

50 Days after the Oil Spill in the Peruvian Marine Coast of January 2022 at La Pampilla Refinery

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Comment

The oil spill that took place in the sea of Ventanilla, in the coastal littoral zone of La Pampilla Refinery, Constitutional Province of Callao, Peru, occurred on Saturday, January 15, 2022, at 17:18 hours when the moorings of the Italian flagged vessel Mare Dorium broke at the buoy terminal 2 of La Pampilla Refinery while it was carrying out its crude oil loading and unloading activities. Shortly thereafter, a change in color and the expulsion of an unpleasant odor was registered on the beaches of our coastline [1]. Because of the above, the objective of this article is to make a first approximation of the environmental damage caused by the oil spill at the La Pampilla Refinery on the coast of Peru's marine littoral up to March 5. Several circumstances have played a determining role. Among them the poor ability to detect the oil leakage to take corrective measures. The control systems have valves that measure the pressure in the hydrostatic which allows detecting if there is a leak, which would indicate that they have not been working properly. Therefore, the amount of oil that has spilled into the sea is not known precisely because the flow control system would not have been working properly. Nor can one leave aside the fact that there was a rupture, the valve closes as the ship pulls away, the hose is left floating and spewing oil into the sea. However, these safeguard systems close automatically, under any circumstance. The human factor must also be considered; likely, the personnel were not properly trained in risk situations, which resulted in them not following the established protocols that would allow them to respond effectively to such circumstances. On January 15, more than 10,300 kilometers off the Pacific coast of Peru (in Oceania), a submarine volcano called Hunga Tonga-Hunga Haapai erupted for 11 hours. This eruption sent an ash cloud into the upper atmosphere and triggered a tsunami that destroyed houses on the nearby islands of Tonga [2]. Based on this event, Repsol argues that the abnormal swell caused by the eruption of the submarine volcano in Tonga caused the rupture of the offloading pipelines. Repsol is in charge of the administration of the La Pampilla Refinery and the oil landing operations. In this scenario, several factors lead us to think that there was negligence, and everything points to Repsol. Thus, there was no early warning of the oil leak and information about what had happened was concealed, since neither the exact amount of barrels of oil that had reached the sea as a result of the leak nor the measures adopted to mitigate the effects of the spill were disclosed. Therefore, beyond the late reaction of the government's environmental authorities, the responsibility lies solely with Repsol. From the beginning, there has been great confusion about the total number of barrels of oil spilled into the sea. According to statements made by Repsol, initially the amount was 0.16 barrels, then six barrels and then 6,000 barrels. The figures issued were confusing and the

information received by the population was not reliable. The crude oil spill recorded so far is 1,739,000 square meters. Only on January 27, 2021, MINAM confirmed that there were 11,900 barrels of oil, although Repsol claims that there were 10,396 barrels; therefore, it is a spill of great magnitude because the quantities are greater than 700 tons [3]. The size of the ecological catastrophe caused by the oil spill is a consequence of the inadequate implementation of a Contingency Plan by the company. Every time an oil spill occurs, the public loses faith in the authorities and oil companies due to their lack of capacity to implement rapid responses to mitigate the impacts [4]. The oil slick has spread more widely and rapidly due to the slow actions of Repsol and governmental entities. Fifty days after the spill, the oil slick has spread along more than 40km of coastline and reached the Islotes de Pescadores areas of the Reserva Nacional Islas, Islotes y Puntas Guaneras (512 hectares approximately) and the Ancón Reserved Zone (1758.1ha), affecting habitats and biodiversity [5]. The spill is very dangerous for marine organisms and ecosystems and other coastal ecosystems such as wetlands [6]. To date, 24 Pacific beaches are known to be contaminated and the area impacted by the oil is 713ha of sea affected and 180ha of coastline [3].

The recovery of the marine coastal ecosystem depends on the amount of oil spilled and the containment work being done by the various actors; although the clean-up phase could take several months, while many of the secondary and chronic effects of the spill could last for several years [7,8]. In the final stages of the spill, marine bacteria are responsible for processing what remains of the oil. An alternative is the application of remediation processes using microorganisms, due to their high effectiveness, low costs and environmental synergy [9,10]. Contamination caused by oil spills has a great impact on the marine ecosystem and on hydrobiological resources especially. In Peru, the diversity of marine algae is represented by 602 species [11]. The Illustrated Catalog of Macroalgae of the Central Coast of Peru, reports 87 species, including 67 Rhodophyta, 10 Chlorophyta, and 10 Phaeophyceae, identified, in the perspective of their potential uses and biotechnological applications [12,13]. Although we do not have precise figures on the number of algal species for the spill area it is estimated that no less than 100 species have been seriously affected. In the rocky marine littoral of Lima, 175 marine invertebrate species are recorded, belonging to 126 genera, 76 families, 39 orders, and 11 Phyla; the majority were mollusks with 79 species, crustaceans 44 species, and polychaetes 30. On the rocky shore, there is a high diversity. In the mithilid communities and the community associated with the tubicolous polychaetae *Phragmatopoma merci* in particular, up to 87 species are present, excluding crusting bryozoans and nematodes [14]. On the sandy beach, it is common to find the Pacific sand crab (*Emerita analoga*) and the painted ghost crab (*Occipode gaudichaudi*). The most representative mammals are the South American sea lion (*Otaria flavescens*), the South American fur seal (*Arctocephalus australis*), and the marine otter (*Lontra felina*). In Peru, 500 species of birds inhabit marine and continental aquatic environments or are associated with them, which represents

