

Fact Sheet for Municipalities

Oil spills are ugly and are expensive to clean up. When oil enters the ocean it quickly begins to change and disperse. As time passes the oil weathers and will stick more and more firmly to rocks and sediment. Though oil is toxic, it becomes less so with time. Winds and waves help spread and disperse the oil. Some oil will evaporate. Some will form into tar balls and sink to the bottom where they may remain for a long time, slowly releasing hydrocarbons into the water. Bacteria in the water attack and digest the oil.

The 2006 spill in Lebanon is heavy fuel oil. This tends to form dense sticky substances, called tar balls and asphalt, when exposed to wind and sunlight that are very difficult to remove from rocks and sediment. So the earlier the clean up the better. If people act quickly after the spill, they can scoop up some of the oil and stop it from causing even more damage to the environment. Just removing the oil out of the environment is better than doing nothing.

The most important thing is to not allow oil to move back into the sea cycle and recontaminate. Contaminated sand and pebbles should be moved away as far as possible from wave action at high tide so it is not allowed to be taken back into the sea. It is important to store these contaminated material into confined areas where the oil will not be allowed to go back into the environment.

The short term effects of oil spills affect:

- Beaches: They become tarred.
- Wildlife: Oil is damaging to shellfish, fish, turtles, marine mammals and waterfowl that live next to the spill).
- Water: just one quart of oil may pollute up to 150,000 gallons of water).
- Fisheries: The oil can form a sort of seal on the surface of the water which will stop the re-oxygenation of the water and not allow sunlight to filter through the water. Fish will either leave that area or die from this. Damage to fisheries places a hardship on those who make their living by fishing.

Long term effects include:

- The bioaccumulation of the toxins in the food chain.
- Deadly materials which remain in the water for years (and may destroy the ecosystem).
- The adverse affects on human health through the carcinogenic components of the oil.

Each tier of the marine food chain can be affected by an oil spill. Oil floating on the water may contaminate plankton (very small, swimming or floating plants and animals). When small fish eat these plankton, they also eat the oil. Bigger fish, bears and humans who eat these fish will ingest oil too. Marine animals and birds can eat oil or it can get on their fur and feathers. When oil gets on a bird's feathers, the feathers lose their insulation capability and the bird can't adjust its body temperature and dies. Oil may obstruct the germination and growth of marine plants.

Cleaning Up Oil Spills

How the spill is cleaned up depends on where it happened. Shoreline clean up does not usually need specialized equipment. Reliance is on man power and available equipment. Good management and organization are the key to an effective cleanup. Uncoordinated clean ups usually result in inefficient uses of resources and may even cause more problems.

The clean up can be carried out in stages. The first stage is the removal of the heaviest accumulations (this type is difficult to degrade and it is persistent and can recontaminate or contaminate previously clean/cleaned areas), the second stage usually occurs when we are sure that no oil will recontaminate the shoreline. The third and most difficult is the final removal of all the traces of oil. If left these will naturally weather but in the mean time they will be eyesores.

Wherever a cleanup is carried out arrangements should be made for temporary storage of the recovered oil. Car parks are a good place for example. The waste should be separated into pure oil, oily sand and oily garbage.

It is important that all personnel working wear protective gear. Overalls (to protect their body), gloves and face masks (to protect from oil vapours) as well as hats (for sun protection).

- *Sand beaches:* All polluted sand needs to be removed. Man power with shovels can be used as well as mechanical means such as front end loaders. All sand removed needs to be stored away from wave action and from clean areas. Oil that is under the surface is exposed by using a rake to turn over the topsoil. Raking helps in natural degradation or bioremediation. Care needs to be taken not to remove clean sand and not to mix the oil deeper into the substrate.
- *Pebbly beaches:* All polluted pebbles need to be removed away from wave action and stored in a confined area.
- *Rocky beaches:* this is the hardest to clean and needs manual labour to scrub the rocks. High power water jets can be used and then absorbent sheets can be used to mop up residual oil. Pompoms and scrubbers can be used to scrub individual rocks. Pooled oil can be absorbed by absorbent sheets or removed using buckets or vacuums but it is important not to drip oil onto clean rocks. If the oil is firmly stuck to the rock high pressure hot water can be used or even sand blasting but this needs to be carefully monitored.
- *Cliffs:* A high pressure water hose can be used and this can also remove oil from underwater. If it is too powerful it might begin shipping away the rock so care must be taken on the pressure of the water. The runoff water must be collected as it is contaminated.
- *Ports:* The oil in inlets needs to be pumped out because it can accumulate and become very thick. Oil should be confined in the port (until it is removed) and so not allowed to move back into the sea using booms at the entrance of the port.

Oil floating on the surface can be held away from the shore by booms and cleared with skimmers. Booms are barriers that extend about three feet below the water surface. They are anchored near the shoreline. Booms intercept and contain the oil. These are easy to place and can help in absorbing a high quantity of oil that is still in the waves.

Skimmers, such as vacuum machines or oil absorbent plastic ropes, are placed inside the boom to scoop up the oil. Booms and fences are often of little use in the open seas. They cannot contain a spill when there are big waves or strong currents. Once the oil is whipped into a froth called a mousse, skimming is difficult.

Sometimes chemicals, known as dispersants, are used to speed the disposal of the oil into small globules that are more easily eaten by microorganisms. But these tend to be poisonous and dispersants are only really used on oil slicks in deep waters off land.

Sometimes these techniques cannot remove all the oil trapped under rocks or in beach sediments. A technique called bioremediation has worked to remove underlying oil. Bioremediation involves covering the oiled area with "fertilizers" that contain microorganisms, like bacteria. These microorganisms speed the natural degradation processes already at work. It is thought that the more microorganisms at work, the faster the oil will be removed. Bioremediation is less disruptive to the environment than other techniques. It simply improves on nature's own way of destroying oil.

Inspecting fish

Fish should be tested on a regular basis. All that has to be done is that sample fish are smelt and cut to see if they contain oil. A record should be kept of where polluted fish had been caught. The municipality can assign people to do this as a safety measure for people and a way to encourage people to know that the fish are healthy and can be eaten.

Swimming

Oil is toxic. It is important to inform people that they should not swim in water polluted with oil. They should also not tread on contaminated beaches as this might transfer oil from one polluted area to an uncontaminated area.

Contamination of groundwater or streams

It is very important to store anything polluted with oil in a safe and confined area. The rock type on the Lebanon is very porous limestone (mostly Sannine and Miocene formations) and if oil contamination occurs contaminating groundwater it is very difficult to clean and all springs in the area will be poisoned. This is why it is of the utmost importance that the municipality knows where the contaminated sand/items/rocks etc are being dumped. Throwing the oil into deep valleys or old quarries will only create another problem that will be even harder to clean up, probably even impossible.