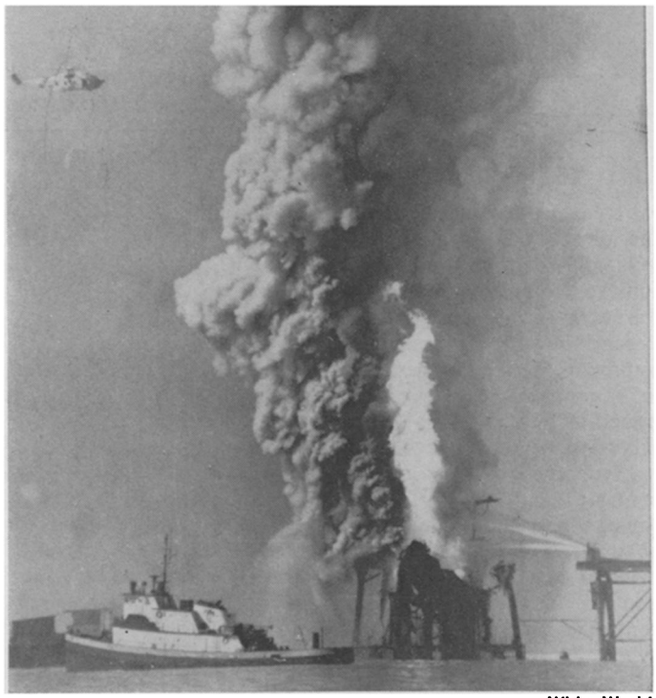
The long and short of the oil spills

Scientists discover lingering effects of oil spills as a well in Louisiana tests defenses



Wide World

Louisiana: With the fire out, a gusher in the sea.

Since the wreck of the tanker Torrey Canyon off the coast of England in 1967, and the Santa Barbara oil leak in 1969, scientific, official and public awareness of the seriousness of oil spills has grown. The problem has grown, too, as larger facilities are built both to produce and to transport the increasing volume of petroleum consumed throughout the world.

But effective methods of coping with oil spills are still lacking (SN: 2/29/69, p. 183), as are clear-cut guidelines for assigning liability and jurisdiction for cleanup. A Congressional conference committee worked toward a solution of the legal problems this week; at the same time one of the worst oil spills in history was in the making eight miles off the Louisiana coast, where several wells had been burning at a collection point since Feb. 10.

The fire, in fact, had been all that protected the Gulf Coast from the oil, consuming it as fast as it surfaced. But when the fire atop the Chevron Co. drilling platform in the Gulf of Mexico was blown out with a dynamite blast, at 11:27 A.M. Tuesday, a gusher of oil and gas 100 feet high erupted.

Chevron threw booms, skimmers and other equipment into action immediately, reporting that 20 percent of the oil was getting through the boom that served as the first line of defense. But officials believed they would be able to stop it before it got ashore. The Interior Department estimated the oil was flowing at a rate of 600 to 1,000 barrels a day, making the Louisiana spill bigger than the Santa Barbara leak. But Chevron officials hoped that the time they had had for advance preparation would make the disaster less serious.

Chevron had prepared, along the Louisiana shore as well as at sea, one of the largest and most expensive assemblages of men and equipment ever gathered for an oil spill. The company says it is using every technique known to try to prevent the oil's spread and to shut off the flow.

But such willingness to accept responsibility is not always the case. There was a serious question of liability after Santa Barbara, and the Senate-House conference committee discussing pollution control legislation this week sought to nail shut several loopholes. It gave tentative approval to a proposal that would assign nearly ironclad liability to a well or ship which is the source of an oil spill. This would amend a 1966 law, which insists on proof of willful negligence before liability can be assigned.

The amendments would also authorize money—$50 million in the Senate version and $20 million in the House version—for a revolving fund for the Interior Department's Federal Water Pollution Control Administration to use in dealing with oil spills. Replenishment of funds spent would come from judgments against polluters.

