

Corexit

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A U.S. Air Force Reserve plane sprays dispersants over the [Deepwater Horizon oil spill](#) in the Gulf of Mexico.

Corexit^[1] is a product line of [solvents](#) primarily used as a [dispersant](#) for breaking up [oil slicks](#). It is produced by [Nalco Holding Company](#) which is associated with [BP](#) and [Exxon](#).^[2] Corexit is the most-used dispersant in the [Deepwater Horizon oil spill](#) in the Gulf of Mexico, with COREXIT 9527 having been replaced by COREXIT 9500 after the former was deemed too toxic.^[3] Oil that would normally rise to the surface of the water is broken up by the dispersant into small globules that can then remain suspended in the water, potentially forming underwater plumes of oil.^[4]

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Use

Corexit was used during the 1989 [Exxon Valdez oil spill](#) disaster in Alaska. In 2010, **Corexit EC9500A** and **Corexit EC9527A** are being used in unprecedentedly large quantities in the [Deepwater Horizon oil spill](#).^[5]^[6] The [Environmental Protection Agency](#) (EPA) had pre-approved both forms of Corexit for uses in emergencies such as the Gulf oil spill.^[7]

On May 19, 2010 the EPA gave [BP](#) 24 hours to choose less toxic alternatives to Corexit, selected from the list of EPA-approved dispersants on the National Contingency Plan Product Schedule.^[8] and begin applying them within 72 hours of EPA approval of their choices, but BP refused to

change from Corexit, citing safety and availability concerns with alternatives.[9] Sea Brat 4, the only effective alternative that is available in quantities large enough for the spill and is less toxic, was rejected by BP because of the risk that components would break down into [nonylphenol](#), which persists in the environment and is toxic to marine life.[10]

BP had used Corexit EC9500A and Corexit EC9527A by late May, applying 800,000 US gallons (3,000,000 l) total,[11] but more accurate estimates run as high as 1,000,000 US gallons (3,800,000 l) underwater.[12] By late April 2010, Nalco, the maker of Corexit, says that it has been deploying only Corexit 9500.[13]

[\[edit\]](#) Composition

[\[edit\]](#) Corexit 9527

The proprietary composition is not public, but the manufacturer's own [safety data sheet](#) on Corexit EC9527A says the main components are [2-butoxyethanol](#) and a proprietary [organic sulfonate](#) with a small concentration of [propylene glycol](#).[\[14\]](#)[\[15\]](#)

[\[edit\]](#) Corexit 9500

In response to public pressure, the EPA and Nalco released the list of the six ingredients in Corexit 9500, revealing constituents including [sorbitan](#), [butanedioic acid](#), and [petroleum distillates](#).[\[3\]](#) Corexit EC9500A is mainly comprised of [hydrotreated](#) light petroleum distillates, [propylene glycol](#) and a proprietary organic [sulfonate](#).[\[16\]](#) Environmentalists also pressured Nalco to reveal to the public what concentrations of each chemical are in the product; Nalco considers that information to be a [trade secret](#), but has shared it with the EPA.[\[17\]](#) Propylene glycol is a chemical commonly used as a solvent or moisturizer in pharmaceuticals and cosmetics, and is of relatively low toxicity. An organic sulfonate (or organic sulfonic acid salt) is a synthetic chemical [detergent](#), that acts as a [surfactant](#) to [emulsify](#) oil and allow its dispersion into water. The identity of the sulfonate used in both forms of Corexit was disclosed to the EPA in June 2010, as [dioctyl sodium sulfosuccinate](#).[\[18\]](#)

