROJECT EXPERIENCE



### 加拿大 LNG 项目

### LNG CANADA Project

#### 项目信息

- ◆ 建造场地: 青岛场地
- ◆ 业主: SHELL/JGC/FLOUR
- ◆ 位置: CANADA
- ◆ 工期: 2020.7-2022.12

#### Project

- ◆ Construction Yard: Qingdao yard
- ◆ Client: Shell/JGC/Flour
- ◆ Location: Canada
- ◆ Duration: 2020.7-2022.12



#### 工作范围

- ◆ 35个模块(其中19个为核心工艺模块)的预调试和调试。
- ◆ 模块总计 178,830 吨。

#### Scope of Work

- ◆ Pre-commissioning and commissioning for 35 modules(19 of them are core processmodules ).
- ◆ Total in 178,830 tons.

#### 预调试工作能力

- ◆ 机械/工艺/电气/仪表专业的预调试工作
- ◆ 设备保护技术指导
- ◆ ITR 检查和功能测试
- ◆ 最大操作压力密封性试验技术指导
- ◆ 管线酸洗钝化技术指导
- ◆ 罐/换热器内部安装检查
- ◆ 关键阀门的密封试验
- ◆ 大型容器内部安装、泄漏试验、填料、注气安装、活性碳装载、装箱
- ◆ 电气配电系统测试
- ◆ 海上运输设备保护技术指导

#### Precommissioning capabilities

- ◆ Pre-commissioning for mechanical/piping/ electrical /instrument
- ◆ Technical guidance for preservation
- ◆ ITR check and function test
- ◆ Technical guidance for MOP leak Test
- ◆ Technical guidance for piping degreasing
- ◆ Internals installation check for vessel /exchanger
- ◆ Check for the Seat Test of Critical valves
- ◆ Check for Huge vessel internals installation, leakage test, random packing installation, gas injection installation, activity carbon loading, Box-up
- ◆ Electrical power distribution system test
- ◆ Technical guidance for sea transportation preservation

## LNG 项目经验

LNG PROJECT EXPERIENCE



### YAMAL LNG 项目

### YAMAL LNG Project

#### 项目信息

- ◆ 建造场地: 青岛场地
- ◆ 业主: TECNIP
- ◆ 位置: 俄罗斯
- ◆ 工期: 2014.10-2017.7

#### Project

- ◆ Construction Yard: Qingdao yard
- ◆ Client: Tecnip
- ◆ Location: Russia
- ◆ Duration: 2014.10-2017.7



#### 工作范围

- ◆ MWP1, 36 列 预调试工作
- ◆ 模块总计 180000吨
- ◆ 系统MARK UP 工作和数据库管理(EASY PLANT)
- ◆ 协助工作

#### Scope of work

- ◆ Pre-commissioning for MWP1, 36 PAU
- ◆ Modules, totally 180000tons
- ◆ System mark-up and database(Easy plant)
- ◆ assistant



#### 预调试工作能力

- ◆ 预调试 机械/管道/电气/仪表设备
- ◆ 设备保护的技术支持
- ◆ ITR检查和功能试验
- ◆ 照明送电测试
- ◆ 照明照度测试
- ◆ 最大操作压力MOP泄露试验技术指导
- ◆ 管道酸洗钝化技术指导
- ◆ 容器/换热器内部安装检查
- ◆ 关键阀门的密封试验
- ◆ 检查大型容器内部附件安装, 泄漏试验, 填料安装、注气安装、活性碳装载、装箱
- ◆ 海上运输设备保护技术指导

#### Precommissioning capabilities

- ◆ Pre-commissioning for mechanical/piping/ electrical /instrument
- ◆ Technical guidance for preservation
- ◆ ITR check and function test
- ◆ Lighting initial energization
- ◆ Illumination test for lighting
- ◆ Technical guidance for MOP leak Test
- ◆ Technical guidance for piping degreasing
- ◆ Internals installation check for vessel /exchanger
- ◆ Check for the Seat Test of Critical valves
- ◆ Check for Huge vessel internals installation, leakage test, random packing installation, gas injection installation, activity carbon loading, Box-up
- ◆ Technical guidance for sea transportation preservation



