Design Approval and Certification Services for Subsea Production System



CCS
CHINA CLASSIFICATION SOCIETY
中国船级社

Background

With the gradual deep-water development of offshore oil & gas resources, subsea production system of main installation for deep sea oil & gas development is increasingly applied to the development of oil &gas resource. For example, it has been applied to oil & gas fields such as Liuhua 11-1,Yacheng13-4, Liwan3-1, Panyu35-2/1 with depth ranging from hundreds meters to 1,500 meters. In contrast to the issues such as long construction cycle, high cost, weak capacity of disaster resistance for the conventional offshore production platform, subsea production system gradually becomes the mainstream model for the development of deep-water oil & gas resource. Ministry of Industry and Information Technology and Ministry of Science and Technology in China has made great effort in supporting the nationalized development of subsea production equipment through project establishment. Under the background of great development, CCS officially established the project with regard to subsea production system in 2010 which lasted 5 years. Based on the absorption of international standards and advanced experience in application, development and survey of subsea production system, CCS officially publish Guideline for certificate of subsea production system with 11 chapters in total , systematically including design, manufacture, testing and requirement of survey technology for the main equipment of subsea production system and subsea control system. The guideline fills in the gap for the basis of certificate issuance standards for subsea production system, control system and subsea oil & gas production equipment and provides the technology basis for design verification of subsea production equipment for newly developed products.

CCS Service

The Guideline originates from scientific research and engineering, and serves that. With the development in the past 10 years, currently, CCS can provide you with the following services:

(1) Classification and certificate service for whole subsea production system

(2) AIP service for subsea production system, control system and its equipment

(3) Provide the following services for subsea production equipment, control equipment, separation equipment, booster equipment, measuring equipment and monitoring system:
- Design approval
- Type approval
- Product certificate
- Verification

(4) The process service available are included but not limited to:
- Design review and approval
- Verification and surveys for manufacture process
- Witness for testing process (such as FAT, EFAT, SIT, SAT, testing for engineering environment, etc.)
- Verification and surveys for installation reinstallation process
- Technology Service



Customer benefits

(1) Subsea production system includes the control system and equipment in compliance with the relevant requirement by Chinese competent authority (Ministry of Emergency Management); the whole subsea production system is awarded the compliance/classification certificate issued by CCS (according to the competent authority or clients will).

(2) Subsea production equipment, control equipment, separation equipment, booster equipment, measuring equipment, monitoring equipment and the like are awarded the relevant recognition and product certificate issued by CCS.

(3) It is not necessary to submit the drawing for review again after the same products are put into production, with respect to new products which pass through design and type approval by CCS.

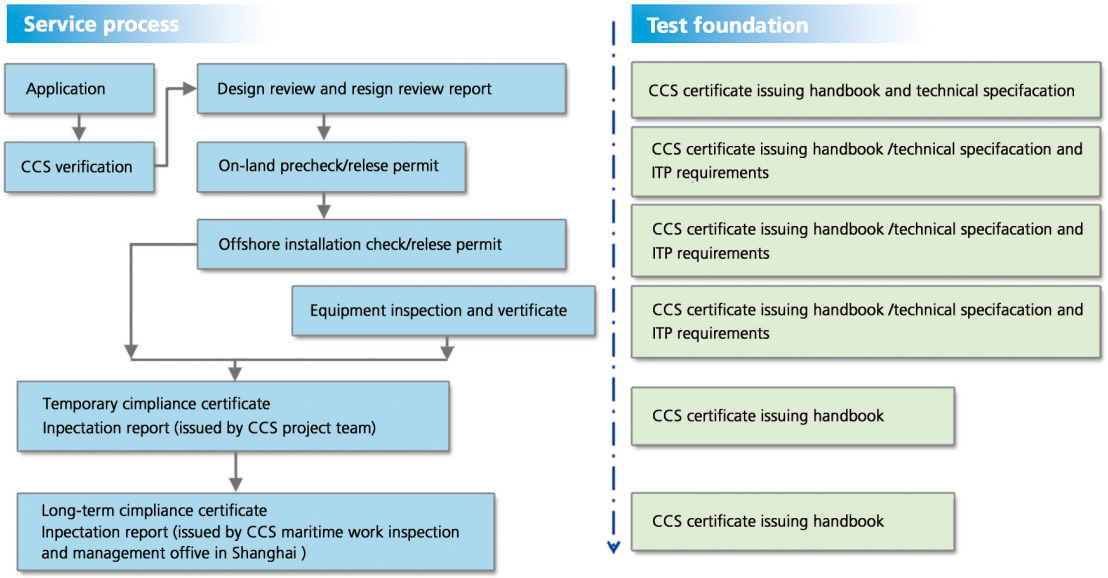
(4) To improve the product recognition.



