■ 논 단

Legal Analysis on Stakeholders of Offshore Energy*

- Focusing on the Lifecycle of Offshore Plants and Contractual Relationships between Stakeholders in Korean Legal perspective

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*논문접수 : 2025. 4. 20. *심사개시 : 2025. 4. 21. *게재확정 : 2025. 5. 9.

〈목 차〉

1) This dissertation is an excerpted and revised version of the section on stakeholders from the author's doctoral dissertation titled "Legal Study on Offshore Plant Accidents during Operation Phase – Focusing on Civil Liability of Stakeholders." The discussion on legal liabilities of stakeholders regarding Offshore Plant Incidents is to be published later.

Ⅰ. Introduction

The term "Offshore Plant" is a composite term combining "Offshore," referring to areas near or far from the coast, and "Plant," denoting large-scale machinery or facilities, typically used as a collective term to describe installations involved in the drilling, production, storage, and offloading of resources such as oil and gas at sea.[2] The offshore plant industry exhibits characteristics similar to the traditional shipbuilding and maritime industries but also demonstrates unique features due to factors such as oil price fluctuations, differences in construction processes compared to shipbuilding, and the distinctive nature of offshore plant construction contracts. These distinctive features necessitate additional research and policy improvements separate from traditional shipbuilding industry studies. Korean shipyards have demonstrated the nation's shipbuilding excellence by constructing a majority of offshore plants currently operating globally. Despite unprecedented challenges due to severe economic downturns and volatile oil prices, with increasing global demand for marine resources and expanding applications of ocean-derived natural resources and renewable energy in various industries, offshore plants are recognized as having sustainable and virtually limitless potential. Korean shipbuilding companies are actively pursuing new offshore plant contracts and seeking innovative solutions to address past stagnation. Contemporary offshore plant models are no longer limited to finite petroleum resources but extend to facilities designed to harness diverse forms of marine energy, thereby broadening the scope to include numerous "Offshore Structures". Given this broadened scope, some argue that "Offshore Plant" is no longer an adequate term, suggesting "Offshore Facility" as a more appropriate English designation.[3] Consequently, products of the offshore plant industry are built in various forms, including fixed, floating, and mobile platforms, and are exported globally to multinational oil majors operating offshore concessions.

2) However, some argue that "marine facility" is a more appropriate term compared to "Offshore Plant." Lim Youngsub, Kwon Do-joong & Lee Chang-hee, "A Study for Definition and Classification of Offshore Units," Journal of Fisheries and Marine Sciences Education, Vol 29. No. 3, 2017, p. 691.

3) Given this broadened scope, some argue that "Offshore Plant" is no longer an adequate term, suggesting "Offshore Facility" as a more appropriate English designation.

However, the Korean offshore plant industry has predominantly grown by focusing on the construction and fabrication phases, preceding the operational stage. Consequently, there is a significant deficiency in legal research and literature concerning the operational and maintenance phases—collectively referred to herein as the "operational phase" —despite this stage constituting the majority of the lifecycle. Thus, it is crucial to undertake research on the legal status of offshore plants, liability relationships among stakeholders and insurance during the operational phase, with a particular emphasis on analyses based on domestic(Korean) law, considering the potential of Korean Ocean as a future source of offshore energy and growth of Offshore renewable energy market in Korea. Since various types of offshore facilities entail substantially different legal relationships among stakeholders, a detailed understanding of the relatively broad concept of "Offshore Plant" is essential for accurately analyzing any further analysis of stakeholders' liabilities in case of operational accidents.

Ⅱ. Offshore Plant

1. Definition, Classifications and Legal Status

A. Definitions of Offshore Plant

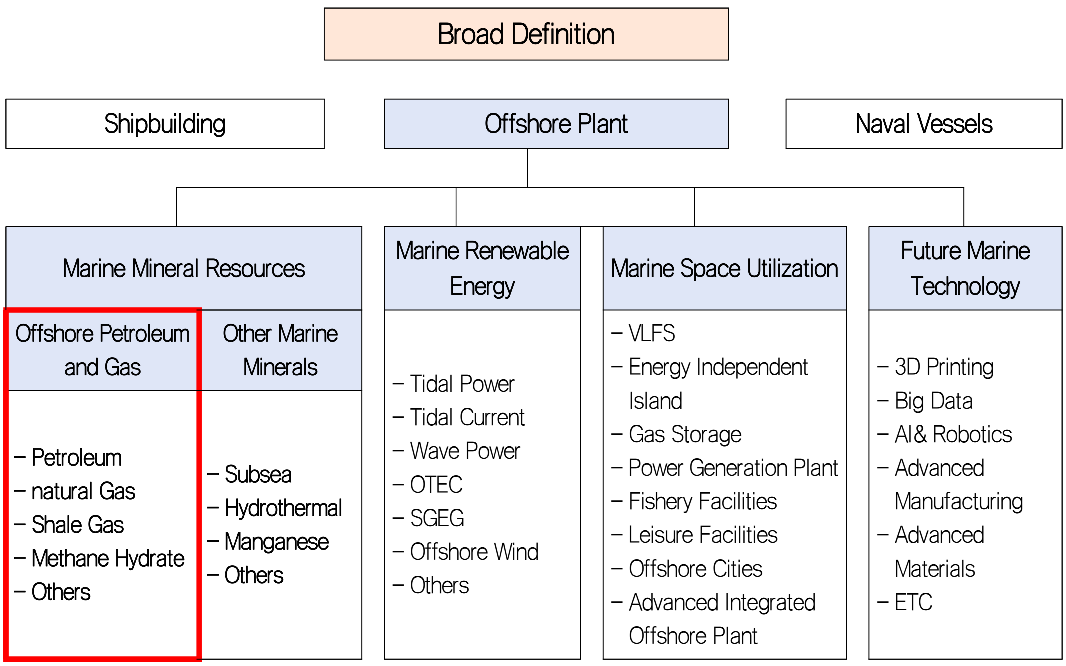
The offshore plant industry refers to "the business encompassing the comprehensive process of exploration, drilling, development, production, and operation of crude oil and natural gas resources offshore, including the manufacturing, transportation, installation, and management of necessary technologies, equipment, and facilities."[4] For instance, Article 2(15) of Korea's Maritime Safety Act defines "offshore facilities" as "structures fixed to the seabed, such as bridges, tunnels, cables, artificial islands, or floating structures for purposes including resource exploration and development, maritime scientific research, mooring, repair, cargo handling, maritime residential, tourism, and leisure, excluding ships."

The "broad definition" encompasses all offshore structures beyond direct seabed resource extraction, including stationary power

4) Kim In-Hyun et al., 2021, "Dialogue with the Sea Authors Vol. 1," Beommunsa, p.3; Contractually labeled as "Offshore Plant" or "Marine Plant," industry practitioners commonly adopt broader terms such as offshore facilities or offshore structures DLA Piper (2011). EPC Contracts in the Power Sector, Asia Pacific Projects Update, p.1.

plants, storage facilities for industrial materials, marine cultural facilities, offshore wind farms, tidal power plants, and even support vessels for offshore resource development[5)]

Conversely, the "narrow definition" specifically refers to "a collection of facilities directly or indirectly assisting offshore operations." In practice, subsea resources targeted by offshore plants can be classified into four main categories: marine mineral resources (including petroleum, gas, and other minerals), marine renewable energy, marine space utilization, and future marine technology. Typically, facilities for developing marine petroleum and gas resources are recognized as "offshore plants in the narrow sense"[6)] The distinctions between broad and narrow definitions of offshore plants can be visually represented as follows.[7)]



<Figure 1> Scope of Offshore Plants: Broad and Narrow Definitions

5) Ahn Chung-Seung, 2010, "Activation of Offshore Plants," Chodang, p.32; Kim Jin-Kwon & Jin Ho-Hyun, 2016, "A Legal Review on the Ship Status of Offshore Plants," Maritime Law Review, 28(1), p.122.

6) Korea Ministry of Oceans and Fisheries, 2020, "Offshore Plant Market Trend Analysis Report," pp.2-4; Lee Chang-Hee & Jin Ho-Hyun, 2017, "A Basic Study for the Contract of Offshore Plant Operation and Maintenance", Law and Policy, 23(1), p.147.

7) KRISO, 2017, "Offshore Business Vol.41," cited in Korea Ministry of Oceans and Fisheries, op. cit., p. 2.

This paper aims to analyze the life cycle and contractual relationships among stakeholders within offshore plant projects, specifically under the legal framework of Korean law.

B. Classifications of Offshore Plant

(1) Classification by Purpose

Offshore plants in the **narrow sense** can be classified based on their purpose into “drilling facilities” and “production facilities.” Based on installation methods, they can further be categorized into “fixed facilities,” “compliant facilities,” and “floating facilities.” “Fixed facilities” include jacket structures (pile fixed platforms), concrete gravity platforms, and jack-up rigs. “Compliant facilities” are subdivided into guyed towers, SPAR (Single Point Anchor Reservoir) structures, and tension leg platforms (TLPs). “Floating facilities” include semi-submersible rigs, drill ships, and floating production systems (FPSs) and floating production, storage, and offloading units (FPSOs).[8]

More specifically, the extraction of petroleum and natural gas involves two major processes: “drilling” and “production.” A “well” is a borehole connecting the underground reservoir to the surface. “Drilling” involves boring into the seabed and installing casing, which is then cemented in place. “Completion” refers to installing production equipment and perforating the well. During the exploration phase, exploration wells confirm the presence of hydrocarbons, and appraisal wells evaluate the commercial viability. If development is pursued, development wells are drilled to produce hydrocarbons. The life cycle of a well from drilling to abandonment is termed the “life cycle of a well,” comprising planning, drilling, completion, production, plugging and abandonment. Casings protect wells from unstable strata, while wellheads control pressure and prevent blowouts. Blowout preventers (BOPs) are installed above wellheads for additional safety. Facilities conducting drilling operations are called “drilling rigs.”

“Production” refers to the process where well-fluids ─ mixtures of hydrocarbons, water, sand, carbon dioxide, and hydrogen sulfide

8) FPS(Floating Production System) refers to a facility that not only extracts crude oil but also stores it, integrating production and storage capabilities on a hull combined with topside processing units. An FPSO adds offloading capabilities to an FPS.

— are processed on topside structures to separate oil, gas, and water. The gas is separated first, followed by oil and water, and the final separated crude oil is produced.[9] In FPSO systems, production facilities include topside structures, hulls (or lower structures), well systems, subsea systems, and pipelines. The topside consists of Accomodation areas, Utility areas, Drilling areas, Wellhead areas, Process areas (where separtation and treatment occur). Not all topsides contain all five zones; typically, 1–4 zones are present depending on the facility type.[10] Power supply for offshore plants typically uses self-generation through gas turbines fueled by produced gas or, alternatively, external power supply via subsea cables. In modern developments, main production facilities sometimes integrate renewable energy generation systems.[11]

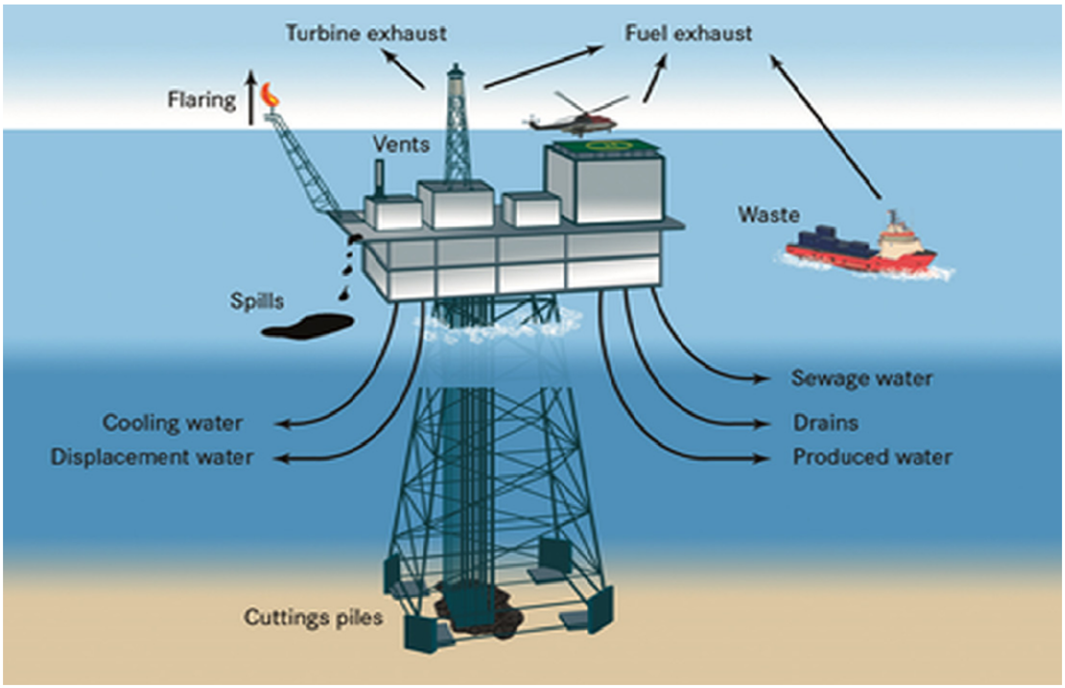
(2) Classification by Installation Methods

In fixed facilities, the structure is divided into a topside and a substructure (such as jackets). Typically, these components are built separately and then transported to the site for installation and integration. This distinction between topside and substructure is especially clear in jack-up rigs. In construction, EPC (Engineering, Procurement, Construction) contractors often execute hook-up operations, encompassing design, procurement, construction, and integration under turnkey contracts. Fixed facilities—particularly jackets—are tower structures made of cylindrical steel pipes, anchored to the seabed by piling. They are usually installed in depths ranging from 100 to 150 meters, with a maximum up to 411 meters.

