International Legal Regime of Offshore Structures- Environmental Concerns

By Violeta S. Radovich

I. Introduction. Preliminary Questions

To begin with the study of this subject, we shall pose the following question: Is there any global international convention devoted to Offshore Platforms? And the answer is: no, there is not.

Then, we shall continue asking the following question: Have there been attempts to establish an International Convention on Offshore Platforms? And the answer is: yes, there have been.

In 1976, the Convention on Civil Liability for Oil Pollution Damage Resulting from Exploration and Exploitation of Sea Bed Mineral Resources (CLEE Convention) was adopted; it has never come into force. It allowed signatory states to opt for limited or unlimited liability. In 1977, the CMI adopted the "Rio Draft", the Convention on *Offshore Mobile* Craft. In 1990, the IMO requested the CMI to review the "Rio Draft". In 1994, the CMI adopted the "Sydney Draft", but the Canadian Maritime Law Association (CMLA) concluded that continuing the "Rio Draft" model of incorporation by reference was not appropriate. The CMLA prepared "The Background Paper for International Convention on Offshore Units, Artificial Islands and Related Structures Used in the Exploration for and Exploitation of Petroleum and Seabed Mineral Resources".[1]

II. Offshore Structures

When we refer to offshore structures, we must distinguish between offshore drilling structures and offshore platforms; I include both of them within the category of offshore structures.

Due to the technical particularities of offshore structures, the environmental principle of reality shall be taken into account.[2]

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[1] CMI News Letter. No.1- January / April 2004.

[2] Cf. Jaquenod de Zsögön, Silvia. "Environmental Law". Second Edition. Page 424. Dykinson, S.L. Madrid. 2004.

On the one hand, offshore exploration and exploitation is more complex, sophisticated and expensive than inshore exploration and exploitation. Offshore structures shall be apt to extreme climate conditions, some of them shall accommodate and provide catering for 20-200 workers and they shall have specific services on board such as divers, meteorological measurements, helicopters, control and communications equipment, cranes, equipment to put out and prevent fire, storage and management of human waste and assistance vessels.[3]

On the other hand, offshore platforms are vastly different from oil rigs like BP's Deepwater Horizon. They are usually brought in after wells are already drilled and sealed. “A production platform is much more stable”, said Andy Radford, an API expert on offshore oil drilling. “On a drilling rig you are actually drilling the well. You are cutting. You are pumping mud down the hole. You have a lot more activity on a drilling.”[4]

The exploitation companies must obtain the pertinent federal or state government authorizations. Then, three types of wells are drilled:

1. Exploration Wells: to confirm if the geologic formations identified by the seismic data contain hydrocarbons or gas.
2. Delineation Wells: to confirm the size of the geologic formation and whether it is economically convenient to develop the area.
3. Development Wells: then the production stage begins.

II.a. Offshore Drilling Structures

As it has been previously explained, these structures are exclusively used to drill the wells.

There are two main categories: mobile bottom- supported and floating rigs and stationary production structures used exclusively for development wells. Within the first category we may enumerate:

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[3] De Man, Marc. “Plataformas Costa Afuera: Perspectiva Canadiense” (Offshore Platforms: Canadian Perspective). Revista de Estudios Marítimos Nº 57 (Maritime Studies Review). Año XXXV. March 2010. Argentine Association of Maritime Law. Buenos Aires.

[4] Gulf Platform Investigators Focus on Blast Cause. GRAND ISLE, La., Sept. 2, 2010. CBS News. http://www.cbsnews.com/stories/2010/09/02/national/main6829893.shtml

a. Jack-up rigs

b. Submersible rigs (swamp barges)

c. Anchor-stationed or dynamically positioned semisubmersible rigs

d. Anchor-stationed or dynamically positioned drillships

We will now describe and illustrate each type of drilling structure:

a. Jack-up drilling rig

I. 