◎ Protection Legs Function Test

Business flowchart

Design and type approval complies with requirement of Chapter 1 of Rules for Classification of Sea-going Steel Ships by CCS. Typical process for engineering inspection is as follows:





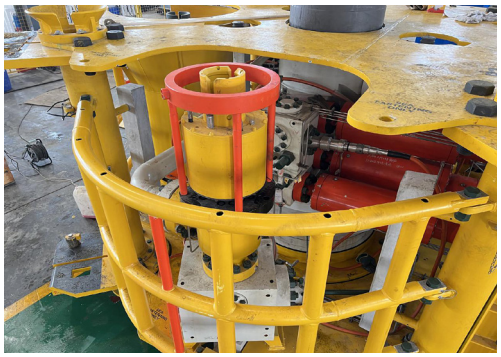
◎ Run Lower And Upper Wire Line Plug



◎ Tree Assembly Earth Strapping Resistance Test



◎ Installation Of Tubing Hanger In XMT



◎ PCV Function Test

Engineering experience

(1) Manufacturing inspection of all China-made subsea equipment of Liwan 3-1 1st phase; inspection carried out abroad of subsea production tree, subsea manifold, subsea divider assembly.
(2) Completed design review and product survey for subsea in-line pipeline tee of Dong Fang13-2.
(3) Completed design review and product survey for Damola Island project of Zhejiang Hengyi Wenlan.
(4) Completed the FEED phase, basic design and detailed design drawing review for deep-water subsea production system of Lingshui 17-2. Undertaking the survey for subsea products manufactured in China.
(5) Design review and product survey for subsea production system of development project LF22-1 in Lufeng oilfield cluster.
(6) AIP for subsea manifold of Dalian Shipbuilding Industry Group.
(7) Design review and product survey for subsea production system (including subsea Christmas tree, subsea multifunctional manifold, subsea control module and subsea two-phase wet gas flow meter) of Dong Fang 1-1 demonstration engineering.
(8) Design review and product survey for subsea production system (including subsea Christmas tree, subsea multifunctional manifold, subsea control module and subsea two-phase wet gas flow meter) of LeDong 1-1 demonstration engineering
(9) Completed basic design and detailed design drawing review for deep-water subsea production system of Lingshui 25-1.
(10) JingZhou 31-1 installation survey for subsea products system.

List of survey of some subsea equipment:

	Structure	Brief Descriptions	Qty	Weight (T)
1	P1	22" Single Hori. Hub SSIV PLET with 1x22" Vales	2	263
2	P2	22" Main Hori. PLET no Valve	2	126
3	P3	6" Single Vert. Hub PLET No Valve	4	39
4	P4	12" Single Vert. Hub PLET No Valve	8	274
5	P5	4" Single Vert. Hub PLET No Valve	4	46
6	P6	3" Single Vert. Hub PLET No Valve	1	11
7	P7	12"x8" Double Vert. Hub PLET(2x12" & 1x 1.25" Valve)	1	46
8	P8	12"x8"Double Vert. Hub PLET(2x12"/1x2.5"/2x1.25"Valve)	1	45
9	P9	2.5" Double Vert. Hub PLET with 4 x 2.5" Valve	1	11



◎ one type of subsea clamp connector



◎ one type of subsea pipline end terminal



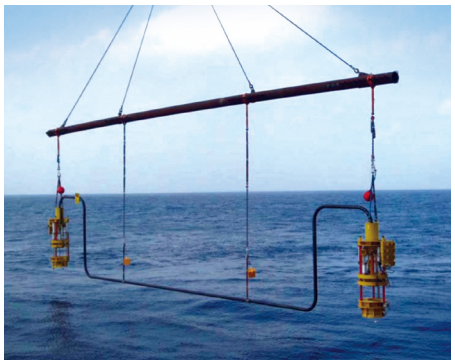
◎ Damola Island project of Zhejiang Hengyi Wenlan

