

BAB III

MARINE POLLUTION AND ITS IMPACTS

The dangerous things always threatening environmental sustainability over times all over the world are the pollution and environmental destruction. The environmental pollution is defined by Prof. Munajat Danusaputra as a condition in which a material, energy, and or information are entering or entered naturally into certain basic limits or content that leads to environmental degradation, until it could not be able to hold its function properly looked in term of health, welfare, and biological safety.³⁴The pollution does not just happen in the land, but also often occur in environmental sea resulting from both onshore and offshore activities. The contaminants entering into marine ecosystem not only can directly damage the environmental sea itself, but further it might also be dangerous for food supply and marine habitat, which are a source of natural wealth of a country.

The pollution has considerably degraded the coastal and marine environment time by times. The contaminants entering into environmental sea will have a process in accordance with a marine condition at that surrounding place and time. The blend of these contaminants and natural condition will much influence the amount and scale of destruction. Meanwhile, the destruction of environmental sea greatly affects the marine economic sectors. When marine environment was threatened then people's economic and social life also probably might be in danger. Several marine pollution cases caused by both direct activities

³⁴ Abdurrahman (1990). Pengantar Hukum Lingkungan Indonesia Citra Aditya Bhakti Press: Bandung p. 98

in the territorial waters and the activities in the coastal region have occurred commonly all over the world and have threatened most coastal states. One of the most serious pollution cases for marine environment is the pollution caused by the oil spilling into waters sea.

A. Oil Pollution as One of Serious Threat to the Ocean

The oil and gas reserves contending within the seabed beside very profitable for a country it also becomes the source of various threats for the environmental sea that led to the potential risk for ecological loss. The ecological loss may probably create hazardous impacts toward both economic sectors and the existence of natural resources. The intensive shipping and exploration activity in the offshore areas has indirectly brought a lot of pollutions problems for both marine ecosystem and environmental sea itself.

The oil spilled by shipping and exploration activities had become one of the most serious threats to the oceans. At this time, the most dangerous contaminants and often polluting environmental sea is oil, for every year, three up to four millions ton of crude oil pollutes the environmental sea. Shipping activities had contributed for about 50 per cent of the oil spilling to the oceans, largely as the result of tank flushing, bilge pumping and tankers accident. The main route of marine transports from the Gulf crossing Arabian Sea has been frequently contributed accidental oil spill along the transport routes. Moreover, In the Pacific

Island Countries (PICs) marine pollution from shipping activities becomes a threat following the increase level of trade and economies development.³⁵

One of the most serious pollution cases that happened because of oil spill from oil shipping activities was the Exxon Valdes accident on March 24, 1989. That incident began when the oil tanker Exxon Valdes struck the Bligh Reef in western Prince William Sound, Alaska. At the time the oil slick had spread over 3,000 square miles and onto over 350 miles of beaches in Prince William Sound, one of the most pristine and magnificent natural areas in the country. That oil tanker had spilled between 11 and 34 million gallons of crude oil into the sea.

Apart from shipping activities, pollution of oil spill has also been contributed much by offshore petroleum and exploration activities. Large spills from oil tankers accident are the major sources of sudden pollution, but oil spill from offshore exploration also make major contribution to this marine problem, for even regular activities in the offshore environment potentially contribute significant amounts of oil pollution.³⁶

Nevertheless, the size of particular oil spill in the oceans is not always becoming appropriate indication of its ultimate impacts. However, some natural influences like combination of winds with the wave around the oceans will also much determine the volume of oil spill that flows over the waters area. The wider

³⁵ Coastal and marine areas: Asia and the Pacific. UNEP, Global Environment Outlook 3, London, p. 12

³⁶ Kemp. David. (2004). *Exploring Environmental Issues*. Routledge: London. p. 291-292

the oil spill covers the ocean, the larger the effects threaten the ecosystem within environmental sea itself.

