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Methods to enhance the predictability of petroleum offshore liability

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ABSTRACT

Two major accidents in the energy sector — the Macondo well blowout in the U.S. coastal waters in 2010 and a series of equipment failures at the Fukushima I Nuclear Power Plant in Japan in 2011 — proved that the existing liability regimes are incapable to assign systematically the responsibility for accidental pollution damage and third parties' losses. The paper reviews the offshore spill data, petroleum liability regime that has developed in Canada over time and proposes three methods aimed at enhancing the post-accident regulatory predictability in petroleum offshore.

1. Introduction

In 2010 and in 2011 witnessed two major energy accidents: the Macondo well blowout in the U.S. coastal waters and a series of releases of radioactive materials at the Fukushima I Nuclear Power Plant in Japan. In both cases, the facilities' operators were surprised to discover that their actual payments for accidental pollution damage and third parties' losses far exceeded the limit of liabilities prescribed in the regulations. For example, while the U.S. Oil Pollution Act of 1990 limits the operator's payment to $ 75 million, the well operator BP plc incurred expenses totaling $ 13.9 billion on February 28, 2015 [2]. Similarly, the Japan's 1961 Act on Compensation for Nuclear Damage sets the limit at 120 billion yen per plant, but the Fukushima plant's operator Tepco paid 4.4 trillion yen on November 25, 2014 [15].

Large discrepancy between the legal terms and actual payments has raised the question of why the generic liability regime fails to provide guidance following a major energy accident. Three venues of analytic interest have emerged. Regulators have initiated reviews of the administrative procedures debating how to reduce the probability of accidents in the light of new evidence (see, e.g., Refs. [14,16,17]). Legal experts discussed the subtleties of ongoing juridical arguments furnished to identify responsible parties, their victims, and the appropriate amount of compensations (such as [8]). Finally, economists concentrated efforts on the identification of potential gaps in the energy regulatory regime that governs the post-accident assignment of financial responsibility (e.g., Refs. [1,12]), but such studies are few.[1]

Economic theory does not provide clear guidance on how to manage the financial consequences of a catastrophic proportion. For example, Bennear [1] finds that while the theory of management-based regulations provides the basis to respond to regular offshore incidents, it fails in the case of low-probability, high-consequence event like the Macondo well blowout. Based on the analysis of existing offshore regimes, general economic principles and available historical data, the paper explores the sources of regulatory unpredictability in the existing liability regime and suggests three methods, the use of which would inform the operators about the costs of offshore catastrophes that they could face.

The paper starts with a brief overview of data on offshore spills' frequency and costs followed with a description of the offshore liability regime as it has developed in Canada over time. This description allows sketching a liability regime generic to the world. After reviewing the pitfalls present in the regime, the paper suggests three

[1] It is unclear why the events have been largely shunned within the profession. Petrolia [12] suggests that the U.S. regulators have gradually moved away from using economic valuation of damages prompting the courts to stop engaged economic experts in the hearings.

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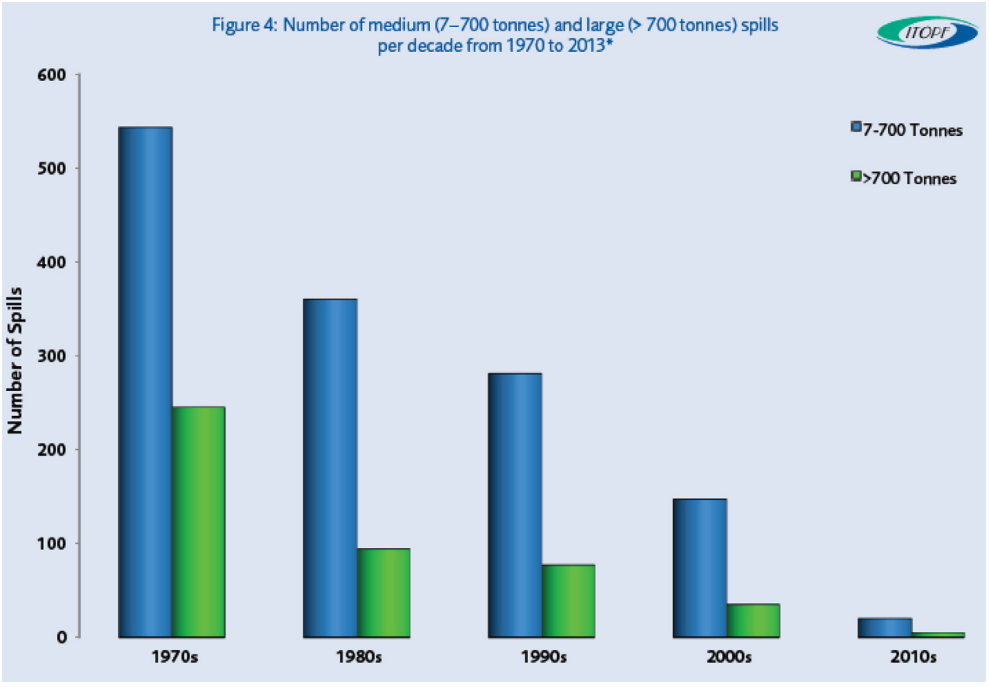