Actively taking part in national / MIIT subsea production equipment R&D project

Before and after the publication of the guideline, we strongly support the development of subsea production equipment in China. And we support the development of subsea product such as subsea vertical Christmas tree, subsea two-phase wet gas flow meter, subsea security system engineering by Ministry of Industry and Information Technology, where subsea vertical Christmas tree developed by Baoji Petroleum Machinery completed design approval, ray-based subsea two-phase wet gas flow meters developed by Lanzhou Haimo Group and Tianjin University respectively completed type approval and subsea multi-beam belief sonar of the core equipment for subsea security system is awarded the CCS product certificate. We made great efforts in supporting R&D for subsea product in the industry and currently, we have supported the R&D for subsea horizontal Christmas tree by Chongqing Qianwei and subsea connector by Offshore oil engineering, etc.

1. MIIT: Subsea connected system design and key equipment development

Main work: standard applicability study, engineering prototype design approval (design review, performance verification test, FAT, SIT, offshore test authentication).



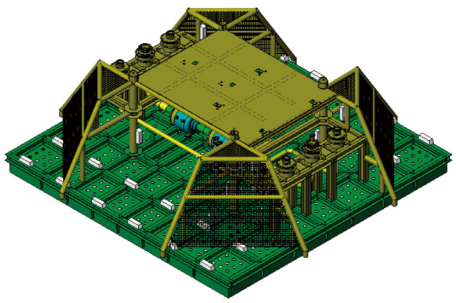
◎ Offshore installation test of subsea vertical-collet-connector and dlamp-connector with jumper
(Photo provided by COOEC)



◎ Installation and un-installation underwater of subsea clamp connector
(Photo provided by COOEC)

2. MIIT: Subsea production system design and key equipment development

Main work: standard applicability study of subsea wet-type thermal insulation materials, subsea manifold and PLET, engineering prototype design approval (design review, performance verification test, FAT, SIT and offshore test authentication), Split-type subsea PLET test and standard compilation.



◎ Subsea manifold
(Photo provided by COOEC)



◎ Subsea manifold for Offshore Oil Engineering

3. MIIT: subsea vertical Christmas tree development

Main work: standard applicability research, engineering prototype design approval (design review, performance verification test, FAT, SIT and offshore test authentication).

4. MIIT: subsea control system and key equipment development

Main work: standard applicability research, engineering prototype design approval (design review, performance verification test, FAT, SIT and offshore test authentication).

5. MIIT: subsea security system "engineerization" research

Main work: standard applicability research, engineering prototype design approval (design review, performance verification test, FAT, SIT and offshore test authentication).



◎ Subsea vertical Christmas tree



◎ Subsea distribution unit for Offshore Oil Engineering



◎ Chongqing Qianwei SCM



◎ Core product of subsea security system in 750 testing ground



◎ Subsea two-phase wet gas flow meter for Lanzhou Haimo (type approval)

6. MIIT: subsea two-phase wet gas airflow device

Main work: standard applicability research, ultrasound and roentgen technology based engineering prototype design approval (design review, performance verification test, FAT, SIT and offshore test authentication).

7. R&D of Subsea Christmas tree of Chongqing Qianwei

Main work: Undertook the design review, manufacture survey, factory acceptance test (FAT), system integration test (SIT) and test in sea of subsea Christmas tree developed by Chongqing Qianwei and issued product certificate.