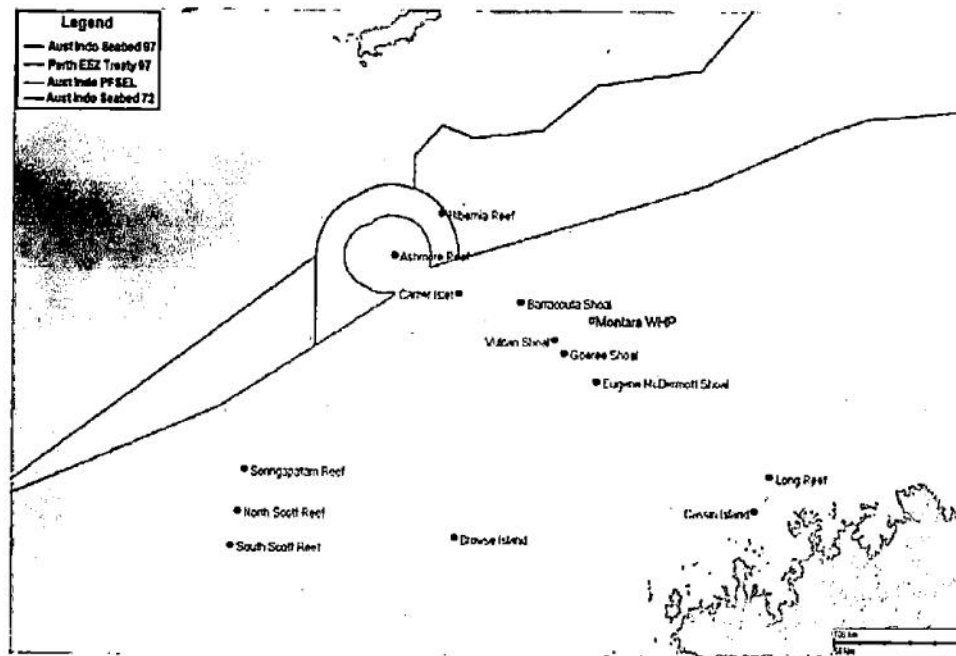
The ecological impacts created by this marine pollution certainly have economic implication for societies. The physical degradation for the coastal state significantly brings economic loss through the disruption of tourist industry. Moreover, the environmental sea degradation automatically harms marine ecosystem and biota within the sea. Those kinds of impacts may more or less influence fisheries activities in coastline areas. The decreasing fish catch might become one great loss for people who owe their livelihood from this fish-farming sector. This kinds of serious problem could be seen from several cases that already occurred in some previous marine pollution incidents.

One of recent cases of marine pollution caused by oil spill from offshore exploration activity was the explosion of deepwater oil Horizon drilling rig in the Gulf of Mexico on April 20th, 2010. It has been the largest accidental marine oil spill in the history of US petroleum industry. However, this case had found its completion followed by the payment of compensation claim demanded by United State government as the contaminated party by British Petroleum as an operator of that oil field. Meanwhile, the same case has also happened in the Timor Sea's water, with the explosion of Montara's oil field located within Australian territorial authority. Unfortunately, this marine pollution has not found its completion of several problems that emerged in the post-explosion.

B. Montara's Oil Spill in the Timor Sea

The case of oil and gas field's leakage in the offshore has been an accident that often occurs in hydrocarbon exploration projects. One of the recent cases is the explosion of one field including within Montara Development Projects in August. Actually, the Montara Development Project consists of four oil and gas fields namely Montara, Skua, Swift, and Swallow. Those four oil and gas fields, located in the Southern Timor Sea approximately 650 km west of Darwin, lied under the administration of the Northern Territory Department of Primary Industry Fisheries and Mines (NTDPIFM) within Australian territory. One of exploded field was Montara oil field located approximately 82 kilometers south west of the existing operation at Challis, the field that whose joint venture also participated by PTTEP Australasia, in about 80 meter of water.

Map 3: Map showing location of the Montara Well Head Platform (WHP) in the Timor Sea



This explosion led oil spilling over the Timor Sea as the leak initially issued from the Montara wellhead platform on August 21st, 2010. Furthermore, on August 24th, the oil from the spill was estimated to be 14 kilometers long and 30 meter wide and the spill continued to spread day by day. The Australian Maritime Safety Authority (AMSA) reported on September 3rd, 2009, that the slick was 170 kilometers from the coast of Western Australia and continued moving closer to the shore. Besides, the slick also reported to have spread over 6,000 square kilometer of ocean.³⁷

For this accident, Montara's operator issued early response in August 23rd, 2009 by spraying approximately 10,000 chemical dispersant into the parts of oil

³⁷ Opcit: Oil Leaking Five Times Faster than thought

spill from a Hercules aircraft. It aims to sink the oil spill that has flowed over the Timor Sea area. Moreover, to stop the leak of this oil well, PTTEP brought mobile offshore rig of Australia West Triton from Batam to the incident place. In November 1st 2009, the West Triton, mobile offshore rig, successfully drilled the relief well to clog the well leakage. During operation to close the leak by pumping heavy mud down the relief well, a fire suddenly flamed up from the H1 well in the wellhead platform. This incident caused a closing process suspended for several times. Finally, after pumping approximately 3,400 barrels of heavy mud down the relief well exactly in November 3, 2009 the leak could be stopped and the fire was extinguished.