Figure 1: Jack-Up Drilling Rig with Triangular Shape and 3 Legs (JDC Hakuryu 8) (Reproduced Courtesy of Japan Drilling Co.)

The hull is typically constructed in a triangular shape with 3 legs, and in a few cases in rectangular or other shapes. It is moved by being towed by a tugboat or transported by a heavy lift carrier from one drilling location to another.[5]

b. Submersible Drilling Rig (Swamp Barge)

Figure 2: Submersible Drilling Rig (Noble FriRodli)
(Reproduced Courtesy of Noble Drilling Corporation)

It consists of upper and lower hulls connected by a network of post or beams. The drilling equipment and living quarters are installed on the upper hull deck.[6]

[5] Encyclopedia of Life Support Systems (EOLSS). CIVIL ENGINEERING – Offshore Drilling and Production Equipment - S. Tanaka, Y. Okada, Y. Ichikawa.
http://www.eolss.net/ebooks/Sample%20Chapters/C05/E6-37-06-04.pdf
[6] See note 5.

d. Anchor-stationed or dynamically positioned drillships

Figure 3: (Reproduced Courtesy of Transocean Inc.)

The Larger is a Drillship with Dual-Activity Drilling System, and the Smaller is a Previous Generation Drillship Alongside with a Supply Boat. An opening called a moon pool is equipped in the center of the ship from the main deck to the water.[7]

II.b. Offshore Platforms

Now, we will refer to offshore platforms. There are two main categories: bottom-supported platforms and floating platforms.

1) Bottom-supported platforms

1.a) Template Platforms

[7] See note 5.

Figure 4: (Reproduced Courtesy of Offshore Iwaki Petroleum Company, Ltd.)

They usually consist of jacket, piles and deck. The jacket is fixed to sea bottom by means of piles and they together support the deck load. The deck is the topside structure of the platform and houses most of the equipment.[8]

1.b) Gravity Platforms

[8] See note 5.