8. Verification and survey of subsea multifunctional connector by Chongqing Qianwei.

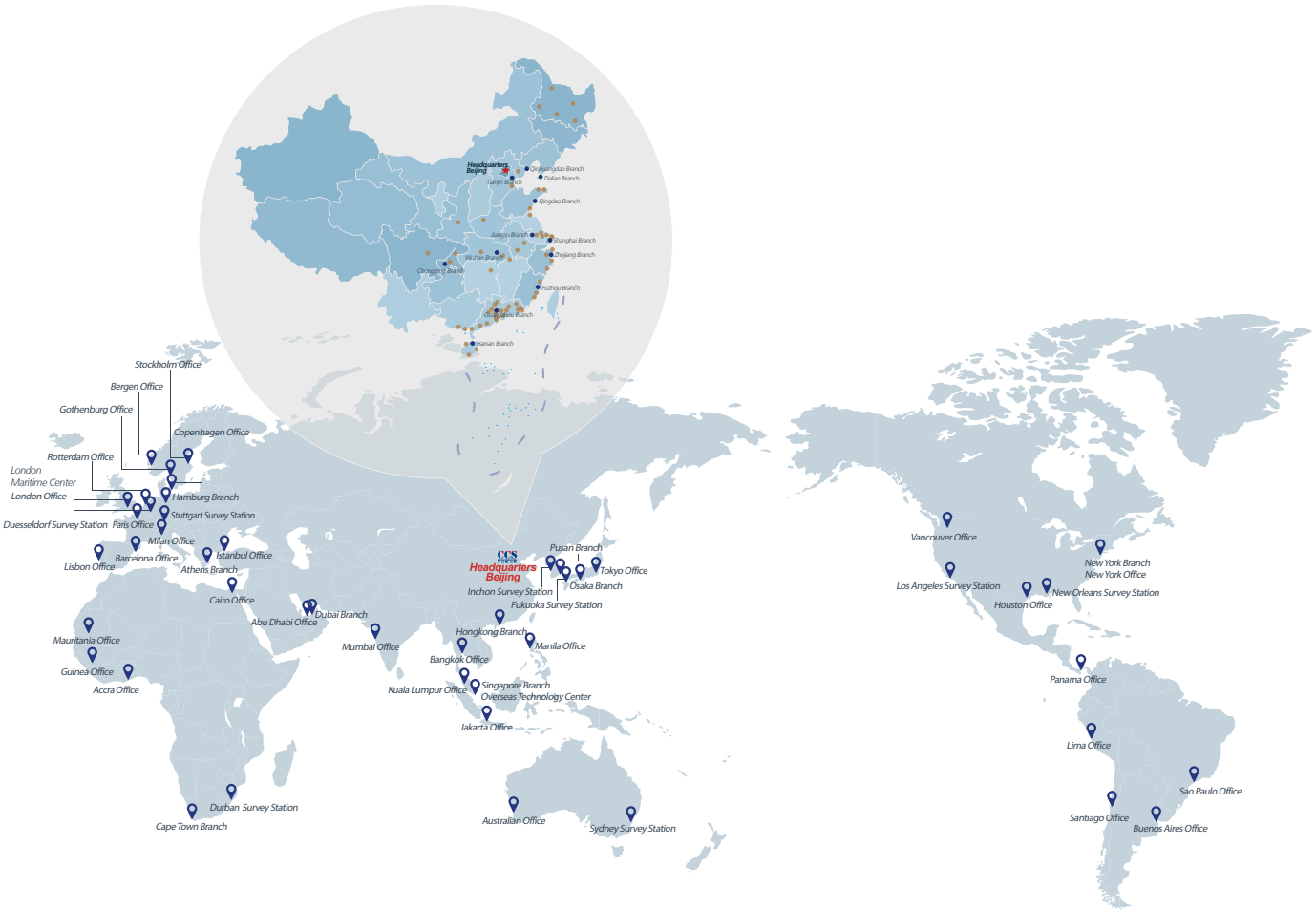


◎ Subsea Christmas tree of Chongqing Qianwei

This brochure has been printed on environmentally friendly paper.

Contact us

To meet the demand of our customers, we have set up branches and offices in major port cities in China as well as in Asia, Europe, America, Middle East, Australia and many other countries or regions worldwide, forming a global survey network.



Offshore Engineering Management Department, CCS

Address: CCS Mansion, 9 Dongzhimen Nan Da Jie, Beijing 100007, China

Post code: 100007

Phone: 0086-10-58112288

Fax: 0086-10-58112875

E-mail: oe@ccs.org.cn

www.ccs.org.cn

APR, 2023