



A Yukon Fish and Wildlife Management Board  
Series: The Impacts of Oil and Gas Industry  
Activity on Fish and Wildlife.

## Pollution and Toxicity



Photo: Ken Madsen

Old batteries, fuel containers, oil canisters and other waste. Prudhoe Bay Complex, Alaska.



Photo: Juri Peepre

Through erosion, waste from this old oil and gas company site is exposed to the Peel River.

## What causes pollution and toxicity?

There are many substances used in the oil and gas industry that can be harmful to fish and wildlife if they are not handled properly. This includes the oil or gas that is being extracted and transported to market.

The oil and gas industry produces a range of wastes, including empty chemical containers, oily rags and used filters, drilling fluids, produced water, elemental sulphur, tank bottom sludge, and contaminated soils.

Soil and water contaminants associated with oil and gas activity (especially oilfield wastes) are crude oil, salts, heavy metals and process chemicals.

Crude oil contamination can cause concern for a number of reasons. Some compounds that make up crude oil can dissolve in water. This means that if these compounds come in contact with water, they can travel through watercourses above and below the surface and be transported into other areas. Crude oil also contains compounds called "poly-aromatic hydrocarbons" (PAHs) that are toxic and can cause cancer.

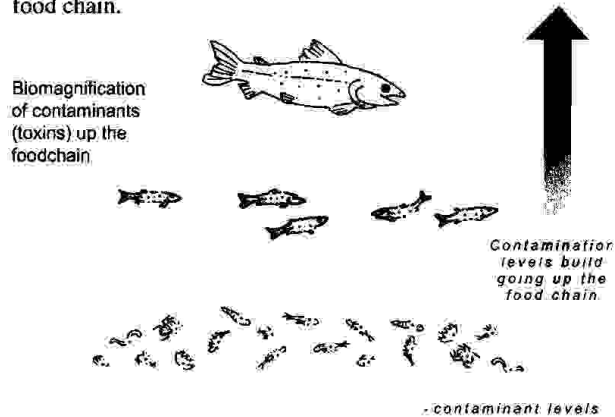
Crude oil and water produced in oil and gas production contain a lot of salt, which in high amounts can be harmful to fish, aquatic insects and plants. Salts can get into the environment through spills and leaks during drilling. However, unlike many other compounds salt can degrade over time.

Heavy metals can be harmful if they come into contact with fish or wildlife. Metals do not easily break down over time, and if they are not handled properly, they can be toxic and cancer-causing.

Process chemicals include compounds like drilling mud additives, lubricants, cleaning and degreasing compounds, and pesticides. If these chemicals come into contact with fish or wildlife, they can have a wide variety of impacts depending on the length of exposure, and the amount of chemical the animal is exposed to.

## What is Bio-Magnification?

Some compounds like poly-aromatic hydrocarbons and heavy metals can be absorbed or eaten by plants, insects, fish and other wildlife. Many of these compounds can not be broken down and disposed of by animals, but instead build up in their bodies. Over time these chemicals can be passed from animal to animal as one eats the other. Often the worst effects are seen at the top of the food chain.



## How do toxic compounds come into contact with fish and wildlife?

Toxic compounds can come into contact with fish and wildlife through spills, leaks and general mishandling. Here are some examples:

- Oil can get into the environment through oil spills and pipeline breaks.
- Salts can get into the environment through spills and leaks during drilling, the use of in-ground sumps, oil and produced water pipeline breaks, and land disposal of wastes and drilling muds.
- Heavy metals can get into the environment through spills and leaks during drilling, and during the processing stage of oil and gas production.

Remember, these compounds can only be toxic to fish and wildlife if they come into contact with them. Oil and gas companies that have strict policies about handling toxic compounds can minimize the amount of contact that occurs.

## Other Areas of Concern

- Seismic shotholes, if not plugged properly, can provide a path for contaminants at the surface to leak into the ground water, or for ground water to be released to the surface.
- Leaks and Spills of:
  - > Oils and other chemicals (like solvents) associated with motorized vehicles (running of, maintenance, cleaning); and
  - > Drilling fluids, hydrocarbons and water produced during drilling operations. Some drilling muds may contain additives that can be toxic if leaked or spilled.
- Leaks and Spills from:
  - > Disposal of waste chemicals, drilling muds and other compounds used in oil and gas activities;
  - > The operation of wells (drips and leaks at well heads, pipe connections and vehicle loading areas).
- Pipelines can directly expose plant, animal and aquatic life to hydrocarbon and salt contamination.
- Vandalism (people shooting at a pipeline or damaging it in another way) can result in leaks and spills
- Air quality
- Sour gas leaks can be fatal for animals exposed to the fumes. Low grade exposure to sour gas flares is suspected of causing human and animal health problems.

### Pollution and Toxicity

#### Key Issue:

Fish and Wildlife (including humans) can be poisoned by contaminants in soil or water from the oil and gas industry.

This information is taken from the Yukon Fish and Wildlife Management Board publication titled *The Effects of Oil and Gas Industry Activity on Fish and Wildlife: a review of selected literature*. To obtain a copy, call (867) 667-3754 or contact [www.vfwmb.vk.ca](http://www.vfwmb.vk.ca)