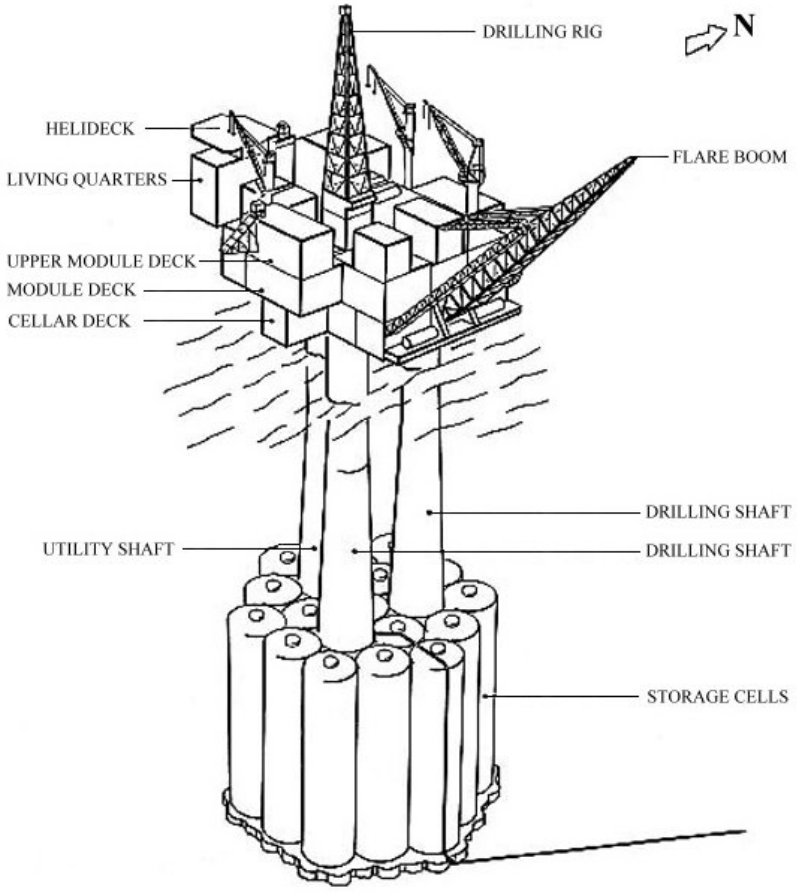

Figure 5: Gravity Platform
(From Ager-Hanssen H., & Medley E.J (1979): Main Considerations in Development of StatfJord Field, Volume of Production, Proc. of the 10th World Petroleum Congress. Reproduced Courtesy of World Petroleum Congress)

They derive required stability from their own weight. The substructure is usually built from concrete. The completely assembled platform is towed to the installation site and ballasted down to seafloor. They are employed in geographical locations to which this type is applicable are limited. They are suitable for situations where pipeline transportation is not readily available.[9]

2) Floating Platforms

2.a.) Semisubmersible platform

[9] See note 5.

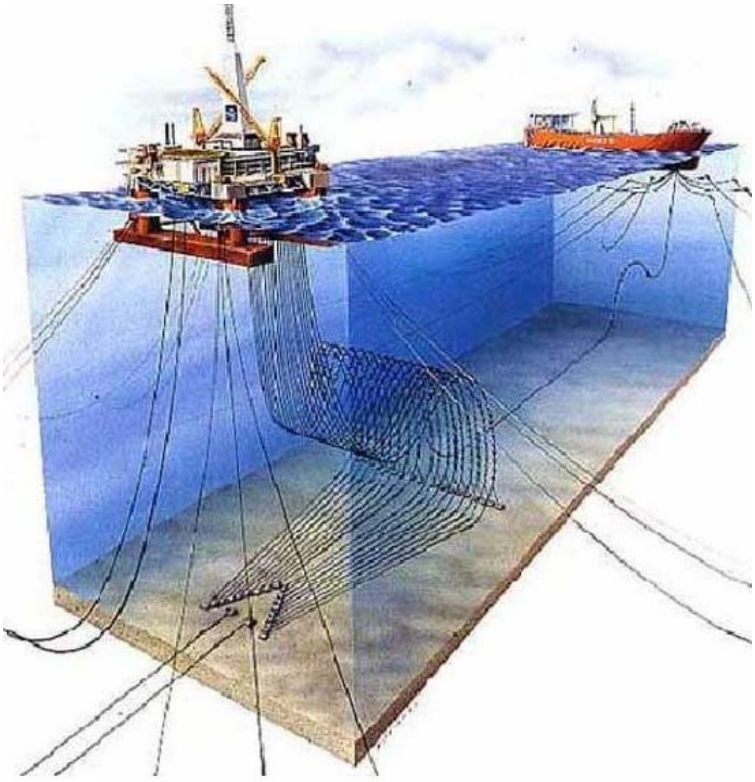

Figure 6: Semisubmersible Platform
(Reproduced Courtesy of Norsk Hydro ASA)

Mooring is usually by eight to twelve point catenaries. Motion of the platform does not allow wells to be completed on the deck. Wells are usually completed subsea and produced fluid is brought to the processing equipment aboard the platform by means of pipeline and riser. Disadvantages: limited payload capacity and lack of storage capability.[10]

2.b) Floating Production Storage and Offloading System (FPSO)

[10] See note 5.

