

# RRT III Fact Sheet

[www.dot.gov/dotinfo/Uscg/lantarea/rrt/rrtmain.htm](http://www.dot.gov/dotinfo/Uscg/lantarea/rrt/rrtmain.htm)

## WHAT IS OIL?

**Different kinds of oil** - There are literally hundreds of different kinds of petroleum products that travel the oceans of the world in tankers and also transit U.S. coastal waters in tankers and barges. The proper identification of the specific kind of oil involved in a spill is one of the first tasks of effective spill response. *Sometimes this* is relatively straightforward samples of the oil can be taken from the tanker or barge involved. Other times it is not as straight forward and analyses need to be performed on the distinct product to determine detailed information about its physical and chemical properties.

### CRUDE OIL

The chemical composition and properties of crude oil from different regions of the world can vary tremendously. Even samples from within a particular oil-bearing geologic formation can vary. Crude oils contain literally hundreds of different chemical compounds depending on the unique geologic history involved in the formation a particular oil deposit. All crude oils contain light "fractions" similar to gasoline as well as heavier tars and waxes. Hydrocarbons are by far the most abundant compounds in crude oils, accounting for 50-98% , though most crude oil hydrocarbon content is in the higher range.

In addition to hydrocarbons, sulfur, nitrogen and oxygen compounds (often referred to as "NSO compounds") are important minor constituents. Crude oils also contain widely varying concentrations of trace metals including vanadium and nickel.

### REFINED PRODUCTS

There are hundreds of different substances derived from crude oil. They contain complex mixes of hydrocarbons and other elements. Refining processes and terminologies also vary throughout the world yielding a huge array of different substances. The final products will contain a subset of the chemicals from the crude oil but with a narrower range of activity. Some refining processes generate substances not found in the crude oil which will affect the fate of the substance in the environment.

**Gasolines - Lightweight** material that flows easily, spreads quickly and may evaporate completely in a few hours under temperate conditions. Gasoline spills can pose a risk of fire and explosion because of the product's high volatility of gasoline is more toxic than crude oil.

**Kerosene and Jet Fuels - Like** gasoline, kerosene and related jet fuels are still relatively lightweight materials that flow easily and can evaporate quickly. These substances may persist in the environment.

**No. 2 Fuel Oil - (Furnace, diesel, stove)** - Still considered "lightweight", but No. 2 oil is not volatile and will not generally form emulsions in water. Like gasoline and kerosene, the fuel oils tend to be non-persistent but are less flammable.

**No. 4. Fuel Oil (Industrial heating)** - A medium weight product, generally a mix of #2 and #4, that still flows easily and can be easily dispersed if acted on by wind, wave or current energy or chemically treated quickly under appropriate conditions.

**No. 6 Fuel Oil (Bunker C)** - a heavy product requiring preheating to use. This oil may be heavier than water, is not likely to dissolve and is difficult or impossible to disperse. It is likely to form tar balls, "pancakes", and emulsions in water. It may persist for long periods of time in the environment.

**Lubricating Oils** - a group of medium weight oils that have low volatility and can be fairly persistent in the environment.

**Group V Oils** - Group V oils have become more widely used by utilities due to their lower costs. These oils are generally similar to No. 6 fuel oils but contain heavier components that could lead to sinking under some situations. One Group V oil that is relatively new and being considered for use in the U.S. is Orimulsion. This oil is a water-Bitumen emulsion that has different properties due to the fact that it is pre-dispersed with a chemical surfactant. Orimulsion is classified as a Group V oil because of its non-floating tendencies.

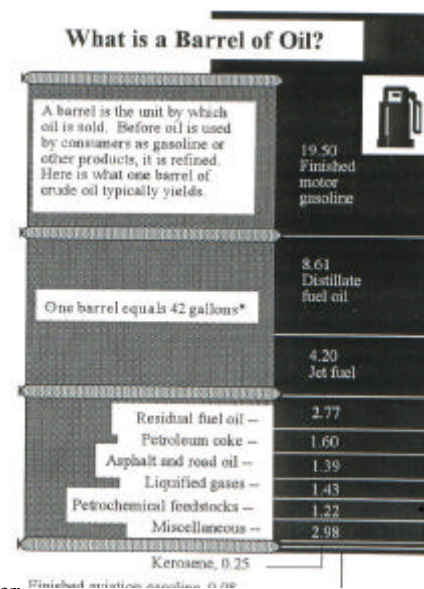
**Non-Petroleum/Edible Oils - Vegetable** or other food oils such as corn, palm, or soybean oil are often shipped in bulk and also may be of concern if spilled, especially to birds and wildlife that could be coated with the oil. These oils require cleanup the same as other NCP listed oils.

**Production and Consumption** - The U.S. has 22.5 billion barrels of oil reserve, ninth largest in the world, concentrated primarily in Texas, Alaska and California. The U.S. processed 9.8 million barrels per day of oil and consumed 17.7 million barrels of oil per day in 1995. This included 7.8 million barrels of motor gasoline, 3.2 million barrels of distilled fuel oils, 1.5 million barrels of jet fuel and 850,000 barrels of lower grade fuel oils. Demand is expected to increase in the future.

**Import and export** - The U.S. imports 49 % of all oil consumption. Slightly less than half of this came from OPEC nations. Overall, the top suppliers of oil to the U.S. in 1996 were Venezuela, Canada, Saudi Arabia and Mexico.

**Refining** - The U.S. has experienced a steep decline in refining capacity since 1981, with number of refineries falling from 324 to 204, representing a loss of 3 million barrels per day in refining capacity.

**Transportation - Total waterborne** commerce of the U. S. in 1994 was 2.2 billion tons, including 1.1 billion tons in foreign trade and 1.1 billion in domestic commerce. Of that 2.2 billion, 961 million tons was of petroleum and petroleum products. Of the 961 million tons, 540 million represented foreign commerce and 420 domestic. Breaking down the domestic traffic further, 250 million tons of petroleum products were carried via barge and 171 million tons via self-propelled traffic.



Finished aviation gasoline, 0.08

\*Note that 42 gallons of crude oil yields slightly more than 44 gallons of product, though nothing is added. The reason is that the density of the oil is reduced in the refining process. This is called the "processing gain".

Suggested References:

*Oil in the Sea*  
National Academy Press, 1985  
*National Response Team*  
[www.nrt.org/](http://www.nrt.org/).