9) Ahn Byung-Moo and Jung Woo-Song, Offshore Oilfield Development – Introduction to the Offshore Plant Industry, Kyomunsa, 2018, pp. 89–90, 95–97.

10) For example, a PDQ (Production, Drilling, Quarters) unit includes production, drilling, and living quarters, while an FPSO includes living quarters, turret systems, flare towers, and utility areas.

11) Furthermore, in modern developments, it is increasingly common for primary production facilities to incorporate systems for renewable energy generation.

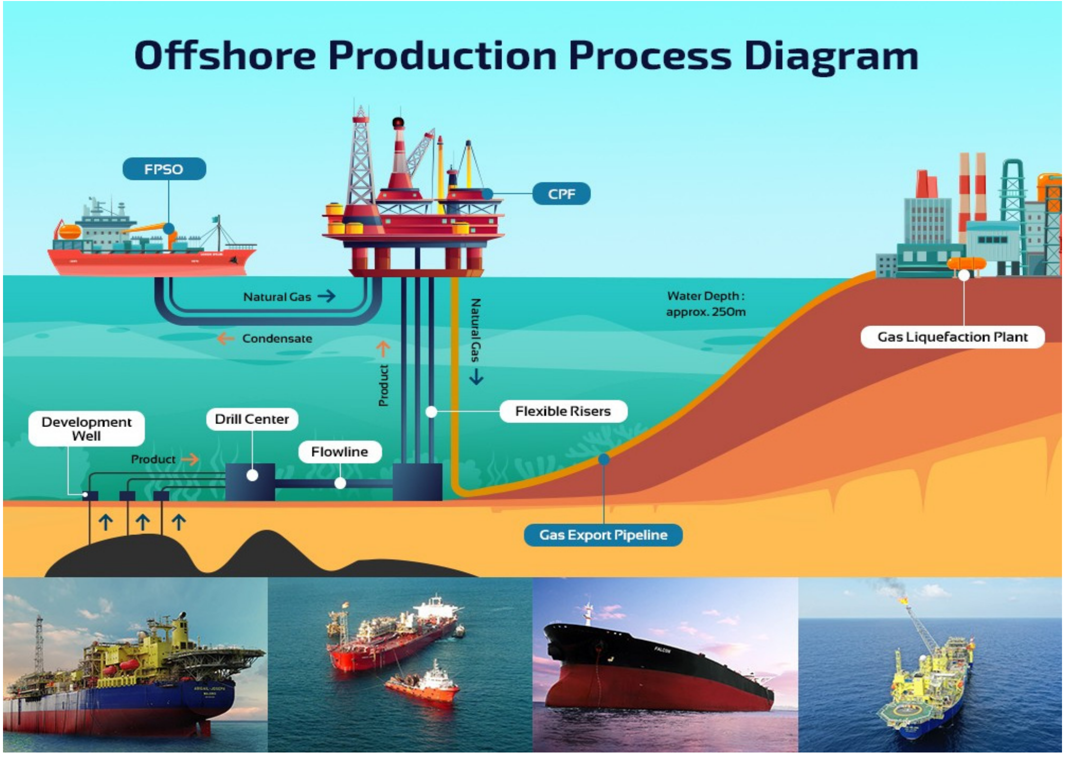


<Figure 2> Example of Fixed Offshore Production Facilities and Pipelines[12)]

Floating production systems have expanded globally since their first installation in the North Sea in 1975, initially designed for specific reservoirs but gradually evolving with technical improvements like seismic resistance and dynamic positioning. Today, the most typical floating production systems are FPSOs, FSOs, FLNGs, and FSRUs.[13)] Floating facilities remain buoyant at the surface, capable of moving to different operational areas. They maintain position using dynamic positioning (DP) systems or mooring lines. FPSO vessels, in particular, resemble conventional ships with production equipment installed on the hull. Semi-submersibles differ in that their lower structure is submerged. Regarding transportation and installation, FPSOs with self-propulsion capabilities move independently, whereas non-propelled units are transported by heavy-lift vessels or towing fleets.

12) "Assessment of impacts of the offshore oil and gas industry on the marine environment." OAP OSPAR Assessment Portal, 10 Oct. 2024, https: //oap.ospar.org /en/versions /2209-en- 1-0-0-impacts-offshore-oil-and-gas-industry/. Accessed 10 Oct. 2024.

13) In some classifications, facilities referred to as "compliant" are included within "floating" systems. Jung Woo-Young, et al. Understanding and Practice of Offshore Finance. Korea Institute of Finance, 2021. p.602.



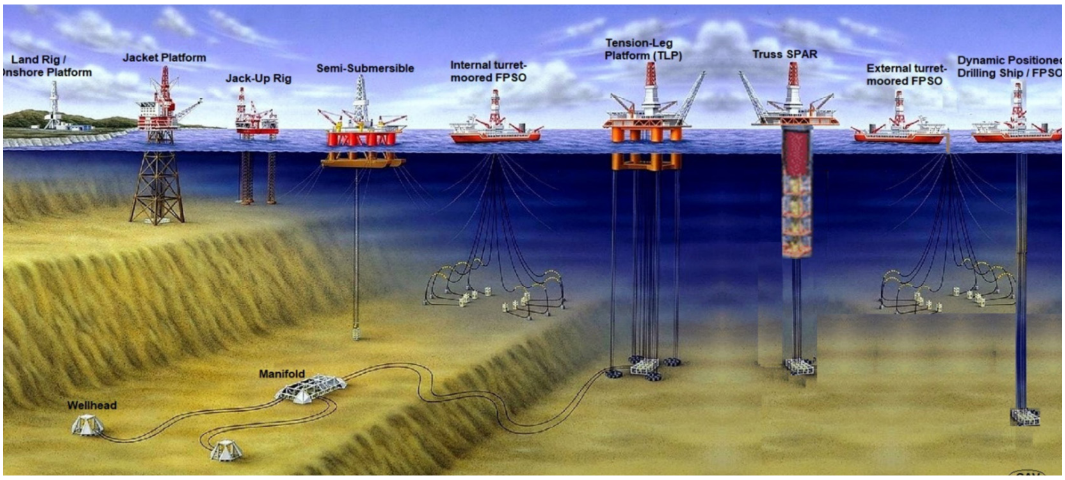
<Figure 3> Explantions on FPSO[14)]

Compliant facilities—seen as an intermediate form between floating and fixed structures—connect topside and seabed using specialized cables rather than rigid steel. This allows flexibility in deepwater operations and facilitates relocation by simply detaching the cables. Structures like SPARs and Tension Leg Platforms (TLPs) exemplify this category.[15)] SPARs are large cylindrical structures ballasted to submerge 90% of the hull, anchored to the seabed with radial mooring lines. TLPs employ four vertical tendons secured to seabed templates. Modern technology allows SPARs to be installed at depths up to 3,000 meters, and TLPs up to 2,000 meters.[16)]

14) Soheil Sabzevari, “what is Floating Production Storage and Offloading(FPSO)?” https:// www.linkedin.com/pulse/fpso-floating-production-storage-offloading-soheil-sabzevari/

15) Jung Woo-Young, et al., Understanding and Practice of Offshore Finance, Korea Institute of Finance, 2021, p. 601.

16) Ibid, p.601.



<Figure 4> Examples of Offshore Production Installations Classified by Locations[17]

Furthermore, the classification can be summarized as follows.

Installation	Structure	Function	Location
Fixed	Jacket structure	Production	Shallow Sea
	Concrete gravity platform	Production(Storage)	
	Jack-up rig	Drilling, Production	
Compliant[18]	Guyed tower, compliant Tower	Production	Deep Sea
	SPAR	Production	
	Tension leg platform	Production	
Floating	Semi-submersible[19]	Drilling, Production	
	Drill Ship		
	FPS, FPSO[20], FSRU[21]	Production	

<Figure 5> Classification by Installation Methods[22][23]

17) Fixed structures are typically installed at water depths of less than 300 meters, while floating structures are used for deepwater oil fields at depths around 1,000 meters (Chimela Victor Amaechi, "Design Considerations of Fixed and Floating Offshore Structures," Scholarly Community Encyclopedia, 2022).

18) Flexible platforms can be used for both production and drilling facilities depending on the operational conditions.

19) Jack-up rigs and semi-submersible platforms are mainly used for drilling operations; however, recently, production facilities have also been installed on such units. Moreover, semi-submersibles have increased in size as they have been converted from drilling to production use. Jung Woo-Young, et al. op. cit., pp. 599–600.

20) Traditionally, FPSOs did not have engines and thus lacked self-propulsion capabilities. However, discussions have been held in Korean shipyards regarding the development of FPSOs equipped with self-propulsion systems. Myeong-Seok Chae, "[Ship Story] Floating Refinery on the Sea, FPSO," Asia Economy, June 2010, accessed 1 Oct. 2024, https://www.asiae.co.kr/article/2010061211020012073.

2. Legal Status by Type

A. Definition of a ship

In Korean, the term “seonbak (ship)” literally means “a large boat” and is generally defined as “an object made of wood or metal that floats on water, carrying people or cargo”.[24] In English, similar concepts are expressed through the terms “ship” and “vessel.” A “ship” is broadly defined as “any vessel used for navigation”; however, the two terms are sometimes used interchangeably depending on the source.[25]

A representative legal definition of a ship under Korean law is found in Article 1-2 of the Ship Act. Historically, this definition emphasized buoyancy and navigation over water. However, following an amendment in April 1994, non-self-propelled barges and submersibles operating underwater were also included within the scope of “ships.” The Maritime Section of the Korean Commercial Act does not provide a general definition of ships to which maritime law applies. Instead, various maritime-related statutes define ships differently. Thus, a comprehensive definition must rely on societal conventions. From a societal perspective, a ship can be characterized as “(1) a floating structure (2) intended and capable of navigation (3) either on the surface or underwater”[26]Moreover, the requirement of navigability is crucial. Structures fixed in place, such as buoys or maritime hotels, are generally not considered ships. There is academic debate over whether self-propulsion is necessary, but the prevailing view and Supreme Court precedents deny such a requirement.[27]

21) An FSRU (Floating Storage and Regasification Unit) is a floating plant capable of storing and regasifying LNG, serving to expand the usage of natural gas into regions where production facilities have not been established.

22) Kim, Jin-Kwon, and Jin Ho-Hyun, op. cit., p. 124.

23) Ministry of knowledge Economy. Developing Offshore Plants into Korea’s Second Shipbuilding Industry!, Press Release, 2012, p. 8.

24) National Institute of Korean Language, https://stdict.korean.go.kr/main/main.do

25) Merriam-Webster, accessed 13 Oct. 2024, https://www.merriam-webster.com/; Naver English Dictionary, accessed 9 Oct. 2024, https://en.dict.naver.com/main

26) Choi Jong-Hyun, Maritime Law Theory, 2nd ed., Pakyoungsa, 2014, p. 34

27) According to Supreme Court Decision 2012.4.17. 2010Ma222, considering how the former Article 740 of the Korean Commercial Act defines a ship and that the Article 1-2 of the former Ship Act also includes

Under the current Article 740 of the Korean Commercial Act, a "ship" is defined as a vessel used for navigation for business or commercial purposes. Additionally, Article 1-2(1)(3) of the Ship Act includes non-self-propelled "barges" within the definition of ships, and Article 29 stipulates that the maritime law provisions apply to such vessels.

Considering this, during the movement or dis-assembly of offshore plants—whether fixed, floating, or compliant—before final installation on the seabed, they could qualify as "barges" under the Ship Act and Commercial Act. Furthermore, under the Ship Act, vessels equipped with propulsion are considered "steamships," while those without are "barges." Offshore plants should similarly be classified based on the presence or absence of propulsion systems.[28] However, beyond the two primary statutes, individual laws may define "ships" differently depending on the law's purpose. Therefore, the following sections will discuss how ships are defined in specific statutes and the legal implications of recognizing offshore plants as ships.

B. Legal Standards of the "Ship Status"

First, the Ship Safety Act imposes various inspection obligations on ships, requires plan approvals, and sanctions uninspected ships. It also stipulates requirements for safety equipment, the management of toxic gases, dangerous goods, and highly flammable fuels. Therefore, if an offshore plant qualifies as a ship under the Ship Safety Act, its owners must comply with these procedural requirements.

The Marine Environment Management Act, incorporating the 1973 and 1978 MARPOL Conventions into domestic law, broadly defines "ships" to include all structures operating at sea, including fixed platforms, regardless of self-propulsion capability. Under this Act, shipowners must comply with pollution prevention obligations and inspection requirements (Articles 22, 26, and 41).

The Ship Safety Act, particularly in Chapter 2, also regulates specific seaworthi-

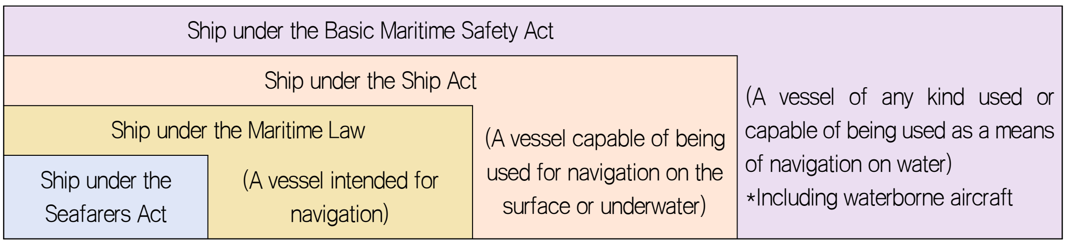
non-self-propelled barges, a privately owned or non-state-owned barge that is towed or pushed by another vessel qualifies as a "ship" regardless of whether it is engaged in commercial activity or operated for profit, and is therefore subject to provisions such as the shipowner's limitation of liability under the Commercial Act.