Other provisions would allow the President to clarify jurisdictional problems within the three-mile limit and extend Interior's authority over vessels beyond it.

The Interior Department now has jurisdiction for outer continental shelf drilling beyond the three-mile limit. After the Santa Barbara leak, Interior Secretary Walter Hickel used leasing laws as a basis for regulations which impose total liability, without a requirement for proof of negligence, for spills from these wells (SN: 3/1, p. 208). The Union Oil Co. and others have spent $5 million in cleanup since the Santa Barbara spill started.

Valuable as FWPCA officials believe these existing regulations to be—they apply in the Louisiana case—and as much as they want enactment of amendments along the lines of those considered by the conference committee, they are convinced that because of the drawbacks of cleanup methods, prevention will be the only ultimate remedy for oil pollution.

The spectacular Louisiana disaster is still at center stage, but research is under way which promises to overshadow any single oil spill in ecological importance.

The research, centered at Woods Hole Oceanographic Institution, shows already that effects of various fractions of petroleum on marine life systems are insidious, deadly and widespread, even months after a disaster is ostensibly over.

Dr. Max Blumer, Woods Hole chemist, reports that levels of certain hydrocarbons from a September spill at West Falmouth, Mass., are as high in sediments and organisms now as they were six months ago. These hydrocarbons are like chlorinated pesticides; they are not biodegradable, and they concentrate in organisms up the food chain.

Dr. Blumer is most concerned about the toxic aromatic hydrocarbons— containing closed rings—in petroleum and its products. Unlike other fractions, the aromatics—such as benzene, toluene and xylene—do not occur naturally in marine organisms, and bacteria which would degrade them have not evolved. Though such relatively volatile fractions might be expected to evaporate, Dr. Blumer has discovered them in the Sargassoc Sea, where tar balls that had

been in the ocean for long periods were discovered and analyzed. The aromatics are also more water-soluble than other hydrocarbons.

Although he regards the aromatics as the most toxic fractions, Dr. Blumer says all hydrocarbons are suspect and some are unexpectedly nondegradable. Paraffins—straight chain saturated hydrocarbons—degrade scarcely at all in sediments, although they degrade within organisms at rates not yet determined. They are also showing themselves to be unexpectedly toxic.

Hydrocarbons in general tend to concentrate in the fatty tissues of organisms, where they remain virtually unchanged by metabolic processes. By transfer from the fat of one organism to another, they can become more concentrated as they move up the food chain. Mechanisms of toxicity are not wholly understood, but the aromatics have been implicated as carcinogens. The paraffins cause damage through cell narcosis, especially in shrimp larvae and other juvenile organisms.

Olefins—unsaturated—hydrocarbons interfere with ecologic processes which use various chemicals in concentrations as small as one part per million for such functions as attracting predators to their prey

The olefins are generally absent from crude oil, but they are common in gasoline and other petroleum products, as well as in synthetic crude produced from coal or oil shale. "There is still a great mystery about the role that the olefinics play in marine life processes," Dr. Blumer says. "But even if they are nontoxic, they can interfere with these life processes."

Dr. Edward Goldberg of Scripps Institution of Oceanography confirms Dr. Blumer's conclusions. "The chronic buildup of pollutants from petroleum is quite serious," he says. Dr. Goldberg has done research in the transmittal of pesticides in the environment.

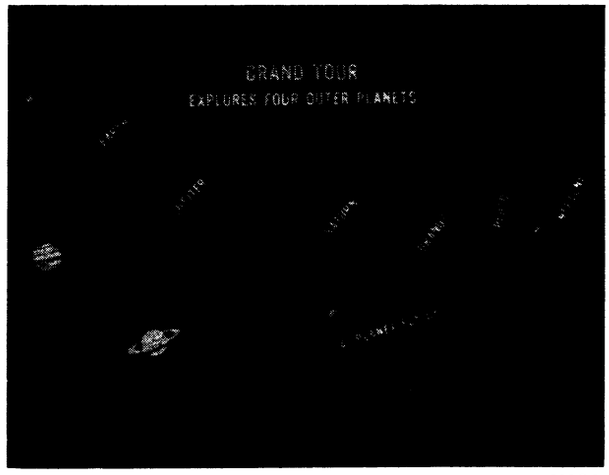
Woods Hole scientists plan further sampling, at various points in the open sea, to learn the extent of pollution farther from shore.