However, even after the leak was plugged and the fire was extinguished, oil spill has already expanded because of the wind and wave in the Timor Sea area. According to the record of the Indonesia's Directorate of Marine Transportation on September 1st, whose ship was patrolling this contaminated regions, small patches weathered oil has been entering Indonesian Exclusive Economic Zone in position 110 50-LS, 1250 10-BT, exactly ten days after the explosion. A month after the explosion, the monitor of Department of transportation's *aerial surveillance* recorded most of the oil spill has been located at location 51 nautical miles southeast of the Island of Rote.³⁸ Meanwhile, Australian Maritime Safety Authority (AMSA) just announced its official reports to Indonesian Government four week after an explosion that volume of crude oil had already entered the Indonesian Exclusive Economic Zones. This report was

³⁸ Bencana Minyak di Laut Timor <http://www.gatra.com/artikel.php?id=131425>
Retrieved: November 25th, 2010

supported by the analysis of the NTT's Environmental Affairs Agency (BLHD NTT), based on laboratory test, confirms that Timor Sea waters has been contaminated with oil leaked from Montara oil field.

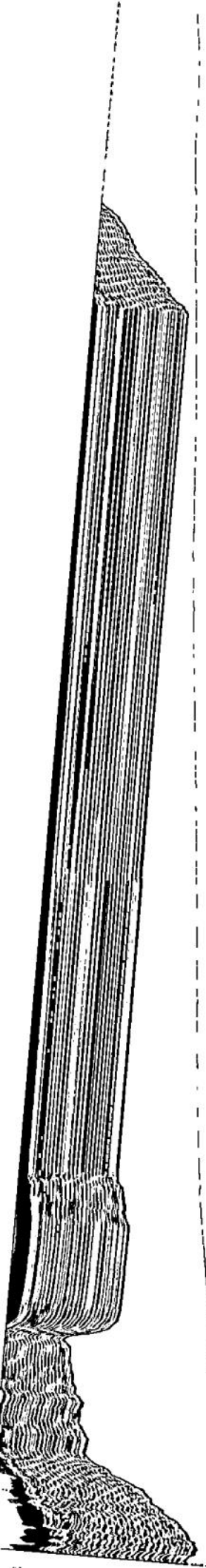
C. The Impacts of Oil Spill from Montara Explosion.

The marine pollution in the Timor Sea has the volume and widespread larger than the oil spill from both Exxon Valdez tanker on 1989 and the explosion of British Petroleum in the Gulf of Mexico on April 2010. At that time, Exxon Valdes accident had spilled 11 billion gallons crude oil in the Alaska waters whereas the leak in the Gulf of Mexico had spilled approximately 18-40 billion gallon of oil. The oil spill over Timor Sea certainly has impacts on many things such as toward the condition of marine environment, marine biota, and the lives of fishermen who do daily activities in those areas.

1. The impacts for environmental sea

Several effects of oil spilling over the sea actually could be seen clearly, as the beach might be uncomfortable to sea, the death of sea birds, fish and seashells. The changing characteristic of marine species or the ecological structure of marine ecosystem could be worried as long-term effect created by this oil spill problems.

Generally, oil spill in the sea may be classified into two types. First is the oil that soluble in water and would float upward the seawater surface. The second one is the oil that sinks below the surface and accumulates in the sediment as black deposit within the sand and rock in the beach. The oil floating over the water surface might certainly cause the changes of watercolor and would degrade



organism in the water surface. In addition, it might decrease the sunlight intensity entering the water sea used by phytoplankton to have a photosynthesis process. This effect will ultimately cut the food chain in that place as the productive standard of that area might be in decreasing level.

Meanwhile, for the oil sinking below the water and accumulate within the sediment as black deposit inside the sand and rock around the beach, it could potentially degrade the living organism in the tidal area. The damaged effects are, when the oil could reach the shoreline, the organism that are vulnerable to oil such as crab and reef will face an inhibition growth, or even mortality. Nonetheless, the following impacts were very serious such as the death and the reducing marine species. However oil spill could be cleaned naturally as the tidal area can commonly be recovered quickly by the wave possible to clean oil-contaminated area.