## 铺管船项目经验

PIPE-LAYING VESSEL EXPERIENCES



### 海洋石油 201船

—深水铺管船

### HYSY 201 Project

—Deepwater Pipe-laying Vessel

#### 项目信息

- ◆ 建造场地: 青岛场地
- ◆ 业主: GUST
- ◆ 工期: 2011.7 – 2012.7

#### Project

- ◆ construction yard: Qingdao yard
- ◆ Owner: GUST
- ◆ Duration: Jul, 2011 – Jul 2012

#### 工作范围

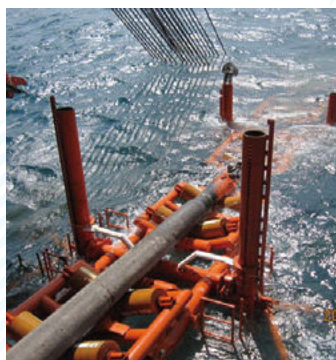
- ◆ 吊机负载试验(4000T/800T/70T/50T)
- ◆ 管道铺设系统调试
- ◆ 托管架调试

#### Scope of work

- ◆ Load test for crane(4000T/800T/70T/50T)
- ◆ Commissioning for pipe-laying system
- ◆ Commissioning for Stinger



主吊机负载试验  
Load test for main crane



Stinger功能测试  
Stinger function test

## 常规油气平台主要项目经验

THE FIXED PLATFORM EXPERIENCES



### 泰国 EPCIC 项目

### Zawtika EPCIC Project

#### 项目信息

- ◆ 建造场地: 塘沽场地
- ◆ 业主: PTTEP/MOGE
- ◆ 位置: 缅甸
- ◆ 工期: 2014.5-2016.4

#### Project

- ◆ Construction Yard: Tanggu yard
- ◆ Client: PTTEP/MOGE
- ◆ Location: Myanmar
- ◆ Duration: 2014.5-2016.4

#### 工作范围

- ◆ 系统MARK UP
- ◆ ITR 检查功能测试
- ◆ 4 个平台(每个1200T)的陆地调试
- ◆ 海上联接调试工作
- ◆ 系统移交

#### Scope of work

- ◆ System mark-up
- ◆ ITR check and function test
- ◆ Commissioning onshore for 4 Platform (1200T)
- ◆ Hook-up and commissioning offshore
- ◆ Hand over



调试报验  
Commissioning and inspection



系统移交文件  
Hand over document

## 常规油气平台主要项目经验

THE FIXED PLATFORM EXPERIENCES



### 卡塔尔NFA项目

### Qatar NFA Project

#### 项目信息

- ◆ 建造场地: 青岛场地
- ◆ 业主: 卡塔尔国家石油公司
- ◆ 位置: 卡塔尔
- ◆ 工期: 2017.5-2019.4

#### Project

- ◆ construction yard: Qingdao yard
- ◆ Client: Qatar Petroleum
- ◆ Location: Qatar
- ◆ Duration: 2017.5-2019.4

#### 工作范围

- ◆ 系统MARK UP和数据库建立
- ◆ 陆地预调试、调试
- ◆ 海上调试和投产开车工作
- ◆ 系统移交

#### Our scope of work

- ◆ System mark-up&Database
- ◆ Onshore Pre-commissioning ,commissioning
- ◆ offshore commissioning and Start-up
- ◆ Hand over



## 200英尺自升式钻井平台项目

200ft Self Jack-up Project



#### 项目信息

- ◆ 建造场地: 青岛场地
- ◆ 业主: COSL
- ◆ 数量: 4 座
- ◆ 工作水深: 200 英尺
- ◆ 工期: 2007.11- 2010.8

#### Project

- ◆ Construction Yard : Qingdao Yard
- ◆ Owner : COSL
- ◆ Quantity : 4 Units in total
- ◆ Working Water Depth : 200 feet
- ◆ Duration: Nov 2007 – Aug 2010

#### 调试工作内容

- ◆ 船舶压载水系统调试
- ◆ 钻井系统调试
- ◆ 升降系统调试
- ◆ 悬臂梁负载测试
- ◆ 倾斜试验
- ◆ 悬臂梁和钻台滑移系统调试

#### Commissioning description

- ◆ Hull ballast system
- ◆ Drilling system
- ◆ Jacking system
- ◆ Cantilever Load Test
- ◆ Inclining Test
- ◆ Cantilever and drilling floor skidding system

#### 工作范围

- ◆ 陆地调试
- ◆ 海上技术支持

#### Our scope of work

- ◆ Commissioning onshore
- ◆ Technical assistant offshore