Dr. Blumer's work has concentrated on the more subtle biochemical effects of oil pollution. But the grosser effects have been known for a long time. Petroleum saturates the feathers of aquatic birds, reducing their buoyancy and water resistance and finally killing them.

The Interior Department reported last week that an estimated 10,000 birds had been killed along the shores of Alaska's Kodiak Island as a result of tankers pumping oily ballast out of their tanks into the sea. A sternly worded statement from Hickel indicated that he held this spill to be one that could have been avoided. □

SPACE MESSAGE

Reaching for the planets



NASA

To the outer planets: An earlier version planned to visit four.

With the first round of a continuing budget battle and the dedication of his Administration to environment, education and fiscal responsibility behind him, President Nixon last week turned to space. His promised space message (SN: 9/20, p. 233) was exactly what the scientists had ordered—not one present but a bundle full, largely unmanned.

The President, in deferring to the "many critical problems here on this planet which make high priority demands on our attention and resources," seemed to be trying to allay criticism of space-budget cuts by announcing that "by no means would we allow our space budget to stagnate."

The biggest plum was the first Presidential confirmation of a grand planetary tour: two unmanned cruises to the outer planets. One, aimed at Jupiter, Saturn and Pluto, is set for 1977. The second, to Jupiter, Uranus and Neptune, will go two years later. Such missions are the rare opportunity of this decade; it will be 180 years before the planets will be aligned again in such a way as to allow one vehicle to swing by each of them.

Scientists had been rather gloomy about the prospects of the grand tour idea. The date had not been mentioned in the National Aeronautics and Space Administration budget announced Jan. 31 by Administrator Dr. Thomas Paine. At that time Paine also inferred that neither the nuclear-powered vehicle NERVA, nor the Saturn 5 rocket, would be able to carry out the mission; the nuclear vehicle will not be flown until 1978, and production of the Saturn 5 rocket has been suspended. Now scheduled for the task is the Titan III-D Centaur-Burner II, which could carry a payload of about 1,600 pounds; the Saturn could carry 9,800 pounds.

Another theme that scientists have been pushing is greater emphasis on unmanned flights as precursors to manned missions. The President seemed to be going along with this idea, too. In particular, he did not set a firm date for a manned flight to Mars, although he said we will eventually, fly there. Dr. Paine says such a flight could not take place before the late 1980's.

Nevertheless, manned flights are the meat of the space program, and to support his contention that his program is "bold but balanced," the President emphasized the importance of the remaining manned lunar flights, to be completed with Apollo 19, according to NASA plans, by 1974. He also mentioned Skylab—the orbiting workshop of 1972—which will house several three-man crews for periods up to 56 days.

In addition, as his Space Task Group pointed out in its September report, unmanned planetary explorations, such as two planned Mars orbital flights in 1971, the two unmanned spacecraft landings on Mars in 1976, and the Venus-Mercury flyby in 1973, are all precursors of later manned missions.

Another aspect of President Nixon's space program is the much-touted possibility of gains from earth applications. The President went through the catalogue once more: communications, weather forecasting, low-cost space transportation, crop surveys, mineral location and the measuring of water supplies. Much of this work will be done by a variety of earth satellites which Mr. Nixon did not catalogue.

The President also made a traditional gesture to "greater international cooperation in space," a point backed up by Dr. Paine's recent trip to Canada, Japan and Australia to discuss cooperative space projects.