

## Table of Chemical Constituents Commonly Found in Crude Oil

This information is for environmental exposures. These constituents are present to some degree in all crude oil. Different types of oil, like light sweet crude oil, have different levels of these chemicals. If reported data indicate specific public health risks, CDC will develop and publish recommended steps to stop or reduce exposure.

Additional constituents may be added to this list as needed. For information on constituents of crude oil not listed here, go to: [http://www.osha.gov/dts/osta/otm/otm\\_iv/otm\\_iv\\_2.html](http://www.osha.gov/dts/osta/otm/otm_iv/otm_iv_2.html)

The cancer value for benzene is based on one excess cancer case in one million over a lifetime of exposure. For a complete toxic profile of each chemical in this chart, go to

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Chemical	What is being done to monitor exposures?	Routes of exposure and absorption	Acute (immediate) health risks	Chronic (long-term) health risks	Comparison Values: safe level for humans <sup>1, 2, 3</sup>	How to protect against exposure
<p><b>Benzene</b> Colorless, sweet-smelling liquid and vapor. Evaporates very quickly and dissolves slightly in water.</p>	Local Poison Control Centers and Health Departments are tracking calls related to potential exposures to this chemical, and several federal agencies, including the EPA, are taking frequent air and water samples.	Benzene vapors, (or fumes) can be inhaled and benzene can be consumed in contaminated food or water. It can also be absorbed through the skin. Benzene does not accumulate in significant amounts in the body.	Eating or drinking highly-contaminated food or water can cause vomiting, stomach irritation, dizziness, sleepiness, convulsions, rapid heart rate, and death. Inhaling low levels of benzene can irritate eyes, nose, throat and skin. People with chronic diseases such as asthma may be more sensitive to fumes.	Long-term exposure can adversely affect bone marrow and cause anemia, leukemia and death.	<p>In Air: 10 ug/m3 Chronic; 0.1 ug/m3 Cancer.</p> <p>In liquids: 5 ug/l Chronic; 0.6 ug/l Cancer.</p> <p>In Soil: 30 mg/kg Chronic; 10 mg/kg Cancer.</p>	If benzene is released into the air, leave the area. Avoid contact with contaminated water, soil or sediment.
<p><b>Hydrogen sulfide</b> Hydrogen sulfide is a poisonous, flammable, colorless gas that smells like rotten eggs. People usually can smell hydrogen sulfide at very low concentrations in air.</p>	Local Poison Control Centers and Health Departments are tracking calls related to potential exposures to this chemical, and several federal agencies, including the EPA, are taking frequent air and water samples.	Hydrogen sulfide can be inhaled or absorbed through the skin. In the body, hydrogen sulfide is primarily converted to sulfate and is excreted in the urine. Hydrogen sulfide is rapidly removed from the body.	Inhaling low levels concentrations of hydrogen sulfide can irritate the eyes, nose, or throat. People with chronic diseases such as asthma may have trouble breathing. Brief exposure to concentrations of hydrogen sulfide greater than 500 ppm can cause loss of consciousness. In many cases where people are removed from the exposure immediately, they regain consciousness without any other effects.	Chronic exposure to high levels may cause long-term or permanent effects including headaches, impaired attention span, memory, or motor function.	<p>In Air: No health effects have been found in humans exposed to typical environmental concentrations of hydrogen sulfide 0.2 -0.5 ug/m3).</p>	If hydrogen sulfide is released into the air, leave the area. Avoid contact with contaminated water, soil or sediment. Because the gas is heavier than oxygen, it hangs at low levels in the air, closer to the ground.

<sup>1</sup> The Minimal Risk Level (MRL) is an estimate of the daily human exposure to a hazardous substance that is likely to be without appreciable risk of adverse, non-cancer health effects over a specified duration of exposure. The information in this MRL serves as a screening tool to help public health professionals decide where to look more closely to evaluate possible risk of adverse health effects from human exposure. <sup>2</sup> Measures are calculated as ug(micrograms)/m3(meters cubed) in air; ug(micrograms)/(liter) in water; mg(milligrams)/kg(kilograms) in soil. <sup>3</sup> All comparison values in this table were calculated by the Agency for Toxic Substances and Disease Registry. The calculations for cancer values are based on National Academy of Sciences (NAS) assessment methods.