28) Lim Chae-Jin, "A Study on Offshore Structure's Legal Problems in Admiralty—Focusing on the Concept of Ships," Master's thesis, Korea University, 2004, p. 55; Kim Jin-Kwon and Jin Ho-Hyun, op. cit., p. 130

ness standards, and in Chapter 6, mandates safety equipment and risk management measures. Owners of offshore plants recognized as ships must adhere to these regulations.

The Oil Pollution Damage Compensation Act, reflecting the 1992 Civil Liability Convention into Korean law, provides different standards for liability limitation procedures, mandatory insurance requirements, and burden of proof.[29] Of particular note, the Korean Act imposes a stricter mandatory insurance requirement: 200 tons instead of the 2,000-ton standard under international conventions, raising concerns about potential breaches of international law. Moreover, even foreign-flagged ships bareboat chartered by Korean nationals must obtain separate insurance to ensure compliance with the Oil Pollution Damage Compensation Act.

Lastly, maritime safety regulations were previously consolidated under the Maritime Safety Act, but following a legislative overhaul, the management of waterways, maritime traffic safety, and ship safety systems were divided into the Maritime Traffic Safety Act and the Basic Maritime Safety Act. The Maritime Traffic Safety Act aims to remove hazards and obstacles to safe navigation and promote maritime safety (Article 1), while the Basic Maritime Safety Act stipulates national measures such as maritime traffic management and the establishment of basic maritime safety plans (Chapters 2 and 3). Among the relevant statutes, the Seafarers Act adopts the narrowest definition of a ship, whereas the Maritime Safety Act adopts the broadest definition.



<Figure 6> Definitions and Scope of Ships under Various Legal Frameworks[30]

29) Some scholars argue that the law aims to enhance victim protection beyond international conventions, though the practical impact may be limited. Park Yo-Seop, "Comparative Legal Study and Improvement Plan on Marine Pollution Accident Compensation," Master's thesis, Korea University, 2023, p. 65.

30) Kwon Chang-Young. Commentary on the Seafarers Act, 3rd ed., Beommunsa, 2022, p. 45.

C. Recognition of Ship Status by Types

The Ship Act does not explicitly state whether offshore plants qualify as ships. However, it defines a ship as "any type of vessel used or capable of being used for navigation on or under water," regardless of self-propulsion capability (Article 1-2(1)). Thus, offshore plants possessing mobility and buoyancy—particularly mobile and floating offshore plants—could potentially be interpreted as ships under the Ship Act. Even if self-propulsion is lacking, facilities capable of movement with tug assistance may be considered barges subject to the Ship Act.[31]

Under the Ship Safety Act, "mobile offshore drilling units" are considered ships, defined as "marine structures for the exploration or extraction of seabed resources." Floating offshore plants not fixed to the seabed are treated as ships, whereas fixed structures are not (Ship Safety Act Article 2(1); Enforcement Rule Article 3). Thus, floating offshore plants are likely recognized as ships, but fixed offshore plants are not.

The Basic Maritime Safety Act distinguishes between "ships" and "marine facilities," defining marine facilities as "structures fixed to the seabed such as bridges, tunnels, cables, artificial islands, or floating marine structures (excluding ships)" (Article 3(3)). Fixed offshore plants are categorized as "marine facilities" rather than ships. However, mobile offshore plants with self-propulsion, such as drillships, may be interpreted as ships rather than marine facilities.[32]

The Marine Environment Management Act is notable for explicitly including "fixed and floating drilling units and platforms" designated by the Ministry of Oceans and Fisheries as ships (Article 2(16)). According to the Rules on the Prevention of Pollution from Ships, offshore plants governed by the "Act on the Development of Marine Mineral Resources" are also considered ships. Consequently, even fixed offshore plants fall

31) According to the Seoul High Court Decision 96Na51228, dated August 1, 1997, a vessel equipped with a propulsion device but lacking autonomous navigational capability—where the propulsion system merely assists during towing against currents—was deemed a barge rather than a ship subject to the Seafarers Act. Kwon Chang-Young, "The Scope of Ships Governed by the Seafarers Act," Law Journal, no. 579, 2004, p. 190.

32) According to Kim Jin-Kwon and Jin Ho-Hyun, since the definitions of "ship" and "marine facility" under the Act are mutually exclusive, floating offshore plants that are not ordinary ships could be classified as marine facilities, although ambiguities remain due to the literal interpretation of the text.

within the scope of ships under this law, likely reflecting the broader environmental protection objectives drawn from the 1973 MARPOL Convention.

The Act on the Punishment of Acts Threatening Ships and Offshore Structures separately defines ships and offshore structures. Here, “offshore structures” refer to “artificial structures or installations fixed to the continental shelf under the United Nations Convention on the Law of the Sea” (Article 2(5)). Under this definition, only fixed offshore plants are considered offshore structures, suggesting that floating offshore plants are more likely classified as ships.

The Oil Pollution Damage Compensation Act, unlike the 1992 Civil Liability Convention (CLC), explicitly includes “oil storage barges” within its scope. Thus, mobile drilling barges, FPSOs, and FPSOs carrying stored oil while navigating would clearly qualify as ships subject to the Act. FSOs used for production purposes may also fall within the scope. Although the literal text does not mandate “in transit” status, international interpretations favor restricting the application to mobile offshore units.[33)]

In conclusion, except under the Basic Maritime Safety Act, most maritime-related statutes recognize mobile and floating offshore plants as ships. Fixed offshore plants are generally excluded from the ship category due to the lack of mobility and buoyancy. However, the Marine Environment Management Act extends the definition to fixed offshore plants for environmental protection purposes, reflecting the broader regulatory scope intended under the MARPOL framework.[34)] This can be summarized in the following table.

33) Yoon Hyo-Young, “Present Condition and Proposals on Liability and Compensation Regimes for Pollution Damage Resulting from Offshore Plant”, Kangwon Law, No. 49, 2016, p. 593.

34) Kim Jae-Hee, op. cit., p.26.

Law	Ship Status of Offshore Plant	Remarks
Ship Act	Considered a ship	Fixed offshore plants excluded
Marine Environment Management Act	Considered a ship	Fixed offshore plants excluded
Oil Pollution Damage Compensation Act	Not considered a ship	Oil storage barges in transit are recognized as ships
Ship Safety Act	Considered a ship	Fixed offshore plants excluded
Basic Maritime Safety Act	Distinguishes between ships and marine facilities	Debate exists regarding floating offshore plants
Marine Accident Inquiry Act	Considered a ship	Fixed offshore plants excluded
Act on the Entry and Departure of Ships	Considered a ship	Fixed offshore plants excluded
Act on the Punishment of Acts Threatening Ships[35)	Distinguishes between ships and offshore structures	Fixed offshore plants are classified as offshore structures

<Figure 7> Recognition of Offshore Plant Ship status under Korean Legal System

3. Life Cycle

Various expressions such as "lifecycle" and "life span" are often used interchangeably to describe the life stages of offshore plants; however, for the purposes of this paper, the term "life cycle" will be consistently used. The concept can be divided into the "project life cycle," which includes the stages up to installation and delivery, and the "product life cycle," which refers to stages following the commencement of production. This paper focuses on the "operation" phase, which falls under the product life cycle.

The life cycle of an offshore plant refers to the division of the entire industrial domain—from construction to decommissioning—into sequential stages over time. Some sources use this categorization to analyze which business areas Korean companies are active in according to each phase of the offshore plant lifecycle.[36) Typically, transportation and decommissioning each take approximately six months, while installation, commissioning, and modification require about one year each. However, the operation and maintenance stages span at least 25 years and are collectively referred to as MMO (Maintenance,

35) This refers to the abbreviated title of the "Act on the Punishment of Acts Threatening Ships and Offshore Structures," which considers ships and offshore structures in operation as ships.

36) Ministry of Oceans and Fisheries, op. cit., p.5.

Modification, and Operation).

Life Cycle	Design					Construction	Commissioning	Transportation	Installation	MMO			Decommissioning
	Conceptual Design	Pre FEED	FEED	Verification	Detailed Design	Construction	Commissioning	Transportation	Installation	Operation	Maintenance	Modification	Decommissioning
	Client or Engineering Contractor			Major Domestic Shipyards' Scope				Partial	Partial	Project devloper or Operator			

<Figure 8> Lifecycle of Offshore Plant[37)]

The typical life cycle for resource development includes stages such as exploration, drilling, design, construction, transportation, installation, and operation. In the offshore oil and natural gas value chain, a feasibility study and preliminary exploration are first conducted at the proposed installation site to verify the presence of petroleum and natural gas. Following this, economic feasibility is assessed through drilling. Based on the results, a decision is made regarding the construction of offshore plants.

Once the decision is made, the plant is designed considering environmental conditions and technical parameters, constructed, transported to the site, installed, and subjected to commissioning before commencing production. Thereafter, the operation and maintenance phases are carried out, which may either be handled by a specialized operator under a separate contract or managed directly by the original owner. Major international oil companies or state-owned enterprises often serve as offshore plant operators.[38)]

Ⅲ. Life Cycle and Stakeholders

1. Acquisition of Exploration and Mining Rights

A. Concept of Mining Rights

Article 6(1) of the Constitution of the

37) Douglas Westwood, “World Deepwater Market Forecast” 2017-2021, 2021.

38) Operating an offshore plant requires not only technological expertise and proven experience in installation, operation, maintenance, and decommissioning but also competence in operating offshore support vessels Lee Chang-Hee and Jin Ho-Hyun, “A Study of Legislative for the Offshore Support Business Revitalization— Focusing on the amendment of Maritime Transport Act,” Journal of the Korean Society of Marine Environment and Safety, vol. 21, no. 4, 2014, p. 429.

Republic of Korea stipulates that treaties concluded and promulgated under the Constitution and generally recognized rules of international law have the same effect as domestic law. The United Nations Convention on the Law of the Sea of 1982 ("UNCLOS") establishes exclusive economic zones (EEZs) where limited sovereign rights are exercised and provides rights for the development of continental shelf resources up to the outer edge of the continental margin.[39] Article 120(1) of the Korean Constitution establishes the patent principle for the development and use of important underground resources, fisheries, and hydropower. Accordingly, Korea enacted the Territorial Sea and Contiguous Zone Act, the Exclusive Economic Zone Act, and the Act on the Development of Seabed Mineral Resources ("Seabed Resources Act"), stipulating that mining rights over seabed blocks belong solely to the state. Some criticize the Seabed Resources Act for merely defining the attribution of mining rights without clarifying ownership.[40]

The Seabed Resources Act, enacted in 1970, aims to rationally develop seabed minerals in areas adjacent to the Korean Peninsula and its islands (Article 1). Article 4(1) of the Act specifies that only the state may possess seabed mining rights, with the Minister of Trade, Industry, and Energy responsible for registration (Enforcement Decree Article 4). The Act establishes a dual system of exploration rights and extraction rights (Article 5), subject to approval for transfer (Article 6(1)). Corporations wishing to explore must meet financial and technical qualifications and obtain a permit (Articles 12 and 13). Extraction rights are granted following successful exploration, subject to evaluation and consultation with related ministries (Articles 14 and 15).

39) UNCLOS, adopted in 1982 following the third UN Conference on the Law of the Sea (1973–1982), consists of 320 articles and 9 annexes, regulating the rights and obligations of nations in marine development and related dispute settlement. UNCLOS Article 3 (Breadth of the territorial sea) defines the 12-nautical mile territorial sea; Article 66 (Anadromous stocks) addresses the 12-nautical mile contiguous zone; and Article 56 (Rights, jurisdiction and duties of the coastal State in the exclusive economic zone) grants resource development rights, including seabed mineral rights, within the 200-nautical mile EEZ.

40) Some criticize the Seabed Resources Act for merely specifying that seabed mining rights belong to the state without explicitly addressing ownership. There is also a view that ownership of minerals remains with the landowner, but their development requires a state-issued patent. Ryu Kwon-Hong, International Petroleum and Gas Development and Transaction Contracts, Korea Scholarly Information Co., 2011, p. 48; Jung Young-Chul, International Transaction Law: Energy, Pakyoungsa, 2012, p. 207.

Under the domestic laws of various countries, mining rights are typically granted by the resource-owning government: to foreign companies through concession agreements, and to national oil companies through applications and registrations. The typical domestic regime grants exploration rights for 10 years and extraction rights for 30 years, with possible extensions under special circumstances.[41] Oil companies acquiring mining rights later assume the role of "operators" during the operational phase, which will be discussed below.

B. IOC

"International Oil Companies" (IOCs) refer to private-sector corporations engaged primarily in managing petroleum and related resources, distinct from state-owned enterprises. Examples include BP, Exxon, Total, and Chevron, often termed "oil majors."[42] The origin traces back to the Standard Oil Company Trust established by Rockefeller in 1882, which controlled 95% of U.S. oil production until its breakup under the Sherman Antitrust Act in 1911, leading to the creation of 34 independent companies, including Exxon and Chevron. These large corporate entities went on to dominate the petroleum industry, evolving into today's oil majors. In the late 1990s, following a period of declining oil prices, significant mergers took place among major oil companies: Exxon and Mobil (1999), BP and Amoco (1998), Total and Petrofina (1999), Chevron and Texaco (2001), and Conoco and Phillips (2001). These mergers resulted in the formation of what are commonly known as the "supermajors" or "Big Five" in the global oil industry: ExxonMobil, BP, Chevron, TotalEnergies, and Shell (Royal Dutch Shell).[43] The rise of a high oil price era in the early 2000s further strengthened the dominance of these supermajors.[44]

Meanwhile, the offshore drilling rig market emerged in the 1980s. Initially, oil compa-

41) Jung Young-Chul, op. cit., p.159.