The oil spills in this Timor Sea continued spreading and brought hazardous impacts for the environmental sea even after Montara operator had successfully closed the leak. Oil that has already spilled into this Timor Sea continued to spread following the blowing of wind and waves in this area. In the post-explosion, oil spill from Montara's field that shed approximately 500,000/day liter crude oil mingled with gas, condensate, and lead with others chemical substances, has expanded, and flowed over Indonesian territorial waters. Australian Maritime Safety Authority also admitted the existence of that pollution and the oil spill that had destructed an area of 16, 420 square kilometer.

Some Biologists stated that the effects of the Montara oil spill could be really dangerous for marine ecosystem for its toxic effects on birds, coral and marine algae. The Wilderness Society, an Australian not-for-profit non-governmental environmental advocacy organization, described the Timor Sea area as “Marine Superhighway”, for a range of species including whales, dolphins, diverse and rare sea snakes and turtles were living in this area.³⁹ Those marine species observed in this area have been discovered for being at risk from the spill. Beside an absence of birds in the spill area, a lot of sick and dying marine life had had been seen here.

Relating to this disaster, the World Wildlife Fund Australia (WWF) has conducted a survey of the area affected by the oil spill. Some reports were announced by this NGO as hazardous impacts brought by this serious accident. Like what was said by WWF-Australia’s Director of Conservation Dr. Gilly Liewellin, who led the ecologist team in this survey:

“We recorded hundred of dolphins and sea birds in the oil slick area, as well as sea snakes and threatened hawksbill and flat-back turtles. Clearly, wildlife is dying and hundreds if not thousands of dolphins, seabirds and sea-snakes are being exposed to toxic oil. The critical issue is the long term impact of this slick on a rich marine ecosystem, taking into consideration the magnitude, extent, and duration of the event”⁴⁰

³⁹ Kimberley Oil spill – help us turn this disaster into greater protection for the Kimberley <http://www.wilderness.org.au/campaigns/kimberley/kimberley-oil-spill-help-us-turn-disaster-into-greater-protection> Retrieved: November 25th, 2010

⁴⁰ Expedition observes hundreds of marine creatures in oil slick <http://wwf.org.au/news/expedition-observes-hundreds-of-marine-creatures-in-oil-slick/> Retrieved: November 25th, 2010

During their expedition, WWF-Australia team discovered high level of mortality affected the marine biota in this area. Wildlife was dying and hundreds of dolphins, seabird, and sea snake were being exposed to toxic oil. In addition, marine turtles and many others species were swimming through the waters that have been polluted by this oil spill.

Overall, the expedition of WWF recorded that 17 species of seabirds, four species of cetacean and five marine reptiles including two species of marine turtle were found swimming over this area. At least eleven of the species were listed migratory, while hawksbill and flat-back turtles are listed as threatened there.⁴¹

In addition, the Coral Triangle conservation in this water area was also potentially being threatened by this oil spill. This conservation was a place for 500 species of reef-building coral that become a home to 3,000 species of coral fish and the some fish with its high commercial values. Marine animals such as whales, dolphins, and tuna breeding place, turtles, and sea birds were dead and polluted. Directly and indirectly this incident has affected the live of fishermen and coastal communities' life dependent on fishing and tourism industry. According to WWF-Indonesia, another loss is Indonesia's investment in marine protected areas which certainly need the high rehabilitation cost for the oil that has already infected the coral reef in Sawu sea. Apart from the survey of WWF, the facts were also raised by the fishermen who had done daily shipping in the waters around Indonesia. They have seen many dying fish floating over the waters surface around oil spill.

⁴¹ Ibid

2. The impact for people living around the sea

Certainly, the environmental sea degradation followed by the contaminated marine biota in this ocean could create many problems for the coastal communities who live in the surrounding of Timor Sea area for depending their live on fisheries and aquaculture sectors.

The changing environmental sea caused by marine pollution has influenced much to the human life in this coastal region. In this marine pollution case, with oil spill that has spread over the Timor Sea waters it more or less created great economic and social loss for the society.

