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Response Goals of Marine Plastic Spills

Authors: **David Campion** (ITOPF, Floor 8, The Great Room, 63 Robinson Road, Singapore 068894), **Samuel Durrance** (ITOPF, Dashwood, 69 Old Broad Street, London, EC2M 1QS, UK), **Gareth Goosen** (Spill Tech, 580 Umbilo Rd, Congela, Berea, 4001, South Africa)

EXTENDED ABSTRACT:

Plastic is ubiquitous in the environment. Despite plastic pellets representing only a fraction of all plastic in the environment, when they are accidentally lost on land or during transshipment, plastic pellets still occur throughout the marine environment. In recent years, ITOPF has been heavily involved in five spills of plastic pellets, including incidents in Sri Lanka, South Africa and Spain.

Due to their size and mobility, once lost, plastic pellets can spread extensively and rapidly become buried and mixed with sediments, natural debris and other plastics in the coastal environment. Experience has shown that subsequent clean-up operations are laborious, protracted and costly.

Increasing research examines the impact of microplastics in the environment. It is worthy of consideration, that the inherent risks presented by undamaged plastic pellets, once uniformly distributed amongst the environment, may be no more significant than existing background micro- or nano-plastics. This condition questions what benefit is created by separating spilt pellets from other micro-plastics that already exist in the environment as part

of a response. There is clear merit when the volume is greater than background levels, but once distribution has normalised due to natural spreading, are pellets equal to other plastics?

The goal of pollution response is to mitigate damage to sensitive environmental or economic receptors, and to enable the continuance of normal function. As with oil and chemical spills, we must consider the ‘normal’ function of habitats on their individual merits. Responders have long recognised the importance of retaining a holistic sense of this goal, systematically balancing the impact of response operations against the potential impacts caused by a pollutant. With increasing focus on the climate change agenda, the broader environmental consequences associated with greenhouse gas (GHG) generation may also be considered during this assessment process.

Utilizing data from three plastic pellets spills in South Africa, Sri Lanka, and Spain, operational GHG release and those produced via life cycle analysis of utilised resources was developed to examine plastic spill response through the lens of the climate change agenda. As a result, alternative response strategies are discussed which consider a range of holistic environmental and social impacts, including; climate change, the provision of employment, aesthetic benefits, and the opportunity cost of not removing considerable amounts of macro- and microplastic from the environment.

This study indicates that the efficiency of plastic pellet recovery diminishes greatly over time resulting in significantly increased emissions per kilogram of pollution collected. Pilot studies demonstrate that inclusion of collecting background plastic waste can produce a more efficient recovery solution to remove environmental plastic, creating a holistic net benefit, whilst also mitigating GHG impacts. This study offers considerations for stakeholders involved in plastic pellet spill response when developing clean-up goals and strategies.