42) While some classify smaller companies like Anadarko and EOG Resources separately, this paper focuses solely on the oil majors.

43) Royal Dutch Shell, although originally formed by a merger in 1907 between the Royal Dutch Petroleum Company and the Shell Transport and Trading Company, is often included among the supermajors due to its size and influence.

44) Shin Eon-Soo, Cycle of Hope: Industries, Markets, Movements, PubPle, 2015, pp. 394–397.

nies ordered, owned, and operated rigs directly. However, specialized drilling contractors eventually developed, and oil companies began chartering rigs, focusing resources on exploration and production.

C. NOC

The ownership and management of resources vary across countries, but most establish a legal basis and procedures through national petroleum legislation. Governments may directly manage resources or establish state-owned oil companies, known as "National Oil Companies" (NOCs), granting them exploration and development rights.[45] Thus, an NOC can be defined as "an oil company wholly or largely owned by a producing country's government".[46] For instance, Mexico's Constitution explicitly grants the state ownership and development rights over petroleum and gas resources within its jurisdiction, leading to the establishment of PEMEX in 1938.[47]

However, under Korea's mining rights system, where the government is always a contracting party, it has been criticized that all substantial rights remain with the government, relegating NOCs merely to the role of administrative agencies without substantive rights or obligations.[48] In Korea, the representative NOC is the Korea National Oil Corporation (KNOC). Internationally, major NOCs include Saudi Aramco (Saudi Arabia), PDVSA (Venezuela), KPC (Kuwait), NIOC (Iran), PEMEX (Mexico), and more recently, Petrobras (Brazil).

2. Project Development

A. Establishment of Project Companies

As previously discussed, IOCs establish

45) More specifically, while some NOCs were created through the nationalization of pre-existing petroleum assets, many are established from the outset based on foundational legislation aimed at resource development. Examples of NOCs formed through nationalization include Pemex (Mexico), NIOC (Iran), and PDVSA (Venezuela), whereas other NOCs are established directly under domestic laws. In some cases, such as Saudi Arabia and Abu Dhabi, states have acquired shares from pre-existing IOCs to form NOCs. Consequently, not all NOCs are 100% state-owned; partial privatization is also observed. Jung Young-Chul, op. cit., p. 210.

46) Ahn Byung-Moo and Jung Woo-Song, op. cit., p.33.

47) In federal countries like Russia, constitutions sometimes allocate mining rights jointly between federal and state governments. Jung, op. cit., p. 209.

48) Jung Young-Chul, op. cit., p. 161.

project development companies (PDCs) or acquire existing companies to participate in the development of offshore blocks. In integrated development structures, IOCs form investment consortiums even before exploration, concluding joint bidding agreements or Joint Operation Agreements (JOAs) to create project companies. The project company then contracts with the NOC or resource-owning country regarding the block and raises financing to order offshore plants. In some cases, special divisions or branches within the IOC fulfill this role instead of setting up a separate project company. After executing resource development contracts such as concessions, the project company determines whether to proceed with the project, conducts Front-End Engineering Design (FEED), and prepares tender documents for the selection of EPC contractors.[49] After awarding the contract, the project company oversees delivery, warranty management, and project post-completion administration until full ownership and possession are transferred to the operator, marking the end of the project cycle. As these companies are created specifically for offshore plant procurement, they usually do not engage in plant operation or management post-delivery, and thus it is difficult to assume that they would bear liability to third parties for operational accidents.

B. Execution of Resource Development Contracts

(1) Concession Agreement

A concession agreement is a contract between a resource-owning country and a development company, under which the developer obtains ownership of all petroleum produced, and the host country receives royalties, bonuses, or taxes as specified in the contract.[50] Governments typically award exploration and development rights through bidding, either directly or through NOCs. Bidding practices vary by country: some rely on bid price to determine winners, while others, like the United Kingdom's North Sea oil regime, extensively evaluate technical and financial capabilities and exercise broad dis-

49) Tender documents typically specify the scope of work, quality standards, schedule, pricing, and related quality requirements.

50) In Korea, the Seabed Resources Act permits conditions and obligations to be attached to permits, although the specifics are delegated to the Minister of Trade, Industry, and Energy without detailed statutory provisions (Article 16).

cretion in selecting contractors. Traditional concession agreements are treated as administrative contracts—special contracts that blend public law administrative acts with elements of private law contracts.[51)]

(2) Production Sharing Contracts

Under a Production Sharing Contract (PSC), unlike a concession, the developer does not acquire ownership of petroleum. Ownership of facilities and resources generally remains with the resource-owning country unless otherwise agreed. If the development succeeds, the IOC gains rights to a share of the petroleum produced and is compensated for its exploration and development costs. However, NOCs often exercise stronger oversight rights over IOCs under PSCs, and IOCs bear the full exploration risk. Even after successful development, equipment and technologies typically revert to the NOC at contract expiration.[52)] Once exploration and development are successfully completed and production begins, the IOC recovers its investment through the allocation of "profit oil."

Another type of agreement is the service contract or risk service contract, under which an IOC acts effectively as a subcontractor to the NOC, funding exploration and development with its own capital but without receiving rights to the petroleum produced. These arrangements, marked by strong host country control, were temporarily adopted after nationalization in countries like Mexico, Venezuela, Brazil, and Iran.[53)]

The three types of resource development contracts described above—concessions, PSCs, and service contracts—are generally executed by the project development company with the NOC or resource-owning country and serve as the financial basis for offshore plant projects.

51) Although the Seabed Resources Act does not explicitly designate the granting of mining rights as a contract, some scholars argue that national contract law should apply supplementarily as the Seabed Resources Act serves as special legislation. Jung Young-Chul, op. cit., p. 241.

52) Jung Young-Chul, op. cit., p. 276.

53) Jung, op. cit., p. 367.

	Concession Agreement	PSC	Service Contract
Rights Granted	Exclusive rights for exploration and development; disposal rights over resources	Exclusive rights for exploration and development; disposal rights over resources	Exclusive operational rights; remuneration based on success
Ownership of Assets	Owned by the developer	Transferred to the authority once investment is recovered	Immediately vested in the authority upon installation
Control over Operations	Discretionary control according to relevant regulations	Nominal control held by the authority or NOC	Full control held by the authority or NOC
Ownership of Production	Owned by the developer before production, but subject to domestic supply obligations	Owned by the developer after production, but subject to domestic supply obligations	No ownership rights granted to the developer

<Figure 9> Comparison of Types of Resources Development Contracts[54]

3. EPC Contractors

A. Offshore Plant Construction

The petroleum industry is divided into three sectors: upstream, midstream, and downstream. This paper focuses on the upstream sector, which can be divided more specifically into exploration, appraisal, development, and production. After successfully completing the exploration and appraisal stages, a development plan is submitted to the resource-owning country. Once project approval is granted and the Final Investment Decision ("FID") is made, the development phase formally begins.

The objective of the development and execution phase is to construct offshore plants (production facilities) in accordance with the approved development plan and to bring the oilfield into a producible state. Contractors hired by the operator include engineering contractors responsible for detailed design and procurement, fabrication contractors, and installation/hook-up specialists. Equipment suppliers may also be involved as necessary. Contractors engaged in offshore plant construction are collectively referred to as "EPC contractors."

The project development company typically signs construction contracts with ship-

54) Ryu Kwon-Hong. International Petroleum and Gas Development and Transaction Contracts. Korea Scholarly Information Co. Ltd., 2011, p. 108.

yards for offshore plants, generally under an EPC (Engineering, Procurement, and Construction) structure, whereby the contractor undertakes design, procurement of necessary materials, and construction.[55)] Initially, project development companies executed separate contracts for each phase of offshore plant construction. However, by the 1980s, they began signing comprehensive "EPC Turnkey" contracts with major engineering firms, with Korean shipyards like Hyundai Heavy Industries and Daewoo Shipbuilding & Marine Engineering participating as subcontractors. Building on this experience, Korean shipyards began to compete directly with engineering firms to secure EPC Turnkey contracts from the 1990s onwards. Under an EPC Turnkey contract, the EPC contractor handles design, construction, and installation, and the project company pays for the completed facility.[56)] Unlike onshore EPC projects, offshore plant construction contracts require the project company to conduct feasibility studies in advance, not only regarding geological conditions of the offshore field but also the political and economic environment of the country. Basic design (FEED) is carried out, and based on the results, bids are invited, leading to the signing of EPC Turnkey contracts. The EPC contractor is responsible for all stages starting from specialized engineering design.[57)] In the 1980s, offshore plants were primarily constructed as fixed platforms installed in shallow waters. Production facilities consisted of topsides, jacket structures, wellhead systems, and transport pipelines. Each component undergoes FEED,[58)] Following FEED, the project progresses sequentially through detailed design, procurement, fabrication, installation/hook-up, and commissioning, ultimately preparing for production. Timelines for platform construction significantly affect the schedules for other components.[59)]Since the 1990s, with the advancement of deepwater development,

55) Kim In-Hyun et al., Conversations with the Sea 1, Beommunsa, 2021, p.70.

56) This "turnkey" approach, meaning the facility is delivered ready for operation upon turning a key, allows the project company to avoid managing multiple separate contracts. It is widely used for projects requiring complex design and construction or high-value-added technologies (Kim Jae-Hee, op. cit., p. 47).

57) After completing detailed design, the contractor procures various materials and equipment, which must typically be certified by the owner or classification societies. Kwon Do-Joong, op. cit., p. 25.

58) "Front-End Engineering Design" assesses the overall technical and economic feasibility of the project, estimated costs, risks, and schedules for future project phases.

Floating Production Systems (FPS), including FPSO, FSO, FLNG, and FSRU, have become the preferred choice. As a result, most construction activities are performed onshore, minimizing offshore work to transport and installation only.

B. Installation and HUC

The installation and hook-up (HUC) of offshore plants (platforms) differ depending on their type, mainly divided into fixed platforms and floating production systems (FPS). For fixed platforms, the topside and jacket are separately transported to the offshore installation site, where the jacket is first installed on the seabed and secured by piling into the rock bed, followed by installing the topside. After installation, HUC operations complete the platform. Typically, fixed platforms involve the sequential installation of jackets, topsides, and gas pipelines, progressing through design and procurement, fabrication, transportation and installation, and hook-up and commissioning.

For FPS, the topside is integrated onto the hull at the shipyard, eliminating the need for extensive offshore hook-up operations. FPS units are often transported to deepwater installation sites using transportation barges or, in some cases, by self-propelled vessels.[60] For floating platforms, jack-up platforms, and some concrete fixed platforms, topside modules and substructures are assembled near the coast.[61] Floating offshore plants like FPS are anchored to the seabed using mooring lines. Flowlines are connected to tie the wells to the production facility. Before towing to the installation site, topsides and hulls undergo pre-commissioning onshore or nearshore to confirm readiness through the supply of utilities such as power, water, and steam.[62] Topsides, SURF,[63] and pipelines are sequentially designed, procured, fabricated, assembled, and installed offshore. SURF refers to the subsea systems that transfer and control fluids between the subsea

59) An Byung-Moo and Jung Woo-Song, op. cit., p. 221.

60) Modern transport vessels can accommodate FPS units weighing up to 120,000 tons, enabling Korean shipyards to enhance their competitiveness.

61) An Byung-Moo and Jung Woo-Song, op. cit., p. 218.

62) An Byung-Moo and Jung Woo-Song, op. cit., p. 222.

63) SURF refers to the subsea systems that transfer and control fluids between the subsea wells and the topside facilities.

wells and the topside facilities.

C. Commissioning and Delivery

Once fabrication and assembly are completed, offshore structures are towed to the installation site. After supplying reservoir fluids and other necessary utilities, test operations commence. Following successful trials and the issuance of completion documents, production commencement applications are submitted to the resource-owning government for approval.

The commissioning and delivery process includes pre-commissioning, commissioning, performance testing and optimization, and final handover. Pre-commissioning involves mechanical completion checks, pressure testing, and electrical testing. Commissioning ensures system integration and tests under operating conditions. Performance testing and optimization confirm compliance with contract requirements. Upon successful final inspection, the project developer or operator signs the official handover document.[64] Meanwhile, EPC contractors typically provide operational training and assume warranty obligations for approximately two years. Major standard contracts like the FIDIC Yellow Book and the NORWEGIAN TOTAL CONTRACT 2015 include provisions requiring defect notifications within specific periods after completion, obligations for remedial works, and liability for delayed repairs. To assert warranty claims, owners must notify defects or damages within the notification period, after which the contractor is responsible for necessary repairs.[65]

4. Operators

A. Green Field and Brown Field

When multinational oil companies invest in the ownership and operation of an oil block and jointly operate it, the oil major with the highest share is usually designated as the operator to lead the project, while other investors participate as license partners in

64) Ownership of offshore plants generally transfers to the project company upon final delivery. In cases where the contractor retains possession, ownership may transfer upon full payment, following conditional title retention agreements. If such an agreement exists, the contractor can claim ownership against third parties until payment is complete. Once payment is completed, ownership transfers automatically to the project company without further declaration (Kim Jae-Hee, op. cit., citing Supreme Court Decision 2009Da93671, Feb. 11, 2010).

65) FIDIC Yellow Book; NORWEGIAN TOTAL CONTRACT 2015.

major decision-making processes. The operator, based on exploration and production rights, manages the drilling rigs and production facilities. New investments following the methods introduced in previous sections are referred to as CAPEX, and the production fields developed through CAPEX and handed over after delivery are known as Green Fields. Fields under long-term production, typically after about 20 years of development, are referred to as Brown Fields. CAPEX (Capital Expenditure) covers the costs incurred until handover, while OPEX (Operational Expenditure) covers the costs during the operation and maintenance (O&M) phase thereafter.[66] In simple terms, operations based on CAPEX are Green Fields, and operations based on OPEX are Brown Fields. Green Field operators focus on building new offshore facilities in previously undeveloped environments, while Brown Field operators focus on optimizing and managing existing assets.