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<p><b>Ethyl benzene</b> Ethyl benzene is a colorless liquid. It is highly flammable and smells like gasoline. It is naturally found in coal tar and petroleum.</p>	Local Poison Control Centers and Health Departments are tracking calls related to potential exposures to this chemical, and several federal agencies, including the EPA, are taking frequent air and water samples.	Ethyl benzene can be inhaled, absorbed through the skin, or ingested in contaminated water.	Exposure to high levels of ethyl benzene in air for short periods can irritate eyes and throat. Exposure to higher levels can cause dizziness or vertigo.	Long term exposure has not been studied in humans.	<p>In air: 3,000 ug/m<sup>3</sup></p> <p>In water: 1,000 ug/l</p> <p>In soil: 5,000 ug/kg</p>	If ethyl benzene is released into the air, leave the area. Avoid contact with contaminated water.
<p><b>Toluene aka Methylbenzene</b> Toluene is a clear, colorless liquid and vapor that smells like gasoline. Toluene occurs naturally in crude oil.</p>	Local Poison Control Centers and Health Departments are tracking calls related to potential exposures to this chemical, and several federal agencies, including the EPA, are taking frequent air and water samples.	Toluene can be inhaled, absorbed through the skin, or ingested in contaminated water.	Short term exposure to low to moderate levels can cause tiredness, confusion, weakness, impaired memory or motor control, nausea, loss of appetite, loss of hearing and color vision. Inhaling high levels of toluene in a short time can make you feel light-headed, dizzy, or sleepy. It can also cause unconsciousness and may be fatal.	Long term exposure to toluene may affect the nervous system or kidneys.	<p>In air: 300 ug/m<sup>3</sup></p> <p>In water: 200 ug/l</p> <p>In soil: 1,000 mg/kg</p>	If toluene is released into the air, leave the area. Avoid contact with contaminated water, soil, or sediment.
<p><b>Xylene</b> Xylene is a colorless, sweet-smelling liquid and vapor. It is highly flammable and evaporates easily. It occurs naturally in petroleum and coal tar.</p>	Local Poison Control Centers and Health Departments are tracking calls related to potential exposures to this chemical, and several federal agencies, including the EPA, are taking frequent air and water samples.	Xylene can be inhaled, ingested in contaminated water and absorbed through the skin.	Short term exposure to high levels can cause headaches, lack of coordination, dizziness, confusion, and impaired balance. Such exposure can also irritate skin, eyes, nose, throat and stomach. Other symptoms may include breathing difficulties, especially in those with chronic lung problems. At very high levels, exposure may cause unconsciousness and death.	Symptoms may include impaired reaction time, concentration and memory, and changes in the liver and kidneys.	<p>In air: 3,000 ug/m<sup>3</sup></p> <p>In water: 2,000 ug/l</p> <p>In soil: 10,000 mg/kg</p>	If xylene is released into the air, leave the area. Avoid skin contact with tar, gasoline, paint varnish, shellac and contaminated water.

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<p><b>Naphthalene and Methylnaphthalene</b> Naphthalene is a colorless to white or brown solid or vapor that smells like mothballs. It evaporates quickly and dissolves in water. 1-Methylnaphthalene is a clear liquid and 2-Methylnaphthalene is a solid.</p>	Local Poison Control Centers and Health Departments are tracking calls related to potential exposures to this chemical, and several federal agencies, including the EPA, are taking frequent air and water samples.	Naphthalene can be inhaled, absorbed through the skin, or ingested through contaminated water.	Exposure to high levels of naphthalene can cause nausea, vomiting, diarrhea, blood in urine, rash and yellow skin. Exposure to extremely elevated levels (500 ppm) of airborne naphthalene can be fatal.	Long term exposure has been linked to hemolytic anemia, a disorder of red blood cells. Symptoms of this anemia include fatigue, lack of appetite, restlessness, and pale skin.	<p>In air: 3 ug/m<sup>3</sup></p> <p>In water: 700 ug/l</p> <p>In soil: 700 ug/kg</p>	If the concentration rises above (~1300 mg/m <sup>3</sup> ) in the air, leave the area. Avoid contact with contaminated water, soil and sediment.
<p><b>Generic alkanes (including octane, hexane, nonane)</b> Alkanes are colorless liquids or vapors that smell like gasoline. They are present in crude oil and petroleum products. They are highly flammable and evaporate easily.</p>	Local Poison Control Centers and Health Departments are tracking calls related to potential exposures to this chemical, and several federal agencies, including the EPA, are taking frequent air and water samples.	Alkanes can be inhaled, absorbed through the skin, or ingested in contaminated water.	Inhaling high levels of n-hexane (a specific type of medium-sized alkane), can cause numbness in the feet and hands and muscle weakness in the feet and lower legs. Inhaling high levels of some alkanes can cause asphyxiation.	Toxicity is dependent on type of alkane as well as route and duration of exposure. Long term exposure to n-hexane can causes weakness and loss of feeling in the arms and legs. In one study, exposed workers removed from the exposure site recovered in 6 months to a year.	<p>In air: 31,000 ug/m<sup>3</sup>*</p> <p>In water: 120,000 ug/l*</p> <p>In soil: 600 mg/kg*</p> <p>*Decane and white oil</p>	If generic alkanes are released into the air, leave the area. Avoid contact with contaminated water, soil or sediment.

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