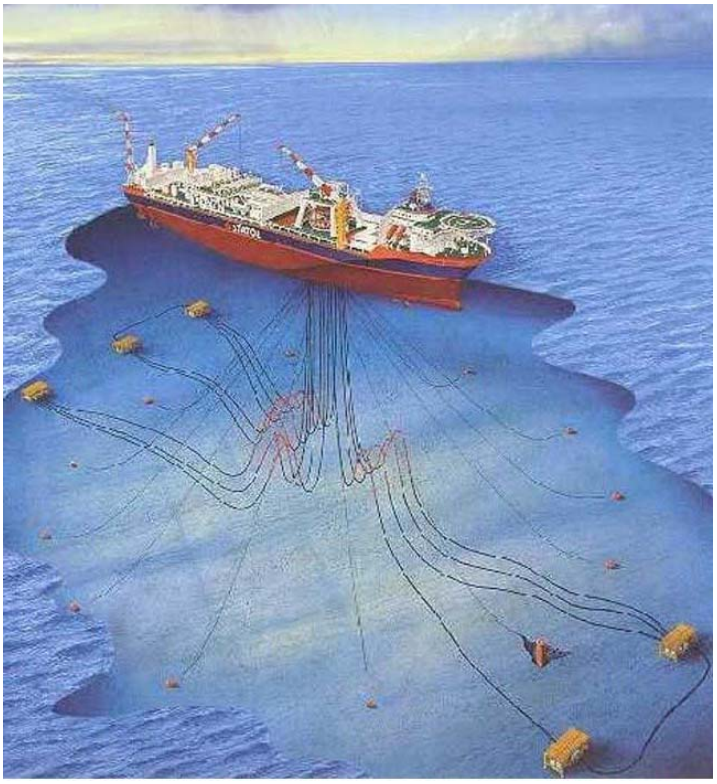

Figure 7: Floating Production Storage and Offloading System
(Reproduced Courtesy of Norske Stats Oljeselskap a.s. (STATOIL))

First application was made in the late 1970s and it was converted ocean-going tanker. They are ship-shaped platforms either with or without propulsion capability. They have a large payload and storage capacity. They are suitable for application in isolated locations where pipeline transportation cannot be an option. Wells are completed at separate locations, either subsea or on separate platforms.[11]

2.c.) Tension Leg Platform (TLP)

[11] See note 5.

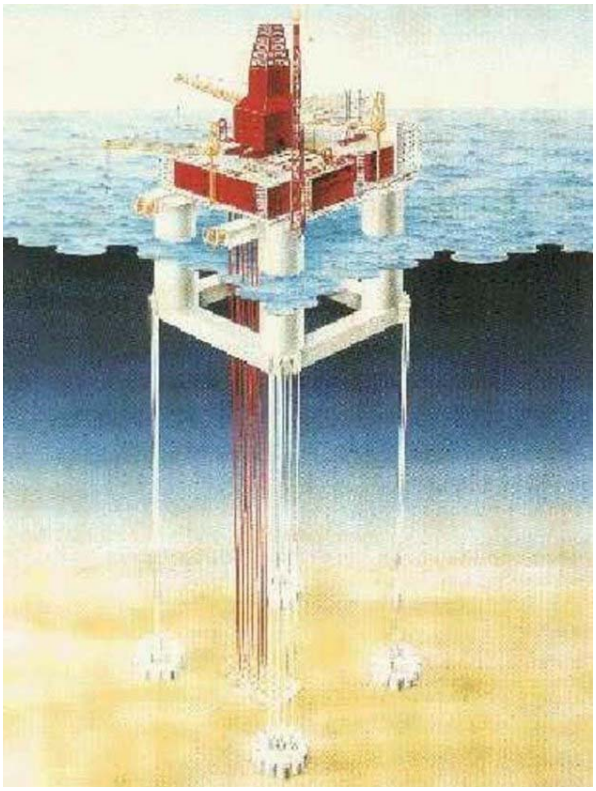

Figure 8: Tension Leg Platform
(Reproduced Courtesy of ConocoPhillips Norge)

It is essentially a semisubmersible attached to the seabed by vertical members called tendons, which are usually made of steel tubulars and tensioned by excess buoyancy of the platform hull. Tendons are pinned to the seabed directly or indirectly by piles. Motion characteristics of the TLP allow wells to be completed on its deck.[12]

2.d) Spar platform or deep-craft caisson vessel (DDCV)

It has a deeply submerged, spar-shaped hull and a deck structure. The platform is moored to the seabed by means of catenary. Like FPSO, oil storage capability can be incorporated in the hull, making this type attractive at isolated deep water locations.[13]

III. Analysis of Global International Legal Instruments

[12] See note 5.
[13] See note 5.