For Green Field operators, the initial capital investment (CAPEX) is significantly higher than the OPEX, as infrastructure must be built from scratch, and new equipment typically incurs lower maintenance costs. However, initial OPEX may still be incurred for tasks such as team formation and training.

In contrast, Brown Field operators, who operate on existing sites, focus on expansions, upgrades, or optimization projects rather than new construction. They often need to invest in removing outdated facilities and ensuring regulatory compliance, resulting in higher ongoing OPEX.

In practice, rights holders may establish separate entities by country or region, such as BP E&P Inc., or utilize affiliates within the BP Group. Alternatively, equity partners may jointly establish a third company to serve as the operator. During the production phase following the project life cycle, it is the operator—not the project development

66) CAPEX represents the initial investment costs required for the design, construction, and installation (the so-called “Project Cycle”) of offshore plants, including site acquisition, equipment purchases, installation, infrastructure development, and commissioning. In contrast, OPEX refers to the ongoing operating and maintenance costs incurred once the offshore plant enters its operational phase, representing the costs necessary throughout the offshore plant life cycle. These expenses cover workforce, energy, maintenance, inspections, and regulatory compliance. Although the division is not always clear-cut, generally speaking, project development companies rely on CAPEX until handover, while operators, who take over after delivery, use OPEX to manage operations.

company—who functions as the owner and possessor, and thus the responsibility for operational accidents lies with the operator.

B. Lease Operator

In addition to the traditional operators, there is also a lease-based operational model known as the "Lease Operator." Under this structure, an entity temporarily leases (or acquires) the exploration and production rights of an existing block from an oil major. This model is typically applied to smaller fields with daily production rates below 50,000 barrels or to early production efforts aimed at quickly bringing initial outputs online.

The lease operator obtains exploration rights from the oil major and owns facilities such as FPSOs in its name. During the lease term, the lease operator leases the facilities back to the original rights holder while providing operational services.[67] Under this model, the oil company retains ownership of the produced oil, while the lease operator (acting as the lessor) receives installment payments over the lease term to recover initial FPSO construction costs along with service fees. Given the temporary nature of production in this model, oil companies generally prefer mobile production systems such as FPSOs, MOPUs (Mobile Offshore Production Units), SPARs, or TLPs, rather than fixed platforms that are difficult to relocate. Globally recognized lease operators include MODEC, SBM Offshore, and Bumi Armada.[68]

Different models exist within lease operations. In another common type, the oil major procures and owns the FPSO directly through a project development company but outsources only operational management services to a third-party service provider. The key differences between the two models lie in who places the EPC order and who holds ownership of the offshore facilities.[69] In

67) In international practice, terms like "LEASE" (akin to lease contracts) and "CHARTER" (similar to charter party agreements) are often used interchangeably. However, the key distinction typically lies in which party deploys more operational personnel to the project.

68) "Bumi Armada secures FPSO contract extension in Nigeria," Offshore Energy, Feb. 2014. Accessed Sept. 30, 2024. For example, in the marginal OYO Field in Nigeria, the rights holder and FPSO owner Oceanic entered into an O&M contract with Bumi Armada and a charter agreement with its affiliate Armada Oyo Ltd.

69) Facilities ordered directly by oil companies are typically built to higher specifications, longer service lives, and stricter standards because they are intended for multiple global fields, making them more costly and technically demanding. In contrast, lease operators often aim to minimize construction costs by lowering quality

Korean literature, these different models are often collectively referred to as "operational management companies." However, due to the significant differences in ownership and contractual responsibilities, this paper distinguishes between "lease operators" and "O&M service companies." For example, in Korea's Donghae gas field, the Korea National Oil Corporation (KNOC), acting as the rights holder, directly procured and owns the production facilities while outsourcing operational services to a third party, thus resembling an O&M service model rather than a lease operation model. In such cases, the operator functions similarly to a ship management company, as will be discussed further below.[70]

5. Service Providers

A. Stakeholders in Drilling Rigs

(1) Drilling Rig Owner

Operators seeking to conduct drilling must procure drilling rigs and enter into drilling contracts with the owners of these facilities. Under a drilling contract, the owner operates their facility according to the operator's instructions, supplies necessary personnel, and may lease the facility to the operator, receiving payment as agreed under the contract type. Typically, owners operate under the supervision and direction of the operator during drilling operations. In some cases, rigs are owned by multiple investors or service companies affiliated with a corporate group, who contract separately with the operator. Thus, rig owners both own and actively support drilling operations, unlike FPSOs where operators typically own the facility. In offshore drilling, exploration rights holders rarely own the drilling rigs themselves but instead contract with specialized service companies owning the rigs.

When petroleum exploration companies begin exploratory drilling, numerous subcontractors provide services such as geological surveys and exploration drilling. Industry associations such as the International Association of Drilling Contractors (IADC), the International Association of Geophysical Contractors (IAGC), the International Association of Oil & Gas Producers (IOGP), and LOGIC (a subsidiary of Offshore Energies UK) provide standardized contracts and in-

requirements since their facilities have shorter service lives and a higher proportion of debt financing.

70) In such cases, the operator functions similarly to a ship management company.

dustry resources.[71)]

Standard drilling contracts typically regulate limited warranties and representations, services and payments, breach and remedies, risk allocation and indemnity, governing law, and dispute resolution mechanisms. Key stakeholders in drilling operations include rig owners (Contractors), operators (also called E&P companies such as Exxon Mobil, Shell, and BP), oilfield service companies, and occasionally OEM suppliers of drilling equipment. Three major types of drilling contracts are used: (1) Daywork Contract: Payment based on daily operation. (2) Footage Contract: Payment based on drilling depth (usually per foot). (3) Turnkey Contract: A lump-sum payment upon reaching a target depth, with the contractor bearing full responsibility for drilling. Daywork and Turnkey contracts are most commonly used, with incentive bonuses sometimes provided for meeting targets.[72)]

Charterers of drilling rigs are typically IOCs or NOCs who utilize geological data to locate drilling points. Since it is rare for operators to own drilling rigs directly, they contract with rig-owning companies to conduct drilling operations. Liability to third parties arising from drilling activities is determined by the drilling contract terms.

Subsequently, the operator designs the oil field, including the drilling method and the installation of necessary structures and pipelines, ultimately establishing the life cycle plan of the offshore plant. After installation, the operator manages the entire drilling project and, depending on the contractual framework, may also market the produced oil.

(2) Oilfield Service Company

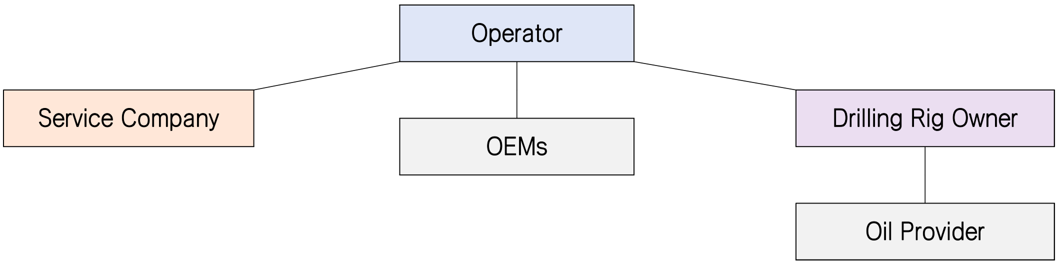
Oilfield service companies primarily enter into contracts with operators to perform specific tasks as instructed. Unlike FPSO operation and management companies, oilfield service companies specialize in narrowly defined services and enter into short-term contracts for individual tasks as needed, rather than maintaining long-term or continuous engagements. Such services can include fluid management, cementing, wireline operations, maintenance work, and mud logging.

Notable examples include Halliburton, which was responsible for cementing oper-

71) “Who’s Who in the Drilling Business,” IADC. Accessed Oct. 1, 2024, https:// drillingmatters.org/whos-who-in-the-drilling-business/

72) Jeong Young-cheol. International Transaction Law: Energy. Seoul: Pakyoungsa, 2012, p. 524.

ations on the Deepwater Horizon, and Schlumberger, one of the world's largest multinational service companies specializing not only in drilling services but also in production management.



<Figure 10> Contractual relationships between Drilling Rig Stakeholders

B. Production Platform Operators

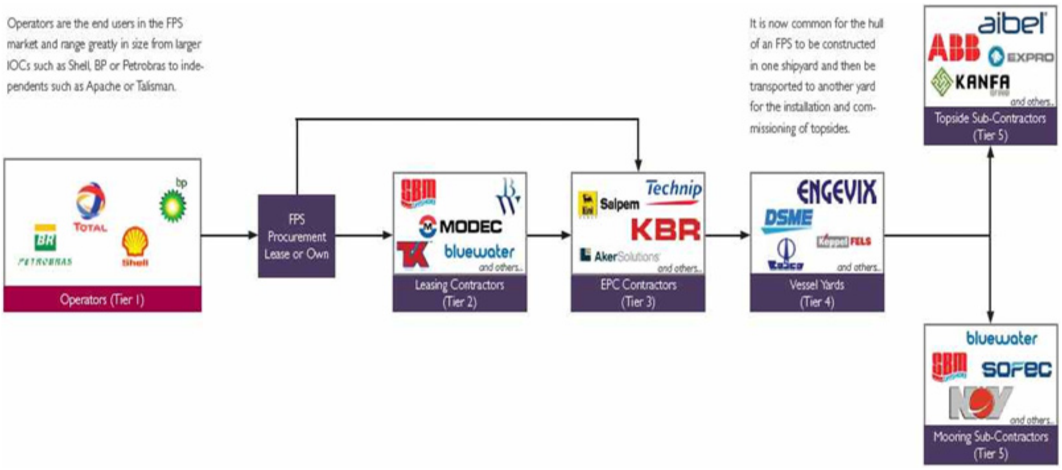
(1) Lease & O&M Model

Generally, the resource holder places an order for an FPS(Floating Production System)[73] through a project company and takes delivery from a shipyard, operating the facility directly. However, for fields with relatively small production volumes, a lease operator model is often used. In Chapter 3, to distinguish between resource holders directly operating facilities and those leasing them out, the term "Lease Operator" was introduced.

Under the Lease & Operate model, the lease operator owns FPSOs or similar units and leases them to oil majors or other resource holders while simultaneously being responsible for the operation and maintenance of these facilities.[74] In this arrangement, the lease operator leases the mining rights from the original resource holder for a specific period. While the production during the lease term is attributed to the resource holder, the lease operator is repaid for the FPSO construction costs in installments throughout the lease period and also receives a fee for providing operation and maintenance services. After the lease term ends, the FPSO is returned to the original resource holder.[75]

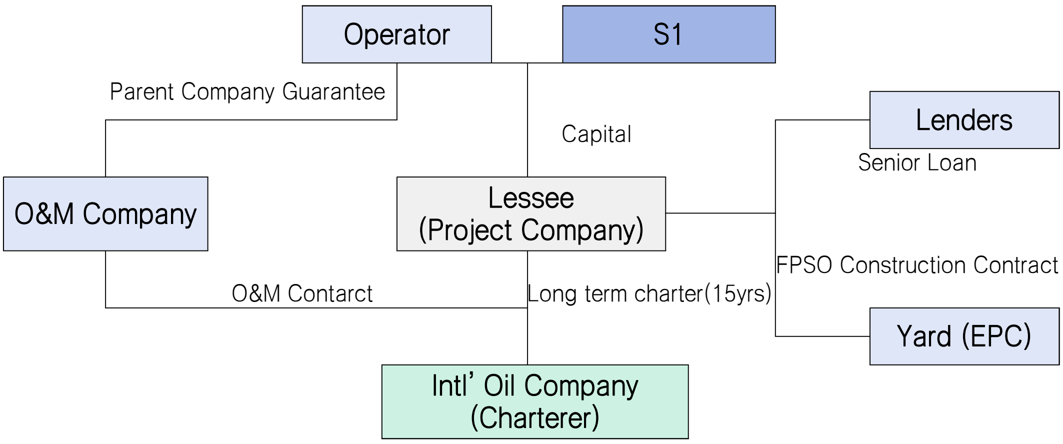
73) FPS(Floating Production System) is a term that encompasses floating production facilities such as FPSOs and FSRUs. In the case of the Donghae gas field ("Daewang Whale") located offshore Korea, FPS is expected to be used due to the field's deepwater location.

74) Strictly speaking, two separate agreements— a lease contract and an operation and maintenance (O&M) contract— are entered into between the lease operator and the resource holder. However, these agreements are often combined into a single integrated contract.



<Figure 11> FPS Supply Chain

As previously noted, it is possible for the lease and operation management contracts to be concluded separately. However, in many cases, they are integrated into a single charter contract, necessitating careful legal analysis regarding the nature of such agreements. Nonetheless, it should be emphasized that offshore plants are not inherently designed for transportation, and thus direct analogies to ship charter party agreements must be approached cautiously.[76)]



<Figure 12> FPSO Financing Structure Example

75) This Lease & O&M model is often referred to as the “lease contractor” structure in industry reports, such as in the Offshore Business Special Edition published by the Korea Maritime Institute, December 3, 2012, p. 5.

76) The diagram below, adapted from Jang Seho, “Offshore Finance and the Role of Korea Development Bank,” KDB Presentation Materials, 2022, p.10, illustrates the Lease & O&M model.

The above diagram presents a representative example of the Lease & O&M model, where an FPSO operating company (which, in the context of this thesis, refers specifically to the lease operator—thus care must be taken not to confuse the two) establishes a project company to own the FPSO. While effectively owning the FPSO, the lease operator then enters into a long-term charter with an oil major or original resource holder and simultaneously executes an operation and maintenance (O&M) contract either directly or through an affiliated operating company.