Actually Ecological losses caused by marine pollution are difficult enough to be measured by money. Nevertheless, invisible economic impacts can be seen from the ruins of social activity and industry in the location around the polluted area in this Timor Sea. Nowadays, the fishermen have faced difficulty to catch the fish in this Timor Sea area and the fate of seaweed growers was increasingly squeezed. This pollution has already threatened Indonesian waters area around NTT provinces. The facts showed that this pollution have caused the decline in fish and seaweed production in several NTT'S districts such as Rote Ndao, Florest Timur, Timor Tengah Utara (TTU), Sabu Raijua and Timor Tengah Sealatan (TTS).

According to the reports from local government of Rote Ndao, the oil spill has been polluting about 56,440 square kilometers of Timor Sea area covering

inside Indonesian Exclusive Economic Zone.⁴² That spill had moved closer to 51 nautical miles from Rote island in the most southern of Indonesian regions and threatened marine biota in Indonesian waters, including seaweed that were cultivated on a large scale in this Rote Ndao.

The damaged marine ecosystem and the death of various kinds of marine biota had decreased fishermen and seaweed farmer's income in this area. The catch for about 4.914 fishermen in islands of Rote and Ndao was decreasing drastically.⁴³ In addition, the seaweed farmers are forced to hang a rope that was used to cultivate their seaweed. At the end of 2009 was a year of disaster for seaweed farmers by losing much of their crop. The contaminated water brought a pest disease for seaweed, which makes the stems and branches of that seaweed become whitish, and this situation forced the farmer to harvest their crops early, which in turn lowered the price of this seaweed.

Table 1: The Seaweed Production 2008-June 2010

No	Region	2008		2009		Mid-2010	
		Dried Seaweed	Wet Seaweed	Dried Seaweed	Wet Seaweed	Dried Seaweed	Wet Seaweed
1	Rote Ndao	7,334	-	1,512	-	341,4	-
2	Sabu Raijua	-	46,000	-	39,600	-	13,200

⁴² Pencemaran Rote Capai 56.440 km2 http://mirror.unpad.ac.id/koran/republika/2010-08-04/republika_2010-08-04_006.pdf Retrieved: December 15th, 2010

⁴³ *ibid*

Prior to the occurrence of pollution, the seaweed farmers in Route Ndao could produce about 7,334 ton dried seaweed per year. While in 2009 or after the pollution occurred in the Timor Sea, the production has decreased to 1,512 ton. Indeed until June 2010, dried seaweed production in Rote just reached 341,4 ton. In addition, by the contamination of farmer's seaweed crops it decreases the seaweed's market price drastically in the end of 2009. It can be seen from market price of the seaweed in Rote Ndao and Kupang that originally assessed standard of the lowest price ranged about 20,000 rupiah/kg and now down to only about 5,000/kg.⁴⁴ Meanwhile, in Sabu Raijua, wet-seaweed production that reaches 46,000 ton in 2008 and 39,600 ton in 2009, in January to June 2010 just reached 13,200 ton.⁴⁵

Table 2: The Fish Production 2008-June 2010

No	Region	2008		2009		Mid-2010	
		Catch fish	Marine fish production	Catch fish	Marine fish production	Catch fish	Marine fish production
1	TTU	939,7	-	589,25	-	147,31	-
2	TTS	-	18,541	-	7,020	-	1,063

Based on report of NTT's Fisheries and Marine Services, production of catch fish until June 2010 in TTU only achieve 147,31 ton, while in 2009 it

⁴⁴ Admin. Tumpahan minyak Montara terus Ancam Laut Timor. <http://www.goblue.or.id/tumpahan-minyak-montara-terus-ancam-laut-timor>
Retrieved: December 15th, 2010

⁴⁵ Opcit: Pencemaran Rote Capai 56.440 km²

reached 589,25 ton. The year of 2008 reached 939,7 ton. Meanwhile, in the coastal areas of TTS, marine fish production is currently only 1.063 ton. In the year of 2008 reached 18,541 tons, and in 2009 only 7020 tons.⁴⁶ Particularly for the decline of fish catch, this is much influenced by the change of large scale in fish migration route in the territorial waters of NTT, as its habit was polluted.

The fishermen that spend their daily sail in this waters area announced their discovered facts around October 2009. It was showing the dead fish caused by pollution were no longer limited on thousands of small fish and red snapper but more than that whale and dolphins also have been floating in this oil-contaminated waters area.⁴⁷ This pollution not only destructed the marine ecology but also threatened the fishermen. Moreover, the polluted area is a habitat for red snapper that become a sailing target of fishermen in the province of Kupang, East Nusa Tenggara.