Now that we have studied these structures from a technical point of view, therefore applying the environmental principle of reality, we may now study the global international legal instruments referred to them. In the first place, we must say that there are three forms of pollution that may derive from offshore exploration and exploitation activities. The first one is intentional pollution, which is less common because any loss of hydrocarbons contravenes commercial interests. The second one is accidental pollution, which derives from blow-outs, pipeline ruptures, tanker spillages and collisions when ships are docking the platforms. Finally, operational pollution arises as a result of the normal operation of offshore installations. These include oil in produced water, contaminated drill cuttings and muds, production chemicals, sewage, garbage, deck drainage, heavy metals and aromatics as well as atmospheric emissions, principally CO, SO, NO, CH, and VOCs. We shall bear into mind that major pollution incidents -which have great impact over public in general- differ from continuous disposals into the environment.[14]

As there is no International Convention on offshore structures, we shall study every convention that is applicable to offshore structures.

The **Convention on the Continental Shelf (Geneva, 1958)** provides for safety zones around installations. The coastal State is obliged to undertake, in the safety zones, all appropriate measures for the protection of the living resources of the sea from harmful agents. As regards removal of installations, there are no fundamental advances for environmental pollution protection.

Under the **United Nations Law of the Sea Convention (UNCLOS, 1982)** States have the sovereign right to exploit their natural resources pursuant to their environmental policies, in accordance with their duty to protect and preserve the marine environment (Articles *56,* 77, 193). In addition to this, States shall minimize discharges from offshore installations to the fullest possible extent. (Article 194 (3)(c)). States shall take measures for accident prevention and emergency response, and the regulation of the design; construction, equipment, operation and crewing of them. (Article 194 (3)(c)). States shall establish global and regional regimes, standards and recommended practices and procedures to prevent and control marine pollution arising from offshore units and seabed activities. (Article 194 (1) and 208 (5)). States need to ensure that sufficient recourse is available under their legal systems for prompt and

[14] "Combatting Operational Pollution from Offshore Petroleum Activities". S Vinogradov, 1997. The Centre for Energy, Petroleum and Mineral Law and Policy, University of Dundee.

adequate compensation of damage caused by pollution to the marine environment. Abandoned structures shall be removed for safety of navigation and protection of the marine environment.

The primary objective of the **International Convention for the Prevention of Pollution from Ships, (MARPOL 73/78)** is the prevention and control of vessel-source marine pollution. MARPOL has a broad definition of ships- it encompasses “fixed or floating platforms”. MARPOL does not apply to marine pollution directly resulting from offshore operations, ex. in connection with the use of oil-based drilling muds or leakage of oil during well testing, and water production. Garbage and chemical residues, and oily residues from the vessels engines, generated on offshore platforms are regulated.

As regards operational discharges of oil, some authors assume that MARPOL 73/8 “applies to platforms in respect to activities common to both platforms and ships, namely to operational discharges (e.g. tank cleaning).”

Annex V, although entitled "Regulations for the Prevention of Pollution by Garbage from Ships", applies equally to offshore installations. In fact, the pollution-prevention regime for offshore installations is considerably stricter than the one regarding sea-going vessels. Whereas Annex V allows, under certain conditions, the disposal into the sea of particular types of garbage, including lining and packing materials, food wastes and other garbage from ships, this does not apply to platforms.

The **1969 Civil Liability Convention for Oil Pollution Damage (CLC)** and **the 1992 Civil Liability and Fund Conventions** do not apply to fixed offshore installations or to oil tankers that were converted into production platforms. They apply where there is transport of oil to be loaded in another place.