Under this structure, the fixed portion of the charter fee is typically allocated toward repaying the project's debt, while the variable portion is used to cover the lease operator's operating costs. The overall charter fee is determined based on the availability of the FPSO.

Meanwhile, lenders conduct due diligence before providing financing, taking into account economic risks, the creditworthiness of the charterer, political risks, and the regulatory environment of the relevant region.[77]

(2) Own and Operate Model

In addition to the Lease & Operate model primarily used for marginal fields, there exists a general model where the original resource holder, such as an oil major, directly places an order for production facilities with EPC contractors, retains ownership, and handles operations.[78] Even in this direct ownership model, it is common for the resource holder to outsource specialized operation and maintenance tasks to a professional "O&M company." This approach can also be applied to marginal fields. For example, in the case of the Donghae Gas Field, KNOC (Korea National Oil Corporation) established a project company, placed an order for production facilities with an EPC contractor, took delivery, and directly owns and operates the production facilities while maintaining mining rights. However, to ensure more professional operation, KNOC entered into an O&M con-

77) Ibid, p. 10.

78) Moreover, prominent lease operators in the industry, such as MODEC and SBM, possess robust engineering capabilities, enabling them to independently order the construction or conversion of offshore plants and undertake turnkey EPC contracts. Consequently, due to competition with these technologically advanced lease operators, it has become increasingly difficult for traditional EPC contractors to enter and compete in the market. (Oaklands Path, "The FPSO Industry and Top-Tier Lessor and Operator-Yinson," last accessed November 26, 2024, https://www.oaklandspath.com/the-fpso-industry-and-top-tier-lessor-and-operator-yinson.)

tract with an experienced service company.

For the sake of convenience in this discussion, under "(1) Lease & O&M," the lease contractor (Lease Contractor) will be referred to as the "Lease Operator," and the original resource holder (Operator) will simply be referred to as the "Operator." Under "(2) Direct Ownership and Operation Model," the professional company providing operation services to the resource holder will be referred to as the "O&M Company," while the original resource holder receiving the services will continue to be referred to as the "Operator."

Unlike the Lease & O&M structure, in the direct ownership and operation model, the original resource holder finances the offshore plant through project financing, owning and operating the facilities, selling the production output directly to purchasers, and using the proceeds to repay debts.

When the resource holder owns and operates the production facilities, all rights and obligations related to the offshore plant are exercised by the operator, except for parts specifically outsourced to the O&M company. In such cases, the contract between the operator and the O&M company typically takes the nature of either a contract for work or a mandate (agency agreement), meaning that the O&M company acts as a trustee and agent, performing legal acts on behalf of and at the expense and responsibility of the operator.[79)]

C. Offshore Support Vessel

Offshore Support Vessels (hereinafter referred to as "Support Vessels") are vessels that, in essence, share the fate of offshore plants.[80)] They play a critical role particularly during the installation stage described earlier, and during the production phase, they provide essential support services related to workforce logistics. Support Vessels are deployed in "support operations," meaning transportation, installation, and decommissioning activities essential to offshore plant operations at each stage of the life cycle. For example, during installation and decommissioning phases, they tow floating or semi-submersible platforms to the designated offshore sites (Semi-submersible heavy transport vessels), assist in mooring drilling ships

79) Kim Jaehee. Ibid, p. 102.

80) Korea Maritime Institute. Offshore Business, Vol. 18, 2015, p. 5.

to their targeted locations using anchors (Anchor handling tugs)[81]and help install cables (Cable Trenchers).[82] In addition to vessels that transport crew, there are also Accommodation & Support Vessels, which allow offshore personnel to live and rest. These specialized Support Vessels (often referred to as Crew Vessels) have become increasingly diversified. Recently, the market for Multi-Purpose Support Vessels capable of performing various functions beyond a single dedicated purpose has also expanded.[83]

<Figure 13> OSVs required at each stage of Offshore Lifecycle[84]

Operating Offshore Support Vessels (OSVs) requires highly specialized knowledge and technical skills. While simple transport activities, such as delivering water, fuel,

81) In the case of offshore drilling rigs, while some are equipped with dynamic positioning systems (DPS) that allow them to maintain their position without the need for anchors, the growing installation of floating offshore wind turbines has significantly increased the demand for anchor handling tug supply vessels. According to FORTUNE BUSINESS INSIGHTS, “Offshore Support Vessel Market Size, Share & COVID-19 Impact Analysis, by Vessel Type (Anchor Handling Tug Supply Vessel, Platform Supply Vessel, Crew Vessel, and Others), by Water Depth (Shallow Water, Deepwater, and Ultra-Deepwater), by Application (Oil & Gas, Offshore Wind, Patrol, Research & Survey, etc.), and Regional Forecasts (2023–2030),” 2024. (last accessed: October 1, 2024).
<https://www.fortunebusinessinsights. com/ ko/industry-reports/offshore-support-vessels-market-100147>

82) The multinational offshore support vessel operator Boskalis provides detailed specifications for a total of 14 types of support vessels on its website. (Last accessed: October 1, 2024) <https: //boskalis.com/ about-us/ fleet-and-equipment/ offshore-vessels>

83) Kim Jaehee. op. cit., p. 117.

84) Korea Maritime Institute, Offshore Business, 2015, p. 6. The definitions of the abbreviations are as follows: Seismic Vessel – Geological survey vessel; Diving Support Vessel (DSV) – Diving support vessel; Platform Supply Vessel (PSV) – Platform supply vessel; Well Intervention Vessel – A vessel that performs direct operations to enhance productivity or improve safety at oil wells; Utility Vessel – A vessel that performs a variety of comprehensive support tasks, similar to a multi-purpose support vessel.

and provisions necessary for offshore plant operations, follow a contractual structure similar to that of maritime transportation agreements, support operations such as towing offshore plants generally differ from traditional cargo transport contracts. Instead, they are typically governed by time charter agreements, under which the charter hire is paid upfront.

Given the significant financial burden associated with directly owning specialized support vessels, offshore plant owners commonly opt to charter appropriate vessels as needed under time charters, minimizing financial strain. Additionally, if an Operation and Management (O&M) Company exists, and the O&M contract includes chartering support vessels within its scope of work, the chartering party would be the O&M company.[85)] Starting with the offshore service vessel time charter party published by BIMCO (Baltic and International Maritime Council) in 1975, the "SUPPLYTIME" contract, revised in 2005, has become the internationally accepted standard for time chartering offshore service vessels. Given the increasing variety of support vessel types, appropriately modified versions of the standard contract are often used depending on the intended use of the chartered vessel.[86)]

However, in practice, it is generally reported that international standard charter forms are not widely used in Korea; instead, short-term service contracts, often renewable annually, are the norm.[87)] This phenomenon appears to stem from the fact that, aside from the Donghae-1 and Donghae-2 gas fields, there have been virtually no cases of

85) For example, during the development of the Donghae-1 Gas Field, Korea National Oil Corporation (KNOC) and its subsidiaries, acting as the O&M company, provided comprehensive management services, including the chartering, maintenance, and operation of offshore support vessels. Lee Chang-hee and Jin Ho-hyun, op. cit., p. 150.

86) Depending on the type of charter—time charter, bareboat charter, or voyage charter—different standard forms are used. For instance, BARECON (Standard Bareboat Charter) is typically used for bareboat charters; TOWHIRE (International Ocean Towage Agreement) is employed for time charters of towing vessels; and HEAVYCON (Standard Transportation Contract for Heavy and Voluminous Cargoes) is used for voyage charters related to heavy cargo transportation. Kim Jaehee, op. cit., pp. 125-126.

87) For example, during the development of the Donghae-1 Gas Field, Korea National Oil Corporation (KNOC) entered into service contracts for offshore support vessels, deploying them to the oil field to perform standby operations, transport supplies, and protect production facilities for specified periods. Lee Chang Hee and Kim Jin Kwon, "A Study on the 2005 Offshore Plant Support Vessel Time Charter Party," Journal of Navigation and Port Research, vol. 38, no. 1, 2014, p. 82.

commercial offshore oil and gas field development in Korea, resulting in a relatively small offshore plant support sector. However, considering the current trend of exponential growth in offshore renewable energy projects, such as offshore wind farms, it is expected that the demand for offshore support vessels will significantly increase.[88)]

Consequently, the number of domestic companies owning and operating floating offshore wind structures is expected to increase, and it is anticipated that the use of internationally recognized standard charter forms for offshore support vessels will become more common.

6. OEM

Original Equipment Manufacturers ("OEMs") refer to companies that design and produce specific equipment or components necessary for drilling and production operations on offshore plants. They supply parts that meet industry standards to offshore plant operators or drilling rig operators.

OEMs are responsible for designing and manufacturing specialized equipment and sometimes customize products to meet the requirements of specific offshore projects. They must comply with international standards such as those set by ISO (International Organization for Standardization) and local regulations related to offshore operations, such as API (American Petroleum Institute) standards. In addition, they provide spare parts, maintenance support, and technical assistance to ensure the proper use of their equipment by offshore plant operators.

Common categories of OEM equipment used in offshore plants include: (i) Rotating equipment such as compressors, turbines, and pumps; (ii) Drilling equipment such as BOPs (Blowout Preventers), drill bits, and mud pumps; (iii) Subsea systems; and (iv) Electrical systems. Notable companies in the industry include Siemens Energy, which produces rotating equipment; General Electric Oil & Gas, specializing in subsea systems; Baker Hughes, a producer of hydraulic systems; and Cameron, well-known for manufacturing BOPs. Although a wide variety of OEMs exist, BOP manufacturers are particularly relevant when discussing liability for accidents occurring during offshore plant op-

88) KDB Future Strategy Research Institute (Joonhwan Jung, Research Fellow), "Trends in Offshore Wind Power Generation," 2024, p. 36.

erations, such as the Deepwater Horizon incident.

Ⅳ. Insurers and Risk Management

1. All risk Insurance

A. Definition and Backgrounds

An offshore energy all-risk insurance policy refers to insurance that comprehensively covers the risks borne by the insured during the operational phase of the offshore plant lifecycle, in connection with offshore energy exploration, drilling, production, storage, and transportation, under a single insurance certificate.[89] The scope of covered risks is categorized into property damage, operator extra expense, business interruption, offshore construction risks, and third-party liability risks, with the insured risks and excluded risks clearly defined for each category. The legal nature of offshore energy all-risk insurance has not yet been clearly established; however, it generally refers to insurance that indemnifies the insured for the loss of exchange value in the insured's entire property caused by a fortuitous accident as stipulated in the insurance contract.[90]

When examining offshore plant operation and maintenance contracts or drilling contracts, it is evident that offshore plant operators invariably bear responsibility for the management and supervision of all or part of the contractual object. The specific allocation of risks associated with the tasks performed by drilling service contractors is determined according to the provisions of the drilling contract, and this allocation affects the nature and extent of the risks. Accordingly, each party must procure insurance to cover its respective risks. In fact, coastal states often stipulate insurance obligations covering all operations at the site as part of the terms and conditions when granting resource development rights or executing concession contracts. For example, under the U.S. Oil Pollution Act of 1990, companies engaged in offshore oil and gas development in the Gulf of Mexico are required to either submit proof

89) Lee Chang-Hee & Hong Sung-Hwa, "A Study on the Some Considerations of the Offshore Oil&Gas Package Insurance Policy," Maritime Law Review, Vol. 29, No. 2, Korea Maritime Law Association, 2017, p. 85.

90) Park Se-min, "A Study of Insurable Interests and Legal Issues of All Risk Cover among Package Insurance contract", Business Law Review, Vol. 35, No. 1, Korean Corporate Law Association, 2021, p. 202.

of financial responsibility capable of covering the costs of oil spill removal, residual clean-up, and compensation for damaged property, or submit documents proving they have obtained sufficient insurance coverage for these risks. Standard contracts such as the IADC model drilling contracts similarly require both drilling rig owners and operators to maintain appropriate insurance coverage for their respective risks.

B. Standard Insurance Policies

Among offshore energy comprehensive insurance terms, the first part of the standard All-risk Insurance Policy concerning physical damage includes general conditions followed sequentially by individual standard clauses applicable to each type of facility. The types applicable to each facility are broadly outlined in the table below.

Meanwhile, each individual standard clause is designed with sufficient independence to function as a stand-alone policy, meaning that they can operate as independent insurance contracts. Therefore, a more detailed examination of each of these policies will be necessary in future studies.

Currently, in practice, the London Standard Platform Form among below standardized policies is most commonly applied to production facilities.[91]

Property Insured	Standard Policy
Production Units	London Standard Platform Form
Offshore Rigs	London Standard Drilling Barge Form
Mobile Offshore Drilling Unit	London Market Offshore Mobile Unit Form
Pipelines	London Standard Pipeline Form

<Figure 14> Standard Policies classified by Insured Properties

The London Standard Platform Form (hereinafter referred to as "LSPF"), first developed in 1972, has been widely recognized in the field of marine insurance for providing a comprehensive insurance framework covering various risks associated with offshore plants. In particular, due to the high-risk nature of offshore plant operations, and given that offshore plants often do not qualify as vessels and thus are not protected under conventional maritime laws, it is necessary to provide insurance coverage for maritime risks similar to those applicable to vessels. In 2009, the LSPF expanded its coverage to include various types of floating production fa-

91) London Standard Platform Form-March 1, 1972 and London Standard Platform Form-JR 2009/003(amended).

cilities such as FPSOs, FSOs, FSRUs, and FLNGs, and incorporated specialized risk factors tailored to offshore plant operations. It also covers agreed risks related to fixed platforms and subsea facilities such as catwalks and connecting passageways (excluding subsurface facilities like dolphins) and pipelines. The LSPF remains the most widely used and reputable insurance clause for production offshore plants to this day. Since the LSPF maintains the nature of all-risk insurance, it covers accidents with the element of fortuity unless specifically excluded under the policy terms.[92)]

C. Liability Insurance Policy

From the perspective of offshore plant operators, they are inevitably exposed to the unfamiliar laws and regulations of coastal states or neighboring countries. Consequently, when they face third-party claims for damages, fines, or punitive damages, they often find themselves in a highly vulnerable position. Legal liability risk, therefore, is one of the most critical factors in the offshore energy sector. This is particularly true for multinational companies engaged in upstream offshore energy development projects around the world, where operating across various jurisdictions significantly increases exposure to such risks.