Fig. 1. Number of medium (7—700 tons) and large (>700 tons) spills per decade from 1970 to 2013 [10, Fig. 4].

principles, the use of which results in specific policy recommendations. The conclusion summarizes the discussion and highlights issues that no liability regime can resolve in principle.

2. Historical evidence on frequency and costs of offshore oil spills

Public regulators and industrial associations maintain the databases on offshore oil spills either because of their mandate to monitor the pollution or due to their business needs to estimate the expected costs of cleanup and damage compensation. For both types of data, the heterogeneity of reporting norms and the reporters' reluctance to reveal accidents hinders the comparison of cases across jurisdictions and in time. Yet, the available evidence allows coming up with some tentative conclusions.

ITOPF [10] maintains a database of global oil spills from tankers, combined carriers and barges that contains information on accidental spillages since 1970. According to ITOPF, the number of spills per decade decreased steadily for each size category — large spills (>700 tonnes) and medium (7—700 tonnes), for which evidence is hard to hide — from 1970 to 2013 (see Fig. 1). The same downward trend is noticeable for the quantities of oil spilled with the caveat that trend is susceptible to very large spills that happen infrequently thus rendering impossible their statistical analysis.

Etkin [6] uses the International Oil Spill Database, which includes spills from offshore wells, to estimate the cleanup costs and factors that affect them across the geographic areas. He finds that the costs per ton rose in 1970—80, but stabilized since 1990s. Table 1 gives the average cleanup costs per ton for different regions. Similarly to [10] Etkin notes that the costs of large accidents are highly variable.

Two tentative conclusions can be drawn from the data. First, the number and the severity of smaller, more predictable spills are falling in time. Second, the costs vary significantly across the regions and for very large spills.

3. Canadian legislation as an example of the offshore liability regime

National offshore liability regimes share the same main aspects implying the existence of a worldwide generic system. A brief description of one of such systems, developed in Canada, illustrates its salient features. Canada's convoluted history of offshore liability regime provides additional benefit of exposing hidden factors at play.

Table 1
Average cleanup cost per ton spilled (in 1997 U.S. $) [6, Fig. 2].

Region	US$/ton
United States	$73,156
Asia	$16,006
Europe	$8596
Canada	$6147
Former USSR	$2929
South Pacific	$2441
Latin America	$2158
Africa	$1078

According to the Canada Oil and Gas Land Regulations of 1961, the federal government has authority for issuing exploration licenses for maritime areas. However, as the economic benefits of offshore development became obvious, provinces challenged the federal government's right to manage offshore projects. In the end, two provinces, Nova Scotia and Newfoundland and Labrador, have signed with the federal government accords on joint management of offshore resources (Accords).[2] On their ratification, the full administrative authority over the offshore projects has been transferred respectively to the Canada—Nova Scotia Offshore Petroleum Board (CNSOPB) and the Canada—Newfoundland and Labrador and Offshore Petroleum Board (CNLOPB) appointed jointly by the federal and provincial governments. The federal government continues to hold responsibilities for offshore projects elsewhere but no projects operate in those areas.

The process of granting a concession on offshore exploration and development starts with an expression of interest from a business entity seeking the resource extraction for commercial purposes. The boards call for nomination of fields and bidding over them at

[2] The accords with the two provinces are the Canada—Nova Scotia Offshore Petroleum Resources Accord Implementation Act, the Canada—Newfoundland Atlantic Accord Implementation Act.