THE *SAFER* IMBROGLIO

Oil discharges and spills are environmentally the most devastating consequence of the rapidly increasing global quest for oil. Its transport across all oceans of the world in massive tankers loaded with hundreds of thousands of tons of crude oil results in inevitable disasters. The Exxon Valdez and Torrey Canyon spills and the environmental catastrophes they caused are synonymous with the dangers of oil transport. The Deepwater Horizon disaster exemplifies the long-lasting damage to the neighbouring coastlines associated with oil spills related to oil production using a wide range of sea drilling and pumping platforms. The Safer – a Floating Storage and Offloading platformer an FSO for short - represents yet another source of danger. Typically, an FSO is a Very Large Crude Carrier (VLCC) permanently anchored offshore and connected to the oil producing fields on land via a series of pipelines. Oil from the wells is stored aboard an FSO then transshipped to a working tanker for transport to its destination anywhere in the world. FSOs simplify transport of oil by obviating the need for construction of permanent and expensive oil terminals substituting those with a floating and movable platform already equipped with storage tanks and the needed pumping systems required for transloading of the stored oil to the relief tanker. FSOs offer convenience and speed. FSOs represent potential danger as well, and the SAFER represents a particularly severe danger.

Anchored off the Yemeni coast in 1988, the SAFER stored approximately 3 million barrels of oil flowing into its tanks from the nearby Marib oil field. The FSO fell into Houthi hands in 2015. Without maintenance and with only a skeleton crew on board the oil laden FSO started to degenerate into a highly dangerous floating derelict whose decaying hull could release its contents at any moment, causing the worst environmental disaster in human history. Oil would cover the entire coastline of the Red Sea, kill fish stocks, destroy vital mangrove growths, and halt operation of desalination plants that generate drinking water for the entire region. Millions of people would be directly affected. Indirectly, through its impact on Suez Canal shipping and the potential closure of practically all major Yemeni ports, together with the very important Israeli Eilat and Jordanian Aqaba, the SAFER spill would cause global losses in excess of 20 billion dollars. The catastrophe that the SAFER spill would generate in this geo-strategically essential region is obvious to all, and so is the need to prevent it, but…

The SAFER is now in the hands of the rebel Houthis, the oil aboard the vessel belongs to the Yemeni government, and, worst of all, the ship is located in an active war zone itself affecting a very important geostrategic space. Negotiations aimed at averting the disaster have been conducted by the United Nations and the involved parties ever since the abandonment of the FSO. Finally, an agreement has been reached and, even if not yet fully funded, a relief operation has been initiated by the UN.

The reports provided in the hyperlinks outline the UN plan for the pre-salvage inspection of the SAFER (UNOPS OPERATIONS RELATED TO FSO SAFER ASSESSMENT AND LIGHT MAINTENANCE); the description by the Dutch salvage company SMIT-Boskalis of the approach to transshipment of the oil cargo from the SAFER to the relief tanker NAUTICA (FSO Safer Oil Transfer Operation by Boskalis).

While relatively detailed, these publicly available outlines of the proceedings fail to mention several significant details, omission of which during the operations may adversely affect the success of salvage. What follows provides details of issues not mentioned by either UN or SMIT-Boskalis. These remarks are authored by an experienced VLCC and FSO Captain and international consultant on super tanker/FSO construction and operations, Master Mariner and Captain, Peter Pikinski.

PROFESSIONAL REMARKS AND SUGGESTIONS

Contrary to popular belief, today the excellence of seamanship is not enough to navigate an ocean-going ship. Modern seafaring operations require a very high degree of specialization and expertise, a diversity that can be readily compared to that seen in medicine. Sailing a cruise ship demands an entirely different set of skills compared to those required aboard a general cargo vessel, and the often-extreme complexity and variety of the involved tasks require from the officers and crews manning modern ships an equally wide range of internationally recognized class and type certifications to safely operate their vessels. Massive super-tankers provide the extreme demand for such certifications. Due to their size, they are difficult to operate and demand special seamanship skills. Their dangerous cargos demand highly specialized handling equipment and procedures on board and ashore. Hence, to be conducted safely, tanker operations *demand* extremely well-trained specialized personnel. The need for such qualifications is emphasized by the vast quantities of the highly dangerous cargo – crude oil – carried by VLCCs. Accidents involving these ships, e.g., the grounding of Exxon Valdez, that result in the release of large amounts of their oil cargo, lead to catastrophic environmental damage, major economic losses, and often severe health consequences affecting the exposed coastal populations. Unsurprisingly, the fragility of the SAFER demands an extreme level of professional knowledge and practical expertise at all levels from operational command to manning the complex and ill maintained cargo handling systems aboard the aging FSO.