In the case of insurance products with the nature of liability insurance, they have traditionally been provided as part of comprehensive insurance policies rather than as stand-alone policies. However, in 1991, the London Market Excess Liability Claims Made Policy (hereinafter referred to as "LSW 244") was developed to cover liabilities not insured under traditional comprehensive insurance policies as well as damages exceeding existing coverage limits. Since then, LSW 244 has been revised several times and has now become the standard liability insurance policy for covering legal risks associated with oil production operations. In 2003, JLC[93)] once released a wording titled London Claims Made Wording (JL 2003/007).

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92) According to London Standard Platform Form, "Property Insured Hereunder" means "*platforms(s), catwlks, and landing ramp (but excluding dolphins) and all property as scheduled herein, owned by or in the care, custody or control of the Assured located on the said Platform Installations(s) except as herinafter excluded*"

93) The "London Market Joint Liability Committee" is a committee that establishes and coordinates policies related to liability among insurers. In high-risk industries such as the offshore plant sector, the committee works to standardize insurance terms, provide risk assessment guidelines, and coordinate claims handling.

Nevertheless, in the energy industry, the LSW 244 form continued to be widely used. Subsequently, in the United States, a form known as LPO 418(B) was developed, functioning as a tailor-made liability insurance wording specifically for the oil and gas sector. Unlike LSW 244, which is a "claims made policy" covering only claims made during the policy period, LPO 418(B) is an "occurrence policy" that covers incidents that occurred during the policy period even if claims are filed after the termination of the insurance contract. This feature makes LPO 418(B) a relatively exceptional case even within the energy industry. In addition, the LSW 245 wording was specifically created for the oil and gas industry, adding seven additional exclusions. If the LSW 244 form is used to cover energy-related risks, it must include the provisions of LSW 245. Furthermore, when applied as part of a comprehensive insurance package, it is typically incorporated into Section 5, which deals with third-party liability risks.[94)]

The LSW 244 is divided into four main parts: insurance contract clauses, conditions, specific exclusions, and definitions. The definitions section specifies the types of damages covered and circumstances excluded from coverage. It stipulates that regardless of where the insured operates globally, liabilities imposed on the insured by law, liabilities arising from indemnity (exculpatory) clauses in contracts, and the insured's liabilities toward third parties for bodily injury, personal injury, property damage, and advertising-related defamation are all within the scope of coverage. The insured's affiliates—entities owned or controlled by the insured—as well as liabilities towards officers, partners, employees, and shareholders are also included in the coverage. Furthermore, operators, owners, their officers, partners, and other parties who could potentially bear liability arising from offshore plant accidents are all entitled to insured interests within the scope and limits of the insurance coverage.

2. Extra Expense Insurance

A. Definition and Background

As observed during the Deepwater Horizon incident, well stability is a critically important factor in offshore plant operations, and well blowouts are among the most com-

94) David Sharp, op. cit., p. 453.

mon causes of offshore accidents. “Well control” refers to preventive measures—including the use of blowout preventers (BOPs)—to prevent the unexpected influx of fluids into the well. Well control risks, including damages to the well, losses arising during well control operations, and blowout incidents, are excluded from coverage under the general all-risk clauses in offshore comprehensive insurance policies. Therefore, operators must either secure separate insurance or extend coverage through additional policies such as the Operator’s Extra Expense (OEE) insurance. Well control insurance, which specifically covers risks related to well instability, incident response costs, and well control expenses, has become an attractive means for oil companies to transfer potential liabilities to insurers. In 1978, the London market introduced both the London All-Risks Material Damage Clauses and the Operator’s Extra Expense (OEE) insurance, with the latter exclusively covering well control-related risks. However, during the claims handling process, the necessity for clear and precise definitions within the OEE (Operator’s Extra Expense) insurance clauses—particularly regarding when a well is deemed to be in an uncontrollable state—has been increasingly recognized.[95] In 1985, the London Rig Association introduced the EED9/85 form to the market, and one year later, the revised EED8/86 form was released.[96] The EED forms clarified the definitions regarding when a well is considered out of control and when it is under control, leading to a somewhat stricter interpretation of coverage compared to the previous OEE policies. Subsequently, the London Rig Association released the LSW 614A form in 1994, which further enhanced clarity and is sometimes referred to as the EED7/94 form. However, due to criticism that the EED7/94 form was excessively strict and left little room for flexible inter-

95) This issue was directly connected to whether the incident fell within the coverage of the insurance policy. Specifically, the OEE clause contained a definition of “blowout,” but this was intended only to trigger redrilling coverage and was not an essential requirement for insurance compensation. Although both the insured risks of “loss of well control” and “blowout” shared the common element of the continuous and uncontrollable influx of fluids, a loss of well control could still occur without an actual blowout. Therefore, disputes arose between insurers and insureds regarding the scope of coverage. For instance, even in cases where a loss of well control—such as a kick—occurred without a blowout and damage was sustained, insurers often refused to pay, arguing that such incidents were outside the originally intended coverage. David Sharp, op. cit., pp. 125-127.

96) EED refers to “Energy Exploration and Development.” David Sharp, op. cit., p. 126.

pretation, its popularity quickly declined, and it is no longer widely used.

B. Well out of control

The insurer first covers the costs incurred by the insured to control the well or to extinguish a fire after the well has entered a state of being "out of control." Ultimately, the prerequisite for indemnity is that the well must have entered into an "out of control" state as defined by the insurance policy. Furthermore, the policy defines the scope of coverage as the costs incurred to return an out-of-control well to a "well under control" state. The original wording of the coverage provision in the policy is as follows. Meanwhile, damages arising from damage to drilling equipment, production equipment, and wells themselves are excluded from the scope of coverage. In addition, the insurer does not cover losses resulting from delays following well damage (such as production delays or shutdowns) or from defects such as reservoir pressure loss.

expenditures recoverable hereunder shall include costs of materials and supplies required, the services of individuals or firms specializing in controlling wells, and directional drilling and similar operations necessary to bring the well(s) under control, including cost and expenses incurred at the direction of regulatory authorities to bring the well(s) under control, and other expenses included within Clause 1 of this Secion A.[97]

C. Re-drilling

The trigger condition for re-drilling coverage is that after the well is brought under control, the costs incurred to re-drill the well back down to the depth where the loss of control occurred are eligible for compensation. Furthermore, through defenses raised by the insurer, whether the well was re-drilled using the most prudent and economical method becomes a key issue in determining the insurance payout, and time limitations for re-drilling and restoration also apply. The specific wording of the relevant clause is as follows. Similarly, under the re-drilling coverage, damages arising from the drilling equipment itself being damaged, delays in drilling, or production interruptions caused by accidents are excluded from coverage.

reimburse the Assured for actual costs and/ or expenses reasonably incurred to restore or redrill a well insured hereunder, or

97) "other expenses included within Clause 1 of this Secion A" refers to the cost spent on extinguishing of fire.

any part thereof, which has been lost or otherwise damaged as a result of an occurrence giving rise to a cliam which would be recoverable under Section A of this policy if the Assured's retention is applicable to Section A.

D. Seepage and pollution[98)]

In pollution and spill coverage, two main areas are protected: (i) the costs incurred in removing or attempting to remove pollutants, and (ii) legal and litigation costs associated with pollution. The primary advantage of this coverage lies in the fact that the triggering event is the occurrence of pollution itself, not the establishment of legal liability for pollution. Thus, under this clause, the operator as the insured party is compensated for pollution removal costs, regardless of the allocation of liability.[99)] Additionally, considering that accidents such as well blowouts occur abruptly and without warning, the insurer includes immediate expenses such as the relief well in the insurance coverage once notification of the accident is received. To claim insurance coverage under this coverage, three main conditions must be satisfied: First, the spill or pollution must occur during the insurance policy period; Second, the pollution must be promptly reported to the insurer as required by the policy terms; Third, the incident must fall within the coverage scope of the "well out of control" endorsement, which compensates for costs incurred in bringing an uncontrolled well back under control or extinguishing a well fire, thereby triggering coverage for pollution-related expenses. Moreover, insured parties covered under this endorsement are not limited to the company itself but also include responsible officers, shareholders, and workers within the scope of their business activities. Thus, individuals performing work can also be protected against third-party claims.

On the other hand, the endorsement excludes from coverage any claims for third-party bodily injury, property damage, environmental remediation costs, or clean-up costs. Furthermore, it excludes claims arising directly or indirectly from intentional acts of the insured or from the insured's non-compliance with government guidelines, regulations, or applicable laws. However, if such non-compliance was actively being remedied at

98) The complete expression is "Seepage and Pollution, Clean-up and Contamination."

99) David Sharp, op. cit., p. 134.

the time of the incident, this exclusion would not apply.

3. Risk-Pooling and Other Financial Instruments

A. Backgrounds

Moreover, in addition to obtaining insurance coverage, most offshore plant operators or owners voluntarily participate in risk pooling agreements among themselves. This concept contrasts with commercial insurance, where insurance companies underwrite risks in exchange for premiums. Risk pooling functions as a mutual insurance system or a joint risk management fund among members, providing security against the insolvency of fellow participants. Under this arrangement, members are obligated to share critical accident and risk information and to act in good faith. Such member obligations are codified in instruments such as the 1906 Marine Insurance Act and the 2005 Insurance Act of the United Kingdom. In the United States, the Oil Pollution Act (OPA) similarly mandates the establishment of risk pooling systems for offshore plant operators. In Korea, unlike in foreign jurisdictions, there are no equivalent public financial guarantee mechanisms in place. As a result, the practical ability of victims to recover damages heavily depends on the financial solvency of individual offshore operators.[100]

B. OPOL[101]

The Offshore Pollution Liability Association Limited (hereinafter referred to as "OPOL Association") is a UK-based limited liability company and petroleum industry organization, established to comply with various international liability conventions, including the MARPOL Convention, and to uphold the Offshore Pollution Liability Agreement (hereinafter referred to as "OPOL"), a voluntary agreement among offshore plant operators. OPOL, known as the Offshore Pollution Liability Agreement, originated as a contractual arrangement among offshore plant operators in the United Kingdom and officially came into effect on May 1, 1975, as an agreement among all offshore operators around the UK coast. It holds significance as the first private-sector voluntary compensation scheme

100) Yoon Hyo-young,"Present Condition and Proposals on Liability and Compensation Regimes for Pollution Damage Resulting from Offshore Plant", Kangwon Law, Vol. 49, 2016, p. 590.

101) Offshore Pollution Liability Association Limited, <http://www.opol.or.uk/index.htm>.

regulating liability for oil pollution damage caused by offshore plants in the UK and the North Sea region. Although initially designed as a temporary measure pending the entry into force of an international offshore civil liability convention, OPOL remained the only operative agreement for oil pollution damage from offshore plants after the international convention failed to be ratified.

The stakeholders who are members of OPOL are offshore plant operators. A notable feature of OPOL is that the "offshore facilities" subject to its application include all structures used for the exploration, production, storage, transportation, and distribution of oil from the seabed or subsoil, including pipelines. Once a facility falls within the scope of application, it remains covered even if temporarily removed from the worksite. Moreover, facilities for natural gas drilling are also subject to the agreement, provided that drilling operations are underway or that oil and gas are in the production process.[102)][103)]

C. OIL and OCIL

Oil Insurance Ltd. ("OIL") and Oil Casualty Insurance Ltd. ("OCIL") are both privately established mutual insurance systems, created by a group of energy companies that share similar risk profiles. These companies sought to address the instability associated with relying solely on commercial insurance and reinsurance to cover potential losses.[104)] OIL

102) Membership in the OPOL Agreement is restricted to offshore plant operators, and the OPOL Association—the enforcement body of the agreement—was initially composed primarily of British oil companies at the time of its establishment. Hyo-Young Yoon, ioop. cit., p. 593.

103) Meanwhile, examining the international normative force of OPOL, it holds very limited effect as an international framework, being recognized in only ten countries, including the United Kingdom and several EU coastal states. However, among them, only the United Kingdom and Greenland have made OPOL membership mandatory through domestic legislation. In the United Kingdom, obtaining a license to operate offshore facilities requires mandatory OPOL membership, and the operator's strict liability, limitation of liability, and compulsory insurance under OPOL are fully recognized. Therefore, if English law applies as the governing law for accident handling, pollution victims will first seek compensation under OPOL. If their damages fall outside the scope of OPOL coverage or if OPOL compensation proves insufficient, they may pursue additional remedies under the Environmental Damage (Prevention and Remediation) Regulations 2009.