about 27% of the total richness of birds in our country. Taking as a reference one of the closest inventories to the spill area, the Pantanos de Villa Wildlife Refuge, located south of Ventanilla, 211 bird species have been recorded: 97 residents, 82 Nearctic, austral, and Andean migrants, and 32 occasional visitors [15]. Álvarez and Iannacone (2008) report 78 species for the wetlands and beach of Ventanilla: 52 residents, 18 Nearctic migrants, three Andean migrants, two Antarctic migrants, and three occasional visitors. The effects of the contamination caused by the spill have resulted in the near total elimination of species in the impact area, mostly marine invertebrates such as sponges of the Porifera phyla, Pelecypods such as bivalves and polychaetes, and algae that usually inhabit the supralittoral, mesolittoral and infralittoral zones. The partial disappearance of species in the area, such as crustaceans with greater movement capacity, floating marine algae, and birds. And the displacement of species to places without contamination, such as the South American sea lion, which have managed to escape the effects of oil contamination due to their greater movement capacity. As for birds, the impact must be much greater because this is the migration season and about 60 species from the Nearctic Region, such as Laridae, Scolopacidae, and Charadriidae, are suffering the consequences of the contamination of habitats on the sea coast. The oil spill has had dire consequences for the biodiversity of this marine littoral zone, and many species are likely to reach their minimum population limits. Fifty days after the spill, it is estimated that close to 500 species of marine biodiversity have been affected, not counting fish and other benthic species. In addition, it is important to implement state rescue centers. The Forestry and Wildlife Service has transferred the specimens affected by the oil to the Parque de las Leyendas Zoo, where highly specialized personnel, such as biologists and veterinarians, have set up a rescue center. In this center, 989 birds have been recovered to date.

A regrettable aspect is the late reaction of the Ministry of Environment, starting with its highest authority, and this only occurred several days later, when through the media the oil spill was known by the entire population. The high-level officials of the Ministry of Environment are not recognized by the citizens as being committed to the defense of the environment and biodiversity. These officials are seen as bureaucrats behind a desk issuing ineffective regulations that contribute little or nothing to environmental remediation and recovery processes. In the first 30 days after the oil spill, three Ministers of the Environment were in charge of this portfolio, which demonstrates the inefficiency at this level of the State. Seven days after the oil spill on the Peruvian coast was reported, Ministerial Resolution 021-2022-MINAM was issued, declaring an environmental emergency in the geographic area comprising the coastal marine zone affected by the spill. This resolution approves the implementation of the Immediate and Short-Term Action Plan to address the environmental emergency in the affected geographic area, in charge of the public entities involved in its compliance, in coordination with the respective regional and local governments [5]. To this end, it is necessary that the General Directorate of the Coast Guard, the Ministry of

the Environment, and the Ministry of Agrarian Development and Irrigation develop protocols for the rescue and recovery of fauna and the opening and closing of ports. Oil spills affect human health depending on the type of oil and the amount spilled [16]. People cleaning up spills are at higher risk and may have skin and eye irritation, neurological problems, respiratory problems, and stress [17]. Therefore, cleanup activities should be carried out by trained personnel with the appropriate technology and personal protection to reduce all hazards associated with this activity. Repsol, the Ministry of the Environment, the Regional Government, the Provincial Municipality, and the District Municipality are the entities responsible for environmental cleanup and corrective measures in the event of an oil spill [18]. According to the Ministry of Production, there are 2,500 artisanal fishermen affected by the oil spill in part of the Peruvian coast and who will receive a bonus from the State amounting to 3,000 soles. Additionally, on February 10, the Environmental Evaluation and Control Agency, attached to the Peruvian Ministry of the Environment, imposed a penalty on Repsol amounting to 100 UIT, equivalent to S/ 460,000, for failure to identify the affected areas. In addition, in March, two new coercive penalties of US\$ 240,000 were imposed on Repsol for failing to comply with the administrative measures issued after the oil spill, bringing the total amount to be paid by the company to 1,380,000 soles (US\$358,800). OEFA has imposed 14 measures on Repsol to guarantee cleanup, proper management of solid waste, and rescue of contaminated fauna in the areas affected by the spill [19]. It is necessary to learn from this terrible disaster to avoid future inadequate actions by all private and state components in charge of the oil industry. In Peru, there are several regions with high environmental risk, including a Natural Gas Liquids Fractionation Plant near the Paracas National Reserve in Pisco, Ica. In this sense, compliance with the requirements of the environmental, economic, and social impact studies is necessary since they contribute to the exploitation of the oil industry to develop a climate of sustainability and sustainability [20].

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