The Timor Sea contamination was a major problem particularly for Rote Ndao, the region in the most southern part of this East Nusa Tenggara province that directly adjacent to Australian waters territory. The core problem is due to the limitation of this new expansion district to provide other new job fields than fisheries and agricultures sectors so that the majority of their peoples still depends their livelihood in this Timor Sea areas. The location of this Montara's field, whose share mostly is owned by Thailand former president, Thaksin Sinawatra,

⁴⁶ Opcit: Pencemaran Rote Capai 56.440 km2

⁴⁷ Ikan Paus dan Lumba-lumba Ikut Mati

http://www.nttprov.go.id/ntt_09/index.php?hal=tampilberita&id=UMU3765

Retrieved: December 21st, 1010

was closer to Ashmore Reef Island, a popular fishing location for many East Nusa Tenggara traditional fishermen. Fishermen in this area are reported to be going bankrupt because of the oil spill effects on fishing stocks. Declining fish catches forced thousands of fishermen to find new livelihoods as far away as the Bangka-Belitung Islands.

Beside threatening the economic sector of coastal communities, this marine pollution also brought serious impacts to the health of people around the Timor Sea area. Dead fish consumption by coastal communities potentially interfere the public health in the long term due to the contamination of water and marine biota in this water by dangerous substances contained in the oil that had spilled and expanded over the Timor Sea. East Nusa Tenggara legislative vice speaker Nelson Matara announced the serious impacts for NTT residents:

"We received reports the oil spill is getting closer to the Kolbano area in South Central Timor regency. Some residents were reportedly suffering from skin irritation and nausea after consuming fish. The issue is quite serious - the central government should take urgent steps to push Australia to clean up the mess,"⁴⁸

Some residents who had eaten this contaminated fish admitted to suffer diarrhea and skin problem. Even though the pollutant in this coastal East Nusa Tenggara regions was not seen clearly but the ship of fishermen in Papela, and Rote-Ndao, looks plastered by oil. Until now, the beaches in the Rote Ndao and Sabu Raijua, have not yet sterile from crude oil, so that the cultivated seaweed does not grow normally with maximum production.

⁴⁸ Fointuna, Yemris. Timor Sea oil spill Worsen, Indonesia sets up post. <http://wildsingaporenews.blogspot.com/2009/10/timor-sea-oil-spill-worsens-indonesia.html>
Retrieved: December 15th, 2010

The impacts of marine pollution by ultimate oil spill from Montara explosion was further compounded by the entry of dispersant substances, the chemicals that oil companies routinely use to break up oil slicks on water, sprayed by Australian Maritime Safety Authority to sink Montara's crude oil in the Timor Seawater surface. This substance is the most dangerous type of chemical powder in the world. In the same case of Exxon Valdez incident on 1989 in Alaska, this substance was also used as an effort to overcome oil spill in that water area. The previous case had showed the fact that this substance potentially create chronic effects toward physical health of population in Cordova (Alaska) that participated in cleaning up the crude oil in Alaska Sea. As said by Pamela Miller, Executive director of Alaska Community Action on Toxic,:

*"In Alaska, we have witnessed the long-term adverse health consequences of the use of dispersants on the health of cleanup workers. The indiscriminate use of toxic dispersants also threatens the health of subsistence and commercial fisheries that are essential to the culture and economy of Alaska."*⁴⁹

The worst possibility currently still haunts and threatens coastal communities in East Nusa Tenggara Province. However, the Montara's oil spill and the spraying of this dangerous chemical dispersant did not carry significant adverse impacts on the waters and coastal area in Western and Northern Australia. The impact of this field's explosion, operated within Australian territorial water has even more pronounced by Indonesian society in East Nusa Tenggara province. This occurs because at the time of Montara's explosion at Blok West

⁴⁹How Toxic are Oil Dispersants? Groups Press EPA to Find Out Before Next Spill
<http://www.commondreams.org/newswire/2010/10/13-6> Retrieved: January 7th, 2011

Atlas of Timor Sea, wind and wave flowing under the Timor Sea were tight turn from south to north towards Indonesian waters.

The impacts of this oil spill have created environmental and economic loss encouraging the coastal communities of NTT provinces to ask Government attention for handling the problem. In addition, several local NGOs also have moved on observing the impacts of this oil spill and demanding Indonesian Government responsibility to cope with this problem.