[\[edit\]](#) Toxicity

The relative toxicity of Corexit and other dispersants are difficult to determine due to a scarcity of scientific data.[\[3\]](#) The manufacturer's safety data sheet states "No toxicity studies have been conducted on this product," and later concludes "The potential human hazard is: Low."[\[19\]](#) According to the manufacturer's website, workers applying Corexit should wear breathing protection and work in a ventilated area.[\[20\]](#) Compared with 12 other dispersants listed by the EPA, Corexit 9500 and 9527 are either similarly toxic or 10 to 20 times more toxic.[\[7\]](#) In another preliminary EPA study of eight different dispersants, Corexit 9500 was found to be less toxic to some marine life than other dispersants and to break down within weeks, rather than settling to the bottom of the ocean or collecting in the water.[\[21\]](#) None of the eight products tested are "without toxicity", according to an EPA administrator, and the ecological effect of mixing the dispersants with oil is unknown, as is the toxicity of the breakdown products of the dispersant.[\[21\]](#)

Corexit 9527, considered by the EPA to be an acute health hazard, is stated by its manufacturer to be potentially harmful to [red blood cells](#), the [kidneys](#) and the [liver](#), and may irritate eyes and skin.[\[22\]](#)[\[13\]](#) The chemical 2-butoxyethanol, found in Corexit 9527, was identified as having caused lasting health problems in workers involved in the cleanup of the Exxon Valdez oil spill.[\[23\]](#) According to the Alaska Community Action on Toxics, the use of Corexit during the Exxon Valdez oil spill caused people "respiratory, nervous system, liver, kidney and blood disorders".[\[15\]](#) Like 9527, 9500 can cause [hemolysis](#) (rupture of blood cells) and may also cause internal bleeding.[\[4\]](#)

According to the EPA, Corexit is more toxic than dispersants made by several competitors and less effective in handling southern Louisiana crude.[24] On May 20, 2010, the EPA ordered [BP](#) to look for less toxic alternatives to Corexit, and later ordered BP to stop spraying dispersants, but BP responded that it thought that Corexit was the best alternative and continued to spray it.[3]

Reportedly Corexit may be toxic to marine life and helps keep spilled oil submerged. There is concern that the quantities used in the Gulf will create 'unprecedented underwater damage to organisms.'[\[25\]](#) Nalco spokesman Charlie Pajor said that oil mixed with Corexit is "more toxic to marine life, but less toxic to life along the shore and animals at the surface" because the dispersant allows the oil to stay submerged below the surface of the water.[\[26\]](#) Corexit 9500 causes oil to form into small droplets in the water; fish may be harmed when they eat these droplets.[\[4\]](#) According to its [Material safety data sheet](#), Corexit may also [bioaccumulate](#), remaining in the flesh and building up over time.[\[27\]](#) Thus predators who eat smaller fish with the toxin in their systems may end up with much higher levels in their flesh.[\[4\]](#)

[\[edit\]](#) Effectiveness

The oil film will be dispersed in small droplets which intermix with the seawater. The oil is then not only distributed in two dimensions but is [dispersed](#) in three.

Corexit EC9500A (formerly called Corexit 9500) was 54.7% effective in handling Louisiana [crude](#), while Corexit EC9527A was 63.4% effective in handling the same oil.[\[28\]](#)[\[29\]](#) The EPA lists 12 other types of dispersants as being more effective in dealing with oil in a way that is safe for wildlife.[\[7\]](#) One of those tested was [Dispersit](#), which was 100% effective in dispersing Gulf oil and is less toxic to [silverfish](#) and [shrimp](#) than Corexit.[\[30\]](#)

[\[edit\]](#) Alternatives

UK authorities have an approved list of products which must pass both "sea/beach" and "rocky shore" laboratory toxicity tests, following a review of approval procedures over a decade ago.[\[31\]](#) Corexit did not pass the rocky shore test when submitted for renewal of its inclusion on the list, and was dropped. Although it has been omitted from the approved list since 1998, existing stocks which pre-date the removal may be permitted for use away from rocky shorelines, subject to prior approval.

Alternative dispersants which are approved by the EPA are listed on the National Contingency Plan Product Schedule[\[8\]](#) and rated for their toxicity and effectiveness.[\[32\]](#)

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