104) Although there are indeed some differences in nature compared to traditional mutual insurance associations like P&I Clubs in marine insurance, Oil Insurance Limited (OIL) and Offshore Captive Insurance Limited (OCIL) can both be characterized as having a mutual insurance nature. This is because their member companies jointly fund and manage large-scale risks, distinguishing them from purely commercial insurance. Under Korean law, mutual insurance must be operated by a mutual company duly licensed by the Financial

was established in 1972 through an agreement among 16 energy companies, in response to two major oil pollution incidents that occurred in the 1960s. Similarly, OCIL was jointly founded by energy companies in 1986. The fundamental purpose behind the creation of both organizations was to provide compensation for damages arising from environmental pollution incidents, particularly for losses exceeding the coverage limits of conventional insurance policies. As of 2022, OIL and OCIL have rebranded themselves as “Everen” and “Everen Specialty,” respectively. The name “Everen,” combining “ever” and “energy,” was chosen to reflect the rapidly evolving nature of the energy industry while emphasizing the two groups’ enduring commitment to their member companies.[105)]

OIL is a traditional mutual insurance association established in 1972 by 16 energy companies with the aim of responding to two major offshore plant incidents that occurred in the 1960s. OIL operates for the benefit of stakeholders engaged in the energy sector, providing coverage for property damage, well control expenses, and third-party liability arising from energy operations. The third-party liabilities covered by OIL include tortious or contractual liabilities for personal injury and property damage resulting from pollution incidents, and punitive damages are also included within the scope of coverage. The compensation limit is set at USD 300 million, with a minimum deductible of USD 10 million.[106)]

OCIL was established in 1986 as an insurance provider by companies in the energy sector—primarily existing members of OIL—aiming to reduce reliance on the volatile commercial insurance market, which at the time was unable to provide adequate coverage. OCIL offers coverage for losses exceeding directors and officers (D&O) liability and general liability insurance (excess

Services Commission under the Insurance Business Act. However, as the distinction between commercial and mutual insurance has increasingly blurred, Korean courts have, in certain cases, applied Article 664 of the Commercial Act concerning mutual insurance by analogy, recognizing the similarity of certain cooperative insurance operations to mutual insurance (Supreme Court Decisions 96Da37848, Dec. 10, 1996; 97Da52622, Mar. 13, 1998).

105) Businesswire, “The OIL Group of Companies announces name chages as part of a major rebrand”, (last access : 2024. 10. 1.) <https://www.businesswire.com /news/home / 20220628006121/en/ The-OIL-Group-of-Companies-announces- name-changes -as-part -of-a-major-rebrand>

106) Michael Faure·Hui Wang, “Compensating victims of a European Deepwater Horizon Accident: OPOL revisited”, Marine Policy, Vol.62, 2015, p. 34.

general liability insurance), specializing in offshore pollution liability insurance, and serves exclusively energy companies. It complements the property insurance provided by OIL, ensuring appropriate risk management for OIL's members. Moreover, OCIL not only provides coverage for amounts exceeding OIL's compensation limits but also performs reinsurance functions. Compared to OIL, OCIL places greater emphasis on liability risks, including third-party liabilities arising from offshore pollution incidents, contractual liabilities, and bodily injury claims involving operational personnel.[107)]

Ⅴ. Conclusion

Recently, interest in new offshore resource development along the East Sea coast has been increasing, highlighting the critical importance of offshore plant-related research in Korea. Offshore plant orders and technological developments, led by Samsung Heavy Industries, Hanwha Ocean, and Hyundai Heavy Industries, are experiencing a revival and gaining worldwide attention.

While previous Korean legal research has mainly focused on offshore plant construction contracts, the significance of offshore plants, and offshore support vessels, there has been little study addressing the legal issues arising during the operational phase of offshore plants from a Korean law perspective. Despite repeated oil spill incidents along the Korean coastline that prompted research on pollution liability, concrete analyses of the legal relationships of stakeholders of operational phase of Offshore Plant have remained scarce. The most existing domestic research has concentrated on the construction phase without clearly articulating the overall life cycle of offshore plants, the distinction of stakeholder roles, or the fundamental structural differences between drilling rig and production facility contracts—topics essential for comprehensive understanding. Additionally, there has been a notable lack of research identifying all stakeholders involved throughout the offshore plant lifecycle.

This thesis aims to fill that research gap by examining the lifecycle of offshore plants with a particular focus on the operational

107) Unlike OIL, becoming a shareholder is not a prerequisite for obtaining coverage from OCIL; energy companies can simply purchase insurance and obtain protection without undergoing a stringent qualification process. Ibid, p. 34.

phase, analyzing the relevant stakeholders and their legal relationships under Korean law. Discussion on the legal status and relationships of stakeholders is crucial because it underpins their internal and external liabilities in the event of an offshore accident. More in-depth research will be needed in this area. In addition, this study identified areas where improvements and supplementation of Korean law are necessary. Furthermore, it is essential to conduct additional discussions on the legal definition of offshore plants under Korean law, particularly regarding whether they qualify as ships, and to study the applicable laws based on such definitions and their resulting legal effects. For example, the legal status of offshore plants is critically important because it directly determines whether personnel working on offshore plants can be protected as seafarers and whether various protective regimes applicable to ships can be extended to offshore plants.

To achieve these reforms, it is essential to monitor international trends in offshore plant law and incorporate relevant standards and regulations into Korean law. Establishing a robust legal framework will position Korea not only as a leader in offshore plant construction but also as a competitive player in offshore plant operation, making it an attractive market for global oil majors.

Moreover, if Korean operators and O&M service providers actively participate in global offshore development projects with innovation and leadership, the ripple effects will extend to related industries such as equipment manufacturing and human resource development, fostering a new era for Korea's offshore industry. In this context, this thesis highlights the need for further research into legal relationships and liability issues surrounding offshore plants during the post-installation operational and maintenance phases. Rather than attempting to cover specific features of legal disputes, this study investigated selected practical issues that are basis for further studies on legal liabilities of relavant parties in Offshore incidents, hoping to lay the groundwork for further Korean scholarship in offshore related legal issues. Going forward, more detailed studies on insurance claims, contribution rights among stakeholders, issues related to offshore support vessel collisions, and liability arising during commissioning and operation phases—topics not covered in depth here—should be pursued.

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[국문초록]

해양에너지 이해관계자들에 대한 법적 연구
- 국내법상 해양플랜트의 생애주기와 계약관계를 중심으로-

김의석

대한민국은 세계 해양플랜트 건조 시장의 선두주자로서 자리매김해 왔다. 그러나 국내의 해양플랜트 관련 인프라와 연구는 건조에 집중되어 있고, 실질적인 운영 및 관리의 경험이 거의 전무한 관계로, 운영 및 관리가 해양플랜트 생애주기의 대부분을 차지함에도 불구하고, 운영 과정에서 발생하는 각종 사고에 대한 대비가 전혀 이루어지고 있지 않은 상황이다. 특히 해외에서는 21세기에 들어서서도 여전히 해양플랜트의 운영과정상 크고 작은 사고가 다수 발생하면서 인명 피해, 환경 오염, 경제적 손실이 새로운 법적, 사회적 쟁점으로 대두되고는 했었다. 그러나 이와 관련해서도, 해양 산업 전반에 걸친 안전 관리 체계의 공백뿐만 아니라 사고 발생 시 해양플랜트 운영에 관여한 이해 관련자들의 손해배상 책임을 포함한 다양한 쟁점에 대한 법률적 연구도 부족한 상황이다. 최근 "대왕고래"를 비롯한 대한민국 내 해양플랜트 운영 수요가 발생한 점 등을 고려하여 국내의 관련 제도에 대한 연구의 필요성이 있다.

해양플랜트는 일반적인 선박과는 달리 그 유형이 다양하기 때문에 구체적인 법률관계의 논의에 앞서서 논의의 전제가 되는 해양플랜트의 범위에 대해서 정의해야 한다. 최근 건조되는 해양플랜트의 경우 바다에 고정된 형태뿐만 아니라 바다에 떠 있는 부유식의 형태로 설치되기도 하고, 기존의 선박과 유사한 형태로 설계되어 자력 항행능력을 가지고 작업을 이어나가는 경우도 있다. 한편 용도에 따라서 구분한다면, 시추 설비와 생산설비로 크게 분류될 수 있을 것이다. 나아가 단순히 석유를 생산하기 위한 해양플랜트뿐만 아니라, 석유의 생산과 더불어 풍력발전 기능이 복합적으로 추가되기도 하므로, 갈수록 해양플랜트의 외연은 점점 확장되고 있다. 해양플랜트 자체뿐만 아니라, 해양플랜트의 소유와 운영에 관여하는 여러 이해 관련자들에 대한 법적인 문제에 대해서, 특히 해양플랜트와 관련한 사고 발생 시의 법률관계에 대해서 앞으로 천천히 고루 살펴볼 필요가 있다.

다음으로, 해양플랜트의 운영과 관련하여, 소유자, 운영자, 운영 관리회사 등과 같이 해양플랜트의 운영과 관련한 계약의 체결을 통해 직접적으로 이해관계를 형성하고 해양플

랜트 운영을 통해 구체적·직접적 이해관계를 형성한 자들뿐만 아니라, 해양플랜트와 관련한 계약관계가 없음에도 해양플랜트 인근 해역에서 어업을 하는 어업민, 인근 지역에 거주하는 자 등 해양플랜트 사고와 관련해서 피해를 입을 가능성이 있는 제3자들이 존재하며, 해양플랜트에서 작업을 하는 인력 내지 해양플랜트 지원선박에서 작업을 하는 인력 등 해양플랜트 운영과정에서 노무를 제공하는 관계에 있고, 사고 발생 시 피해를 입을 가능성이 있는 자들도 있다. 따라서 국내법이 적용되는 해양플랜트 운영과정상 사고와 관련된 이들 사이의 구체적인 법률관계에 대해서 논하기 위해서는, 우선은 국내법하에서의 해양플랜트 운영·관리 체계를 살펴보아야 할 것이다. 아울러, 해양플랜트의 구조와 용도에 따라서 운영 방식 및 이에 적용되는 법령의 내용상 상이한 부분이 있고, 사고 발생 원인에 따라서 각 당사자의 책임이 상이할 수 있다.

나아가 사고와 관련한 이해 관련자들의 구체적인 대·내외적 책임의 범위는 해양플랜트 사고의 발생 원인에 따라서 결론을 달리할 수 있으므로, 해양플랜트의 운영에 대한 각 이해 관련자들의 의무와 사고의 원인에 따른 각 이해 관련자들의 귀책에 대한 폭넓은 이해가 선행되어야 할 것이다. 본 논문에서는 과거 발생했던 주요 사고들에 대한 경과를 중심으로, 사고의 원인과 이에 대한 이해 관련자들의 구체적인 법적 책임을 살펴본다. 또한 국내법적 연구를 위해 해양환경관리법, 해사안전법, 산업안전보건법 등을 포함하여 해양플랜트 사고에 적용될 수 있는 현재 시행 중인 국내 법령을 살펴보고, 관련 판례를 분석한다. 한편 해양플랜트 사고와 관련한 이해 관련자들의 귀책은 이해 관련자들 사이 계약의 구체적인 내용을 반드시 고려해야 하는바, 해외의 표준계약서 등을 분석하여 이해의 폭을 넓히고자 한다.

주제어: 해양구조물, 해양플랜트 사고, 손해배상책임, 해양플랜트 운영자, 해양플랜트 운영관리회사, 시추서비스회사, 해양플랜트 안전 규제, 제조물 책임, 해양플랜트 종합 보험, 선원법, 유류오염 손해배상책임

[Abstract]

Legal Analysis on Stakeholders of Offshore Energy
- Focusing on the Lifecycle of Offshore Plants and Contractual Relationships between Stakeholders in Korean Legal perspective -

Eui Seok Kim

The Republic of Korea has firmly established itself as a global leader in the offshore plant construction market. However, domestic offshore plant infrastructure and research have been heavily concentrated on construction, with little practical experience in the operation and management of offshore plants. Consequently, despite the fact that the operational phase constitutes the majority of an offshore plant's lifecycle, there has been almost no preparation for accidents occurring during operation.

Even in the 21st century, large and small accidents continue to occur worldwide during the operation of offshore plants, resulting in loss of life, environmental pollution, and economic damages—raising new legal and social issues. Nevertheless, there remains a significant gap in legal research addressing not only systemic deficiencies in offshore industry safety management but also the liabilities of various stakeholders involved in accidents. Given the growing demand for offshore plant operations within Korea, as seen in projects such as the "Daewang Whale" field, there is an urgent need for research into relevant domestic legal systems.

Because offshore plants differ significantly from ordinary ships in their diverse types, it is essential to first define the scope of offshore plants before engaging in any legal discussion. Modern offshore plants may be fixed installations or floating structures, some designed similarly to ships with self-propulsion capabilities. Functionally, they can be broadly categorized into drilling facilities and production facilities. Furthermore, the scope of offshore plants is expanding, incorporating functions such as offshore wind energy generation in addition to oil production.

Legal issues not only concern the offshore plants themselves but also the various stakeholders involved in their ownership and operation. In addition to direct stakeholders—such as owners,

operators, and operation management companies—third parties who have no contractual relationship with the offshore plant, including local fishermen and coastal residents, may suffer damage in the event of an accident. Laborers working on offshore plants or support vessels are also at risk.

Thus, in order to discuss the specific legal relationships involved in offshore plant operations under Korean law, it is necessary to first examine the domestic operational and management framework. Additionally, differences in operational methods and applicable laws must be considered depending on the offshore plant's structure, use, and the causes of accidents, all of which can influence stakeholder liability.

The scope of internal and external liability of stakeholders depends on the specific causes of accidents, necessitating a comprehensive understanding of stakeholders' duties and responsibilities during offshore plant operations. This study examines major past offshore accidents, analyzes their causes, and explores the legal responsibilities of stakeholders. It also reviews relevant domestic laws, including the Marine Environment Management Act, the Maritime Safety Act, and the Occupational Safety and Health Act, as well as related Korean court cases. Furthermore, it incorporates analysis of international standard contracts to broaden the understanding of stakeholder relationships.

Keywords: Offshore Structures, Offshore plant accidents, liability for damages, offshore plant operators, offshore plant operation and management companies, drilling service companies, offshore plant safety regulations, product liability, offshore plant package insurance, Seafarers Act, oil pollution liability