Captain Pikinski lucidly outlines these difficulties and offers a series of practical recommendations whose implementation will significantly enhance the efficiency and safety of SAFER's salvage.

FSO SAFER SALVAGE REMARKS AND RECOMMENDATIONS

In order to spend limited resources economically, the following should be discussed and the purpose of all intended activities in the operation adressed specifically. Please, note that thesse are the basic conditions that will assure a safe and effective execcution of SAFER salvage operation with continuously limited financial resources.

1. Every attempt shall be made to restart the vessel's boilers and cargo pumps. Discharge using cargo pumps takes usually 24 hrs, and, if the tanks are also COW washed (COW - Crude Oil Wash), the operation will last approximately 36 hrs. This is much less than the 16 days planned by Boskalis.
2. Oil removal/transfer: in a vessel fitted with COW system (e.g., SAFER), piping on the deck is easily connected to the deep well pumps used for oil transfer. COW (in inerted atmosphere) is mandatory for the effective removal of the residual oily sludge from the structural elements of the tanks, since a simple water wash will not accomplish the task. COW is the standard practice on crude oil tankers.
3. Discharge of the vessel shall be planned and performed in steps based on stability calculations employing an approved software program. Otherwise, a vessel of SAFER's size may be subjected to excessive SF (Shearing Forces) and BM (Bending Moment) that will exceed the allowed values and result in the hull fracturing or even breaking apart.
4. Water wash of the tanks shall be performed in inerted atmosphere and the cargo pipelines need to be flushed with wash water. After washing, the tanks shall be vented to a gas free condition. The ship's own, fixed COW equipment should be used instead of portable tank washing machines. The procedure significantly reduces the required labour and is much more effective compared to that employed on smaller product tankers where portable machines are commonly implemented (the latter have smaller range and effectivness).
5. The tanks must be mucked out, i.e., the sludge shall be completely removed and the tanks kept in a sludge-free state. The sludge and gas-free condition of the ship must be inspected and certified as acceptable by the scrapyard representative. Failure to remove the sludge will reult in sloshing during the tow and the release of hydrocarbon gases that may lead to fire/explosion if any hot work/torch cutting is attemped by the yard. The yard may, therefore, refuse to accept the ship for demolition. Note that since the amount of bagged mucked out sludge may be as high as 250 tons or even more, its disposal ashore must be arranged *a priori* with the appropriate authorities.
6. Prior to towing, a temporay classs certificate must be obtained and the vessel insured for her last voyage. Classification may require UWILD (Under Water Inspection in Lieu of Drydocking).
7. Turret disconnection, including prompt securing facilities for future CALM (Catenary Anchor Leg Mooring) buoy connection, must be set immediately following cargo transfer.
8. Making certain the vessel is ready for a safe ocean tow to the scrapyard once the temporary classificcatin has been obtained.

9. The future of the CALM buoy installation must be discussed with *all* relevant parties.
10. SMIT-Boskalis agreement shall clearly and precisely define and ensure safety of ops, responsibility to and cooperation with the Owner's representative(-s), establishment of professionally sound chain of command that is based on the recognized practices of VLCC operations, and ascertain both the qualifications and responsibilities of the involved personnel. Due to the nature of SAFER's salvage operations and the very grave consequences of any accident involving the potential breach of SAFER's hull integrity, all personnel involved directly with the supervision and execution of all activities aboard the SAFER must have qualifications required by IMO STCW convention (Advanced Tankers Certificates)

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