The **Convention on the Control of Harmful Anti-Fouling Systems on Ships (2009)** prohibits the use of harmful organotins in antifouling paints. Within the definition of ship is included “floating craft, fixed or floating platforms, floating storage units (FSUs) and floating production storage and off-loading units (FPSOs).”

The **Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matters (LC), 1972 (and the 1996 London Protocol)** contain rules for incineration at sea and dumping at sea of waste products generated on land. It applies to platforms and other man made structures.

The **1989 Salvage Convention** is not applicable to fixed or floating platforms or to mobile offshore drilling units where such platforms or units are on location engaged in the exploration, exploitation or production of sea-bed mineral resources (art.3). Therefore, it is applicable to them when they are being transported; awaiting for instructions; being repaired or supplied.

The **Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009** is applicable to submersibles, floating craft, floating platforms, self elevating platforms, Floating Storage Units (FSUs), and Floating Production Storage and Offloading Units (FPSOs).

As regards soft law, we shall enumerate the MODU (IMO) Code for the Construction and Equipment for Mobile Offshore Drilling and the Guidelines and recommendations issued by UNEP, international financial institutions such as the World Bank and a variety of non-governmental organizations including the E&P Forum and the World Conservation Union (IUCN).

IV. Conclusions

Finally, environmental concerns about offshore structures may be summarized as follows:

An integrated and sustainable International Convention on offshore structures shall be established as soon as possible - applying the principle of reality.

Until now, the only references to environmental issues regarding offshore structures concern posterior aspects to the erection of platforms, ex. liability for pollution damage, salvage and removal - not to the application of the precautionary principle.

Most of the Conventions which apply to offshore structures, only apply to floating offshore platforms. However, fixed platforms shall also be taken into account. Specific mention shall be made to rig structures.

All the activities, including erection of installations, shall be subject to prior written authorization after proving that constructions have been performed according to

international standards and that the operator has the technical competence and the financial capacity to carry out the activities. Authorization may be refused by application of the precautionary principle[15].

The sustainable management system shall embrace in a more integral manner two aspects that mark the beginning and ending of the activities[16]:

Seismic Surveys: they have to be carried out at the exploration phase, seismic survey noise, as a form of energy introduced into the marine environment, constitutes pollution according to UNCLOS definition (art.1(1)(4)). This surveys cause serious chronic and cumulative effects on marine mammals. Risks associated with the consequences of their operation are unknown. Given the high level of uncertainty, the precautionary approach for the management of this issue should be properly developed. Specific preventive measures, including a mandatory Strategic Environmental Assessment (SEA), the application of Best Technologies Available (BTA) shall be applied, and monitoring should be provided; and

Removal of installations: this requires a more integrated management. Plans for removal should be developed in consultation with the competent authorities and stakeholders (ex. Local communities, fishing groups). Post removal environmental monitoring should be part of the removal process as an important aspect for assessing the recovery of the production site.

Emissions from flaring, especially, the flaring of gas from offshore installations need to be reduced and be associated with specific licenses or flaring permits.

Finally, the relevant coastal states shall apply for “Areas-to-be-Avoided”, Particularly Sensitive Sea Areas (PSSA) and Special Areas (SA) under the provision of IMO so as to identify no-go zones for offshore oil development and associated oil transport or to install special discharge restrictions.

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[15] See “Sustainable Governance of Offshore Oil and Gas Development in the Mediterranean: Revitalizing the Dormant Mediterranean Offshore Protocol”. Evangelos Raftpoulos. http://www.mepielan-ebulletin.gr/default.aspx?pid=18&CategoryId=4&ArticleId=29&Article=Sustainable-Governance-of-Offshore-Oil-and-Gas-Development-in-the-Mediterranean:-Revitalizing-the-Dormant-Mediterranean-Offshore-Protocol

[16] See Note 15.